

PRANAVA TEJA SURUKUCHI

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Education

- 2014 - 2019 **Ph.D., Physics**
Illinois Institute of Technology, Chicago, IL, USA
Thesis Title: Search for Sterile Neutrino Oscillations with the Prospect Experiment
- 2012 - 2013 **M.S., Physics**
Illinois Institute of Technology, Chicago, IL, USA
- 2006 - 2010 **B.Tech., Mechanical Engineering**
Jawaharlal Nehru Technological University, Hyderabad, India

Appointments

- 2019 - Present **Postdoctoral Research Associate**
Yale University, Wright Laboratory, New Haven, CT, USA
Advisor: Dr. Karsten Heeger
- 2014 - 2019 **Research Assistant**
Illinois Institute of Technology, Chicago, IL, USA
Advisor: Dr. Bryce Littlejohn

Research Projects

- 2019 - Present **Project 8** (*neutrino mass measurement experiment*)
<https://www.project8.org>
Advisor: Dr. Karsten Heeger
- **Chair** of Phase-III antenna array design working group (June 2020 - Present)
 - **Coordinator** of Phase-III position, track, and event reconstruction group (Oct 2020 - Present)
 - **Early Career Representative** to the science board (Jan 2020 - Present)
 - Developed simulations for antenna array radiation detection and electron reconstruction
 - Detector operator for the experiment's Phase II data taking campaigns
- 2019 - Present **CUORE and CUPID** (*neutrinoless double beta decay experiments*)
<https://cuore.lngs.infn.it>, <https://cupid.lngs.infn.it/>
Advisor: Dr. Karsten Heeger
- **WBS lead** on acoustic and vibration sensors for the CUPID experiment
 - Lead on the design of the muon veto system for the CUORE/CUPID experiment
 - Performed efficiency calculations in search for neutrinoless double beta decay on the CUORE experiment
 - CUORE Vetting Board member (Nov 2019 - Nov 2021)
 - Shifter calendar administrator (2019 - Present)

- 2014 - Present **PROSPECT** (*Precision Reactor Oscillation and Spectrum Experiment*)
<https://prospect.yale.edu>
 Advisors: Dr. Bryce Littlejohn and Dr. Karsten Heeger
- **Convener** of oscillation working group (2017-2019)
 - **Lead** of design, fabrication, QA, and assembly of the target segmentation system
 - **Developer** of PROSPECT's official sterile neutrino search framework
 - Performed PROSPECT's first oscillation search for eV-scale sterile neutrinos
 - Member of PROSPECT analysis coordination group (2017-2019)

Awards and Recognition

- 2017 **2017 APS April meeting Travel Grant**
 Awarded to support travel to APS April meeting to present research work
- 2016, 2015 **IIT Annual BCPS poster presentation award**
 First(2016), second(2015) prize for presenting research poster at the Annual Biology, Chemistry and Physics poster session
- 2015 **Faculty nominated member to Sigma Pi Sigma**

Synergistic Activities and Service

- Snowmass 2021 Neutrino Oscillations (NF02) - White Paper Editor
- Snowmass 2021 Neutrino Properties (NF05) - Liaison
- Nuclear Particle and Astrophysics Seminar Series - Organizer (2020–2021)
- Snowmass 2021 Early Career Long-Term Organization - Team Leader (2020)
- APS DNP Conference Experience for Undergraduates 2020 - Chair
- APS DNP Conference Experience for Undergraduates 2020 - Mentor
- APS DNP Conference Experience for Undergraduates 2019 - Mentor
- Chicago Area STEM Exhibition 2018 - Judge
- Chicago Area Undergraduate Research Symposium 2017 - Judge
- CSIM, IV International Military Games - Volunteer (2007)

Outreach

- Yale Physics Olympics 2019 - Executive Member
- Academy of Urban School Leadership 7th annual STEAM fair 2018 - Judge
- International Conference on High Energy Physics 2016 - Outreach Volunteer
- Math Club, Illinois Institute of Technology - Vice-President (2012-2013)
- IIT High School Math Competition - Executive Member (2013, 2012)
- Skyway Enrichment Program - Program Developer (2012)

