

**Evaluation of the California Institute of  
Technology (Caltech)  
Global Relay of Observatories Watching  
Transients Happen (GROWTH)  
Partnership for International Research and  
Education (PIRE)  
2018 GROWTH SURF Internship**

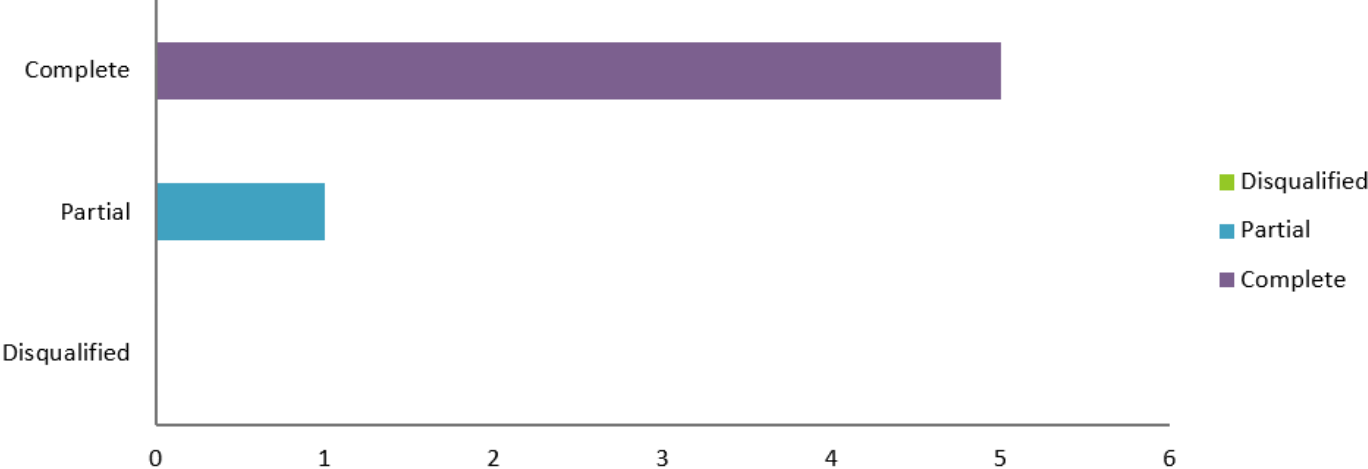
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Response Statistics



	Count	Percent
Complete	5	83
Partial	1	17
Disqualified	0	0
Totals	6	

1.Please rate how useful the following services were during your GROWTH SURF internship on a scale from not at all useful to extremely useful.

	Not at all useful		Slightly useful		Somewhat useful		Very useful		Extremely useful		N/A		Responses
	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count
Information provided by my home institution mentor about the internship.	0	%	0	%	0	%	3	50%	3	50%	0	%	6
Support and assistance provided by the GROWTH/Caltech SURF staff during my time away.	0	%	0	%	1	17%	2	33%	3	50%	0	%	6
Informational/welcome meeting with my host institution mentor.	0	%	0	%	0	%	4	67%	2	33%	0	%	6
Response to my questions, requests, and needs from my host institution.	0	%	0	%	0	%	4	67%	2	33%	0	%	6
Academic support provided by my host institution mentor during my Summer Research Program.	0	%	0	%	0	%	4	67%	2	33%	0	%	6
Social activities and events provided/organized by my host institution.	0	%	0	%	0	%	3	50%	3	50%	0	%	6

2.Is there any other information and/or assistance from your home institution that proved to be useful or that would have been useful? Please explain.

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Response

My home institution was extremely helpful in providing me international health insurance for my trip.

My mentors at my host institution were very forthcoming with any information I requested both in regards to the project and relating to career planning and academia

None that I can think of.

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3.Is there any other information and/or assistance from your host institution that proved to be useful or that would have been useful? Please explain.

Response

I could have used more information on navigating events and things to do in the city, or perhaps been pointed to a student social club or something

My host institution did an amazing job of making me feel included and helping navigate [name of city removed] without speaking [the language].

