

COVER SHEET FOR PROPOSAL TO THE NATIONAL SCIENCE FOUNDATION

PROGRAM ANNOUNCEMENT/SOLICITATION NO./DUE DATE NSF 20-580 11/25/20		<input type="checkbox"/> Special Exception to Deadline Date Policy		FOR NSF USE ONLY NSF PROPOSAL NUMBER 2110178	
FOR CONSIDERATION BY NSF ORGANIZATION UNIT(S) (Indicate the most specific unit known, i.e. program, division, etc.) PHY - INTEGRATIVE ACTIVITIES IN PHYSICS, (continued)					
DATE RECEIVED 11/23/2020	NUMBER OF COPIES 1	DIVISION ASSIGNED 03010000 PHY	FUND CODE 9134	DUNS# (Data Universal Numbering System) 064234610	FILE LOCATION 12/02/2020 3:04am
EMPLOYER IDENTIFICATION NUMBER (EIN) OR TAXPAYER IDENTIFICATION NUMBER (TIN) 756000121		SHOW PREVIOUS AWARD NO. IF THIS IS <input type="checkbox"/> A RENEWAL <input type="checkbox"/> AN ACCOMPLISHMENT-BASED RENEWAL		IS THIS PROPOSAL BEING SUBMITTED TO ANOTHER FEDERAL AGENCY? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> IF YES, LIST ACRONYM(S)	
NAME OF ORGANIZATION TO WHICH AWARD SHOULD BE MADE University of Texas at Arlington		ADDRESS OF AWARDEE ORGANIZATION, INCLUDING 9 DIGIT ZIP CODE University of Texas at Arlington 701 S Nedderman Dr, Box 19145 Arlington, TX 760190145			
AWARDEE ORGANIZATION CODE (IF KNOWN) 0036566000					
NAME OF PRIMARY PLACE OF PERF University of Texas at Arlington		ADDRESS OF PRIMARY PLACE OF PERF, INCLUDING 9 DIGIT ZIP CODE University of Texas at Arlington TX 760190145 ,US.			
IS AWARDEE ORGANIZATION (Check All That Apply)		<input type="checkbox"/> SMALL BUSINESS <input type="checkbox"/> FOR-PROFIT ORGANIZATION		<input type="checkbox"/> MINORITY BUSINESS <input type="checkbox"/> WOMAN-OWNED BUSINESS <input type="checkbox"/> IF THIS IS A PRELIMINARY PROPOSAL THEN CHECK HERE	
TITLE OF PROPOSED PROJECT Collaborative Research: Neutrino Research Initiative for College Students (NRICoS)					
REQUESTED AMOUNT \$ 571,223	PROPOSED DURATION (1-60 MONTHS) 60 months	REQUESTED STARTING DATE 09/01/21	SHOW RELATED PRELIMINARY PROPOSAL NO. IF APPLICABLE		
THIS PROPOSAL INCLUDES ANY OF THE ITEMS LISTED BELOW			<input type="checkbox"/> BEGINNING INVESTIGATOR <input type="checkbox"/> DISCLOSURE OF LOBBYING ACTIVITIES <input type="checkbox"/> PROPRIETARY & PRIVILEGED INFORMATION <input type="checkbox"/> HISTORIC PLACES <input type="checkbox"/> VERTEBRATE ANIMALS IACUC App. Date _____ PHS Animal Welfare Assurance Number _____ <input checked="" type="checkbox"/> TYPE OF PROPOSAL Research		
PI/PD DEPARTMENT Physics		PI/PD POSTAL ADDRESS Office of Research Box 19145 Arlington, TX 760190145 United States			
PI/PD FAX NUMBER 817-272-2824					
NAMES (TYPED)	High Degree	Yr of Degree	Telephone Number	Email Address	
PI/PD NAME Jaehoon Yu	PhD	1993	817-272-2814	jaehoonyu@uta.edu	
CO-PI/PD Jonathan Asaadi	DSc	2005	817-272-2105	jonathan.asaadi@uta.edu	
CO-PI/PD Ramon Lopez	PhD	1986	817-272-0386	relopez@uta.edu	
CO-PI/PD					
CO-PI/PD					

CERTIFICATION PAGE

Certification for Authorized Organizational Representative (or Equivalent)

By electronically signing and submitting this proposal, the Authorized Organizational Representative (AOR) is: (1) certifying that statements made herein are true and complete to the best of his/her knowledge; and (2) agreeing to accept the obligation to comply with NSF award terms and conditions if an award is made as a result of this application. Further, the applicant is hereby providing certifications regarding conflict of interest (when applicable), flood hazard insurance (when applicable), responsible conduct of research and organizational support as set forth in the NSF Proposal & Award Policies & Procedures Guide (PAPPG). Willful provision of false information in this application and its supporting documents or in reports required under an ensuing award is a criminal offense (U.S. Code, Title 18, Section 1001).

Certification Regarding Conflict of Interest

The AOR is required to complete certifications stating that the organization has implemented and is enforcing a written policy on conflicts of interest (COI), consistent with the provisions of PAPPG Chapter IX.A.; that, to the best of his/her knowledge, all financial disclosures required by the conflict of interest policy were made; and that conflicts of interest, if any, were, or prior to the organization's expenditure of any funds under the award, will be, satisfactorily managed, reduced or eliminated in accordance with the organization's conflict of interest policy. Conflicts that cannot be satisfactorily managed, reduced or eliminated and research that proceeds without the imposition of conditions or restrictions when a conflict of interest exists, must be disclosed to NSF via use of the Notifications and Requests Module in FastLane.

Certification Regarding Flood Hazard Insurance

Two sections of the National Flood Insurance Act of 1968 (42 USC §4012a and §4106) bar Federal agencies from giving financial assistance for acquisition or construction purposes in any area identified by the Federal Emergency Management Agency (FEMA) as having special flood hazards unless the:

- (1) community in which that area is located participates in the national flood insurance program; and
- (2) building (and any related equipment) is covered by adequate flood insurance.

By electronically signing the Certification Pages, the Authorized Organizational Representative (or equivalent) located in FEMA-designated special flood hazard areas is certifying that adequate flood insurance has been or will be obtained in the following situations:

- (1) for NSF grants for the construction of a building or facility, regardless of the dollar amount of the grant; and
- (2) for other NSF grants when more than \$25,000 has been budgeted in the proposal for repair, alteration or improvement (construction) of a building or facility.

Certification Regarding Responsible Conduct of Research (RCR)

(This certification is not applicable to proposals for conferences, symposia, and workshops.)

By electronically signing the Certification Pages, the Authorized Organizational Representative is certifying that, in accordance with the NSF Proposal & Award Policies & Procedures Guide, Chapter IX.B., the institution has a plan in place to provide appropriate training and oversight in the responsible and ethical conduct of research to undergraduates, graduate students and postdoctoral researchers who will be supported by NSF to conduct research. The AOR shall require that the language of this certification be included in any award documents for all subawards at all tiers.

Certification Regarding Organizational Support

By electronically signing the Certification Pages, the Authorized Organizational Representative (or equivalent) is certifying that there is organizational support for the proposal as required by Section 526 of the America COMPETES Reauthorization Act of 2010. This support extends to the portion of the proposal developed to satisfy the Broader Impacts Review Criterion as well as the Intellectual Merit Review Criterion, and any additional review criteria specified in the solicitation. Organizational support will be made available, as described in the proposal, in order to address the broader impacts and intellectual merit activities to be undertaken.

Certification Regarding Dual Use Research of Concern

By electronically signing the certification pages, the Authorized Organizational Representative is certifying that the organization will be or is in compliance with all aspects of the United States Government Policy for Institutional Oversight of Life Sciences Dual Use Research of Concern.

AUTHORIZED ORGANIZATIONAL REPRESENTATIVE	SIGNATURE	DATE
NAME Sarah R Panepinto	Electronic Signature	Nov 23 2020 1:11PM
TELEPHONE NUMBER 817-272-0243	EMAIL ADDRESS spanepin@exchange.uta.edu	FAX NUMBER 817-272-5808

COVER SHEET FOR PROPOSAL TO THE NATIONAL SCIENCE FOUNDATION

FOR CONSIDERATION BY NSF ORGANIZATION UNIT(S) - continued from page 1
(Indicate the most specific unit known, i.e. program, division, etc.)

PHY - INTEGRATIVE ACTIVITIES IN PHYSICS

COVER SHEET FOR PROPOSAL TO THE NATIONAL SCIENCE FOUNDATION

PROGRAM ANNOUNCEMENT/SOLICITATION NO./DUE DATE NSF 20-580 11/25/20		<input type="checkbox"/> Special Exception to Deadline Date Policy			FOR NSF USE ONLY NSF PROPOSAL NUMBER
FOR CONSIDERATION BY NSF ORGANIZATION UNIT(S) (Indicate the most specific unit known, i.e. program, division, etc.) PHY - HEP-High Energy Physics					2110022
DATE RECEIVED 11/20/2020	NUMBER OF COPIES 1	DIVISION ASSIGNED 03010000 PHY	FUND CODE 1221	DUNS# (Data Universal Numbering System) 073171951	FILE LOCATION 12/02/2020 3:04am
EMPLOYER IDENTIFICATION NUMBER (EIN) OR TAXPAYER IDENTIFICATION NUMBER (TIN) 750851900		SHOW PREVIOUS AWARD NO. IF THIS IS <input type="checkbox"/> A RENEWAL <input type="checkbox"/> AN ACCOMPLISHMENT-BASED RENEWAL		IS THIS PROPOSAL BEING SUBMITTED TO ANOTHER FEDERAL AGENCY? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> IF YES, LIST ACRONYM(S)	
NAME OF ORGANIZATION TO WHICH AWARD SHOULD BE MADE Abilene Christian University		ADDRESS OF AWARDEE ORGANIZATION, INCLUDING 9 DIGIT ZIP CODE Abilene Christian University ACU Box 29103 Abilene, TX 796999103			
AWARDEE ORGANIZATION CODE (IF KNOWN) 0035378000					
NAME OF PRIMARY PLACE OF PERF Abilene Christian University		ADDRESS OF PRIMARY PLACE OF PERF, INCLUDING 9 DIGIT ZIP CODE Abilene Christian University 1600 Campus Crt Abilene ,TX ,796990001 ,US.			
IS AWARDEE ORGANIZATION (Check All That Apply)		<input type="checkbox"/> SMALL BUSINESS <input type="checkbox"/> FOR-PROFIT ORGANIZATION		<input type="checkbox"/> MINORITY BUSINESS <input type="checkbox"/> WOMAN-OWNED BUSINESS	
				<input type="checkbox"/> IF THIS IS A PRELIMINARY PROPOSAL THEN CHECK HERE	
TITLE OF PROPOSED PROJECT Collaborative Research: Neutrino Research Initiative for College Students (NRICoS)					
REQUESTED AMOUNT \$ 326,481	PROPOSED DURATION (1-60 MONTHS) 60 months	REQUESTED STARTING DATE 09/01/21	SHOW RELATED PRELIMINARY PROPOSAL NO. IF APPLICABLE		
THIS PROPOSAL INCLUDES ANY OF THE ITEMS LISTED BELOW		<input type="checkbox"/> BEGINNING INVESTIGATOR <input type="checkbox"/> DISCLOSURE OF LOBBYING ACTIVITIES <input type="checkbox"/> PROPRIETARY & PRIVILEGED INFORMATION <input type="checkbox"/> HISTORIC PLACES <input type="checkbox"/> VERTEBRATE ANIMALS IACUC App. Date _____ PHS Animal Welfare Assurance Number _____ <input checked="" type="checkbox"/> TYPE OF PROPOSAL Research			
		<input type="checkbox"/> HUMAN SUBJECTS Human Subjects Assurance Number _____ Exemption Subsection _____ or IRB App. Date _____ <input type="checkbox"/> FUNDING OF INT'L BRANCH CAMPUS OF U.S IHE <input type="checkbox"/> FUNDING OF FOREIGN ORG <input checked="" type="checkbox"/> INTERNATIONAL ACTIVITIES: COUNTRY/COUNTRIES INVOLVED XX <input checked="" type="checkbox"/> COLLABORATIVE STATUS A collaborative proposal from multiple organizations (PAPPG II.D.3.b)			
PI/PD DEPARTMENT Engineering and Physics	PI/PD POSTAL ADDRESS ACU Box 27963 Abilene, TX 796990001 United States				
PI/PD FAX NUMBER					
NAMES (TYPED)	High Degree	Yr of Degree	Telephone Number	Email Address	
PI/PD NAME Larry Isenhower	PhD	2010	325-674-2165	ldi00a@acu.edu	
CO-PI/PD					

CERTIFICATION PAGE

Certification for Authorized Organizational Representative (or Equivalent)

By electronically signing and submitting this proposal, the Authorized Organizational Representative (AOR) is: (1) certifying that statements made herein are true and complete to the best of his/her knowledge; and (2) agreeing to accept the obligation to comply with NSF award terms and conditions if an award is made as a result of this application. Further, the applicant is hereby providing certifications regarding conflict of interest (when applicable), flood hazard insurance (when applicable), responsible conduct of research and organizational support as set forth in the NSF Proposal & Award Policies & Procedures Guide (PAPPG). Willful provision of false information in this application and its supporting documents or in reports required under an ensuing award is a criminal offense (U.S. Code, Title 18, Section 1001).

Certification Regarding Conflict of Interest

The AOR is required to complete certifications stating that the organization has implemented and is enforcing a written policy on conflicts of interest (COI), consistent with the provisions of PAPPG Chapter IX.A.; that, to the best of his/her knowledge, all financial disclosures required by the conflict of interest policy were made; and that conflicts of interest, if any, were, or prior to the organization's expenditure of any funds under the award, will be, satisfactorily managed, reduced or eliminated in accordance with the organization's conflict of interest policy. Conflicts that cannot be satisfactorily managed, reduced or eliminated and research that proceeds without the imposition of conditions or restrictions when a conflict of interest exists, must be disclosed to NSF via use of the Notifications and Requests Module in FastLane.

Certification Regarding Flood Hazard Insurance

Two sections of the National Flood Insurance Act of 1968 (42 USC §4012a and §4106) bar Federal agencies from giving financial assistance for acquisition or construction purposes in any area identified by the Federal Emergency Management Agency (FEMA) as having special flood hazards unless the:

- (1) community in which that area is located participates in the national flood insurance program; and
- (2) building (and any related equipment) is covered by adequate flood insurance.

By electronically signing the Certification Pages, the Authorized Organizational Representative (or equivalent) located in FEMA-designated special flood hazard areas is certifying that adequate flood insurance has been or will be obtained in the following situations:

- (1) for NSF grants for the construction of a building or facility, regardless of the dollar amount of the grant; and
- (2) for other NSF grants when more than \$25,000 has been budgeted in the proposal for repair, alteration or improvement (construction) of a building or facility.

Certification Regarding Responsible Conduct of Research (RCR)

(This certification is not applicable to proposals for conferences, symposia, and workshops.)

By electronically signing the Certification Pages, the Authorized Organizational Representative is certifying that, in accordance with the NSF Proposal & Award Policies & Procedures Guide, Chapter IX.B., the institution has a plan in place to provide appropriate training and oversight in the responsible and ethical conduct of research to undergraduates, graduate students and postdoctoral researchers who will be supported by NSF to conduct research. The AOR shall require that the language of this certification be included in any award documents for all subawards at all tiers.

Certification Regarding Organizational Support

By electronically signing the Certification Pages, the Authorized Organizational Representative (or equivalent) is certifying that there is organizational support for the proposal as required by Section 526 of the America COMPETES Reauthorization Act of 2010. This support extends to the portion of the proposal developed to satisfy the Broader Impacts Review Criterion as well as the Intellectual Merit Review Criterion, and any additional review criteria specified in the solicitation. Organizational support will be made available, as described in the proposal, in order to address the broader impacts and intellectual merit activities to be undertaken.

Certification Regarding Dual Use Research of Concern

By electronically signing the certification pages, the Authorized Organizational Representative is certifying that the organization will be or is in compliance with all aspects of the United States Government Policy for Institutional Oversight of Life Sciences Dual Use Research of Concern.

AUTHORIZED ORGANIZATIONAL REPRESENTATIVE	SIGNATURE	DATE
NAME Megan Roth	Electronic Signature	Nov 20 2020 10:17AM
TELEPHONE NUMBER 325-674-2885	EMAIL ADDRESS mkr15a@acu.edu	FAX NUMBER 325-674-6785

COVER SHEET FOR PROPOSAL TO THE NATIONAL SCIENCE FOUNDATION

PROGRAM ANNOUNCEMENT/SOLICITATION NO./DUE DATE NSF 20-580 11/25/20		<input type="checkbox"/> Special Exception to Deadline Date Policy		FOR NSF USE ONLY NSF PROPOSAL NUMBER 2109969	
FOR CONSIDERATION BY NSF ORGANIZATION UNIT(S) (Indicate the most specific unit known, i.e. program, division, etc.) PHY - INTEGRATIVE ACTIVITIES IN PHYSICS, (continued)					
DATE RECEIVED 11/19/2020	NUMBER OF COPIES 1	DIVISION ASSIGNED 03010000 PHY	FUND CODE 9134	DUNS# (Data Universal Numbering System) 068979848	FILE LOCATION 12/02/2020 3:04am
EMPLOYER IDENTIFICATION NUMBER (EIN) OR TAXPAYER IDENTIFICATION NUMBER (TIN) 756002618		SHOW PREVIOUS AWARD NO. IF THIS IS <input type="checkbox"/> A RENEWAL <input type="checkbox"/> AN ACCOMPLISHMENT-BASED RENEWAL		IS THIS PROPOSAL BEING SUBMITTED TO ANOTHER FEDERAL AGENCY? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> IF YES, LIST ACRONYM(S)	
NAME OF ORGANIZATION TO WHICH AWARD SHOULD BE MADE Texas Woman's University		ADDRESS OF Awardee ORGANIZATION, INCLUDING 9 DIGIT ZIP CODE Texas Woman's University BOX 425619 T W U STATION Denton, TX 762045619			
AWARDEE ORGANIZATION CODE (IF KNOWN) 0036467000					
NAME OF PRIMARY PLACE OF PERF Texas Woman's University		ADDRESS OF PRIMARY PLACE OF PERF, INCLUDING 9 DIGIT ZIP CODE Texas Woman's University PO Box 425619 Denton ,TX ,762045619 ,US.			
IS Awardee ORGANIZATION (Check All That Apply)		<input type="checkbox"/> SMALL BUSINESS <input type="checkbox"/> FOR-PROFIT ORGANIZATION		<input type="checkbox"/> MINORITY BUSINESS <input type="checkbox"/> WOMAN-OWNED BUSINESS <input type="checkbox"/> IF THIS IS A PRELIMINARY PROPOSAL THEN CHECK HERE	
TITLE OF PROPOSED PROJECT Collaborative Research: Neutrino Research Initiative for College Students (NRICoS)					
REQUESTED AMOUNT \$ 350,456	PROPOSED DURATION (1-60 MONTHS) 60 months	REQUESTED STARTING DATE 09/01/21	SHOW RELATED PRELIMINARY PROPOSAL NO. IF APPLICABLE		
THIS PROPOSAL INCLUDES ANY OF THE ITEMS LISTED BELOW			<input type="checkbox"/> HUMAN SUBJECTS Human Subjects Assurance Number _____ <input type="checkbox"/> Disclosure of LOBBYING ACTIVITIES Exemption Subsection _____ or IRB App. Date _____ <input type="checkbox"/> PROPRIETARY & PRIVILEGED INFORMATION <input type="checkbox"/> HISTORIC PLACES <input type="checkbox"/> VERTEBRATE ANIMALS IACUC App. Date _____ PHS Animal Welfare Assurance Number _____ <input checked="" type="checkbox"/> TYPE OF PROPOSAL Research <input type="checkbox"/> COLLABORATIVE STATUS A collaborative proposal from multiple organizations (PAPPG II.D.3.b)		
PI/PD DEPARTMENT Chemistry and Biochemistry	PI/PD POSTAL ADDRESS BOX 425619 T W U STATION Research & Sponsored Programs Denton, TX 762045619 United States				
NAMES (TYPED)	High Degree	Yr of Degree	Telephone Number	Email Address	
PI/PD NAME Nasrin Mirsaleh Kohan	DPhil	2008	940-898-3375	nmirsalehkohan@twu.edu	
CO-PI/PD					

CERTIFICATION PAGE

Certification for Authorized Organizational Representative (or Equivalent)

By electronically signing and submitting this proposal, the Authorized Organizational Representative (AOR) is: (1) certifying that statements made herein are true and complete to the best of his/her knowledge; and (2) agreeing to accept the obligation to comply with NSF award terms and conditions if an award is made as a result of this application. Further, the applicant is hereby providing certifications regarding conflict of interest (when applicable), flood hazard insurance (when applicable), responsible conduct of research and organizational support as set forth in the NSF Proposal & Award Policies & Procedures Guide (PAPPG). Willful provision of false information in this application and its supporting documents or in reports required under an ensuing award is a criminal offense (U.S. Code, Title 18, Section 1001).

Certification Regarding Conflict of Interest

The AOR is required to complete certifications stating that the organization has implemented and is enforcing a written policy on conflicts of interest (COI), consistent with the provisions of PAPPG Chapter IX.A.; that, to the best of his/her knowledge, all financial disclosures required by the conflict of interest policy were made; and that conflicts of interest, if any, were, or prior to the organization's expenditure of any funds under the award, will be, satisfactorily managed, reduced or eliminated in accordance with the organization's conflict of interest policy. Conflicts that cannot be satisfactorily managed, reduced or eliminated and research that proceeds without the imposition of conditions or restrictions when a conflict of interest exists, must be disclosed to NSF via use of the Notifications and Requests Module in FastLane.

Certification Regarding Flood Hazard Insurance

Two sections of the National Flood Insurance Act of 1968 (42 USC §4012a and §4106) bar Federal agencies from giving financial assistance for acquisition or construction purposes in any area identified by the Federal Emergency Management Agency (FEMA) as having special flood hazards unless the:

- (1) community in which that area is located participates in the national flood insurance program; and
- (2) building (and any related equipment) is covered by adequate flood insurance.

By electronically signing the Certification Pages, the Authorized Organizational Representative (or equivalent) located in FEMA-designated special flood hazard areas is certifying that adequate flood insurance has been or will be obtained in the following situations:

- (1) for NSF grants for the construction of a building or facility, regardless of the dollar amount of the grant; and
- (2) for other NSF grants when more than \$25,000 has been budgeted in the proposal for repair, alteration or improvement (construction) of a building or facility.

Certification Regarding Responsible Conduct of Research (RCR)

(This certification is not applicable to proposals for conferences, symposia, and workshops.)

By electronically signing the Certification Pages, the Authorized Organizational Representative is certifying that, in accordance with the NSF Proposal & Award Policies & Procedures Guide, Chapter IX.B., the institution has a plan in place to provide appropriate training and oversight in the responsible and ethical conduct of research to undergraduates, graduate students and postdoctoral researchers who will be supported by NSF to conduct research. The AOR shall require that the language of this certification be included in any award documents for all subawards at all tiers.

Certification Regarding Organizational Support

By electronically signing the Certification Pages, the Authorized Organizational Representative (or equivalent) is certifying that there is organizational support for the proposal as required by Section 526 of the America COMPETES Reauthorization Act of 2010. This support extends to the portion of the proposal developed to satisfy the Broader Impacts Review Criterion as well as the Intellectual Merit Review Criterion, and any additional review criteria specified in the solicitation. Organizational support will be made available, as described in the proposal, in order to address the broader impacts and intellectual merit activities to be undertaken.

Certification Regarding Dual Use Research of Concern

By electronically signing the certification pages, the Authorized Organizational Representative is certifying that the organization will be or is in compliance with all aspects of the United States Government Policy for Institutional Oversight of Life Sciences Dual Use Research of Concern.

AUTHORIZED ORGANIZATIONAL REPRESENTATIVE	SIGNATURE	DATE
NAME Tracy A Lindsay	Electronic Signature	Nov 19 2020 2:58PM
TELEPHONE NUMBER 940-898-3377	EMAIL ADDRESS TLINDSAY@TWU.EDU	FAX NUMBER 940-898-3416

COVER SHEET FOR PROPOSAL TO THE NATIONAL SCIENCE FOUNDATION

FOR CONSIDERATION BY NSF ORGANIZATION UNIT(S) - continued from page 1
(Indicate the most specific unit known, i.e. program, division, etc.)

PHY - INTEGRATIVE ACTIVITIES IN PHYSICS

COVER SHEET FOR PROPOSAL TO THE NATIONAL SCIENCE FOUNDATION

PROGRAM ANNOUNCEMENT/SOLICITATION NO./DUE DATE NSF 20-580 11/25/20		<input type="checkbox"/> Special Exception to Deadline Date Policy			FOR NSF USE ONLY
FOR CONSIDERATION BY NSF ORGANIZATION UNIT(S) (Indicate the most specific unit known, i.e. program, division, etc.) PHY - ATOMIC, MOLECULAR, AND OPTICAL EXPERIMENTAL PHYSICS					NSF PROPOSAL NUMBER 2110092
DATE RECEIVED 11/20/2020	NUMBER OF COPIES 1	DIVISION ASSIGNED 03010000 PHY	FUND CODE 1241	DUNS# (Data Universal Numbering System) 074602939	FILE LOCATION 12/02/2020 3:04am
EMPLOYER IDENTIFICATION NUMBER (EIN) OR TAXPAYER IDENTIFICATION NUMBER (TIN) 741233796		SHOW PREVIOUS AWARD NO. IF THIS IS <input type="checkbox"/> A RENEWAL <input type="checkbox"/> AN ACCOMPLISHMENT-BASED RENEWAL		IS THIS PROPOSAL BEING SUBMITTED TO ANOTHER FEDERAL AGENCY? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> IF YES, LIST ACRONYM(S)	
NAME OF ORGANIZATION TO WHICH AWARD SHOULD BE MADE Southwestern University		ADDRESS OF Awardee ORGANIZATION, INCLUDING 9 DIGIT ZIP CODE Southwestern University P. O. Box 770 Georgetown, TX 786270770			
AWARDEE ORGANIZATION CODE (IF KNOWN) 0036202000					
NAME OF PRIMARY PLACE OF PERF Southwestern University		ADDRESS OF PRIMARY PLACE OF PERF, INCLUDING 9 DIGIT ZIP CODE Southwestern University 1001 E. University Drive Georgetown, TX 786266100 , US.			
IS Awardee ORGANIZATION (Check All That Apply)		<input type="checkbox"/> SMALL BUSINESS <input type="checkbox"/> FOR-PROFIT ORGANIZATION		<input type="checkbox"/> MINORITY BUSINESS <input type="checkbox"/> WOMAN-OWNED BUSINESS	
				<input type="checkbox"/> IF THIS IS A PRELIMINARY PROPOSAL THEN CHECK HERE	
TITLE OF PROPOSED PROJECT Collaborative Research: Neutrino Research Initiative for College Students (NRICoS)					
REQUESTED AMOUNT \$ 331,879	PROPOSED DURATION (1-60 MONTHS) 60 months	REQUESTED STARTING DATE 09/01/21	SHOW RELATED PRELIMINARY PROPOSAL NO. IF APPLICABLE		
THIS PROPOSAL INCLUDES ANY OF THE ITEMS LISTED BELOW					
<input type="checkbox"/> BEGINNING INVESTIGATOR		<input type="checkbox"/> HUMAN SUBJECTS Human Subjects Assurance Number _____			
<input type="checkbox"/> DISCLOSURE OF LOBBYING ACTIVITIES		<input type="checkbox"/> Exemption Subsection _____ or IRB App. Date _____			
<input type="checkbox"/> PROPRIETARY & PRIVILEGED INFORMATION		<input type="checkbox"/> FUNDING OF INT'L BRANCH CAMPUS OF U.S IHE <input type="checkbox"/> FUNDING OF FOREIGN ORG			
<input type="checkbox"/> HISTORIC PLACES		<input type="checkbox"/> INTERNATIONAL ACTIVITIES: COUNTRY/COUNTRIES INVOLVED _____			
<input type="checkbox"/> VERTEBRATE ANIMALS IACUC App. Date _____ PHS Animal Welfare Assurance Number _____		<input checked="" type="checkbox"/> COLLABORATIVE STATUS A collaborative proposal from multiple organizations (PAPPG II.D.3.b)			
PI/PD DEPARTMENT Physics		PI/PD POSTAL ADDRESS 1001 E University FJS 124 Georgetown, TX 78627 United States			
PI/PD FAX NUMBER 512-863-1696					
NAMES (TYPED)	High Degree	Yr of Degree	Telephone Number	Email Address	
Steven A Alexander	PhD	1982	512-863-1633	alexands@southwestern.edu	
CO-PI/PD					

CERTIFICATION PAGE

Certification for Authorized Organizational Representative (or Equivalent)

By electronically signing and submitting this proposal, the Authorized Organizational Representative (AOR) is: (1) certifying that statements made herein are true and complete to the best of his/her knowledge; and (2) agreeing to accept the obligation to comply with NSF award terms and conditions if an award is made as a result of this application. Further, the applicant is hereby providing certifications regarding conflict of interest (when applicable), flood hazard insurance (when applicable), responsible conduct of research and organizational support as set forth in the NSF Proposal & Award Policies & Procedures Guide (PAPPG). Willful provision of false information in this application and its supporting documents or in reports required under an ensuing award is a criminal offense (U.S. Code, Title 18, Section 1001).

Certification Regarding Conflict of Interest

The AOR is required to complete certifications stating that the organization has implemented and is enforcing a written policy on conflicts of interest (COI), consistent with the provisions of PAPPG Chapter IX.A.; that, to the best of his/her knowledge, all financial disclosures required by the conflict of interest policy were made; and that conflicts of interest, if any, were, or prior to the organization's expenditure of any funds under the award, will be, satisfactorily managed, reduced or eliminated in accordance with the organization's conflict of interest policy. Conflicts that cannot be satisfactorily managed, reduced or eliminated and research that proceeds without the imposition of conditions or restrictions when a conflict of interest exists, must be disclosed to NSF via use of the Notifications and Requests Module in FastLane.

Certification Regarding Flood Hazard Insurance

Two sections of the National Flood Insurance Act of 1968 (42 USC §4012a and §4106) bar Federal agencies from giving financial assistance for acquisition or construction purposes in any area identified by the Federal Emergency Management Agency (FEMA) as having special flood hazards unless the:

- (1) community in which that area is located participates in the national flood insurance program; and
- (2) building (and any related equipment) is covered by adequate flood insurance.

By electronically signing the Certification Pages, the Authorized Organizational Representative (or equivalent) located in FEMA-designated special flood hazard areas is certifying that adequate flood insurance has been or will be obtained in the following situations:

- (1) for NSF grants for the construction of a building or facility, regardless of the dollar amount of the grant; and
- (2) for other NSF grants when more than \$25,000 has been budgeted in the proposal for repair, alteration or improvement (construction) of a building or facility.

Certification Regarding Responsible Conduct of Research (RCR)

(This certification is not applicable to proposals for conferences, symposia, and workshops.)

By electronically signing the Certification Pages, the Authorized Organizational Representative is certifying that, in accordance with the NSF Proposal & Award Policies & Procedures Guide, Chapter IX.B., the institution has a plan in place to provide appropriate training and oversight in the responsible and ethical conduct of research to undergraduates, graduate students and postdoctoral researchers who will be supported by NSF to conduct research. The AOR shall require that the language of this certification be included in any award documents for all subawards at all tiers.

Certification Regarding Organizational Support

By electronically signing the Certification Pages, the Authorized Organizational Representative (or equivalent) is certifying that there is organizational support for the proposal as required by Section 526 of the America COMPETES Reauthorization Act of 2010. This support extends to the portion of the proposal developed to satisfy the Broader Impacts Review Criterion as well as the Intellectual Merit Review Criterion, and any additional review criteria specified in the solicitation. Organizational support will be made available, as described in the proposal, in order to address the broader impacts and intellectual merit activities to be undertaken.

Certification Regarding Dual Use Research of Concern

By electronically signing the certification pages, the Authorized Organizational Representative is certifying that the organization will be or is in compliance with all aspects of the United States Government Policy for Institutional Oversight of Life Sciences Dual Use Research of Concern.

AUTHORIZED ORGANIZATIONAL REPRESENTATIVE	SIGNATURE	DATE
NAME Sonya Robinson	Electronic Signature	Nov 20 2020 4:44PM
TELEPHONE NUMBER 512-863-1578	EMAIL ADDRESS robinsos@southwestern.edu	FAX NUMBER

COVER SHEET FOR PROPOSAL TO THE NATIONAL SCIENCE FOUNDATION

PROGRAM ANNOUNCEMENT/SOLICITATION NO./DUE DATE NSF 20-580 11/25/20		<input type="checkbox"/> Special Exception to Deadline Date Policy			FOR NSF USE ONLY
FOR CONSIDERATION BY NSF ORGANIZATION UNIT(S) (Indicate the most specific unit known, i.e. program, division, etc.) PHY - INTEGRATIVE ACTIVITIES IN PHYSICS, (continued)					NSF PROPOSAL NUMBER 2110175
DATE RECEIVED 11/23/2020	NUMBER OF COPIES 1	DIVISION ASSIGNED 03010000 PHY	FUND CODE 9134	DUNS# (Data Universal Numbering System) 001981133	FILE LOCATION 12/02/2020 3:04am
EMPLOYER IDENTIFICATION NUMBER (EIN) OR TAXPAYER IDENTIFICATION NUMBER (TIN) 750800689		SHOW PREVIOUS AWARD NO. IF THIS IS <input type="checkbox"/> A RENEWAL <input type="checkbox"/> AN ACCOMPLISHMENT-BASED RENEWAL		IS THIS PROPOSAL BEING SUBMITTED TO ANOTHER FEDERAL AGENCY? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> IF YES, LIST ACRONYM(S)	
NAME OF ORGANIZATION TO WHICH AWARD SHOULD BE MADE Southern Methodist University			ADDRESS OF AWARDEE ORGANIZATION, INCLUDING 9 DIGIT ZIP CODE Southern Methodist University 6425 BOAZ Dallas, TX 752750302		
AWARDEE ORGANIZATION CODE (IF KNOWN) 0036137000					
NAME OF PRIMARY PLACE OF PERF Southern Methodist University			ADDRESS OF PRIMARY PLACE OF PERF, INCLUDING 9 DIGIT ZIP CODE Southern Methodist University 3215 Daniel Avenue DALLAS ,TX ,752750302 ,US.		
IS AWARDEE ORGANIZATION (Check All That Apply)		<input type="checkbox"/> SMALL BUSINESS <input type="checkbox"/> FOR-PROFIT ORGANIZATION		<input type="checkbox"/> MINORITY BUSINESS <input type="checkbox"/> WOMAN-OWNED BUSINESS	<input type="checkbox"/> IF THIS IS A PRELIMINARY PROPOSAL THEN CHECK HERE
TITLE OF PROPOSED PROJECT Collaborative Research: Neutrino Research Initiative for College Students (NRICoS)					
REQUESTED AMOUNT \$ 364,154	PROPOSED DURATION (1-60 MONTHS) 60 months		REQUESTED STARTING DATE 09/01/21	SHOW RELATED PRELIMINARY PROPOSAL NO. IF APPLICABLE	
THIS PROPOSAL INCLUDES ANY OF THE ITEMS LISTED BELOW			<input type="checkbox"/> HUMAN SUBJECTS Human Subjects Assurance Number _____ <input type="checkbox"/> Disclosure of Lobbying Activities Exemption Subsection _____ or IRB App. Date _____ <input type="checkbox"/> PROPRIETARY & PRIVILEGED INFORMATION <input type="checkbox"/> HISTORIC PLACES <input type="checkbox"/> VERTEBRATE ANIMALS IACUC App. Date _____ PHS Animal Welfare Assurance Number _____ <input checked="" type="checkbox"/> TYPE OF PROPOSAL Research		
PI/PD DEPARTMENT Physics		PI/PD POSTAL ADDRESS Dallas, TX 75275 United States			
PI/PD FAX NUMBER 214-768-4095					
NAMES (TYPED)	High Degree	Yr of Degree	Telephone Number	Email Address	
PI/PD NAME Thomas E Coan	PhD	1989	214-768-2497	coan@mail.physics.smu.edu	
CO-PI/PD					

CERTIFICATION PAGE

Certification for Authorized Organizational Representative (or Equivalent)

By electronically signing and submitting this proposal, the Authorized Organizational Representative (AOR) is: (1) certifying that statements made herein are true and complete to the best of his/her knowledge; and (2) agreeing to accept the obligation to comply with NSF award terms and conditions if an award is made as a result of this application. Further, the applicant is hereby providing certifications regarding conflict of interest (when applicable), flood hazard insurance (when applicable), responsible conduct of research and organizational support as set forth in the NSF Proposal & Award Policies & Procedures Guide (PAPPG). Willful provision of false information in this application and its supporting documents or in reports required under an ensuing award is a criminal offense (U.S. Code, Title 18, Section 1001).

Certification Regarding Conflict of Interest

The AOR is required to complete certifications stating that the organization has implemented and is enforcing a written policy on conflicts of interest (COI), consistent with the provisions of PAPPG Chapter IX.A.; that, to the best of his/her knowledge, all financial disclosures required by the conflict of interest policy were made; and that conflicts of interest, if any, were, or prior to the organization's expenditure of any funds under the award, will be, satisfactorily managed, reduced or eliminated in accordance with the organization's conflict of interest policy. Conflicts that cannot be satisfactorily managed, reduced or eliminated and research that proceeds without the imposition of conditions or restrictions when a conflict of interest exists, must be disclosed to NSF via use of the Notifications and Requests Module in FastLane.

Certification Regarding Flood Hazard Insurance

Two sections of the National Flood Insurance Act of 1968 (42 USC §4012a and §4106) bar Federal agencies from giving financial assistance for acquisition or construction purposes in any area identified by the Federal Emergency Management Agency (FEMA) as having special flood hazards unless the:

- (1) community in which that area is located participates in the national flood insurance program; and
- (2) building (and any related equipment) is covered by adequate flood insurance.

By electronically signing the Certification Pages, the Authorized Organizational Representative (or equivalent) located in FEMA-designated special flood hazard areas is certifying that adequate flood insurance has been or will be obtained in the following situations:

- (1) for NSF grants for the construction of a building or facility, regardless of the dollar amount of the grant; and
- (2) for other NSF grants when more than \$25,000 has been budgeted in the proposal for repair, alteration or improvement (construction) of a building or facility.

Certification Regarding Responsible Conduct of Research (RCR)

(This certification is not applicable to proposals for conferences, symposia, and workshops.)

By electronically signing the Certification Pages, the Authorized Organizational Representative is certifying that, in accordance with the NSF Proposal & Award Policies & Procedures Guide, Chapter IX.B., the institution has a plan in place to provide appropriate training and oversight in the responsible and ethical conduct of research to undergraduates, graduate students and postdoctoral researchers who will be supported by NSF to conduct research. The AOR shall require that the language of this certification be included in any award documents for all subawards at all tiers.

Certification Regarding Organizational Support

By electronically signing the Certification Pages, the Authorized Organizational Representative (or equivalent) is certifying that there is organizational support for the proposal as required by Section 526 of the America COMPETES Reauthorization Act of 2010. This support extends to the portion of the proposal developed to satisfy the Broader Impacts Review Criterion as well as the Intellectual Merit Review Criterion, and any additional review criteria specified in the solicitation. Organizational support will be made available, as described in the proposal, in order to address the broader impacts and intellectual merit activities to be undertaken.

Certification Regarding Dual Use Research of Concern

By electronically signing the certification pages, the Authorized Organizational Representative is certifying that the organization will be or is in compliance with all aspects of the United States Government Policy for Institutional Oversight of Life Sciences Dual Use Research of Concern.

AUTHORIZED ORGANIZATIONAL REPRESENTATIVE	SIGNATURE	DATE
NAME Elvin Franklin	Electronic Signature	Nov 23 2020 12:59PM
TELEPHONE NUMBER 214-768-4306	EMAIL ADDRESS elvinf@smu.edu	FAX NUMBER

COVER SHEET FOR PROPOSAL TO THE NATIONAL SCIENCE FOUNDATION

FOR CONSIDERATION BY NSF ORGANIZATION UNIT(S) - continued from page 1
(Indicate the most specific unit known, i.e. program, division, etc.)

PHY - INTEGRATIVE ACTIVITIES IN PHYSICS

COVER SHEET FOR PROPOSAL TO THE NATIONAL SCIENCE FOUNDATION

PROGRAM ANNOUNCEMENT/SOLICITATION NO./DUE DATE NSF 20-580 11/25/20		<input type="checkbox"/> Special Exception to Deadline Date Policy			FOR NSF USE ONLY
FOR CONSIDERATION BY NSF ORGANIZATION UNIT(S) (Indicate the most specific unit known, i.e. program, division, etc.) PHY - INTEGRATIVE ACTIVITIES IN PHYSICS, (continued)					NSF PROPOSAL NUMBER 2110173
DATE RECEIVED 11/23/2020	NUMBER OF COPIES 1	DIVISION ASSIGNED 03010000 PHY	FUND CODE 9134	DUNS# (Data Universal Numbering System) 055329239	FILE LOCATION 12/02/2020 3:04am
EMPLOYER IDENTIFICATION NUMBER (EIN) OR TAXPAYER IDENTIFICATION NUMBER (TIN) 750926755		SHOW PREVIOUS AWARD NO. IF THIS IS <input type="checkbox"/> A RENEWAL <input type="checkbox"/> AN ACCOMPLISHMENT-BASED RENEWAL		IS THIS PROPOSAL BEING SUBMITTED TO ANOTHER FEDERAL AGENCY? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> IF YES, LIST ACRONYM(S)	
NAME OF ORGANIZATION TO WHICH AWARD SHOULD BE MADE University of Dallas		ADDRESS OF AWARDEE ORGANIZATION, INCLUDING 9 DIGIT ZIP CODE University of Dallas 1845 East Northgate Drive Irving, TX 750624736			
AWARDEE ORGANIZATION CODE (IF KNOWN) 0036517000					
NAME OF PRIMARY PLACE OF PERF University of Dallas		ADDRESS OF PRIMARY PLACE OF PERF, INCLUDING 9 DIGIT ZIP CODE University of Dallas 1845 East Northgate Drive Irving, TX 750624736 ,US.			
IS AWARDEE ORGANIZATION (Check All That Apply)		<input type="checkbox"/> SMALL BUSINESS <input type="checkbox"/> FOR-PROFIT ORGANIZATION		<input type="checkbox"/> MINORITY BUSINESS <input type="checkbox"/> WOMAN-OWNED BUSINESS	
				<input type="checkbox"/> IF THIS IS A PRELIMINARY PROPOSAL THEN CHECK HERE	
TITLE OF PROPOSED PROJECT Collaborative Research: Neutrino Research Initiative for College Students (NRICoS)					
REQUESTED AMOUNT \$ 334,008	PROPOSED DURATION (1-60 MONTHS) 60 months	REQUESTED STARTING DATE 09/01/21	SHOW RELATED PRELIMINARY PROPOSAL NO. IF APPLICABLE		
THIS PROPOSAL INCLUDES ANY OF THE ITEMS LISTED BELOW					
<input type="checkbox"/> BEGINNING INVESTIGATOR		<input type="checkbox"/> HUMAN SUBJECTS Human Subjects Assurance Number _____			
<input type="checkbox"/> DISCLOSURE OF LOBBYING ACTIVITIES		<input type="checkbox"/> Exemption Subsection _____ or IRB App. Date _____			
<input type="checkbox"/> PROPRIETARY & PRIVILEGED INFORMATION		<input type="checkbox"/> FUNDING OF INT'L BRANCH CAMPUS OF U.S IHE <input type="checkbox"/> FUNDING OF FOREIGN ORG			
<input type="checkbox"/> HISTORIC PLACES		<input type="checkbox"/> INTERNATIONAL ACTIVITIES: COUNTRY/COUNTRIES INVOLVED _____			
<input type="checkbox"/> VERTEBRATE ANIMALS IACUC App. Date _____ PHS Animal Welfare Assurance Number _____		<input type="checkbox"/> COLLABORATIVE STATUS A collaborative proposal from multiple organizations (PAPPG II.D.3.b)			
PI/PD DEPARTMENT Physics		PI/PD POSTAL ADDRESS 1845 East Northgate Drive Irving, TX 75062 United States			
PI/PD FAX NUMBER					
NAMES (TYPED)	High Degree	Yr of Degree	Telephone Number	Email Address	
PI/PD NAME Levente Borvak	PhD	2016	972-721-5722	lborvak@udallas.edu	
CO-PI/PD					

CERTIFICATION PAGE

Certification for Authorized Organizational Representative (or Equivalent)

By electronically signing and submitting this proposal, the Authorized Organizational Representative (AOR) is: (1) certifying that statements made herein are true and complete to the best of his/her knowledge; and (2) agreeing to accept the obligation to comply with NSF award terms and conditions if an award is made as a result of this application. Further, the applicant is hereby providing certifications regarding conflict of interest (when applicable), flood hazard insurance (when applicable), responsible conduct of research and organizational support as set forth in the NSF Proposal & Award Policies & Procedures Guide (PAPPG). Willful provision of false information in this application and its supporting documents or in reports required under an ensuing award is a criminal offense (U.S. Code, Title 18, Section 1001).

