Summer Undergraduate Research Fellowship (SURF)
National Institute of Standards and Technology

STUDENT APPLICATION FORM

(To be completed by the student applicant and included with the completed institutional application package. DO NOT SEND Separately.)

Application Deadline: **February 12, 2018**

APPLICANT INFORMATION

Name: Nitschelm (Last) Charlie (First) James (Middle Name)

Permanent Address: 384 Peverly Hill Road
Street Address or PO Box, Apartment #, etc.

Portsmouth (City) NH (State (Abbreviation)) 03801 (Zip Code)

Telephone: (603) 923-9079 (Quickest Contact Number (xxx-xxx-xxxx))

Email: cjn1012@wildcats.unh.edu (Primary email address)

Citizenship: (●) U.S. Citizen ( ) Permanent U.S. Resident (with a valid Green Card)

NOTE: SURF participants **MUST** be U.S. citizens or Permanent Residents

ACADEMIC INFORMATION

***Please submit unofficial transcripts only.**

Name of College/University: University of New Hampshire

Current Class Standing (check only one): ( ) Freshman (●) Sophomore ( ) Junior ( ) Senior

Major/Minor: Mechanical Engineering / Physics **Overall GPA:** 3.84

Do you have experience with computer languages? (●) **Yes** ( ) **No**

If so, please describe *briefly* in the provided space. Please include specific details in your resume.

Python - Summer 2017 Research
Matlab - Introduction to Engineering Computing Course (Spring 2018)

SURF PROGRAM LOCATION

Which location(s) are you applying to for SURF 2018? (Note, the SURF Program accepts ~20 applicants at Boulder and ~120 applicants at Gaithersburg annually)

( ) Boulder (●) Gaithersburg ( ) Both

**Complete research preference based on previously selected NIST location ONLY.

HOUSING

If accepted, will you require housing?

[ ] Yes for Boulder [✓] Yes for Gaithersburg [ ] No

Gender (for housing purposes only)

( ) Female (●) Male

**Note: *Participants should expect to share a bedroom with one other student.*
*Local students will **ONLY** receive housing under special circumstances.*

Name: Nitschelm (Last) Charlie (First) University of New Hampshire (University Name)

BOULDER SURF RESEARCH PREFERENCE

List (by reference number) the 6 research opportunities which you are most interested in order of preference. Include opportunities from at least two different divisions. (Go to https://www.nist.gov/surf/surf-boulder/research-opportunities for the current list of research opportunities.)

1	2	3	4	5	6

Are you available for the entire 11-week SURF Program in Boulder, CO on May 21, 2018-August 3, 2018?

◯ Yes ◯ No

If no, give availability dates. **Total amount of time must span 11 weeks.

NOTE: ***All students must attend through August 3, 2018.***

GAITHERSBURG SURF RESEARCH PREFERENCE

Select from the dropdown menu, the 2 research opportunities (by laboratory name) in which you are most interested in order of preference. Try to include opportunities from at least two different laboratories. (Go to https://www.nist.gov/surf/surf-gaithersburg/research-programs for a description of each laboratory.)

1	2
MML/NCNR Materials Science	PML-Electrical Engineering

Are you available for the for the entire 11-week SURF program in Gaithersburg, MD?
(May 29, 2018 – August 10, 2018)

◉ Yes ◯ No

If no, give availability dates.

**Limited number of 9-week fellowships available (June 11, 2018 – August 10, 2018).

NOTE: All students must attend through August 10, 2018.

PREVIOUS SURF EXPERIENCE

Have you participated in the SURF program at NIST previously? ◯ Yes ◉ No

If yes, please indicate: Year (s): Location: ◯ Boulder ◯ Gaithersburg

Mentor's Name:

If you were to return, would you prefer to work with the same mentor?

◯ Yes ◯ No ◯ No Preference

SPECIAL SKILLS

Do you have experience working in a laboratory? ◉ Yes ◯ No

If so, please describe *briefly* in the provided space. Please include specific details in your resume.