None that I can think of.

#### 4.Overall experience

Please rate your level of agreement with the following statements about SURF on a scale from strongly disagree to strongly agree.

	Strongly disagree		Disagree		Neither disagree/agree		Agree		Strongly agree		Responses
	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count
I felt my internship was an appropriate length of time.	0	%	0	%	0	%	3	50%	3	50%	6
I had the necessary skills to be successful during my internship.	0	%	0	%	0	%	5	83%	1	17%	6
I felt part of a community at my host institution.	0	%	0	%	1	17%	4	67%	1	17%	6
I was motivated and engaged with my assigned project throughout the summer.	0	%	0	%	0	%	2	33%	4	67%	6
I was intellectually challenged by the work/project I was assigned.	0	%	0	%	0	%	4	67%	2	33%	6
I learned new skills.	0	%	0	%	0	%	2	33%	4	67%	6
The GROWTH SURF experience met my expectations.	0	%	0	%	0	%	4	67%	2	33%	6
I feel like my contributions were valuable.	0	%	0	%	0	%	4	67%	2	33%	6

## 5.What was the most important skill you gained from participating in GROWTH SURF?

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Response

Data analysis

How to extract information from raw data.

I learned a lot about constraining physical models using statistical methods, which will be useful in any branch of physics moving forward

I learned how to navigate a new culture, and many skills about creating light curves from raw telescope data and data analysis. I also learned how to open myself to entirely new experiences.

I learned some photometric skills which would be helpful for images with bad quality and some analyzing skills on the survey data.

The most important skill I learned was using Python, IRAF, etc. and in general how observational astronomers analyze their data.

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## 6.Experience with host mentor

Please rate your level of agreement with the following statements about SURF on a scale from strongly disagree to strongly agree.

	Strongly disagree		Disagree		Neither disagree/agree		Agree		Strongly agree		Responses
	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count
My host mentor provided me with adequate supervision and guidance, including feedback, during my time at my host institution.	0	%	0	%	0	%	3	50%	3	50%	6
My host mentor kept me engaged with the project throughout the program.	0	%	0	%	0	%	4	67%	2	33%	6
The frequency of meetings with my mentor was sufficient.	0	%	0	%	0	%	3	50%	3	50%	6



7.Do you plan to continue working with your host mentor or other individuals with whom you worked during the SURF program? Please explain why or why not.

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Response

I do not plan to continue working since it might be difficult to continue when we are no longer in the same country. In addition, I have a research project in my home institution that I work on and I feel that doing both would be too much.

I plan to continue the final analysis with my mentor. [He/She] plans to include my contributions in a future paper so I may make more contributions there. I am a senior and working on a senior thesis with my home institution but I am hopeful I can keep in contact with my mentor.

I would be happy to, but probably will not because I'm [finishing up program soon], and have a lot of course work and research at my home institution this year

No. I have finished my project.

Yes, I would like to because some parts of the project are still need further analysis to gain good results. And it was a good experience working with my mentor. I learned a lot from [him/her], so it would be great to continue working with [him/her].

Yes, if I have the chance. Because I still think I can do a lot more with the skill I have.

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## 8. Research knowledge and skills

Please rate the following items regarding your knowledge and abilities **before** your GROWTH SURF internship on a scale from minimal to extensive.

	Minimal		Slight		Moderate		Great		Extensive		Responses
	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count
My understanding of the research process in astronomy/astrophysics.	0	%	0	%	2	40%	3	60%	0	%	5
My ability to conduct astronomy/astrophysics research.	0	%	1	20%	2	40%	1	20%	1	20%	5
My knowledge of how to present scientific results in written reports.	0	%	0	%	3	60%	2	40%	0	%	5
My overall knowledge of astronomy/astrophysics.	0	%	0	%	2	40%	3	60%	0	%	5

9.Please rate the following items regarding your knowledge and abilities after your GROWTH SURF internship on a scale from minimal to extensive.