Certification Regarding Conflict of Interest

The AOR is required to complete certifications stating that the organization has implemented and is enforcing a written policy on conflicts of interest (COI), consistent with the provisions of PAPPG Chapter IX.A.; that, to the best of his/her knowledge, all financial disclosures required by the conflict of interest policy were made; and that conflicts of interest, if any, were, or prior to the organization's expenditure of any funds under the award, will be, satisfactorily managed, reduced or eliminated in accordance with the organization's conflict of interest policy. Conflicts that cannot be satisfactorily managed, reduced or eliminated and research that proceeds without the imposition of conditions or restrictions when a conflict of interest exists, must be disclosed to NSF via use of the Notifications and Requests Module in FastLane.

Certification Regarding Flood Hazard Insurance

Two sections of the National Flood Insurance Act of 1968 (42 USC §4012a and §4106) bar Federal agencies from giving financial assistance for acquisition or construction purposes in any area identified by the Federal Emergency Management Agency (FEMA) as having special flood hazards unless the:

- (1) community in which that area is located participates in the national flood insurance program; and
- (2) building (and any related equipment) is covered by adequate flood insurance.

By electronically signing the Certification Pages, the Authorized Organizational Representative (or equivalent) located in FEMA-designated special flood hazard areas is certifying that adequate flood insurance has been or will be obtained in the following situations:

- (1) for NSF grants for the construction of a building or facility, regardless of the dollar amount of the grant; and
- (2) for other NSF grants when more than \$25,000 has been budgeted in the proposal for repair, alteration or improvement (construction) of a building or facility.

Certification Regarding Responsible Conduct of Research (RCR)

(This certification is not applicable to proposals for conferences, symposia, and workshops.)

By electronically signing the Certification Pages, the Authorized Organizational Representative is certifying that, in accordance with the NSF Proposal & Award Policies & Procedures Guide, Chapter IX.B., the institution has a plan in place to provide appropriate training and oversight in the responsible and ethical conduct of research to undergraduates, graduate students and postdoctoral researchers who will be supported by NSF to conduct research. The AOR shall require that the language of this certification be included in any award documents for all subawards at all tiers.

Certification Regarding Organizational Support

By electronically signing the Certification Pages, the Authorized Organizational Representative (or equivalent) is certifying that there is organizational support for the proposal as required by Section 526 of the America COMPETES Reauthorization Act of 2010. This support extends to the portion of the proposal developed to satisfy the Broader Impacts Review Criterion as well as the Intellectual Merit Review Criterion, and any additional review criteria specified in the solicitation. Organizational support will be made available, as described in the proposal, in order to address the broader impacts and intellectual merit activities to be undertaken.

Certification Regarding Dual Use Research of Concern

By electronically signing the certification pages, the Authorized Organizational Representative is certifying that the organization will be or is in compliance with all aspects of the United States Government Policy for Institutional Oversight of Life Sciences Dual Use Research of Concern.

AUTHORIZED ORGANIZATIONAL REPRESENTATIVE	SIGNATURE	DATE
NAME Deborah B Zimmerman	Electronic Signature	Nov 23 2020 12:51PM
TELEPHONE NUMBER 972-721-5177	EMAIL ADDRESS dbzimmerman@udallas.edu	FAX NUMBER

COVER SHEET FOR PROPOSAL TO THE NATIONAL SCIENCE FOUNDATION

FOR CONSIDERATION BY NSF ORGANIZATION UNIT(S) - continued from page 1
(Indicate the most specific unit known, i.e. program, division, etc.)

PHY - INTEGRATIVE ACTIVITIES IN PHYSICS

PROJECT SUMMARY

Overview:

Neutrino Research Initiative for College Students (NRICoS, pronounced Enicos) is an innovative education program that engages a diverse cohort of undergraduate students in current and future neutrino experiments inaccessible to most students. Integrating research in fundamental physics with a strong educational component, this program will stimulate the scientific curiosity of these students, starting as early as at the end of their first year. The considerable opportunities provided to this cohort will motivate them to finish their physics bachelor's degree. NRICoS supports participating students for multiple years so that they can acquire and solidify the skills they need to participate in fundamental physics research. A vital component of this proposal is connecting several undergraduate-only physics programs with R1/R2 programs. For those students at institutions that do not offer a physics degree or have limited advanced electives, NRICoS will allow a broader demographic of undergraduate students to pursue a rigorous undergraduate education in physics and provide them with a pathway to graduate physics programs. The NRICoS students will be trained in cutting-edge science, technology, engineering and math (STEM), and this intellectual capital will become an important asset to the nation for future advances in fundamental and applied sciences. They will also understand the broader impacts that high energy particle physics brings to society and be able to share the excitement of the fundamental science of neutrinos with the general public. We expect that a large fraction of the students will be inspired to continue into physics graduate programs and be the leaders furthering competitiveness of the nation's technology industry. We will keep close contact with NRICoS graduates to track their career paths to evaluate the impact of this innovative program and provide networking among NRICoS' students and graduates.

Intellectual Merit:

High energy particle physics research seeks to understand the most fundamental nature of the universe through finding the fundamental building blocks of matter and the forces between them. Neutrinos make up a quarter of the fundamental constituents of matter within the current theoretical framework, the Standard Model (SM) of Particle Physics, as massless particles. In the past 2 – 3 decades, however, it has been discovered and solidly verified that neutrinos have non-zero mass, which suggests that SM requires a significant modification. Both the existing and planned neutrino experiments will provide an excellent training ground for the next generation scientists and STEM workforce. The NRICoS students will obtain a deeper understanding of the universe, the symmetry breaking mechanism, and the interactions between fundamental constituents of matter, in addition to the analysis techniques that will enable them to perform hands-on data analysis to participate in this novel endeavor. The students will be exposed to high throughput, high performance and high availability computing and the advanced machine learning technologies - essential components of modern science research. Finally, if NRICoS' model of long-term student engagement and alternative pipelines is successful, it could be adopted by other schools.

Broader Impacts:

Two R1/R2 universities and four undergraduate degree granting universities in Texas are participating in the proposed NRICoS project. These universities serve large numbers of traditionally underrepresented students, many of whom are first in their family in higher education. By providing this cohort of students with a pathway to an undergraduate physics degree, the NRICoS program will help produce a diverse, well-trained STEM workforce. The unique partnership among these universities will also create a pipeline that will incentivize many of these students to pursue physics graduate degrees. The NRICoS project will have engaged over 138 student-years and will produce 60 well trained, research-hardened STEM graduates by the end of its lifetime. The NRICoS students will be trained in fundamental physics and related cutting-edge technologies and be mentored to ensure their academic success through the year-long engagements for multiple years continuously. NRICoS will provide students pathways to continue pursuing physics graduate degrees and will contribute to the further diversification in the field of physics. It will also help alleviate the national STEM workforce shortage, produce scientists who will be at the forefront of exploring the fundamental nature of the universe and will serve as role models to other underrepresented students. Once the faculty in this project begin to share their experience with mentoring undergraduates in published papers and conference presentations, NRICoS can become a model to other schools and projects on how to effectively engage a broader range of underrepresented group of students.

TABLE OF CONTENTS

For font size and page formatting specifications, see PAPPG section II.B.2.

	Total No. of Pages	Page No.* (Optional)*
Cover Sheet for Proposal to the National Science Foundation		
Project Summary (not to exceed 1 page)	1	
Table of Contents	1	
Project Description (Including Results from Prior NSF Support) (not to exceed 15 pages) (Exceed only if allowed by a specific program announcement/solicitation or if approved in advance by the appropriate NSF Assistant Director or designee)	15	
References Cited	1	
Biographical Sketches (Not to exceed 2 pages each)	6	
Budget <small>(Plus up to 3 pages of budget justification)</small>	11	
Current and Pending Support	41	
Facilities, Equipment and Other Resources	2	
Special Information/Supplementary Documents <small>(Data Management Plan, Mentoring Plan and Other Supplementary Documents)</small>	4	
Appendix (List below.) (Include only if allowed by a specific program announcement/ solicitation or if approved in advance by the appropriate NSF Assistant Director or designee)		
Appendix Items:		

*Proposers may select any numbering mechanism for the proposal. The entire proposal however, must be paginated.
Complete both columns only if the proposal is numbered consecutively.

TABLE OF CONTENTS

For font size and page formatting specifications, see PAPPG section II.B.2.

	Total No. of Pages	Page No.* (Optional)*
Cover Sheet for Proposal to the National Science Foundation		
Project Summary (not to exceed 1 page)	0	
Table of Contents	1	
Project Description (Including Results from Prior NSF Support) (not to exceed 15 pages) (Exceed only if allowed by a specific program announcement/solicitation or if approved in advance by the appropriate NSF Assistant Director or designee)	0	
References Cited	0	
Biographical Sketches (Not to exceed 2 pages each)	2	
Budget (Plus up to 3 pages of budget justification)	11	
Current and Pending Support	15	
Facilities, Equipment and Other Resources	1	
Special Information/Supplementary Documents (Data Management Plan, Mentoring Plan and Other Supplementary Documents)	0	
Appendix (List below.) (Include only if allowed by a specific program announcement/ solicitation or if approved in advance by the appropriate NSF Assistant Director or designee)		
Appendix Items:		

*Proposers may select any numbering mechanism for the proposal. The entire proposal however, must be paginated. Complete both columns only if the proposal is numbered consecutively.

TABLE OF CONTENTS

For font size and page formatting specifications, see PAPPG section II.B.2.

	Total No. of Pages	Page No.* (Optional)*
Cover Sheet for Proposal to the National Science Foundation		
Project Summary (not to exceed 1 page)	0	
Table of Contents	1	
Project Description (Including Results from Prior NSF Support) (not to exceed 15 pages) (Exceed only if allowed by a specific program announcement/solicitation or if approved in advance by the appropriate NSF Assistant Director or designee)	0	
References Cited	0	
Biographical Sketches (Not to exceed 2 pages each)	2	
Budget (Plus up to 3 pages of budget justification)	11	
Current and Pending Support	15	
Facilities, Equipment and Other Resources	3	
Special Information/Supplementary Documents (Data Management Plan, Mentoring Plan and Other Supplementary Documents)	0	
Appendix (List below.) (Include only if allowed by a specific program announcement/ solicitation or if approved in advance by the appropriate NSF Assistant Director or designee)		
Appendix Items:		

*Proposers may select any numbering mechanism for the proposal. The entire proposal however, must be paginated. Complete both columns only if the proposal is numbered consecutively.

TABLE OF CONTENTS

For font size and page formatting specifications, see PAPPG section II.B.2.

	Total No. of Pages	Page No.* (Optional)*
Cover Sheet for Proposal to the National Science Foundation		
Project Summary (not to exceed 1 page)	0	
Table of Contents	1	
Project Description (Including Results from Prior NSF Support) (not to exceed 15 pages) (Exceed only if allowed by a specific program announcement/solicitation or if approved in advance by the appropriate NSF Assistant Director or designee)	0	
References Cited	0	
Biographical Sketches (Not to exceed 2 pages each)	2	
Budget (Plus up to 3 pages of budget justification)	11	
Current and Pending Support	15	
Facilities, Equipment and Other Resources	1	
Special Information/Supplementary Documents (Data Management Plan, Mentoring Plan and Other Supplementary Documents)	0	
Appendix (List below.) (Include only if allowed by a specific program announcement/ solicitation or if approved in advance by the appropriate NSF Assistant Director or designee)		
Appendix Items:		

*Proposers may select any numbering mechanism for the proposal. The entire proposal however, must be paginated. Complete both columns only if the proposal is numbered consecutively.

TABLE OF CONTENTS

For font size and page formatting specifications, see PAPPG section II.B.2.

	Total No. of Pages	Page No.* (Optional)*
Cover Sheet for Proposal to the National Science Foundation		
Project Summary (not to exceed 1 page)	0	
Table of Contents	1	
Project Description (Including Results from Prior NSF Support) (not to exceed 15 pages) (Exceed only if allowed by a specific program announcement/solicitation or if approved in advance by the appropriate NSF Assistant Director or designee)	0	
References Cited	0	
Biographical Sketches (Not to exceed 2 pages each)	2	
Budget (Plus up to 3 pages of budget justification)	11	
Current and Pending Support	15	
Facilities, Equipment and Other Resources	2	
Special Information/Supplementary Documents (Data Management Plan, Mentoring Plan and Other Supplementary Documents)	0	
Appendix (List below.) (Include only if allowed by a specific program announcement/ solicitation or if approved in advance by the appropriate NSF Assistant Director or designee)		
Appendix Items:		

*Proposers may select any numbering mechanism for the proposal. The entire proposal however, must be paginated. Complete both columns only if the proposal is numbered consecutively.

TABLE OF CONTENTS

For font size and page formatting specifications, see PAPPG section II.B.2.

	Total No. of Pages	Page No.* (Optional)*
Cover Sheet for Proposal to the National Science Foundation		
Project Summary (not to exceed 1 page)	0	
Table of Contents	1	
Project Description (Including Results from Prior NSF Support) (not to exceed 15 pages) (Exceed only if allowed by a specific program announcement/solicitation or if approved in advance by the appropriate NSF Assistant Director or designee)	0	
References Cited	0	
Biographical Sketches (Not to exceed 2 pages each)	2	
Budget (Plus up to 3 pages of budget justification)	11	
Current and Pending Support	15	
Facilities, Equipment and Other Resources	1	
Special Information/Supplementary Documents (Data Management Plan, Mentoring Plan and Other Supplementary Documents)	0	
Appendix (List below.) (Include only if allowed by a specific program announcement/ solicitation or if approved in advance by the appropriate NSF Assistant Director or designee)		
Appendix Items:		

*Proposers may select any numbering mechanism for the proposal. The entire proposal however, must be paginated. Complete both columns only if the proposal is numbered consecutively.

Collaborative Research: Neutrino Research Initiative for College Students (NRICoS)

1. IMPORTANCE

Neutrino Research Initiative for College Students (NRICoS, pronounced Enricos) is an innovative education program that engages a diverse cohort of undergraduate students in current and future neutrino experiments inaccessible to most students. Integrating research in fundamental physics with a strong educational component, this program will stimulate the scientific curiosity of these students, starting as early as at the end of their first year. The sustained and systematic opportunities provided to this cohort will motivate them to finish their physics bachelor's degree. NRICoS supports participating students throughout the year for multiple years so that they can acquire and solidify the skills they need to participate and make tangible contributions in fundamental physics research. A vital component of this proposal is connecting several primary undergraduate serving institutions (PUI) with neighboring R1/R2 universities. NRICoS will allow a broader demographic of undergraduate students, including those at institutions that do not offer a physics degree or have limited advanced electives, to pursue a rigorous undergraduate education in physics and will provide them with a pathway to graduate physics programs.

The NRICoS name is a tribute to Enrico Fermi, an American physicist. Fermi is well known for his contributions such as the discovery of slow neutrons, theory of beta decay, and first critical nuclear reactor. Just as importantly, Fermi left a legacy of being a first-rate educator of the next generation of researchers. Not only did his ‘Via Panisperna Boys’ of his assistant professor years (Amaldi, D’Agostino, Majorana, Pontecorvo, Rasetti, Segrè) make major contributions over the next two decades, but Enrico counted three Nobel Prizes between his students at Sapienza and Chicago (Segrè, Lee, Friedman). NRICoS aims to echo this namesake and value both cutting-edge research in the present and also inspire the next generation.

The students in the NRICoS project, the NRICoS students, will ultimately be able to help analyzing data from several existing neutrino experiments such as LArIAT [1], MicroBooNE [2], MINERvA [3] and NOvA [4]. They will also contribute to some of the next generation detectors that are under construction, such as SBND [5] and ICARUS [6], or under development, such as DUNE [7], during their construction, prototype operation, commissioning, and data-taking phases. The NRICoS team will form a local and regional support group to ensure the academic success of the students. We expect a large fraction of the NRICoS students will be inspired to continue into physics graduate programs, contributing to the improved diversification in these programs. The NRICoS students will be trained in cutting-edge science, technology, engineering and math (STEM) skills and will become an important asset in furthering the competitiveness of the nation’s technology industry. In addition to being a diverse research-hardened workforce, they can furnish the intellectual capital needed for advances in fundamental and applied sciences.

The students graduated from the NRICoS program, the NRICoS graduates will understand the broader impacts that high energy particle physics experiments bring to society and be able to share the excitement of the fundamental science of neutrinos with the general public. The faculty in the project will share their acquired knowledge and experience of mentoring undergraduate in published papers and conference presentations to broaden the pedagogical impact of the NRICoS program. Finally, we will keep close contact with NRICoS graduates to track their career paths to evaluate the impact of this innovative program and provide strong network among NRICoS’ students and graduates.

1.1 Training a Diverse Group of Next Generation STEM Students

A vital component of this proposal is connecting several undergraduate-only physics programs with R1/R2 university programs. Faculty at undergraduate only institutions typically have higher teaching loads (3 – 5 classes each semester), making it much more difficult or even impossible to remain up to date with the simulation and analysis work carried out by numerous high energy physics collaborations today. As a result, the undergraduates at these institutions typically have little opportunity to help with these tasks. The NRICoS program will connect four PUI schools to R1/R2 research teams, allowing these students to have a better access to simulation and analysis tasks than in their own institutions.

The NRICoS program will organize two training workshops each year to introduce these undergraduate students to the advanced topics they will need to perform the analyses and simulations they will eventually

carry out. The workshops will also include outside experts who will support the entire group as the complexity of experiments increases. Because students at smaller undergraduate-only schools may not have been exposed to a diverse choice of potential mentors, these workshops will allow these students to interact with a large group of experts in detectors, simulations, analysis, theory, writing, and communication, who will represent a wide range of cultures, genders and races.

This proposal provides year-long stipend support for the students and encourages and motivates students to be part of the NRICoS group for multiple years. The NRICoS group will support students as they complete their degree and provide skills and encouragement to prepare them for graduate studies. This long-term involvement starts with recruiting students as early as possible, close to the end of their first year and keeping them involved throughout their entire remaining undergraduate program. The additional years of research provide several important benefits to these students: greater depth of knowledge, advanced development of research skills, opportunities to mentor younger students, academic year financial support, access to a highly diverse group of peers and mentors in the NRICoS group and the collaborators in the experiments. All of these benefits target areas shown to improve retention and success of students.

This proposal also offers students at institutions that do not offer a physics degree or have limited advanced electives with a potential pathway to graduate physics programs. The students who will be participating from Texas Woman's University (TWU), for example, will be able to take advanced physics courses from University of Texas, Arlington (UTA) in replacement of advanced chemistry electives. These students, who will earn a chemistry degree from TWU, will have advanced physics classes that can substantially improve their chances of being accepted to graduate programs in physics. If successful, more schools that lack a physics degree could adopt this model to provide access to graduate physics programs to their diverse student populations. This cross-discipline pool of students interested in physics may have dramatic effects as they bring their expertise and different perspectives to solving problems in physics. Many physics departments, in response to the success of the APS Bridge Program, are expanding the pool of potential applicants by accepting students who might not have a physics degree, but who have taken advanced physics courses. Thus the NRICoS model is aligned with a growing inclusivity in physics.

1.2 Impact and Importance of Undergraduate Research

Undergraduate research has been shown to be exceptionally effective in retaining students, especially minority students, in STEM majors [8,9]. The undergraduate research component of NRICoS will follow best practices in mentoring, utilizing resources compiled by the American Physical Society National Mentoring Community [10]. We will also rely on lessons learned by the Center for Integrated Space Weather Modeling (CISM) [11], a U.S. National Science Foundation (NSF)-funded Science and Technology Center (STC) that operated from 2002-2012. Dr. Ramon Lopez (who will lead the education components of this project, as the educational coordinator) was a Co-PI of CISM as well as the Co-Director for Diversity of the center. A report by the AAAS [12] that reviewed 17 STCs found that CISM had the greatest student diversity of all of the STCs, on par with national population figures. CISM was also a distributed center, and students developed an identity as CISM students because of center activities, activities that NRICoS will mirror.

Individual research groups will help develop an NRICoS-student identity through academic support along with mentoring, which will be an explicit and integral part of the research participation by the students. Students will be encouraged to bring homework problems to group meetings and to discuss other features of their education, such as which courses to take and career paths to consider. In addition, being part of the research group will provide a specific location these students can gather if this is not already provided which is a key component to successful physics programs [13]. Faculty and students from other NRICoS institutions will be brought into these conversations, so that students at any NRICoS institution know that they can ask for advice or information from other peers. The collaboration will take advantage of modern internet communication tools to connect the many members together to foster these types of interactions. These kinds of features will transform the research group into a general support structure and provide students with a sense of belonging, which, in turn, will foster better academic performance and greater retention [14 – 16].

Collaborative Research: NRICoS

As with CISM, NRICoS students will be guided to form their own network, to see themselves as part of a larger enterprise. Some research group meetings will be devoted to topics like mentoring and scientific ethics, and these meetings will be held jointly across all the institutions using internet conferencing tools, such as Zoom [17]. Before each Texas Section of the APS (TSAPS) meeting, all of the students at the various institutions will participate in a practice session for their presentations either in person or remotely. This ~1/2-day session will allow the presenting students to do a “test run” of their presentations to their peers (increasing confidence for the meeting and obtaining feedback) and build a sense of belonging to a bigger project. At the TSAPS meeting, the NRICoS students and faculty will eat together and have a small side meeting, again to foster the sense of belonging to a group, of being a NRICoS student. To promote interactions between groups at other times, we will provide access to Zoom and other internet tools so that our students can arrange their own meetings to share ideas and questions.

As discussed above, NRICoS will take advantage of materials developed by the APS National Mentoring Community. In addition, the APS, in conjunction with AAPT, has undertaken a major task to develop a document called *Effective Practices for Physics Programs* (EP3) [18]. This document is being developed by a taskforce with (solicited) input and review by leading researchers and practitioners in various aspects of physics education (including members of the APS National Mentoring Community). The work has been ongoing for three years, and it is expected that portions of the EP3 document will be released in early 2021. R. Lopez is a member of the task force, and as soon as the relevant chapters (Undergraduate research, student mentoring) are available, the document will be provided to all NRICoS participants. In the meantime, many aspects of the education program will be guided by the ongoing Task Force work (R. Lopez is one of the people working on the Mentoring chapter), best practices identified during the CISM experience, and interaction with the APS National Mentoring Community.

1.3 Preparing Undergraduate Students for Success in Fundamental Physics

The collaborating NRICoS institutions listed in Table 1 have diverse student populations in ethnicity and gender with many students first in their families in higher degrees. Thus, the NRICoS program will provide a greater opportunity to select and train traditionally under-represented groups of students in fundamental skills to be independent thinkers and encourage them to continue into physics graduate degree programs, the primary goal of this proposal. The NRICoS program can also function as a companion program to compliment the funding meant to support construction of equipment for neutrino experiments since these funds do not support data analyses. This will enable participating students to have an opportunity to take part directly in construction projects at collaborating institutions while doing analysis as part of NRICoS. The increased scope of this program fits **the STEM Opportunities Act (HR2528)** and **the MSI STEM Achievement Act (HR4372)** passed in the 116th Congress, both under consideration in the Senate.

2. RESEARCH AND DEVELOPMENT DESIGN

2.1 Project Goals

The NRICoS program involves joining four primarily undergraduate (PUI) and the two R1/R2 institutions into a group with the goal of providing undergraduate students opportunities of enhancing their education integrating a multi-year research experience. This innovative program will leverage the extensive neutrino research programs already running at the R1/R2 schools and at one PUI. This program will provide additional support to encourage the completion of their undergraduate physics degrees while also providing additional skills and knowledge needed to continue on to graduate programs. This comprehensive program

Table 1. List of Participating Institutions on NRICoS Project

Institution	Category	Primary Responsible
Univ. of Texas at Arlington	R1, 4 year, Ph.D.	Jaehoon Yu (NRICoS PI)
Southern Methodist Univ.	R2, 4 year, Ph.D.	Thomas Coan
Univ. of Dallas	PUI, 4 year UG	Levente Borvak
Southwestern Univ.	PUI, 4 year UG	Steve Alexander
Abilene Christian Univ.	PUI, 4 year UG	Larry Isenhower
Texas Woman's Univ.	PUI, 4 year UG (no. Phy. BS)	Nasrin Mirsaleh-Kohan

Collaborative Research: NRICoS

involves two training workshops each year, part time research involvement during the academic year, full time involvement during the summer, conference presentations, opportunities for mentoring younger students, and connections to a larger group of similarly interested students and faculty across the six schools. The research opportunities will focus on simulation and data analysis tasks for current and future neutrino experiments and training across all research knowledge and skills such as programming, fundamental physics, computer simulation, data taking, data analysis, research writing, presentation, ethics, networking, and mentoring best practices. Therefore, students participating in this program will be well prepared for a future career in physics and other STEM fields.

2.2 Project Management Structure

The team must have a strong management structure to ensure the success of the NRICoS project. The PI's on this project will form the project executive board (EB) which will be responsible for monitoring progress and the direction and modification of the project execution plan as needed, interacting with each institution's upper administration, writing an annual report, and deciding the location of the annual training workshops and the support for the workshop. The EB will meet more often at the beginning of the project to ensure a smooth start of the project. As the project settles, the EB will have regular meetings once a quarter. The project director, PI Yu will act as the EB chair and will call the meetings.

The project will also have a forum for peer mentors (PM) to ensure close communication between them across the collaborating institutions and to share information needed for effectively guiding and mentoring students. Since PMs are at the front line of NRICoS project and are essential for the success of the project in both the technical aspect and the educational aspect, the forum will be co-chaired by Dr. Jonathan Asaadi who will be responsible for the technical aspect of the project and Dr. Ramon Lopez who will be responsible for the educational and mentoring aspect of the project. The PM at each institution will meet regularly with the PI to ensure that they are interacting with the students effectively. The PMs will help each other to overcome any unforeseen difficulties at any institutions. In addition to the regular meetings, the co-chairs can call meetings as needed, particularly in preparation for the workshops so that PMs can provide input to the training workshop program committee to ensure the topics covered are specific to the students' needs.

2.3 Student Selection and Retention

The student selection criteria for the NRICoS program, whose rubric is shown in Table 2, will focus on two key aspects: diversity of the project group and evidence for a good work ethic without requiring an enrollment in STEM fields *a priori*. These were chosen because the NRICoS program is seeking to make significant improvements to diversity in physics, and PIs' prior experiences working with successful undergraduates shows that work ethic and interest are far more valuable traits than completed courses or grades. The schools involved already start on a good foundation in terms of diversity where combined five year averages of graduates for these schools are 22% Hispanic and 11% African American. This exceeds the national averages found by the National Center for Education Statistics in 2017 of 14.8% Hispanic and 9% African American. In addition, the larger size of the NRICoS student group should increase the chances students will see similar mentors or peers within the program. It is also important to note that diversity will be defined broadly to encourage diversity across degree plan, race, gender, and culture.

The focus on work ethic rather than specific knowledge or skills may also compensate some differences in availability of advanced courses in high schools which can lead to a lack of diversity due to the types of schools lacking these courses. In addition, selection rubrics will use techniques that have been found to reduce issues of implicit bias in the hope to provide the fairest selection process possible [19]. Not only is it of great importance that STEM programs are made more widely available to these underrepresented groups of students, but also that they are then retained in these fields and go on to pursue careers in research and industry in those fields. NRICoS is designed with exactly this type of retention in mind and based on statistics from our institutions over the last five years, we are confident that these benefits will be extended and sustained to such a diverse group of students that will positively impact the national statistics of underrepresented minorities in the STEM fields.

Table 2. Example rubric for student selection process

Topic	Description	Low (1 point)	Middle (2 points)	High (3 points)
Research experience	have prior research experience?	None	1 semester experience	>1 semester experience
Education experience	What courses have they had	Only intro physics courses	Intro courses plus modern	Upper level physics classes
Diversity	Further the diversity of the NRICoS group?	No	Increases for local or entire NRICoS group	Increases for both groups
Personal statement	Evaluation of a personal interest statement and past work examples.	Shows little interest in research or grad school	Well written & shows some interest in research or physics grad school	Very well written and shows a strong interest in physics grad school
Reference Letters	Establishes work ethic	No specific warning signs	Some sense of responsibility & enthusiasm	Strong sense of responsibility & leadership
Non STEM Majors	Willing to take relevant STEM courses outside the major	No	Take 1 – 2 classes, e.g., computing, physics	Take > 2 class, willing to switch major to physics

In the first year, ideally each institution will add two NRICoS students at the beginning of the Fall semester – just starting their sophomore year. In addition, one starting their junior year, preferably having some research experience will be selected as the peer mentor. Although these students will need a tutorial on particle detectors, essential computing skills, and an introduction to the project they will be working on, a 3rd year student will have in general a greater experience in academics and more exposure to physics to draw on enabling the student to fill the PM role. During this first year, the ongoing work of the NRICoS project will be widely publicized to the entire community of the participating institutions and high schools in the vicinity to increase interest in future applicants.

After the first year, each institution will recruit a new set of two sophomores at the beginning of the summer and the existing students will begin to initiate them into the different research activities. This tiered approach has several important advantages: recruiting students into the project early in their career will help retain them in physics programs, recruiting non-physics majors who provide other important skills that may be less common and they can learn the necessary physics through several opportunities provided as part of the NRICoS program. This strategy will add possibilities for recruiting physics majors from students with different talent groups and broaden the diversity of the program participants. Students selected and trained as sophomores can remain in the program for three years, which will allow them to make significant research contributions. Furthermore, these young students will have opportunities to act as mentors to new students brought into the program later, providing another facet of preparing them for a STEM career.

Students who have completed 3 years of the NRICoS program will have had the time to develop substantial technical skills by working on research projects associated with their chosen experiment. Several research studies have demonstrated the importance of faculty-mentored research with students to the retention of these students. In addition, these students will have had the opportunity to develop presentation

skills (having given several poster and oral presentations at both APS meetings and NRICoS meetings) as well as the leadership skills gained from mentoring younger students in each group. They will also have received extensive mentoring from the peer mentors, the faculty PIs and the other members of the wider NRICoS community. Graduates of the NRICoS program will feel confident about their ability to excel in a graduate high-energy physics program. For this reason, we will make sure that our selected students have a range of initial interests - some perhaps will be more interested in the programming and data analysis areas, others in the construction of physical detectors. By cross-training each group, we hope to obtain extremely competitive students who can make substantial contributions to both fields of study.

2.4 Peer Mentors

The Peer Mentor (PM) will act as the mentor and the technical instructor for the students. For this reason, each PM must be trained on data analysis tools and perform analysis themselves together with the students to guide them effectively. We will use resources provided by the APS NMC as well as the EP3 guide to provide professional development to faculty and PMs, since they need to understand their roles as mentees and how to get the most out of mentoring experiences. We anticipate senior NRICoS students who are in their final years of the program would eventually be able to serve as a PM, providing NRICoS students additional opportunities to mentor younger students. The PMs will also be selected in a manner to ensure diversity in range of cultures, races, and genders, in addition to their technical and interpersonal skills.

The roles of PM's will include setting a schedule, assisting in teaching the needed physics and computational skills for the research project, discussing progress on the student's project, help in preparing regular team updates, and providing help with the other courses the student is taking. This is a broader mentoring role than is typical because we believe that the NRICoS program should provide a complete range of skills needed to be a successful scientist rather than focusing solely on the research tasks assigned to the student.

The PMs will be an experienced undergraduate who has been part of the program for at least one year. They will have the skills needed to teach the new students how to do the basic tasks they are assigned and help them learn the basic physics involved while also helping them in their courses and showing them how to interact with their PI and the rest of the NRICoS group. The PMs will get significant experience managing other students and working in a leadership role with other group members which will be highly valuable as they continue their careers. The younger students will see a lower barrier to asking questions and thus be more likely to seek help quickly and not remain stuck on a problem as long. Plus they will have a role model to look at as they learn how to interact with their PI and with the NRICoS group at large.

This is asking a lot of these PMs especially in the first couple years as the program is growing and developing. The PI and the rest of the NRICoS collaboration will need to provide additional support in these first years as the first group of students is brought into the field. Special training sessions will be provided for all PMs so that they can be taught some mentoring best practices and to forge a strong connection with each other so that they will be able to support each other as they fulfill this more challenging role in their local group. While a lot is expected of these PMs, the program will be building a large support structure around them: The PI at their local institution, PIs and PM from the other NRICoS institutions will all be connected in ways to encourage mutual support for any person who is needing it.

It is expected that as students mature in the NRICoS program, their role will shift and take on more responsibilities such as the PM role. Their learned experiences will make them valuable mentors to the younger students and their greater expertise will provide more opportunities to work directly with group leaders. This will help spread the peer mentoring load among several people and increase the diversity of people available to provide support to other NRICoS members.

2.5 Comparison to NSF REU program

While this proposal has some similarities to the already established and successful Research Experience for Undergraduate (REU) program at NSF, its fundamental approach is very different. The primary differences are in three important aspects: **all year participation in the program for multiple years, training workshops focused on teaching skills needed to be successful in research, and a collaboration**

of multiple schools forming a larger regional support group. In addition, it is anticipated that students will choose to remain in the NRICoS program until they graduate. This multi-year **long-term involvement** will allow significantly deeper development of research skills and provide undergraduates with an opportunity to perform every type of research work from construction to maintenance to simulation and analysis as their skills grow each year. While we acknowledge some students will prefer to seek a broader sampling of research opportunities through doing several different research experiences, the NRICoS program will offer students a chance to choose a multi-year experience to deeply develop many critical skills within one research area. All of the skills that the students will develop can be applied to research in other areas and are not limited to neutrino research.

The NRICoS team will organize two one-week long annual workshops to teach skills that fresh NRICoS undergraduates may not have easy access to such as: advanced physics concepts, computer simulation and modeling, data analysis, presentation skills, etc. These workshops will teach the incoming students and also provide existing students opportunities to teach their peers which will develop important communication skills. These workshops will bring in research leaders in the areas being focused on in addition to the expertise already available within the NRICoS program. Then students will be expected to use these skills in their research assignments as they continue working with the NRICoS group.

2.6 Emphasis on STEM Education

The student learning goals center on science, communication skills, and the skills to operate effectively in a collaborative science environment. To the extent possible, active learning pedagogies will be incorporated into activities that provide students with the basic scientific content, as was done in the CISM experience [10]. As described above, the education component will include academic support for students in all of their undergraduate classes to increase retention.

Many undergraduate programs include a senior capstone or thesis component in their curriculum. NRICoS provides this same type of experience in a way that more closely resembles what the students will encounter during a career in private industry or graduate school. Because NRICoS encourages students to interact with mentors at other institutions, our students will no longer be restricted to the projects that the faculty at their institutions would normally sponsor. This expanded opportunity will help our students decide which career path best fits their interests and skills and help further diversification in STEM fields.

2.7 Student Neutrino Data Analysis Tasks

In order to engage the students throughout the entire year, each student will be given a data analysis task to be carried out throughout the semester along with an identified mentor to assist in the project. These tasks are meant to provide real world experience analyzing data or simulating data from both existing neutrino experiments, such as LArIAT, MINERvA, MicroBooNE and ICARUS, and future experiments currently being developed such as SBND and DUNE. These tasks teach important research skills but also tie into concepts they are learning in their courses such as radioactive decay and conservation of energy and momentum which will show real world applications of this learning.

Open source tools will be utilized such as those provided by *Neutrino's in the classroom* [21] and the *Argo* [20] event display in collaboration with open source Monte Carlo and data files from the associated collaborations. These tools can serve as a starting point for the curriculum, which can be further developed by the PI's in this grant and then re-released back to the community for further inclusion.

Example analysis tasks which can be accomplished with these tools include

- **Event identification:** Beginning with visual identification in event viewers students will learn how to recognize specific types of neutrino interactions. Then techniques that automatically classify these events will be introduced and students will be shown how machine learning is used to make best guess assignments of interactions. Finally, students could help developing new techniques to improve these identifications through studying the aspects of missed events or misclassified events. This process will introduce students to the entire machine learning process through learning how to understand the system being studied and the biases that can occur within machine learning. These skills will be extremely valuable to many future careers paths in physics and society.

- **Event reconstruction:** This type of analysis requires students to look at the data coming from a particular detector and group parts of this together into tracks that can be associated to a specific particle with a specific momentum. With these tracks identified the underlying physics can be analyzed to look for things such as the invariant mass of a previous parent particle. This requires looking for patterns in contained within various histograms and other abstract data analysis results. This will teach the students how to apply the fundamental laws of motion they have learned in their classes to real world collisions and learn how to interpret complex data to find the hidden patterns which are signs of the underlying physics of our universe.
- **Background rejection:** Another important aspect of scientific data analysis will be taught through understanding background rejection. Backgrounds come from the many different possible interactions that can create signals in a given region of interest. Understanding these backgrounds are critical to making statements about many important physics measurements. Doing this well requires students to combine many different skills together: event identification, particle identification, relevant physics involved, results from simulations, etc. Through this work students will see how to carefully evaluate a set of data to make clear statements about what can be known after all these backgrounds have been removed from a particular data set.
- **Presentation of Work:** Students will be encouraged to present their analysis progress and results at the relevant working group meetings of the particular experiment they are involved in as well as at regular internal NRICoS meetings and regional APS meetings throughout the semester.

2.8 Annual Training Workshops

NRICoS students will participate in two one-week long annual training workshops to be held (and rotated through) the various associated institutions. Nominally, these workshops are envisioned to take place during the summer (~mid June) and winter (~early January) prior to the start of the long semesters. All NRICoS students will be required to attend and participate in the workshop.

The workshop will have two major components. The first will be half-day lectures meant to teach the basics of particle physics (with a focus on neutrino physics), particle detectors (with an emphasis on neutrino detectors), and the history of discovery within high energy physics (again, with an emphasis on neutrino physics). The second part of the day will be hands-on training of the associated software which will be used by the students throughout the semester. In addition to training using the associated event display tools and packages, students will be provided a basic primer in common data analysis packages such as python and C++. Jupyter notebooks [22] and the CERN [23] based scientific toolkit known as ROOT [24] provide a good template for tutorials and examples which the students will be led through with an emphasis on the tasks they will be attempting throughout the semester. A similar approach has been used at UTA's High Energy and Nuclear Physics Summer Camp [25] with great success and can be expanded upon for the NRICoS program.

2.9 Regular Meetings for Checkpointing Progress

Each institution will hold a local weekly meeting where students will present their work and give updates on their research. The second portion of the meeting, whether institutional or remote, is a round table. The intent is for each student to discuss their recent efforts and any technical hurdles they are facing. The goal is to facilitate group members to help each other. This is also a chance for the PI and/or PM to explain why each student's effort matters and how it fits together as a combined research effort.

Each month all participating institutions will be hold a remote meeting to share the progress of each group, to mentor students across participating institutions, and to discuss any difficulties (both technical and otherwise) that students have encountered. One goal for these meetings is to create a sense of ownership in the participating students for the program and to fully integrate them into the program as a stake holder. This monthly meeting will also include a short keynote talk. These talks will be given by experienced students when possible but also by faculty. The idea here is to give an overview of key historical experiments (Cowan and Reines, the discovery of oscillations), current events (the discovery of coherent neutrino scattering or the latest paper from experiment X) or practical matters (the beam structure of the

Fermilab accelerator complex, ROOT 101). Each monthly keynote will be distributed between institution and change topic based on what is most useful to students at the time.

Both the regular institutional meetings and the monthly remote meetings will share the same basic structure. Students are encouraged to show slides whether with a single plot or a larger suite of results. The institutional meetings prepare students for the remote meetings and the remote meetings prepare students for conferences and larger collaboration meetings. The process of making plots also gives the students material that they can collect later when giving more major presentations or when writing an undergraduate thesis.

2.10 Regional and National American Physical Society Meeting Participation

Each NRICoS student will be sent to the two Texas Section American Physical Society (TSAPS) meetings to attend and to present their work. The importance of taking students to both the TSAPS meetings is twofold. First, the Texas meetings usually are scheduled in October and in March. This is well after the students participating in NRICoS program will have finished their summer research projects. Having students present their work at these meetings gives us a low stakes venue for our newest students to give their first public presentation. Such an accomplishment helps these students to realize that they could have a future in this field of physics and have something tangible to report when applying for a graduate school.

Secondly, since more advanced NRICoS students will be presenting their work at this meeting, it will give the new students a sense of esprit d'corp - of belonging to an important project. Once students have had the chance to demo their posters and talks at the Texas meeting, they should be more comfortable/more capable of delivering an improved version of their work at larger meetings. Since each school will have a mix of younger and advanced students, they will be able to help mentor the younger students through the important task of communicating scientific ideas to no specialists, in addition to the PM.

Finally, we will select two students out of the NRICoS cohort at the annual workshops, starting from second year and send them to the national APS April meetings to present their work, motivate other NRICoS students to perform better during the year and give them a national exposure to potential graduate advisors. This will also provide the NRICoS project further exposure and showcase its accomplishments within the field of physics and build a network of prestige for a broader demographics of students to apply.

2.11 Participation in Neutrino Experiments at Fermilab

One selected student (preferably the more senior student in their UG years) from each institution will be sent to Fermilab for a four week stay in the summer each year to participate in a neutrino experiment – construction, commissioning, data taking and data analysis. These students by then will have acquired significant knowledge of neutrino physics and expertise in software relevant to their research activities. Each student will be paired with an on-site mentor (e.g., graduate student, postdoc, staff scientist, etc.) who will serve as both a technical resource for their research as well as a general “cultural guide” to the research environment of their experiment and Fermilab as a whole. An initial contact with the Fermilab Neutrino Division to assist us in identifying suitable Fermilab-resident mentors is encouraging. We do not anticipate any difficulties in providing suitable mentors for the students during their stay. This summer sojourn will help students hone their technical skills, identify potential graduate advisors and understand how actual “big science” research is conducted. The sojourn will aid students in creating a peer network helpful to them in their future careers and significantly increase the likelihood they remain in the field.

2.12 NRICoS Computing Resources for Student Data Analysis

The two research universities on the project, namely The University of Texas at Arlington (UTA – R1) and Southern Methodist University (SMU – R2) have teams participating in the ATLAS [26] experiment at CERN’s Large Hadron Collider (LHC) [27]. UTA is the home of one of the six U.S. tier 2 computing centers for ATLAS and has tier 3 compute and storage resources to serve local computing needs. SMU also has tier 3 compute and storage resources. These resources could be made available to NRICoS project participants in addition to the computing resources for each of the neutrino experiments at Fermilab.

In particular, SMU will make its computing resources at its Center for of Research Computational Computing Science (CRCS) as a cost-free dedicated computing farm for students’ Monte Carlo simulations.

Collaborative Research: NRICoS

All NRICoS associated faculty and students, irrespective of home institution, would be granted full computing privileges to the CRCS. A dedicated site for computation simplifies software installation and access to mass storage and guarantees to NRICoS participants a minimum number of CPU cycles for computation. SMU's computing resources are significant. We intend to purchase enough dedicated mass storage to ensure NRICoS participants have stable, long-term storage for their results and data sets.

2.13 Synergy with Existing Education and Outreach Programs

QuarkNet [28] is a U.S. National Science Foundation funded partnership between Fermilab and the University of Notre Dame and is a nonprofit collaboration dedicated to developing the nation's technical workforce. It provides means for high school teachers to develop their skills and bring research experience to high school science classrooms which ultimately affect high school students by promoting their scientific curiosity and encouraging interest in pursuing a STEM field in.

We will leverage the existing QuarkNet summer programs hosted by UTA and SMU by having participating undergraduates explain their research to the enrolled high school teachers during one or more of the daily sessions. These outreach presentations benefit the undergraduates by providing them an opportunity to explain their neutrino research to motivated non-experts in a coherent fashion. This interaction benefits the teachers by providing accessible speakers who can spend considerable time explaining their work. Subsequent to the summer QuarkNet workshop, the undergraduates are then paired with interested teachers to make a limited number of presentations to high school physics classes. Again, this procedure provides undergraduates with the experience of explaining their work to non-experts. It also permits high school students to interact with an accessible and non-threatening speaker of roughly comparable age at a time when some appreciable fraction of them are likely considering college applications.