Teaching and Mentoring

2021	PHYS 530/BBS 879: Theory and Practice of Scientific Teaching Poorvu Center for Teaching and Learning, Yale University, New Haven, CT, USA
2021	Mentorship Training Program for Postdocs Yale Postdoctoral Affairs, Yale University, New Haven, CT, USA
2014	Teaching Assistant Department of Physics, Illinois Institute of Technology, Chicago, IL, USA
2013 - 2016	Graduate Scholar (Tutor) Academic Resource Center, Illinois Institute of Technology, Chicago, IL, USA
2012	Program Instructor Chicago Public Schools, Chicago, IL, USA

Students Mentored

Samantha Pagan	2019 - Present	Graduate student at Yale University <i>Prototyping, design, and data analysis for CUPID muon veto system</i>
Ridge Liu	2020 - Present	Graduate student at Yale University <i>Correlation analysis between CUORE detectors and auxiliary devices</i> <i>Efficiency analysis for CUORE's search for $0\nu\beta\beta$</i>
Iris Ponce	2020 - Present	Graduate student at Yale University <i>DAQ design for CUPID muon veto system</i>
Caitlin Gainey	2019 - 2021	Undergraduate student at Yale University <i>Development of Geant4 simulations for CUPID muon veto system</i>
Gabe Hoshino	2020 - 2021	Now at University of Chicago <i>Development of Geant4 simulations for CUPID muon veto system</i>
Yonas Gebre	2016 - 2018	Now at University of Colorado, Boulder <i>Reactor antineutrino phenomenology</i>

Invited Seminars and Talks

[9] Direct Measurement of Neutrino Mass with Project 8 Experiment

Fundamental Physics Directorate seminars, SLAC, Remote seminar, Nov 30, 2021

[8] Latest Status on the Search for Sterile Neutrinos

40th International Symposium on Physics in Collision (PIC 2020), Aachen, Germany, September 14 – 17, 2021

[7] Latest Results from the CUORE Experiment

20th Lomonosov Conference on Elementary Particle Physics, Remote, Aug 19 – 25, 2021

[6] Latest Results from the CUORE Experiment

Nuclear, Particle, and Astrophysics Seminar, Wright Laboratory, Yale University, Remote seminar, May 19, 2021

[5] Direct Measurement of Neutrino Mass with the Project 8 Experiment

Kavli Institute for Cosmological Physics Seminar Series, University of Chicago, Remote seminar, Feb 25, 2021

[4] CUORE, CUPID, and the Nature of Neutrino Mass

Brookhaven National Laboratory Seminar, June 18, 2020

[3] First search for short-baseline neutrino oscillations at HFIR with PROSPECT

Fermilab Joint Experimental-Theoretical Physics Seminar, Fermilab, Batavia, IL, USA, Aug, 2018

[2] Prospects for Sterile Neutrino Searches at Reactors (Invited)

Nu Horizons VII, Harish Chandra Research Institute, Allahabad, India, Feb 22, 2018

[1] PROSPECT: A Precision Reactor Oscillation and Spectrum Experiment

Indian Institute of Technology, Hyderabad, India, Feb 19, 2016

Conferences and Presentations

[17] Physics Potential of the PROSPECT-II Experiment

Snowmass NF03 BSM@nu Workshop, Feb 10–12, 2022

[16] Latest Results from the CUORE Experiment in Search for $0\nu\beta\beta$

APS DNP Conference, Remote, Oct 12, 2021

[15] Event Reconstruction in the Project 8 Free Space CRES Demonstrator

APS April Meeting, remote conference, Apr 19, 2021

[14] Analysis Techniques for Background Reduction and Event Identification in the Search for $0\nu\beta\beta$ with CUORE

APS DNP Conference, Remote, Oct 30, 2020

[13] Simulation and Signal Extraction for the Project 8 Free Space CRES Demonstrator

XXIX International Conference on Neutrino Physics and Astrophysics, Remote, June 22 – 2, 2020

[12] Modeling Transmitting Antennas to Simulate Phase-III of the Project 8 Experiment

APS DNP Conference, Arlington, Virginia, USA, Oct 16, 2019

[11] Measurement of Reactor Antineutrino Spectrum from ^{235}U using PROSPECT

APS DPF Conference, Northeastern University, Boston, MA, USA, Aug 8, 2019

[10] Searching for Sterile Neutrino Oscillations with the PROSPECT Experiment (Poster)

51st Annual Users Meeting, Fermilab, Batavia, IL, USA, Jun 20, 2018

[9] Prospects for Improved Understanding of Isotopic Reactor Antineutrino Fluxes

5th Annual PIKIO Conference, University of Illinois Urbana-Champaign, Urbana, IL, USA, Mar 17, 2018