Will begin working on the Mechanics, Materials, and Manufacturing Research Group - February 2018

List any other special skills not included above (e.g., tutoring, extracurricular activities, leadership positions):

Founder of UNH SEDS - Rocketry Organization
Bass and Beatbox in an all-male a Cappella group, Not Too Sharp

Name: Nitschelm (Last) Charlie (First) University of New Hampshire (University Name)

TERMS & Conditions
Please provide your initials by each statement below to acknowledge that you have read the statements below and plan to abide by the conditions.
CN If invited to participate in the NIST SURF Program, I acknowledge that I must indicate in this application if I require housing. I will not have the opportunity to request housing once my application is submitted.
CN If invited to participate in the NIST SURF Program, I acknowledge that I am required to undergo a background check which includes fingerprinting.
CN If invited to participate in the NIST SURF Program, I acknowledge that I will provide the required federal identification for entry to NIST on the first day of the program established under the REALID Act of 2005. Drivers' licenses from the following states and territories will NOT be accepted for entry to NIST: American Samoa, Arizona, and Louisiana. In addition, only enhanced drivers' licenses (identified by the American flag on the face of the card) will be accepted from the following three states: Minnesota, New Hampshire, and New York state. Individuals without licenses from compliant jurisdictions may present alternative forms of identification such as an unexpired U.S. Passport.

Application Deadline: February 12, 2018

Checklist:

- ✔ Resume (Important: be sure to include any laboratory skills or computer laguages, etc.)
- ✔ Personal Statement of Commitment to participate (includes research interest)
- ✔ Two letters of recommendation
- ✔ Transcripts (unofficial acceptable)
- ✔ Verificiation of US citizenship or permanent legal residence (e.g. legible copy of birth certificate, passport, or green card)

Please submit this application and the items listed in the checklist above to your University Contact for inclusion with institutional application–DO NOT SEND SEPARATELY.

SURF Program Contact: Dr. Brandi Toliver, Email: brandi.toliver@nist.gov
Website: http://www.nist.gov/surf

Note: This collection of information contains Paperwork Reduction Act (PRA) requirements approved by the Office of Management and Budget (OMB). Notwithstanding any other provisions of the law, no person is required to respond to, nor shall any person be subject to a penalty for failure to comply with, a collection of information subject to the requirements of the PRA unless that collection of information displays a currently valid OMB control number. Public reporting burden for this collection is estimated to be 60 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed and completing and reviewing the collection of information. **OMB Control No. 0693-0042 Expiration Date: 10-31-2018**

linkedin.com/in/cjnitschelm/

Charlie Nitschelm

384 Peverly Hill Road, Portsmouth, NH 03801 • (603) 923-9079 • Charlie6055@gmail.com

Objective: Find an internship or research position pertaining to materials science or aerospace engineering

Education:

University of New Hampshire – *College of Engineering and Physical Sciences* **Aug. 2016 – May 2020, anticipated**
GPA: **3.84/4.0** | Honors Program | B.S, Mechanical Engineering | Physics Minor

Tech Skills: Microsoft Suite | Solidworks | Python | MATLAB | Lean & VSM | GD&T | Machining

Experience:

UNH Institute for the Study of Earth, Oceans, and Space **May 2017 – August 2017**
Researcher

- Used Python to conduct a systematic search of the COMPTEL data for evidence of polarization from solar flares
- Organized necessary data sets and developed tools that will be needed for analysis
- Using the COMPTEL field-of-view, determined the number of source and background counts for that event, and then used simulations to estimate the polarization sensitivity for that event
- Created a systematic analysis of all gamma ray bursts that took place within the COMPTEL field-of-view

Shoal Interactive, LLC **January 2017 – present**
Business and Marketing Intern

- Attend weekly meetings to decide business and product decisions with the team
- Assist with the applications user interface and administrative writing
- Lead major marketing campaigns to neighboring towns for the release of our Coupler's alpha

Relevant Orgs:

UNH Students for the Exploration and Development of Space **Mar. 2017 – present**
Co-Founder, CTO, Head of Rocket Propulsion

- Lead overall managerial duties of the organization including running all meetings and overseeing the goals of the organization
- Foster a learning environment for all and manage all outreach and networking events
- Head the design and manufacturing for the rocket propulsion team, which includes a two-stage solid rocket booster
- Manage all tech leads to create a high-altitude rocket to participate in the University Student Rocketry Competition in September. 2018

UNH LunaCats **Sept. 2016 – May 2017**
Electrical Team Member

- Designed, fabricated and coded a robotic excavator to compete in NASA's Robotics Mining Competition
- Assembled and tested the electronics box so the rover can successfully compete at Kennedy Space Center for the 2017 NASA sponsored Robotics Mining Competition