In addition, the International Masterclasses (IMC) [29] provide a one-day experience of particle physics research to 12,000 high school students in 55 countries at 255 universities and research labs each year. The NRICoS project can be a natural pathway QuarkNet teachers can encourage their students to consider after the graduation, and for high school students who went through the IMC program to continue their excitement in fundamental physics in college and eventually to a graduate program. The NRICoS team will work closely with the QuarkNet and IMC teams to make NRICoS into a synergist continuation program for high school students who benefit from these programs. NRICoS will motivate students to join a STEM field in their college education and move on to graduate programs in the field of physics or enter the STEM workforce. Therefore, synergistically connecting these programs will enable high school students to have independent, extensive research activities throughout their college years.

2.14 Expected Educational Outcomes

The expected educational outcomes for NRICoS students are threefold. First, by participating in this program NRICoS students will gain a strong understanding of particle physics and be able to contribute to the ongoing research projects described in this proposal. Second, by providing our students with the opportunity to conduct cutting-edge research and to present their results at conferences, they will be retained during their undergraduate career and obtain their BS degrees or take enough upper division courses to be accepted into a physics graduate program. Finally, by mentoring our students and providing them ample role models, the students will have the ability and confidence to apply to Ph.D. programs. The expected educational outcomes for faculty are twofold. First, NRICoS faculty will gain knowledge of independent research-based best practices in mentoring. We expect that they will share this knowledge and information such as that about the EP3 document, with colleagues. Second, NRICoS faculty will gain familiarity with active learning pedagogy, at least those aspects that are used in NRICoS educational activities.

3. MECHANISMS TO ASSESS SUCCESS OF THE PROJECT

Project evaluation will be conducted primarily as an internal evaluation in combination with regularly scheduled external review by the external evaluation advisory board (EEAB) members. The EEAB will comprise of six representatives from participating institutions, the technical coordinator, the educational coordinator, and an external project evaluator. Dr. Toni Sauncy, Chair of Physics at Texas Lutheran

Collaborative Research: NRICoS

University and former Director of the Society of Physics Students and Sigma Pi Sigma from 2012-2014 at the American Institute of Physics will be the external project evaluator and the chair of EEAB. She has extensive experience in undergraduate physics education, particularly with regard to best practices in undergraduate research. The purpose of EEAB is to provide feedback on educational materials, research designs, and instruments to improve the relevance and feasibility of the project findings to colleges, universities, school districts, and communities. The project team will convene with EEAB via teleconference annually at the summer semi-annual training workshop and the end of the project. Based on their input, the project team will develop detailed reports on progress and amendments.

To assess the impacts of the project on professional knowledge, skills, and self-efficacy of the students, the project team will have two subject groups, an experimental group of newly participating students and a control group of previously trained students at each of the semi-annual training workshop so that data for students' performances and knowledge can be compared between the two groups. The project team will develop a set of metrics for measuring the effectiveness of the training workshop and of the analysis tasks and administer them on the two groups.

The mentoring and education program will be evaluated using instruments provided by the APS National Mentoring Community (NMC), in particular the CIMER Assessment Platform [30]. By using and adapting these instruments that are particularly tailored to measuring the effect of a mentoring program, we will be able to document how the mentoring experience is benefitting the students. The evaluation will be enhanced by the interviews of the students conducted by Dr. Sauncy to produce a rich description of the students experiences that could inform other projects involving undergraduates in research on the advantages of using best practices in student mentoring. We will be particularly attentive to the response and success of underrepresented groups among the students.

Finally, in order to assess the long-term effect of the program and to build a strong network of pride and prestige, we will establish a system to track NRICoS graduates throughout their careers. For this, we will design a website and a LinkedIn [31] account for the NRICoS program. All of our NRICoS students will be asked to open a LinkedIn account so we may keep updated information on our graduates' employment and activities. Through our group LinkedIn account, we will create networking opportunities between the NRICoS alumni and current students. In addition, we will invite an NRICoS alumnus to one of the two training workshops starting the 4th year of our program for them to share their accomplishments and the career paths they have chosen with the current cohort of NRICoS students. To keep our graduates informed, we will send an annual report about our workshops and publications to all of our students.

4. DISSEMINATION

The NRICoS website will serve as the main hub for providing general information about the project, tasks assigned to each participating student and the corresponding experiments, the necessary links to various analysis software information and the materials used in the training workshop. The training materials will be posted using the CERN indico system without restrictions so that students and student peer mentors can access them anytime, anywhere. The training session handouts, resources, and educational materials for fundamental physics of neutrinos, developed by the project team, will supplement the website. Institutional PIs and student peer mentors will be responsible for updating their own information as students make progress. Each participating student will be encouraged to add tips and other supporting materials to be shared between the students on the program so that the NRICoS network can be leveraged toward accomplishing their analysis tasks.

During and after the training workshop sessions, the project team will continually update the website with the actual training experiences. The NRICoS website will become the resource hub for not only the participating students but also for other students taking part in the neutrino experiments so that technical know-how can be shared within a broader community at large, nationally and internationally. Information and findings from the NRICoS project will be publicized in journals and presented at regional, national and international conferences, such as the American Association of Physics Teachers (AAPT), the Society for the Advancement of Chicanos and Native Americans in Science (SACNAS), American Society for

Engineering Education (ASEE), and National Art Education Association (NAEA) as well as American Physical Society meetings.

5. EXPERTISE

This five-year project will be managed by a team of faculty members from a coalition of two R1/R2 universities and four undergraduate or master's degree granting universities in Texas.

Dr. Jaehoon Yu (PI) is a distinguished professor in the Department of Physics at the University of Texas at Arlington. He is a high energy particle physics (HEP) experimentalist with over 30 years of experience in the field. He has a long track record of serving on many leadership roles in the field, including the commissioning coordinator of the upgraded DZero detector, leading over 600 collaborating members and as the R&D coordinator of the Long Baseline Neutrino Experiment (previous incarnation of DUNE) at Fermilab. His group is one of the factories to construct the electric field cage for the prototype detectors and for the final DUNE detector. In addition, he has a long track record of community service. He has served as the president of Association of Korean Physicists in America [32] and as the president of the member Korean American Scientists and Engineers Association [33] that promotes close collaboration between U.S. and Korea. As the PI of the project, he will be responsible for overseeing the entire project and manage the program, serving as the project director and the chair of the executive board (EB) which consists of the PIs of this proposal. He will make arrangements for regular EB meetings, external evaluation, semi-annual workshops and project reports in collaboration with the institutional representatives.

Dr. Larry Isenhower (Co-PI) is an associate professor in the Department of Engineering and Physics at Abilene Christian University. He brings 15 years of experience in atomic, laser, and optical physics. He was part of the first successful 2 qubit quantum gate between individually addressed neutral atoms and helped lead the construction of a 49-qubit QC as part of an IARPA project. Since joining ACU's engineering and physics department, he has taken a major role in curriculum development, is the Society of Physics Students faculty advisor, worked on E1039 at Fermilab, NIFFTE at LANL, and has started working on DUNE near detector development. He was just elected the SPS Zone Councilor for Zone 13 and this leadership role has given him an important perspective on the critical role research projects hold for undergraduate students and the need to provide these opportunities to educate the future STEM workforce.

Dr. Nasrin Mirsaleh-Kohan (Co-PI) is an associate professor in the Department of Chemistry and Biochemistry at Texas Woman's University (TWU). She is interested in understanding teaching pedagogy and student learning, particularly in science classes such as Physics. She has developed novel techniques such as Physics Photobook, creating videos, and the three-column-activity. These techniques have been incorporated in physics classes as well as other classes such as climate change and environmental chemistry. Her research interests include surface-enhanced Raman scattering, interaction of anticancer drugs with DNA, negative ions, laser spectroscopy, and radiation damage to DNA. Nasrin is a SENCER (Science Education for New Civic Engagements and Responsibilities) Leadership Fellow. Additionally, she has been a co-director of TWU's SENCER Center for Innovation-Southwest since January 2017. In this position, she along with other faculty is expanding the SENCER network of practitioners throughout a multi-state area centered on Texas. She is also advisor for the KEM Club (Kappa Epsilon Mu), TWU's award winning student chapter of the American Chemical Society. Furthermore, Nasrin is the faculty organizer for the annual poster show at the Golden Triangle Mall titled "Pioneer Research at the Mall" held every fall.

Dr. Steven Alexander (Co-PI) is a professor of the Department of Physics, Southwestern University (SU) and has a long history of promoting student research. Since 2015 he has worked with 48 students on 27 different hands-on projects during the school year and with 18 students for during SU's 8-week summer research program. Most of these students have gone on to present their work at a scientific meeting. This is usually their first exposure with communicating science to other physicists. Many of these students go on to leverage their hands-on projects or summer research to obtain REUs at other schools or to gain entry to a graduate school.

Dr. Levente Borvák (Co-PI) is an affiliate assistant professor in the Department of Physics at the University of Dallas (UD). His current research in cosmology involves the characterization of gamma ray

Collaborative Research: NRICoS

bursts with a focus on redshift measurements. He did his PhD at the University of Notre Dame where his research topic was laser absorption spectroscopy to aid with measurements of parity violation in cesium atoms. He then moved to cosmology research as part of a collaboration between a group of physicists in the Czech Republic and Hungary. Currently, he is at UD where one of his goals is to involve more undergraduate students in research. PI Borvák will facilitate informal research talks from more experienced students or faculty to less experienced students as a means of putting their research in a larger context.

Dr. Thomas Coan (Co-PI) is a professor in the Department of Physics at Southern Methodist University (SMU) and has been a high energy physicist since his postdoc years, performing experiments at Fermilab, CERN and Cornell's Wilson Laboratory. He is a member of three prominent Fermilab-based neutrino experiments: NOvA, ICARUS and DUNE and has given multiple outreach talks at SMU's annual QuarkNet high school teacher summer workshop. He is the founder of a company (MATPHYS LLC) that manufactures a pedagogical muon lifetime experiment for the advanced undergraduate physics laboratory and is a reviewer for the American Journal of Physics.

Dr. Ramon Lopez (Co-PI) is a professor in the Department of Physics at UTA. He is a space plasma physicist and an expert in physics education research. Dr. Lopez is active in promoting science education and diversity in science at all levels. He was one of the Co-Chairs of the writing team that produced the Next Generation Science Standards. He has also served on several scientific or education-related committees of the American Geophysical Union, the American Physical Society (APS), the National Academy of Sciences, the American Association for the Advancement of Science (AAAS), and the American Association of Physics Teachers (AAAPT). He has served as the President of the National Society of Hispanic Physicists (2018-2020). Dr. Lopez has won numerous awards for his work in both space physics and science education, including the 2002 APS Nicholson Medal, the 2010 SACNAS Distinguished Scientist Award, the 2012 APS Edward A. Bouchet Award, the 2018 HENAAC Great Minds in STEM Education Award, and two NASA Group Achievements Awards. He is a member of the UT System Academy of Distinguished Teachers. Dr. Lopez is a Fellow of the APS, the AAAS, and the AAPT. He will serve as the educational coordinator and will play a leading role in the design of the student research and mentoring experience and the building of the inter-institutional student network.

Dr. Jonathan Asaadi (Co-PI) is an assistant professor in the Department of Physics at UTA. He is a HEP experimentalist and serves as a leader in the field of accelerator-based neutrino experiments utilizing liquid argon time projection chambers as detectors. He has helped organize a series of two week-long high energy and nuclear physics summer camps aimed at engaging local high school students in physics research and will bring this experience and curriculum to the project as outlined in the narrative. He is also a Co-PI on the Mid-scale RI-2 Consortium: Enabling Precision Neutrino Physics with DUNE proposal where UTA will be responsible for the assembly of wire plane boards to be used in the DUNE detector. He will serve as the technical coordinator of the project and will be responsible for facilitating the two week-long workshops and be organizing the curriculum and hands-on exercises for the students. As a member of the Fermilab Users Executive Committee, PI Asaadi will work with PI's Lopez and Yu to facilitate the logistics of travel and work for the participants during their time at Fermilab in the summer.

Dr. Toni Sauncy (Evaluator) is the chair of the Physics Department Texas Lutheran University. She has over 25 years of experience in conducting research and research training in the area of optoelectronic materials fabrication and characterization with undergraduate students in primarily undergraduate institutions. She has served in a variety of leadership positions connected to the undergraduate physics community including a term as Director of the Society of Physics Students and Sigma Pi Sigma Physics Honor Society at the American Institute of Physics. Dr. Sauncy served as the president of the Society of Physics students before the directorship appointment, is currently the Chair of the Council on Undergraduate Research Physics and Astronomy Division and has recently been elected as the Vice President of the American Association of Physics Teachers. She will serve as the external evaluator for the project, selected due to her experience in all areas of undergraduate education and focus on research with undergraduates, which will provide a strong foundation for evaluation of the proposed work and its impact on the students involved.

6. BROADER IMPACTS

Two R1/R2 universities and four undergraduate or master's degree granting universities in Texas are participating in the proposed NRICoS project. These universities serve large numbers of female and minority students. Many of these students are the first in their family to pursue advanced degrees and will benefit greatly from the NRICoS project. The students in this project will become part of a well-trained STEM workforce and will be inspired to earn post graduate degrees. Some specific examples of the diverse populations served by two of the six participating institutions are described in detail below.

Texas Woman's University (TWU) is the largest public university primarily for women in the United States and is a Hispanic Serving Institution. TWU has been recognized as the most ethnically diverse student bodies in Texas and No. 5 nationally according to U.S. News & World Report's 2021 "Best Colleges" rankings. Fall 2018 enrollments indicated 31% Hispanic, 18% African American, 1% Native American and 31% Caucasian. TWU has a strong commitment to educating female and ethnically diverse students, both in the state of Texas and nationally. Moreover, given many TWU undergraduate and graduate students are first generation college students, the training these students receive at TWU plays a significant role in expanding opportunities of earning advanced degrees to a broader demographic group.

Southwestern University is a small liberal arts school that is located in Georgetown, Texas. It offers only undergraduate degrees and in 2016 its 1486 students consisted of 57% women and 43% men. Of these 62% of the students were white, 4% were Asian, 5% were black and 22% were Hispanic. In addition, 27% of the student body were Pell Grant recipients. Since the physics majors at Southwestern closely reflect these demographics, any effort to recruit physics majors into the field of high energy physics will significantly improve the diversity of this rapidly growing field.

The NRICoS program will enhance our training success by involving more undergraduate students in research. The hands-on training with state-of-the-art instrumentation will empower students to pursue advanced degrees and successful academic or industrial careers. These students will be involved in all aspects of the project from experimental design to data acquisition and analysis and to presentation of their work at regional and national meetings. Thus, not only will they be learning the theory and practice of cutting-edge techniques, they will also be learning other valuable skills, such as problem-solving and analytical thinking skills in their research. Furthermore, they will also learn the critical skill of presenting their research to colleagues and the public, which can often be paramount to obtaining support and funding for future endeavors. Overall, the unique aspect of these universities enables us to have an important impact in the students' lives by improving job prospects, preparation for further academic endeavors, and acquiring a higher level of critical thinking skills.

The NRICoS program will give students opportunities to interact with mentors covering a significantly broader range of cultures, races, and genders than would be available at any one particular institution. This is especially true at the undergraduate-only institutions as they tend to have smaller programs with fewer faculty. The emphasis on forming a close-knit group of students and mentors will support this goal, and the many events planned each year will naturally help students develop these important relationships and a broader network.

Finally, the NRICoS project will provide a unique partnership among the participating universities to facilitate transfer of undergraduate students to Ph.D. programs, improving their opportunities in the pursuit of advanced physics degrees. Specifically, the NRICoS program is expected to reach a total of 138 student-years of contact with the students. In this period, NRICoS students will be trained in fundamental physics and related cutting-edge technologies, be mentored to ensure their academic success and be provided with a pathway and markedly improved opportunities to advanced physics degrees. If successful, the NRICoS program could be a model for other programs to increase diversity in the field of physics and could expand beyond the State of Texas. Through this endeavor, NRICoS will have graduated 60 research-hardened NRICoS graduates to help alleviate the national STEM workforce shortage and produce a diverse group of physicists who will be at the forefront of exploring the fundamental nature of the universe. Faculty in the program will learn about and incorporate research-based best practices in mentoring undergraduate students and will share this knowledge with other colleagues in the field to train more diverse groups of students.

7. RESULTS OF PRIOR NSF SUPPORT

PI: Jaehoon Yu, University of Texas at Arlington

PHY-1639157, 7/1/2016 – 6/30/2017, \$28,215, “Support for Biennial African School of Fundamental Physics 2016” (PI: Yu)

Intellectual Merit: The biennial African School of Fundamental Physics 2016 (ASP2016) program on advanced distributed computing technology clearly helped students explore fundamental nature of the universe and its forces and promoted deeper understanding of the origin of the universe. In particular, the characterization and deeper understanding of dark matter and dark energy that make up over 95% of the universe and a fuller understanding of the symmetry breaking mechanism. The program introduced state-of-the-art technologies in high throughput, high performance and high availability computing that are essential to digital contemporary scientific experiments.

Broader Impacts: The advanced distributed computing technology introduced in ASP2016 may be immediately used for other areas of scientific research and education, in addition to a wide range of sectors in society. This school helped to establish a greater pool of highly technical human resources in sub-Saharan African countries and promoted close collaboration with U.S. in academic and scientific research. Given proven successes of distributed computing school in three consecutive ASP series, it is clear that the strong support from NSF for offering advanced distributed computing program at ASP enables U.S. to maintain leadership in disseminating and training of the application of the distributed computing, the NSF supported OSGGrid to African continent and continue strengthening the relationship with these important countries for future.

Publications & Products: Lecture notes are posted on ASP2016 agenda page in Ref. [34]

Ramon E. Lopez, University of Texas at Arlington (relevant NSF grants only)

NSF Award #0856796 (\$1,999,994; 8/15/2009-12/31/2016).

Intellectual Merit: The *Arlington Undergraduate Research-based Achievement for STEM* (AURAS) was a combined effort of the Colleges of Science and Engineering (R. Lopez, Co-PI) to increase retention of incoming first-time first semester freshmen in these colleges by 15%. The primary work of AURAS involved implementing an “Emerging Scholars” program (ESP) in high-loss courses in mathematics (specifically, precalculus and calculus) and chemistry. Data showed that ESP students earned better grades in the corresponding lecture course than non-ESP students.

Broader Impacts: Undergraduate research was also supported, leading many faculty to continue to support undergraduates in their labs after the grant ended.

NSF *Robert Noyce Scholarship Program for Science and Mathematics Teachers* (DUE 0833343, 1035483, 14439914, and supplement 1640688) were funded between 2008 and 2016 (total \$3,308,921). Ann Cavallo (PI), Greg Hale, Ramon Lopez, James Alvarez, Theresa Jorgensen, and Laura Mydlarz (Co-PIs).

To date we have supported 123 undergraduate Noyce Scholars and 33 post-bac Noyce stipends. Notably, the total scholarships/stipends award was *more than our proposed numbers* in each grant. The most current program has a community college component, and to date we have awarded 51% of our scholarships to transfer students.

Broader Impacts: As of spring 2017, 108 Noyce Scholar graduates are actively teaching an estimated 16,200 high need secondary school students per year. Data on graduated Scholars reveals these 108 UTA Noyce Scholar graduates are currently teaching in 37 different school districts, ranging from 9% - 100% and averaging 53.2% economically disadvantaged student populations. The average teacher turnover rate of these Scholars’ school districts is 19.9%, which is well over the state average of 16%. However, about one-third to one-half of the 108 Noyce Scholars in these classrooms are beyond their required 2- or 4-year teaching requirement, with combined years of teaching equaling 248 years (ranging from 1–6 years).

References

1. LArIAT, J. Asaadi and J. Raaf, Co-spokespersons, <https://lariat.fnal.gov/>
2. MicroBooNE, B. Fleming and G. Zeller, Co-spokespersons, <https://microboone.fnal.gov/>
3. MINERvA, D. Harris and L. Fields, Co-spokespersons, <https://minerva.fnal.gov/>
4. NOvA, P. Shanahan and P. Valhe, Co-spokespersons, <https://novaexperiment.fnal.gov>
5. SBND, O. Palamara and D. Schmitz, Co-spokespersons, <https://sbn-nd.fnal.gov>
6. ICARUS, C. Rubbia, Spokesperson, <https://icarus.fnal.gov>
7. DUNE, E. Bluecher and S. Soldner-rembold, Co-Spokespersons, <https://www.dunescience.org>
8. M. J. Chang, J. Sharkness, S. Hurtuado, and C. B. Newman, What Matters in College for Retaining Aspiring Scientists and Engineers From Underrepresented Racial Groups, *J. Res. Sci. Teach.*, 51, 5, 555-580, DOI 10.1002/tea.21146 (2014).
9. M. J. Graham, J. Frederick, A. Byars-Winston, A. B. Hunter, & J. Handelsman, Increasing persistence of college students in STEM. *Science*, 341(6153), 1455-1456 (2013).
10. American Physical Society National Mentoring Community, <https://www.aps.org/programs/minorities/nmc/webinars.cfm>
11. Center for Integrated Space Weather Modeling, CISM, <https://www.bu.edu/cism/>
12. D. E. Chubin, E. Derrick, I. Feller, & P. Phartiyal, *AAAS Review of the NSF Science and Technology Centers Integrative Partnerships (STC) Program, 2000-2009*. Washington, DC: American Association for the Advancement of Science (2010).
13. D. Lopatto, Undergraduate Research Experiences Support Science Career Decisions and Active Learning, *CBE Life Sci Educ* 6(4): 297-306, DOI: 10.1187/cbe.07-06-0039 (2007).
14. Nagda, S. Gregerman, J. Jonides, W. Hippel, and J. Lerner "Undergraduate Student-Faculty Research Partnerships Affect Student Retention"; *The Review of Higher Education*, 22.1, 55-72 (1998).
15. S. H. Russell, M. P. Hancock, and J. McCulloug, "THE PIPELINE: Benefits of Undergraduate Research Experiences", *Science*, B., 316 (5824), 548-549 (2007).
16. ZOOM, <https://www.zoom.us/>
17. R. E. Lopez and N. A. Gross, Active Learning for Advanced Students: The Center for Integrated Space Weather Modeling Graduate Summer School, *Adv. Space Res.*, 42, pp. 1864-1868, doi:10.1016/j.asr.2007.06.056 (2008).
18. American Physical Society & American Association of Physics Teachers, "Effective Practices for Physics Program Project," <https://www.aps.org/programs/education/ep3/>
19. Fitzgerald, C., Martin, A., Berner, D. et al. Interventions designed to reduce implicit prejudices and implicit stereotypes in real world contexts: a systematic review. *BMC Psychol* 7, 29 (2019). <https://doi.org/10.1186/s40359-019-0299-7>
20. Neutrinos in the classroom, <https://neutrino-classroom.org>
21. Argo, MicroBooNE Event Viewer, <https://argo-microboone.fnal.gov/>
22. Jupyter Notebook, Data Camp, <https://jupyter.org/>
23. European Center for Nuclear and Particle Physics Research (CERN), F. Gianotti, Director General, [http://www.cern.ch/](http://www.cern.ch)
24. Root, Data Analysis Framework, <https://root.cern.ch>
25. UTA HEP-NP Summer Camp, <https://utahepcamp.wordpress.com>
26. ATLAS, K. Jakobs, Spokesperson [https://atlas.cern/](https://atlas.cern)
27. LHC, The Large Hadron Collider, <https://home.cern/science/accelerators/large-hadron-collider>
28. QuarkNet, <https://quarknet.org/content/about-quarknet>
29. International Masterclasses, <https://www.physicsmasterclasses.org>
30. CIMER Assessment Platform (<https://cimerproject.org/cimer-assessment-platform/>)
31. LinkedIn, Microsoft Co., Reid Hoffman founder, <https://www.linkedin.com/>
32. Association of Korean Physicists in America, <http://www.akpa.org/>
33. Korean American Scientists and Engineers Association, <http://www.ksea.org/>
34. ASP2016 Lecture Notes, <https://indico.cern.ch/event/528094/timetable/?view=standard>

Revised 05/01/2020

NSF BIOGRAPHICAL SKETCH

OMB-3145-0058

NAME: Jaehoon Yu

POSITION TITLE & INSTITUTION: Professor, University of Texas at Arlington

A. PROFESSIONAL PREPARATION

(see [PAPPG Chapter II.C.2.f.\(i\)\(a\)](#))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
Stony Brook University	Stony Brook, NY	Physics	Ph.D.	1993
Stony Brook University	Stony Brook, NY	Physics	M.S.	1992
Korea University	Seoul, Korea	Physics	M.A.	1985
Korea University	Seoul, Korea	Physics	B.S.	1983

B. APPOINTMENTS

(see [PAPPG Chapter II.C.2.f.\(i\)\(b\)](#))

From - To	Position Title, Organization and Location
2012 - present	Professor, University of Texas, Arlington, TX
2006 - 2012	Associate Professor, University of Texas, Arlington, TX
2001 - 2006	Assistant Professor, University of Texas, Arlington, TX
1998 - 2001	Associate Scientist, Fermi National Accelerator Laboratory, Batavia, IL
1996 - 1998	Research Associate, Fermi National Accelerator Laboratory, Batavia, IL
1993 - 1996	Research Fellow, University of Rochester, Rochester, Ny

C. PRODUCTS

(see [PAPPG Chapter II.C.2.f.\(i\)\(c\)](#))

Products Most Closely Related to the Proposed Project

1. B.S. Acharya et al., "African School of Fundamental Physics and Its Application,"
<https://www.africanschoolofphysics.org/wp-content/uploads/2019/08/ASP2016-FinalReport.pdf> (2016)
2. B.S. Acharya et al., "Biennial African School of Fundamental Physics and Its Application 2012 Report,"
http://africanschoolofphysics.web.cern.ch/AfricanSchoolofPhysics/asp2012/asp2012_final.pdf (2012)

Other Significant Products, Whether or Not Related to the Proposed Project

1. C.A. Argüelles et al., "New Opportunities at the Next-Generation Neutrino Experiments (Part 1: BSM Neutrino Physics and Dark Matter)," ROP V83, N12 (2020); DOI <https://dx.doi.org/10.1088/1361-6633/ab9d12>
2. V. Brdar et al., "Axion-like Particles at Future Neutrino Experiments: Closing Cosmological Triangle," arXiv:2011.0754 (2020)
3. DUNE Collaboration, "Prospects for Beyond the Standard Model Physics Searches at the Deep Underground Neutrino Experiment," arXiv:2008.12769 (2020)
4. DUNE Collaboration, "DUNE Far Detector Technical Design Report, Volume II DUNE Physics." arXiv:2002.03005 (2020)
5. A. Chatterjee et al., "Searching for boosted dark matter at ProtoDUNE," Phys. Rev. D98, (2018)

D. SYNERGISTIC ACTIVITIES

(see [PAPPG Chapter II.C.2.f.\(i\)\(d\)](#))

1. Oct. 2020 – present: DUNE Vertical Drift TPC proposal HV System Co-editor
2. May 2020 – present: APS DPF Snowmass 2021, Neutrino at BSM topical group co-convener
3. Sept. 2018 – present: Fermilab Shot Baseline Neutrino Program Institutional Board member
4. Nov. 2015 – present: Institutional Board member, ICARUS experiment at CERN/Fermilab
5. Sept. 2015 – present: DUNE Beyond the Standard Model physics group founding co-convener

Revised 05/01/2020

NSF BIOGRAPHICAL SKETCH

OMB-3145-0058

NAME: Jonathan Asaadi

POSITION TITLE & INSTITUTION: Assistant Professor, University of Texas at Arlington

A. PROFESSIONAL PREPARATION

(see [PAPPG Chapter II.C.2.f.\(i\)\(a\)](#))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
Texas A& M University	College Station, TX	Physics	Ph.D.	2012
University of Iowa	Iowa City, IA	Physics	B.S.	2004

B. APPOINTMENTS

(see [PAPPG Chapter II.C.2.f.\(i\)\(b\)](#))

From - To	Position Title, Organization and Location
2012 - present	Assistant Professor, University of Texas, Arlington, TX
2012 - 2015	Postdoctoral Fellow, Syracuse University, Syracuse, NY

C. PRODUCTS

(see [**PAPPG Chapter II.C.2.f.\(i\)\(c\)**](#))

Products Most Closely Related to the Proposed Project

1. J. Asaadi, et. al, "Tetraphenyl Butadiene Emanation and Bulk Fluorescence from Wavelength Shifting Coatings in Liquid Argon," JINST 14 P02021 (2019), arXiv:1804.00011 (Primary author and primary analyzer)
2. J. Asaadi et. al, "First Demonstration of a Pixelated Charge Readout for Single-Phase Liquid Argon Time Projection Chambers," Submitted to JINST, arXiv:1801.08884 (Contributing author and analyzer)
3. R. Acciarri, et. al, MicroBooNE Collaboration, "Design and construction of the MicroBooNE Detector," JINST 12 P02017 (2017) arXiv:1612.05824 (Contributing author and analyzer)
4. R. Acciarri et. al, "Construction and Assembly of the Wire Planes for the MicroBooNE Time Projection Chamber," JINST 12 T03003 (2017), arXiv:1609.06169 (Contributing author and analyzer)
5. J. Asaadi et. al, "Testing of High Voltage Surge Protection Devices for Use in Liquid Argon TPC Detectors," JINST 9 P09002 (2014), arXiv:1406.5216 (Primary author and primary analyzer)

Other Significant Products, Whether or Not Related to the Proposed Project

1. R. Acciarri et al, ArgoNeuT Collaboration, "Demonstration of MeV-Scale Physics in Liquid Argon Time Projection Chambers Using ArgoNeuT," : Phys. Rev. D 99, 012002 (2019), arXiv:1810.06502
2. R. Acciarri et al, ArgoNeuT Collaboration, "First measurement of the cross section for nu_mu and nu_mu-bar induced single charged pion production on argon using ArgoNeuT," Phys. Rev. D 98, 052002 (2018)
3. J. Asaadi, et. al, "A New Light Higgs Boson and Short-Baseline Neutrino Anomalies," Phys. Rev. D 97, 075021 (2018), arXiv:1712.08019
4. R. Acciarri et. al, ArgoNeuT Collaboration, "First Observation of Low Energy Electron Neutrinos in Liquid Argon TPC Detectors," Phys. Rev. D 95, 072005 (2017)

D. SYNERGISTIC ACTIVITIES

(see [**PAPPG Chapter II.C.2.f.\(i\)\(d\)**](#))

1. Fermilab Users Executive Committee Member (2019 - Present)
2. CENF-ND Experimental Cross-Section Working Group Convener (in collaboration with Dr. Sara Bolognesi, 2018 - Present)
3. Co-Spokesperson for the LArIAT Experiment (in collaboration with Dr. Jen Raaf, 2016 - Present)
4. Fermilab Detector R&D Advisory Board Member (November 2016 - Present)
5. MicroBooNE TPC Subsystem Lead (October 2015 - Present)

Revised 05/01/2020

NSF BIOGRAPHICAL SKETCH

OMB-3145-0058

NAME: Ramon E. Lopez

POSITION TITLE & INSTITUTION: Professor of Physics, The University of Texas at Arlington

A. PROFESSIONAL PREPARATION

(see [PAPPG Chapter II.C.2.f.\(i\)\(a\)](#))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
University of Illinois	Urbana-Champaign	Physics	B.S.	1980
Rice University	Houston	Space Physics	M.S.	1984
Rice University	Houston	Space Physics	Ph.D	1986

B. APPOINTMENTS

(see [PAPPG Chapter II.C.2.f.\(i\)\(b\)](#))

From - To	Position Title, Organization and Location
July 2007 - present	Professor, Department of Physics and CoDirector, UTeach Arlington, University of Texas at Arlington
Aug 2004 - July 2007	Professor, Department of Physics and Space Sciences, Florida Institute of Technology, Melbourne, Florida
Aug 1999 -Aug 2004	C. Sharp Cook Distinguished Professor, Dept. of Physics, University of Texas at El Paso (UTEP)
Aug 1999 - June 2001	Chair, Dept. of Physics, UTEP
May 1994 - June 1999	Director, Education and Outreach, The American Physical Society
July 1993 - Aug 1999	Associate Research Scientist, Department of Astronomy, University of Maryland at College Park (UMCP)
April 1993 - June 1994	Asst. Director for Research, East-West Space Science Center, UMCP
June 1992 - July 1993	Research Associate, Department of Astronomy, UMCP
Dec. 1985 - June 1992	Scientist (various ranks), Applied Research Corporation (on contract to The Johns Hopkins University Applied Physics Laboratory)
Aug. 1985 - Dec. 1985	Postdoctoral Research Fellow, Rice University.

C. PRODUCTS

(see [PAPPG Chapter II.C.2.f.\(i\)\(c\)](#))

Products Most Closely Related to the Proposed Project

1. Lopez, R. E., An interdisciplinary undergraduate space physics course, *Journal of College Science Teaching*, 263-269, Feb, 1996.
2. Lopez, R. E. and N. A. Gross (2008), Active Learning for Advanced Students: The Center for Integrated Space Weather Modeling Graduate Summer School, *Adv. Space Res.*, 42, pp. 1864-1868, doi:10.1016/j.asr.2007.06.056.
3. Cid, X., and R. E. Lopez (2010), The Impact of Stereo Display on Student Understanding of Phases of the Moon, *Astronomy Education Review*, 9, 010105, doi:10.3847/AER2009044.
4. Lopez, R. E., Hale, G., and Cavallo, A. (2014), The Preparation of Physics Teachers and the Next Generation Science Standards in the United States, in ICPE-EPEC 2013 Conference Proceedings, Eds. Leoš Dvořák and Věra Koudelková, Charles University in Prague, MATFYZPRESS publisher, Prague, 2014 ISBN 978-80-7378-266-5, pp. 501-508.
5. Lopez, R. E., Greene, M., and Cid, X. (2020). Using theory to inform practice in the advanced physics classroom, in press in *Research and Innovation in Physics Education: Two Sides of the Same Coin*, Guisasola, J. and Zuza, K. (Eds.), Springer, doi: 10.1007/978-3-030-51182-1.

Other Significant Products, Whether or Not Related to the Proposed Project

- Ongoing, extensive research in space physics and physics education (Google Scholar H-index = 37 as of 11/07/20)
- Provided research opportunities to >80 undergraduates since 2010
- Organizer of scientific and education symposia at numerous national and international conferences
- Graduated 3 Physics Ph.D. students in Physics Education Research between 2011 and 2018

D. SYNERGISTIC ACTIVITIES

(see [PAPPG Chapter II.C.2.f.\(i\)\(d\)](#))

- Writer for the College Board Standards for College Success, Physics Standards Committee
- Member, Leadership Team that directed the writing of the Next Generation Science Standards
- Member, Writing team for the revision of the High School Active Physics curriculum
- Member, APS task force Best Practices in Undergraduate Physics Education, 2014-present
- Chair, College Board Science Advisory Committee, 2019-present

Revised 05/01/2020

NSF BIOGRAPHICAL SKETCH

OMB-3145-0058

NAME: Larry Isenhower

POSITION TITLE & INSTITUTION: Associate Professor, Abilene Christian University

A. PROFESSIONAL PREPARATION

(see [PAPPG Chapter II.C.2.f.\(i\)\(a\)](#))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
Univ. of Wisconsin, Madison	Madison, WI	Physics	Ph. D.	2010
Abilene Christian University	Abilene, TX	Physics	BS	2005

B. APPOINTMENTS

(see [PAPPG Chapter II.C.2.f.\(i\)\(b\)](#))

From - To	Position Title, Organization and Location
2020-present	Associate Professor, Abilene Christian University, Abilene, TX
2014-2020	Assistant Professor, Abilene Christian University, Abilene, TX
2012-2014	Research Assistant Scientist, Univ. of Wisconsin, Madison, Madison, WI
2010-2012	Postdoc researcher, Univ. of Wisconsin, Madison, Madison, WI

C. PRODUCTS

(see [PAPPG Chapter II.C.2.f.\(i\)\(c\)](#))

Products Most Closely Related to the Proposed Project

PHENIX Collaboration, Formation of dense partonic matter in relativistic nucleus-nucleus collisions at RHIC: Experimental evaluation by the PHENIX collaboration, Nucl. Phys. A, **757**, 184-283 (2005)

Other Significant Products, Whether or Not Related to the Proposed Project

K. M. Maller, M. T. Lichtman, T. Xia, Y. Sun, M. J. Piotrowicz, A. W. Carr, L. Isenhower, and M. Saffman, Rydberg-blockade controlled-NOT gate and entanglement in a two-dimensional array of neutral-atom qubits, Phys. Rev. A 92, 022336 (2015)

L. Isenhower, M. Saffman, and K. Mølmer, Multibit CkNOT quantum gates via Rydberg blockade, Quant. Inf. Proc., 10, 755 (2011)

K. Mølmer, L. Isenhower, and M. Saffman, Efficient Grover search with Rydberg blockade, J. Phys. B, 44, 184016 (2011)

L. Isenhower, E. Urban, X. L. Zhang, A. T. Gill, T. Henage, T. A. Johnson, T. G. Walker & M. Saffman, Demonstration of a neutral atom controlled-NOT quantum gate, Phys. Rev. Lett., 104, 010503 (2010)

E. Urban, T. A. Johnson, T. Henage, L. Isenhower, D. D. Yavuz, T. G. Walker, and M. Saffman, Observation of Rydberg blockade between two atoms, Nature Phys., 5, 110 (2009)

D. SYNERGISTIC ACTIVITIES

(see [PAPPG Chapter II.C.2.f.\(i\)\(d\)](#))

Member of DUNE collaboration and Institutional Board representative. Working on development of the high pressure gas TPC for the near detector.

Worked with ACU team on commissioning the SpinQuest (E1039) experiment in summer 2019.

Working with ACU team on construction of STAR Forward Upgrade calorimeter at RHIC.

Society of Physics Students Zone Councilor for Zone 13 (Texas)

Principle faculty in charge of senior capstone course for Physics majors. This involves mentoring students through preparations for their next career steps and mentoring final year long research projects where students use all their accumulated knowledge to do a real world research project.

NAME: Nasrin Mirsaleh-Kohan

POSITION TITLE & INSTITUTION: Associate Professor, Texas Woman's University

A. PROFESSIONAL PREPARATION(see [PAPPG Chapter II.C.2.f.\(i\)\(a\)](#))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
University of Tehran	Tehran, Iran	Physics	B.S.	1997
Bowling Green State University	Bowling Green, OH	Physics	M.S.	2003
University of Tennessee	Knoxville, TN	Physics	PhD	2008
University of Sherbrooke	Sherbrooke, QC, Canada		Postdoctoral Researcher	2011
University of Tennessee	Knoxville, TN		Postdoctoral Researcher	2013

B. APPOINTMENTS(see [PAPPG Chapter II.C.2.f.\(i\)\(b\)](#))

From - To	Position Title, Organization and Location
2019-present	Associate Professor, Department of Chemistry and Biochemistry, Texas Woman's University, Denton, TX
2013-2019	Assistant Professor, Department of Chemistry and Biochemistry, Texas Woman's University, Denton, TX
2011-2013	Postdoctoral Researcher, University of Tennessee, Knoxville, TN
2008-2011	Postdoctoral Researcher, University of Sherbrooke, QC, Canada
2003-2008	Graduate Research/Teaching Assistant, University of Tennessee, Knoxville, TN
2002-2003	Teaching Assistant, Bowling Green State University, Bowling Green, OH

C. PRODUCTS

(see [PAPPG Chapter II.C.2.f.\(i\)\(c\)](#))

Products Most Closely Related to the Proposed Project

Torres, M., Khan, S., Duplanty, M., Lozano, H. C., Morris, T. J., Nguyen, T., Rostovtsev, Y. V., DeYonker, N. J., & Mirsaleh-Kohan, N. (2018). Raman and Infrared Studies of Platinum-Based Drugs: Cisplatin, Carboplatin, Oxaliplatin, Nedaplatin and Heptaplatin. *Journal of Physical Chemistry A*, 122, 6934.

Mirsaleh-Kohan, N., Khan, S., Maguire, C., & Sheardy, R. D. (2018). Communicating Your Research to the Public: A Trip to the Mall. *Citizens First! Democracy, Social Responsibility and Chemistry*. ACS Symposium Books, Washington, D.C.

Mirsaleh-Kohan, N. & Maguire, C. (2016). Incorporating Photo-Book of Concepts in Physics and Environmental Chemistry Courses. *Science Education and Civic Engagement: An International Journal*. 8:2

Mirsaleh-Kohan, N., Robertson, W. D., & Compton, R. N. (2008). Electron Ionization Time-of-Flight Mass Spectrometry: Historical Review and Current Applications. *Mass Spectrometry Review*, 27, 237.

Mirsaleh-Kohan, N., Iberi, V., Simmons Jr., P. D., Bigelow, N. W., Vaschillo, A., M. M. Rowland, M. D. Best, S. J. Pennycook, D. J. Masiello, B. S. Guiton, and J. P. Camden (2012). Single-Molecule Surface-Enhanced Raman Scattering: Can STEM/EELS Image Electromagnetic Hot Spots? *Journal of Physical Chemistry Letters*, 3, 2303.

Other Significant Products, Whether or Not Related to the Proposed Project

Mirsaleh-Kohan, N., Duplanty, M., Torres, M., Moazzezi, M., & Rostovtsev, Y.V. (2018). Raman Scattering of Cisplatin near Silver Nanoparticles. *Optics Communications*, 410, 228.

Mirsaleh-Kohan, N., Fischer, A., Graves, B., Bolorizadeh, M., Kondepudi, D., and R. Compton. (2017). Laser Shock-Wave Induced Crystallization. *Journal of Crystal Growth & Design*, 17, 576.

Maguire, C. F., Mirsaleh-Kohan, N., & Sheardy, R. D. (2018). Civic Engagement for Chemistry and Biochemistry Majors at Texas Woman's University. *Peer Review, American Association of Colleges and Universities*, 19, 28.

Iberi, V., Mirsaleh-Kohan, N., & Camden, J. P. (2013). Understanding Plasmonic Properties in Metallic Nanostructures by Correlating Photonic and Electronic Excitations. *Journal of Physical Chemistry Letters*, 4, 1070.

D. SYNERGISTIC ACTIVITIES

(see [PAPPG Chapter II.C.2.f.\(i\)\(d\)](#))

A review article contributing to the field of spectroscopy, primarily focusing on the development of Time-of-Flight Mass Spectrometry. It has been cited 92 times since 2008 [Mass Spectrometry Review, 27, 237].

For the first time, we employed electron energy-loss spectroscopy in a scanning transmission electron microscope. This work has been cited 71 times since 2012 [J. of Physical Chemistry Letters, 3, 2303].

Co-Director, SENCER Center of Innovation – Southwest (2017 – present): I am actively involved in national strategic planning working with other regional leaders to grow our SENCER program and network.

Faculty Advisor, Chemistry Club, Texas Woman's University (2013-present): our Club is very involved in the community. Since 2013, we have received various awards from the ACS and Texas Woman's University for our activities especially our service to our community

Revised 05/01/2020

NSF BIOGRAPHICAL SKETCH

OMB-3145-0058

NAME: Steve Alexander

POSITION TITLE & INSTITUTION: Professor of Physics, Southwestern University

A. PROFESSIONAL PREPARATION

(see [PAPPG Chapter II.C.2.f.\(i\)\(a\)](#))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
Univ. Texas	Austin	Physics	Ph.D.	1982
Univ. Texas	Austin	Math	B.S.	1978

B. APPOINTMENTS

(see [PAPPG Chapter II.C.2.f.\(i\)\(b\)](#))

From - To	Position Title, Organization and Location
2011-present	Professor of Physics, Southwestern University, Georgetown, TX
2003-2011	Associate Professor of Physics, Southwestern University, Georgetown, TX
2002-2003	Associate Professor of Physics, University of Texas Pan American, Edinburg, TX
1998-2002	Assistant Professor of Physics, University of Texas Pan American, Edinburg, TX
1997-1998	Lecturer, University of Texas Pan American, Edinburg, TX
1996-1997	Physics Instructor, El Centro College, Dallas, TX
1995-1996	Visiting Assistant Professor, University of Texas, Arlington, TX
1993-1994	Staff Scientist, Constellation Technology, St. Petersburg, FL
1990-1993	Assistant Scientist, University of Florida, Gainesville, FL
1985-1989	Postdoctoral Associate, University of Florida, Gainesville, FL
1984	Postdoctoral Associate, Texas A&M, Galveston, TX

C. PRODUCTS

(see [PAPPG Chapter II.C.2.f.\(i\)\(c\)](#))

Products Most Closely Related to the Proposed Project

“Undergraduate Research Opportunities in Neutron Activation Analysis for Local, Regional and International Students” Sheldon Landsberger, Tracy Tipping, Ofodike Ezekoye, Dimitri Tamalis, Viki Lott, S. Alexander and Gilles Ban, Journal of Radioanalytical and Nuclear Chemistry 291, 59 (2012).

