

Science Undergraduate Laboratory Internships (SULI)

Summer 2022 - Application for: Brody Vernon Beskar

APPLICANT PROFILE

General Applicant Information

First Name: Brody

Middle Name: Vernon

Last Name: Beskar

Previous Last Name(s):

Primary Email Address: bbeskar001@csbsju.edu

Alternate Email Address 1: beskarb@gmail.com

Alternate Email Address 2:

ORCID: [0000-0002-4984-0946](https://orcid.org/0000-0002-4984-0946)

Current Address

Primary Phone Number: 612-254-4900

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:

Sophomore

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:

Minnesota

College/University Name: Saint John's University

College/University Address: 2850 Abbey Plaza, Collegeville, MN 56321

College/University City: Collegeville

College/University Zip Code: 56321-9999

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:

May / 2024

Transcript:

Transcript.pdf

Does this institution provide grades?

Yes

GPA Scale:

4.0

Total Attempted Credits:

54.00

Total Earned Credits:

50.00

Total Quality Points:

190.00

GPA:

3.80

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Science, Technology, Engineering and Mathematics (STEM) Courses

Course Title: Analog Electronics

Course Number: 338

Enrollment Status: Currently Enrolled

Course Title: Analog Electronics Lab

Course Number: 338L

Enrollment Status: Currently Enrolled

Course Title: Calc 1

Course Number: 119

Enrollment Status: Recently Completed

Course Title: Calc 2

Course Number: 120

Enrollment Status: Recently Completed

Course Title: Differential Equations

Course Number: 337

Enrollment Status: Currently Enrolled

Course Title: Digital Electronics

Course Number: 217

Enrollment Status: Currently Enrolled

Course Title: Digital Electronics Lab

Course Number: 217L

Enrollment Status: Currently Enrolled

Course Title: Foundations of Physics 1

Course Number: 191

Enrollment Status: Recently Completed

Course Title: Foundations of Physics 2

Course Number: 200

Enrollment Status: Recently Completed

Course Title: Foundations of Physics 3

Course Number: 211

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Enrollment Status:	Recently Completed
Course Title:	Intermediate Physics Lab
Course Number:	332
Enrollment Status:	Recently Completed
Course Title:	Linear Algebra
Course Number:	239
Enrollment Status:	Recently Completed
Course Title:	Modern Physics
Course Number:	320
Enrollment Status:	Currently Enrolled
Course Title:	Physics 191 Lab
Course Number:	191L
Enrollment Status:	Recently Completed
Course Title:	Physics 200 Lab
Course Number:	200L
Enrollment Status:	Recently Completed
Awards or Honors	
Award Title:	Deans List
Month & Year Received:	December / 2020
Awarding Institution:	Saint Johns University
Award Title:	Deans List
Month & Year Received:	May / 2021
Awarding Institution:	Saint Johns University
High School Graduation or GED	
Date of High School Graduation or GED:	June / 2020
Country:	United States
City:	Mahtomedi
State/Province/Territory:	MN

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WORK EXPERIENCE & SKILLS

Work Experience

Name of Place of Employment or Activity:	Physics Lab Teacher Assistant
Dates of Employment or Activity:	From 11/6/2021 To Present
Hours Per Week:	10.0
Primary Duties:	Coach 20 students weekly to support understanding and implementation of lab content, including providing a deep overview of lab material, ensuring correct equipment set-up, and detailing safety risks and tools for risk avoidance. Support student success by grading lab reports weekly and providing individualized coaching to select students.
Tasks Performed:	Demonstrated understanding of calculations and analysis by being able to identify and problem-solve errors in student work – including data collection errors, calculation errors, and misuse of equipment.
Name of Place of Employment or Activity:	Saint Johns University Grounds Crew
Dates of Employment or Activity:	From 11/6/2020 To Present
Hours Per Week:	5.0
Primary Duties:	Operate equipment such as lawn mowers, snow blowers, leaf blowers, and weed eaters.
Tasks Performed:	Mowing, Snow removal, Brush removal, take out campus trashes and overall campus landscaping.
Name of Place of Employment or Activity:	Discount Tire
Dates of Employment or Activity:	From 12/5/2019 To Present
Hours Per Week:	40.0
Primary Duties:	Led team of 8 technicians to manage maintenance schedule, coordinate and carryout customer services, train new employees and experienced technicians to obtain further certifications, and ensure customer satisfaction in 50 interactions daily.
Tasks Performed:	Problem solving for unexpected issues such as tool and auto part failures and make final decisions regarding problematic service issues. Optimized service time from 21 minutes to 16 minutes by facilitating seamless communication between sales team, technicians, and customers and prioritizing service based on urgency and customer pick-up time.
Professional Associations	
Are you a member of any professional organizations?	No
Computer Skills	
Computer related skills:	Years of experience collecting and analyzing data using Excel, Logger Pro, and Lab Quest, and various linear regression/fitting software. Entry level programming experience in LabVIEW to create and run experiments while collecting data.

