

Science Undergraduate Laboratory Internships (SULI)

Summer 2022 - Application for: Jeremiah Jin Hwan Ockenfuss

APPLICANT PROFILE

General Applicant Information

First Name: Jeremiah

Middle Name: Jin Hwan

Last Name: Ockenfuss

Previous Last Name(s):

Primary Email Address: jockenfu@ucsc.edu

Alternate Email Address 1: jeremiah86jo@gmail.com

Alternate Email Address 2:

ORCID: [0000-0002-2140-6312](https://orcid.org/0000-0002-2140-6312)

Current Address

Primary Phone Number: 707-696-0046

Alternate Phone Number:

Citizenship/Languages/Eligibility Information

I will be 18 years of age or older by the time the internship begins: Yes

Are you a U.S. Citizen? Yes

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EDUCATIONAL BACKGROUND

Academic Information

Are you currently attending a community college or 2-year college? No

Current academic status: Junior

If you are selected as a participant in this DOE program, will you receive academic credit from your university/college for participating? No

Undergraduate Institution Information

College/University Country: United States and U.S. Territories

College/University State/Province/Territory: California

College/University Name: University of California-Santa Cruz

College/University Address: 1156 High St

College/University City: Santa Cruz

College/University Zip Code: 95064

Expected/Declared Major: Physical Sciences - Physics

Minor and/or Concentration Expected/Declared: Mathematics

Expected Degree From This College/University: Bachelor's

Expected/Completed Graduation Date: June / 2023

Transcript: SSR_TSRPT.pdf

Does this institution provide grades? Yes

GPA Scale: 4.0

Total Attempted Credits: 118.00

Total Earned Credits: 118.00

Total Quality Points: 500.71

GPA: 4.24

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Science, Technology, Engineering and Mathematics (STEM) Courses

Course Title: Electricity, Magnetism, and Optics

Course Number: PHYS 110B

Enrollment Status: Currently Enrolled

Course Title: Particle Physics and Astrophysics

Course Number: PHYS 129

Enrollment Status: Currently Enrolled

Course Title: Physics Advanced Laboratory

Course Number: PHYS 134

Enrollment Status: Planning to Enroll

Course Title: Quantum Mechanics I

Course Number: PHYS 139A

Enrollment Status: Recently Completed

Course Title: Thermodynamics and Statistical Mechanics

Course Number: PHYS 112

Enrollment Status: Currently Enrolled

Awards or Honors

Award Title: Koret Scholarship

Month & Year Received: November / 2021

Awarding Institution: University of California Santa Cruz

High School Graduation or GED

Date of High School Graduation or GED: May / 2019

Country: United States

City: Santa Rosa

State/Province/Territory: CA

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WORK EXPERIENCE & SKILLS

Professional Associations

Are you a member of any
professional organizations?

No

Computer Skills

Computer related skills:

- Python (intermediate)
 - numpy, matplotlib, pandas, etc...
 - jupyter notebooks
- ROOT (basic)
- LaTeX (intermediate)
- Git (basic)
- MATLAB (basic)
- Excel (basic)
- Linux (basic)

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PROGRAM INFORMATION

Eligibility

Have you previously participated in 2
SULI appointments? No

Previous DOE Internship/Fellowship Experience

Have you ever had an
internship/fellowship with the
Department of Energy or any of its
National Laboratories? No

Availability

What is the earliest date you can
begin your internship? 6/12/2022

When do you need to complete your
internship? 9/10/2022

First Choice Host DOE Laboratory

DOE Laboratory: Lawrence Berkeley National Laboratory (LBNL)

First Choice Research Area: High Energy Physics

Second Choice Research Area: Nuclear Physics

Third Choice Research Area: Atomic, Molecular, and Optical Sciences

Second Choice Host DOE Laboratory

DOE Laboratory: Thomas Jefferson National Accelerator Facility (TJNAF)