Other Significant Products, Whether or Not Related to the Proposed Project

“Elemental Analysis of the Geothermal Microecology of the Los Azufres (Mexico) Volcanic Complex” W.A Abuhani, N. Dasgupta-Schubert, Jürgen Mattusch, Luis M. Villaseñor-Cendejas, S. Landsberger, S.A. Alexander and Ma. Guadalupe Garnica-Romo, Journal of Radioanalytical and Nuclear Chemistry 322, 1365 (2019).

“Heavy radioactive and Trans-Lanthanide Elements in the Geothermal Microecology of the Los Azufres Volcanic Complex” W.A Abuhani, N. Dasgupta-Schubert, Luis M. Villaseñor-Cendejas, S.A. Alexander and S. Landsberger, J. Phys.: Conf. Ser. 1308, 012001 (2019).

“Properties of the Finite-Mass Helium Ground State” S.A. Alexander and R.L. Coldwell, Molecular Physics 115, 598, (2017).

D. SYNERGISTIC ACTIVITIES

(see [PAPPG Chapter II.C.2.f.\(i\)\(d\)](#))

Member of the American Physical Society and the American Chemical Society.

65 invited talks given at local, national and international meetings.

82 papers published in professional journals.

Since 2015 I have worked with 48 students on 27 different hands-on projects during the school year and with 18 students for during Southwestern's 8-week summer research program. Most of these students have gone on to present their work at a scientific meeting. This is usually their first exposure with communicating science to other physicists. Many of these students go on to leverage their hands-on projects or summer research to obtain REUs at other schools or to gain entry to a graduate school.

NAME: Thomas Coan

POSITION TITLE & INSTITUTION: Professor of Physics, Southern Methodist University

A. PROFESSIONAL PREPARATION(see [PAPPG Chapter II.C.2.f.\(i\)\(a\)](#))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
Massachusetts Institute of Technology	Cambridge, MA, USA	Physics	BS	1980
University of California, Berkeley	Berkeley, CA, USA	Physics	MS	1983
University of California, Berkeley	Berkeley, CA, USA	Physics	PhD	1989
Los Alamos National Laboratory	Los Alamos, NM, USA	Electron-positron collisions at the CERN LEP I experiment		1991-1994

B. APPOINTMENTS(see [PAPPG Chapter II.C.2.f.\(i\)\(b\)](#))

From - To	Position Title, Organization and Location
2015 - present	Professor of Physics, Southern Methodist University, Dallas, TX, USA
2000 - 2015	Assoc. Professor of Physics, Southern Methodist University, Dallas, TX, USA
1994 - 2000	Asst. Professor of Physics, Southern Methodist University, Dallas, TX, USA
1991 - 1994	Postdoctoral Fellow, Los Alamos National Laboratory, Los Alamos, NM, USA
1989 - 1991	Engineering Physicist, Boston University, Boston, MA, USA

C. PRODUCTS

(see [**PAPPG Chapter II.C.2.f.\(i\)\(c\)**](#))

Products Most Closely Related to the Proposed Project

1. C.A. Argüelles et al., "White Paper on New Opportunities at the Next-Generation Neutrino Experiments (Part 1: BSM Neutrino Physics and Dark Matter)," [https://arxiv.org/abs/1907.08311 \[hep-ph\]](https://arxiv.org/abs/1907.08311) (2019).
2. NOvA Collaboration, "First measurement of neutrino oscillation parameters using neutrinos and antineutrinos by NOvA," *Phys. Rev. Lett.* 123, 151803 (2019).
3. NOvA Collaboration, "New constraints on oscillation parameters from e appearance and disappearance in the NOvA experiment," *Phys. Rev. D* 98, 032012 (2018).
4. DUNE Collaboration "The DUNE Far Detector Interim Design Report: Volumes 1–2," <https://arxiv.org/abs/1807.10327>, <https://arxiv.org/abs/1807.10334> and <https://arxiv.org/abs/1807.10340> (2018).
5. DUNE Collaboration "The Single-Phase ProtoDUNE Technical Design Report," <https://arxiv.org/abs/1706.07081> (2017).

Other Significant Products, Whether or Not Related to the Proposed Project

T. Coan, T. Liu and J. Ye, "A compact apparatus for muon lifetime measurement and time dilation demonstration in the undergraduate laboratory," *American Journal of Physics* 74, 161 (2006).

D. SYNERGISTIC ACTIVITIES

(see [**PAPPG Chapter II.C.2.f.\(i\)\(d\)**](#))

1. Mar. 2019.-present: Institutional Board representative, ICARUS Neutrino Experiment at Fermilab.
2. Mar. 2015 - present: Institutional Board representative, Deep Underground Neutrino Experiment at Fermilab.
3. Dec. 2005 - present: Institutional Board representative, NOvA Neutrino Experiment at Fermilab.
4. Mar. 2003 - present: Founder of MATPHYS LLC, a private company that manufactures teaching equipment for the advanced undergraduate physics laboratory.

Revised 05/01/2020

NSF BIOGRAPHICAL SKETCH

OMB-3145-0058

NAME: Levente Borvák

POSITION TITLE & INSTITUTION: Affiliate Assistant Professor, University of Dallas

A. PROFESSIONAL PREPARATION

(see [PAPPG Chapter II.C.2.f.\(i\)\(a\)](#))

INSTITUTION	LOCATION	MAJOR/AREA OF STUDY	DEGREE (if applicable)	YEAR (YYYY)
University of Dallas	Irving, TX	Physics	B.S.	2004
University of Notre Dame	Notre Dame, IN	Physics	M.S.	2009
University of Notre Dame	Notre Dame, IN	Physics	PhD	2016

B. APPOINTMENTS

(see [PAPPG Chapter II.C.2.f.\(i\)\(b\)](#))

From - To	Position Title, Organization and Location
2019-present	Affiliate Assistant Professor, Department of Physics, University of Dallas, Irving, TX
2018-present	Instructor, School of Engineering, Technology, Mathematics, and Science, Dallas College - Brookhaven Campus, Farmers Branch, TX
2017-2019	Adjunct Professor, University of Dallas, Irving, TX
2017-2018	Associate Professor, Tarrant County College -NW Campus, Fort Worth, TX
2017-2017	Physics Lab Experimenter, University of Dallas, Irving, TX
2015-2018	Adjunct Instructor, Dallas College - Northlake Campus, Irving, TX
2015-2017	Lab Coordinator, University of Dallas, Irving, TX
2006-2009	Graduate Research/Teaching Assistant, University of Notre Dame, Notre Dame, IN

C. PRODUCTS

(see [PAPPG Chapter II.C.2.f.\(i\)\(c\)](#))

Products Most Closely Related to the Proposed Project

Other Significant Products, Whether or Not Related to the Proposed Project

D. SYNERGISTIC ACTIVITIES

(see [PAPPG Chapter II.C.2.f.\(i\)\(d\)](#))

College Extension Pilot Program Workshop for Eduphoric LLC, Lead Consulting Professor of Physics, Summer 2017

Region 10 Texas Regional Professional Development Workshop: Kinematics: Motion in 1&2 Dimensions, Waves, Electricity and Magnetism, Optics; Organized, Developed Curriculum, and led event at the University of Dallas, Summer 2016.

**SUMMARY
PROPOSAL BUDGET**

YEAR 1

		FOR NSF USE ONLY			
ORGANIZATION		PROPOSAL NO.		DURATION (months)	
University of Texas at Arlington				Proposed	Granted
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR		AWARD NO.			
Jaehoon Yu					
A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)		NSF Funded Person-months			Funds Requested By proposer
		CAL	ACAD	SUMR	Funds granted by NSF (if different)
1. Jaehoon Yu - Professor		0.10	0.00	0.00	1,496
2. Jonathan Asaadi - Assistant Professor		0.10	0.00	0.00	1,000
3. Ramon Lopez - Professor		0.10	0.00	0.00	1,839
4.					
5.					
6. (0) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)		0.00	0.00	0.00	0
7. (3) TOTAL SENIOR PERSONNEL (1 - 6)		0.30	0.00	0.00	4,335
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (0) POST DOCTORAL SCHOLARS		0.00	0.00	0.00	0
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)		0.00	0.00	0.00	0
3. (0) GRADUATE STUDENTS					10,200
4. (1) UNDERGRADUATE STUDENTS					0
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)					0
6. (0) OTHER					0
TOTAL SALARIES AND WAGES (A + B)					14,535
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)					2,147
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)					16,682
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING \$5,000.)					
TOTAL EQUIPMENT					0
E. TRAVEL 1. DOMESTIC (INCL. U.S. POSSESSIONS)					7,040
2. INTERNATIONAL					2,500
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS \$ 18,000					
2. TRAVEL 6,140					
3. SUBSISTENCE 0					
4. OTHER 6,000					
TOTAL NUMBER OF PARTICIPANTS (6)					30,140
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES					11,000
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION					0
3. CONSULTANT SERVICES					7,000
4. COMPUTER SERVICES					0
5. SUBAWARDS					0
6. OTHER					0
TOTAL OTHER DIRECT COSTS					18,000
H. TOTAL DIRECT COSTS (A THROUGH G)					74,362
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) MTDC (Rate: 34.0000, Base: 44223)					
TOTAL INDIRECT COSTS (F&A)					15,036
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)					89,398
K. FEE					0
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)					89,398
M. COST SHARING PROPOSED LEVEL \$ 0		AGREED LEVEL IF DIFFERENT \$			
PI/PD NAME Jaehoon Yu		FOR NSF USE ONLY			
		INDIRECT COST RATE VERIFICATION			
ORG. REP. NAME* Sarah Panepinto		Date Checked	Date Of Rate Sheet		Initials - ORG

1 *ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

2110178

**SUMMARY
PROPOSAL BUDGET**

YEAR 2

				FOR NSF USE ONLY			
				PROPOSAL NO.		DURATION (months)	
				Proposed	Granted		
ORGANIZATION University of Texas at Arlington				AWARD NO.			
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR Jaehoon Yu							
A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)				NSF Funded Person-months		Funds Requested By proposer	Funds granted by NSF (if different)
				CAL	ACAD	SUMR	
1. Jaehoon Yu - Professor				0.10	0.00	0.00	1,541
2. Jonathan Asaadi - Assistant Professor				0.10	0.00	0.00	1,030
3. Ramon Lopez - Professor				0.10	0.00	0.00	1,894
4.							
5.							
6. (0) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)				0.00	0.00	0.00	0
7. (3) TOTAL SENIOR PERSONNEL (1 - 6)				0.30	0.00	0.00	4,465
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)							
1. (0) POST DOCTORAL SCHOLARS				0.00	0.00	0.00	0
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)				0.00	0.00	0.00	0
3. (0) GRADUATE STUDENTS							10,506
4. (1) UNDERGRADUATE STUDENTS							0
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)							0
6. (0) OTHER							0
TOTAL SALARIES AND WAGES (A + B)							14,971
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)							2,212
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)							17,183
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING \$5,000.)							
TOTAL EQUIPMENT							0
E. TRAVEL 1. DOMESTIC (INCL. U.S. POSSESSIONS)							7,102
2. INTERNATIONAL							2,500
F. PARTICIPANT SUPPORT COSTS							
1. STIPENDS \$ 36,000							
2. TRAVEL 13,439							
3. SUBSISTENCE 0							
4. OTHER 6,180							
TOTAL NUMBER OF PARTICIPANTS (8)						TOTAL PARTICIPANT COSTS	55,619
G. OTHER DIRECT COSTS							
1. MATERIALS AND SUPPLIES							10,000
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION							2,000
3. CONSULTANT SERVICES							7,000
4. COMPUTER SERVICES							0
5. SUBAWARDS							0
6. OTHER							0
TOTAL OTHER DIRECT COSTS							19,000
H. TOTAL DIRECT COSTS (A THROUGH G)							101,404
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) MTDC (Rate: 34.0000, Base: 45783)							
TOTAL INDIRECT COSTS (F&A)							15,566
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)							116,970
K. FEE							0
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)							116,970
M. COST SHARING PROPOSED LEVEL \$ 0				AGREED LEVEL IF DIFFERENT \$			
PI/PD NAME Jaehoon Yu				FOR NSF USE ONLY			
				INDIRECT COST RATE VERIFICATION			
ORG. REP. NAME* Sarah Panepinto				Date Checked	Date Of Rate Sheet	Initials - ORG	

2 *ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

2110178

**SUMMARY
PROPOSAL BUDGET**

YEAR 3

				FOR NSF USE ONLY			
				PROPOSAL NO.		DURATION (months)	
				Proposed		Granted	
ORGANIZATION University of Texas at Arlington				AWARD NO.			
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR Jaehoon Yu							
A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)				NSF Funded Person-months		Funds Requested By proposer	Funds granted by NSF (if different)
				CAL	ACAD	SUMR	
1. Jaehoon Yu - Professor				0.10	0.00	0.00	1,588
2. Jonathan Asaadi - Assistant Professor				0.10	0.00	0.00	1,061
3. Ramon Lopez - Professor				0.10	0.00	0.00	1,951
4.							
5.							
6. (0) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)				0.00	0.00	0.00	0
7. (3) TOTAL SENIOR PERSONNEL (1 - 6)				0.30	0.00	0.00	4,600
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)							
1. (0) POST DOCTORAL SCHOLARS				0.00	0.00	0.00	0
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)				0.00	0.00	0.00	0
3. (0) GRADUATE STUDENTS							10,821
4. (1) UNDERGRADUATE STUDENTS							0
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)							0
6. (0) OTHER							0
TOTAL SALARIES AND WAGES (A + B)							15,421
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)							2,278
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)							17,699
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING \$5,000.)							
TOTAL EQUIPMENT							0
E. TRAVEL 1. DOMESTIC (INCL. U.S. POSSESSIONS)							7,165
2. INTERNATIONAL							2,500
F. PARTICIPANT SUPPORT COSTS							
1. STIPENDS \$ 36,000							
2. TRAVEL 13,919							
3. SUBSISTENCE 0							
4. OTHER 6,365							
TOTAL NUMBER OF PARTICIPANTS (8)						TOTAL PARTICIPANT COSTS	56,284
G. OTHER DIRECT COSTS							
1. MATERIALS AND SUPPLIES							10,000
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION							2,000
3. CONSULTANT SERVICES							7,000
4. COMPUTER SERVICES							0
5. SUBAWARDS							0
6. OTHER							0
TOTAL OTHER DIRECT COSTS							19,000
H. TOTAL DIRECT COSTS (A THROUGH G)							102,648
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) MTDC (Rate: 34.0000, Base: 46360)							
TOTAL INDIRECT COSTS (F&A)							15,762
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)							118,410
K. FEE							0
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)							118,410
M. COST SHARING PROPOSED LEVEL \$ 0				AGREED LEVEL IF DIFFERENT \$			
PI/PD NAME Jaehoon Yu				FOR NSF USE ONLY			
				INDIRECT COST RATE VERIFICATION			
ORG. REP. NAME* Sarah Panepinto				Date Checked	Date Of Rate Sheet		Initials - ORG

3 *ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

2110178

**SUMMARY
PROPOSAL BUDGET**

YEAR 4

				FOR NSF USE ONLY			
				PROPOSAL NO.		DURATION (months)	
				Proposed	Granted		
ORGANIZATION University of Texas at Arlington				AWARD NO.			
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR Jaehoon Yu							
A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)				NSF Funded Person-months		Funds Requested By proposer	Funds granted by NSF (if different)
				CAL	ACAD	SUMR	
1. Jaehoon Yu - Professor				0.10	0.00	0.00	1,635
2. Jonathan Asaadi - Assistant Professor				0.10	0.00	0.00	1,093
3. Ramon Lopez - Professor				0.10	0.00	0.00	2,009
4.							
5.							
6. (0) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)				0.00	0.00	0.00	0
7. (3) TOTAL SENIOR PERSONNEL (1 - 6)				0.30	0.00	0.00	4,737
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)							
1. (0) POST DOCTORAL SCHOLARS				0.00	0.00	0.00	0
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)				0.00	0.00	0.00	0
3. (0) GRADUATE STUDENTS							11,146
4. (1) UNDERGRADUATE STUDENTS							0
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)							0
6. (0) OTHER							0
TOTAL SALARIES AND WAGES (A + B)							15,883
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)							2,346
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)							18,229
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING \$5,000.)							
TOTAL EQUIPMENT							0
E. TRAVEL 1. DOMESTIC (INCL. U.S. POSSESSIONS)							7,230
2. INTERNATIONAL							2,500
F. PARTICIPANT SUPPORT COSTS							
1. STIPENDS \$ 36,000							
2. TRAVEL 14,337							
3. SUBSISTENCE 0							
4. OTHER 6,556							
TOTAL NUMBER OF PARTICIPANTS (8)						TOTAL PARTICIPANT COSTS	56,893
G. OTHER DIRECT COSTS							
1. MATERIALS AND SUPPLIES							13,000
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION							2,000
3. CONSULTANT SERVICES							7,000
4. COMPUTER SERVICES							0
5. SUBAWARDS							0
6. OTHER							0
TOTAL OTHER DIRECT COSTS							22,000
H. TOTAL DIRECT COSTS (A THROUGH G)							106,852
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) MTDC (Rate: 34.0000, Base: 49959)							
TOTAL INDIRECT COSTS (F&A)							16,986
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)							123,838
K. FEE							0
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)							123,838
M. COST SHARING PROPOSED LEVEL \$ 0				AGREED LEVEL IF DIFFERENT \$			
PI/PD NAME Jaehoon Yu				FOR NSF USE ONLY			
				INDIRECT COST RATE VERIFICATION			
ORG. REP. NAME* Sarah Panepinto				Date Checked	Date Of Rate Sheet	Initials - ORG	

4 *ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

2110178

**SUMMARY
PROPOSAL BUDGET**

YEAR 5

		FOR NSF USE ONLY			
		PROPOSAL NO.		DURATION (months)	
		Proposed		Granted	
		AWARD NO.			
ORGANIZATION University of Texas at Arlington					
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR Jaehoon Yu					
A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)		NSF Funded Person-months		Funds Requested By proposer	
		CAL	ACAD	SUMR	Funds granted by NSF (if different)
1. Jaehoon Yu - Professor		0.10	0.00	0.00	1,684
2. Jonathan Asaadi - Assistant Professor		0.10	0.00	0.00	1,126
3. Ramon Lopez - Professor		0.10	0.00	0.00	2,070
4.					
5.					
6. (0) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)		0.00	0.00	0.00	0
7. (3) TOTAL SENIOR PERSONNEL (1 - 6)		0.30	0.00	0.00	4,880
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (0) POST DOCTORAL SCHOLARS		0.00	0.00	0.00	0
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)		0.00	0.00	0.00	0
3. (0) GRADUATE STUDENTS					11,480
4. (1) UNDERGRADUATE STUDENTS					0
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)					0
6. (0) OTHER					0
TOTAL SALARIES AND WAGES (A + B)					16,360
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)					2,417
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)					18,777
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING \$5,000.)					
TOTAL EQUIPMENT					0
E. TRAVEL 1. DOMESTIC (INCL. U.S. POSSESSIONS)					7,296
2. INTERNATIONAL					2,500
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS \$ 36,000					
2. TRAVEL 14,767					
3. SUBSISTENCE 0					
4. OTHER 6,753					
TOTAL NUMBER OF PARTICIPANTS (8)		TOTAL PARTICIPANT COSTS		57,520	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES					11,000
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION					2,000
3. CONSULTANT SERVICES					7,000
4. COMPUTER SERVICES					0
5. SUBAWARDS					0
6. OTHER					0
TOTAL OTHER DIRECT COSTS					20,000
H. TOTAL DIRECT COSTS (A THROUGH G)					106,093
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) MTDC (Rate: 34.0000, Base: 48572)					
TOTAL INDIRECT COSTS (F&A)					16,514
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)					122,607
K. FEE					0
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)					122,607
M. COST SHARING PROPOSED LEVEL \$ 0		AGREED LEVEL IF DIFFERENT \$			
PI/PD NAME Jaehoon Yu		FOR NSF USE ONLY			
		INDIRECT COST RATE VERIFICATION			
ORG. REP. NAME* Sarah Panepinto		Date Checked	Date Of Rate Sheet	Initials - ORG	

5 *ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

2110178

**SUMMARY
PROPOSAL BUDGET**

Cumulative

ORGANIZATION University of Texas at Arlington		FOR NSF USE ONLY			
		PROPOSAL NO.		DURATION (months)	
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR Jaehoon Yu		Proposed		Granted	
		AWARD NO.			
A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)		NSF Funded Person-months			Funds Requested By proposer
		CAL	ACAD	SUMR	Funds granted by NSF (if different)
1. Jaehoon Yu - Professor		0.50	0.00	0.00	7,944
2. Jonathan Asaadi - Assistant Professor		0.50	0.00	0.00	5,310
3. Ramon Lopez - Professor		0.50	0.00	0.00	9,763
4.					
5.					
6. () OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)		0.00	0.00	0.00	0
7. (3) TOTAL SENIOR PERSONNEL (1 - 6)		1.50	0.00	0.00	23,017
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (0) POST DOCTORAL SCHOLARS		0.00	0.00	0.00	0
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)		0.00	0.00	0.00	0
3. (0) GRADUATE STUDENTS					54,153
4. (5) UNDERGRADUATE STUDENTS					0
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)					0
6. (0) OTHER					0
TOTAL SALARIES AND WAGES (A + B)					77,170
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)					11,400
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)					88,570
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING \$5,000.)					
TOTAL EQUIPMENT					0
E. TRAVEL 1. DOMESTIC (INCL. U.S. POSSESSIONS)					35,833
2. INTERNATIONAL					12,500
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS \$ 162,000					
2. TRAVEL 62,602					
3. SUBSISTENCE 0					
4. OTHER 31,854					
TOTAL NUMBER OF PARTICIPANTS (38)		TOTAL PARTICIPANT COSTS			256,456
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES					55,000
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION					8,000
3. CONSULTANT SERVICES					35,000
4. COMPUTER SERVICES					0
5. SUBAWARDS					0
6. OTHER					0
TOTAL OTHER DIRECT COSTS					98,000
H. TOTAL DIRECT COSTS (A THROUGH G)					491,359
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE)					
TOTAL INDIRECT COSTS (F&A)					79,864
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)					571,223
K. FEE					0
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)					571,223
M. COST SHARING PROPOSED LEVEL \$ 0		AGREED LEVEL IF DIFFERENT \$			
PI/PD NAME Jaehoon Yu		FOR NSF USE ONLY			
		INDIRECT COST RATE VERIFICATION			
ORG. REP. NAME* Sarah Panepinto		Date Checked	Date Of Rate Sheet		Initials - ORG

C *ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

Budget Justification

The detailed justification for the budget whose fundamental goal is to maximize the support for participating undergraduate students, keeping the cost for each student-year engaged as low as possible, is presented for each year. Salaries for all personnel are based upon current University of Texas at Arlington (UTA) academic and staff salary scales. At UTA, a year equals a 12-month period for senior personnel from start of project. All personnel budget calculations include a 3% annual increase.

Year 1 – Sept. 2021. – Aug. 2022

- Salaries:
 - Total of \$10,200 is requested to cover the salary of one peer mentor (PM), a senior undergraduate student, estimated at \$15/hr. with the anticipated total number of hours per year of 680 hours which consist of 140 hours for each of the fall and spring semesters and 400 hours for 10 weeks in the summer, including the two one week training workshops.
 - Salary for 0.1 month for professor Ramon Lopez who serves as the educational coordinator is requested at \$1,838 calculated based on the 12-mo salary of \$220,644.
 - Salary for 0.1 month for professor Jonathan Asaadi who serves as the technical coordinator is requested at \$1,000, calculated based on the 12-mo salary of \$120,012.
 - Salary for 0.1 month for professor Jaehoon Yu who serves as the project director and the executive board chair is requested at \$1,496, calculated based on the 12-mo salary of \$179,557.
- Fringe:
 - Fringe benefit cost of \$847 for PM undergraduate students at 8.3% rate is requested.
 - Fringe benefit costs at the rate of 30% of the salary for Lopez, Asaadi, and Yu are requested at \$552, \$300 and \$449, respectively.
- Travel:

Domestic

- PM's travel to the two one-week training workshops is requested at \$760 per trip, totaling \$1,320. Each trip cost reflects \$200 transportation cost, \$50/night shared housing and \$30/ day per-diem.
- PM's travel to the two Texas Section American Physical Society (TSAPS) meetings is requested at \$720. This reflects \$200 transportation, \$50/night shared housing, and \$30/ day per-diem for a two-day trip.
- Travel cost for the three PIs' participation to the relevant conferences and to the training workshop is requested at \$5,000.

International

- Travel cost for PI participation to the relevant international conferences totaling \$2,500 is requested.
- Participant support:
 - Stipend: The cost for two participating NRICoS students with a stipend of \$3,000 per each of fall and spring semesters and \$3,000 for the summer, \$9000 per year per student is requested at the total of \$18,000.
 - Other: Scholarship support for four PUI students at \$1,500 each, totaling \$6,000 is requested to defray the cost for them to take necessary advanced physics courses at UTA.
 - Travel: The following participant travel support are requested
 - One selected NRICoS student's four week stay at Fermilab is requested at \$1,660 which includes \$35/night dormitory cost at Fermilab on campus, \$10/day cost of living adjustment (COLA) and \$400 roundtrip air and other transportation costs.
 - The cost for two NRICoS students' travel to the two TSAPS meetings each a year is requested \$1,440 total. This cost reflects \$200 transportation, \$50/night shared housing, and \$30/ day per-diem for a two-day trip per student.
 - The travel costs for two NRICoS students, each taking part in the two one-week training workshops held at a collaborating institution is requested at \$3,040. This cost reflects \$200 transportation, \$50/night shared room housing, and \$30/ day per-diem for one week stay per trip per student.

- Other Direct Costs
 - The consultant fee to cover the cost for the external evaluator, Dr. T. Sauncy's service and other costs is requested at \$7,000 which consists of \$5,000 evaluation fee and \$2,000 to support the evaluator's trip to the annual training workshops during which she will have face-to-face meeting opportunities with the NRICoS student, PM's and PI's.
 - The cost for training workshop organization to be awarded to the hosting institution is requested at \$6,000 for the two annual workshops. These funds will be used to cover expenses for the two workshops, such as venue rental fees, AV rental cost, materials, publicizing cost, etc.
 - The cost for purchasing a computer is requested at \$2,000 for the first year. We anticipate the three years at the useful lifetime.
 - Materials and operations support is requested at \$3,000 to support various expenses for operations and materials as the lead institution throughout the year, such as web site operation and management, software license, materials for NRICoS students use, etc.
- Total direct cost for year 1 is \$74,362.
- The modified direct cost subject to indirect is \$44,222.
- Indirect cost is requested at \$15,036 based on the 34% agreed rates.
- The grand total for year 1 is \$89,398.

Year 2 – Sept. 2022. – Aug. 2023

- Salaries:
 - Total of \$10,506 which reflects 3% cost of living (COL) adjusted hourly rate to \$15/hr is requested to cover the salary of one peer mentor (PM).
 - The 3% COL adjusted 0.1 month salaries for Lopez, Asaadi, and Yu are requested at \$1,894, \$1,030 and \$1,541, respectively.
- Fringe:
 - Fringe benefit cost of \$872 for PM undergraduate students at 8.3% rate is requested.
 - Fringe benefit for Lopez, Asaadi, and Yu are requested at \$568, \$309 and \$462, respectively.
- Travel:

Domestic

- The 3% COL adjusted PM's travel to the two one-week training workshops and the two TXAPS meetings are requested at \$1,360 and \$742, respectively.
- The cost for PI participation to conferences and the training workshop is requested at \$5,000.

International

- Travel cost for PI participation to the relevant international conferences totaling \$2,500 is requested.
- Participant support:
 - Stipend: Two additional NRICoS students will be added to the program in year 2 to the two already in the program from in year 1. The stipend for the four NRICoS students with a stipend of \$3,000 per each of fall and spring semesters and \$3,000 for the summer, \$9000 per year per student is requested at the total of \$36,000.
 - Other: The 3% COL adjusted scholarship support for four PUI students at \$6,180 is requested to defray the cost for them to take necessary advanced physics courses at UTA.
 - Travel: The following participant travel support are requested
 - The 3% COL adjusted for one selected NRICoS student's four week stay at Fermilab is requested at \$1,710, including the dormitory cost at Fermilab on campus, COLA and the roundtrip air and other transportation costs.
 - The 3% COL adjusted cost for four NRICoS students' travel to the two TSAPS meetings a year is requested \$2,966 total.
 - The 3% COL adjusted travel costs for four NRICoS students, each taking part in the two one-week training workshops held at a collaborating institution is requested at \$6,262 total.

- The travel cost for two selected NRICoS students out of all participating students in the project for the national American Physical Society (APS) April meeting is requested at \$1,250 per student, totaling \$2,500.
- Other Direct Costs
 - The consultant fee to cover the cost for the external evaluator, Dr. T. Sauncy's service and other costs is requested at \$7,000, as described in year 1.
 - The cost for training workshop organization to be awarded to the hosting institution is requested at \$7,000 for the workshop, as in year 1, for twice the number of students.
 - Materials and operations support is requested at \$3,000 as in year 1.
 - Publication cost is requested at \$2,000.
- Total direct cost for year 2 is \$101,403.
- The modified direct cost subject to indirect is \$45,784.
- Indirect cost is requested at \$15,567 based on the 34% agreed rates.
- The grand total for year 2 is \$116,970.

Year 3 – Sept. 2023. – Aug. 2024

- Salaries:
 - Total of \$10,821 which reflects 3% COL adjusted hourly rate of year 2 is requested to cover the salary of one peer mentor (PM).
 - The 3% COL adjusted 0.1 month salaries for Lopez, Asaadi, and Yu are requested at \$1,951, \$1,061 and \$1,587, respectively.
- Fringe:
 - Fringe benefit cost of \$898 for PM undergraduate students at 8.3% rate is requested.
 - Fringe benefit for Lopez, Asaadi, and Yu are requested at \$585, \$318 and \$476, respectively.
- Travel:

Domestic

- The 3% COL adjusted PM's travel to the two one-week training workshops and the two TXAPS meetings are requested at \$1,401 and \$764, respectively.
 - The cost for PI participation to conferences and the training workshop is requested at \$5,000.

International

- Travel cost for PI participation to the relevant international conferences totaling \$2,500 is requested.
- Participant support:
 - Stipend: The stipend for the four NRICoS students is requested at the total of \$36,000, \$9,000 per student.
 - Subsistence: The 3% COL adjusted scholarship support for four PUI students at \$6,365 is requested to defray the cost for them to take necessary advanced physics courses at UTA.
 - Travel: The following participant travel support are requested
 - The 3% COL adjusted for one selected NRICoS student's four week stay at Fermilab is requested at \$1,761, including the dormitory cost at Fermilab on campus, COLA and the roundtrip air and other transportation costs.
 - The 3% COL adjusted cost for four NRICoS students' travel to the two TSAPS meetings a year is requested \$3,055 total.
 - The 3% COL adjusted workshop travel costs for four NRICoS students, each taking part in the two one-week training workshops held at a collaborating institution is requested at \$6,450 total.
 - The 3% COL adjusted cost for two selected NRICoS students' travel to the national APS April meeting is requested at \$2,652 total.
- Other Direct Costs
 - The consultant fee to cover the cost for the external evaluator, Dr. T. Sauncy's service and other costs is requested at \$7,000, as described in year 1.
 - The cost for training workshop organization to be awarded to the hosting institution is requested at \$7,000 for the workshop, as described in year 2.

- Materials and operations support is requested at \$3,000 to support various expenses for operations and materials as the lead institution throughout the year, as in year 1.
- Publication cost is requested at \$2,000.
- Total direct cost for year 3 is \$102,646.
- The modified direct cost subject to indirect is \$46,363.
- Indirect cost is requested at \$15,763 based on the 34% agreed rates.
- The grand total for year 3 is \$118,409.

Year 4 – Sept. 2024. – Aug. 2025

- Salaries:
 - Total of \$11,146 which reflects 3% COL adjusted hourly rate of year 3 is requested to cover the salary of one peer mentor (PM).
 - The 3% COL adjusted 0.1 month salaries for Lopez, Asaadi and Yu are requested at \$2,010, \$1,093 and \$1,635, respectively.
- Fringe:
 - Fringe benefit cost of \$925 for PM undergraduate students at 8.3% rate is requested.
 - Fringe benefit for Lopez, Asaadi, and Yu are requested at \$603, \$328 and \$491, respectively.
- Travel:

Domestic

- The 3% COL adjusted PM's travel to the two one-week training workshops and the two TXAPS meetings are requested at \$1,443 and \$787, respectively.
- The travel cost for the three PIs' participation to the relevant conferences and to the training workshop participation is requested at \$5,000.

International

- Travel cost for PI participation to the relevant international conferences totaling \$2,500 is requested.
- Participant support:
 - The stipend for the four NRICoS students is requested at the total of \$36,000, \$9,000 per student.
 - Other: The 3% COL adjusted scholarship support for four PUI students at \$6,556 is requested to defray the cost for them to take necessary advanced physics courses at UTA.
 - Travel: The following participant travel support are requested
 - The 3% COL adjusted for one selected NRICoS student's four week stay at Fermilab is requested at \$1,814, including the dormitory cost at Fermilab on campus, COLA and the roundtrip air and other transportation costs.
 - The 3% COL adjusted cost for four NRICoS students' travel to the two TSAPS meetings a year is requested \$3,147 total.
 - The 3% COL adjusted workshop travel costs for four NRICoS students, each taking part in the two one-week training workshops held at a collaborating institution is requested at \$6,644 total.
 - The 3% COL adjusted cost for two selected NRICoS students' travel to the national APS April meeting is requested at \$2,732 total.
- Other Direct Costs
 - The consultant fee to cover the cost for the external evaluator, Dr. T. Sauncy's service and other costs is requested at \$7,000, as described in year 1.
 - The cost for training workshop organization to be awarded to the hosting institution is requested at \$8,000 for the workshop. The \$1,000 increase compared to year 3 is to cover the cost for one invited NRICoS graduate to the training workshops. These funds will also be used to cover expenses for the two workshops, such as venue rental fees, AV rental cost, materials, publicizing cost, etc.
 - The cost for a computer is requested at \$2,000 to replace the computer purchased in year 1.
 - Materials and operations support is requested at \$3,000 as in year 1.
 - Publication cost is requested at \$2,000.
- Total direct cost for year 4 is \$106,853.
- The modified direct cost subject to indirect is \$49,960.

- Indirect cost is requested at \$16,986 based on the 34% agreed rates.
- The grand total for year 4 is \$123,839.

Year 5 – Sept. 2025. – Aug. 2026

- Salaries:
 - Total of \$11,480 which reflects 3% COL adjusted hourly rate of year 4 is requested to cover the salary of one peer mentor (PM).
 - The 3% COL adjusted 0.1 month salaries for Lopez, Asaadi and Yu are requested at \$2,070, \$1,126 and \$1,684, respectively
- Fringe:
 - Fringe benefit cost of \$953 for PM undergraduate students at 8.3% rate is requested.
 - Fringe benefit for Lopez, Asaadi, and Yu are requested at \$621, \$338 and \$505, respectively.
- Travel:

Domestic

- The 3% COL adjusted PM's travel to the 2 one-week training workshops and the two TXAPS meetings are requested at \$1,486 and \$810, respectively.
- The travel cost for the three PIs' participation to the relevant conferences and to the training workshop participation is requested at \$5,000.

International

- Travel cost for PI participation to the relevant international conferences totaling \$2,500 is requested.
- Participant support:
 - The stipend for the four NRICoS students is requested at the total of \$36,000, \$9,000 per student.
 - Other: The 3% COL adjusted scholarship support for four PUI students at \$6,753 is requested to defray the cost for them to take necessary advanced physics courses at UTA.
 - Travel: The following participant travel support are requested
 - The 3% COL adjusted support for one selected student at Fermilab is requested at \$1,868.
 - The 3% COL adjusted support for four NRICoS students' travel to the two TSAPS meetings a year is requested \$3,241 total.
 - The 3% COL adjusted workshop travel costs for four NRICoS students, each taking part in the two one-week training workshops held at a collaborating institution is requested at \$6,843 total.
 - The 3% COL adjusted cost for two selected NRICoS students' travel to the national APS April meeting is requested at \$2,814 total.
- Other Direct Costs
 - The consultant fee to cover the cost for the external evaluator, Dr. T. Sauncy's service and other costs is requested at \$7,000, as in year 1.
 - The cost for training workshop organization to be awarded to the hosting institution is requested at \$8,000 for the workshop, as described in year 4.
 - Materials and operations support is requested at \$3,000 as in year 1.
 - Publication cost is requested at \$2,000.
- Total direct cost for year 5 is \$106,093.
- The modified direct cost subject to indirect is \$48,573.
- Indirect cost is requested at \$16,515 based on the 34% agreed rates.
- The grand total for year 5 is \$122,608.

Grand total: \$571,224

**SUMMARY
PROPOSAL BUDGET**

YEAR 1

		FOR NSF USE ONLY			
		PROPOSAL NO.		DURATION (months)	
		Proposed		Granted	
		AWARD NO.			
ORGANIZATION Abilene Christian University					
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR Larry Isenhower					
A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)		NSF Funded Person-months		Funds Requested By proposer	
		CAL	ACAD	SUMR	Funds granted by NSF (if different)
1. Larry Isenhower		0.10	0.00	0.00	800
2.					
3.					
4.					
5.					
6. (0) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)		0.00	0.00	0.00	0
7. (1) TOTAL SENIOR PERSONNEL (1 - 6)		0.10	0.00	0.00	800
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (0) POST DOCTORAL SCHOLARS		0.00	0.00	0.00	0
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)		0.00	0.00	0.00	0
3. (0) GRADUATE STUDENTS					0
4. (1) UNDERGRADUATE STUDENTS					7,200
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)					0
6. (0) OTHER					0
TOTAL SALARIES AND WAGES (A + B)					8,000
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)					520
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)					8,520
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING \$5,000.)					
TOTAL EQUIPMENT					0
E. TRAVEL 1. DOMESTIC (INCL. U.S. POSSESSIONS)					3,240
2. INTERNATIONAL					1,500
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS \$ 21,000					
2. TRAVEL 6,140					
3. SUBSISTENCE 0					
4. OTHER 0					
TOTAL NUMBER OF PARTICIPANTS (0)					27,140
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES					2,500
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION					0
3. CONSULTANT SERVICES					0
4. COMPUTER SERVICES					0
5. SUBAWARDS					0
6. OTHER					0
TOTAL OTHER DIRECT COSTS					2,500
H. TOTAL DIRECT COSTS (A THROUGH G)					42,900
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) Salaries (Rate: 50.5000, Base: 8000)					
TOTAL INDIRECT COSTS (F&A)					4,040
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)					46,940
K. FEE					0
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)					46,940
M. COST SHARING PROPOSED LEVEL \$ 0		AGREED LEVEL IF DIFFERENT \$			
PI/PD NAME Larry Isenhower		FOR NSF USE ONLY			
		INDIRECT COST RATE VERIFICATION			
ORG. REP. NAME* Megan Roth		Date Checked	Date Of Rate Sheet	Initials - ORG	

1 *ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

**SUMMARY
PROPOSAL BUDGET**

YEAR 2

		FOR NSF USE ONLY			
		PROPOSAL NO.		DURATION (months)	
		Proposed	Granted		
ORGANIZATION Abilene Christian University		AWARD NO.			
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR Larry Isenhower					
A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)		NSF Funded Person-months		Funds Requested By proposer	
		CAL	ACAD	SUMR	Funds granted by NSF (if different)
1. Larry Isenhower		0.10	0.00	0.00	824
2.					
3.					
4.					
5.					
6. (0) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)		0.00	0.00	0.00	0
7. (1) TOTAL SENIOR PERSONNEL (1 - 6)		0.10	0.00	0.00	824
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (0) POST DOCTORAL SCHOLARS		0.00	0.00	0.00	0
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)		0.00	0.00	0.00	0
3. (0) GRADUATE STUDENTS					0
4. (1) UNDERGRADUATE STUDENTS					7,416
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)					0
6. (0) OTHER					0
TOTAL SALARIES AND WAGES (A + B)					8,240
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)					535
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)					8,775
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING \$5,000.)					
TOTAL EQUIPMENT					0
E. TRAVEL 1. DOMESTIC (INCL. U.S. POSSESSIONS)					3,308
2. INTERNATIONAL					1,500
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS \$ 39,000					
2. TRAVEL 10,939					
3. SUBSISTENCE 0					
4. OTHER 0					
TOTAL NUMBER OF PARTICIPANTS (0)					49,939
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES					500
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION					0
3. CONSULTANT SERVICES					0
4. COMPUTER SERVICES					0
5. SUBAWARDS					0
6. OTHER					0
TOTAL OTHER DIRECT COSTS					500
H. TOTAL DIRECT COSTS (A THROUGH G)					64,022
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) Salaries (Rate: 50.5000, Base: 8240)					
TOTAL INDIRECT COSTS (F&A)					4,161
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)					68,183
K. FEE					0
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)					68,183
M. COST SHARING PROPOSED LEVEL \$ 0		AGREED LEVEL IF DIFFERENT \$			
PI/PD NAME Larry Isenhower		FOR NSF USE ONLY			
		INDIRECT COST RATE VERIFICATION			
ORG. REP. NAME* Megan Roth		Date Checked	Date Of Rate Sheet	Initials - ORG	

2 *ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

2110022

**SUMMARY
PROPOSAL BUDGET**

YEAR 3

		FOR NSF USE ONLY			
ORGANIZATION		PROPOSAL NO.		DURATION (months)	
Abilene Christian University				Proposed	Granted
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR		AWARD NO.			
Larry Isenhower					
A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)		NSF Funded Person-months			Funds Requested By proposer
		CAL	ACAD	SUMR	Funds granted by NSF (if different)
1. Larry Isenhower		0.10	0.00	0.00	849
2.					
3.					
4.					
5.					
6. (0) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)		0.00	0.00	0.00	0
7. (1) TOTAL SENIOR PERSONNEL (1 - 6)		0.10	0.00	0.00	849
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (0) POST DOCTORAL SCHOLARS		0.00	0.00	0.00	0
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)		0.00	0.00	0.00	0
3. (0) GRADUATE STUDENTS					0
4. (1) UNDERGRADUATE STUDENTS					7,639
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)					0
6. (0) OTHER					0
TOTAL SALARIES AND WAGES (A + B)					8,488
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)					552
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)					9,040
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING \$5,000.)					
TOTAL EQUIPMENT					0
E. TRAVEL 1. DOMESTIC (INCL. U.S. POSSESSIONS)					3,377
2. INTERNATIONAL					1,500
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS \$ 39,000					
2. TRAVEL 11,267					
3. SUBSISTENCE 0					
4. OTHER 0					
TOTAL NUMBER OF PARTICIPANTS (0)				TOTAL PARTICIPANT COSTS	50,267
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES					500
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION					0
3. CONSULTANT SERVICES					0
4. COMPUTER SERVICES					0
5. SUBAWARDS					0
6. OTHER					0
TOTAL OTHER DIRECT COSTS					500
H. TOTAL DIRECT COSTS (A THROUGH G)					64,684
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) Salaries (Rate: 50.5000, Base: 8488)					
TOTAL INDIRECT COSTS (F&A)					4,286
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)					68,970
K. FEE					0
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)					68,970
M. COST SHARING PROPOSED LEVEL \$ 0		AGREED LEVEL IF DIFFERENT \$			
PI/PD NAME Larry Isenhower		FOR NSF USE ONLY			
ORG. REP. NAME* Megan Roth		INDIRECT COST RATE VERIFICATION			
		Date Checked	Date Of Rate Sheet	Initials - ORG	

3 *ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

**SUMMARY
PROPOSAL BUDGET**

YEAR 4

		FOR NSF USE ONLY			
		PROPOSAL NO.		DURATION (months)	
		Proposed		Granted	
		AWARD NO.			
ORGANIZATION Abilene Christian University					
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR Larry Isenhower					
A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)		NSF Funded Person-months		Funds Requested By proposer	
		CAL	ACAD	SUMR	Funds granted by NSF (if different)
1. Larry Isenhower		0.10	0.00	0.00	874
2.					
3.					
4.					
5.					
6. (0) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)		0.00	0.00	0.00	0
7. (1) TOTAL SENIOR PERSONNEL (1 - 6)		0.10	0.00	0.00	874
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (0) POST DOCTORAL SCHOLARS		0.00	0.00	0.00	0
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)		0.00	0.00	0.00	0
3. (0) GRADUATE STUDENTS					0
4. (1) UNDERGRADUATE STUDENTS					7,868
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)					0
6. (0) OTHER					0
TOTAL SALARIES AND WAGES (A + B)					8,742
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)					568
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)					9,310
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING \$5,000.)					
TOTAL EQUIPMENT					0
E. TRAVEL 1. DOMESTIC (INCL. U.S. POSSESSIONS)					3,448
2. INTERNATIONAL					1,500
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS \$ 39,000					
2. TRAVEL 11,605					
3. SUBSISTENCE 0					
4. OTHER 0					
TOTAL NUMBER OF PARTICIPANTS (0)					50,605
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES					2,500
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION					0
3. CONSULTANT SERVICES					0
4. COMPUTER SERVICES					0
5. SUBAWARDS					0
6. OTHER					0
TOTAL OTHER DIRECT COSTS					2,500
H. TOTAL DIRECT COSTS (A THROUGH G)					67,363
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) Salaries (Rate: 50.5000, Base: 8742)					
TOTAL INDIRECT COSTS (F&A)					4,415
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)					71,778
K. FEE					0
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)					71,778
M. COST SHARING PROPOSED LEVEL \$ 0		AGREED LEVEL IF DIFFERENT \$			
PI/PD NAME Larry Isenhower		FOR NSF USE ONLY			
		INDIRECT COST RATE VERIFICATION			
ORG. REP. NAME* Megan Roth		Date Checked	Date Of Rate Sheet	Initials - ORG	

4 *ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

2110022

**SUMMARY
PROPOSAL BUDGET**

YEAR 5

		FOR NSF USE ONLY			
ORGANIZATION		PROPOSAL NO.		DURATION (months)	
Abilene Christian University				Proposed	Granted
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR		AWARD NO.			
Larry Isenhower					
A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)		NSF Funded Person-months			Funds Requested By proposer
		CAL	ACAD	SUMR	Funds granted by NSF (if different)
1. Larry Isenhower		0.10	0.00	0.00	900
2.					
3.					
4.					
5.					
6. (0) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)		0.00	0.00	0.00	0
7. (1) TOTAL SENIOR PERSONNEL (1 - 6)		0.10	0.00	0.00	900
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (0) POST DOCTORAL SCHOLARS		0.00	0.00	0.00	0
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)		0.00	0.00	0.00	0
3. (0) GRADUATE STUDENTS					0
4. (1) UNDERGRADUATE STUDENTS					8,104
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)					0
6. (0) OTHER					0
TOTAL SALARIES AND WAGES (A + B)					9,004
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)					585
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)					9,589
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING \$5,000.)					
TOTAL EQUIPMENT					0
E. TRAVEL 1. DOMESTIC (INCL. U.S. POSSESSIONS)					3,521
2. INTERNATIONAL					1,500
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS \$ 39,000					
2. TRAVEL 11,953					
3. SUBSISTENCE 0					
4. OTHER 0					
TOTAL NUMBER OF PARTICIPANTS (0)					50,953
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES					500
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION					0
3. CONSULTANT SERVICES					0
4. COMPUTER SERVICES					0
5. SUBAWARDS					0
6. OTHER					0
TOTAL OTHER DIRECT COSTS					500
H. TOTAL DIRECT COSTS (A THROUGH G)					66,063
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) Salaries (Rate: 50.5000, Base: 9004)					
TOTAL INDIRECT COSTS (F&A)					4,547
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)					70,610
K. FEE					0
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)					70,610
M. COST SHARING PROPOSED LEVEL \$ 0		AGREED LEVEL IF DIFFERENT \$			
PI/PD NAME Larry Isenhower		FOR NSF USE ONLY			
		INDIRECT COST RATE VERIFICATION			
ORG. REP. NAME* Megan Roth		Date Checked	Date Of Rate Sheet	Initials - ORG	

5 *ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

2110022

**SUMMARY
PROPOSAL BUDGET**

Cumulative

ORGANIZATION Abilene Christian University		FOR NSF USE ONLY				
		PROPOSAL NO.		DURATION (months)		
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR Larry Isenhower		AWARD NO.				
A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)		NSF Funded Person-months			Funds Requested By proposer	Funds granted by NSF (if different)
		CAL	ACAD	SUMR		
1. Larry Isenhower		0.50	0.00	0.00	4,247	
2.						
3.						
4.						
5.						
6. () OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)		0.00	0.00	0.00	0	
7. (1) TOTAL SENIOR PERSONNEL (1 - 6)		0.50	0.00	0.00	4,247	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)						
1. (0) POST DOCTORAL SCHOLARS		0.00	0.00	0.00	0	
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)		0.00	0.00	0.00	0	
3. (0) GRADUATE STUDENTS					0	
4. (5) UNDERGRADUATE STUDENTS					38,227	
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)					0	
6. (0) OTHER					0	
TOTAL SALARIES AND WAGES (A + B)					42,474	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)					2,760	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)					45,234	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING \$5,000.)						
TOTAL EQUIPMENT					0	
E. TRAVEL 1. DOMESTIC (INCL. U.S. POSSESSIONS)					16,894	
2. INTERNATIONAL					7,500	
F. PARTICIPANT SUPPORT COSTS						
1. STIPENDS \$ 177,000						
2. TRAVEL 51,904						
3. SUBSISTENCE 0						
4. OTHER 0						
TOTAL NUMBER OF PARTICIPANTS (0)				TOTAL PARTICIPANT COSTS	228,904	
G. OTHER DIRECT COSTS						
1. MATERIALS AND SUPPLIES					6,500	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION					0	
3. CONSULTANT SERVICES					0	
4. COMPUTER SERVICES					0	
5. SUBAWARDS					0	
6. OTHER					0	
TOTAL OTHER DIRECT COSTS					6,500	
H. TOTAL DIRECT COSTS (A THROUGH G)					305,032	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE)						
TOTAL INDIRECT COSTS (F&A)					21,449	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)					326,481	
K. FEE					0	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)					326,481	
M. COST SHARING PROPOSED LEVEL \$ 0		AGREED LEVEL IF DIFFERENT \$				
PI/PD NAME Larry Isenhower		FOR NSF USE ONLY				
		INDIRECT COST RATE VERIFICATION				
ORG. REP. NAME* Megan Roth		Date Checked	Date Of Rate Sheet		Initials - ORG	

C *ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

Budget Justification

The detailed justification for the budget is listed below for each year.

