SLI STEM Internships

Editors:
Marissa Yanez, STEM Workforce Specialist
Sophia Kim, SLI Director
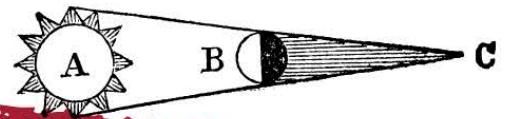
About the Internships

The Science Learning Institute's mission is to advance equity and diversity in STEM at Foothill College by supporting students from underrepresented groups in their academic and career pathways in STEM. As a way to achieve this mission, SLI provides internship opportunities for students at Foothill in the winter and summer through a structured program - the SLI STEM Internship Program.

Students participating in the SLI STEM Internship program will
- Gain hands-on, job-related skills in the relevant discipline.
- Gain exposure to work that may influence their career paths.
- Be mentored by a work supervisor who can provide support and insight in the working world.
- Have a community of support among the other interns in the program.
- Build their professional network for future employment opportunities.

Upon completion of all program requirements, students receive a stipend ranging from $1000 - $4000 depending on the time commitment.

Foothill students participating in the summer 2023 cohort were paired with mentors from local higher education institutions and tech companies to work on research and industry projects. These projects, ranging from python programming for particle accelerators to tumor segmentation, enabled students to gain insight into the research process and to work closely with mentors to advance academic and professional goals.

For more information about the summer internship program refer to the website: https://foothill.edu/sli/internships/summer.html or contact the SLI Director Sophia Kim (kimsophia@fhda.edu).

Summer 2023
Los Alto Hills, CA
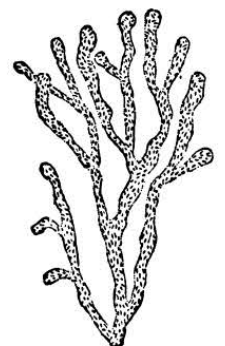
FOOTHILL COLLEGE
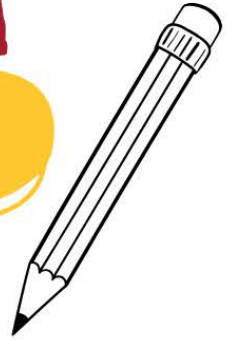### SCIENCE LEARNING INSTITUTE

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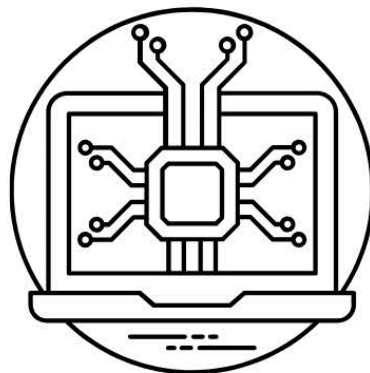Glycel Marie Brady
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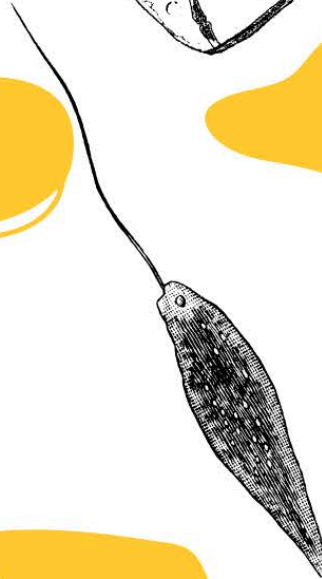
Engineering

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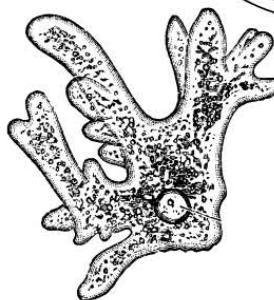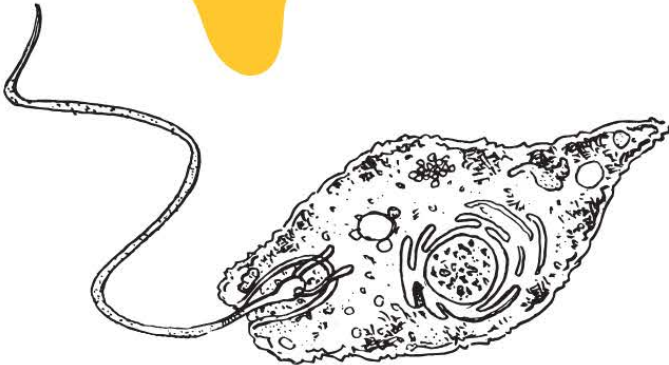Marisela Landaverde
Uriel "Yuri" Valencia
Vy Tran

Medicine

Abimbola Bolarinwa
Amanda Miller
Joshua Vera
Juan Marin Melo

Biology

Concern of the rise of C02 over 148 years
Andre Augustin
Summer 2023

About Me
Hometown: Palo Alto Native
Major: Computer Science
Year of graduation from Foothill: class of 2023, transferred to San Francisco State University

Placement
Name of institution: Plant Biology/ Carnegie of Science, Department of Global Ecology
Institution Website: https://carnegiescience.edu
Mentor: Haley Flickinger

Objective
My primary goal is to investigate any alterations in the behavior of herbivore insects and whether the influence of the rise of C02 due to climate change has changed the sugars by plants that could have consequential effects on our ecosystem.

