

## Science Undergraduate Laboratory Internships (SULI)

Summer 2022 - Application for: Hanna Michelle Pavill

### APPLICANT PROFILE

#### General Applicant Information

First Name: Hanna

Middle Name: Michelle

Last Name: Pavill

Previous Last Name(s):

Primary Email Address: pavillh@gmail.com

Alternate Email Address 1:

Alternate Email Address 2:

ORCID: [0000-0002-6256-2151](https://orcid.org/0000-0002-6256-2151)

#### Current Address

Primary Phone Number: 570-899-4158

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: Hanna Michelle Pavill

### 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?	Yes

#### Undergraduate Institution Information

College/University Country:	United States and U.S. Territories
College/University State/Province/Territory:	Pennsylvania
College/University Name:	Messiah College
College/University Address:	One University Ave.
College/University City:	Grantham
College/University Zip Code:	17027-0800
Expected/Declared Major:	Physical Sciences - Physics
Minor and/or Concentration Expected/Declared:	Visual and Performing Arts - Music (Performance, History, Technology, Theory, Composition)
Expected Degree From This College/University:	Bachelor's
Expected/Completed Graduation Date:	May / 2023
Transcript:	TWOSWIMR_edited.pdf
Does this institution provide grades?	Yes
GPA Scale:	4.0
Total Attempted Credits:	93.50
Total Earned Credits:	87.00
Total Quality Points:	335.10
GPA:	3.85

## Science Undergraduate Laboratory Internships (SULI)

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### Science, Technology, Engineering and Mathematics (STEM) Courses

**Course Title:** Electromagnetics

**Course Number:** ENGR 367

**Enrollment Status:** Recently Completed

**Course Title:** Optics

**Course Number:** PHYS 317

**Enrollment Status:** Currently Enrolled

**Course Title:** Quantum Mechanics

**Course Number:** PHYS 402

**Enrollment Status:** Currently Enrolled

**Course Title:** Research Methods

**Course Number:** CHEM 393

**Enrollment Status:** Recently Completed

**Course Title:** Solid State Physics

**Course Number:** PHYS 425

**Enrollment Status:** Recently Completed

**Course Title:** Thermodynamics

**Course Number:** ENGR 371

**Enrollment Status:** Currently Enrolled

### High School Graduation or GED

**Date of High School Graduation or GED:** June / 2019

**Country:** United States

**City:** Shickshinny

**State/Province/Territory:** PA

## Science Undergraduate Laboratory Internships (SULI)

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### WORK EXPERIENCE & SKILLS

#### Work Experience

<b>Name of Place of Employment or Activity:</b>	Messiah University
<b>Dates of Employment or Activity:</b>	From 9/1/2021 To 12/17/2021
<b>Hours Per Week:</b>	5.0
<b>Primary Duties:</b>	-Plan weekly group sessions -Prepare study sessions -Held one-on-one sessions whenever necessary
<b>Tasks Performed:</b>	-Held weekly review sessions for students in PHYS 201 -Prepare material beforehand to be able to answer student questions

#### Professional Associations

<b>Are you a member of any professional organizations?</b>	No
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#### Computer Skills

<b>Computer related skills:</b>	-Experience with MATLAB
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## Science Undergraduate Laboratory Internships (SULI)

Summer 2022 - Application for: Hanna Michelle Pavill

### 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? 5/9/2022

When do you need to complete your  
internship? 8/12/2022

#### First Choice Host DOE Laboratory

DOE Laboratory: Brookhaven National Laboratory (BNL)

First Choice Research Area: Particle Astrophysics

Second Choice Research Area: Mathematics

Third Choice Research Area: Condensed Matter Physics

#### Second Choice Host DOE Laboratory

DOE Laboratory: Thomas Jefferson National Accelerator Facility (TJNAF)