	Minimal		Slight		Moderate		Great		Extensive		Responses
	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count
My understanding of the research process in astronomy/astrophysics.	0	%	0	%	0	%	4	80%	1	20%	5
My ability to conduct astronomy/astrophysics research.	0	%	0	%	1	20%	4	80%	0	%	5
My knowledge of how to present scientific results in written reports.	0	%	0	%	0	%	5	100%	0	%	5
My overall knowledge of astronomy/astrophysics.	0	%	0	%	0	%	5	100%	0	%	5

10.Do you believe that participating in the GROWTH SURF program has improved your skills as a researcher?

Value	Percent	Count
Yes	100%	5
Totals		5
Statistics		
Total Responses	5	

11.Please explain:

Response
During meetings and telecoms, my mentor and other researchers in our group always can give me some ways to improve our results and correction to my analyzing procedures.
I have learned to define my own project and improved my data analysis skill.
I learned a lot of new skills this past summer and was presented with opportunities to level up my understanding of how theoretical research can be combined with experimental observations to produce practical results. I look forward to the next phase of my career in astronomy.
I learned to tackle problems on my own as well as explored different numerical methods of more efficiently fitting data to a template which is an essential skill in astronomy.
Practice makes perfect, I have never had this experience before.

## 12.Career and education interest

Please rate the following statements about your interest **before** your GROWTH SURF internship on a scale from minimal to extensive.

	Minimal		Slight		Moderate		Great		Extensive		Responses
	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count
My interest in conducting astronomy/astrophysics research.	0	%	0	%	3	60%	2	40%	0	%	5
My interest in pursuing a graduate degree in astronomy/astrophysics.	0	%	0	%	3	60%	2	40%	0	%	5
My interest in pursuing a career in astronomy/astrophysics.	0	%	0	%	2	40%	3	60%	0	%	5

13. Please rate the following statements about your interest after your GROWTH SURF internship on a scale from minimal to extensive.

	Minimal		Slight		Moderate		Great		Extensive		Responses
	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count
My interest in conducting astronomy/astrophysics research.	0	%	0	%	0	%	4	80%	1	20%	5
My interest in pursuing a graduate degree in astronomy/astrophysics.	0	%	0	%	0	%	3	60%	2	40%	5
My interest in pursuing a career in astronomy/astrophysics.	0	%	0	%	0	%	4	80%	1	20%	5

14. Please describe how participating in the GROWTH SURF program has helped to prepare you for graduate school and/or a career in astronomy/astrophysics and how.

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Response

After the program, I had experiences of doing photometry for images, analyzing survey data, and machine learning. These experiences would be able to convince the committee to admit me to the graduate school.

As a rising [year removed], I had little astronomy/astrophysics knowledge. Through the GROWTH SURF program, I had learned a lot about asteroids. Under my mentor's guidance, I have successfully completed my project. This project has taught me how to solve problems using my technical skills as well as how to define my own research topic. These skills are essential for graduate school and a career in astronomy/astrophysics.

I feel way more prepared to conduct research in graduate school after learning new skill sets with the internship. Specifically I will be able to employ sampling algorithms, build systems of functions in python, analyze probabilistic model fits, and present my work with a strong lean towards understanding the motivation of the research.

I learnt tons of different astronomy knowledges, and that certainly helps.

The GROWTH SURF program did a great job of simulating the graduate school experience. I had biweekly meetings with my mentor but was also given space to explore problems on my own. Also I absolutely loved being able to devote all of my time on a research question.

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15.If you are interested in participating further in astronomy/astrophysics research projects, please explain why. If not, please explain why not.

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Response

Astronomy has been my favorite subject since I was in junior high school. Doing research in astronomy is kind of dream job for me. Therefore, I am glad if I can still participate in astronomy research projects. This is what I want to do in my whole life.

I am interested in participating further in astronomy/astrophysics research projects because astronomy/astrophysics are very interesting and exciting subjects. It allows me to further explore the unknowns of the universe.

I am interested. I enjoy working on the edge of discovery, and being in the frontlines of knowledge as it unfolds and is released to the public. I also really enjoy working with cutting edge techniques and technologies to understand phenomena that occur outside of our planet.

