

Science Undergraduate Laboratory Internships (SULI)

Summer 2022 - Application for: Grant Hunter

APPLICANT PROFILE

General Applicant Information

First Name: Grant

Middle Name:

Last Name: Hunter

Previous Last Name(s):

Primary Email Address: grant.hunter@students.fhu.edu

Alternate Email Address 1: 5020hunter@gmail.com

Alternate Email Address 2:

ORCID: [0000-0002-3618-218X](https://orcid.org/0000-0002-3618-218X)

Current Address

Primary Phone Number: 321-412-8280

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

Science Undergraduate Laboratory Internships (SULI)

Summer 2022 - Application for: Grant Hunter

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:

Tennessee

College/University Name: Freed-Hardeman University

College/University Address: 158 E Main St

College/University City: Henderson

College/University Zip Code: 38340-2398

Expected/Declared Major: Mathematics

Expected Degree From This College/University:

Bachelor's

Expected/Completed Graduation Date:

May / 2023

Transcript: GH_Fall21_Transcript.pdf

Does this institution provide grades? Yes

GPA Scale: 4.0

Total Attempted Credits: 54.00

Total Earned Credits: 53.00

Total Quality Points: 198.00

GPA: 3.74

Science Undergraduate Laboratory Internships (SULI)

Summer 2022 - Application for: Grant Hunter

Science, Technology, Engineering and Mathematics (STEM) Courses

Course Title: Abstract Algebra

Course Number: MAT430

Enrollment Status: Recently Completed

Course Title: Calculus 1

Course Number: MAT122

Enrollment Status: Recently Completed

Course Title: Calculus 2

Course Number: MAT223

Enrollment Status: Recently Completed

Course Title: Calculus 3

Course Number: MAT224

Enrollment Status: Recently Completed

Course Title: Complex Analysis

Course Number: MAT424

Enrollment Status: Currently Enrolled

Course Title: Differential Equations

Course Number: MAT345

Enrollment Status: Currently Enrolled

Course Title: Discrete Mathematics

Course Number: MAT240

Enrollment Status: Recently Completed

Course Title: Foundations of Geometry

Course Number: MAT306

Enrollment Status: Recently Completed

Course Title: Intro Statistics

Course Number: MAT235

Enrollment Status: Recently Completed

Course Title: Linear Algebra

Course Number: MAT330

Science Undergraduate Laboratory Internships (SULI)

Summer 2022 - Application for: Grant Hunter

Enrollment Status:	Recently Completed
Course Title:	Physics 1 + Lab
Course Number:	PHS211
Enrollment Status:	Recently Completed
Course Title:	Physics 2 + Lab
Course Number:	PHS212
Enrollment Status:	Recently Completed
Course Title:	Probability
Course Number:	MAT351
Enrollment Status:	Currently Enrolled
Course Title:	Programming 1 (Python)
Course Number:	CIS171
Enrollment Status:	Recently Completed
Course Title:	Programming 2 (Python)
Course Number:	CIS172
Enrollment Status:	Currently Enrolled
Course Title:	Quantitative Business Analysis
Course Number:	BAN225
Enrollment Status:	Recently Completed
Course Title:	Thermodynamics and Kinetics + Lab
Course Number:	CHE422
Enrollment Status:	Currently Enrolled

Science Undergraduate Laboratory Internships (SULI)

Summer 2022 - Application for: Grant Hunter

Awards or Honors

Award Title: Outstanding Student in the Calculus Sequence

Month & Year Received: May / 2021

Awarding Institution: Freed Hardeman University

Award Title: Trustee Scholarship

Month & Year Received: August / 2020

Awarding Institution: Freed Hardeman University

Award Title: Honors Scholarship

Month & Year Received: August / 2020

Awarding Institution: Freed Hardeman University

High School Graduation or GED

Date of High School Graduation or GED: May / 2020

Country: United States

City: Titusville

State/Province/Territory: FL

Science Undergraduate Laboratory Internships (SULI)