UNH Precision Racing **Sept. 2016 – May 2017**
Secretary, Powertrain Engineer

- Maintained all relations to the college and the surrounding community by providing outreach and an end-of-year banquet to all our supporters
- Assisted the design of the intake system and catch cans

STEMbassadors **Sept. 2016 – present**
Member Lead in the Robotics Activity

- Volunteer in the New Hampshire area to inspire the next generation of engineers and problem solvers
- Run the World of Robotics activity where students can experiment with gear ratios and different wheel choices

Other Skills: Project Management | Organizational Leadership | Creativity and Problem-Solving | Communication

Official Academic Transcript from

University of New Hampshire

Statement of Authenticity
This official academic transcript has been delivered to you through eSCRIP-SAFE, the Global Electronic Transcript Delivery Network, provided by Credentials eScrip-Safe, 9435 Waterstone Blvd, Suite 260, Cincinnati, OH 45249, 1-847-716-3805. Credentials eScrip-Safe has been appointed and serves as the designated delivery agent for this sending school, and verifies this sender is recognized by the accreditation source identified below

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Sending School Information

University of New Hampshire
Elizabeth Smith
Stoke Hall
11 Garrison Avenue
Durham, NH 03824
Telephone: 603-862-1593
School Web Page: http://unh.edu/
Accreditation: New England Association of Schools and Colleges, Comm on Institutions of Higher Ed (NEASC-CIHE)

Student Information

Student Name: Charlie James Nitschelm
Numeric Identifier: 936785333
Birth Date: Not Provided By the Sending School
Student Email: cjn1012@wildcats.unh.edu

Receiver Information

cjn1012@wildcats.unh.edu

Document Information

Transmitted On: Fri, 19 January 2018
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UNIVERSITY OF NEW HAMPSHIRE

SSN: ***-**-6736 ID: 936785333 Date of Birth: 30-APR Date Issued: 19-JAN-2018

Record of: Charlie James Nitschelm
Current Name: Charlie James Nitschelm
384 Peverly Hill Road
Portsmouth, NH 03801

Issued To: Charlie James Nitschelm
cjn1012@wildcats.unh.edu
Student email:
cjn1012@wildcats.unh.edu

Course Level: Undergrad degree

Current Program
College : Engineering&Physical Sciences
Major : Mechanical Engineering

SUBJ	NO.	COURSE TITLE	CRED	GRD	PTS	R
TRANSFER CREDIT ACCEPTED BY THE INSTITUTION:						
201610		College Board Examinations				
MATH	425	Calculus I AP	4.00	TCR		
MATH	426	Calculus II AP	4.00	TCR		
PHYS	401	Introduction to Physics I AP	4.00	TCR		
Ehrs: 12.00 GPA-Hrs: 0.00 QPts: 0.00 GPA: 0.00						
INSTITUTION CREDIT:						
Fall 2016						
Engineering&Physical Sciences						
Mechanical Engineering						
ENGL	401	First-Year Writing	4.00	A	16.00	
EREC	411	Envrnmntl&Res Econ Perspectves	4.00	A	16.00	
MATH	527	Diff Equation w/Linear Algebra	4.00	A	16.00	
PHYS	407S	General Physics I Studio	4.00	A	16.00	
Ehrs: 16.00 GPA-Hrs: 16.00 QPts: 64.00 GPA: 4.00						
Spring 2017						
Engineering&Physical Sciences						
Mechanical Engineering						
CHEM	405	Chem Principles for Engineers	4.00	A-	14.68	
MATH	528	Multidimensional Calculus	4.00	A	16.00	
ME	477	Introduction to Solid Modeling	1.00	A	4.00	
PHYS	408	General Physics II	4.00	A	16.00	
THDA	440A	Honors/Theatre &Social Justice	4.00	A-	14.68	
Ehrs: 17.00 GPA-Hrs: 17.00 QPts: 65.36 GPA: 3.84						
Fall 2017						
Engineering&Physical Sciences						