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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? 5/6/2022

When do you need to complete your
internship? 9/24/2022

First Choice Host DOE Laboratory

DOE Laboratory: Brookhaven National Laboratory (BNL)

First Choice Research Area: Accelerator Physics/Science

Second Choice Research Area: Nuclear Physics

Third Choice Research Area: High Energy Physics

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: Although I do not have any research experience in a research lab, hands on lab work is central to the physics major at Saint John's University. This includes upper divisions such as the lab I am currently enrolled in, where we are given a topic by the professor and are free to create and conduct an experiment exploring the given topic. In this lab the professor lets us conduct our experiment as we please but is there to provide guidance along the way as we need it. In these labs working closely with your lab partner to set up apparatus properly, collect data, and analyze data is essential. These labs include developing a experiment and using LabVIEW programming to run the experiment, working out unexpected issues in apparatus and data collection, analyzing several trials of data, and maintaining an official lab notebook. At the end of the semester, we are randomly assigned a lab we completed throughout the semester and have a formal presentation in front of the physics department. The professors then ask us various questions about the lab such as the procedure, theory, data collection, programming, and data analysis. These labs are by far my favorite curriculum that I have engaged during college. I am also currently working on a research proposal on nuclear physics for the Barry Goldwater scholarship. To do so I am working independently to figure out how to set up equipment left by a professor who retired years ago to explore and measure gamma rays and beta and alpha particles in naturally occurring materials. This project has entailed of reading a lot literature on the subject to determine the extent of research I can perform with limited resources. Also since none of my professors are familiar with nuclear physics or the apparatus, this project has tested my ability as a researcher to conduct and improve experiments.

Research Interests: I have a great interest in the areas of nuclear and particle physics. In particular, I am interested in researching nuclear power and radiation. I find these topics to be very interesting because they have many important applications such as medicine. Although I have not had the opportunity to take classes on nuclear or particle physics, I have started independent research on naturally occurring radionuclides by measuring their gamma spectrum. This has included learning a lot of new material outside of class have found that particle physics is actually quite similar to nuclear physics. I think that research in these two fields of physics have great potential to make important contributions to physics and society. While looking at which facilities to apply to, I looked at labs that have a focus on preparing their interns for a career in research, which I think is very important. I also looked at experiments that these labs have done in the past and found them to be very intriguing. I was also looking for an opportunity to work with advanced equipment that I do not have at my current University.

Personal Experience: The coursework I have engaged in at Saint John's University has properly prepared me and helped me developed skills needed to be a part of a research group. I am also a determined and hard worker, currently I am working three jobs including being a teacher's assistant for a physics lab, working on grounds crew on campus, and working at discount tire off campus while at the same time maintaining a strong GPA. To this I have found that time management is very important. Throughout my lab experience I have also learned that attention to detail is vital in while experimenting and maintaining a official lab notebook. At discount tire a big part of my job is to problem solve and make final decisions regarding unforeseen issues such as auto part and tool failures. This has given me strong problem-solving skills, and the ability to look at things from different points of views to fix equipment and solve problems. Another key skill that I have developed is communication, while working in small groups in class or maintaining communication between salesmen, technicians, and customers at discount tire to make sure services are carried out properly. I have learned to apply these skills from my personal life into my studies, strengthening myself as student and as a researcher. I have confidence I can apply these same skills to be an excellent contributing member to the program.

Professional Goals: I aspire to conduct physics research after I complete my education, particularly in particle physics or nuclear physics. The course work I have engaged at my university, Saint Johns, will properly prepare to continue down this path. Currently I plan on completing my senior thesis on nuclear physics, in particular gamma radiation. After graduating with a bachelors in Physics I plan on attending a university for a PH.D that has a focus in research, such as the University of Michigan. The physics major at Saint Johns isn't very popular so this allows me to work very closely with my professors in lector, lab and outside of class on projects. I find this to be valuable in having a deep and thorough understanding the topics in lecture, and in lab. I often find myself asking questions outside of class about topics that are not included in class that I am interested in. Although a downside the small physics

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department is a lack of advanced equipment, which having exposure to such equipment is valuable to advance myself as a researcher. I am applying to the SULI program to obtain valuable research experience in cutting edge areas of physics with advanced equipment. Having the opportunity to participate in the SULI program will give me experience to continue down the path to become a qualified researcher.