Methods
To carry out this research, I plan to utilize image processing techniques, which help to collect and analyze data. With this I will be able gained from this data, I can then proceed to develop programming and algorithms that will provide me with an analysis.

Results & Discussion
In conclusion, my observations made an accurate correlation to the increase in herbivore activity, particularly in recent years. These findings agreed with my initial hypothesis, which I stated to have a surge in insect activity could be attributed to the rising levels of CO2, primarily due to the increased sugar production by plants. When it comes to nitrogen and carbon, were very minimal. Furthermore, I observed variations in plant size among different species, with the common milkweed being notably influenced and well noted that both plant chewing such as edge and inside had an influence with the size of the leaf which showed an increase of behavior.

Acknowledgements
I will thank my mentor Haley Flickinger for being a great mentor for me this past summer. Her patience and overall support system help me thrive in the research I was able to contribute to the science community.

The Gut Microbiota of Honeybees
Gina Hua
Summer 2023

ABOUT ME:
- Hometown: San Jose
- Major/certificate: Biology or Bioengineering
- Year of graduation from Foothill College: 2024

PLACEMENT:
Name of institution: Stanford Biology Department, Fukumi Lab
Website: https://web.stanford.edu/~fukamit/index.html
Supervisor: Magdalena Warren

OBJECTIVE:
The goal of the project was to find the effects of agricultural intensity on the gut microbiota of honeybees. My specific focus was to prepare a fungal library for sequencing, i.e. to sequence the ITS gene for fungal identification.

METHODS:
I performed DNA extraction on the gut samples to obtain the microbial DNA, and then amplified the ITS gene through PCR. To ensure that the PCR worked correctly and to check for contamination, I performed a gel electrophoresis on the amplified samples. If everything looks well, I would purify the DNA which would then be submitted for Next Generation Sequencing. With the retrieved sequences, the species of fungi residing in the honeybee gut could be determined.

RESULTS:
I amplified the ITS gene of approximately 100 samples. The next steps would be to complete the rest of the samples and analyze the fungal community. The completed microbial analyses would show the effects of agricultural intensity on the gut microbiota in addition to revealing the interactions between fungi and bacteria. Preliminary results suggest that the use of these pesticides/herbicides have an effect on the bacterial symbionts, so we would expect to see that with the fungi as well. Previous studies have shown the effects of these chemicals on bee health, but this project will be one of the first to show them outside of the lab.
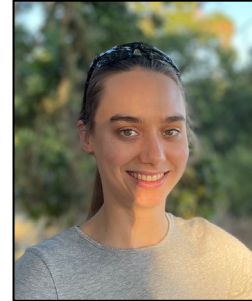
ACKNOWLEDGEMENTS:
- Magdalena Warren, Stanford Ph.D. Student in Biology
- Sophia Kim, SLI Director
- Marissa Yanez, SLI STEM Workforce Specialist

Structure and resilience of microbial interaction networks in a marine oxygen minimum zone

Hilary Bayer

Summary 2023

ABOUT ME:

- Hometown: Palo Alto
- Major/certificate: Applied Math
- Transfer institution: UCSB
- Year of graduation from Foothill College: transferred without graduating in 2023

PLACEMENT:

Name of company/institution: Carnegie Science
Website: https://carnegiescience.edu
Supervisor: Yi-Chun (Liv) Yeh

OBJECTIVE:

The objective of my internship was to investigate what functional groups of microbes are present in a marine oxygen minimum zone, how microbial community composition varies over time, and how it varies with temperature and nutrient concentration. We focused on functional groups related to the nitrogen cycle.

METHODS:

This project is based on data from the San Pedro Ocean Time Series, specifically from water samples collected at a depth of 500 meters between February 2001 and July 2016. Microbes in these water samples were identified using rRNA sequencing. We analyzed this data with Python and another programming language called R. In Python, we used a tool called FAPROTAX to map microbes to functional groups. We used R to work with the output from FAPROTAX, to do principal component analysis and canonical correlation analysis, and to create figures.

RESULTS & DISCUSSION:

There appears to a weak relationship between environmental variables and functional composition. It may be that there are unmeasured variables that influence taxonomic and functional composition of the microbial community. This weak relationship is consistent with existing literature. In our data we found that the oxygen minimum zone is not permanent and fluctuates from oxygen minimum conditions to aerobic conditions. When oxygen in present, the two directions of the nitrogen cycle are competing. Variation in the oxygen minimum zone over time is a new result that doesn't appear in existing literature. A potential next step is doing network analysis to better understand the interactions between marine microbes present in the oxygen minimum zone.

