

STEM Summer Research Pre & Post Survey - Summer 2024

The following report summarizes the results of the STEM Summer Research Pre and Post Surveys administered in Summer 2024. The surveys assessed students' interest in STEM, motivation for participating in the program, and sense of belonging within the field and research environment. A total of 8 students completed the pre-survey, while 5 students completed the post-survey. The difference in response counts limits the ability to make direct one-to-one comparisons between pre- and post-survey data. As a result, the data is presented in aggregate form rather than as direct pre/post comparisons.

Interest

PRE-Survey Question	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		Total
	#	%	#	%	#	%	#	%	#	%	
STEM fascinates me.	8	100.0	0	0.0	0	0.0	0	0.0	0	0.0	8
I am excited about STEM.	8	100.0	0	0.0	0	0.0	0	0.0	0	0.0	8
I think what we will learn in this research program is important.	7	87.5	1	12.5	0	0.0	0	0.0	0	0.0	8
To be honest, I just don't find STEM interesting.	0	0.0	0	0.0	0	0.0	0	0.0	8	100.0	8
I think the field of STEM is an important discipline.	8	100.0	0	0.0	0	0.0	0	0.0	0	0.0	8
I think what we will learn in this research program will be useful for me to know.	7	87.5	1	12.5	0	0.0	0	0.0	0	0.0	8
I think the field of STEM is very interesting.	8	100.0	0	0.0	0	0.0	0	0.0	0	0.0	8

POST-Survey Question	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		Total
	#	%	#	%	#	%	#	%	#	%	
STEM fascinates me.	5	100.0	0	0.0	0	0.0	0	0.0	0	0.0	5
I am excited about STEM.	5	100.0	0	0.0	0	0.0	0	0.0	0	0.0	5
I think what we will learn in this research program is important.	4	80.0	0	0.0	1	20.0	0	0.0	0	0.0	5
To be honest, I just don't find STEM interesting.	0	0.0	0	0.0	0	0.0	0	0.0	5	100.0	5
I think the field of STEM is an important discipline.	5	100.0	0	0.0	0	0.0	0	0.0	0	0.0	5
I think what we will learn in this research program will be useful for me to know.	3	60.0	0	0.0	1	20.0	1	20.0	0	0.0	5
I think the field of STEM is very interesting.	5	100.0	0	0.0	0	0.0	0	0.0	0	0.0	5

Motivation

PRE-Survey Question	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		Total
	#	%	#	%	#	%	#	%	#	%	
I think STEM is important.	8	100.0	0	0.0	0	0.0	0	0.0	0	0.0	8
I have to give up too much to do well in this research program.	0	0.0	2	25.0	2	25.0	0	0.0	4	50.0	8
I value STEM.	7	87.5	0	0.0	0	0.0	1	12.5	0	0.0	8
I believe I can be successful in this research program.	6	75.0	0	0.0	0	0.0	2	25.0	0	0.0	8
I believe participating in this research program will be useful.	7	87.5	0	0.0	0	0.0	1	12.5	0	0.0	8
Because of other things I do, I don't have time to put into this research program.	0	0.0	2	25.0	0	0.0	0	0.0	6	75.0	8
This research program will require too much time.	0	0.0	2	25.0	0	0.0	0	0.0	6	75.0	8
I am unable to put in the time needed to do well in this research program.	0	0.0	1	12.5	0	0.0	0	0.0	7	87.5	8
I am confident that I can understand the material in this research program.	5	62.5	0	0.0	1	12.5	2	25.0	0	0.0	8