Summer 2022 - Application for: Grant Hunter

WORK EXPERIENCE & SKILLS

Work Experience

Name of Place of Employment or Activity:	Titusville Tool & Engineering
Dates of Employment or Activity:	From 3/13/2020 To Present
Hours Per Week:	30.0
Primary Duties:	Operate CNC Lathe Operate Mill Operate Bandsaw Measure Parts Inspect Parts for Irregularities Document Irregularities
Tasks Performed:	Ensure Lathe/Mill follows Program set by Chief Engineer Inspect Parts meet Measurement/Tolerance Standards set by Customer Inspect Irregularities in Parts caused by Machine Glitches/Errors Document Irregularities for Files and Customers

Professional Associations

Are you a member of any professional organizations?	No
--	----

Computer Skills

Computer related skills:	Python - 1 year of experience Excel - Applied statistical tests for data analysis Microsoft Office SPSS - Applied statistical tests for data analysis
---------------------------------	--

Laboratory/Technical Skills

Experience with advanced laboratory techniques or equipment:	As of applying, I have not acquired tactile equipment experience yet, as my Physics 1 + 2 were both largely online. I do have experience in recording data, reporting data, and quantitatively approaching such data to derive conclusions. However, by the summer, I will have completed CHE422 Thermodynamics and Kinetics which will provide in-person laboratory experience with chemical potential, solvent and solute activities, and the microscopic details of chemical reactions.
---	--

Science Undergraduate Laboratory Internships (SULI)

Summer 2022 - Application for: Grant Hunter

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? 5/15/2022

When do you need to complete your
internship? 8/3/2022

First Choice Host DOE Laboratory

DOE Laboratory: Oak Ridge National Laboratory (ORNL)

First Choice Research Area: Mathematics

Second Choice Research Area: Nuclear Physics

Third Choice Research Area: Quantum Simulation

Second Choice Host DOE Laboratory

DOE Laboratory: Thomas Jefferson National Accelerator Facility (TJNAF)

First Choice Research Area: Mathematics

Second Choice Research Area: High Energy Physics

Third Choice Research Area: Nuclear Physics

Relatives Employed at DOE Laboratories

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

Science Undergraduate Laboratory Internships (SULI)