Year 1 – Sept. 2021. – Aug. 2022

- Salaries:
 - Total of \$7,200 is requested to cover the salary of one peer mentor (PM), a senior undergraduate student, estimated at \$15/hr with the anticipated total number of hours per year of 480 hours which consist of 140 hours for each of the fall and spring semesters and 200 hours for 10 weeks in the summer, including the one week training workshop.
 - Salary for 0.1 month for associate professor Larry Eisenhower who serves as the ACU PI is requested at \$800 calculated based on the 9mo salary of \$72,000
- Fringe:
 - Fringe benefit cost of \$240 for PM undergraduate student at 8% of summer salary is requested.
 - Fringe benefit cost of \$280 for Dr. Larry Eisenhower at 35% rate is requested.
- Travel:
 - PM's travel to the 2 one-week training workshops once a year is requested at \$760 per trip, totaling \$1,520. The cost for each trip reflects \$200 transportation cost, \$50/night shared housing and \$30/ day per-diem.
 - PM's travel to the two APS Texas section meetings is requested at \$720. This cost reflects \$200 transportation cost, \$50/night shared housing, and \$30/ day per-diem for a two-day trip.
 - The travel cost for the PIs' participation to relevant conferences and for training workshop participation is requested at \$2,500.
- Participant support:
 - Stipend: Two participating NRICoS students during the Fall and Spring semesters with a stipend of \$3,000 each, and three students participating in summer research at \$3,000 each. This gives a total of \$21,000.
 - Travel: The following participant travel support are requested
 - One selected NRICoS student's four week stay at Fermi National Accelerator Laboratory is requested at \$1,660 which includes \$35/night dormitory cost at Fermilab on campus, \$10/day cost of living adjustment and \$400 roundtrip air and other transportation costs.
 - The cost for two NRICoS students' travel to the two Texas Section American Physical Society meetings each a year is requested \$1,440 total. This cost reflects \$200 transportation cost, \$50/night shared housing, and \$30/ day per-diem for a two-day trip per student.
 - The workshop travel costs for two NRICoS students taking part in the 2 one-week training workshop each held at a collaborating institution, once a year, is requested at \$3,040. This cost reflects \$200 transportation cost, \$50/night shared room housing, and \$30/ day per-diem for one week stay per trip per NRICoS student.
- The cost for computing equipment for the first year is requested at \$2,000 for the first year. We anticipate a three year useful lifetime.
- Materials and operations support is requested at \$500 to support various cost for operations and materials as a participating institution.
- Total direct cost for year 1 is \$42,900.

- The salaries and wages subject to indirect costs are \$8000.
- Indirect cost is requested at \$4,040 based on the 50.5% agreed rates on salaries.
- The grand total for year 1 is \$46,940.

Year 2 – Sept. 2022. – Aug. 2023

- Salaries:
 - Total of \$7,416 which reflects a canonical 3% cost of living adjusted hourly rate to \$15/hr is requested to cover the salary of one peer mentor (PM), a senior undergraduate student with the anticipated total number of hours per year of 480 hours which consist of 140 hours for each of the fall and spring semesters and 200 hours for 10 weeks in the summer, including the one week training workshop.
 - The 3% canonical cost of living adjustment applied with respect to year 1 salary for 0.1 month for Dr. Larry Isenhower is requested at \$824.
- Fringe:
 - Fringe benefit cost of \$247 for PM undergraduate students at 8% of summer salary is requested.
 - Fringe benefit cost of \$288 for Dr. Larry Isenhower at 35% rate is requested.
- Travel:
 - The 3% canonical cost of living adjusted PM's travel to the 2 one-week training workshop once a year is requested at \$1,566.
 - The 3% canonical cost of living adjusted PM's travel to the two APS Texas section meetings is requested at \$742.
 - The travel cost for the PIs' participation to relevant conferences and for training workshop participation is requested \$2,500.
- Participant support:
 - Stipend: Two additional NRICoS students will be added to the program in year 2 to the two already in the program from in year 1. Therefore we request funds for 4 students during the Fall and Spring semesters with a stipend of \$3,000 each, and 5 students participating in summer research at \$3,000 each. This gives a total of \$39,000.
 - Travel: The following participant travel support are requested
 - The 3% canonical cost of living adjusted for one selected NRICoS student's four week stay at Fermi National Accelerator Laboratory is requested at \$1,710, including the dormitory cost at Fermilab on campus, cost of living adjustment and the roundtrip air and other transportation costs.
 - The 3% canonical cost of living adjusted cost for four NRICoS students' travel to the two Texas Section American Physical Society meetings a year is requested \$2,966 total.
 - The 3% canonical cost of living adjusted workshop travel costs for four NRICoS students taking part in the 2 one-week training workshops each held at a collaborating institution, once a year, is requested at \$6,262 total.
- Materials and operations support is requested at \$500 to support various cost for operations and materials as the host institution.
- Total direct cost for year 2 is \$64,021
- The salaries and wages subject to indirect are \$8,240
- Indirect cost is requested at \$4,161 based on the 50.5% agreed rates.
- The grand total for year 2 is \$68,183.

Year 3 – Sept. 2023. – Aug. 2024

- Salaries:
 - Total of \$7,639 which reflects a canonical 3% cost of living adjusted hourly rate to \$15/hr is requested to cover the salary of one peer mentor (PM), a senior undergraduate student with the anticipated total number of hours per year of 480 hours which consist of 140 hours for each of the fall and spring semesters and 200 hours for 10 weeks in the summer, including the one week training workshop.
 - The 3% canonical cost of living adjustment applied with respect to year 2 salary for 0.1 month for Dr. Larry Isenhower is requested at \$849.
- Fringe:
 - Fringe benefit cost of \$255 for PM undergraduate students at 8% of summer salary is requested.
 - Fringe benefit cost of \$297 for Dr. Larry Isenhower at 35% rate is requested.
- Travel:
 - The 3% canonical cost of living adjusted PM's travel to the 2 one-week training workshop once a year is requested at \$1,613.
 - The 3% canonical cost of living adjusted PM's travel to the two APS Texas section meetings is requested at \$764.
 - The travel cost for the PIs' participation to relevant conferences and for training workshop participation is requested \$2,500.
- Participant support:
 - Stipend: We request funds for 4 students during the Fall and Spring semesters with a stipend of \$3,000 each, and 5 students participating in summer research at \$3,000 each. This gives a total of \$39,000.
 - Travel: The following participant travel support are requested
 - The 3% canonical cost of living adjusted for one selected NRICoS student's four week stay at Fermi National Accelerator Laboratory is requested at \$1,761, including the dormitory cost at Fermilab on campus, cost of living adjustment and the roundtrip air and other transportation costs.
 - The 3% canonical cost of living adjusted cost for four NRICoS students' travel to the two Texas Section American Physical Society meetings a year is requested \$3,055 total.
 - The 3% canonical cost of living adjusted workshop travel costs for four NRICoS students taking part in the 2 one-week training workshops each held at a collaborating institution, once a year, is requested at \$6,450 total.
- Materials and operations support is requested at \$500 to support various cost for operations and materials as the host institution.
- Total direct cost for year 3 is \$64,684
- The salaries and wages subject to indirect are \$8,488
- Indirect cost is requested at \$4,286 based on the 50.5% agreed rates.
- The grand total for year 3 is \$68,970.

Year 4 – Sept. 2024. – Aug. 2025

- Salaries:
 - Total of \$7,868 which reflects a canonical 3% cost of living adjusted hourly rate to \$15/hr is requested to cover the salary of one peer mentor (PM), a senior undergraduate student with the anticipated total number of hours per year of 480 hours which consist of 140 hours for each of the fall and spring semesters and 200 hours for 10 weeks in the summer, including the one week training workshop.
 - The 3% canonical cost of living adjustment applied with respect to year 3 salary for 0.1 month for Dr. Larry Isenhower is requested at \$874.
- Fringe:
 - Fringe benefit cost of \$262 for PM undergraduate students at 8% of summer salary is requested.
 - Fringe benefit cost of \$306 for Dr. Larry Isenhower at 35% rate is requested.
- Travel:
 - The 3% canonical cost of living adjusted PM's travel to the 2 one-week training workshop once a year is requested at \$1,661.
 - The 3% canonical cost of living adjusted PM's travel to the two APS Texas section meetings is requested at \$787.
 - The travel cost for the PIs' participation to relevant conferences and for training workshop participation is requested \$2,500.
- Participant support:
 - Stipend: We request funds for 4 students during the Fall and Spring semesters with a stipend of \$3,000 each, and 5 students participating in summer research at \$3,000 each. This gives a total of \$39,000.
 - Travel: The following participant travel support are requested
 - The 3% canonical cost of living adjusted for one selected NRICoS student's four week stay at Fermi National Accelerator Laboratory is requested at \$1,814, including the dormitory cost at Fermilab on campus, cost of living adjustment and the roundtrip air and other transportation costs.
 - The 3% canonical cost of living adjusted cost for four NRICoS students' travel to the two Texas Section American Physical Society meetings a year is requested \$3,147 total.
 - The 3% canonical cost of living adjusted workshop travel costs for four NRICoS students taking part in the 2 one-week training workshops each held at a collaborating institution, once a year, is requested at \$6,644 total.
- The cost for computing equipment at \$2,000 for replacement of computers bought in the first year. We anticipate a three year useful lifetime.
- Materials and operations support is requested at \$500 to support various cost for operations and materials as the host institution.
- Total direct cost for year 4 is \$67,363
- The salaries and wages subject to indirect are \$8,742
- Indirect cost is requested at \$4,415 based on the 50.5% agreed rates.
- The grand total for year 4 is \$71,778.

Year 5 – Sept. 2025. – Aug. 2026

- Salaries:
 - Total of \$8,104 which reflects a canonical 3% cost of living adjusted hourly rate to \$15/hr is requested to cover the salary of one peer mentor (PM), a senior undergraduate student with the anticipated total number of hours per year of 480 hours which consist of 140 hours for each of the fall and spring semesters and 200 hours for 10 weeks in the summer, including the one week training workshop.
 - The 3% canonical cost of living adjustment applied with respect to year 4 salary for 0.1 month for Dr. Larry Isenhower is requested at \$900.
- Fringe:
 - Fringe benefit cost of \$270 for PM undergraduate students at 8% of summer salary is requested.
 - Fringe benefit cost of \$315 for Dr. Larry Isenhower at 35% rate is requested.
- Travel:
 - The 3% canonical cost of living adjusted PM's travel to the 2 one-week training workshop once a year is requested at \$1,711.
 - The 3% canonical cost of living adjusted PM's travel to the two APS Texas section meetings is requested at \$810.
 - The travel cost for the PIs' participation to relevant conferences and for training workshop participation is requested \$2,500.
- Participant support:
 - Stipend: We request funds for 4 students during the Fall and Spring semesters with a stipend of \$3,000 each, and 5 students participating in summer research at \$3,000 each. This gives a total of \$39,000.
 - Travel: The following participant travel support are requested
 - The 3% canonical cost of living adjusted for one selected NRICoS student's four week stay at Fermi National Accelerator Laboratory is requested at \$1,868, including the dormitory cost at Fermilab on campus, cost of living adjustment and the roundtrip air and other transportation costs.
 - The 3% canonical cost of living adjusted cost for four NRICoS students' travel to the two Texas Section American Physical Society meetings a year is requested \$3,241 total.
 - The 3% canonical cost of living adjusted workshop travel costs for four NRICoS students taking part in the 2 one-week training workshops each held at a collaborating institution, once a year, is requested at \$6,843 total.
- Materials and operations support is requested at \$500 to support various cost for operations and materials as the host institution.
- Total direct cost for year 5 is \$66,063
- The salaries and wages subject to indirect are \$9,004
- Indirect cost is requested at \$4,547 based on the 50.5% agreed rates.
- The grand total for year 5 is \$70,610.

Grand total: \$326,481

**SUMMARY
PROPOSAL BUDGET**

YEAR 1

				FOR NSF USE ONLY			
				PROPOSAL NO.		DURATION (months)	
				Proposed	Granted		
ORGANIZATION Texas Woman's University				AWARD NO.			
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR Nasrin Mirsaleh Kohan							
A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)				NSF Funded Person-months		Funds Requested By proposer	Funds granted by NSF (if different)
				CAL	ACAD	SUMR	
1. Nasrin Mirsaleh Kohan - Associate Professor				0.00	0.00	0.01	3,630
2.							
3.							
4.							
5.							
6. (0) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)				0.00	0.00	0.00	0
7. (1) TOTAL SENIOR PERSONNEL (1 - 6)				0.00	0.00	0.01	3,630
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)							
1. (0) POST DOCTORAL SCHOLARS				0.00	0.00	0.00	0
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)				0.00	0.00	0.00	0
3. (0) GRADUATE STUDENTS							0
4. (1) UNDERGRADUATE STUDENTS							7,200
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)							0
6. (0) OTHER							0
TOTAL SALARIES AND WAGES (A + B)							10,830
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)							1,821
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)							12,651
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING \$5,000.)							
Computing equipment				\$	2,000		
TOTAL EQUIPMENT							2,000
E. TRAVEL 1. DOMESTIC (INCL. U.S. POSSESSIONS)							4,540
2. INTERNATIONAL							0
F. PARTICIPANT SUPPORT COSTS							
1. STIPENDS \$ 21,000							
2. TRAVEL 6,140							
3. SUBSISTENCE 0							
4. OTHER 0							
TOTAL NUMBER OF PARTICIPANTS (2)							27,140
G. OTHER DIRECT COSTS							
1. MATERIALS AND SUPPLIES							500
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION							0
3. CONSULTANT SERVICES							0
4. COMPUTER SERVICES							0
5. SUBAWARDS							0
6. OTHER							0
TOTAL OTHER DIRECT COSTS							500
H. TOTAL DIRECT COSTS (A THROUGH G)							46,831
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) Salaries and Wages (Rate: 42.7000, Base: 10829)							
TOTAL INDIRECT COSTS (F&A)							4,624
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)							51,455
K. FEE							0
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)							51,455
M. COST SHARING PROPOSED LEVEL \$ 0				AGREED LEVEL IF DIFFERENT \$			
PI/PD NAME Nasrin Mirsaleh Kohan				FOR NSF USE ONLY			
				INDIRECT COST RATE VERIFICATION			
ORG. REP. NAME* Tracy Lindsay				Date Checked	Date Of Rate Sheet	Initials - ORG	

1 *ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

2109969

**SUMMARY
PROPOSAL BUDGET**

YEAR 2

		FOR NSF USE ONLY			
ORGANIZATION		PROPOSAL NO.		DURATION (months)	
Texas Woman's University				Proposed	Granted
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR		AWARD NO.			
Nasrin Mirsaleh Kohan					
A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)		NSF Funded Person-months			Funds Requested By proposer
		CAL	ACAD	SUMR	Funds granted by NSF (if different)
1. Nasrin Mirsaleh Kohan - Associate Professor		0.00	0.00	0.01	3,739
2.					
3.					
4.					
5.					
6. (0) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)		0.00	0.00	0.00	0
7. (1) TOTAL SENIOR PERSONNEL (1 - 6)		0.00	0.00	0.01	3,739
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (0) POST DOCTORAL SCHOLARS		0.00	0.00	0.00	0
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)		0.00	0.00	0.00	0
3. (0) GRADUATE STUDENTS					0
4. (1) UNDERGRADUATE STUDENTS					7,416
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)					0
6. (0) OTHER					0
TOTAL SALARIES AND WAGES (A + B)					11,155
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)					1,876
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)					13,031
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING \$5,000.)					
TOTAL EQUIPMENT					0
E. TRAVEL 1. DOMESTIC (INCL. U.S. POSSESSIONS)					4,601
2. INTERNATIONAL					0
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS \$ 39,000					
2. TRAVEL 10,939					
3. SUBSISTENCE 0					
4. OTHER 0					
TOTAL NUMBER OF PARTICIPANTS (4)					49,939
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES					500
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION					0
3. CONSULTANT SERVICES					0
4. COMPUTER SERVICES					0
5. SUBAWARDS					0
6. OTHER					0
TOTAL OTHER DIRECT COSTS					500
H. TOTAL DIRECT COSTS (A THROUGH G)					68,071
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) Salaries and Wages (Rate: 42.7000, Base: 11155)					
TOTAL INDIRECT COSTS (F&A)					4,763
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)					72,834
K. FEE					0
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)					72,834
M. COST SHARING PROPOSED LEVEL \$ 0		AGREED LEVEL IF DIFFERENT \$			
PI/PD NAME Nasrin Mirsaleh Kohan		FOR NSF USE ONLY			
		INDIRECT COST RATE VERIFICATION			
ORG. REP. NAME* Tracy Lindsay		Date Checked	Date Of Rate Sheet		Initials - ORG

2 *ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

2109969

**SUMMARY
PROPOSAL BUDGET**

YEAR 3

		FOR NSF USE ONLY			
		PROPOSAL NO.		DURATION (months)	
		Proposed		Granted	
		AWARD NO.			
ORGANIZATION Texas Woman's University					
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR Nasrin Mirsaleh Kohan					
A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)		NSF Funded Person-months		Funds Requested By proposer	
		CAL	ACAD	SUMR	Funds granted by NSF (if different)
1. Nasrin Mirsaleh Kohan - Associate Professor		0.00	0.00	0.01	3,851
2.					
3.					
4.					
5.					
6. (0) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)		0.00	0.00	0.00	0
7. (1) TOTAL SENIOR PERSONNEL (1 - 6)		0.00	0.00	0.01	3,851
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (0) POST DOCTORAL SCHOLARS		0.00	0.00	0.00	0
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)		0.00	0.00	0.00	0
3. (0) GRADUATE STUDENTS					0
4. (1) UNDERGRADUATE STUDENTS					7,639
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)					0
6. (0) OTHER					0
TOTAL SALARIES AND WAGES (A + B)					11,490
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)					1,932
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)					13,422
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING \$5,000.)					
TOTAL EQUIPMENT					0
E. TRAVEL 1. DOMESTIC (INCL. U.S. POSSESSIONS)					4,665
2. INTERNATIONAL					0
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS \$ 39,000					
2. TRAVEL 11,267					
3. SUBSISTENCE 0					
4. OTHER 0					
TOTAL NUMBER OF PARTICIPANTS (4)					50,267
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES					500
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION					0
3. CONSULTANT SERVICES					0
4. COMPUTER SERVICES					0
5. SUBAWARDS					0
6. OTHER					0
TOTAL OTHER DIRECT COSTS					500
H. TOTAL DIRECT COSTS (A THROUGH G)					68,854
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) Salaries and Wages (Rate: 42.7000, Base: 11490)					
TOTAL INDIRECT COSTS (F&A)					4,906
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)					73,760
K. FEE					0
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)					73,760
M. COST SHARING PROPOSED LEVEL \$ 0		AGREED LEVEL IF DIFFERENT \$			
PI/PD NAME Nasrin Mirsaleh Kohan		FOR NSF USE ONLY			
		INDIRECT COST RATE VERIFICATION			
ORG. REP. NAME* Tracy Lindsay		Date Checked	Date Of Rate Sheet	Initials - ORG	

3 *ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

2109969

**SUMMARY
PROPOSAL BUDGET**

YEAR 4

		FOR NSF USE ONLY			
		PROPOSAL NO.		DURATION (months)	
		Proposed		Granted	
		AWARD NO.			
ORGANIZATION Texas Woman's University					
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR Nasrin Mirsaleh Kohan					
A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)		NSF Funded Person-months		Funds Requested By proposer	
		CAL	ACAD	SUMR	Funds granted by NSF (if different)
1. Nasrin Mirsaleh Kohan - Associate Professor		0.00	0.00	0.01	3,967
2.					
3.					
4.					
5.					
6. (0) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)		0.00	0.00	0.00	0
7. (1) TOTAL SENIOR PERSONNEL (1 - 6)		0.00	0.00	0.01	3,967
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (0) POST DOCTORAL SCHOLARS		0.00	0.00	0.00	0
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)		0.00	0.00	0.00	0
3. (0) GRADUATE STUDENTS					0
4. (1) UNDERGRADUATE STUDENTS					7,868
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)					0
6. (0) OTHER					0
TOTAL SALARIES AND WAGES (A + B)					11,835
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)					1,990
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)					13,825
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING \$5,000.)					
Computing equipment			\$	2,000	
TOTAL EQUIPMENT					2,000
E. TRAVEL 1. DOMESTIC (INCL. U.S. POSSESSIONS)					4,729
2. INTERNATIONAL					0
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS \$ 39,000					
2. TRAVEL 11,605					
3. SUBSISTENCE 0					
4. OTHER 0					
TOTAL NUMBER OF PARTICIPANTS (4)					50,605
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES					500
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION					0
3. CONSULTANT SERVICES					0
4. COMPUTER SERVICES					0
5. SUBAWARDS					0
6. OTHER					0
TOTAL OTHER DIRECT COSTS					500
H. TOTAL DIRECT COSTS (A THROUGH G)					71,659
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) Salaries and Wages (Rate: 42.7000, Base: 11835)					
TOTAL INDIRECT COSTS (F&A)					5,054
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)					76,713
K. FEE					0
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)					76,713
M. COST SHARING PROPOSED LEVEL \$ 0		AGREED LEVEL IF DIFFERENT \$			
PI/PD NAME Nasrin Mirsaleh Kohan		FOR NSF USE ONLY			
		INDIRECT COST RATE VERIFICATION			
ORG. REP. NAME* Tracy Lindsay		Date Checked	Date Of Rate Sheet	Initials - ORG	

4 *ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

2109969

**SUMMARY
PROPOSAL BUDGET**

YEAR 5

		FOR NSF USE ONLY			
ORGANIZATION		PROPOSAL NO.		DURATION (months)	
Texas Woman's University				Proposed	Granted
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR		AWARD NO.			
Nasrin Mirsaleh Kohan					
A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)		NSF Funded Person-months			Funds Requested By proposer
		CAL	ACAD	SUMR	Funds granted by NSF (if different)
1. Nasrin Mirsaleh Kohan - Associate Professor		0.00	0.00	0.01	4,086
2.					
3.					
4.					
5.					
6. (0) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)		0.00	0.00	0.00	0
7. (1) TOTAL SENIOR PERSONNEL (1 - 6)		0.00	0.00	0.01	4,086
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (0) POST DOCTORAL SCHOLARS		0.00	0.00	0.00	0
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)		0.00	0.00	0.00	0
3. (0) GRADUATE STUDENTS					0
4. (1) UNDERGRADUATE STUDENTS					8,104
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)					0
6. (0) OTHER					0
TOTAL SALARIES AND WAGES (A + B)					12,190
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)					2,050
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)					14,240
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING \$5,000.)					
TOTAL EQUIPMENT					0
E. TRAVEL 1. DOMESTIC (INCL. U.S. POSSESSIONS)					4,796
2. INTERNATIONAL					0
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS \$ 39,000					
2. TRAVEL 11,953					
3. SUBSISTENCE 0					
4. OTHER 0					
TOTAL NUMBER OF PARTICIPANTS (4)					50,953
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES					500
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION					0
3. CONSULTANT SERVICES					0
4. COMPUTER SERVICES					0
5. SUBAWARDS					0
6. OTHER					0
TOTAL OTHER DIRECT COSTS					500
H. TOTAL DIRECT COSTS (A THROUGH G)					70,489
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) Salaries and Wages (Rate: 42.7000, Base: 12190)					
TOTAL INDIRECT COSTS (F&A)					5,205
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)					75,694
K. FEE					0
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)					75,694
M. COST SHARING PROPOSED LEVEL \$ 0		AGREED LEVEL IF DIFFERENT \$			
PI/PD NAME Nasrin Mirsaleh Kohan		FOR NSF USE ONLY			
		INDIRECT COST RATE VERIFICATION			
ORG. REP. NAME* Tracy Lindsay		Date Checked	Date Of Rate Sheet	Initials - ORG	

5 *ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

2109969

**SUMMARY
PROPOSAL BUDGET**

Cumulative

		FOR NSF USE ONLY			
		PROPOSAL NO.		DURATION (months)	
		Proposed	Granted		
ORGANIZATION Texas Woman's University		AWARD NO.			
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR Nasrin Mirsaleh Kohan					
A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)		NSF Funded Person-months		Funds Requested By proposer	
		CAL	ACAD	Funds granted by NSF (if different)	
1. Nasrin Mirsaleh Kohan - Associate Professor		0.00	0.00	0.05	19,273
2.					
3.					
4.					
5.					
6. () OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)		0.00	0.00	0.00	0
7. (1) TOTAL SENIOR PERSONNEL (1 - 6)		0.00	0.00	0.05	19,273
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (0) POST DOCTORAL SCHOLARS		0.00	0.00	0.00	0
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)		0.00	0.00	0.00	0
3. (0) GRADUATE STUDENTS					0
4. (5) UNDERGRADUATE STUDENTS					38,227
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)					0
6. (0) OTHER					0
TOTAL SALARIES AND WAGES (A + B)					57,500
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)					9,669
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)					67,169
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING \$5,000.)		\$	4,000		
TOTAL EQUIPMENT					4,000
E. TRAVEL 1. DOMESTIC (INCL. U.S. POSSESSIONS)					23,331
2. INTERNATIONAL					0
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS \$ 177,000					
2. TRAVEL 51,904					
3. SUBSISTENCE 0					
4. OTHER 0					
TOTAL NUMBER OF PARTICIPANTS (18)					228,904
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES					2,500
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION					0
3. CONSULTANT SERVICES					0
4. COMPUTER SERVICES					0
5. SUBAWARDS					0
6. OTHER					0
TOTAL OTHER DIRECT COSTS					2,500
H. TOTAL DIRECT COSTS (A THROUGH G)					325,904
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE)					
TOTAL INDIRECT COSTS (F&A)					24,552
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)					350,456
K. FEE					0
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)					350,456
M. COST SHARING PROPOSED LEVEL \$ 0		AGREED LEVEL IF DIFFERENT \$			
PI/PD NAME Nasrin Mirsaleh Kohan		FOR NSF USE ONLY			
		INDIRECT COST RATE VERIFICATION			
ORG. REP. NAME* Tracy Lindsay		Date Checked	Date Of Rate Sheet	Initials - ORG	

C *ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

Budget Justification

The detailed justification for the budget is listed below for each year.

Year 1 – Sept. 2021. – Aug. 2022

- Salaries:
 - Total of \$7,200 is requested to cover the salary of one peer mentor (PM), a senior undergraduate student. The hourly rate is estimated at \$15/hour with an anticipated total number of hours per year of 480, which consists of 140 hours for each of the fall and spring semesters and 200 hours for 10 weeks in the summer, including the 2 one-week training workshops.
 - Salary for 0.5 summer month for professor Nasrin Mirsaleh-Kohan (PI) who serves as the project director at TWU is requested for \$3,629.67 based on the 9-month salary of \$65,334.
- Fringe Benefits:
 - Fringe benefit cost of \$551 for PM undergraduate students at 7.65% rate is requested.
 - Fringe benefit cost of \$1270 for PI, Dr. Nasrin Mirsaleh-Kohan, at 35% rate is requested.
- Travel:
 - PM's travel to the 2 one-week training workshops is requested at \$660 per trip, totaling \$1,320. The cost for each trip reflects \$100 in transportation cost, \$50/night shared housing and \$30/day per diem.
 - The cost for PM to travel to the two Texas Section American Physical Society meetings a year is requested at \$720 total. This cost reflects \$200 in transportation cost, \$50/night shared housing, and \$30/day per diem for a two-day trip. PM will act as chaperone for the NRICoS students.
 - Travel cost for the PI to participate in the relevant conferences and to attend the training workshops is requested at \$2,500.
- Participant support:
 - Stipend: Funds to provide two participating NRICoS students with a stipend of \$9,000 per year is requested for a total of \$18,000. Stipends of \$3,000 to be dispersed in fall, spring and summer terms for each student.
 - PM will receive a stipend of \$3,000 per year to be disbursed during the summer term.
 - Travel: The following participant travel support is requested:
 - One selected NRICoS student's four week stay at Fermi National Accelerator Laboratory is requested at \$1,660, which includes \$35/night dormitory cost at Fermilab on campus, \$10/day cost of living adjustment and \$400 roundtrip air and other transportation costs.
 - The cost for two NRICoS students to each travel to two Texas Section American Physical Society meetings is requested at \$1,440 total. This cost reflects \$200 in transportation cost, \$50/night shared housing, and \$30/day per diem for 2 two-day trips per student.
 - The workshop travel costs for each of the two NRICoS students to take part in the 2 one-week training workshops held at a collaborating institution is requested at \$3,040. This cost reflects \$200 in transportation cost, \$50/night shared room housing, and \$30/day per diem for 2 one-week stays per NRICoS student.
- The cost for computing equipment for the first year is requested at \$2,000. We anticipate a useful lifetime of three years.
- Materials and operations support is requested at \$500 to cover various project costs.
- Total direct cost for Year 1 is \$46,830.67.
- Indirect cost is requested at \$4,624.27 based on the agreed rate of 42.7% of salaries and wages.
- The grand total for Year 1 is \$51,454.93.

Year 2 – Sept. 2022. – Aug. 2023

- Salaries:
 - Total of \$7,416 is requested to cover the salary of one peer mentor (PM), a senior undergraduate student. The hourly rate is estimated at \$15.45/hour with an anticipated total number of hours per

year of 480, which consists of 140 hours for each of the fall and spring semesters and 200 hours for 10 weeks in the summer, including the 2 one-week training workshops.

- Salary for 0.5 summer month for professor Nasrin Mirsaleh-Kohan (PI) who serves as the project director at TWU is requested for \$3,739 based on the 9-month salary of \$67,302.
- Fringe Benefits:
 - Fringe benefit cost of \$567 for PM undergraduate students at 7.65% rate is requested.
 - Fringe benefit cost of \$1309 for PI, Dr. Nasrin Mirsaleh-Kohan, at 35% rate is requested.
- Travel:
 - PM's travel to the 2 one-week training workshops is requested at \$680 per trip, totaling \$1,360. The cost for each trip reflects \$103 in transportation cost, \$51.50/night shared housing and \$30.90/day per diem.
 - The cost for PM to travel to the two Texas Section American Physical Society meetings a year is requested \$741.60 total. This cost reflects \$206 in transportation cost, \$51.50/night shared housing, and \$30.90/day per diem for a two-day trip. PM will act as chaperone for the NRICoS students.
 - Travel cost for the PI to participate in the relevant conferences and to attend the training workshops is requested at \$2,500.
- Participant support:
 - Stipend: Funds to provide four participating NRICoS students with a stipend of \$9,000 per year is requested for a total of \$36,000. Stipends of \$3,000 to be dispersed in fall, spring and summer terms for each student.
 - PM will receive a stipend of \$3,000 per year to be disbursed during the summer term.
 - Travel: The following participant travel support is requested:
 - One selected NRICoS student's four week stay at Fermi National Accelerator Laboratory is requested at \$1,710, which includes \$36.05/night dormitory cost at Fermilab on campus, \$10.30/day cost of living adjustment and \$412 roundtrip air and other transportation costs.
 - The cost for four NRICoS students to each travel to two Texas Section American Physical Society meetings a year is requested at \$2,966.40 total. This cost reflects \$206 in transportation cost, \$51.50/night shared housing, and \$30.90/day per diem for 2 two-day trips per student.
 - The workshop travel costs for each of the four NRICoS students to take part in the 2 one-week training workshops held at a collaborating institution is requested at \$6,262.40. This cost reflects \$206 in transportation cost, \$51.50/night shared room housing, and \$30.90/day per diem for 2 one-week stays per NRICoS student.
- No funds for computing equipment is requested in Year 2.
- Materials and operations support is requested at \$500 to cover various project costs.
- Total direct cost for Year 2 is \$68,071.40.
- Indirect cost is requested at \$4,763.19 based on the agreed rate of 42.7% of salaries and wages.
- The grand total for Year 2 is \$72,834.59.

Year 3 – Sept. 2023. – Aug. 2024

- Salaries:
 - Total of \$7,639 is requested to cover the salary of one peer mentor (PM), a senior undergraduate student. The hourly rate is estimated at \$15.91/hour with an anticipated total number of hours per year of 480, which consists of 140 hours for each of the fall and spring semesters and 200 hours for 10 weeks in the summer, including the 2 one-week training workshops.
 - Salary for 0.5 summer month for professor Nasrin Mirsaleh-Kohan (PI) who serves as the project director at TWU is requested for \$3,851based on the 9-month salary of \$69,318.
- Fringe Benefits:
 - Fringe benefit cost of \$584for PM undergraduate students at 7.65% rate is requested.
 - Fringe benefit cost of \$1348 for PI, Dr. Nasrin Mirsaleh-Kohan, at 35% rate is requested.

- Travel:
 - PM's travel to the 2 one-week training workshops is requested at \$700.50 per trip, totaling \$1401. The cost for each trip reflects \$106 in transportation cost, \$53.05/night shared housing and \$31.83/day per diem.
 - The cost for PM to travel to the two Texas Section American Physical Society meetings a year is requested \$763.85 total. This cost reflects \$212.18 in transportation cost, \$53.05/night shared housing, and \$31.83/day per diem for a two-day trip. PM will act as chaperone for the NRICoS students.
 - Travel cost for the PI to participate in the relevant conferences and to attend the training workshops is requested at \$2,500.
- Participant support:
 - Stipend: Funds to provide four participating NRICoS students with a stipend of \$9,000 per year is requested for a total of \$36,000. Stipends of \$3,000 to be dispersed in fall, spring and summer terms for each student.
 - PM will receive a stipend of \$3,000 per year to be disbursed during the summer term.
 - Travel: The following participant travel support is requested:
 - One selected NRICoS student's four week stay at Fermi National Accelerator Laboratory is requested at \$1,761, which includes \$37.13/night dormitory cost at Fermilab on campus, \$10.61/day cost of living adjustment and \$424.36 roundtrip air and other transportation costs.
 - The cost for four NRICoS students to each travel to two Texas Section American Physical Society meetings a year is requested at \$3,055.39 total. This cost reflects \$212.18 in transportation cost, \$53.05/night shared housing, and \$31.83/day per diem for 2 two-day trips per student.
 - The workshop travel costs for four NRICoS students each taking part in the 2 one-week training workshops held at a collaborating institution is requested at \$6,450.27. This cost reflects \$212.18 in transportation cost, \$53.05/night shared room housing, and \$31.83/day per diem for 2 one-week stays per NRICoS student.
- No funds for computing equipment is requested in Year 3.
- Materials and operations support is requested at \$500 to cover various project costs.
- Total direct cost for Year 3 is \$68,853.51.
- Indirect cost is requested at \$4,906.23 based on the agreed rate of 42.7% of salaries and wages.
- The grand total for Year 3 is \$73,759.74.

Year 4 – Sept. 2024. – Aug. 2025

- Salaries:
 - Total of \$7,868 is requested to cover the salary of one peer mentor (PM), a senior undergraduate student. The hourly rate is estimated at \$16.39/hour with an anticipated total number of hours per year of 480, which consists of 140 hours for each of the fall and spring semesters and 200 hours for 10 weeks in the summer, including the 2 one-week training workshops.
 - Salary for 0.5 summer month for professor Nasrin Mirsaleh-Kohan (PI) who serves as the project director at TWU is requested for \$3,967 based on the 9-month salary of \$71,406.
- Fringe Benefits:
 - Fringe benefit cost of \$602 for PM undergraduate students at 7.65% rate is requested.
 - Fringe benefit cost of \$1,388 for PI, Dr. Nasrin Mirsaleh-Kohan, at 35% rate is requested.
- Travel:
 - PM's travel to the 2 one-week training workshops is requested at \$721.50 per trip, totaling \$1,443. The cost for each trip reflects \$109.27 in transportation cost, \$54.64/night shared housing and \$32.78/day per diem.
 - The cost for PM to travel to the two Texas Section American Physical Society meetings a year is requested \$786.76 total. This cost reflects \$218.55 in transportation cost, \$54.64/night shared

- housing, and \$32.78/day per diem for a two-day trip. PM will act as chaperone for the NRICoS students.
- Travel cost for the PI to participate in the relevant conferences and to attend the training workshops is requested at \$2,500.
- Participant support:
 - Stipend: Funds to provide four participating NRICoS students with a stipend of \$9,000 per year is requested for a total of \$36,000. Stipends of \$3,000 to be dispersed in fall, spring and summer terms for each student.
 - PM will receive a stipend of \$3,000 per year to be disbursed during the summer term.
 - Travel: The following participant travel support is requested:
 - One selected NRICoS student's four week stay at Fermi National Accelerator Laboratory is requested at \$1,814, which includes \$38.25/night dormitory cost at Fermilab on campus, \$10.93/day cost of living adjustment and \$437.09 roundtrip air and other transportation costs.
 - The cost for four NRICoS students to each travel to two Texas Section American Physical Society meetings a year is requested at \$3,147.05 total. This cost reflects \$218.55 in transportation cost, \$54.64/night shared housing, and \$32.78/day per diem for 2 two-day trips per student.
 - The workshop travel costs for four NRICoS students each taking part in the 2 one-week training workshops held at a collaborating institution is requested at \$6,643.78. This cost reflects \$218.55 in transportation cost, \$54.64/night shared room housing, and \$32.78/day per diem for 2 one-week stays per NRICoS student.
- The cost for computing equipment for the fourth year is requested at \$2,000. We anticipate a useful lifetime of three years.
- Materials and operations support is requested at \$500 to cover various project costs.
- Total direct cost for Year 4 is \$71,659.60.
- Indirect cost is requested at \$5,053.55 based on the agreed rate of 42.7% of salaries and wages.
- The grand total for Year 4 is \$76,713.14.