First Choice Research Area: Nuclear Physics

Second Choice Research Area: Accelerator Physics/Science

Third Choice Research Area: High Energy Physics

Relatives Employed at DOE Laboratories

Are you a relative of an employee at
the proposed host DOE laboratories? No

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ESSAYS

Research Experience:	<p>My previous research experience was physics research at my home institution of UC Santa Cruz. This research started in Summer 2021 and is still ongoing. For this project, I'm collaborating with another undergraduate student under Professor Jason Nielsen to study simulated collisions. In particular we are analyzing Higgs boson production via vector boson fusion. We started out by learning the basics of ROOT and creating plots of various kinematic variables. To aid in collaboration, we learned how to use Git and GitLab to properly share code and manage versions. One early project was a primitive event display for the Higgs events we are studying. The next step was writing basic event selection code, whose purpose is to filter out certain events to maximize the signal-to-background ratio. Background events are events with the same final product as the signal, so it is hard to distinguish between the two and establish statistical significance. However, since signal and background events stem from different processes, certain kinematic variables will differ, allowing us to filter out a lot of the background. We are currently working on optimizing our event selection code by fine tuning certain parameters. In the upcoming Winter quarter we are planning on learning about machine learning to assist us in the optimization process.</p> <p>In terms of independence, Professor Nielsen guides us through the necessary physics and motivates each task we are given, however most of the work and coding is left for us to figure out. In a weekly meeting we present and discuss the work we did that week and figure out what should be done next. There are often multiple important tasks to be completed, and it is up to my partner and I to decide who's doing what and to communicate our methods and findings throughout the week.</p>
Research Interests:	<p>I chose LBNL and Jefferson Lab because they both had very interesting research. A factor as to why I chose LBNL as my first choice is its location. I live in the bay area so traveling there would be very easy.</p> <p>In terms of research I am mainly interested in particle physics and nuclear physics. My current research is in particle physics and I find it very interesting and I would love to learn more about it. In particular my research seems most similar to the LBNL ATLAS group's work with the Higgs boson. However, I am hoping to broaden my experience as much as possible, so I may prefer doing research that is not available at my home institution. In particular, nuclear physics sounds pretty interesting, hence why I chose Jefferson Lab and also put down nuclear physics as my second choice research area in my application. In particular, for LBNL, the ATLAS group's research seems interesting as well as the neutrino research. For Jefferson Lab, I found the discussion on the website about the structure of the proton and neutron very interesting.</p>
Personal Experience:	<p>First off, I am prepared for this program through my previous research experience at UCSC (described in detail in my "Research Experience" essay). During my research, I gained experience collaborating with an advisor and another undergraduate student. I also gained familiarity with ROOT for data analysis, Git/GitLab to share and collaborate on code, and a bit of Linux as well. We also plan on using some machine learning, although this is an ongoing project at the time of writing. Also, as part of a scholarship I received, I will be doing a presentation on this research in the spring, which will be good practice for the presentation I'll have to give for the SULI program.</p> <p>I am also well prepared for this program in terms of my coursework. By this summer I will have taken all of the core physics courses required for my undergraduate degree, as well as an elective course on particle physics. Additionally, I have earned near straight A+'s in all of the classes I have taken thus far, so I have an undergraduate level of mastery over all of these subjects. This academic performance also reflects my passion for physics and the hard work I put in as a result. I am excited and ready to learn as much as possible in order to contribute to research during this program.</p>
Professional Goals:	<p>After I finish my undergraduate degree, my goal is to go to graduate school and earn a PhD in physics. I'm not fully decided on what field of physics I would like to specialize in yet, and I hope that participating in the SULI program will help me make this decision. I find my current research in</p>

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particle physics very interesting and would love to learn more about this field and whether I want to further pursue it through this program. However, I am very open to trying out new fields, like nuclear physics perhaps, to broaden my research experience as much as possible before I need to decide what to specialize in.

Doing a PhD in physics is largely about doing research, so getting research experience, in any field, through this program will be great preparation for me. First there are many technical research skills I need more experience in like experimental techniques, computer skills, data analysis, and using laboratory equipment. The SULI program will also give me experience in collaborating on research. Effectively collaborating with my advisor, peers, and other researchers will be vital to my success in graduate school, so being able to work with professional researchers from outside my home institution will be a great experience to have under my belt. The SULI program also will give me valuable experience presenting my research through the poster presentation and the research project report we need to make.