This experience allowed me to explore a new field of time domain astronomy which I really enjoyed. I am excited to explore a graduate school career and explore even more exciting areas of astronomy.

Yes, because I really want to substitute most of the pipeline with machine learning model.

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## 16.Global research competencies

Please rate the following statements about your understanding and ability **before** your GROWTH SURF internship on a scale for minimal to extensive.

	Minimal		Slight		Moderate		Great		Extensive		Responses
	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count
My understanding of how different cultural backgrounds influence individuals' research perspectives.	1	20%	1	20%	2	40%	1	20%	0	%	5
My understanding of how different cultural backgrounds influence communication.	1	20%	1	20%	2	40%	1	20%	0	%	5
My ability to modify my communication style to fit a culturally diverse audience.	0	%	2	40%	2	40%	1	20%	0	%	5

17. Please rate the following statements about your understanding and ability after your GROWTH SURF internship on a scale for minimal to extensive.

	Minimal		Slight		Moderate		Great		Extensive		Responses
	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count
My understanding of how different cultural backgrounds influence individuals' research perspectives.	0	%	0	%	0	%	5	100%	0	%	5
My understanding of how different cultural backgrounds influence communication.	0	%	0	%	0	%	5	100%	0	%	5
My ability to modify my communication style to fit a culturally diverse audience.	0	%	0	%	0	%	5	100%	0	%	5

18.Please rate your agreement with the following statements on a scale from strongly disagree to strongly agree.

	Strongly disagree		Disagree		Neither disagree/agree		Agree		Strongly agree		Responses
	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count
I have a better understanding of what skills and competencies are required in the global workplace.	0	%	0	%	0	%	3	60%	2	40%	5
My GROWTH SURF experience helped me develop skills and competencies that will benefit me in the global workplace.	0	%	0	%	0	%	2	40%	3	60%	5

## 19.Collaboration

Please rate the following statements **before** your GROWTH SURF internship on a scale from minimal to extensive.

## 19.Collaboration

Please rate the following statements **before** your GROWTH SURF internship on a scale from minimal to extensive.

	Minimal		Slight		Moderate		Great		Extensive		Responses
	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count
My understanding of how to collaborate on a project with researchers from other countries.	0	%	3	60%	1	20%	1	20%	0	%	5
My understanding of how to form or be a part of international scientific collaborations.	0	%	3	60%	0	%	2	40%	0	%	5
My understanding of how collaborating with researchers from another discipline and/or country is beneficial for me.	0	%	1	20%	3	60%	1	20%	0	%	5
My motivation to collaborate on scientific projects with researchers from other countries.	0	%	1	20%	2	40%	1	20%	1	20%	5

20. Please rate the following statements after your GROWTH SURF internship on a scale from minimal to extensive.

	Minimal		Slight		Moderate		Great		Extensive		Responses
	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count
My understanding of how to collaborate on a project with researchers from other countries.	0	%	0	%	0	%	5	100%	0	%	5
My understanding of how to form or be a part of international scientific collaborations.	0	%	0	%	0	%	4	80%	1	20%	5
My understanding of how collaborating with researchers from another discipline and/or country is beneficial for me.	0	%	0	%	0	%	3	60%	2	40%	5
My motivation to collaborate on scientific projects with researchers from other countries.	0	%	0	%	0	%	2	40%	3	60%	5

21.Did you learn about the GROWTH project before or after participating in the GROWTH SURF program?

Value	Percent	Count
Yes	100%	5
Totals		5
Statistics		
Total Responses		5

22.Did you learn how your research connects to GROWTH?

Value	Percent	Count
Yes	100%	5
Totals		5
Statistics		
Total Responses		5

23.Do you want to continue to participate in research activities within the GROWTH collaboration?

Value		Percent	Count
Yes	<div></div>	100%	5
Totals			5
Statistics			
Total Responses		5	



24.We try to provide students with tools to remain connected to the GROWTH research community in the future. In addition to direct communication with your mentor(s), we have a Facebook group for students, our newsletter, and mailing lists. Do you think these resources are useful?