Year 5 – Sept. 2025. – Aug. 2026

- Salaries:
 - Total of \$8,104 is requested to cover the salary of one peer mentor (PM), a senior undergraduate student. The hourly rate is estimated at \$16.88/hour with an anticipated total number of hours per year of 480, which consists of 140 hours for each of the fall and spring semesters and 200 hours for 10 weeks in the summer, including the 2 one-week training workshops.
 - Salary for 0.5 summer month for professor Nasrin Mirsaleh-Kohan (PI) who serves as the project director at TWU is requested for \$4,086 based on the 9-month salary of \$73,548.
- Fringe Benefits:
 - Fringe benefit cost of \$620 for PM undergraduate students at 7.65% rate is requested.
 - Fringe benefit cost of \$1,430 for PI, Dr. Nasrin Mirsaleh-Kohan, at 35% rate is requested.
- Travel:
 - PM's travel to the 2 one-week training workshops is requested at \$743.00 per trip, totaling \$1486. The cost for each trip reflects \$112.55 in transportation cost, \$56.28/night shared housing and \$33.77/day per diem.
 - The cost for PM to travel to the two Texas Section American Physical Society meetings a year is requested \$810.37 total. This cost reflects \$225.10 in transportation cost, \$56.28/night shared housing, and \$33.77/day per diem for a two-day trip. PM will act as chaperone for the NRICoS students.
 - Travel cost for the PI to participate in the relevant conferences and to attend the training workshops is requested at \$2,500.
- Participant support:

- Stipend: Funds to provide four participating NRICoS students with a stipend of \$9,000 per year is requested for a total of \$36,000. Stipends of \$3,000 to be dispersed in fall, spring and summer terms for each student.
- PM will receive a stipend of \$3,000 per year to be disbursed during the summer term.
- Travel: The following participant travel support is requested:
 - One selected NRICoS student's four week stay at Fermi National Accelerator Laboratory is requested at \$1,868, which includes \$39.39/night dormitory cost at Fermilab on campus, \$11.26/day cost of living adjustment and \$450.20 roundtrip air and other transportation costs.
 - The cost for four NRICoS students to each travel to two Texas Section American Physical Society meetings a year is requested at \$3,241.47 total. This cost reflects \$225.10 in transportation cost, \$56.28/night shared housing, and \$33.77/day per diem for 2 two-day trips per student.
 - The workshop travel costs for four NRICoS students each taking part in the 2 one-week training workshops held at a collaborating institution is requested at \$6,843.09. This cost reflects \$225.10 in transportation cost, \$56.28/night shared room housing, and \$33.77/day per diem for 2 one-week stays per NRICoS student.
- No funds for computing equipment is requested in Year 5.
- Materials and operations support is requested at \$500 to cover various project costs.
- Total direct cost for Year 5 is \$70,488.93.
- Indirect cost is requested at \$5,205.13 based on the agreed rate of 42.7% of salaries and wages.
- The grand total for Year 5 is \$75,694.06.

Grand total: \$350,456.46

**SUMMARY
PROPOSAL BUDGET**

YEAR 1

		FOR NSF USE ONLY			
		PROPOSAL NO.		DURATION (months)	
		Proposed		Granted	
		AWARD NO.			
ORGANIZATION Southwestern University					
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR Steven Alexander					
A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)		NSF Funded Person-months			Funds Requested By proposer
		CAL	ACAD	SUMR	Funds granted by NSF (if different)
1. Steven A Alexander - PI		0.00	0.00	0.50	3,000
2.					
3.					
4.					
5.					
6. (0) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)		0.00	0.00	0.00	0
7. (1) TOTAL SENIOR PERSONNEL (1 - 6)		0.00	0.00	0.50	3,000
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (0) POST DOCTORAL SCHOLARS		0.00	0.00	0.00	0
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)		0.00	0.00	0.00	0
3. (0) GRADUATE STUDENTS					0
4. (1) UNDERGRADUATE STUDENTS					10,200
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)					0
6. (0) OTHER					0
TOTAL SALARIES AND WAGES (A + B)					13,200
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)					230
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)					13,430
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING \$5,000.)					
TOTAL EQUIPMENT					0
E. TRAVEL 1. DOMESTIC (INCL. U.S. POSSESSIONS)					4,540
2. INTERNATIONAL					0
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS \$ 18,000					
2. TRAVEL 6,140					
3. SUBSISTENCE 0					
4. OTHER 0					
TOTAL NUMBER OF PARTICIPANTS (2)				TOTAL PARTICIPANT COSTS	24,140
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES					500
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION					0
3. CONSULTANT SERVICES					0
4. COMPUTER SERVICES					0
5. SUBAWARDS					0
6. OTHER					2,000
TOTAL OTHER DIRECT COSTS					2,500
H. TOTAL DIRECT COSTS (A THROUGH G)					44,610
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) Other Sponsored Activity IDC Rate (Rate: 46.6000, Base: 8230)					
TOTAL INDIRECT COSTS (F&A)					3,835
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)					48,445
K. FEE					0
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)					48,445
M. COST SHARING PROPOSED LEVEL \$ 0		AGREED LEVEL IF DIFFERENT \$			
PI/PD NAME Steven Alexander		FOR NSF USE ONLY			
		INDIRECT COST RATE VERIFICATION			
ORG. REP. NAME* Sonya Robinson		Date Checked	Date Of Rate Sheet	Initials - ORG	

1 *ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

2110092

**SUMMARY
PROPOSAL BUDGET**

YEAR 2

		FOR NSF USE ONLY			
		PROPOSAL NO.		DURATION (months)	
		Proposed		Granted	
		AWARD NO.			
ORGANIZATION Southwestern University					
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR Steven Alexander					
A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)		NSF Funded Person-months			Funds Requested By proposer
		CAL	ACAD	SUMR	Funds granted by NSF (if different)
1. Steven A Alexander - PI		0.50	0.00	0.00	3,090
2.					
3.					
4.					
5.					
6. (0) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)		0.00	0.00	0.00	0
7. (1) TOTAL SENIOR PERSONNEL (1 - 6)		0.50	0.00	0.00	3,090
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (0) POST DOCTORAL SCHOLARS		0.00	0.00	0.00	0
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)		0.00	0.00	0.00	0
3. (0) GRADUATE STUDENTS					0
4. (1) UNDERGRADUATE STUDENTS					10,506
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)					0
6. (0) OTHER					0
TOTAL SALARIES AND WAGES (A + B)					13,596
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)					236
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)					13,832
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING \$5,000.)					
TOTAL EQUIPMENT					0
E. TRAVEL 1. DOMESTIC (INCL. U.S. POSSESSIONS)					4,602
2. INTERNATIONAL					0
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS \$ 36,000					
2. TRAVEL 10,939					
3. SUBSISTENCE 0					
4. OTHER 0					
TOTAL NUMBER OF PARTICIPANTS (4)				TOTAL PARTICIPANT COSTS	46,939
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES					500
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION					0
3. CONSULTANT SERVICES					0
4. COMPUTER SERVICES					0
5. SUBAWARDS					0
6. OTHER					0
TOTAL OTHER DIRECT COSTS					500
H. TOTAL DIRECT COSTS (A THROUGH G)					65,873
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) Other Activity IDC Rate (Rate: 46.6000, Base: 6326)					
TOTAL INDIRECT COSTS (F&A)					2,948
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)					68,821
K. FEE					0
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)					68,821
M. COST SHARING PROPOSED LEVEL \$ 0		AGREED LEVEL IF DIFFERENT \$			
PI/PD NAME Steven Alexander		FOR NSF USE ONLY			
		INDIRECT COST RATE VERIFICATION			
ORG. REP. NAME* Sonya Robinson		Date Checked	Date Of Rate Sheet	Initials - ORG	

2 *ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

2110092

**SUMMARY
PROPOSAL BUDGET**

YEAR 3

				FOR NSF USE ONLY			
				PROPOSAL NO.		DURATION (months)	
				Proposed	Granted		
ORGANIZATION Southwestern University				AWARD NO.			
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR Steven Alexander							
A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)				NSF Funded Person-months		Funds Requested By proposer	Funds granted by NSF (if different)
				CAL	ACAD	SUMR	
1. Steven A Alexander - PI				0.00	0.00	0.50	3,183
2.							
3.							
4.							
5.							
6. (0) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)				0.00	0.00	0.00	0
7. (1) TOTAL SENIOR PERSONNEL (1 - 6)				0.00	0.00	0.50	3,183
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)							
1. (0) POST DOCTORAL SCHOLARS				0.00	0.00	0.00	0
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)				0.00	0.00	0.00	0
3. (0) GRADUATE STUDENTS							0
4. (1) UNDERGRADUATE STUDENTS							10,821
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)							0
6. (0) OTHER							0
TOTAL SALARIES AND WAGES (A + B)							14,004
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)							243
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)							14,247
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING \$5,000.)							
TOTAL EQUIPMENT							0
E. TRAVEL 1. DOMESTIC (INCL. U.S. POSSESSIONS)							4,665
2. INTERNATIONAL							0
F. PARTICIPANT SUPPORT COSTS							
1. STIPENDS \$ 36,000							
2. TRAVEL 11,267							
3. SUBSISTENCE 0							
4. OTHER 0							
TOTAL NUMBER OF PARTICIPANTS (4)							47,267
G. OTHER DIRECT COSTS							
1. MATERIALS AND SUPPLIES							500
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION							0
3. CONSULTANT SERVICES							0
4. COMPUTER SERVICES							0
5. SUBAWARDS							0
6. OTHER							0
TOTAL OTHER DIRECT COSTS							500
H. TOTAL DIRECT COSTS (A THROUGH G)							66,679
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) Other Sponsored Activity IDC (Rate: 46.6000, Base: 6426)							
TOTAL INDIRECT COSTS (F&A)							2,995
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)							69,674
K. FEE							0
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)							69,674
M. COST SHARING PROPOSED LEVEL \$ 0				AGREED LEVEL IF DIFFERENT \$			
PI/PD NAME Steven Alexander				FOR NSF USE ONLY			
				INDIRECT COST RATE VERIFICATION			
ORG. REP. NAME* Sonya Robinson				Date Checked	Date Of Rate Sheet	Initials - ORG	

3 *ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

2110092

**SUMMARY
PROPOSAL BUDGET**

YEAR 4

		FOR NSF USE ONLY			
		PROPOSAL NO.		DURATION (months)	
		Proposed		Granted	
		AWARD NO.			
ORGANIZATION Southwestern University					
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR Steven Alexander					
A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)		NSF Funded Person-months			Funds Requested By proposer
		CAL	ACAD	SUMR	Funds granted by NSF (if different)
1. Steven A Alexander - PI		0.00	0.00	0.50	3,278
2.					
3.					
4.					
5.					
6. (0) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)		0.00	0.00	0.00	0
7. (1) TOTAL SENIOR PERSONNEL (1 - 6)		0.00	0.00	0.50	3,278
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (0) POST DOCTORAL SCHOLARS		0.00	0.00	0.00	0
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)		0.00	0.00	0.00	0
3. (0) GRADUATE STUDENTS					0
4. (1) UNDERGRADUATE STUDENTS					11,146
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)					0
6. (0) OTHER					0
TOTAL SALARIES AND WAGES (A + B)					14,424
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)					251
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)					14,675
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING \$5,000.)					
TOTAL EQUIPMENT					0
E. TRAVEL 1. DOMESTIC (INCL. U.S. POSSESSIONS)					4,730
2. INTERNATIONAL					0
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS \$ 36,000					
2. TRAVEL 11,605					
3. SUBSISTENCE 0					
4. OTHER 0					
TOTAL NUMBER OF PARTICIPANTS (4)					47,605
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES					2,500
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION					0
3. CONSULTANT SERVICES					0
4. COMPUTER SERVICES					0
5. SUBAWARDS					0
6. OTHER					0
TOTAL OTHER DIRECT COSTS					2,500
H. TOTAL DIRECT COSTS (A THROUGH G)					69,510
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) Other Sponsored Activity Rate (Rate: 46.6000, Base: 8529)					
TOTAL INDIRECT COSTS (F&A)					3,975
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)					73,485
K. FEE					0
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)					73,485
M. COST SHARING PROPOSED LEVEL \$ 0		AGREED LEVEL IF DIFFERENT \$			
PI/PD NAME Steven Alexander		FOR NSF USE ONLY			
		INDIRECT COST RATE VERIFICATION			
ORG. REP. NAME* Sonya Robinson		Date Checked	Date Of Rate Sheet	Initials - ORG	

4 *ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

2110092

**SUMMARY
PROPOSAL BUDGET**

YEAR 5

		FOR NSF USE ONLY			
		PROPOSAL NO.		DURATION (months)	
		Proposed		Granted	
		AWARD NO.			
ORGANIZATION Southwestern University					
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR Steven Alexander					
A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)		NSF Funded Person-months			Funds Requested By proposer
		CAL	ACAD	SUMR	Funds granted by NSF (if different)
1. Steven A Alexander - PI		0.00	0.00	0.50	3,376
2.					
3.					
4.					
5.					
6. (0) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)		0.00	0.00	0.00	0
7. (1) TOTAL SENIOR PERSONNEL (1 - 6)		0.00	0.00	0.50	3,376
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (0) POST DOCTORAL SCHOLARS		0.00	0.00	0.00	0
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)		0.00	0.00	0.00	0
3. (0) GRADUATE STUDENTS					0
4. (1) UNDERGRADUATE STUDENTS					11,480
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)					0
6. (0) OTHER					0
TOTAL SALARIES AND WAGES (A + B)					14,856
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)					258
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)					15,114
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING \$5,000.)					
TOTAL EQUIPMENT					0
E. TRAVEL 1. DOMESTIC (INCL. U.S. POSSESSIONS)					4,796
2. INTERNATIONAL					0
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS \$ 36,000					
2. TRAVEL 11,953					
3. SUBSISTENCE 0					
4. OTHER 0					
TOTAL NUMBER OF PARTICIPANTS (4)					47,953
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES					500
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION					0
3. CONSULTANT SERVICES					0
4. COMPUTER SERVICES					0
5. SUBAWARDS					0
6. OTHER					0
TOTAL OTHER DIRECT COSTS					500
H. TOTAL DIRECT COSTS (A THROUGH G)					68,363
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) Other Sponsored Activity IDC-UG (Rate: 46.6000, Base: 6634)					
TOTAL INDIRECT COSTS (F&A)					3,091
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)					71,454
K. FEE					0
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)					71,454
M. COST SHARING PROPOSED LEVEL \$ 0		AGREED LEVEL IF DIFFERENT \$			
PI/PD NAME Steven Alexander		FOR NSF USE ONLY			
		INDIRECT COST RATE VERIFICATION			
ORG. REP. NAME* Sonya Robinson		Date Checked	Date Of Rate Sheet	Initials - ORG	

5 *ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

2110092

**SUMMARY
PROPOSAL BUDGET**

Cumulative

ORGANIZATION Southwestern University		FOR NSF USE ONLY			
		PROPOSAL NO.	DURATION (months)		
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR Steven Alexander		AWARD NO.			
A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)		NSF Funded Person-months		Funds Requested By proposer	
		CAL	ACAD	SUMR	Funds granted by NSF (if different)
1. Steven A Alexander - PI		0.50	0.00	2.00	15,927
2.					
3.					
4.					
5.					
6. () OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)		0.00	0.00	0.00	0
7. (1) TOTAL SENIOR PERSONNEL (1 - 6)		0.50	0.00	2.00	15,927
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (0) POST DOCTORAL SCHOLARS		0.00	0.00	0.00	0
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)		0.00	0.00	0.00	0
3. (0) GRADUATE STUDENTS					0
4. (5) UNDERGRADUATE STUDENTS					54,153
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)					0
6. (0) OTHER					0
TOTAL SALARIES AND WAGES (A + B)					70,080
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)					1,218
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)					71,298
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING \$5,000.)					
TOTAL EQUIPMENT					0
E. TRAVEL 1. DOMESTIC (INCL. U.S. POSSESSIONS)					23,333
2. INTERNATIONAL					0
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS \$ 162,000					
2. TRAVEL 51,904					
3. SUBSISTENCE 0					
4. OTHER 0					
TOTAL NUMBER OF PARTICIPANTS (18)					213,904
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES					4,500
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION					0
3. CONSULTANT SERVICES					0
4. COMPUTER SERVICES					0
5. SUBAWARDS					0
6. OTHER					2,000
TOTAL OTHER DIRECT COSTS					6,500
H. TOTAL DIRECT COSTS (A THROUGH G)					315,035
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE)					
TOTAL INDIRECT COSTS (F&A)					16,844
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)					331,879
K. FEE					0
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)					331,879
M. COST SHARING PROPOSED LEVEL \$ 0		AGREED LEVEL IF DIFFERENT \$			
PI/PD NAME Steven Alexander		FOR NSF USE ONLY			
		INDIRECT COST RATE VERIFICATION			
ORG. REP. NAME* Sonya Robinson		Date Checked	Date Of Rate Sheet	Initials - ORG	

C *ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

Budget Justification

Year 1: Sept. 2021 – Aug. 2022

- **Salaries: Senior Personnel:** Salary for 0.5 summer month for professor Steven Alexander who serves as Southwestern University's Co-PI educational coordinator is requested at \$3,000.
- **Stipends: Other Personnel:** \$10,200 is requested to cover the salary of one peer mentor (PM), a senior undergraduate student, estimated at \$17/hr with the anticipated total number of hours per year of 600 hours which consist of 100 hours for each of the fall and spring semesters and 400 hours for 10 weeks in the summer, including the one-week training workshop.
- **Stipends: Participant Support:** \$18,000 is requested to cover the salaries of two participating NRICoS student at \$9000 per year. This amount is estimated at \$15/hr with the anticipated total number of hours per year of 600 hours which consist of 100 hours for each of the fall and spring semesters and 400 hours for 10 weeks in the summer, including the one-week training workshop.
- **Fringe: Senior Personnel:** Fringe benefit cost of \$230 for Dr. Alexander at 7.65% rate.
- **Travel:** \$2,500 travel costs for the PI to participate at relevant conferences and to the training workshop. \$1,660 for one selected NRICoS student's 4-week stay at Fermi National Accelerator Laboratory, which includes \$35/night dorm cost at Fermilab on campus, \$10/day per-diem and \$400 round-trip air and other transportation costs. \$1,520 workshop travel costs for one peer mentor (PM) to take part in two, one-week training workshops held at a collaborating institution per year, which includes \$200 transportation cost, \$50/night shared room housing, and \$30/day per-diem for one week stay for each meeting. \$3,040 workshop travel costs for two NRICoS students to take part in two one-week training workshops held at a collaborating institution per year, which includes \$200 transportation cost, \$50/night shared room housing, and \$30/day per-diem for one week stay per trip per NRICoS student for each meeting. \$720 for one peer mentor (PM) to attend two Texas Section American Physical Society meetings annually, which includes \$200 transportation, \$50/night shared housing, and \$30/day per-diem for a two-day trip per meeting. \$1,440 for two NRICoS students to attend two Texas Section American Physical Society meetings annually, which includes \$200 transportation, \$50/night shared housing, and \$30/day per-diem for a two-day trip per student for each meeting.
- \$2,000 for **computing equipment** is requested for the first year. We anticipate three years of useful lifetime.
- \$500 for **materials and operations** support as the host institution.
- **Total direct cost** for year 1 is \$44,610
- The **modified direct cost** subject to indirect is \$8,230
- **Indirect cost** is requested at \$3,835 based on the 46.6% other sponsored activity IDC rate.
- The **grand total** for year 1 is \$48,445

Year 2: Sept. 2022 – Aug. 2023

- **Salaries: Senior Personnel:** Salary for 0.5 summer month for professor Steven Alexander who serves as Southwestern University's Co-PI educational coordinator is requested at \$3,090. This amount reflects a canonical 3% cost of living adjustment.
- **Stipends: Other Personnel:** \$10,506 for one peer mentor (PM), a senior undergraduate student. This amount reflects a canonical 3% cost of living adjustment to \$17/hr with the

Southwestern University
Budget Justification

anticipated total number of hours per year of 600 hours which consist of 100 hours for each of the fall and spring semesters and 400 hours for 10 weeks in the summer, including the one-week training workshop.

- **Stipends: Participant Support:** \$36,000 to cover the salaries of four participating NRICoS student at \$9000 each, per year. This amount is estimated at \$15/hr with the anticipated total number of hours per year of 600 hours which consist of 100 hours for each of the fall and spring semesters and 400 hours for 10 weeks in the summer, including the one-week training workshop.
- **Fringe: Senior Personnel:** Fringe benefit cost of \$236 for Dr. Alexander at 7.65% rate.
- **Travel:** \$2,500 travel costs for the PI to participate at relevant conferences and to the training workshop. \$1,710 for one selected NRICoS student's four week stay at Fermi National Accelerator Laboratory, which includes \$35/night dormitory cost at Fermilab on campus, \$10/day per-diem and \$400 round-trip air and other transportation costs. This amount reflects a canonical 3% cost of living adjustment. \$1,566 for workshop travel costs for one peer mentor (PM) to take part in two one-week training workshops held at a collaborating institution per year, which includes \$200 transportation cost, \$50/night shared room housing, and \$30/day per-diem for one week stay for each meeting, with a canonical 3% cost of living adjustment. \$6,262.40 for workshop travel costs for four NRICoS students to take part in two one-week training workshops held at a collaborating institution per year, which includes \$200 transportation cost, \$50/night shared room housing, and \$30/day per-diem for one week stay per trip per NRICoS student per meeting, with reflects a canonical 3% cost of living adjustment. \$741.60 for one peer mentor (PM) to attend two Texas Section American Physical Society meetings annually, which includes \$200 transportation cost, \$50/night shared housing, and \$30/day per-diem for a two-day trip for each meeting, with a canonical 3% cost of living adjustment. \$2966.40 for four NRICoS students to attend two Texas Section American Physical Society meetings annually, which includes \$200 transportation cost, \$50/night shared housing, and \$30/day per-diem for a two-day trip per student per meeting, with a canonical 3% cost of living adjustment.
- \$500 **materials and operations** support to cover the cost as the host institution.
- Total **direct cost** for year 2 is \$65,872.40
- The **modified direct cost subject to indirect** is \$6,326
- **Indirect cost** is requested at \$2,948 based on the 46.6% other sponsored activity IDC rate.
- The **grand total** for year 2 is \$68,820.40

Year 3: Sept. 2023 – Aug. 2024

- **Salaries: Senior Personnel:** Salary for 0.5 summer month for professor Steven Alexander who serves as Southwestern University's Co-PI educational coordinator is requested at \$3,183. This amount reflects a canonical 3% cost of living adjustment.
- **Stipends: Other Personnel:** \$10,821 to cover the salary of one peer mentor (PM), a senior undergraduate student. This amount reflects a canonical 3% cost of living adjustment to \$17/hr with the anticipated total number of hours per year of 600 hours which consist of 100 hours for each of the fall and spring semesters and 400 hours for 10 weeks in the summer, including the one-week training workshop.
- **Stipends: Participant Support:** \$36,000 to cover the salaries of four participating NRICoS student at \$9,000 each per year. This amount is estimated at \$15/hr with the anticipated total number of hours per year of 600 hours which consist of 100 hours for each of the fall and

Southwestern University
Budget Justification

spring semesters and 400 hours for 10 weeks in the summer, including the one-week training workshop.

- **Fringe: Senior Personnel:** Fringe benefit cost of \$243 for Dr. Alexander at 7.65% rate.
- **Travel:** \$2,500 for travel costs for the PI to participate at relevant conferences and to the training workshop. \$1,761 for one selected NRICoS student's four week stay at Fermi National Accelerator Laboratory, which includes \$35/night dormitory cost at Fermilab on campus, \$10/day per-diem and \$400 round-trip air and other transportation costs. This amount reflects a canonical 3% cost of living adjustment. \$1,613 for workshop travel costs for one peer mentor (PM) to take part in two one-week training workshops held at a collaborating institution per year, which includes \$200 transportation, \$50/night shared room housing, and \$30/day per-diem for one week stay for each meeting, with a 3% cost of living adjustment. \$6,450.27 for workshop travel costs for four NRICoS students to take part in two one-week training workshops held at a collaborating institution annually, which includes \$200 transportation cost, \$50/night shared room housing, and \$30/day per-diem for one week stay per trip per NRICoS student per meeting, with a canonical 3% cost of living adjustment. \$763.85 for one peer mentor (PM) to attend two Texas Section American Physical Society meetings annually, which includes \$200 transportation cost, \$50/night shared housing, and \$30/day per-diem for a two-day trip per meeting, with a 3% cost of living adjustment. \$6,450.27 for four NRICoS students to attend two Texas Section American Physical Society meetings annually, which includes \$200 transportation cost, \$50/night shared housing, and \$30/day per-diem for a two-day trip per student per meeting, with a canonical 3% cost of living adjustment.
- \$500 for **materials and operations** support as the host institution.
- **Total direct cost** for year 3 is \$66,678.51
- The **modified direct cost** subject to indirect is \$6,426
- **Indirect cost** is requested at \$2,995 based on the 46.6% other sponsored activity IDC rate.
- The **grand total** for year 3 is \$69,673.51

Year 4: Sept. 2024 – Aug. 2025

- **Salaries: Senior Personnel:** Salary for 0.5 summer month for professor Steven Alexander who serves as Southwestern University's Co-PI educational coordinator is requested at \$3,278. This amount reflects a canonical 3% cost of living adjustment.
- **Stipends: Other Personnel:** \$11,146 is requested to cover the salary of one peer mentor (PM), a senior undergraduate student. This amount reflects a canonical 3% cost of living adjustment to \$17/hr with the anticipated total number of hours per year of 600 hours which consist of 100 hours for each of the fall and spring semesters and 400 hours for 10 weeks in the summer, including the one-week training workshop.
- **Stipends: Participant Support** \$36,000 is requested to cover the salaries of four participating NRICoS student at \$9,000 each per year. This amount is estimated at \$15/hr with the anticipated total number of hours per year of 600 hours which consist of 100 hours for each of the fall and spring semesters and 400 hours for 10 weeks in the summer, including the one-week training workshop.
- **Fringe: Senior Personnel:** Fringe benefit cost of \$251 for Dr. Alexander at 7.65% rate.
- **Travel:** \$2,500 for the PI to participate at relevant conferences and to the training workshop. \$1,814 for one selected NRICoS student's four week stay at Fermi National Accelerator Laboratory, which includes \$35/night dormitory cost at Fermilab on campus, \$10/day per-diem and \$400 round-trip air and transportation costs, with a canonical 3% cost of living adjustment.

Southwestern University
Budget Justification

\$1,486 for workshop travel costs for one peer mentor (PM) to take part in two one-week training workshops held at a collaborating institution per year, which includes \$200 transportation cost, \$50/night shared room housing, and \$30/day per-diem for one week stay per meeting, with a canonical 3% cost of living adjustment. \$6,843.09 for workshop travel costs for four NRICoS students to take part in two one-week training workshops held at a collaborating institution per year, which includes \$200 transportation cost, \$50/night shared room housing, and \$30/day per-diem for one week stay per trip per NRICoS student per meeting, with a canonical 3% cost of living adjustment. \$763.85 for one peer mentor (PM) to attend two Texas Section American Physical Society meetings annually, which includes \$200 transportation cost, \$50/night shared housing, and \$30/day per-diem for a two-day trip per meeting, with a canonical 3% cost of living adjustment. \$3,055.39 for four NRICoS students to attend two Texas Section American Physical Society meetings per year, which includes \$200 in transportation, \$50/night shared housing, and \$30/day per-diem for a two-day trip per student per meeting, with a canonical 3% cost of living adjustment.

- The cost for **computing equipment** is requested at \$2,000 for the fourth year. We anticipate three years of useful lifetime.
- **Materials and operations** support is requested at \$500 to cover the cost for operations and materials as the host institution.
- Total **direct cost** for year 4 is \$69,509.59
- The **modified direct cost** subject to indirect is \$8,529
- **Indirect cost** is requested at \$3,975 based on the 46.6% other sponsored activity IDC rate.
- The **grand total** for year 4 is \$73,484.59

Year 5: Sept. 2025 – Aug. 2026

- **Salaries: Senior Personnel:** Salary for 0.5 summer month for professor Steven Alexander who serves as Southwestern University's Co-PI educational coordinator is requested at \$3,376. This amount reflects a canonical 3% cost of living adjustment.
- **Stipends: Other Personnel:** \$11,480 to cover the salary of one peer mentor (PM), a senior undergraduate student. This amount reflects a canonical 3% cost of living adjustment to \$17/hr with the anticipated total number of hours per year of 600 hours which consist of 100 hours for each of the fall and spring semesters and 400 hours for 10 weeks in the summer, including the one-week training workshop.
- **Stipends: Participant Support:** \$36,000 is requested to cover the salaries of four participating NRICoS student at \$9,000 each per year. This amount is estimated at \$15/hr with the anticipated total number of hours per year of 600 hours which consist of 100 hours for each of the fall and spring semesters and 400 hours for 10 weeks in the summer, including the one-week training workshop.
- **Fringe: Senior Personnel:** Fringe benefit cost of \$258 for Dr. Alexander at 7.65% rate.
- **Travel:** \$2,500 for the PI to participate at relevant conferences and to the training workshop. \$1,868 for one selected NRICoS student's four week stay at Fermi National Accelerator Laboratory, which includes \$35/night dormitory cost at Fermilab on campus, \$10/day per-diem and \$400 round-trip air and transportation costs, with a canonical 3% cost of living adjustment. \$1,486 for workshop travel costs for one peer mentor (PM) to take part in two one-week training workshops held at a collaborating institution per year, which includes \$200 transportation, \$50/night shared room housing, and \$30/day per-diem for one week stay per meeting, with a canonical 3% cost of living adjustment. \$6,843.09 for workshop travel costs

Southwestern University
Budget Justification

for four NRICoS students to take part in two one-week training workshops held at a collaborating institution per year, which includes \$200 transportation cost, \$50/night shared room housing, and \$30/day per-diem for one week stay per trip per NRICoS student per meeting, with a canonical 3% cost of living adjustment. $\$810.37$ for one peer mentor (PM) to attend two Texas Section American Physical Society meetings, which includes \$200 transportation cost, \$50/night shared housing, and \$30/day per-diem for a two-day trip per meeting, with a canonical 3% cost of living adjustment. $\$3,241.47$ for four NRICoS students to attend two Texas Section American Physical Society meetings per year, which includes \$200 transportation cost, \$50/night shared housing, and \$30/day per-diem for a two-day trip per student per meeting, with a canonical 3% cost of living adjustment.

- **Materials and operations** support is requested at \$500 to cover the cost for operations and materials as the host institution.
- Total **direct cost** for year 5 is \$68,362.93
- The **modified direct cost** subject to indirect is \$6,634
- **Indirect cost** is requested at \$3,091 based on the 46.6% other sponsored activity IDC rate.
- The **grand total** for year 5 is \$71,453.93

Grand total: \$331,877.43

**SUMMARY
PROPOSAL BUDGET**

YEAR 1

		FOR NSF USE ONLY			
ORGANIZATION		PROPOSAL NO.		DURATION (months)	
Southern Methodist University				Proposed	Granted
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR		AWARD NO.			
Thomas Coan					
A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)		NSF Funded Person-months			Funds Requested By proposer
		CAL	ACAD	SUMR	Funds granted by NSF (if different)
1. Thomas E Coan - none		0.00	0.00	0.10	1,187
2.					
3.					
4.					
5.					
6. (0) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)		0.00	0.00	0.00	0
7. (1) TOTAL SENIOR PERSONNEL (1 - 6)		0.00	0.00	0.10	1,187
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (0) POST DOCTORAL SCHOLARS		0.00	0.00	0.00	0
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)		0.00	0.00	0.00	0
3. (0) GRADUATE STUDENTS					0
4. (1) UNDERGRADUATE STUDENTS					10,200
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)					0
6. (0) OTHER					0
TOTAL SALARIES AND WAGES (A + B)					11,387
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)					2,336
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)					13,723
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING \$5,000.)					
TOTAL EQUIPMENT					0
E. TRAVEL 1. DOMESTIC (INCL. U.S. POSSESSIONS)					4,540
2. INTERNATIONAL					0
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS \$ 18,000					
2. TRAVEL 6,140					
3. SUBSISTENCE 0					
4. OTHER 0					
TOTAL NUMBER OF PARTICIPANTS (2)					24,140
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES					500
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION					0
3. CONSULTANT SERVICES					0
4. COMPUTER SERVICES					0
5. SUBAWARDS					0
6. OTHER					2,000
TOTAL OTHER DIRECT COSTS					2,500
H. TOTAL DIRECT COSTS (A THROUGH G)					44,903
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) MTDC (Rate: 48.0000, Base: 20763)					
TOTAL INDIRECT COSTS (F&A)					9,966
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)					54,869
K. FEE					0
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)					54,869
M. COST SHARING PROPOSED LEVEL \$ 0		AGREED LEVEL IF DIFFERENT \$			
PI/PD NAME Thomas Coan		FOR NSF USE ONLY			
		INDIRECT COST RATE VERIFICATION			
ORG. REP. NAME* Elvin Franklin		Date Checked	Date Of Rate Sheet	Initials - ORG	

1 *ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

2110175

**SUMMARY
PROPOSAL BUDGET**

YEAR 2

		FOR NSF USE ONLY			
ORGANIZATION		PROPOSAL NO.		DURATION (months)	
Southern Methodist University				Proposed	Granted
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR		AWARD NO.			
Thomas Coan					
A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)		NSF Funded Person-months			Funds Requested By proposer
		CAL	ACAD	SUMR	Funds granted by NSF (if different)
1. Thomas E Coan - none		0.00	0.00	0.10	1,211
2.					
3.					
4.					
5.					
6. (0) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)		0.00	0.00	0.00	0
7. (1) TOTAL SENIOR PERSONNEL (1 - 6)		0.00	0.00	0.10	1,211
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (0) POST DOCTORAL SCHOLARS		0.00	0.00	0.00	0
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)		0.00	0.00	0.00	0
3. (0) GRADUATE STUDENTS					0
4. (1) UNDERGRADUATE STUDENTS					10,404
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)					0
6. (0) OTHER					0
TOTAL SALARIES AND WAGES (A + B)					11,615
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)					2,383
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)					13,998
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING \$5,000.)					
TOTAL EQUIPMENT					0
E. TRAVEL 1. DOMESTIC (INCL. U.S. POSSESSIONS)					4,602
2. INTERNATIONAL					0
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS \$ 36,000					
2. TRAVEL 10,939					
3. SUBSISTENCE 0					
4. OTHER 0					
TOTAL NUMBER OF PARTICIPANTS (4)					46,939
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES					500
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION					0
3. CONSULTANT SERVICES					0
4. COMPUTER SERVICES					0
5. SUBAWARDS					0
6. OTHER					0
TOTAL OTHER DIRECT COSTS					500
H. TOTAL DIRECT COSTS (A THROUGH G)					66,039
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) MTDC (Rate: 48.5000, Base: 19100)					
TOTAL INDIRECT COSTS (F&A)					9,264
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)					75,303
K. FEE					0
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)					75,303
M. COST SHARING PROPOSED LEVEL \$ 0		AGREED LEVEL IF DIFFERENT \$			
PI/PD NAME Thomas Coan		FOR NSF USE ONLY			
		INDIRECT COST RATE VERIFICATION			
ORG. REP. NAME* Elvin Franklin		Date Checked	Date Of Rate Sheet	Initials - ORG	

2 *ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

2110175

**SUMMARY
PROPOSAL BUDGET**

YEAR 3

				FOR NSF USE ONLY			
				PROPOSAL NO.		DURATION (months)	
				Proposed		Granted	
ORGANIZATION Southern Methodist University				AWARD NO.			
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR Thomas Coan							
A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)				NSF Funded Person-months		Funds Requested By proposer	Funds granted by NSF (if different)
				CAL	ACAD	SUMR	
1. Thomas E Coan - none				0.00	0.00	0.10	1,235
2.							
3.							
4.							
5.							
6. (0) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)				0.00	0.00	0.00	0
7. (1) TOTAL SENIOR PERSONNEL (1 - 6)				0.00	0.00	0.10	1,235
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)							
1. (0) POST DOCTORAL SCHOLARS				0.00	0.00	0.00	0
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)				0.00	0.00	0.00	0
3. (0) GRADUATE STUDENTS							0
4. (1) UNDERGRADUATE STUDENTS							10,612
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)							0
6. (0) OTHER							0
TOTAL SALARIES AND WAGES (A + B)							11,847
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)							2,430
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)							14,277
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING \$5,000.)							
TOTAL EQUIPMENT							0
E. TRAVEL 1. DOMESTIC (INCL. U.S. POSSESSIONS)							4,665
2. INTERNATIONAL							0
F. PARTICIPANT SUPPORT COSTS							
1. STIPENDS \$ 36,000							
2. TRAVEL 11,267							
3. SUBSISTENCE 0							
4. OTHER 0							
TOTAL NUMBER OF PARTICIPANTS (4)							47,267
G. OTHER DIRECT COSTS							
1. MATERIALS AND SUPPLIES							500
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION							0
3. CONSULTANT SERVICES							0
4. COMPUTER SERVICES							0
5. SUBAWARDS							0
6. OTHER							0
TOTAL OTHER DIRECT COSTS							500
H. TOTAL DIRECT COSTS (A THROUGH G)							66,709
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) MTDC (Rate: 48.5000, Base: 19442)							
TOTAL INDIRECT COSTS (F&A)							9,429
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)							76,138
K. FEE							0
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)							76,138
M. COST SHARING PROPOSED LEVEL \$ 0				AGREED LEVEL IF DIFFERENT \$			
PI/PD NAME Thomas Coan				FOR NSF USE ONLY			
				INDIRECT COST RATE VERIFICATION			
ORG. REP. NAME* Elvin Franklin				Date Checked	Date Of Rate Sheet	Initials - ORG	

3 *ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

2110175

**SUMMARY
PROPOSAL BUDGET**

YEAR 4

		FOR NSF USE ONLY			
ORGANIZATION		PROPOSAL NO.		DURATION (months)	
Southern Methodist University				Proposed	Granted
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR		AWARD NO.			
Thomas Coan					
A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)		NSF Funded Person-months			Funds Requested By proposer
		CAL	ACAD	SUMR	Funds granted by NSF (if different)
1. Thomas E Coan - none		0.00	0.00	0.10	1,260
2.					
3.					
4.					
5.					
6. (0) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)		0.00	0.00	0.00	0
7. (1) TOTAL SENIOR PERSONNEL (1 - 6)		0.00	0.00	0.10	1,260
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (0) POST DOCTORAL SCHOLARS		0.00	0.00	0.00	0
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)		0.00	0.00	0.00	0
3. (0) GRADUATE STUDENTS					0
4. (1) UNDERGRADUATE STUDENTS					10,824
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)					0
6. (0) OTHER					0
TOTAL SALARIES AND WAGES (A + B)					12,084
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)					2,479
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)					14,563
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING \$5,000.)					
TOTAL EQUIPMENT					0
E. TRAVEL 1. DOMESTIC (INCL. U.S. POSSESSIONS)					4,730
2. INTERNATIONAL					0
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS \$ 36,000					
2. TRAVEL 11,605					
3. SUBSISTENCE 0					
4. OTHER 0					
TOTAL NUMBER OF PARTICIPANTS (4)					47,605
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES					500
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION					0
3. CONSULTANT SERVICES					0
4. COMPUTER SERVICES					0
5. SUBAWARDS					0
6. OTHER					2,000
TOTAL OTHER DIRECT COSTS					2,500
H. TOTAL DIRECT COSTS (A THROUGH G)					69,398
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) MTDC (Rate: 48.5000, Base: 21793)					
TOTAL INDIRECT COSTS (F&A)					10,570
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)					79,968
K. FEE					0
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)					79,968
M. COST SHARING PROPOSED LEVEL \$ 0		AGREED LEVEL IF DIFFERENT \$			
PI/PD NAME Thomas Coan		FOR NSF USE ONLY			
		INDIRECT COST RATE VERIFICATION			
ORG. REP. NAME* Elvin Franklin		Date Checked	Date Of Rate Sheet	Initials - ORG	

4 *ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

2110175

**SUMMARY
PROPOSAL BUDGET**

YEAR 5

		FOR NSF USE ONLY			
ORGANIZATION		PROPOSAL NO.		DURATION (months)	
Southern Methodist University				Proposed	Granted
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR		AWARD NO.			
Thomas Coan					
A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)		NSF Funded Person-months			Funds Requested By proposer
		CAL	ACAD	SUMR	Funds granted by NSF (if different)
1. Thomas E Coan - none		0.00	0.00	0.10	1,285
2.					
3.					
4.					
5.					
6. (0) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)		0.00	0.00	0.00	0
7. (1) TOTAL SENIOR PERSONNEL (1 - 6)		0.00	0.00	0.10	1,285
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (0) POST DOCTORAL SCHOLARS		0.00	0.00	0.00	0
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)		0.00	0.00	0.00	0
3. (0) GRADUATE STUDENTS					0
4. (1) UNDERGRADUATE STUDENTS					11,040
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)					0
6. (0) OTHER					0
TOTAL SALARIES AND WAGES (A + B)					12,325
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)					2,529
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)					14,854
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING \$5,000.)					
TOTAL EQUIPMENT					0
E. TRAVEL 1. DOMESTIC (INCL. U.S. POSSESSIONS)					4,796
2. INTERNATIONAL					0
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS \$ 36,000					
2. TRAVEL 11,953					
3. SUBSISTENCE 0					
4. OTHER 0					
TOTAL NUMBER OF PARTICIPANTS (4)					47,953
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES					500
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION					0
3. CONSULTANT SERVICES					0
4. COMPUTER SERVICES					0
5. SUBAWARDS					0
6. OTHER					0
TOTAL OTHER DIRECT COSTS					500
H. TOTAL DIRECT COSTS (A THROUGH G)					68,103
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) MTDC (Rate: 48.5000, Base: 20150)					
TOTAL INDIRECT COSTS (F&A)					9,773
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)					77,876
K. FEE					0
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)					77,876
M. COST SHARING PROPOSED LEVEL \$ 0		AGREED LEVEL IF DIFFERENT \$			
PI/PD NAME Thomas Coan		FOR NSF USE ONLY			
		INDIRECT COST RATE VERIFICATION			
ORG. REP. NAME* Elvin Franklin		Date Checked	Date Of Rate Sheet	Initials - ORG	

5 *ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

2110175

**SUMMARY
PROPOSAL BUDGET**

Cumulative

ORGANIZATION Southern Methodist University		FOR NSF USE ONLY			
		PROPOSAL NO.		DURATION (months)	
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR Thomas Coan		AWARD NO.			
A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)		NSF Funded Person-months		Funds Requested By proposer	Funds granted by NSF (if different)
		CAL	ACAD		
1. Thomas E Coan - none		0.00	0.00	0.50	6,178
2.					
3.					
4.					
5.					
6. () OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)		0.00	0.00	0.00	0
7. (1) TOTAL SENIOR PERSONNEL (1 - 6)		0.00	0.00	0.50	6,178
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (0) POST DOCTORAL SCHOLARS		0.00	0.00	0.00	0
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)		0.00	0.00	0.00	0
3. (0) GRADUATE STUDENTS					0
4. (5) UNDERGRADUATE STUDENTS					53,080
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)					0
6. (0) OTHER					0
TOTAL SALARIES AND WAGES (A + B)					59,258
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)					12,157
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)					71,415
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING \$5,000.)					
TOTAL EQUIPMENT					0
E. TRAVEL 1. DOMESTIC (INCL. U.S. POSSESSIONS)					23,333
2. INTERNATIONAL					0
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS \$ 162,000					
2. TRAVEL 51,904					
3. SUBSISTENCE 0					
4. OTHER 0					
TOTAL NUMBER OF PARTICIPANTS (18)					213,904
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES					2,500
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION					0
3. CONSULTANT SERVICES					0
4. COMPUTER SERVICES					0
5. SUBAWARDS					0
6. OTHER					4,000
TOTAL OTHER DIRECT COSTS					6,500
H. TOTAL DIRECT COSTS (A THROUGH G)					315,152
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE)					
TOTAL INDIRECT COSTS (F&A)					49,002
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)					364,154
K. FEE					0
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)					364,154
M. COST SHARING PROPOSED LEVEL \$ 0		AGREED LEVEL IF DIFFERENT \$			
PI/PD NAME Thomas Coan		FOR NSF USE ONLY			
		INDIRECT COST RATE VERIFICATION			
ORG. REP. NAME* Elvin Franklin		Date Checked	Date Of Rate Sheet	Initials - ORG	

C *ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

Budget Justification

The detailed justification for the budget is listed below for each year.