********** CONTINUED ON NEXT COLUMN **********

Term Information continued:
Mechanical Engineering

SUBJ	NO.	COURSE TITLE	CRED	GRD	PTS	R
HIST	444J	Honors/Global Citizenship	4.00	A	16.00	
ME	503	Thermodynamics	3.00	A	12.00	
ME	525	Statics	3.00	A	12.00	
ME	561	Intro to Materials Science	4.00	B	12.00	
PHYS	405	Intro to Modern Astronomy	4.00	A-	14.68	
Ehrs: 18.00 GPA-Hrs: 18.00 QPts: 66.68 GPA: 3.70						
January 2018						
IN PROGRESS WORK						
ME	795	Top/Industrial Skills & Eng	3.00	IN PROGRESS		
In Progress Credits 3.00						
Spring 2018						
IN PROGRESS WORK						
BIOL	444B	Honors/Current Issues in Biol	4.00	IN PROGRESS		
HUMA	440B	Honors/That Belongs in aMuseum	4.00	IN PROGRESS		
IAM	550	Intro to Engineering Computing	4.00	IN PROGRESS		
ME	526	Mechanics of Materials	3.00	IN PROGRESS		
PHYS	615	Mechanics/Mathematical Phys I	4.00	IN PROGRESS		
TECH	602	Machine Shop Training	1.00	IN PROGRESS		
In Progress Credits 20.00						

********** TRANSCRIPT TOTALS **********

	Earned Hrs	GPA Hrs	Points	GPA
TOTAL INSTITUTION	51.00	51.00	196.04	3.84
TOTAL TRANSFER	12.00	0.00	0.00	0.00
OVERALL	63.00	51.00	196.04	3.84

********** END OF TRANSCRIPT **********

Andrew Colby, University Registrar

From University of New Hampshire to cjn1012@wildcats.unh.edu on 01/19/2018 03:50 PM TRAN0000013637870

Office of the Registrar
University of New Hampshire
Stoke Hall
11 Garrison Avenue
Durham, NH 03824-3511
(603) 862-1587

Graduate School
University of New Hampshire
Thompson Hall
105 Main Street
Durham, NH 03824-2512
(603) 862-3000

University of New Hampshire
School of Law
2 White Street
Concord, NH 03301-4115
(603) 228-1541

The University of New Hampshire and the University of New Hampshire School of Law transcript keys may be viewed at http://www.unh.edu/registrar/grades-transcripts/transcript-keys.html.

From University of New Hampshire to cjn1012@wildcats.unh.edu on 01/19/2018 03:50 PM TRAN0000013637870

Charlie Nitschelm
384 Peverly Hill Road
Portsmouth, NH 03801
603-923-9079

Personal Statement

October 22, 2017

100 Bureau Drive
Gaithersburg, MD 20899

Dear NIST SURF team,

I fell in love with engineering when I became a founding member of a FIRST robotics team that was started during my senior year of high school. When the FIRST season was over, I felt the need to continue building on my engineering skills. I began to experiment with model rocketry, which is still my hobby. I converted my longboard to be electric. I welded the motor mount onto the back truck and hooked a Turnigy electric motor to it. I used an electronic speed controller paired with a transmitter and receiver to control the acceleration and breaking of the board. I learned how lithium polymer batteries worked and hooked two 5000 mAh batteries in parallel to power it. I began to realize that I naturally gravitated to math and science in high school and constantly surrounded myself with various engineering projects. I knew I wanted to continue my education in mechanical engineering, but I did not know what I wanted to do with a mechanical engineering degree. I began to explore my options for a career when I picked up an unexpected past-time, reading.

Reading became a big part of my life in university. I started to replace all my time wasters including scrolling through Facebook and TV shows with reading. The first book I read, *Space Chronicles* by Neil deGrasse Tyson, sparked a huge transformation of the interests in my life. For most, it is scary to think of something so huge and complex. I see opportunity. I see an adventure waiting to happen. It empowers me to join the force for space exploration and be at the forefront of human adventure. Reading books that let me explore the universe continues to inspire and invigorate me. It fills me with hope for the future. It is what made me fall in love with astronomy, physics and, ultimately, aerospace engineering.

I have nearly 3 years of experience leading organizations, with my current one being an aerospace engineering organization. As co-founder and Chief Technical Officer of UNH Students for the Exploration and Development of Space (SEDS), I have developed a skill set that allows me to understand my organization members' personalities and commitments to better manage the team. Teamwork is a skill that can only be learned in practice and having experience in engineering projects has helped me be a better communicator and team player. As head of propulsion at UNH SEDS, I gained experience in running design meetings and detailing expectations for each member in my group. In my research position this past summer through a research award, I was able to gain experience in data analysis using Python and the experience has given me a better understanding of the process of research and working under deadlines.