Summer 2022 - Application for: Grant Hunter

ESSAYS

Research Experience:	<p>Previously, I have written two literature reviews. The first paper discussed probabilities of survival given a Biblical narrative. I received some guidance on the statistical approach from my math professors. The data was collected from modern sources as well as historical data generated from regression. This paper was presented on University Scholar's Day at Freed-Hardeman University and was highlighted on Freed-Hardeman's merit page (https://fhu.meritpages.com/updates).</p> <p>The second paper was written in a draft/revision process alongside my professor. I conducted all research necessary to provide a psychological perspective on another Biblical narrative. My professor focused on teaching formality and style for academic writings, which I implemented from his general comments.</p> <p>Also, this past semester, I wrote a program that tunes an instrument in the Python language. I utilized many Python modules including PyAudio, Numpy, and Scipy. I also researched the mathematics behind notes and their frequency distribution. My professor guided the selection of the topic, but I wrote the code independently.</p> <p>Currently, I am beginning an undergraduate honors thesis that is co-opted with my advisor/professor. We will discuss super-attractors, a subtopic of Complex Analysis, seeking to find a (set of) polynomial(s) of degrees 3 and 4 that are super-attractors under Newton's, Halley's, and Schröder's methods for the same domain.</p>
Research Interests:	<p><u>Oak Ridge National Laboratory:</u></p> <p>I am interested in the work being done towards nuclear fission and fusion, which I believe can present solutions to the energy crisis. I have learned about the mechanics and principles behind fusion through my Physics 2 course, but am interested in learning more and supporting future research.</p> <p>I am also interested in the research done with the High Flux Isotope Reactor for material irradiation and neutron activation. Researching topics in quantum entanglement or magnetic flux would be fascinating to expand upon the knowledge I have established already, with the HFIR as the pre-eminent location to do so. Separately, assisting with the HPCDA Initiative would follow in my passion for statistics and data modeling.</p> <p><u>Thomas Jefferson National Accelerator Facility:</u></p> <p>I am most interested in contributing toward the Discovery Plasma Science program to explore the fundamental properties and complex behavior of matter in the plasma state. I desire to better quantify the properties of plasma and contribute towards either measuring or modeling the behaviors of matter in the plasma state.</p> <p>I am also interested in the Theoretical Physics done under the HEP program, which would help me grasp a stronger, more encapsulating mathematical framework. I would enjoy approaching such a problem and assisting with forming a framework that encourages deeper theoretical understanding which could describe gravity or dark matter in a high-energy context.</p> <p><u>General Research Interest:</u></p> <p>I am open to working in any of the above fields of study where a mathematician is needed, as I plan to use this opportunity to expand my knowledge in more specific areas of science and to guide my decision of a job field. I would love to gain experience in physics/data modeling to further develop my interpersonal skills and understanding of research.</p> <p>Doing research is a goal of mine because of a passion for challenging myself. I also desire to maintain a diverse set of skills to apply the fundamentals of mathematics and logic to any field that comes my way. Education received through this program will guide my future in research as I plan to pursue graduate schooling.</p>
Personal Experience:	<p>In my two years at Freed-Hardeman, I have had opportunities to write a few major research papers, as discussed previously. Writing these papers has helped me learn to expand on the literature by creating an educated perspective for myself. I have also learned how to engage my peers in my findings through presentations.</p> <p>Growing up, I attended a Bible camp and was personally invited by a director to a leadership camp for older kids even though I was still below the typical age. The leadership camp taught me how to manage group dynamics in high-stress situations and how to delegate tasks. In more recent years, I have been able to go back and help at different weeks as a counselor and I have learned the benefits of positive leadership. I have learned the importance of empathy for those of different backgrounds and how to work together even with a range of different perspectives.</p> <p>In high school, I had many opportunities to serve in leadership positions, which helped me balance many levels of responsibility. I learned how to discern priorities, which helped me mature as a junior and senior. In my junior and senior years, I served as both section leader of the trombones and captain of the soccer team.</p> <p>Each of these experiences in my life helped me realize the importance of working hard. Having these goals has pushed me to expect more from myself and has made me want to challenge myself to have a deeper skillset beyond just being intelligent. Being able to understand others has helped me realize the importance of being a team</p>

Science Undergraduate Laboratory Internships (SULI)

Summer 2022 - Application for: Grant Hunter

	member because it truly takes so many people to achieve particular goals. I have held many team positions in the past, and I am driven to fulfill any role I may be given at SULI.
Professional Goals:	I am seeking to pursue a Ph.D. in applied mathematics once I graduate with my Bachelor's degree in May 2023. I have a great desire for research and solving upcoming problems of any topic. The greatest goal that I am currently working through is finding a specific field that I am most interested in as I am passionate about Computer Science, Physics, Data Analysis, and Pure Math. Working for the SULI program would help to develop or inform me about the inner workings of a field inaccessible to me from a classroom. Such an experience will help me narrow my general interest and focus on more specific fields of study that I would enjoy working in. Participating in field research would expand my skills in technical writing as well as the skills I have already developed. Working for the SULI program will also help me to learn programs or tools that I do not yet use on a regular basis. Having this opportunity would not only add research to my portfolio but can give me field knowledge that I can utilize in the future for my professional life.

RECOMMENDATIONS

Recommendation 1:	First Name: James Last Name: Gardner Email: jgardner@fhu.edu Status: Received 1/11/2022
Recommendation 2:	First Name: Jared Last Name: Collins Email: jtcollins@fhu.edu Status: Received 1/9/2022

Unofficial Transcript

Freed-Hardeman University

Office of the Registrar

158 East Main Street

Henderson, TN 38340

Name: Hunter, Grant Jackson

Program / Degree / Curriculum	Degree Awarded	Date Granted
Undergraduate/BS/Mathematics	No Degree Awarded Yet	