RECOMMENDATIONS

Recommendation 1: **First Name:** Jason
Last Name: Nielsen
Email: jnielsen@ucsc.edu
Status: Received 1/11/2022

Recommendation 2: **First Name:** Mike
Last Name: Hance
Email: mhance@ucsc.edu
Status: Received 1/4/2022

*** UNOFFICIAL ***

Name: Ockenfuss, Jeremiah Jin Hwan
Student ID: 1730955

Institution Info: University of California, Santa Cruz
1156 High Street
Santa Cruz, CA 95064

Test Credits:

Test Credits Applied Toward Undergraduate Program

Test Trans GPA:	0.000	Transfer Totals:	Attempted 16.000	Earned 16.000	Points 0.000
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Beginning of Undergraduate Record

2019 Fall Quarter

Program: Undergraduate
Plan: Physics
Plan: Charles E. Merrill College

Course	Description	Attempted	Earned	Grade	Points
MATH 19B	Calc:Sci,Engin,Math	5.00	5.00	A+	20.000
MERR 1	ALE:ReadSelves/World	5.00	5.00	A	20.000
PHYS 5A	Intro Physics I	5.00	5.00	A+	20.000
PHYS 5L	Intro Phys I Lab	1.00	1.00	A+	4.000

Term Honor: Dean's Honors

Academic Standing Effective 12/20/2019: Good Standing

		Attempted	Earned	GPA Units	Points
Term GPA	4.00	Term Totals	16.00	16.00	64.000
Transfer Term GPA		Transfer Totals	16.00	16.00	0.00
Combined GPA	4.00	Comb Totals	32.00	32.00	64.000
Cum GPA	4.00	Cum Totals	16.00	32.00	64.000
Transfer Cum GPA		Transfer Totals	16.00	16.00	0.00
Combined Cum GPA	4.00	Comb Totals	32.00	32.00	64.000

2020 Winter Quarter

Program: Undergraduate
Plan: Physics
Plan: Charles E. Merrill College

Course	Description	Attempted	Earned	Grade	Points
MATH 23A	Vector Calculus	5.00	5.00	A	20.000
PHYS 5C	Intro Physics III	5.00	5.00	A+	20.000
PHYS 5N	Intro Phys III Lab	1.00	1.00	A	4.000
WRIT 1	Intro to Comp	5.00	5.00	A+	20.000

Term Honor: Dean's Honors

Academic Standing Effective 03/23/2020: Good Standing

		Attempted	Earned	GPA Units	Points
Term GPA	4.00	Term Totals	16.00	16.00	64.000
Transfer Term GPA		Transfer Totals	0.00	0.00	0.000
Combined GPA	4.00	Comb Totals	16.00	16.00	64.000
Cum GPA	4.00	Cum Totals	32.00	48.00	128.000
Transfer Cum GPA		Transfer Totals	16.00	16.00	0.000
Combined Cum GPA	4.00	Comb Totals	48.00	48.00	128.000

2020 Spring Quarter

Program: Undergraduate
Plan: Physics
Plan: Charles E. Merrill College

*** UNOFFICIAL ***

Name: Ockenfuss, Jeremiah Jin Hwan
Student ID: 1730955

Course	Description	Attempted	Earned	Grade	Points
CSE 20	Beginning Python	5.00	5.00	A+	20.000
MATH 23B	Vector Calculus	5.00	5.00	A	20.000
PHYS 5B	Intro Physics II	5.00	5.00	A+	20.000
PHYS 5M	Intro Phys II Lab	1.00	1.00	A+	4.000

Term Honor: Dean's Honors

Academic Standing Effective 06/15/2020: Good Standing

		Attempted	Earned	GPA Units	Points
Term GPA	4.00	Term Totals	16.00	16.00	64.000
Transfer Term GPA		Transfer Totals	0.00	0.00	0.000
Combined GPA	4.00	Comb Totals	16.00	16.00	64.000
Cum GPA	4.00	Cum Totals	48.00	48.00	192.000
Transfer Cum GPA		Transfer Totals	16.00	0.00	0.000
Combined Cum GPA	4.00	Comb Totals	64.00	48.00	192.000

2020 Summer Quarter

Program: Undergraduate
Plan: Physics
Plan: Charles E. Merrill College

Course	Description	Attempted	Earned	Grade	Points
MATH 21	Linear Algebra	5.00	5.00	A+	20.000

Academic Standing Effective 09/10/2020: Good Standing

		Attempted	Earned	GPA Units	Points
Term GPA	4.00	Term Totals	5.00	5.00	20.000
Transfer Term GPA		Transfer Totals	0.00	0.00	0.000
Combined GPA	4.00	Comb Totals	5.00	5.00	20.000
Cum GPA	4.00	Cum Totals	53.00	53.00	212.000
Transfer Cum GPA		Transfer Totals	16.00	0.00	0.000
Combined Cum GPA	4.00	Comb Totals	69.00	53.00	212.000