[8] Design of the PROSPECT Experiment (Poster)

International Neutrino Summer School, Chicago, IL, USA, Aug 16, 2017

[7] **PROSPECT: Precision Reactor Oscillation and Spectrum Experiment**
APS DPF Conference, Fermilab, Chicago, IL, USA, Aug 8, 2017

[6] **Sterile Neutrino Search with the PROSPECT Experiment**
New Perspectives Conference, Fermilab, Chicago, IL, USA, Jun 6, 2017

[5] **A Precision Reactor Oscillation and Spectrum Experiment**
IPA 2017, Chicago, IL, USA, May 9, 2017

[4] **Sterile Neutrino Search with the PROSPECT Experiment**
APS April Meeting, Washington DC, USA, Jan 28, 2017

[3] **Design of the PROSPECT Experiment (Poster)**
International Conference on High Energy Physics, Chicago, IL, USA, Aug 6, 2016

[2] **Background and Detector Response Studies for PROSPECT Experiment**
Prairie Section American Physical Society Meeting (PSAPS), Notre Dame University, South Bend, IN, USA, Nov 21, 2015

[1] **PROSPECT: A Precision Reactor Oscillation and Spectrum Experiment**
New Perspectives Conference, Fermilab, Chicago, IL, USA, Jun 8, 2015

Significant Refereed Publications

(Publications where I made significant contributions)

[10] **High sensitivity neutrinoless double-beta decay search with one tonne-year of CUORE data**

CUORE Collaboration, arXiv:2104.06906 (*Currently under peer review*)

Contribution: Mentored a team of students to perform efficiency analysis crucial for $0\nu\beta\beta$ search

[9] **CUORE Opens the Door to Tonne-scale Cryogenics Experiments**

CUORE Collaboration, PPNP (2021) 103902

Contribution: Primary co-author and coordinator of the manuscript

[8] **Improved Limit on Neutrinoless Double-Beta Decay in ^{130}Te with CUORE**

CUORE Collaboration, Phys. Rev. Letter. 124, 122501 (2020)

Contribution: Performed efficiency analysis crucial for $0\nu\beta\beta$ search

[7] **Diagnosing the Reactor Antineutrino Anomaly with Global Antineutrino Flux Data**

C. Giunti, Y.F. Li, B.R. Littlejohn, P.T. Surukuchi, Phys. Rev. D 99, 073005 (2019)

Contribution: Analysed and interpreted global neutrino data

[6] **Measurement of the Antineutrino Spectrum from ^{235}U Fission at HFIR with PROSPECT**

PROSPECT Collaboration, Phys. Rev. Lett. 122, 251801 (2019)

Contribution: Performed cross-checks and interpreted results

[5] **A Low Mass Optical Grid for the PROSPECT Reactor Antineutrino Detector**

PROSPECT Collaboration, JINST 14, P04014 (2019)

Contribution: Instrumentation lead and primary co-author of the paper

- [4] **The PROSPECT Reactor Antineutrino Experiment**
 PROSPECT Collaboration, Nuclear Inst. and Methods in Physics Research, A (2018), Pages 287-309
Contribution: Performed simulation and contributed to writing of manuscript
- [3] **First search for short-baseline neutrino oscillations at HFIR with PROSPECT**
 PROSPECT Collaboration, Phys. Rev. Lett. 121 251802 (2018)
Contribution: Coordinated and performed primary analysis
- [2] **Prospects for improved understanding of isotopic reactor antineutrino fluxes**
 Y. Gebre, B. R. Littlejohn, P. T. Surukuchi, Phys. Rev. D 97, 013003 (2017)
Contribution: Primary analyzer and corresponding author
- [1] **The PROSPECT Physics Program**
 PROSPECT Collaboration, J. Phys. G: Nucl. Part. Phys. 43 113001 (2016)
Contribution: Performed simulation and contributed to writing of manuscript