Year 1 – Sept. 2021. – Aug. 2022

- Salaries:
 - Total of \$10,200 is requested to cover the salary of one peer mentor (PM), a senior undergraduate student, estimated at \$15/hr with the anticipated total number of hours per year of 680 hours which consist of 140 hours for each of the fall and spring semesters and 400 hours for 10 weeks in the summer, including the one week training workshop.
 - Salary for 0.1 summer months for professor Thomas Coan is requested at \$1,187 based on the 9-month academic salary.
- Fringe:
 - Fringe benefit cost of \$1950 for PM undergraduate student at 32.5% of their summer salary is requested.
 - Fringe benefit cost of \$386 for PI Thomas Coan at a negotiated 32.5% rate is requested.
- Travel:
 - PM's travel to the 2 one-week training workshops a year is requested at \$660 per trip, totaling \$1,320. The cost for each trip reflects \$100 transportation cost, \$50/night shared housing and \$30/ day per-diem. Support is also requested for two annual trips to the Texas Section of the American Physical Society at a level of \$720 total. This cost reflects \$200 transportation cost, \$50/night housing, and \$30/ day per-diem for a two-day trip.
 - The travel cost for the PI's participation in relevant conferences and for training workshop participation is requested at a level of \$2,500.
- Participant support:
 - Stipend: The cost for two participating NRICoS student with a stipend of \$3,000 per each of fall and spring semesters and \$3,000 for the summer, \$9000 per year per student is requested at the total of \$18,000.
 - Travel: The following participant travel support are requested
 - One selected NRICoS student's four week stay at Fermi National Accelerator Laboratory is requested at \$1,660 which includes \$35/night dormitory cost at Fermilab on campus, \$10/day cost of living adjustment and \$400 roundtrip air and other transportation costs.
 - The cost for two NRICoS students' travel to the two Texas Section American Physical Society meetings a year is requested \$1,440 total. This cost reflects \$200 transportation cost, \$50/night shared housing, and \$30/ day per-diem for a two-day trip per student.
 - The workshop travel costs for two NRICoS students taking part in the 2 one-week training workshops held at a collaborating institution is requested at \$3,040. This cost reflects \$200 transportation cost, \$50/night shared room housing, and \$30/ day per-diem for one week stay per trip per NRICoS student.
- The cost for computing equipment for the first year is requested at \$2,000 for the first year. We anticipate the three years at the useful lifetime.
- Materials and operations support is requested at a level of \$500.
- Total direct cost for year 1 is \$44,903.

- The modified direct cost subject to indirect is \$20,763.
- Indirect cost is requested at \$9,966 based on the year-1 48.0% agreed rates.
- The grand total for year 1 is \$54,869.

Year 2 – Sept. 2022. – Aug. 2023

- Salaries:
 - Total of \$10,404 which reflects a 2% cost of living adjusted hourly rate relative to \$15/hr is requested to cover the salary of one peer mentor (PM), a senior undergraduate student for the anticipated total number of hours per year of 680 hours which consist of 140 hours for each of the fall and spring semesters and 400 hours for 10 weeks in the summer, including the one week training workshop.
 - The 2% canonical cost of living adjustment applied with respect to year 1 salary for 0.1 summer month for PI Thomas Coan is requested at \$1,211.
- Fringe:
 - Fringe benefit cost of \$1,989 for the PM undergraduate student at 32.5% of their summer salary is requested.
 - Fringe benefit cost of \$394 for Dr. Thomas Coan at a 32.5% rate is requested.
- Travel:
 - The 3% canonical cost of living adjusted PM's travel to the 2 one-week training workshop once a year is requested at \$1,360. The same cost-of-living rate adjusted for the two trips of the Texas APS meeting yields a request of \$742 for this activity.
 - The travel cost for the PI's participation in relevant conferences and to the training workshop is requested at a level of \$2,500.
- Participant support:
 - Stipend: Two additional NRICoS students will be added to the program in year 2 to the two already in the program from in year 1. The stipend for the three NRICoS students with a stipend of \$3,000 per each of fall and spring semesters and \$3,000 for the summer, \$9000 per year per student is requested at the total of \$36,000.
 - Travel: The following participant travel support are requested
 - The 3% canonical cost of living adjusted for one selected NRICoS student's four week stay at Fermi National Accelerator Laboratory is requested at \$1,710, including the dormitory cost at Fermilab on campus, cost of living adjustment and the roundtrip air and other transportation costs.
 - The 3% canonical cost of living adjusted cost for four NRICoS students' travel to the two Texas Section American Physical Society meetings a year is requested at a lev-1 of \$2,967 total.
 - The 3% canonical cost of living adjusted workshop travel costs for four NRICoS students taking part in the 2 one-week training workshop held at a collaborating institution, is requested at \$6,262 total.
- Materials and operations support is requested at \$500 to support various operational costs.
- Total direct cost for year 2 is \$66,039.
- The modified total direct cost subject to indirect charges is \$19,100.
- Indirect cost is requested at \$9,264 based on the 48.5% agreed rate.
- The grand total for year 2 is \$75,303.

Year 3 – Sept. 2023. – Aug. 2024

- Salaries:
 - A total of \$10,404 reflecting a 2% cost of living adjusted hourly rate relative to year 2 is requested to cover the salary of one peer mentor (PM), a senior undergraduate student for the anticipated total number of hours per year of 680 hours which consist of 140 hours for each of the fall and spring semesters and 400 hours for 10 weeks in the summer, including the one week training workshop.
 - A 2% canonical cost of living adjustment applied with respect to year 2 salary for 0.1 summer months for PI Thomas Coan yields a request of \$1,235.
- Fringe:
 - Fringe benefit cost of \$2,029 for the PM undergraduate student at a 32.5% rate on their summer salary is requested.
 - Fringe benefit cost of \$401 for Thomas Coan at a 32.5% rate is requested.
- Travel:
 - The 3% canonical cost of living adjusted PM's travel to the 2 one-week training workshop once a year is requested at \$1,401.
 - The travel cost for the PIs' participation in the relevant conferences and training workshop participation at a level of \$2,500 is requested.
- Participant support:
 - Stipend: The stipend for the four NRICoS students is requested at the total of \$36,000, \$9,000 per student per year.
 - Travel: The following participant travel support are requested
 - The 3% canonical cost of living adjusted for one selected NRICoS student's four week stay at Fermi National Accelerator Laboratory is requested at \$1,761, including the dormitory cost at Fermilab on campus, cost of living adjustment and the roundtrip air and other transportation costs.
 - Including the 3% canonical cost of living adjustment for four NRICoS students' travel to the two Texas Section American Physical Society meetings per year yields a request of \$3,056 total.
 - The 3% canonical cost of living adjusted workshop travel costs for four NRICoS students taking part in the two one-week training workshops held at a collaborating institution, is requested at \$6,450 total.
- A sum of \$500 is requested to support various operation and material costs.
- Total direct cost for year 3 is \$66,079.
- The total modified direct cost subject to indirect charges is \$19,442.
- Indirect cost charges of \$9,429 based on a negotiated 48.5% agreed rate.
- The grand total for year 3 is \$76,138.

Year 4 – Sept. 2024. – Aug. 2025

- Salaries:
 - Total of \$10,824 which reflects a 2% cost of living adjusted hourly rate relative to year 3 is requested to cover the salary of one peer mentor (PM), a senior undergraduate student for the anticipated total number of hours per year of 680 hours which consist of 140 hours for each of the fall and spring semesters and 400 hours for 10 weeks in the summer, including the one week training workshop.

- o A 2% cost of living adjustment applied with respect to year 3 salary for 0.1 summer months for PI Thomas Coan is requested at \$1,260.
- Fringe:
 - o Fringe benefit cost of \$2,069 for the PM undergraduate student on their summer salary at a 32.5% rate is requested.
 - o Fringe benefit cost of \$410 for PI Thomas Coan at a 32.5% rate is requested.
- Travel:
 - o The 3% canonical cost of living adjusted PM's travel to the two one-week training workshop is requested at \$1,443.
 - o The travel cost for the PI'S participation to relevant conferences and for the training workshop participation is requested at a level of \$2,500.
- Participant support:
 - o The stipend for the four NRICoS students is requested at the total of \$36,000, \$9,000 per student per year.
 - o Travel: The following participant travel support are requested
 - Including a 3% canonical cost of living adjustment for one selected NRICoS student's four week stay at Fermi National Accelerator Laboratory, support is requested at a level of \$1,814 to absorb Fermilab on-campus housing costs, per diem and roundtrip air and other transportation costs.
 - Support that including a 3% canonical cost of living adjustment cost for four NRICoS students' travel to the two Texas Section American Physical Society meetings a year is requested at a total level of \$3,147.
 - Including a 3% canonical cost of living adjustment, support for travel for four NRICoS students taking part in our two one-week training workshops held at a collaborating institution is requested at a total level of \$6,643.
- The cost for computing equipment is requested at \$2,000 to replace the computing equipment purchased in year 1.
- Support for various materials and operational costs at a level of \$500 is requested.
- Total direct cost for year 4 is \$69,398.
- The modified total direct cost subject to indirect is \$21,793.
- Indirect cost charges are requested for \$10,570 based on SMU's negotiated 48.5% rate.
- The grand total for year 4 is \$79,968.

Year 5 – Sept. 2025. – Aug. 2026

- Salaries:
 - o A total of \$11,040 which reflects a canonical 2% cost of living adjustment relative to year 4 is requested to cover the salary of one peer mentor (PM), a senior undergraduate student for the anticipated total number of hours per year of 680 hours, which consist of 140 hours for each of the fall and spring semesters and 400 hours for 10 weeks in the summer, including a one-week training workshop.
 - o With a 2% cost of living adjustment applied with respect to year 4 salary for 0.1 summer month for PI Thomas Coan, support is requested at \$1,285.
- Fringe:
 - o Fringe benefit costs of \$2,069 for the PM undergraduate students at a 32.5% rate is requested.
 - o Fringe benefit costs of \$418 for PI Thomas Coan at 32.5% rate are requested.

- Travel:
 - The 3% canonical cost of living adjusted PM's travel to the w one-week training workshop once a year is requested at \$1,486.
 - The travel cost for the PI's participation in relevant conferences and the training workshop is requested at a level of \$2,500.
- Participant support:
 - The stipend for the four NRICoS students is requested at the total of \$36,000, \$9,000 per student per year.
 - Travel: The following participant travel support are requested
 - The 3% canonical cost of living adjusted for one selected NRICoS student's four week stay at Fermi National Accelerator Laboratory is requested at \$1,868, including the dormitory cost at Fermilab on campus, cost of living adjustment and the roundtrip air and other transportation costs.
 - The 3% canonical cost of living adjusted cost for four NRICoS students' travel to the two Texas Section American Physical Society meetings a year is requested at a total level of \$3,242.
 - The 3% canonical cost of living adjusted workshop travel costs for four NRICoS students taking part in the two one-week training workshops held at a collaborating institution, is requested at a total level of \$6,843.
- Support for miscellaneous materials ad operations is requested at a level of \$500.
- Total direct cost for year 5 is \$68,103.
- The total modified direct cost subject to indirect charges is \$20,150.
- Indirect cost charge support is requested at \$9,773 based on the negotiated 48.5% rate.
- The grand total for year 5 is \$77,876.

Grand total: \$364,154

**SUMMARY
PROPOSAL BUDGET**

YEAR 1

		FOR NSF USE ONLY			
		PROPOSAL NO.		DURATION (months)	
		Proposed		Granted	
		AWARD NO.			
ORGANIZATION University of Dallas					
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR Levente Borvak					
A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)		NSF Funded Person-months			Funds Requested By proposer
		CAL	ACAD	SUMR	Funds granted by NSF (if different)
1. Levente Borvak - Assistant Professor		0.00	0.00	0.50	3,000
2.					
3.					
4.					
5.					
6. (0) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)		0.00	0.00	0.00	0
7. (1) TOTAL SENIOR PERSONNEL (1 - 6)		0.00	0.00	0.50	3,000
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (0) POST DOCTORAL SCHOLARS		0.00	0.00	0.00	0
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)		0.00	0.00	0.00	0
3. (0) GRADUATE STUDENTS					0
4. (1) UNDERGRADUATE STUDENTS					10,200
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)					0
6. (0) OTHER					0
TOTAL SALARIES AND WAGES (A + B)					13,200
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)					1,747
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)					14,947
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING \$5,000.)					
Computing equipment		\$	2,000		
TOTAL EQUIPMENT					2,000
E. TRAVEL 1. DOMESTIC (INCL. U.S. POSSESSIONS)					4,540
2. INTERNATIONAL					0
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS \$ 18,000					
2. TRAVEL 6,140					
3. SUBSISTENCE 0					
4. OTHER 0					
TOTAL NUMBER OF PARTICIPANTS (2)					24,140
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES					500
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION					0
3. CONSULTANT SERVICES					0
4. COMPUTER SERVICES					0
5. SUBAWARDS					0
6. OTHER					0
TOTAL OTHER DIRECT COSTS					500
H. TOTAL DIRECT COSTS (A THROUGH G)					46,127
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) Salaries and Wages (Rate: 10.0000, Base: 21987)					
TOTAL INDIRECT COSTS (F&A)					2,199
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)					48,326
K. FEE					0
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)					48,326
M. COST SHARING PROPOSED LEVEL \$ 0		AGREED LEVEL IF DIFFERENT \$			
PI/PD NAME Levente Borvak		FOR NSF USE ONLY			
		INDIRECT COST RATE VERIFICATION			
ORG. REP. NAME* Deborah Zimmerman		Date Checked	Date Of Rate Sheet	Initials - ORG	

1 *ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

2110173

**SUMMARY
PROPOSAL BUDGET**

YEAR 2

		FOR NSF USE ONLY			
		PROPOSAL NO.		DURATION (months)	
		Proposed		Granted	
		AWARD NO.			
ORGANIZATION University of Dallas					
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR Levente Borvak					
A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)		NSF Funded Person-months			Funds Requested By proposer
		CAL	ACAD	SUMR	Funds granted by NSF (if different)
1. Levente Borvak - Assistant Professor		0.00	0.00	0.50	3,090
2.					
3.					
4.					
5.					
6. (0) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)		0.00	0.00	0.00	0
7. (1) TOTAL SENIOR PERSONNEL (1 - 6)		0.00	0.00	0.50	3,090
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (0) POST DOCTORAL SCHOLARS		0.00	0.00	0.00	0
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)		0.00	0.00	0.00	0
3. (0) GRADUATE STUDENTS					0
4. (1) UNDERGRADUATE STUDENTS					10,506
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)					0
6. (0) OTHER					0
TOTAL SALARIES AND WAGES (A + B)					13,596
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)					1,799
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)					15,395
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING \$5,000.)					
TOTAL EQUIPMENT					0
E. TRAVEL 1. DOMESTIC (INCL. U.S. POSSESSIONS)					4,602
2. INTERNATIONAL					0
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS \$ 36,000					
2. TRAVEL 10,939					
3. SUBSISTENCE 0					
4. OTHER 0					
TOTAL NUMBER OF PARTICIPANTS (4)					46,939
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES					500
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION					0
3. CONSULTANT SERVICES					0
4. COMPUTER SERVICES					0
5. SUBAWARDS					0
6. OTHER					0
TOTAL OTHER DIRECT COSTS					500
H. TOTAL DIRECT COSTS (A THROUGH G)					67,436
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) Salaries and Wages (Rate: 10.0000, Base: 20497)					
TOTAL INDIRECT COSTS (F&A)					2,050
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)					69,486
K. FEE					0
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)					69,486
M. COST SHARING PROPOSED LEVEL \$ 0		AGREED LEVEL IF DIFFERENT \$			
PI/PD NAME Levente Borvak		FOR NSF USE ONLY			
		INDIRECT COST RATE VERIFICATION			
ORG. REP. NAME* Deborah Zimmerman		Date Checked	Date Of Rate Sheet	Initials - ORG	

2 *ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

2110173

**SUMMARY
PROPOSAL BUDGET**

YEAR 3

		FOR NSF USE ONLY			
		PROPOSAL NO.		DURATION (months)	
		Proposed		Granted	
		AWARD NO.			
ORGANIZATION University of Dallas					
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR Levente Borvak					
A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)		NSF Funded Person-months			Funds Requested By proposer
		CAL	ACAD	SUMR	Funds granted by NSF (if different)
1. Levente Borvak - Assistant Professor		0.00	0.00	0.50	3,183
2.					
3.					
4.					
5.					
6. (0) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)		0.00	0.00	0.00	0
7. (1) TOTAL SENIOR PERSONNEL (1 - 6)		0.00	0.00	0.50	3,183
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (0) POST DOCTORAL SCHOLARS		0.00	0.00	0.00	0
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)		0.00	0.00	0.00	0
3. (0) GRADUATE STUDENTS					0
4. (1) UNDERGRADUATE STUDENTS					10,821
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)					0
6. (0) OTHER					0
TOTAL SALARIES AND WAGES (A + B)					14,004
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)					1,853
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)					15,857
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING \$5,000.)					
TOTAL EQUIPMENT					0
E. TRAVEL 1. DOMESTIC (INCL. U.S. POSSESSIONS)					4,665
2. INTERNATIONAL					0
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS \$ 36,000					
2. TRAVEL 11,267					
3. SUBSISTENCE 0					
4. OTHER 0					
TOTAL NUMBER OF PARTICIPANTS (4)					47,267
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES					500
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION					0
3. CONSULTANT SERVICES					0
4. COMPUTER SERVICES					0
5. SUBAWARDS					0
6. OTHER					0
TOTAL OTHER DIRECT COSTS					500
H. TOTAL DIRECT COSTS (A THROUGH G)					68,289
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) Salaries and Wages (Rate: 10.0000, Base: 21022)					
TOTAL INDIRECT COSTS (F&A)					2,102
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)					70,391
K. FEE					0
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)					70,391
M. COST SHARING PROPOSED LEVEL \$ 0		AGREED LEVEL IF DIFFERENT \$			
PI/PD NAME Levente Borvak		FOR NSF USE ONLY			
		INDIRECT COST RATE VERIFICATION			
ORG. REP. NAME* Deborah Zimmerman		Date Checked	Date Of Rate Sheet		Initials - ORG

3 *ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

2110173

**SUMMARY
PROPOSAL BUDGET**

YEAR 4

		FOR NSF USE ONLY			
		PROPOSAL NO.		DURATION (months)	
		Proposed		Granted	
		AWARD NO.			
ORGANIZATION University of Dallas					
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR Levente Borvak					
A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)		NSF Funded Person-months			Funds Requested By proposer
		CAL	ACAD	SUMR	Funds granted by NSF (if different)
1. Levente Borvak - Assistant Professor		0.00	0.00	0.50	3,278
2.					
3.					
4.					
5.					
6. (0) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)		0.00	0.00	0.00	0
7. (1) TOTAL SENIOR PERSONNEL (1 - 6)		0.00	0.00	0.50	3,278
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (0) POST DOCTORAL SCHOLARS		0.00	0.00	0.00	0
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)		0.00	0.00	0.00	0
3. (0) GRADUATE STUDENTS					0
4. (1) UNDERGRADUATE STUDENTS					11,146
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)					0
6. (0) OTHER					0
TOTAL SALARIES AND WAGES (A + B)					14,424
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)					1,908
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)					16,332
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING \$5,000.)					
Computing equipment		\$	2,000		
TOTAL EQUIPMENT					2,000
E. TRAVEL 1. DOMESTIC (INCL. U.S. POSSESSIONS)					4,730
2. INTERNATIONAL					0
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS \$ 36,000					
2. TRAVEL 11,605					
3. SUBSISTENCE 0					
4. OTHER 0					
TOTAL NUMBER OF PARTICIPANTS (4)					47,605
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES					500
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION					0
3. CONSULTANT SERVICES					0
4. COMPUTER SERVICES					0
5. SUBAWARDS					0
6. OTHER					0
TOTAL OTHER DIRECT COSTS					500
H. TOTAL DIRECT COSTS (A THROUGH G)					71,167
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) Salaries and Wages (Rate: 10.0000, Base: 23562)					
TOTAL INDIRECT COSTS (F&A)					2,356
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)					73,523
K. FEE					0
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)					73,523
M. COST SHARING PROPOSED LEVEL \$ 0		AGREED LEVEL IF DIFFERENT \$			
PI/PD NAME Levente Borvak		FOR NSF USE ONLY			
		INDIRECT COST RATE VERIFICATION			
ORG. REP. NAME* Deborah Zimmerman		Date Checked	Date Of Rate Sheet		Initials - ORG

4 *ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

2110173

**SUMMARY
PROPOSAL BUDGET**

YEAR 5

		FOR NSF USE ONLY			
ORGANIZATION		PROPOSAL NO.		DURATION (months)	
University of Dallas		Proposed		Granted	
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR		AWARD NO.			
Levente Borvak					
A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)		NSF Funded Person-months			Funds Requested By proposer
		CAL	ACAD	SUMR	Funds granted by NSF (if different)
1. Levente Borvak - Assistant Professor		0.00	0.00	0.50	3,376
2.					
3.					
4.					
5.					
6. (0) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)		0.00	0.00	0.00	0
7. (1) TOTAL SENIOR PERSONNEL (1 - 6)		0.00	0.00	0.50	3,376
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (0) POST DOCTORAL SCHOLARS		0.00	0.00	0.00	0
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)		0.00	0.00	0.00	0
3. (0) GRADUATE STUDENTS					0
4. (1) UNDERGRADUATE STUDENTS					11,480
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)					0
6. (0) OTHER					0
TOTAL SALARIES AND WAGES (A + B)					14,856
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)					1,966
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)					16,822
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING \$5,000.)					
TOTAL EQUIPMENT					0
E. TRAVEL 1. DOMESTIC (INCL. U.S. POSSESSIONS)					4,796
2. INTERNATIONAL					0
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS \$ 36,000					
2. TRAVEL 11,952					
3. SUBSISTENCE 0					
4. OTHER 0					
TOTAL NUMBER OF PARTICIPANTS (4)					47,952
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES					500
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION					0
3. CONSULTANT SERVICES					0
4. COMPUTER SERVICES					0
5. SUBAWARDS					0
6. OTHER					0
TOTAL OTHER DIRECT COSTS					500
H. TOTAL DIRECT COSTS (A THROUGH G)					70,070
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) Salaries and Wages (Rate: 10.0000, Base: 22118)					
TOTAL INDIRECT COSTS (F&A)					2,212
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)					72,282
K. FEE					0
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)					72,282
M. COST SHARING PROPOSED LEVEL \$ 0		AGREED LEVEL IF DIFFERENT \$			
PI/PD NAME Levente Borvak		FOR NSF USE ONLY			
ORG. REP. NAME* Deborah Zimmerman		INDIRECT COST RATE VERIFICATION			
		Date Checked	Date Of Rate Sheet	Initials - ORG	

5 *ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

2110173

**SUMMARY
PROPOSAL BUDGET**

Cumulative

		FOR NSF USE ONLY				
		PROPOSAL NO.		DURATION (months)		
		Proposed		Granted		
		AWARD NO.				
ORGANIZATION University of Dallas						
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR Levente Borvak						
A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)		NSF Funded Person-months		Funds Requested By proposer		
		CAL	ACAD	SUMR	Funds granted by NSF (if different)	
1. Levente Borvak - Assistant Professor		0.00	0.00	2.50	15,927	
2.						
3.						
4.						
5.						
6. () OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)		0.00	0.00	0.00	0	
7. (1) TOTAL SENIOR PERSONNEL (1 - 6)		0.00	0.00	2.50	15,927	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)						
1. (0) POST DOCTORAL SCHOLARS		0.00	0.00	0.00	0	
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)		0.00	0.00	0.00	0	
3. (0) GRADUATE STUDENTS					0	
4. (5) UNDERGRADUATE STUDENTS					54,153	
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)					0	
6. (0) OTHER					0	
TOTAL SALARIES AND WAGES (A + B)					70,080	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)					9,273	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)					79,353	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING \$5,000.)		\$	4,000			
TOTAL EQUIPMENT					4,000	
E. TRAVEL 1. DOMESTIC (INCL. U.S. POSSESSIONS)					23,333	
2. INTERNATIONAL					0	
F. PARTICIPANT SUPPORT COSTS						
1. STIPENDS \$ 162,000						
2. TRAVEL 51,903						
3. SUBSISTENCE 0						
4. OTHER 0						
TOTAL NUMBER OF PARTICIPANTS (18)				TOTAL PARTICIPANT COSTS	213,903	
G. OTHER DIRECT COSTS						
1. MATERIALS AND SUPPLIES					2,500	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION					0	
3. CONSULTANT SERVICES					0	
4. COMPUTER SERVICES					0	
5. SUBAWARDS					0	
6. OTHER					0	
TOTAL OTHER DIRECT COSTS					2,500	
H. TOTAL DIRECT COSTS (A THROUGH G)					323,089	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE)						
TOTAL INDIRECT COSTS (F&A)					10,919	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)					334,008	
K. FEE					0	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)					334,008	
M. COST SHARING PROPOSED LEVEL \$ 0		0	AGREED LEVEL IF DIFFERENT \$			
PI/PD NAME Levente Borvak		FOR NSF USE ONLY				
		INDIRECT COST RATE VERIFICATION				
ORG. REP. NAME* Deborah Zimmerman		Date Checked	Date Of Rate Sheet		Initials - ORG	

C *ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

Budget Justification

The detailed justification for the budget is listed below for each year.

Year 1 – Sept. 2021. – Aug. 2022

- Salaries:
 - Total of \$10,200 is requested to cover the salary of one peer mentor (PM), a senior undergraduate student, estimated at \$15/hr with the anticipated total number of hours per year of 680 hours which consist of 140 hours for each of the fall and spring semesters and 400 hours for 10 weeks in the summer, including the two one-week training workshops.
 - Summer research salary for professor Levente Borvak who serves as the University of Dallas (UD) project director is requested at \$3,000
- Fringe:
 - Fringe benefit cost of \$847 for PM undergraduate students at 8.3% rate is requested.
 - Fringe benefit cost of \$900 for Dr. Levente Borvak at 30% rate is requested.
- Travel:
 - PM's travel to the 2 one-week training workshops is requested at \$560 per trip plus transportation, totaling \$1,320. The cost for each trip reflects \$200 transportation cost, \$50/night shared housing and \$30/ day per-diem.
 - PM's travel to the two APS Texas section meetings is requested at \$720. This cost reflects \$200 transportation cost, \$50/night shared housing, and \$30/ day per-diem for a two-day trip.
 - The travel cost for the PI's participation in relevant conferences and to the training workshop participation is requested at \$2,500.
- Participant support:
 - Stipend: The cost for two participating NRICoS students with a stipend of \$3,000 per each of fall and spring semesters and \$3,000 for the summer, \$9,000 per year per student is requested at the total of \$18,000.
 - Travel: The following participant travel support are requested
 - One selected NRICoS student's four week stay at Fermi National Accelerator Laboratory is requested at \$1,660 which includes \$35/night dormitory cost at Fermilab on campus, \$10/day cost of living adjustment and \$400 roundtrip air and other transportation costs.
 - The cost for two NRICoS students' travel to the two Texas Section American Physical Society meetings each a year is requested \$1,440 total. This cost reflects \$200 transportation cost, \$50/night shared housing, and \$30/ day per-diem for a two-day trip per student.
 - The workshop travel costs for two NRICoS students taking part in the 2 one-week training workshop each held at a collaborating institution, once a year, is requested at \$3,040. This cost reflects \$200 transportation cost, \$50/night shared room housing, and \$30/ day per-diem for one week stay per trip per NRICoS student.
- The cost for computing equipment for the first year is requested at \$2,000. We anticipate three years as the useful lifetime.
- Materials and operations support is requested at \$500.
- Total direct cost for year 1 is \$46,127.
- The modified direct cost subject to indirect is \$21,987.
- Indirect cost is requested at \$2,199 based on the 10% de minimis rate.
- The grand total for year 1 is \$48,326.

Year 2 – Sept. 2022. – Aug. 2023

- Salaries:
 - Total of \$10,506 which reflects a canonical 3% cost of living adjusted hourly rate to \$15/hr is requested to cover the salary of one peer mentor (PM), a senior undergraduate student for the anticipated total number of hours per year of 680 hours which consist of 140 hours for each of the fall and spring semesters and 400 hours for 10 weeks in the summer, including the two one-week training workshops.
 - The 3% canonical cost of living adjustment applied with respect to summer research for professor Levente Borvak is requested at \$3,090.
- Fringe:
 - Fringe benefit cost of \$872 for PM undergraduate students at 8.3% rate is requested.
 - Fringe benefit cost of \$927 for Dr. Levente Borvak at 30% rate is requested.
- Travel:
 - The 3% canonical cost of living adjusted PM's travel to the 2 one-week training workshops is requested at \$1,360.
 - The 3% canonical cost of living adjusted PM's travel to the two APS Texas section meetings is requested at \$742.
 - The travel cost for the PI's participation in relevant conferences and to the training workshop participation is requested at \$2,500.
- Participant support:
 - Stipend: Two additional NRICoS students will be added to the program in year 2 to the two already in the program from in year 1. The stipend for the four NRICoS students with a stipend of \$3,000 per each of fall and spring semesters and \$3,000 for the summer, \$9,000 per year per student is requested at the total of \$36,000.
 - Travel: The following participant travel support are requested
 - The 3% canonical cost of living adjusted for one selected NRICoS student's four week stay at Fermi National Accelerator Laboratory is requested at \$1,710, including the dormitory cost at Fermilab on campus, cost of living adjustment and the roundtrip air and other transportation costs.
 - The 3% canonical cost of living adjusted cost for four NRICoS students' travel to the two Texas Section American Physical Society meetings a year is requested \$2,966 total.
 - The 3% canonical cost of living adjusted workshop travel costs for four NRICoS students taking part in the 2 one-week training workshops each held at a collaborating institution, once a year, is requested at \$6,262 total.
- Materials and operations support is requested at \$500.
- Total direct cost for year 2 is \$67,435.
- The modified direct cost subject to indirect is \$20,497.
- Indirect cost is requested at \$2,050 based on the 10% de minimis rate.
- The grand total for year 2 is \$69,486.

Year 3 – Sept. 2023. – Aug. 2024

- Salaries:
 - Total of \$10,821 which reflects a canonical 3% cost of living adjusted hourly rate of year 2 is requested to cover the salary of one peer mentor (PM), a senior undergraduate student for the anticipated total number of hours per year of 680 hours which consist of 140 hours for each of the fall and spring semesters and 400 hours for 10 weeks in the summer, including the two one-week training workshops.
 - The 3% canonical cost of living adjustment applied with respect to summer research for professor Levente Borvak is requested at \$3,183.
- Fringe:
 - Fringe benefit cost of \$898 for PM undergraduate students at 8.3% rate is requested.
 - Fringe benefit cost of \$955 for Dr. Levente Borvak at 30% rate is requested.
- Travel:
 - The 3% canonical cost of living adjusted PM's travel to the 2 one-week training workshops is requested at \$1,401.
 - The 3% canonical cost of living adjusted PM's travel to the two APS Texas section meetings is requested at \$764.
 - The travel cost for the PI's participation in relevant conferences and to the training workshop participation is requested at \$2,500.
 - .
- Participant support:
 - Stipend: The stipend for the four NRICoS students is requested at the total of \$36,000, \$9,000 per student per year.
 - Travel: The following participant travel support are requested
 - The 3% canonical cost of living adjusted for one selected NRICoS student's four week stay at Fermi National Accelerator Laboratory is requested at \$1,761, including the dormitory cost at Fermilab on campus, cost of living adjustment and the roundtrip air and other transportation costs.
 - The 3% canonical cost of living adjusted cost for four NRICoS students' travel to the two Texas Section American Physical Society meetings a year is requested \$3,055 total.
 - The 3% canonical cost of living adjusted workshop travel costs for four NRICoS students taking part in the two one-week training workshops held at a collaborating institution, is requested at \$6,650 total.
- Materials and operations support is requested at \$500.
- Total direct cost for year 3 is \$68,288.
- The modified direct cost subject to indirect is \$21,022.
- Indirect cost is requested at \$2,102 based on the 10% de minimis rate.
- The grand total for year 3 is \$70,391.

Year 4 – Sept. 2024. – Aug. 2025

- Salaries:
 - Total of \$11,146 which reflects a canonical 3% cost of living adjusted hourly rate of year 3 is requested to cover the salary of one peer mentor (PM), a senior undergraduate

student for the anticipated total number of hours per year of 680 hours which consist of 140 hours for each of the fall and spring semesters and 400 hours for 10 weeks in the summer, including the two one-week training workshop.

- The 3% canonical cost of living adjustment applied with respect to summer research for professor Levente Borvak is requested at \$3,278.
- Fringe:
 - Fringe benefit cost of \$925 for PM undergraduate students at 8.3% rate is requested.
 - Fringe benefit cost of \$983 for Dr. Levente Borvak at 30% rate is requested.
- Travel:
 - The 3% canonical cost of living adjusted PM's travel to the two one-week training workshops is requested at \$1,443.
 - The 3% canonical cost of living adjusted PM's travel to the two APS Texas section meetings is requested at \$787.
 - The travel cost for the PI's participation in relevant conferences and to the training workshop participation is requested at \$2,500.
- Participant support:
 - The stipend for the four NRICoS students is requested at the total of \$36,000, \$9,000 per student per year.
 - Travel: The following participant travel support are requested
 - The 3% canonical cost of living adjusted for one selected NRICoS student's four week stay at Fermi National Accelerator Laboratory is requested at \$1,814, including the dormitory cost at Fermilab on campus, cost of living adjustment and the roundtrip air and other transportation costs.
 - The 3% canonical cost of living adjusted cost for four NRICoS students' travel to the two Texas Section American Physical Society meetings a year is requested \$3,147 total.
 - The 3% canonical cost of living adjusted workshop travel costs for four NRICoS students taking part in the two one-week training workshops held at a collaborating institution, is requested at \$6,644 total.
- The cost for computing equipment is requested at \$2,000 to replace the computing equipment purchased in year 1.
- Materials and operations support is requested at \$500.
- Total direct cost for year 4 is \$71,167.
- The modified direct cost subject to indirect is \$23,562.
- Indirect cost is requested at \$2,356 based on the 10% de minimis rate.
- The grand total for year 4 is \$73,523.

Year 5 – Sept. 2025. – Aug. 2026

- Salaries:
 - Total of \$11,480 which reflects a canonical 3% cost of living adjusted hourly rate of year 2 is requested to cover the salary of one peer mentor (PM), a senior undergraduate student for the anticipated total number of hours per year of 680 hours which consist of 140 hours for each of the fall and spring semesters and 400 hours for 10 weeks in the summer, including the two one-week training workshops.
 - The 3% canonical cost of living adjustment applied with respect to summer research for professor Levente Borvak is requested at \$3,376.

- Fringe:
 - Fringe benefit cost of \$953 for PM undergraduate students at 8.3% rate is requested.
 - Fringe benefit cost of \$1,013 for Dr. Levente Borvak at 30% rate is requested.
- Travel:
 - The 3% canonical cost of living adjusted PM's travel to the two one-week training workshops is requested at \$1,486.
 - The 3% canonical cost of living adjusted PM's travel to the two APS Texas section meetings is requested at \$811.
 - The travel cost for the PI's participation in relevant conferences and to the training workshop participation is requested at \$2,500.
- Participant support:
 - The stipend for the four NRICoS students is requested at the total of \$36,000, \$9,000 per student per year.
 - Travel: The following participant travel support are requested
 - The 3% canonical cost of living adjusted for one selected NRICoS student's four week stay at Fermi National Accelerator Laboratory is requested at \$1,868, including the dormitory cost at Fermilab on campus, cost of living adjustment and the roundtrip air and other transportation costs.
 - The 3% canonical cost of living adjusted cost for four NRICoS students' travel to the two Texas Section American Physical Society meetings a year is requested \$3,241 total.
 - The 3% canonical cost of living adjusted workshop travel costs for four NRICoS students taking part in the two one-week training workshops held at a collaborating institution, is requested at \$6,843 total.
- Materials and operations support is requested at \$500.
- Total direct cost for year 5 is \$70,071.
- The modified direct cost subject to indirect is \$22,119.
- Indirect cost is requested at \$2,212 based on the 10% de minimis rate.
- The grand total for year 5 is \$72,282.

Grand total: \$334,008

*PI/co-PI/Senior Personnel Name: Jonathan Asaadi

***Required fields**

Note: NSF has provided 15 project/proposal and 10 in-kind contribution entries for users to populate. Please leave any unused entries blank.

Project/Proposal Section:

Current and Pending Support includes all resources made available to an individual in support of and/or related to all of his/her research efforts, regardless of whether or not they have monetary value.[\[1\]](#) Information must be provided about all current and pending support, including this project, for ongoing projects, and for any proposals currently under consideration from whatever source[\[2\]](#), irrespective of whether such support is provided through the proposing organization or is provided directly to the individual. Concurrent submission of a proposal to other organizations will not prejudice its review by NSF, if disclosed.[\[3\]](#)

Please enter your support entries so they are grouped together based on the "Status of Support" and are in the order of Current, Pending, Submission Planned, and Transfer of Support from top to bottom

[\[1\]](#) If the time commitment or dollar value is not readily ascertainable, reasonable estimates should be provided.

[\[2\]](#) For example, Federal, State, local, foreign, public or private foundations, non-profits, industrial or other commercial organizations or internal funds allocated toward specific projects.

[\[3\]](#) The Biological Sciences Directorate exception to this policy is delineated in PAPPG Chapter II.D.2.

Projects/Proposals

1.*Project/Proposal Title : Research on Elementary Particle Physics

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available): DE-SC001168

*Source of Support: U.S. Department of Energy

*Primary Place of Performance : University of Texas, Arlington, TX

Project/Proposal Start Date (MM/YYYY) (if available) : 05/2020

Project/Proposal End Date (MM/YYYY) (if available) : 03/2023

*Total Award Amount (including Indirect Costs): \$ 1,180,000

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1. 2020	2.00	4.	
2. 2021	1.00	5.	
3. 2022	1.00		

2.*Project/Proposal Title : Discovery science with new multi-modal pixel based noble element time projection chambers

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available): DE-0000253485

*Source of Support: U.S. Department of Energy

*Primary Place of Performance : University of Texas, Arlington, TX

Project/Proposal Start Date (MM/YYYY) (if available) : 08/2020

Project/Proposal End Date (MM/YYYY) (if available) : 07/2025

*Total Award Amount (including Indirect Costs): \$ 750,000

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1. 2021	1.00	4. 2024	1.00
2. 2022	1.00	5. 2025	1.00
3. 2023	1.00		

Projects/Proposals

3.*Project/Proposal Title : Collaborative Research: Neutrino Research Initiative for College Students (NRICoS)

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support: U.S. National Science Foundation

*Primary Place of Performance : University of Texas, Arlington

Project/Proposal Start Date (MM/YYYY) (if available) : 09/2021

Project/Proposal End Date (MM/YYYY) (if available) : 08/2026

*Total Award Amount (including Indirect Costs): \$ 571,224

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1. 2022	0.10	4. 2025	0.10
2. 2023	0.10	5. 2026	0.10
3. 2024	0.10		

4.*Project/Proposal Title : QPix: Achieving kiloton scale pixelated readout for Liquid Argon Time Projection Chambers

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available): DE-SC0020065

*Source of Support: U.S. Department of Energy

*Primary Place of Performance : University of Texas, Arlington

Project/Proposal Start Date (MM/YYYY) (if available) : 04/2020

Project/Proposal End Date (MM/YYYY) (if available) : 03/2023

*Total Award Amount (including Indirect Costs): \$ 1,100,000

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1. 2020	0.00	4.	
2. 2021	0.00	5.	
3. 2022	0.00		

Projects/Proposals

5.*Project/Proposal Title : Mid-scale Research Infrastructure-2 proposal 1947039

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support: National Science Foundation

*Primary Place of Performance : University of Texas, Arlington

Project/Proposal Start Date (MM/YYYY) (if available) : 08/2020

Project/Proposal End Date (MM/YYYY) (if available) : 07/2025

*Total Award Amount (including Indirect Costs): \$ 807,245

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1. 2020	0.00	4. 2023	0.00
2. 2021	0.00	5. 2024	0.00
3. 2022	0.00		

6.*Project/Proposal Title : Searching for Neutrinoless Double Beta Decay with High Pressure Xenon Gas

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support: Department of Energy

*Primary Place of Performance : University of Texas, Arlington

Project/Proposal Start Date (MM/YYYY) (if available) : 08/2021

Project/Proposal End Date (MM/YYYY) (if available) : 08/2024

*Total Award Amount (including Indirect Costs): \$ 1,043,000

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1. 2021	0.00	4.	
2. 2022	0.00	5.	
3. 2023	0.00		

Projects/Proposals

7.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

8.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

9.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

10.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

11.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

12.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

13.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

14.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

15.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

In Kind Contributions

*Required fields

In-Kind Contribution Section:

Current and Pending Support also includes in-kind contributions (such as office/laboratory space, equipment, supplies, employees, students). If the in-kind contributions are intended for use on the project being proposed to NSF, the information must be included as part of the Facilities, Equipment and Other Resources section of the proposal and need not be replicated in the individual's Current and Pending Support submission. In-kind contributions not intended for use on the project/proposal being proposed that have associated time obligations must be reported below. If the time commitment or dollar value is not readily ascertainable, reasonable estimates should be provided.

Please enter your support entries so they are grouped together based on the "Status of Support" and are in the order of Current to Pending from top to bottom

1.*Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)
1.	
2.	
3.	

Year (YYYY)	Person Months (##.##)
4.	
5.	

*Dollar Value of In-Kind Contribution: \$

In Kind Contributions2.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

3.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

In Kind Contributions4.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

5.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

In Kind Contributions6.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

7.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

In Kind Contributions8.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

9.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

In Kind Contributions

10.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

*PI/co-PI/Senior Personnel Name: Ramon Lopez

***Required fields**

Note: NSF has provided 15 project/proposal and 10 in-kind contribution entries for users to populate. Please leave any unused entries blank.

Project/Proposal Section:

Current and Pending Support includes all resources made available to an individual in support of and/or related to all of his/her research efforts, regardless of whether or not they have monetary value.[\[1\]](#) Information must be provided about all current and pending support, including this project, for ongoing projects, and for any proposals currently under consideration from whatever source[\[2\]](#), irrespective of whether such support is provided through the proposing organization or is provided directly to the individual. Concurrent submission of a proposal to other organizations will not prejudice its review by NSF, if disclosed.[\[3\]](#)

Please enter your support entries so they are grouped together based on the "Status of Support" and are in the order of Current, Pending, Submission Planned, and Transfer of Support from top to bottom

[\[1\]](#) If the time commitment or dollar value is not readily ascertainable, reasonable estimates should be provided.

[\[2\]](#) For example, Federal, State, local, foreign, public or private foundations, non-profits, industrial or other commercial organizations or internal funds allocated toward specific projects.

[\[3\]](#) The Biological Sciences Directorate exception to this policy is delineated in PAPPG Chapter II.D.2.

Projects/Proposals

1.*Project/Proposal Title : Quantum for All Students

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support: National Science Foundation

*Primary Place of Performance : The University of Texas at Arlington

Project/Proposal Start Date (MM/YYYY) (if available) : 01/2021

Project/Proposal End Date (MM/YYYY) (if available) : 12/2022

*Total Award Amount (including Indirect Costs): \$ 1,279,247

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1. 2021	0.25	4.	
2. 2022	0.25	5.	
3.			

2.*Project/Proposal Title : Recruiting and Preparing a New Generation of Mathematics, Science, and Computer Science Teachers for High Need Schools

*Status of Support : Current Pending Submission Planned Transfer of Support

1758507

Proposal/Award Number (if available):

*Source of Support: NSF

*Primary Place of Performance : The University of Texas at Arlington

Project/Proposal Start Date (MM/YYYY) (if available) : 06/2018

Project/Proposal End Date (MM/YYYY) (if available) : 05/2021

*Total Award Amount (including Indirect Costs): \$ 1,448,997

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1. 2018	0.25	4. 2021	0.25
2. 2019	0.25	5.	
3. 2020	0.25		

Projects/Proposals

3.*Project/Proposal Title : Extraction and Transport to the Magnetosphere of Solar Wind Energy during Periods of Low Mach Number Solar Wind Flow

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available): 1916604

*Source of Support: NSF

*Primary Place of Performance : The University of Texas at Arlington

Project/Proposal Start Date (MM/YYYY) (if available) : 06/2019

Project/Proposal End Date (MM/YYYY) (if available) : 06/2021

*Total Award Amount (including Indirect Costs): \$ 611,472

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1. 2019	1.50	4.	
2. 2020	1.50	5.	
3. 2021	1.50		

4.*Project/Proposal Title : The Center for the Unified Study of Interhemispheric Asymmetries (CUSIA)

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available): NNX15AJ03G

*Source of Support: NASA

*Primary Place of Performance : University of Texas at Arlington

Project/Proposal Start Date (MM/YYYY) (if available) : 6/2020

Project/Proposal End Date (MM/YYYY) (if available) : 6/2021

*Total Award Amount (including Indirect Costs): \$ 1,146,466

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1. 2020	2.00	4.	
2. 2021	2.00	5.	
3.			