2020 Fall Quarter

Program: Undergraduate
Plan: Physics
Plan: Charles E. Merrill College

Course	Description	Attempted	Earned	Grade	Points
PHYS 5D	Intro Physics IV	5.00	5.00	A+	20.000
PHYS 116A	Math Method Physics	5.00	5.00	A+	20.000
WRIT 2	Rhetoric & Inquiry	5.00	5.00	P	0.000

Term Honor: Dean's Honors

Academic Standing Effective 12/23/2020: Good Standing

		Attempted	Earned	GPA Units	Points
Term GPA	4.00	Term Totals	15.00	10.00	40.000
Transfer Term GPA		Transfer Totals	0.00	0.00	0.000
Combined GPA	4.00	Comb Totals	15.00	10.00	40.000
Cum GPA	4.00	Cum Totals	68.00	63.00	252.000
Transfer Cum GPA		Transfer Totals	16.00	0.00	0.000
Combined Cum GPA	4.00	Comb Totals	84.00	63.00	252.000

2021 Winter Quarter

Program: Undergraduate
Plan: BS in Physics
Plan: Charles E. Merrill College

*** UNOFFICIAL ***

Name: Ockenfuss, Jeremiah Jin Hwan
Student ID: 1730955

Course	Description	Attempted	Earned	Grade	Points
PHYS 102	Modern Physics	5.00	5.00	A+	20.000
PHYS 116B	Math Method Physics	5.00	5.00	A+	20.000
PHYS 133	Intermediate Lab	5.00	5.00	A	20.000

Term Honor: Dean's Honors

Academic Standing Effective 03/23/2021: Good Standing

		Attempted	Earned	GPA Units	Points
Term GPA	4.00	Term Totals	15.00	15.00	60.000
Transfer Term GPA		Transfer Totals	0.00	0.00	0.000
Combined GPA	4.00	Comb Totals	15.00	15.00	60.000
Cum GPA	4.00	Cum Totals	83.00	99.00	78.00
Transfer Cum GPA		Transfer Totals	16.00	16.00	0.00
Combined Cum GPA	4.00	Comb Totals	99.00	99.00	78.00

2021 Spring Quarter

Program: Undergraduate
Plan: BS in Physics
Plan: Charles E. Merrill College

Course	Description	Attempted	Earned	Grade	Points
EART 1	Oceanography	5.00	5.00	A	20.000
PHYS 105	Mechanics	5.00	5.00	A+	20.000
PHYS 116C	Math Method Physics	5.00	5.00	A+	20.000

Term Honor: Dean's Honors

Academic Standing Effective 06/09/2021: Good Standing

		Attempted	Earned	GPA Units	Points
Term GPA	4.00	Term Totals	15.00	15.00	60.000
Transfer Term GPA		Transfer Totals	0.00	0.00	0.000
Combined GPA	4.00	Comb Totals	15.00	15.00	60.000
Cum GPA	4.00	Cum Totals	98.00	114.00	93.00
Transfer Cum GPA		Transfer Totals	16.00	16.00	0.00
Combined Cum GPA	4.00	Comb Totals	114.00	114.00	93.00

2021 Summer Quarter

Program: Undergraduate
Plan: BS in Physics
Plan: Charles E. Merrill College

Course	Description	Attempted	Earned	Grade	Points
MATH 100	Intr Proof/Prb Solv	5.00	5.00	A+	20.000
MATH 181	History Mathematics	5.00	5.00	A+	20.000

Academic Standing Effective 07/28/2021: Good Standing

		Attempted	Earned	GPA Units	Points
Term GPA	4.00	Term Totals	10.00	10.00	40.000
Transfer Term GPA		Transfer Totals	0.00	0.00	0.000
Combined GPA	4.00	Comb Totals	10.00	10.00	40.000
Cum GPA	4.00	Cum Totals	108.00	124.00	103.00
Transfer Cum GPA		Transfer Totals	16.00	16.00	0.00
Combined Cum GPA	4.00	Comb Totals	124.00	124.00	103.00