POST-Survey Question	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		Total
	#	%	#	%	#	%	#	%	#	%	
I think STEM is important.	5	100.0	0	0.0	0	0.0	0	0.0	0	0.0	5
I have to give up too much to do well in this research program.	0	0.0	1	20.0	2	40.0	0	0.0	2	40.0	5
I value STEM.	5	100.0	0	0.0	0	0.0	0	0.0	0	0.0	5
I believe I can be successful in this research program.	1	20.0	0	0.0	2	40.0	2	40.0	0	0.0	5
I believe participating in this research program will be useful.	3	60.0	0	0.0	1	20.0	1	20.0	0	0.0	5
Because of other things I do, I don't have time to put into this research program.	0	0.0	2	40.0	1	20.0	0	0.0	2	40.0	5
This research program will require too much time.	0	0.0	1	20.0	3	60.0	0	0.0	1	20.0	5
I am unable to put in the time needed to do well in this research program.	0	0.0	2	40.0	0	0.0	1	20.0	2	40.0	5
I am confident that I can understand the material in this research program.	0	0.0	0	0.0	2	40.0	3	60.0	0	0.0	5

Sense of Belonging

PRE-Survey Question	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		Total
	#	%	#	%	#	%	#	%	#	%	
I belong within the field of STEM	7	87.5	0	0.0	0	0.0	1	12.5	0	0.0	8
I feel like the field of STEM is a good fit for me.	7	87.5	0	0.0	0	0.0	1	12.5	0	0.0	8
I feel welcome in the field of STEM.	3	37.5	0	0.0	3	37.5	2	25.0	0	0.0	8
Sometimes I feel that I belong in the STEM field and sometimes I feel that I don't belong in the STEM field.	1	12.5	0	0.0	3	37.5	0	0.0	4	50.0	8
When something bad happens, I feel that maybe I don't belong in the STEM field.	1	12.5	2	25.0	2	25.0	1	12.5	2	25.0	8
I belong within this STEM research program.	3	37.5	0	0.0	1	12.5	4	50.0	0	0.0	8
I feel like this research program is a good fit for me.	4	50.0	0	0.0	1	12.5	3	37.5	0	0.0	8
I feel welcome in this research program.	5	62.5	0	0.0	0	0.0	3	37.5	0	0.0	8

POST-Survey Question	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		Total
	#	%	#	%	#	%	#	%	#	%	
I belong within the field of STEM	4	80.0	0	0.0	1	20.0	0	0.0	0	0.0	5
I feel like the field of STEM is a good fit for me.	4	80.0	0	0.0	1	20.0	0	0.0	0	0.0	5
I feel welcome in the field of STEM.	3	60.0	0	0.0	1	20.0	1	20.0	0	0.0	5
Sometimes I feel that I belong in the STEM field and sometimes I feel that I don't belong in the STEM field.	1	20.0	1	20.0	0	0.0	2	40.0	1	20.0	5
When something bad happens, I feel that maybe I don't belong in the STEM field.	1	20.0	0	0.0	2	40.0	1	20.0	1	20.0	5
I belong within this STEM research program.	2	40.0	1	20.0	1	20.0	1	20.0	0	0.0	5
I feel like this research program is a good fit for me.	2	40.0	1	20.0	1	20.0	1	20.0	0	0.0	5
I feel welcome in this research program.	3	60.0	1	20.0	1	20.0	0	0.0	0	0.0	5

Key Insights – Expectation for the Research Program

- Students hoped to gain hands-on research experience and build technical lab skills.
- Many aimed to explore STEM career paths and strengthen grad school applications.
- Several expected to learn coding, data analysis, or scientific research methods.
- Some mentioned specific interests like geology, biomedical science, or weather analysis.
- A few were unsure what to expect but expressed curiosity and eagerness to learn.
- Some hoped to build professional connections and gain exposure to real lab environments.