Honors: Cumulative GPA: 3.74

Previous Institution: Titusville High School,

2020 Summer (5/18/2020 - 7/24/2020)

Advanced Placement

Course	Title	Subtype	Grade	Credits	Quality Points
ENG101	English Comp I	Lecture	M	3.00	0.00
ENG102	English Comp II	Lecture	M	3.00	0.00
ENG235	American Lit 1	Lecture	M	3.00	0.00
HIS111	Survey Civiliza I	Lecture	M	3.00	0.00
HIS112	Survey Civiliz II	Lecture	M	3.00	0.00
HIS221	Amer History I	Lecture	M	3.00	0.00
HIS222	Amer History II	Lecture	M	3.00	0.00
MAT122	Analytics/Calculus I	Lecture	M	4.00	0.00
MAT235	Intro Statistics	Lecture	M	3.00	0.00
POL231	Amer Government	Lecture	M	3.00	0.00

	Attempted Credit	Earned Credits	Total Credits	GPA Credits	Transfer Credits	Quality Points	GPA
Term	0.00	31.00	31.00	0.00	0.00	0.00	0.00
Overall	0.00	31.00	31.00	0.00	0.00	0.00	0.00

2020 Fall (7/27/2020 - 12/11/2020)

Freed-Hardeman University

Course	Title	Subtype	Grade	Credits	Quality Points
BIB121	The Life of Christ	Lecture	H	2.00	8.00
EDU130	Intro to Education	Lecture	A	3.00	12.00
HON200	Intro to Honors	Lecture	H	1.00	4.00
MAT223	Analytics/Calculus 2	Lecture	A	4.00	16.00
PHS211	Physics Sci/Eng eer I	Lecture	A	4.00	16.00
SOC241	General Sociology	Lecture	A	3.00	12.00

Awards

Presidents List

	Attempted Credit	Earned Credits	Total Credits	GPA Credits	Transfer Credits	Quality Points	GPA
Term	17.00	17.00	17.00	17.00	0.00	68.00	4.00
Overall	17.00	48.00	48.00	17.00	0.00	68.00	4.00

2021 Spring (1/4/2021 - 5/14/2021)

Freed-Hardeman University

Course	Title	Subtype	Grade	Credits	Quality Points
BIB122	Acts of Apostles	Lecture	H	2.00	8.00
HON350	Honors Practicum	Lecture	WA	1.00	0.00
MAT224	Analytics/Calculus 3	Lecture	A	4.00	16.00
MAT240	Discrete Mathematics	Lecture	A	3.00	12.00
MAT330	Linear Algebra	Lecture	A	3.00	12.00
PHS212	Phys Sci/Engineer II	Lecture	B	4.00	12.00

Awards

Deans List

	Attempted Credit	Earned Credits	Total Credits	GPA Credits	Transfer Credits	Quality Points	GPA
Term	17.00	16.00	16.00	17.00	0.00	60.00	3.53
Overall	34.00	64.00	64.00	34.00	0.00	128.00	3.77

2021 Fall (8/2/2021 - 12/9/2021)

Freed-Hardeman University

Course	Title	Subtype	Grade	Credits	Quality Points
BAN225	Quant Bus Analysis	Lecture	A	3.00	12.00
BIB211	Joshua Judges Ruth	Lecture	H	2.00	8.00
BIB322	Hebrews	Lecture	A	2.00	8.00
CIS171	Computer Program I	Lecture	H	3.00	12.00
COM140	Speech Communicat	Lecture	H	3.00	12.00
MAT306	Foundations Geometry	Lecture	B	3.00	9.00
MAT430	Abstract Algebra	Lecture	B	3.00	9.00

Awards

Deans List

	Attempted Credit	Earned Credits	Total Credits	GPA Credits	Transfer Credits	Quality Points	GPA
Term	19.00	19.00	19.00	19.00	0.00	70.00	3.68
Overall	53.00	83.00	83.00	53.00	0.00	198.00	3.74