To move forward onto new research, I have set my sights on the NIST SURF program. During the fellowship, I would be able to begin research on material deformation. From completing Materials Science this past semester, I have become fascinated by the subject. It would be an honor to apply my knowledge into real world applications at NIST. The research experience would not stop after my involvement with NIST. I would be able to present my findings at various conferences and continue the research into the Fall semester. The communication of results is important to the engineering profession and I have made it a personal goal to continue to improve that area through my time as an undergraduate and beyond.

If you have any questions about my application, do not hesitate to contact me.

Sincerely,

Charlie Nitschelm

Undergraduate – Mechanical Engineering

Cjn1012@wildcats.unh.edu

603-459-3300

University of New Hampshire

College of Engineering and Physical Sciences
Department of Mechanical Engineering

Kingsbury Hall, W101
33 Academic Way
Durham, NH 03824

V: 603.862.1352
F: 603.862.1865
TTY: 7.1.1 (Relay NH)

Dear NIST Program Committee:

I have known Charlie Nitschelm since August 2017. I am the instructor for his Thermodynamics class at the University of New Hampshire (UNH) and my impression is that he is in the top 5% of his class. Charlie excels in and outside of class and has a warm, friendly personality, and has exceptional scientific curiosity.

Charlie is easily one of the top students in the class that I am teaching. He grasps all the concepts which many other students struggle with. He often asks questions that reveal his profound understanding of the material and genuine scientific and engineering curiosity. Although he is a sophomore, we have had class-related conversations which many juniors and seniors would struggle to follow.

Charlie is a good team player who cares about his fellow students. I vividly remember how once during office hours he quickly grasped a concept that another student struggled with. Charlie helped the other student understand the concept and offered to help the student further after the office hours. Charlie is considerate – he stays far ahead of schedule in the class but is also humble and gives the opportunity to other students to participate in class. Charlie is not shy though – he asks questions when he occasionally does not understand something – I find this very helpful as often times the rest of the class would have the same question.

Charlie is the founder and president of a university organization called UNH Students for the Exploration and Development of Space. I was recently made aware of the club at an event at our college and was very intrigued by the high-altitude multi-stage rocket project that the club members are working on. Charlie has managed to recruit undergraduates from multiple majors and I am confidents in the success of the project.

I believe that with his academic potential, leadership skills, and kind personality, Charlie will be an excellent fit for the NIST program, and I highly recommend him.

Please do not hesitate to contact me if you have any questions.

Sincerely,

Ivaylo Nedyalkov (Ivo)

University of New Hampshire

College of Engineering and Physical Sciences
Department of Mechanical Engineering

Kingsbury Hall, W101
33 Academic Way
Durham, NH 03824

V: 603.862.1352
F: 603.862.1865
TTY: 7.1.1 (Relay NH)

February 8, 2018

Reference for Charlie Nitschelm

Charlie was a student in a class I just finished teaching to 26 students entitled ME 561 – Introduction to Materials Science. He sits in the front row, comes to most classes, and asks pertinent and thoughtful questions. He received a B in my class, his first grade that was not an A or A- (I guess I'm a hardass). He is a confident and thoughtful student who takes responsibility for his learning successes and failures. ME 561 is a required class for mechanical engineers and many of them view it as an undesirable class similar to chemistry.

He is also a sophomore team member of a team competing in a rocket building competition. He has exhibited strong drive in helping the team achieve their goals. When we have met, Charlie is engaged, listens well, and thinks well on his feet. He is more mature in his thought processes than most of his peers but has not yet gone through the transition in academic performance strategies I see for most students after their Sophomore year (which he has not yet completed).

Charlie is one of those highly motivated and confident people who I believe are capable of achieving excellence in the areas they consider to be important. He attaches significant importance to schoolwork but it does not always appear to be his highest priority. He is highly focused on the rocket team and, while he does not ignore his studies, I think his participation on the team may displace some of his focus on schoolwork. That being said, his high academic achievement, a GPA of 3.84/4 so far, indicates he is highly intelligent and capable of multi-tasking with a great degree of success.

So far, Charlie is a top student who exhibits the ability to focus on multiple areas with creativity and excellence. He has an entrepreneurial flair. I view Charlie as a highly desirable candidate for the NIST program.

Regards,

Todd S. Gross
Professor of Mechanical Engineering
todd.gross@unh.edu