PRE-SURVEY - Expectation

What are your expectations for this STEM research program? Please describe in detail what specific skills, knowledge, or experiences you hope to gain during your participation. (n=8)
As someone who aims to pursue a Ph.D. In Astronautical Engineering, I believe this will grant me insight on how real tangible research is conducted. In addition, having such research on my CV would likely make me a strong candidate for the institutions I want to go to, such as Caltech. I have some basic lab experience from my Chem 101 and Chem 150 course. I have completed many Math courses, such as Calculus II. I also have taken an introductory Physics class and have a keen interest in astronomy. I have also completed an introductory C++ so I do have some coding knowledge but I don't feel super solid on the topic.
I am expecting to learn how to understand weather gradient maps, work with python, lennex, and how to understand weather pattern changed over time.
I am looking forward to getting real research experience, learning new technologies, making new personal and professional connections, being able to put this experience on my resume, and hopefully getting future research opportunities
I do not know what to expect. I think I may be analyzing data but I don't know what form of data.
I love that I will be learning about sedimentary geology, and working with pre-cambrian samples from all around the world. This will supplement my sedimentary geology class in the fall semester. This is part of my PI's research paper, I expect to be familiar with this kind of research since I want to go to graduate school, gain relatable experience, do lab work in geology specifically.
Learning how to utilize lab equipment that can analyze and interpret samples, proper specimen collection, research methodology, and types of water pollutants.
My expectations are gonna be expanding on my understanding of how data is processed. I would also hope that I will be able to become more familiar with the technology that is going to be used within the lab as well. In addition, I also hope that this will be the opportunity for me to get my foot in the door of professional research and to get more familiar with a more professional setting.
My expectations for this STEM research program is to learn more about my own career goals. I am considering going into research as a future career and I would like to explore this interest in lab. I haven't participated in research before, so I look forward to participating in a college-level research lab. My labs focus is Biomedical, I want to learn more about Alzheimer's and how dietary intervention can affect cognitive skills based on the fruit fly models. I am very excited to have the opportunity to participate in this lab that can contribute to future research.

Key Insights – Reflections on Program Participation

- Students gained skills in coding (e.g., Python) and lab techniques (e.g., dissections, assays).
- Reported improvements in scientific literacy, data documentation, and interpreting research.
- Some clarified their career direction (e.g., shifting from astrophysics to biophysics).
- Some valued real lab experience, teamwork, and opportunities to take initiative.
- Challenges included gaps in content knowledge and building confidence in new environments.

POST-SURVEY- Reflection

Reflecting on your participation in this STEM research program, what specific skills, knowledge, or experiences did you gain? (n=5)
I feel like I have a better idea on what a lab is going to be like in the future as well as now I have a better understanding of the work that could be needed in a lab. I also feel like I have a better understanding on the effects of RSC and how it effects flies as well as how it could effect other animals and humans.
I learned a lot about computer programming and I also learned how much I do not know and still do not know about computer programming.
I learned how to dissect drosophila brains, I learned how to make different concentrations of a nutraceutical, I learned how to properly keep data in my lab notebook, I learned how to document health span and lifespan assays , I learned how to conduct assays for drosophila, I learned more about Alzheimer's disease , I learned about others research, I learned how to be in a research setting
I learned to code in python, gained better scientific literacy, learned to take initiative, and gained a firmer direction. What I mean by taking initiative is that I played with the data by myself without being told to do so, I was waiting on instructions for most of this internship. Taking initiative gave me a better opportunity to express my creativity and curiosity. By "gaining firmer direction" I mean I am sure I want to become a researcher in biophysics. Expressing my creativity and curiosity is something I don't get to do much in formal research settings. Now that I have done so, I can say, positively, that I enjoy it and would love to work as a researcher. I mention the biophysics part because actually working in astrophysics, I realize that much of the work does not align with my goals and beliefs.
Understanding prep work Lab skills Reading graphs Technical comprehension Understanding a research paper

Overall Summary

While the number of respondents differed between the pre-survey (n = 8) and post-survey (n = 5), both sets of responses provide valuable insight into students' experiences. Across both surveys, students expressed a consistent interest in STEM, a strong sense of its value, and feelings of belonging in the field and within the research program. Post-survey data indicated declines in confidence, perceived time availability, and the usefulness of the program content, suggesting areas for further exploration.

Open-ended comments emphasized students' expectations for hands-on research, technical skill-building, and career exploration. Reflections showed gains in coding, lab work, and scientific literacy. For some, the program helped shape or clarify career interests, and highlighted the value of initiative and self-directed learning in research.

Overall, the STEM Summer Research Program appears to have had a meaningful impact on participants' academic growth, skill development, and professional direction.