Projects/Proposals

7.*Project/Proposal Title : Preparing secondary teachers to teach quantum information science

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support: NSF

*Primary Place of Performance : The University of Texas at Arlington

Project/Proposal Start Date (MM/YYYY) (if available) : 4/20

Project/Proposal End Date (MM/YYYY) (if available) : 3/21

*Total Award Amount (including Indirect Costs): \$ 97,718

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1. 2020	0.1	4.	
2.		5.	
3.			

Studies of magnetopause structure and motion

8.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support: NASA

*Primary Place of Performance : UT Arlington

Project/Proposal Start Date (MM/YYYY) (if available) : 09/2019

Project/Proposal End Date (MM/YYYY) (if available) : 09/2022

*Total Award Amount (including Indirect Costs): \$ 165,000

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1. 2020	0.25	4.	
2. 2021	0.25	5.	
3. 2022	0.25		

Projects/Proposals

15.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

In Kind Contributions

*Required fields

In-Kind Contribution Section:

Current and Pending Support also includes in-kind contributions (such as office/laboratory space, equipment, supplies, employees, students). If the in-kind contributions are intended for use on the project being proposed to NSF, the information must be included as part of the Facilities, Equipment and Other Resources section of the proposal and need not be replicated in the individual's Current and Pending Support submission. In-kind contributions not intended for use on the project/proposal being proposed that have associated time obligations must be reported below. If the time commitment or dollar value is not readily ascertainable, reasonable estimates should be provided.

Please enter your support entries so they are grouped together based on the "Status of Support" and are in the order of Current to Pending from top to bottom

1.*Status of Support : Current Pending

*Source of Support : Lee College Physics

*Primary Place of Performance : Lee College and 7 Dragon Hill Place, Spring, TX

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)
1.	
2.	
3.	

Year (YYYY)	Person Months (##.##)
4.	
5.	

*Dollar Value of In-Kind Contribution: \$

In Kind Contributions2.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

3.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

In Kind Contributions4.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

5.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

In Kind Contributions6.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

7.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

In Kind Contributions8.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

9.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

In Kind Contributions

10.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

*PI/co-PI/Senior Personnel Name: Jaehoon Yu

***Required fields**

Note: NSF has provided 15 project/proposal and 10 in-kind contribution entries for users to populate. Please leave any unused entries blank.

Project/Proposal Section:

Current and Pending Support includes all resources made available to an individual in support of and/or related to all of his/her research efforts, regardless of whether or not they have monetary value.[\[1\]](#) Information must be provided about all current and pending support, including this project, for ongoing projects, and for any proposals currently under consideration from whatever source[\[2\]](#), irrespective of whether such support is provided through the proposing organization or is provided directly to the individual. Concurrent submission of a proposal to other organizations will not prejudice its review by NSF, if disclosed.[\[3\]](#)

Please enter your support entries so they are grouped together based on the "Status of Support" and are in the order of Current, Pending, Submission Planned, and Transfer of Support from top to bottom

[\[1\]](#) If the time commitment or dollar value is not readily ascertainable, reasonable estimates should be provided.

[\[2\]](#) For example, Federal, State, local, foreign, public or private foundations, non-profits, industrial or other commercial organizations or internal funds allocated toward specific projects.

[\[3\]](#) The Biological Sciences Directorate exception to this policy is delineated in PAPPG Chapter II.D.2.

Projects/Proposals

1.*Project/Proposal Title : Research on Elementary Particle Physics

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available): DE-SC001168

*Source of Support: U.S. Department of Energy

*Primary Place of Performance : University of Texas, Arlington, TX

Project/Proposal Start Date (MM/YYYY) (if available) : 05/2020

Project/Proposal End Date (MM/YYYY) (if available) : 03/2023

*Total Award Amount (including Indirect Costs): \$ 1,180,000

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1. 2020	2.00	4.	
2. 2021	2.00	5.	
3. 2022	2.00		

2.*Project/Proposal Title : Statement of Work Between Fermi National Accelerator Laboratory and The University of Texas at Arlington for Deep Underground Neutrino Experiment (DUNE)

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support: Fermi National Accelerator Laboratory/Department of Energy

*Primary Place of Performance : University of Texas, Arlington, TX

Project/Proposal Start Date (MM/YYYY) (if available) : 11/2019

Project/Proposal End Date (MM/YYYY) (if available) : 12/2021

*Total Award Amount (including Indirect Costs): \$ 272,237

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1. 2020	0.00	4.	
2. 2021	0.00	5.	
3.			

Projects/Proposals

3.*Project/Proposal Title : Collaborative Research: Neutrino Research Initiative for College Students (NRICoS)

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support: U.S. National Science Foundation

*Primary Place of Performance : University of Texas, Arlington

Project/Proposal Start Date (MM/YYYY) (if available) : 09/2021

Project/Proposal End Date (MM/YYYY) (if available) : 08/2026

*Total Award Amount (including Indirect Costs): \$ 571,224

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1. 2022	0.10	4. 2025	0.10
2. 2023	0.10	5. 2026	0.10
3. 2024	0.10		

4.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

5.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

6.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

7.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

8.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

9.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

10.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

11.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

12.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

13.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

14.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

15.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

In Kind Contributions

*Required fields

In-Kind Contribution Section:

Current and Pending Support also includes in-kind contributions (such as office/laboratory space, equipment, supplies, employees, students). If the in-kind contributions are intended for use on the project being proposed to NSF, the information must be included as part of the Facilities, Equipment and Other Resources section of the proposal and need not be replicated in the individual's Current and Pending Support submission. In-kind contributions not intended for use on the project/proposal being proposed that have associated time obligations must be reported below. If the time commitment or dollar value is not readily ascertainable, reasonable estimates should be provided.

Please enter your support entries so they are grouped together based on the "Status of Support" and are in the order of Current to Pending from top to bottom

1.*Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)
1.	
2.	
3.	

Year (YYYY)	Person Months (##.##)
4.	
5.	

*Dollar Value of In-Kind Contribution: \$

In Kind Contributions2.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

3.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

In Kind Contributions4.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

5.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

In Kind Contributions6.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

7.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

In Kind Contributions8.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

9.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

In Kind Contributions

10.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

*PI/co-PI/Senior Personnel Name: Larry Isenhower

***Required fields**

Note: NSF has provided 15 project/proposal and 10 in-kind contribution entries for users to populate. Please leave any unused entries blank.

Project/Proposal Section:

Current and Pending Support includes all resources made available to an individual in support of and/or related to all of his/her research efforts, regardless of whether or not they have monetary value.[\[1\]](#) Information must be provided about all current and pending support, including this project, for ongoing projects, and for any proposals currently under consideration from whatever source[\[2\]](#), irrespective of whether such support is provided through the proposing organization or is provided directly to the individual. Concurrent submission of a proposal to other organizations will not prejudice its review by NSF, if disclosed.[\[3\]](#)

Please enter your support entries so they are grouped together based on the "Status of Support" and are in the order of Current, Pending, Submission Planned, and Transfer of Support from top to bottom

[\[1\]](#) If the time commitment or dollar value is not readily ascertainable, reasonable estimates should be provided.

[\[2\]](#) For example, Federal, State, local, foreign, public or private foundations, non-profits, industrial or other commercial organizations or internal funds allocated toward specific projects.

[\[3\]](#) The Biological Sciences Directorate exception to this policy is delineated in PAPPG Chapter II.D.2.

Projects/Proposals

1.*Project/Proposal Title : Development of Laser Calibration system for DUNE near detector gaseous TPC

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support: DOE

*Primary Place of Performance : Abilene Christian University

Project/Proposal Start Date (MM/YYYY) (if available) : 06/2021

Project/Proposal End Date (MM/YYYY) (if available) : 05/2024

*Total Award Amount (including Indirect Costs): \$ 150,000

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1. 2021	1.5	4.	
2. 2022	1.5	5.	
3. 2023	1.5		

Detector R&D for the DUNE Multi-Purpose Near Detector

2.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support: DOE

*Primary Place of Performance : Abilene Christian University

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$ 57480

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1. 2020	1.5	4.	
2. 2021	1.5	5.	
3. 2022	1.5		

Projects/Proposals

3.*Project/Proposal Title : Collaborative Research: Neutrino Research Initiative for College Students (NRICoS)

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support: NSF

*Primary Place of Performance : Abilene Christian University

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$ 326,481

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1. 2021	0.1	4. 2024	0.1
2. 2022	0.1	5. 2025	0.1
3. 2023	0.1		

4.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

5.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

6.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

7.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

8.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

9.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

10.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

11.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

12.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

13.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

14.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

15.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

In Kind Contributions

*Required fields

In-Kind Contribution Section:

Current and Pending Support also includes in-kind contributions (such as office/laboratory space, equipment, supplies, employees, students). If the in-kind contributions are intended for use on the project being proposed to NSF, the information must be included as part of the Facilities, Equipment and Other Resources section of the proposal and need not be replicated in the individual's Current and Pending Support submission. In-kind contributions not intended for use on the project/proposal being proposed that have associated time obligations must be reported below. If the time commitment or dollar value is not readily ascertainable, reasonable estimates should be provided.

Please enter your support entries so they are grouped together based on the "Status of Support" and are in the order of Current to Pending from top to bottom

1.*Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)
1.	
2.	
3.	

Year (YYYY)	Person Months (##.##)
4.	
5.	

*Dollar Value of In-Kind Contribution: \$

In Kind Contributions2.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

3.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

In Kind Contributions4.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

5.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

In Kind Contributions6.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

7.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

In Kind Contributions8.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

9.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

In Kind Contributions

10.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

*PI/co-PI/Senior Personnel Name: Nasrin Mirsaleh-Kohan, Ph.D

***Required fields**

Note: NSF has provided 15 project/proposal and 10 in-kind contribution entries for users to populate. Please leave any unused entries blank.

Project/Proposal Section:

Current and Pending Support includes all resources made available to an individual in support of and/or related to all of his/her research efforts, regardless of whether or not they have monetary value.[\[1\]](#) Information must be provided about all current and pending support, including this project, for ongoing projects, and for any proposals currently under consideration from whatever source[\[2\]](#), irrespective of whether such support is provided through the proposing organization or is provided directly to the individual. Concurrent submission of a proposal to other organizations will not prejudice its review by NSF, if disclosed.[\[3\]](#)

Please enter your support entries so they are grouped together based on the "Status of Support" and are in the order of Current, Pending, Submission Planned, and Transfer of Support from top to bottom

[\[1\]](#) If the time commitment or dollar value is not readily ascertainable, reasonable estimates should be provided.

[\[2\]](#) For example, Federal, State, local, foreign, public or private foundations, non-profits, industrial or other commercial organizations or internal funds allocated toward specific projects.

[\[3\]](#) The Biological Sciences Directorate exception to this policy is delineated in PAPPG Chapter II.D.2.

Projects/Proposals

1.*Project/Proposal Title : NSF INCLUDES Planning Grant: Transcending Barriers for Success

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support: National Science Foundation

*Primary Place of Performance : Texas Woman's University

Project/Proposal Start Date (MM/YYYY) (if available) : 01/2021

Project/Proposal End Date (MM/YYYY) (if available) : 04/2022

*Total Award Amount (including Indirect Costs): \$ 12,670

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1. 2021	0.54	4.	
2. 2022	0.54	5.	
3.			

2.*Project/Proposal Title : Collaborative Research: Neutrino Research Initiative for College Students (NRICoS)

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support: National Science Foundation

*Primary Place of Performance : Texas Woman's University

Project/Proposal Start Date (MM/YYYY) (if available) : 09/2021

Project/Proposal End Date (MM/YYYY) (if available) : 08/2026

*Total Award Amount (including Indirect Costs): \$ 350,456

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1. 2022	0.50	4. 2025	0.50
2. 2023	0.50	5. 2026	0.50
3. 2024	0.50		

Projects/Proposals

3.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

4.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

5.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

6.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

7.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

8.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

9.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

10.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

11.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

12.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

13.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

14.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

15.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

In Kind Contributions

*Required fields

In-Kind Contribution Section:

Current and Pending Support also includes in-kind contributions (such as office/laboratory space, equipment, supplies, employees, students). If the in-kind contributions are intended for use on the project being proposed to NSF, the information must be included as part of the Facilities, Equipment and Other Resources section of the proposal and need not be replicated in the individual's Current and Pending Support submission. In-kind contributions not intended for use on the project/proposal being proposed that have associated time obligations must be reported below. If the time commitment or dollar value is not readily ascertainable, reasonable estimates should be provided.

Please enter your support entries so they are grouped together based on the "Status of Support" and are in the order of Current to Pending from top to bottom

1.*Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)
1.	
2.	
3.	

Year (YYYY)	Person Months (##.##)
4.	
5.	

*Dollar Value of In-Kind Contribution: \$

In Kind Contributions2.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

3.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

In Kind Contributions4.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

5.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

In Kind Contributions6.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

7.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

In Kind Contributions8.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

9.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

In Kind Contributions

10.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

*PI/co-PI/Senior Personnel Name: Steven Alexander

***Required fields**

Note: NSF has provided 15 project/proposal and 10 in-kind contribution entries for users to populate. Please leave any unused entries blank.

Project/Proposal Section:

Current and Pending Support includes all resources made available to an individual in support of and/or related to all of his/her research efforts, regardless of whether or not they have monetary value.[\[1\]](#) Information must be provided about all current and pending support, including this project, for ongoing projects, and for any proposals currently under consideration from whatever source[\[2\]](#), irrespective of whether such support is provided through the proposing organization or is provided directly to the individual. Concurrent submission of a proposal to other organizations will not prejudice its review by NSF, if disclosed.[\[3\]](#)

Please enter your support entries so they are grouped together based on the "Status of Support" and are in the order of Current, Pending, Submission Planned, and Transfer of Support from top to bottom

[\[1\]](#) If the time commitment or dollar value is not readily ascertainable, reasonable estimates should be provided.

[\[2\]](#) For example, Federal, State, local, foreign, public or private foundations, non-profits, industrial or other commercial organizations or internal funds allocated toward specific projects.

[\[3\]](#) The Biological Sciences Directorate exception to this policy is delineated in PAPPG Chapter II.D.2.

Projects/Proposals

1.*Project/Proposal Title : Collaborative Research: Neutrino Research Initiative for College Students (NRICoS)

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support: National Science Foundation

*Primary Place of Performance : Southwestern University

Project/Proposal Start Date (MM/YYYY) (if available) : 09/2021

Project/Proposal End Date (MM/YYYY) (if available) : 08/2026

*Total Award Amount (including Indirect Costs): \$ 331,878

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1. 2022	0.50	4. 2025	0.50
2. 2023	0.50	5. 2026	0.50
3. 2024	0.50		

2.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

3.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

4.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

5.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

6.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

7.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

8.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

9.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

10.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

11.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

12.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

13.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

14.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

15.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

In Kind Contributions

*Required fields

In-Kind Contribution Section:

Current and Pending Support also includes in-kind contributions (such as office/laboratory space, equipment, supplies, employees, students). If the in-kind contributions are intended for use on the project being proposed to NSF, the information must be included as part of the Facilities, Equipment and Other Resources section of the proposal and need not be replicated in the individual's Current and Pending Support submission. In-kind contributions not intended for use on the project/proposal being proposed that have associated time obligations must be reported below. If the time commitment or dollar value is not readily ascertainable, reasonable estimates should be provided.

Please enter your support entries so they are grouped together based on the "Status of Support" and are in the order of Current to Pending from top to bottom

1.*Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)
1.	
2.	
3.	

Year (YYYY)	Person Months (##.##)
4.	
5.	

*Dollar Value of In-Kind Contribution: \$

In Kind Contributions2.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

3.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

In Kind Contributions4.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

5.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

In Kind Contributions6.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

7.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

In Kind Contributions8.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

9.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

In Kind Contributions

10.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

*PI/co-PI/Senior Personnel Name: Thomas Coan

***Required fields**

Note: NSF has provided 15 project/proposal and 10 in-kind contribution entries for users to populate. Please leave any unused entries blank.

Project/Proposal Section:

Current and Pending Support includes all resources made available to an individual in support of and/or related to all of his/her research efforts, regardless of whether or not they have monetary value.^[1] Information must be provided about all current and pending support, including this project, for ongoing projects, and for any proposals currently under consideration from whatever source^[2], irrespective of whether such support is provided through the proposing organization or is provided directly to the individual. Concurrent submission of a proposal to other organizations will not prejudice its review by NSF, if disclosed.^[3]

Please enter your support entries so they are grouped together based on the "Status of Support" and are in the order of Current, Pending, Submission Planned, and Transfer of Support from top to bottom

^[1] If the time commitment or dollar value is not readily ascertainable, reasonable estimates should be provided.

^[2] For example, Federal, State, local, foreign, public or private foundations, non-profits, industrial or other commercial organizations or internal funds allocated toward specific projects.

^[3] The Biological Sciences Directorate exception to this policy is delineated in PAPPG Chapter II.D.2.

Projects/Proposals

1.*Project/Proposal Title : Collaborative Research: Neutrino Research Initiative for College Students

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support: NSF

*Primary Place of Performance : Southern Methodist University

Project/Proposal Start Date (MM/YYYY) (if available) : 09/2021

Project/Proposal End Date (MM/YYYY) (if available) : 08/2026

*Total Award Amount (including Indirect Costs): \$ 364,154

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1. 2022	0.10	4. 2025	0.10
2. 2023	0.10	5. 2026	0.10
3. 2024	0.10		

2.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

3.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

4.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

5.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

6.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

7.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

8.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

9.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

10.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

11.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

12.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

13.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

14.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

15.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

In Kind Contributions

*Required fields

In-Kind Contribution Section:

Current and Pending Support also includes in-kind contributions (such as office/laboratory space, equipment, supplies, employees, students). If the in-kind contributions are intended for use on the project being proposed to NSF, the information must be included as part of the Facilities, Equipment and Other Resources section of the proposal and need not be replicated in the individual's Current and Pending Support submission. In-kind contributions not intended for use on the project/proposal being proposed that have associated time obligations must be reported below. If the time commitment or dollar value is not readily ascertainable, reasonable estimates should be provided.

Please enter your support entries so they are grouped together based on the "Status of Support" and are in the order of Current to Pending from top to bottom

1.*Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

In Kind Contributions2.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

3.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

In Kind Contributions4.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

5.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

In Kind Contributions6.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

7.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

In Kind Contributions8.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

9.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

In Kind Contributions

10.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

*PI/co-PI/Senior Personnel Name: Levente Borvák, Ph.D.

***Required fields**

Note: NSF has provided 15 project/proposal and 10 in-kind contribution entries for users to populate. Please leave any unused entries blank.

Project/Proposal Section:

Current and Pending Support includes all resources made available to an individual in support of and/or related to all of his/her research efforts, regardless of whether or not they have monetary value.[\[1\]](#) Information must be provided about all current and pending support, including this project, for ongoing projects, and for any proposals currently under consideration from whatever source[\[2\]](#), irrespective of whether such support is provided through the proposing organization or is provided directly to the individual. Concurrent submission of a proposal to other organizations will not prejudice its review by NSF, if disclosed.[\[3\]](#)

Please enter your support entries so they are grouped together based on the "Status of Support" and are in the order of Current, Pending, Submission Planned, and Transfer of Support from top to bottom

[\[1\]](#) If the time commitment or dollar value is not readily ascertainable, reasonable estimates should be provided.

[\[2\]](#) For example, Federal, State, local, foreign, public or private foundations, non-profits, industrial or other commercial organizations or internal funds allocated toward specific projects.

[\[3\]](#) The Biological Sciences Directorate exception to this policy is delineated in PAPPG Chapter II.D.2.

Projects/Proposals

1.*Project/Proposal Title : Collaborative Research: Neutrino Research Initiative for College Students (NRICoS)

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support: National Science Foundation

*Primary Place of Performance : University of Dallas

Project/Proposal Start Date (MM/YYYY) (if available) : 09/2021

Project/Proposal End Date (MM/YYYY) (if available) : 08/2026

*Total Award Amount (including Indirect Costs): \$ 334,007

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1. 2021	0.50	4. 2024	0.50
2. 2022	0.50	5. 2025	0.50
3. 2023	0.50		

2.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

3.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

4.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

5.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

6.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

7.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

8.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

9.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

10.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

11.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

12.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

13.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

14.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

Projects/Proposals

15.*Project/Proposal Title :

*Status of Support : Current Pending Submission Planned Transfer of Support

Proposal/Award Number (if available):

*Source of Support:

*Primary Place of Performance :

Project/Proposal Start Date (MM/YYYY) (if available) :

Project/Proposal End Date (MM/YYYY) (if available) :

*Total Award Amount (including Indirect Costs): \$

*Person-Month(s) (or Partial Person-Months) Per Year Committed to the Project

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

In Kind Contributions

*Required fields

In-Kind Contribution Section:

Current and Pending Support also includes in-kind contributions (such as office/laboratory space, equipment, supplies, employees, students). If the in-kind contributions are intended for use on the project being proposed to NSF, the information must be included as part of the Facilities, Equipment and Other Resources section of the proposal and need not be replicated in the individual's Current and Pending Support submission. In-kind contributions not intended for use on the project/proposal being proposed that have associated time obligations must be reported below. If the time commitment or dollar value is not readily ascertainable, reasonable estimates should be provided.

Please enter your support entries so they are grouped together based on the "Status of Support" and are in the order of Current to Pending from top to bottom

1.*Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)
1.	
2.	
3.	

Year (YYYY)	Person Months (##.##)
4.	
5.	

*Dollar Value of In-Kind Contribution: \$

In Kind Contributions2.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

3.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

In Kind Contributions4.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

5.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

In Kind Contributions

6.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

7.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

In Kind Contributions8.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

9.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

In Kind Contributions

10.* Status of Support : Current Pending

*Source of Support :

*Primary Place of Performance :

*Summary of In-Kind Contributions :

Time Commitment - Month(s) (or Partial Person-Months) Committed Per Year

If the time commitment is not readily ascertainable, reasonable estimates should be provided.

*Year (YYYY)	*Person Months (##.##)	Year (YYYY)	Person Months (##.##)
1.		4.	
2.		5.	
3.			

*Dollar Value of In-Kind Contribution: \$

Facilities, Equipment, and Other Resources

At UTA we have five separate labs (electronics, optics, etc.) with several high speed oscilloscopes including one with 6 GHz bandwidth, power supplies, logic modules, and electronic racks. We also have one large area detector construction facility equipped with a 5 ton building crane, a 2000 ft² high power grid computing facility, a large office area for students and postdoctoral fellows and a conference room, totaling 10,000 ft². The center is one of the few university research centers for excellence and enjoys strong support from the university upper administration.

The center has large number of equipment, such as HV supplies, various trigger logic and data acquisition (DAQ) electronics, as well as gas supply systems. One of the four laboratories is the advanced GEM development lab with radioactive source qualification and will be used for primary GEM detector development. The photo-detector laboratory will be used for integration of photo-cathodes. The physics department of UTA has a machine shop with CNC machines that can produce sophisticated equipment and detector housing. This machine shop is situated immediately next to the HEP group laboratories for ease of machining process and transport of the final products.

In addition, the following equipment is currently available in liquid argon lab:

- Cryofab 3048 540 Liter Cryostat with top plate consisting of 1 CF 14" flange, 3 FC 4.5" flanges, and 3 FC 2.75" flanges including internal fill line and bottom drain
- Cryofab 1636 117 Liter Cryostat with top plate consisting of 2 CF 4.5" flanges and 2 CF 2.75" flanges including internal fill line and bottom drain
- Custom 70 Liter Cylindrical Cryo-Vessel with 14" custom top flange with 1 CF 4.5" flange, 3 FC 2.75" flanges and 2 CF 1.33" flanges
- Custom 40 Liter Cylindrical Cryo Vessel with Two 750 cm³ liquid argon Molecular Sieve filters with Sigma Aldrich 4A bead 8-12 mesh filter material Two 750 cm³ liquid argon activated copper filters with Research Catalyst Q-5 copper catalyst 14x28 mesh bead filter material
- Mc Master Easy-Stor In Lab Hydraulic Crane (2000 lb maximum weight) 10' 8" max height
- CryoMech PT60 cold head with air cooled helium compressor
- HiCube80 Eco Dry Turbo Pump
- Glassman PS/FR50R06 50kV power supply
- Stanford Research Systems Residual Gas Analyzer A200
- Teledyne Lecroy HDO 4104A 1 GHz 2.5 GS/s Oscilloscope
- CAEN A1702 32 Channel SiPM Readout front end board
- CAEN DT1470 4 channel 8kV HV power supply

- MicroBooNE CF 14 cold electronics readout flange with intermediate amplifiers and 16 LARASIC4 motherboards
- Relevant cryogenic hosing and valves associated with the UTA liquid argon cryogenic facility

A small High Performance cluster dedicated to GPU computing, primarily for Deep Learning studies, which are used by over two dozen HEP collaborators over six experiments. The cluster provides 54 processing cores (108 job slots due to hyper-threading) over 4 systems, with more than 4 GB of RAM per core, 2 GB/s SSD caches in front of 50 TB of storage, 10 Gb interconnectivity, 4 NVidia (3 Kepler, 1 Maxwell) GPUs, 3 AMD GPUs, and an Intel Phi (Knights Corner).

Facilities, Equipment and Other Resources

Abilene Christian University will be providing a work space in a newly renovated building on campus. This space will have all the needed computer networking connections and other tools needed in an office and collaboration space for the proposed detector simulation and data analysis work. A conference room is available for video conferencing as needed for the meetings between the various collaborators. In addition, the Engineering and Physics department has many classrooms that can be scheduled for meetings, workshops, or other educational needs related to the project.

Faculty in the department have experience across a broad set of engineering and physics disciplines which can provide advice as needed. Specifically, four professors in the nuclear physics research group have significant experience with the building, operation, and testing of nuclear and high energy particle detectors who will be able to provide valuable advice. This group has maintained DOE support for over 30 years and two professors have received the APS undergraduate research mentor award. Some of these other projects can also provide the hands-on experience to help students learn the physics principles behind particle detectors which is necessary to fully understand the simulation and analysis tasks students will be undertaking as part of this program.

The department will also be fully supporting the educational activities planned as part of this proposal. There is also administrative staff in the Engineering and Physics department and from the Office of Research and Sponsored Programs to help the PI with grant administration.

FACILITIES AND OTHER RESOURCES

Texas Woman's University (TWU) builds on its long tradition as the nation's largest public institution primarily for women and is committed to transformational learning, discovery, and service in an inclusive environment that embraces diversity (<https://twu.edu/about-twu/purpose-mission-vision-values-principles/>).

TWU Student Body

Enrollment at TWU reflects its historical position with women making up approximately 87.5% of the TWU total enrollment of 15,886 in fall 2019. Of these women, 57.8% were undergraduates; 24.7% were enrolled in master's programs and 5.0% in doctoral programs. (TWU Fact Book, 2019).

TWU is an ethnically diverse institution and is ranked no. 1 (tied) in Texas and no. 5 (tied) nationally out of more than 1,500 regionally accredited schools on US News and World Reports 2021 "Best Colleges" Campus Ethnic Diversity report. (<https://www.usnews.com/best-colleges/rankings/national-universities/campus-ethnic-diversity>). TWU 2019 enrollment was 59.7% minorities, primarily African-American (18.0%) and Hispanic (27.1%), and TWU is designated as a Hispanic-Serving Institution as defined by the U.S. Department of Education. TWU enjoys a slightly more diverse student population than the ethnic distribution of the surrounding North Texas Area (TWU Fact Book, 2019).

In the 2018-2019 academic year, 3,769 degrees were conferred by TWU. Of these 2,034 were at the bachelor's level, 1,514 were at the master's level, and 221 doctoral degrees were awarded. Minority ethnicities comprised 55.2% of the undergraduate degrees, 46.9% of the master's degrees, and 39.4% of the doctoral degrees awarded. At the undergraduate level 17.1% were African-American and 26.1% were Hispanic. At the masters level 16.4% were African-American and 18.6% were Hispanic, and at the doctoral level 19.0% were African-American and 12.2% were Hispanic. (TWU Fact Book, <https://twu.edu/media/documents/irdm/FactBook-Degrees-Conferred.pdf>).

The Office of Research and Sponsored Projects (ORSP)

ORSP is the central unit whose primary mission is to preserve TWU's ability to compete for external funds by ensuring that regulatory requirements are properly integrated and consistently implemented throughout the university.

The Office of Research and Sponsored Programs assists faculty with identification of funding sources, preparation and submission of proposals, financial management of grants, and compliance with grant requirements. It also administers university resources to support research.

TWU employs a full-time Scientific Equipment Repair Technician who provides assistance with setting up and testing new equipment, repair and calibration of scientific equipment no longer under warranty; purchasing parts for scientific equipment; obtaining service from outside vendors; and developing operation and maintenance procedures. Service contracts are maintained on major equipment.

Institutional Review Board

The TWU Institutional Review Boards (IRBs) review research projects that involve human subjects to protect their rights and welfare. Therefore, it is the policy of TWU that all research conducted by any TWU faculty member, staff member, or student using human subjects must have prior approval from a TWU IRB before the research is initiated. Each of the TWU campus IRBs (Dallas, Denton, and Houston)

is registered with the Office of Human Research Protections (OHRP) and operates under TWU's Federalwide Assurance, FWA 00000178. Human subjects research at TWU is governed by TWU's FWA, Policy, and IRB Procedures (updated August 2020).

TWU uses Single-IRB procedures for NIH and other federally funded studies. Typically TWU enters into a formal agreement with the other institution(s) through an Institutional Authorization Agreements (IAA). One institution relies on the other's IRB for the review and approval of an IRB study. TWU will work closely with the other institution(s) to determine the IRB of record and the relying IRB.

The Center for Research Design and Analysis

The Center for Research Design and Analysis (CRDA) is an academically-based, multidisciplinary research support and service center, under the Office of Research & Sponsored Programs. The CRDA houses its own statistical and qualitative research consulting lab and survey lab, with a staff of seven. The Center's experienced consultants provide expertise in survey design, needs assessment, program evaluation, sampling, research design, statistical analysis, and report writing.

TWU Technology Support

Texas Woman's University provides students, faculty and staff with the highest quality computer equipment strategically located across all of our campuses (Denton, Dallas, and Houston). A centralized technology department manages four units: business operations, critical infrastructure, enterprise applications, and client services, which includes a Service Desk that is staffed seven days a week to handle or escalate incidents or requests. Every faculty, staff, and administrator is provided with computer equipment that is maintained and replaced on a four-year interval to provide the latest technology to accomplish the university's goals. Texas Woman's University provides premier data analysis products with university-wide instructor licenses, such as SPSS, SAS, and NVivo. Additional software can be reviewed at any time by initiating the request through the Service Desk. The university provides technology training through workshops, webinars and LinkedIn Learning (formerly Lynda.com), a web-based repository of technical and professional instructional videos, accessible to all faculty, staff, administrators, and students anytime and anywhere.

Department of Chemistry and Biochemistry Laboratory Facilities

The Department of Chemistry and Biochemistry is also well equipped with the following instrumentation:

- Nicolet Magna 560 FT-Infrared Spectrophotometer
- Pine Research Instrumentation Cyclic Voltammetry
- Shimadzu UV-2101PC Ultraviolet-Visible Spectrophotometer
- Varian EM 390 Nuclear Magnetic Resonance Spectrometer
- Varian Mercury 300 MHz Nuclear Magnetic Resonance
- Varian Saturn 3 Gas Chromatograph-Mass Spectrometer
- Jobin-Yvon Spex FluoroMax-3 Fluorescence Spectrofluorimeter
- Shimadzu 2401 UV/vis spectrophotometer with a 6 cell holder Peltier
- Shimadzu UFLC HPLC Systems
- Shimadzu RF5301PC Spectrofluorospectrometer
- Paar 1341 Oxygen Bomb Calorimeter
- Shimadzu AA-7000 Atomic Absorption Spectrometer
- Shimadzu GCMS-QP2010S GC Mass Spectrometer
- Rudolf Instruments Autopol 1 Polarimeter
- New Brunswick Scientific Excell E24 Incubator Shaker

- Sorval ST 16R Hanging Bucket Centrifuge
- Eppendorf Mastercycler PCR System
- Reichert AR7 Series Automatic Refractometer
- BioRad Experion Automated Electrophoresis System
- Cary 100 UV/Vis Spectrometer with ThermoSet Multicell Cuvette Holder
- OLIS 100DS Circular Dichroism Spectropolarimeter
- CSC NANO Differential Scanning Calorimeter
- Dynamic Light Scattering System
- Differential Scanning Calorimeter Q500 TGA and Q20 DSC
- Automated Micro-Osmometer Freezing point model 3320
- DXR Raman microscope, a research grade dispersive Raman microscope with DXR 780 nm and 530 nm Excitation Laser Sets. Nominal spectral range, 50-3300 cm⁻¹

Libraries

The Blagg-Huey Library on the Denton campus offers students a modern facility for accessing both print and electronic information in an environment that provides comfort and inspirational beauty. Students from all three campuses can borrow materials, receive in-depth research consultation, and access all TWU Libraries' collections. In support of the academic and research programs at TWU, the libraries offer access to over 553,000 print volumes; 551,000 e-books; 35,000 microform titles; 129,000 streaming media titles; 163,000 print journals; 265,000 electronic journals, as well as over 300 databases. The electronic resources can be accessed from anywhere Internet connection is available.

Center for Faculty Excellence

The Center for Faculty Excellence at TWU serves faculty of all ranks on all three campuses. The center is the “hub” or “commons” for professional development activities, and it provides resources, support, and inspiration for the development and advancement of faculty in all career phases as teachers, scholars, mentors, researchers, and leaders.

Facilities, Equipment and Other Resources. Southwestern University's renovated science center opened in August 2019. This facility brings all STEM faculty and students together in 107,000 square feet of classrooms, offices, seminar rooms and laboratories.

The Phase I construction has three floors with 15,700 square feet of teaching labs, research labs and interactive classroom spaces – opened in Fall 2015 and now fully supports Southwestern's inquiry-based science curriculum with new chemistry, physics and biology teaching spaces. These hybrid spaces allow for short lectures by faculty followed by active learning and group work conducted at laboratory workstations around the perimeter of the room. A grant from the W.M. Keck Foundation in 2015 assisted with the establishment of a molecular biology center within the new wing, bringing faculty from biology, ecology, chemistry, biochemistry, physics, and psychology together to develop inquiry-based laboratory courses across the science disciplines using molecular biological approaches and techniques. New equipment – including a gel imager, table-top ultracentrifuge, fluorimeter, nanodrop and real time PCR – facilitates student faculty research. Faculty implementing project-based laboratories in chemistry also have access to additional equipment supporting the transition to inquiry-based learning, as students work in small groups completing new experiments and projects using rotary evaporators, melting point apparatuses, chromatography columns, specialized glassware and general supplies and reagents.

The Phase II space includes a math and computer science learning center – to be known as the Whitmore Lab – on the third floor of the four-story complex. The space combines computers, flat panels, white boards, and study and interaction spaces. The Whitmore Lab opens directly into the Math and Computer Science faculty office area, facilitating close and constant interaction between students and the faculty in the quantitative disciplines. The new building also includes two computer labs on the second floor, including a general computing lab which holds 32 students and an advanced computer lab which holds 10-20 students. The Phase II space also includes four active learning classrooms, with interactive digital panels, projectors, white boards, and movable furniture that supports collaboration.

The building also includes a machine shop as well as a large maker space where students can use a laser cutter and a state-of-the-art 3D printer to work on their senior capstone projects.

Facilities, Equipment, and Other Resources

The SMU physics department has ample access to a no-cost machine shop housed in one of our engineering buildings. This shop has an array of typical machine tools (lathes, milling machines, drill presses, metal forming breaks, etc.), including CNC capability. Suitably trained students can use the machines. Additionally, there is a “maker space” in a neighboring building, open to all qualified students, that houses a student machine shop, student carpentry shop and a variety of 3D printers.

T.E. Coan has a 750 square-foot general purpose lab that contains extensive bench space, typical hand tools and test electronic instrumentation, ready access to a loading dock, substantial power and wired ethernet connections (plus wireless access points). This lab hosts a remote control room for taking NOvA and ICARUS shifts that allows students to see live event displays.

SMU has a dedicated data center with significant computing resources. These resources include 176 standard compute nodes with 36 cores each, 256 GB of memory, and 100 Gb/s networking. These nodes contain dual Intel Xeon E5-2695v4 2.1 GHz 18-core “Broadwell” processors with 45 MB of cache each and 256 GB of DDR4-2400 memory. In addition, there are 35 medium- and five high-memory compute nodes which have the same processors, but feature 768 GB and 1,536 GB (1.5 TB) of DDR4-2400 memory, respectively. Additionally, the facility also contains 36 accelerator nodes with NVIDIA GPUs configured with dual Intel Xeon E5-2695v4 2.1 GHz 18-core “Broadwell” processors, 256 GB of DDR4-2400 memory, and one NVIDIA P100 GPU accelerator. Each such NVIDIA P100 GPU has 3,584 CUDA cores and 16 GB CoWoS HBM2 memory. The P100 GPU is based on the Pascal architecture and a very high bandwidth (732 GB/s) stacked memory architecture. Use of all the machines is free, including consulting with computing professionals.

The department has a substantial electronics laboratory that includes 5 rooms adding up to 2,520 square-feet. This lab has instruments that can characterize electrical (analog and digital) and optical signals up to about 11GHz or 10Gbps (10Gbps optical and 12.5Gbps electrical). We have capabilities in printed-circuit-board design, assembly (for testing only, not for production) and re-work. We can also carry out tests in total ionizing dose effect with a 160KeV X-ray machine. We have adequate data acquisition instruments and systems (including control software such as LabVIEW) plus FPGA boards and coding capabilities to perform tests in lab or in a beamline (mostly for single-event-effect evaluation). The laboratory has ASIC development capability with experience in prototyping (multi-project-wafer run) and production (engineering run) of CMOS analog and digital circuits with feature sizes of 250nm (SOS), 130nm and 65nm (bulk-silicon). SMU’s computing facility houses and provides administrative support for the ASIC design environment (two dedicated servers, design software such as Cadence, and foundry specific design kits).

Specific major instruments include:

- Real Time Digital oscilloscope, 8 GHz / 25 GS/s
- Real Time Digital oscilloscope, 7 GHz / 50 GS/s
- Digital Sampling Oscilloscope w/ TDR, electrical and optical input modules (80E01, 80E04, 80C08C, 80C12)
- Sampling Oscilloscope w/ TDR and electrical input modules (SE-50 and ST-20)

- 30 Gb/s programmable pattern generator
- 0.5 - 12.5 Gb/s Pulse Pattern Generator
- 0.5 - 12.5 Gb/s Error Detector
- 12.5 Gb/s parallel channel BERT (2 pattern generators, 1 error detector, 1 clock synthesizer)
- Arbitrary waveform generator 200 MS/s, 16 bit resolution
- 600-1700 nm optical spectrum analyzer
- 100 Hz - 26.5 GHz spectrum analyzer
- Lightwave multimeter (2 power 800-1700 nm sensors HP81536A)

Facilities, Equipment, and Other Resources

(University of Dallas)

The University of Dallas (UD) neutrino research group has a dedicated lab space that includes 5 Mac workstations enabled with direct login to Fermilab and CERN computing grids. These workstations are verified to serve as a remote shift station for the NOvA neutrino experiment. The lab also includes significant resources for scintillation counter development including various SiPMs, PMTs, scintillators, and related electronics. These facilities produced the NOvA test beam ToF counters and SiPM front end boards in conjunction with UD's machine shop and electronics shop.

The UD physics department has an in-house machine shop which can be used at no-cost. Our shop has the regular set of machining tools: lathe, milling machine, drill presses, table and band saws, and an array of hand tools. UD offers a course which trains students to use these tools to support laboratory equipment maintenance and operations, so students in this program would be able to take full advantage of this option. As a recent expansion to our machining capabilities, we have added several 3D printers to assist with the design, modeling, and prototyping of student projects. These are also available at no cost to the program.

In addition to the machine shop and 3D printing facilities, UD also has an electronics shop and an advanced physics laboratory which contains ample bench space divided among three larger and four smaller rooms for individual projects/experiments. This laboratory space is available for shared use by this project and contains an array of test electronic instrumentation also available for our use.

The department also has a student study lounge available for student meetings, discussions, and various other collaborative activities.

UD's physics department has a loading dock, ample power and wired ethernet connections (plus wireless access points).

Data Management Plan

This proposal will produce intellectual data from an innovative educational program which integrate neutrino research and internationally representative data from neutrino experiments, currently running and planned to run in the near future. The materials and local data sets will be produced through the analyses on real and simulated data sets. In addition, all peer mentor and the undergraduate students work presented in the weekly meetings at each of the participating institutions and the project-wide monthly meetings would be available on the NRICoS project indico site and freely available to all participating students and PMs. The sensitive data will be released only with permission from the participants with a restrictive contract. Other public data from this proposal will be deposited to ensure that the research community has long-term access to the data. The project team will create a dedicated web site to manage and distribute the data for this purpose. Due to the multi-institutional and multi-experimental nature of NRICoS, and the web sites from this project will be linked to the participating experimental web sites for the proper dissemination of data and the assurance of the long-term security on the disseminated data.

Toni D. Sauncy, Ph.D.
Biographical Sketch September 2016
TLU-IUSE:HSI Capacity Building Proposal

a. Professional Preparation

Texas Tech University	Lubbock, TX.	Mathematics	B.S., 1992
Texas Tech University	Lubbock, TX.	Physics	M.S., 1995
Texas Tech University	Lubbock, TX.	Applied Physics	Ph.D., 1998

b. Appointments

- 2014- Associate Professor and Chair, Department of Physics
Texas Lutheran University, Seguin, TX.
- 2014 - Adjunct Professor
Texas State University Department of Physics, San Marcos, TX.
- 2012-2014 Director, Society of Physics Students /Sigma Pi Sigma Physics Honor Society, American Institute of Physics, College Park, MD.
- 2010-2014 Professor, Department of Physics
Angelo State University, San Angelo, TX.
- 2005-2010 Associate Professor, Department of Physics
Angelo State University, San Angelo, TX.
- 2000-2005 Assistant Professor, Department of Physics
Angelo State University, San Angelo, TX.
- 1998-2000 Assistant Professor, Department of Physics,
Western Illinois University, Macomb, IL.

c. Products

- (i) Most closely related to proposal project

Redmond, K.R., Sauncy, T.D. (2014). *The Careers Toolbox for Undergraduate Physics Students*. Retrieved from American Institute of Physics website:
<https://www.aip.org/statistics/reports>

Czujko, R., Redmond, K.R., Sauncy, T.D. (2014). *Equipping Physics Majors for the STEM Workforce*, Retrieved from American Institute of Physics website:
<https://www.aip.org/statistics/reports>

Toni D. Sauncy, Ph.D.
Biographical Sketch September 2016
TLU-IUSE:HSI Capacity Building Proposal

d. Synergistic Activities

Produced sets of “cultural infusion” slides that highlight contributions to physics by underrepresented minorities (current and historical) for use in introductory physics courses as part of Noyce Capacity building grant, and innovative hybrid-inverted course curriculum for introductory calculus-based physics courses, including video compilations with exercises for online simulation activities in mechanics, waves, thermodynamics and charge, fields, electricity, magnetism as part of NSF IUSE grant –Texas Lutheran University, latest revisions 2019.

Chair, Council on Undergraduate Research Physics and Astronomy Division (current)

Project lead, “HERstories: Words of Encouragement from Women in Physics”, 2014.

Editor, *Journal Of Undergraduate Research in Physics* 2012-2015.

Executive Planning Committee member, and Workshop/Breakout Chair, 2019
Quadrennial Physics Congress (Providence Rhode Island, November 2019).



TEXAS LUTHERAN UNIVERSITY

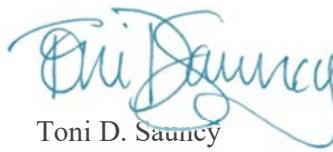
Learn Boldly. Live to Inspire.

November 19, 2020

To the National Science Foundation Division of Physics: Investigator-Initiated Research Projects (PHY)
Program Directors and Review Panelists:

If the proposal submitted by Dr. Jaehoon Yu entitled "Collaborative Research: Neutrino Research Initiative for College Students (NRICoS)" is selected for funding by NSF, it is my intent to collaborate and/or commit resources as detailed in the Project Description or the Facilities, Equipment and Other Resources section of the proposal.

Sincerely,



A handwritten signature in blue ink that reads "Toni D. Sauney".

Toni D. Sauney
Chair – Department of Physics
tsauney@tlu.edu