Value	Percent	Count
Yes	100%	5
Totals		5
Statistics		
Total Responses	5	

25. Do you plan to utilize one or more of these resources to stay connected to the GROWTH research community beyond your SURF experience? Please explain why or why not.

Response

I plan on continuing to stay in contact with my mentor, and keep up to date with GROWTH activities, and apply to graduate schools in the GROWTH collaboration. Not yet, since I usually use emails in researches.

Yes, I think overall it was a good experience, and everyone was very helpful. Also, it's a good thing to stay in touch with other researchers and stay involved.

Yes. They are useful resources for me to gain more information about GROWTH projects as well as up to date researches.

26.What other resources would enable you to stay connected to the GROWTH project?

No comments were provided.

27.In addition to your final reports, do you plan to present your GROWTH SURF research results in the form of oral or poster presentations within the next academic year?

Value	Percent	Count
Yes	100%	5
Totals		5
Statistics		
Total Responses	5	

28.Where do you plan to present? (Please list the event and type of presentation)

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Response

2019 ASROC annual meeting

Currently I plan to present a poster at the Conference for Undergraduate Women in Physics.

Not sure yet, will participate if I have the chance.

SFP Seminar Day - Oral Presentation

University of Wisconsin-Milwaukee; both in astronomy club and in a research poster event at the end of the year. Also possibly a poster presentation at AAS in January

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29. Please explain why.

No comments were provided.

### 30.What suggestions do you have for improving the experience for future participants?

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Response

It was so good. So no suggestion for now.

N/A

Prepare beforehand by asking about social clubs at the university, and by asking a lot of questions of your mentors in help finding things to do and where to stay.

The network in the working place is way too traffic.

The what to expect Google Doc was a huge help in mentally preparing me for [city] and it was an incredible resource I hope continues to be available for future participants.

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31. During your time participating in GROWTH SURF, did you feel comfortable approaching your mentor or contacting the GROWTH/Caltech SURF coordinator when you needed help or support with personal issues? Please explain why or why not.

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Response

I definitely felt comfortable approaching the program or my mentor. Both did a great job of making me feel comfortable and included. My mentor did a great job of helping me arrange things like finding a cell phone carrier and having master students take me to buy groceries when there was a [natural disaster] warning.

I didn't have much in the way of personal issues. The commute to my apartment was long but everything was okay with all of that. If I had needed anything I definitely would have felt comfortable asking my mentors

I have not yet met any personal issues.

Yes, it was a good experience. [Program coordinator] did help me a lot for everything I needed, such as visa application, finding a place to live. [Name of mentor removed] is a nice mentor who taught me with patience when I encountered some problems even if he was busy.

Yes. They are very helpful and kind. They are always there to help whenever I am in need.

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32. During your time participating in GROWTH SURF, did you feel supported socially (e.g., did you have someone to guide you around the university or city where you were living, was there someone with whom you could talk when not conducting research, or did you have a way to communicate with others back home)? Please explain why or why not.

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Response

Caltech SFP provided plenty of information for living, tour and events from both campus and city. It enriched my life doing research there.

I was able to communicate with my family and friends back home via video chat everyday from my apartment and the university. I had gone out a couple of times with my roommates and a couple of times with work friends. Otherwise there was not a lot of social support outside of work, or as far as having a guide around the city or the campus

The masters students at [institution] were incredible. They did a great job of making me feel included and helping me navigate [city]. They took me to lunch everyday and dinner most days which relieved the burden of not being able to read the menu or speak to servers. They also invited me on a trip to explore the southern regions of [city] which was an experience that I will treasure for the rest of my life.

Yes, by email.

Yes. I made a lot of friends and traveled around [city] with some graduate students from [institution], [city], during my time in [city].

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33.If you felt stressed or anxious about your internship experience, what helped you reduce these feelings? What support would have helped reduce feelings of stress or anxiety?

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Response

Before the internship having the google doc of what to expect, as well as having a friend who completed a GROWTH SURF also in [city] really put myself and my parents at ease. Also the other intern being a native speaker was incredibly helpful and allowed a sense of freedom to explore I would not have felt otherwise.