RECOMMENDATIONS

Recommendation 1: **First Name:** Dean
Last Name: Langley
Email: dlangley@csbsju.edu
Status: Received 1/7/2022

Recommendation 2: **First Name:** Greg
Last Name: Taft
Email: gtaft@csbsju.edu
Status: Received 12/17/2021



Brody V. Beskar
Dec 28, 2021 11:08
am Your current
Institution is J

Academic Transcript

This is NOT an official transcript.

[Institution Credit](#) [Transcript Totals](#) [Courses in Progress](#)

Transcript Data

STUDENT INFORMATION

Name : Brody V. Beskar

Birth Date: [REDACTED]

Curriculum Information

Current Program

College: College of Arts and Sciences

Major and Department: Applied Physics, Physics

Major and Department: Pre-Engineering, Special

Minor: Mathematics

***Transcript type:UNOF is NOT Official ***

DEGREES AWARDED

Sought: Not Accepted to a **Degree Date:** Major

Curriculum Information

Primary Degree

Major: Applied Physics

Major: Pre-Engineering

Minor: Mathematics

INSTITUTION CREDIT [-Top-](#)

Term: Fall 2020

Major: Physics

Academic Standing: Good Standing

Additional Standing: Dean's List

Subject Course Level Title				Grade	Credit Hours	Quality Points	<u>R</u>
ECON	111	UG	INTRO TO ECONOMICS (SS,SW,Q)	A	4.000	16.00	
INTG	105	UG	COLLEGE SUCCESS	A	1.000	4.00	
MATH	119	UG	CALCULUS I (MT,AS)	A	4.000	16.00	
PHIL	155	UG	PHIL OF RACE & ETHNIC(HM,CI)	AB	4.000	14.00	
PHYS	191	UG	FOUND OF PHYSICS I(NS,NW,Q)	A	4.000	16.00	

Term Totals (Undergraduate)

	Attempt Hours	Passed Hours	Earned Hours	GPA Hours	Quality Points	GPA
Current Term:	21.000	21.000	21.000	17.000	66.00	3.88
Cumulative:	21.000	21.000	21.000	17.000	66.00	3.88

Unofficial Transcript

Term: Spring 2021

Major: Physics
Academic Standing: Good Standing
Additional Standing: Dean's List

Subject	Course	Level	Title	Grade	Credit Hours	Quality Points	R
FREN	111	UG	INTRO TO THE FRENCH LANGUAGE	A	4.000	16.00	
INTG	100	UG	LEARNING FOUNDATIONS (LF)	A	4.000	16.00	
MATH	120	UG	CALCULUS II (MT,AS)	A	4.000	16.00	
PHYS	200	UG	FOUND OF PHYSICS II (NS,NW)	A	4.000	16.00	

Term Totals (Undergraduate)

	Attempt Hours	Passed Hours	Earned Hours	GPA Hours	Quality Points	GPA
Current Term:	16.000	16.000	16.000	16.000	64.00	4.00
Cumulative:	37.000	37.000	37.000	33.000	130.00	3.93

Unofficial Transcript

Term: Fall 2021

Major: Applied Physics
Academic Standing: Good Standing

Subject	Course	Level	Title	Grade	Credit Hours	Quality Points	R
FREN	112	UG	FRENCH LANGUAGE & CULTURE I	AB	4.000	14.00	
MATH	239	UG	LINEAR ALGEBRA (AS)	AB	4.000	14.00	
PHYS	211	UG	FOUNDATIONS OF PHYSICS III	AB	4.000	14.00	
PHYS	332	UG	INTERMEDIATE PHY LAB	A	1.000	4.00	
THEO	100	UG	THEOLOGICAL EXPLORATION(TH,TE)	AB	4.000	14.00	

Term Totals (Undergraduate)

	Attempt Hours	Passed Hours	Earned Hours	GPA Hours	Quality Points	GPA
Current Term:	17.000	17.000	17.000	17.000	60.00	3.52
Cumulative:	54.000	54.000	54.000	50.000	190.00	3.80

Unofficial Transcript

TRANSCRIPT TOTALS (UNDERGRADUATE) -Top-

	Attempt Hours	Passed Hours	Earned Hours	GPA Hours	Quality Points	GPA
Total Institution:	54.000	54.000	54.000	50.000	190.00	3.80

Total Transfer:	0.000	0.000	0.000	0.000	0.00	0.00
Overall:	54.000	54.000	54.000	50.000	190.00	3.80