Other Refereed Publications

- [17] **PROSPECT-II Physics Opportunities**
 PROSPECT Collaboration, arXiv:2107.03934 (*Accepted by PRL, undergoing proof edits*)
- [16] **Joint Measurement of the ^{235}U Antineutrino Spectrum by PROSPECT and STEREO**
 PROSPECT and STEREO Collaborations, arXiv:2107.03371 (*Currently under peer review*)
- [15] **Joint Determination of Reactor Antineutrino Spectra from ^{235}U and ^{239}Pu Fission by Daya Bay and PROSPECT**
 Daya Bay and PROSPECT Collaborations, arXiv:2106.12251 (*Currently under peer review*)
- [14] **Bayesian Analysis of a Future Beta Decay Experiment's Sensitivity to Neutrino Mass Scale and Ordering**
 Project 8 Collaboration, Phys. Rev. C 103 (2021) 6, 065501
- [13] **Measurement of the $2\nu\beta\beta$ Decay Half-Life of ^{130}Te with CUORE**
 CUORE Collaboration, Phys. Rev. Lett. 126 (2021) 17, 171801
- [12] **Search for Double-Beta Decay of ^{130}Te to the 0^+ States of ^{130}Xe with CUORE**
 CUORE Collaboration, Eur. Phys. J. C volume 81 (2021) 567
- [11] **Characterization of cubic $\text{Li}_2^{100}\text{MoO}_4$ crystals for the CUPID experiment**
 CUPID Collaboration, Eur. Phys. J. C 81 (2021) 2, 104
- [10] **A CUPID $\text{Li}_2^{100}\text{MoO}_4$ scintillating bolometer tested in the CROSS underground facility**
 CUPID Collaboration, JINST 16, P02037 (2021)
- [9] **A novel technique for the study of pile-up events in cryogenic bolometers**
 CUPID Collaboration, Phys. Rev. C 104, 015501 (2021)
- [8] **Limits on Sub-GeV Dark Matter from the PROSPECT Reactor Antineutrino Experiment**
 PROSPECT Collaboration, Phys. Rev. D 104 (2021) 1, 012009
- [7] **Improved Short-Baseline Neutrino Oscillation Search and Energy Spectrum Measurement with the PROSPECT Experiment at HFIR**

PROSPECT Collaboration, Phys. Rev. D 103, 032001 (2021)

[6] **Nonfuel antineutrino contributions in the ORNL High Flux Isotope Reactor**
PROSPECT Collaboration, Phys.Rev.C 101 (2020)

[5] **The Radioactive Source Calibration System of the PROSPECT Reactor Antineutrino Detector**
PROSPECT Collaboration, Nuclear Inst. and Methods in Physics Research, A (2019), 162465

[4] **Lithium-loaded Liquid Scintillator Production for the PROSPECT experiment**
PROSPECT Collaboration, JINST 14, P03026 (2019)

[3] **Performance of a segmented ^6Li -loaded liquid scintillator detector for the PROSPECT experiment**
PROSPECT Collaboration, arXiv:1805.09245, JINST 13, P06023 (2018)

[2] **Background radiation measurements at high power research reactors**
PROSPECT Collaboration, Nuclear Inst. and Methods in Physics Research, A (2016), pp. 401-419

[1] **Light collection and pulse-shape discrimination in elongated scintillator cells for the PROSPECT reactor antineutrino experiment**
PROSPECT Collaboration, JINST 10, P11004 (2015)

Proposals, Reports, and Preprints

[3] **Note on arXiv:2005.05301, 'Preparation of the Neutrino-4 experiment on search for sterile neutrino and the obtained results of measurements'**
PROSPECT Collaboration and STEREO Collaboration, arXiv:2006.13147

[2] **CUPID pre-CDR**
CUPID Collaboration, arXiv:1907.09376

[1] **PROSPECT - A Precision Reactor Oscillation and Spectrum Experiment at Short Baselines**
PROSPECT Collaboration, arXiv:1309.7647

Technical Skills

Programming Languages	C, C++, ROOT, Bash, Java, LaTeX Mathematica, Python, MySQL, PostgreSQL, Geant4
Platforms	Linux, Mac OSX, Microsoft Windows
Tools and Technologies	AutoCAD Inventor, Microsoft Office, Additive manufacturing techniques

Other Work Experience

2012 - 2015	IT Manager TechNews, student-run newspaper at Illinois Institute of Technology, Chicago, IL, USA
2012 - 2014	Help Desk Assistant Office of Technical Services, Illinois Institute of Technology, Chicago, IL, USA
2010 - 2011	Assistant Systems Engineer Tata Consultancy Services, Mumbai, India

Languages

English	Full professional proficiency
Hindi	Native proficiency
Telugu	Native proficiency

References available upon request