[Name of mentor removed] shared a lot of experiences such as how to do a poster presentation, how to write a impressive abstract or report. These did help me reduce the stress when I needed to do them.

I think I had a pretty positive experience during my internship, so I didn't feel stressed or anxious about my experience.

I was able to ask questions of graduate student colleagues in my office, who were very helpful, and of my mentors anytime. They would answer reasonably quickly even if they were not present on campus. The campus was also very nice and it was great to take walks down to the lake or in the nearby parks to de-stress

Nope, everything is fine.

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34.What other support systems, services, or assistance do you wish you had to help with adjusting to work/life in a different country?

Response

In particular it would have been great to have more help with having a room to stay in such as a dorm or something closer to downtown, but I understand the housing in [host nation] is stretched very thin.

No problem at all.

Overall I felt as supported as possible while being basically illiterate which was just a feeling of helplessness and dependence on others I wasn't entirely expecting but learned to come to peace with during my stay.




35.With which gender do you most closely identify?

Value		Percent	Count
Male	<div><div></div></div>	60%	3
Female	<div><div></div></div>	40%	2
Totals			5
Statistics			
Total Responses		5	
Other, please specify:			
Totals		Count	0

36.With which racial/ethnic backgrounds do you most identify? (select all that apply)

Value	Percent	Count
Asian	60%	3
White	40%	2
Statistics		
Total Responses	5	
Other, please specify:		
Totals	0	

37.What is your current grade level?

Value		Percent	Count
Freshman		20%	1
Junior		20%	1
Senior		60%	3
Totals			5
Statistics			-
Total Responses	5		

38.How many internships or summer research programs have you participated in, including this one you just completed?  
Count all internships/programs inside and outside of GROWTH

Value		Percent	Count
1	<div><div></div></div>	60%	3
2	<div><div></div></div>	20%	1
5+	<div><div></div></div>	20%	1
Totals			5
Statistics			
Total Responses		5	
Min		1	
Sum		5	

39.Are you a first-generation college student?

Value		Percent	Count
Yes	<div><div></div></div>	60%	3
No	<div><div></div></div>	40%	2
Totals			5
Statistics			
Total Responses	5		



## Highlights

Respondents had increased research knowledge and skills, global research competencies, and collaboration skills. This was especially true for respondents' abilities to conduct research and their motivation to collaborate with others, which all respondents rated as great or extensive after participating in SURF.

- Respondents shared that the most important skills they gained during their time were related to coding and data analysis.

Respondents also indicated they had increased interest in pursuing further education and careers in astronomy/astrophysics, with all five indicating great or extensive interest in graduate degrees and pursuing careers.

- Respondents credited the direct hands-on experience with helping them feel more prepared for graduate school as this allowed them to gain more technical skills and participate in their own research projects.

All respondents indicated that they had learned about the GROWTH project, how their research interests connect to GROWTH, and that they are interested in participating in future research with GROWTH.

Respondents generally found SURF a positive experience and rated their experience with their mentors highly.

Respondents found the resources, such as the "Google doc of expectations" provided prior to the experience, to be very helpful in preparing them for what to expect during SURF.

**Program leads have continued to refine the SURF experience over the years. These survey results suggest that their refinement efforts have resulted in a consistently more positive experience for students compared to prior years.**

# Recommendations

Consider encouraging the host mentors to match the SURF intern with a local student who can serve as a resource as respondents found it helpful to have someone in their host country to navigate daily life, such as buying groceries or guiding them around the city.

Continue to encourage mentors to engage and be responsive to the needs and questions of their SURF participants both before and during the experience. This seemed to help the respondents both develop their skills more effectively and help to reduce the anxiety and stress of the experience.

Continue to encourage SURF participants to present their research at events like the GROWTH Science Conference or at their universities. By presenting their research at scientific conferences, participants will further develop both their presentation skills and networking skills. To help students continue to develop these skills, program leads and mentors should assist participants with identifying professional events in which they can present or offer suggestions on where to look for information on such events like their department office or astronomy clubs.