First Choice Research Area: Accelerator Physics/Science

Second Choice Research Area: Mathematics

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: Hanna Michelle Pavill

### ESSAYS

<b>Research Experience:</b>	At the university I am attending, Messiah University, there are not many opportunities for research experience until at least Junior year. I hope to use this experience with the DOE to become more familiar with advanced research techniques and methods. All previous experience has been through classes with labs. While this did not leave much room for independence it still gave a nice introduction to many types of equipment, and data collection and analysis. Over this past semester, I have created a research proposal and plan to complete research in the spring semester. With the guidance of my advisor, I will mostly be leading this experiment dealing with acoustic physics. I hope to use this upcoming research in the spring to become more familiar with research techniques and equipment.
<b>Research Interests:</b>	<p>I am very interested in the Brookhaven National Laboratory, because of the particle physics research that they are completing. Ever since getting a brief introduction to particle physics my sophomore year of college I have found the content intriguing. There are so many questions that we have about the universe and participating in this research might give us the answer to some of those questions.</p> <p>I am also interested in the Thomas Jefferson National Accelerator Facility. They are completing multiple research projects and one that I find myself the most interested in is superconducting radiofrequency technologies. Superconductors have the ability to change the world if we find practical ways to utilize them. This project with Jefferson Lab may be able to find new uses for superconductors that can help improve the world as we know it.</p>
<b>Personal Experience:</b>	All throughout my life, whatever task is thrown my way, I persevere to complete the challenge to the best of my abilities. I am very hard working and am always looking to learn new things. Until junior year at Messiah University, it is not typical to complete research. Now that I am in my junior year, I will be completing a research project in the field of acoustic physics. Since Messiah University does not have an acoustics program I have taken it upon myself to build a research project that will be beneficial to me and the University. Creating a proposal for this project involved a lot of hard work and research from myself, but has ultimately led me to be able to work on this project in the upcoming semester. Until this point, the only type of experimentation I have done is what I completed in lab courses. Some of these were upper-level labs, such as modern physics, but this did not allow for much individual work. I hope to use my research in the spring and an internship with the DOE in the summer to improve my skills in advanced research.
<b>Professional Goals:</b>	My eventual goal is to become an acoustic engineer. I am majoring in physics with a music minor, and am very passionate about both. For a long time, I thought I would have to choose between the two, but acoustic engineering is something that will allow me to combine the two. There are not many undergrad acoustic engineering programs so I have taken it upon myself to create my own program by combining physics and music in my undergrad. While these labs are not offering research opportunities in the exact field that I hope to pursue, I will use the skills that I learn in this program and apply them to my future career path. I will learn how to create experiments, use advanced techniques, analyze data, and work with a team. All of these skills will be valuable and integral to my future career.

### RECOMMENDATIONS

<b>Recommendation 1:</b>	<b>First Name:</b> Abaz <b>Last Name:</b> Kryemadhi <b>Email:</b> akryemadhi@messiah.edu <b>Status:</b> Received 1/6/2022
<b>Recommendation 2:</b>	<b>First Name:</b> Niklas <b>Last Name:</b> Hellgren <b>Email:</b> nhellgren@messiah.edu <b>Status:</b> Received 1/8/2022

One University Avenue  
Mechanicsburg, PA 17055  
(717) 766-2511

Name: Hanna M. Pavill  
Date Issued: 22-DEC-2021  
Date of Birth: [REDACTED]  
Student ID: [REDACTED]  
Student SSN: [REDACTED]