2021 Fall Quarter

Program: Undergraduate
Plan: BS in Physics
Plan: Charles E. Merrill College

*** U N O F F I C I A L ***

Name: Ockenfuss, Jeremiah Jin Hwan
Student ID: 1730955

Course	Description	Attempted	Earned	Grade	Points
EDUC 60	Schooling, Dem. & Jus.	5.00	5.00	A	20.000
PHYS 110A	Elec, Magnet, Optic	5.00	5.00	A+	20.000
PHYS 139A	Quantum Mechanics I	5.00	5.00	A+	20.000

Term Honor: Dean's Honors

Academic Standing Effective 12/14/2021: Good Standing

		Attempted	Earned	GPA Units	Points
Term GPA	4.00	Term Totals	15.00	15.00	60.000
Transfer Term GPA		Transfer Totals	0.00	0.00	0.000
Combined GPA	4.00	Comb Totals	15.00	15.00	60.000
Cum GPA	4.00	Cum Totals	123.00	139.00	118.00
Transfer Cum GPA		Transfer Totals	16.00	16.00	0.00
Combined Cum GPA	4.00	Comb Totals	139.00	139.00	118.00

Undergraduate Career Totals

Cum GPA:	4.00	Cum Totals	123.00	139.00	118.00	472.000
Transfer Cum GPA		Transfer Totals	16.00	16.00	0.00	0.000
Combined Cum GPA	4.00	Comb Totals	139.00	139.00	118.00	472.000
UC GPA:	4.00					

Non-Course Milestones

American History Requirement

Status: Completed
Program: Undergraduate

American Institutions Requirement

Status: Completed
Program: Undergraduate

Univ. of Calif. Entry Level Writing Requirement

Status: Completed
Program: Undergraduate
Date Completed: 03/26/2020

End of *** U N O F F I C I A L ***

SULI PROGRAM APPLICATION RECOMMENDATION FOR JEREMIAH JIN HWAN OCKENFUSS

Recommender Contact Information

- **First Name:** Michael
- **Last Name:** Hance
- **Title:** Associate Professor
- **Department:** Physics
- **Institution/Organization:** University of California
- **Telephone:**
- **Email:** mhance@ucsc.edu

Applicant Information

Association

Describe your relationship to the applicant, including how long you've known the applicant, where, and in what capacity.

I've known Jeremiah for a few months, as his professor in an upper-division course in Electricity and Magnetism

Applicant Comments

Please provide substantive comments about the applicant's education, training, aptitude, or promise relevant to the SULI program. Include any relevant additional detail or perspective regarding the applicant's research experience or equivalent experience on complex projects, including the level of independence or other factors that would contribute to the applicant's ability to make an excellent contribution to the SULI program.

I am happy to recommend Jeremiah Ockenfuss for admission to your summer research program. Jeremiah is perhaps the strongest student I have encountered in my time teaching at UC Santa Cruz. He is more than ready to move into serious research, and I have no doubt he will be a fantastic addition to a summer research program. He has my highest possible recommendation.

I met Jeremiah in the Fall of 2021, in my class on Electricity and Magnetism for junior-level undergraduates. It's a Griffiths-level course, covering all the way up through Maxwell's equations in a ten-week quarter. Jeremiah's performance was consistently at the top of the class, and he earned nearly every available point on homeworks and exams, easily earning an ``A+" in the course. He was a quiet student who would occasionally make comments in class to clarify a point (often one that I had explained poorly), but clearly mastered the material on an entirely different level from his peers. His performance in the balance of his courses is entirely summarized by his 4.0 GPA, with ``A's" and ``A+'s" across all courses, both in physics and other disciplines. I have seen only one other student with a similar record in my six years at UCSC (that other student has since gone on to graduate program at UC Santa Barbara), and there are no other students in Jeremiah's cohort working at his level.

In talking more with Jeremiah I was happy to learn that he is now working with my colleague Prof. Jason Nielsen on studies of Higgs boson physics at the Large Hadron Collider. I will let Jason comment more on that work, but in hallway discussions with Jason, I have the impression that Jeremiah is just as effective and conscientious in research as he is in the classroom.

In conclusion, I can keep this letter very brief: Jeremiah is one of our very best students at UC Santa Cruz, indeed the best in several years, and I am confident that a summer research program will have a positive and substantial influence on Jeremiah as he prepares for graduate programs and beyond. He has my highest possible recommendation.