2022 Spring (1/3/2022 - 5/13/2022)

Freed-Hardeman University

Course	Title	Subtype	Grade	Credits	Quality Points
BIB424	Revelation	Lecture		2.00	0.00
CHE422	Chem Kinet Thermo	Lecture		4.00	0.00
CIS172	Computer Program II	Ind Instru		3.00	0.00
HON350	Honors Practicum	Lecture		1.00	0.00
MAT345	Differential Equat	Lecture		3.00	0.00
MAT351	Probability	Lecture		3.00	0.00
MAT424	Complex Analysis	Lecture		3.00	0.00

Test Scores

Total Credits Taken:	83.00
Total Transfer Credits:	0.00
Overall Credits:	83.00

SULI PROGRAM APPLICATION RECOMMENDATION FOR GRANT HUNTER

Recommender Contact Information

- **First Name:** Jared
- **Last Name:** Collins
- **Title:** Associate Professor of Mathematics
- **Department:** Mathematics and Computer Science
- **Institution/Organization:** Freed-Hardeman University
- **Telephone:** 731-989-6665
- **Email:** jtcollins@fhu.edu

Applicant Information

Association

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

Grant is a student, advisee and researcher of mine. He came to FHU in 2020 and became my advisee at that time. I've had him in 3 courses so far and will teach him in a few more before his time at FHU is complete. He is also working with me on a research project that he hopes to turn into an honors thesis and we both hope to turn into a publication.

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.

Grant's appetite for education is astounding. Last semester he took seven classes. He did not need to take seven classes but he chose to because they all were of interest to him. Unlike many students who take what I tell them they must have, Grant asks me if there is room for more. He's currently taking our most advanced math courses and doing well with them. He is also dabbling in the sciences, computer science and business. He has shown interest in several classes in each of these fields. I would place him among my best students and since mathematics occupies somewhere around 1% of students that puts him among the best of the best.

As to research, Grant has just begun on a project with me studying the dynamical relationships between Newton's and Halley's zero-finding algorithms. Ultimately his part of the project is a massive linear algebra problem with far too many unknowns and not nearly enough knowns. He'll have to make clever assumptions to break the problem down into something more manageable. He is working on a somewhat negative result, looking for an example that defeats a conjecture posed by a colleague of mine. I meanwhile am working on substantiating the conjecture. I anticipate some back and forth as we refine our efforts based on the early findings of one another.

As to presentation, Grant was able to present at our most recent Scholars' Day. This is an event where student research is showcased among peers. Grant presented on a paper for another class where he blended mathematics into a liberal arts course. It was well received and I heard a great deal of praise for it. He is also clear spoken in class and I am aware of times when he has taken the lead while working with his classmates.

I have no reservations in recommending Grant to you. He excels mathematically and manages to stay well rounded in other subjects. I believe that is exactly the kind of intern you are interested in.

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 GRANT HUNTER

Recommender Contact Information

- **First Name:** James
- **Last Name:** Gardner
- **Title:** Assoc. Prof. of Bible
- **Department:** Honors College
- **Institution/Organization:** Freed-Hardeman University
- **Telephone:** 731-879-6038
- **Email:** jgardner@fhu.edu

Applicant Information

Association

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

Grant has been a student in two of my classes, an introductory course on the Life of Christ that we require for all incoming Honors students in the Fall of 2020 and an Old Testament history course in the Fall of 2021 that is open to all students but that Grant elected to take as an Honors course requiring the submission of a substantial research paper.

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.

Like many students in that first introductory course, Grant struggled to make the transition to the level of academic effort necessary to produce Honors quality work at the university level. I was very favorably impressed with his willingness to adjust to a higher standard. By the end of the course, his work easily exceeded the Honors standard. I graded his paper in that course as the very best in the class of 18 Honors students. This year, in the second course, his performance was less remarkable, but one of his strongest attributes continued to be his willingness to take general direction and criticism and constructively respond by higher quality work. He was the only student in that class choosing to take it at the Honors level, so that there is no easy comparison of his work with that of his fellow students. I believe that you will find him very open to coaching on how to approach intellectual questions with appropriate diligence and caution. He also incorporated into his work approaches and resulting insights of his own choosing, quite apart from anything covered in class or suggested by myself.

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