Hanna Pavill  
Parchment DocumentID: TWOSWIMR

Course Level: Undergraduate					SUBJ NO.	COURSE TITLE	CRED GRD	PTS R
Current Program					Institution Information continued:			
Major : Physics					Summer 2020			
					MUGE 101	Fundamentals of Music Theory	3.00 A	12.00
					Ehrs: 3.00	GPA-Hrs: 3.00	QPts: 12.00	GPA: 4.00
					Fall 2020			
					MATH 211	Calculus III	4.00 A	16.00
					MATH 211L	Lab: Calculus III	0.00 NG	0.00
					MATH 308	Differential Equations	3.00 A	12.00
					MUAP 145	Applied Saxophone Lessons	1.00 A	4.00 I
					MUEN 122	Symphonic Winds	0.50 P	0.00 I
					MUEN 142	JazzTWO	0.50 P	0.00 I
					MUEN 147	Saxophone Quartet	0.50 P	0.00 I
					MUTH 101	Music Theory I	3.00 A	12.00
					PHYS 212	General Physics II	4.00 B+	13.20
					PHYS 212L	Lab: General Physics II	0.00 NG	0.00
					Ehrs: 16.50	GPA-Hrs: 15.00	QPts: 57.20	GPA: 3.81
					UG Dean's List			
					Spring 2021			
					ENGR 212	Programming for Engineers	2.00 A	8.00
					ENGR 212L	Lab: Programming for Engineers	0.00 NG	0.00
					MATH 261	Linear Algebra	3.00 B+	9.90
					MUAP 145	Applied Saxophone Lessons	1.00 A	4.00 I
					MUEN 122	Symphonic Winds	0.50 P	0.00 I
					MUEN 142	JazzTWO	0.50 P	0.00 I
					MUEN 147	Saxophone Quartet	0.50 P	0.00 I
					MUTH 102	Music Theory II	3.00 A	12.00
					PHIL 101	Problems in Philosophy	3.00 A	12.00
					PHYS 251	Modern Physics	4.00 A-	14.80
					PHYS 251L	Lab: Modern Physics	0.00 NG	0.00
					Ehrs: 17.50	GPA-Hrs: 16.00	QPts: 60.70	GPA: 3.79
					UG Dean's List			
					Summer 2021			
					MUMH 305	History of Music III	3.00 A	12.00
					THEO 205	Intro to Christian Theology	3.00 A	12.00
					Ehrs: 6.00	GPA-Hrs: 6.00	QPts: 24.00	GPA: 4.00
					Fall 2021			
					CHEM 393	Research Methods	1.00 A	4.00
					ENGL 124	Short Story	3.00 A	12.00
					ENGR 367	Electromagnetics	3.00 A	12.00
					***** CONTINUED ON PAGE 2 *****			
TRANSFER CREDIT ACCEPTED BY THE INSTITUTION:								
2016-2018 Luzerne County Community Colle								
COMM 105	Fund of Oral Communication	3.00	TR					
ELET 100	Elective	3.00	TR	I				
ELET 100	Elective	3.00	TR	I				
ELET 100	Elective	1.00	TR	I				
HIST 141	U.S. Survey Before 1865	3.00	TR					
PSYC 101	Introduction to Psychology	3.00	TR					
Ehrs: 16.00	GPA-Hrs: 0.00	QPts: 0.00	GPA: 0.00					
INSTITUTION CREDIT:								
Fall 2019								
CHEM 105	General Chemistry I	4.00	B+	13.20				
CHEM 105L	Lab: General Chemistry I	0.00	NG	0.00				
IDFY 101	Fellowship of Inklings	3.00	A	12.00				
MATH 103	Supplemental Calculus I	1.00	A	4.00				
MATH 111	Calculus I	4.00	B	12.00				
MATH 111L	Lab: Calculus I	0.00	NG	0.00				
MUEN 122	Symphonic Winds	0.50	P	0.00 I				
MUEN 142	JazzTWO	0.50	P	0.00 I				
SPAN 102	Fundamentals of Spanish II	3.00	A	12.00				
Ehrs: 16.00	GPA-Hrs: 15.00	QPts: 53.20	GPA: 3.55					
Spring 2020								
BIBL 201	Encountering the Bible	3.00	A	12.00				
IDCR 151	Created & Called for Community	3.00	A	12.00				
MATH 112	Calculus II	4.00	A	16.00				
MATH 112L	Lab: Calculus II	0.00	NG	0.00				
MUAP 145	Applied Saxophone Lessons	1.00	A	4.00 I				
MUEN 122	Symphonic Winds	0.00	P	0.00 I				
MUEN 142	JazzTWO	0.00	P	0.00 I				
PHYS 211	General Physics I	4.00	A	16.00				
PHYS 211L	Lab: General Physics	0.00	NG	0.00				
SPAN 201	Intermediate Spanish	3.00	A	12.00				
Ehrs: 18.00	GPA-Hrs: 18.00	QPts: 72.00	GPA: 4.00					
UG Dean's List								
***** CONTINUED ON NEXT COLUMN *****								

  
Carrie D. Widdowson, Registrar

The Family Educational Rights and Privacy Act of 1974 prohibits the release or disclosure of its contents to a third party without the written consent of the student.