Applicant Rating

In comparison to other undergraduate students, please rate the applicant relative to his/her peers on the following qualifications:

	Do Not Know	Below Average	Average	Above Average	Superior
Analytical and Mathematical					X
Experimental Research				X	
Overall Academic					X
Initiative and Self Reliance					X
Motivation toward Scientific Career					X
Originality of Thought					X
Emotional Maturity				X	
Ability to Work with Others				X	
Potential for Leadership				X	
Oral Communication Skills					X
Written Communication Skills					X

SULI PROGRAM APPLICATION RECOMMENDATION FOR JEREMIAH JIN HWAN OCKENFUSS

Recommender Contact Information

- **First Name:** Jason
- **Last Name:** Nielsen
- **Title:** Professor
- **Department:** Physics Department
- **Institution/Organization:** University of California, Santa Cruz
- **Telephone:** 831-459-3457
- **Email:** jnielsen@ucsc.edu

Applicant Information

Association

Describe your relationship to the applicant, including how long you've known the applicant, where, and in what capacity.

I have known Jeremiah since he was a first-year physics major in my introductory physics (mechanics) course at the University of California, Santa Cruz, and I have worked with him most recently on LHC research projects, so I am able to give you a detailed picture of his qualifications and strengths as they apply to the SULI program. I have had the pleasure of mentoring several students from UC Santa Cruz who participated in the SULI program, and Jeremiah is certainly stronger than any of them, in both his academic record and research potential.

Applicant Comments

Please provide substantive comments about the applicant's education, training, aptitude, or promise relevant to the SULI program. Include any relevant additional detail or perspective regarding the applicant's research experience or equivalent experience on complex projects, including the level of independence or other factors that would contribute to the applicant's ability to make an excellent contribution to the SULI program.

Jeremiah's academic record is simply extraordinary. In my introductory physics course at UC Santa Cruz, he was the top student out of 250, with an overall score of 99.8%. This was the 2nd-highest score that I have seen in my 15 years of teaching the course to a total of 2500 students. (The only student with a marginally higher score is now an NSF Graduate Fellow at Berkeley.) And this was no fluke: since then, he has consistently been the top student in every course, earning more A+ grades than any other student in the history of the department. (The only other student who came close enrolled in Harvard's physics Ph.D. program.) What is most impressive is that Jeremiah attributes his success to really hard work; he is very accustomed to starting from scratch on a topic and wrestling with it until he has achieved mastery.

During some discussions outside of class, Jeremiah had mentioned to me his strong interest in particle physics, and I was only too happy to engage him in an LHC research project with another talented and hard-working undergraduate student. This data analysis project focuses on Higgs boson production through the vector boson fusion process. Our goal for Fall quarter was to develop an

analysis framework and event selection that would maximize the significance of the Higgs boson measurement in the ATLAS experiment. Jeremiah threw himself into this project while maintaining his outstanding performance in courses. First, he found an example event display code and modified it (including conversion from C++ to Python) to give us a graphical depiction of the Higgs events. This allowed us to visualize the characteristic VBF topology while developing the event selection. Then, Jeremiah decided to implement the basic event selection that had been proposed by a group of phenomenologists in a foundational paper. This allowed us to calculate a baseline significance as a starting point for the event optimization. Finally, at the end of the quarter, Jeremiah and his undergraduate collaborator started to optimize the event selection for the increased luminosity of LHC Run 3. As we begin Winter quarter, we are looking forward to working with UCSC graduate students to explore machine learning techniques for event classification.

Throughout all of these research efforts, Jeremiah has steadily improved his professional skills, ranging from code refactoring, source control with Git, issue boards in Gitlab, and presentation techniques. I have been delighted with the high quality of the work, on par with what we might see from beginning graduate students. Jeremiah’s collaboration skills have been evident during the course of this project, even though he claims he is still improving his communication skills. Both students have thrived while working in the company of an equally dedicated student, and I am sure Jeremiah would continue to thrive in collaboration with other DOE scientists.

Applicant Rating

In comparison to other undergraduate students, please rate the applicant relative to his/her peers on the following qualifications:

	Do Not Know	Below Average	Average	Above Average	Superior
Analytical and Mathematical					X
Experimental Research					X
Overall Academic					X
Initiative and Self Reliance					X
Motivation toward Scientific Career					X
Originality of Thought					X
Emotional Maturity					X
Ability to Work with Others					X
Potential for Leadership					X
Oral Communication Skills				X	
Written Communication Skills					X