Unofficial Transcript

COURSES IN PROGRESS -Top-

Term: Spring 2022

Major: Applied Physics

Subject Course Level Title				Credit Hours
MATH	337	UG	DIFFERENTIAL EQUATIONS (AS)	4.000
PCST	368G	UG	RELIGION/SOCIETY/POLITI(TU,TI)	4.000
PHYS	217	UG	DIGITAL ELECTRONICS	2.000
PHYS	217L	UG	Laboratory	0.000
PHYS	320	UG	MODERN PHYSICS	4.000
PHYS	332	UG	INTERMEDIATE PHY LAB	1.000
PHYS	338	UG	ANALOG ELECTRONICS	2.000
PHYS	338L	UG	Laboratory	0.000

Unofficial Transcript

RELEASE: 8.7.1

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SULI PROGRAM APPLICATION RECOMMENDATION FOR BRODY VERNON BESKAR

Recommender Contact Information

- **First Name:** Greg
- **Last Name:** Taft
- **Title:** Visiting Associate Professor
- **Department:** Physics
- **Institution/Organization:** College of St. Benedict/St. John's University
- **Telephone:** 320-557-6418
- **Email:** gtaft@csbsju.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 Brody for about 15 months. I first met him in September 2020 when he was a student in an introductory physics lab I taught at Saint John's University. This fall (2021) he was a student in an intermediate physics lab course that I taught for physics majors at the College of Saint Benedict / Saint John's University.

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.

Brody performed very well in both lab courses. The introductory physics lab course was made more difficult than usual due to COVID-19 restrictions and a compressed block schedule, but Brody seemed to handle this very well. Although there were many safety restrictions, students were able to attend the lab in-person to do experiments and collect data. Then they used computers to analyze data and write electronically-submitted lab reports. During that lab, Brody learned how to use an Excel spreadsheet to perform calculations involving data and to use an online graphical analysis program to fit data to expected theoretical functions.

In the intermediate lab course, students learned to design and conduct their own experiments. Unlike the introductory lab in which students follow detailed procedures outlined in a lab manual, the intermediate lab students are given only a general idea of what to accomplish and must figure out the rest on their own. Brody and his lab partner did a great job at this as evidenced by their detailed lab notebooks and oral presentations. Special emphasis was made at having students estimate uncertainty in their measurements and calculations, and Brody did very well with this. Also, he was introduced to LabVIEW programming for controlling instruments such as a function generator and digital multimeter. Brody was one of the top students in this lab course. In conversations with him this fall, I learned he is considering pursuing a graduate degree in physics. An internship such as your program would help him solidify those plans while exposing him to new areas of research. I strongly urge you to accept Brody into your program.

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 BRODY VERNON BESKAR

Recommender Contact Information

- **First Name:** Dean
- **Last Name:** Langley
- **Title:** Professor of Physics
- **Department:** Physics
- **Institution/Organization:** St. John's University
- **Telephone:** 320-363-3812
- **Email:** dlangley@csbsju.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 Brody for most of two years, from classes and labs I taught last year, and more recently from research he has begun on nuclear detection with my assistance. I have found him to be a bright, talented and motivated student who will make a strong member of your research team.

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.

As a first-year student Brody was in my Foundations of Physics 1 course, a calculus-based study of motion, and I was also his instructor for the lab associated with the course. In both the lecture and lab components his performance was excellent, placing him among a strong group near the top of the class. With all the uncertainties of the COVID-19 schedule we operated under that semester, he proved to be a resilient and reliable student. He was always prompt and thorough in completing homework assignments, well prepared for exams and experiments, and engaged in classroom activities.

Brody came to me early in his second year to explore an interest in experimental nuclear physics. This is a topic which might come later in our curriculum as an elective for him, but which he was well prepared to take on as an independent learning project. I helped him assemble a set of instruments for gamma-ray spectroscopy, and he had soon worked through a set of tutorials and begun his own studies with sample nuclides. Brody is interested in environmental radioactivity in the natural resources of St. John's and elsewhere in our region. Our campus is surrounded with forests, lakes and wetlands, and there is much effort devoted to reducing the environmental impacts of water treatment, waste disposal and power generation. Brody will also acquire water samples from near a coal plant along the St. Croix River for analysis. His research will build on past studies of radon concentration in soil and buildings; he will look for evidence of other hazardous chemicals using gamma spectroscopy, and also learn to detect beta and alpha radiation from nuclides.

I have been impressed with Brody's research skills, his rapid progress in learning to handle sophisticated instruments and software, and his self-motivation in developing the project to fit our setting and facilities at St. John's and in our larger region. He works very well independently, and will also fit in well with any group of coworkers.

Brody's career interests lie in the realms of atomic, nuclear and particle physics, and particularly fusion research. I am confident that Brody will go on to complete a Ph.D. in Physics when he finishes here. He clearly has the talent and determination to do so. The opportunity to be involved in your program will be of great value to him as he maps his plans for the future, and he will make a an outstanding researcher, so I highly recommend him for one of your internships.

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