Name: Hanna M. Pavill

Date Issued: 22-DEC-2021

Date of Birth:

Student ID:

Student SSN:

SUBJ NO.	COURSE TITLE	CRED GRD	PTS R
Institution Information continued:			
MUAP 145	Applied Saxophone Lessons	1.00 A	4.00 I
MUEN 122	Symphonic Winds	0.50 P	0.00 I
MUEN 141	JazzONE	0.50 P	0.00
MUEN 147	Saxophone Quartet	0.50 P	0.00 I
MUMH 338	Studies in Global Music	2.00 A	8.00
MUTH 107	Sight Singing & Ear Training I	1.00 A	4.00
PHYS 425	Solid State Physics	3.00 A	12.00
WELL 137	Fitness Walking	1.00 P	0.00
Ehrs: 16.50 GPA-Hrs: 14.00 QPts:		56.00 GPA:	4.00
UG Dean's List			

Spring 2022

IN PROGRESS WORK

ENGR 371	Thermodynamics	3.00	IN PROGRESS
MUAP 145	Applied Saxophone Lessons	1.00	IN PROGRESS
MUEN 135	Wind Ensemble	0.50	IN PROGRESS
MUEN 141	JazzONE	0.50	IN PROGRESS
MUEN 147	Saxophone Quartet	0.50	IN PROGRESS
MUTH 108	Sight Singing & Ear Trng II	1.00	IN PROGRESS
PHYS 317	Optics	3.00	IN PROGRESS
PHYS 322	Independent Research	1.00	IN PROGRESS
PHYS 402	Quantum Mechanics	3.00	IN PROGRESS

In Progress Credits 13.50

***** TRANSCRIPT TOTALS *****				
	Earned Hrs	GPA Hrs	Points	GPA
TOTAL INSTITUTION	93.50	87.00	335.10	3.85
TOTAL TRANSFER	16.00	0.00	0.00	0.00
OVERALL	109.50	87.00	335.10	3.85
***** END OF TRANSCRIPT *****				



Messiah University is a private Christian university of the liberal arts and applied sciences offering the following degrees:

Bachelor of Arts, Bachelor of Science, Bachelor of Business Administration, Bachelor of Music, Bachelor of Fine Arts, Bachelor of Social Work, Bachelor of Science in Engineering, Bachelor of Science in Biomedical Engineering, Bachelor of Science in Civil Engineering, Bachelor of Science in Electrical Engineering, Bachelor of Science in Mechanical Engineering, Bachelor of Science in Nursing, Master of Arts, Master of Athletic Training, Master of Music, Master of Education, Master of Business Administration, Master of Occupational Therapy, Master of Science, Master of Science in Nursing, Doctor of Nursing Practice, and Doctor of Physical Therapy.

#### UNIVERSITY NAME:

Previous university names: Messiah Bible School and Missionary Training Home, 1909; Messiah Bible College, 1924; Messiah College, 1951; Messiah University, 2020

#### ACCREDITATION

Messiah University is accredited by the Middle States Association of Colleges and Schools and approved by the Pennsylvania State Department of Education. In addition, a number of academic programs are accredited by various agencies. This information can be found in our online college catalogs.

#### CREDIT

The traditional undergraduate academic year is divided into two semesters. A credit hour (or semester hour) is equivalent to one class hour a week or approximately 15 hours. The undergraduate Adult Degree Program academic year is divided into three semesters. A credit hour (or semester hour) is equivalent to one hour of instruction or approximately 15 hours.

The graduate academic year is divided into three semesters. A credit hour (or semester hour) is equivalent to one hour of instruction or approximately 14 hours.

#### GRADING SYSTEM

Undergraduate Grading System			Graduate Grading System		
Letter Grade	Definition	Quality Points	Letter Grade	Definition	Quality Points
A	Honor-Outstanding	4.00	A	Outstanding	4.00
A-		3.70	A-	Excellent	3.70
B+		3.30	B+	Above Average	3.30
B		3.00	B	Average	3.00
B-		2.70	B-	Somewhat less than Average	2.70
C+	Excellent-Above Average	2.30	C+	Less than Average	2.30
C		2.00	C	Below Average/Minimally Satisfactory	2.00
C-		1.70	F	Unsatisfactory	0.00
D+		1.30	P	Satisfactory	0.00
D		1.00	I, MI	Incomplete	0.00
F	Poor-Below Average	0.00	W	Withdrew	0.00
P	Failing-No Credit	0.00	NG	Non-Graded Course	0.00
NC	Passing	0.00	NR	No Grade Reported	0.00
NG	Failing	0.00	IP	In Progress	0.00
NR	Non-Graded Course	0.00	<u>Repeat Codes</u>		
IP	No Grade Reported	0.00	E	Grade is excluded from the cumulative GPA calculation	
I, MI	In Progress	0.00	I	Grade is included in the cumulative GPA calculation	
W	Incomplete	0.00			
WP	Withdrew	0.00			
WF	Withdrew Passing	0.00			
AU	Withdrew Failing	0.00			
	Audit	0.00			
<u>Repeat Codes</u>					
E	Grade is excluded from the cumulative GPA calculation				
I	Grade is included in the cumulative GPA calculation				

#### REPEATED COURSES

If a course has been repeated it will be denoted with an **E** or **I** in the “R” column next to the quality points (PTS).

#### UNDERGRADUATE DEAN’S LIST

Students achieving a semester grade point average of 3.6 or higher for 12 or more graded hours are placed on the Dean’s List at the end of each semester.

#### UNDERGRADUATE GENERAL EDUCATION AND COMMON LEARNING WRITING INTENSIVE COURSES

The writing across the curriculum requirements consist of three courses: IDFY 101, IDCR 151 and the major-specific writing intensive course for the major.

Prior to Fall 2006 semester, writing intensive courses appear on the transcript with a **W** suffix on the course number (e.g. ENG 255W).

Fall 2006 through Fall 2018, the writing intensive sections appear on the transcript with a **(W)** following the title of the section (e.g. Intro to Poetry (W)). Spring 2019 forward, these courses are IDFY 101/102 and IDCR 151.

# SULI PROGRAM APPLICATION RECOMMENDATION FOR HANNA MICHELLE PAVILL

## Recommender Contact Information

- **First Name:** Abaz
- **Last Name:** Kryemadhi
- **Title:** Prof. Physics
- **Department:** Computing, Math, and Physics
- **Institution/Organization:** Messiah University
- **Telephone:** 717-796-1800
- **Email:** akryemadhi@messiah.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 Hanna for three years as a student in my class and also she has been a TA in my introductory physics class.

### 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.

Hanna is a strong student in physics, she received an A in my General Physics Class. She is currently working on an independent project focusing on acoustics of a building on campus. This project requires a lot of independent work since our expertise as physics faculty is not on that area and she has been making progress on it reading relevant literature and coming up with mathematical models of best acoustics in the building.

Hanna has been a TA in my Introductory Physics class and I could not have asked for any better TA, she has arranged one to one meetings for students struggling in class, she does review sessions with students and she arranges these totally independently. Students comments that she is very eager to help them and explain things to them that connects to where students are struggling.

Hanna would greatly benefit from a SULI program, and I strongly recommend her for this 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 HANNA MICHELLE PAVILL

## Recommender Contact Information

- **First Name:** Niklas
- **Last Name:** Hellgren
- **Title:** Dr./ Associate Professor of Physics / Department chair
- **Department:** Dept. of Computing, mathematics & Physics
- **Institution/Organization:** Messiah University
- **Telephone:** 717-796-1800
- **Email:** nhellgren@messiah.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 Hanna since she started at Messiah University in the fall of 2019 in the capacity as her academic advisor and professor. I had Hanna as a student in General Physics II and Modern Physics classes, and, this coming spring, in Optics. Hanna is also an officer for the Messiah University Physics Club, for which I am the advisor.

### 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 think Hanna has everything it takes to be a great, productive, and successful SULI intern!

Academically Hanna is a very strong student, which is evident from her 3.85 cumulative GPA. She is not the kind of student who understand everything perfectly right away. Instead, she works hard and methodically to figure things out, and she's not afraid to ask questions when needed. These are traits that will serve her well when things become complicated, as they often do in research.

In addition to being gifted intellectually, Hanna has an admirable work ethic, she knows what she wants, and is very organized.

Already from the start, Hanna told me that she was interested in acoustics, so this last year she planned and started a research project, measuring, among other things, damping coefficients as a function of frequency for various configurations of our concert halls. The project is still ongoing, but I can tell that Hanna has the drive, creativity, organization, passion, and not the least, patience and organizational skills to do good research.

Apart from being a physics major, Hanna is also very involved in the music program here on campus. She plays the saxophone in a number of groups, including a jazz band (which is part of the reason she's interested in acoustics) She is also involved in the Messiah Physics Club, and she's working as a tutor in our department.

In summary, Hanna has the aptitude and dedication to make significant and positive contributions in the science community. Her work at Messiah University has demonstrated her dedication to excellence, her ability to work well with others, and her mastery of the necessary knowledge to be

a successful participant in the SULI program. It is with pleasure and without hesitation that I highly recommend Hanna for acceptance to the SULI 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	