ACKNOWLEDGEMENTS:

Yi-Chun (Liv) Yeh, Postdoctoral Fellow, Litchman Lab, Carnegie Science
The Litchman Lab, Carnegie Science
Marissa Yáñez, STEM Workforce Specialist, Foothill College Science Learning Institute
Sophia Kim, Director, Foothill College Science Learning Institute
Miloni Gandhi, Instructor, Foothill College
Jody Ryker, Instructor, Foothill College

Protein 0003 from Mesoplasma Florum:
Expression, Purification, & Crystallization

Sabrina Yaniz Sanchez Rivera
Summer 2023

ABOUT ME:
- Hometown: East Palo Alto
- Major: Biology
- Year of graduation from Foothill College: 2024-2025

PLACEMENT:
- Name of Organization: Stanford University
- Website: https://www.stanford.edu/
- Mission: To learn how to Express, Purify, and Crystallize Protein through Dr. Daniel Fernandez's methods and mentoring.
- Supervisors: Dr. Daniel Fernandez, Dr. Olivia Pattelli

OBJECTIVE:

The goal in this internship is to grow enough cells and create enough protein to be able to purify the protein and then crystallize it. The original Project was working on Protein 3610, we eventually shifted to Protein 0003 with the same goal of protein crystallization.

METHODS:

All methods used were taught by my mentor Dr. Daniel Fernandez, first we transformed E-coli cells, we then Pre-Cultured the cells using one of the colonies from the transformation. Then we Cultured the cells in the Centrifuge machine, this allowed us to collect the cells and put in the machine again to release any protein into the media. Media would then be collected and be put through a column where different concentrations of Imidazole (IMD) would fight the Nickel in the column for the protein left in the resin initially poured in the media. We would then collect the ideal IMD concentration (200-250 IMD) in fractions and place it in the FPLC machine. The FPLC would then purify the protein and we would be able to build a screen with solutions we think ideal for our protein to best thrive and crystallize.

RESULTS & DISCUSSION:

Our results lead to lack of enough protein for both protein 3610 & protein 0003. Our lack of protein prevented us from being able to crystallize either proteins. Being able to collect enough protein is crucial for crystallization. With more time we would have been able to make more protein to achieve our objective. We were still able to see the final process through a frequently used protein for crystallization called lysozyme.

ACKNOWLEDGMENTS:
- Dr. Daniel Fernandez, Stanford Mentor
- Dr. Olivia Pattelli, Stanford Mentor
- Sophia Kim, SLI Director
- Marissa Yanez, SLI STEM Workforce Specialist

Climate Change and Arctic Photosynthesis

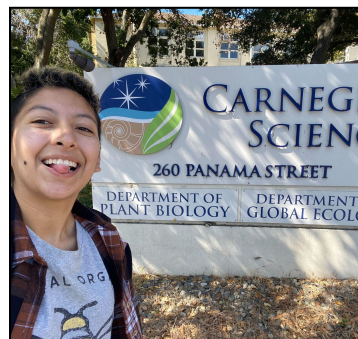*Schyler S. Martin*

Summer 2023

ABOUT YOU:

- **Residence:** Rocklin, California
- **Major:** Earth Systems Science
- **Year of graduation from Foothill College:** 2025

PLACEMENT:

Name of company/ institution: Carnegie Institution for Science

Website: Carnegie Science | Carnegie Science

Supervisor: Wu Sun

OBJECTIVE:

To analyze the effects of air and soil temperature on the photosynthetic rates of plants in the Arctic.

METHODS:

Using the database "ABC flux", we selected three factors: gross primary productivity (GPP), which measures the photosynthetic rates of the plants, air temperature, and soil temperature. We then proceeded to graph the data points in order to visually identify the optimum temperature for photosynthesis on plants in boreal and tundra biomes, which we verified with the Arrhenius function.

RESULTS & DISCUSSION:

The graphs indicated that the optimum temperature for photosynthesis in plants in the Arctic was around 290 K. More importantly, additional graphs displaying the temperature trend throughout the years adequately illustrated how temperature has been rising rapidly, and how it will continue to increase in the future. Unless steps are taken for humanity to reduce the amount of carbon that's being released into the atmosphere, these high temperatures have the potential to completely alter ecosystems at a higher rate than life can adapt to.

ACKNOWLEDGEMENTS:

Understanding Methane Emissions in US Wetlands
Tyrell Baker
Summer 2023

ABOUT YOU:
- Hometown: Bethlehem, Georgia
- Major/ certificate: A.S., Computer Science
- Transfer institution: California State University, Monterey Bay
- Year of graduation from Foothill College: 2023

PLACEMENT:
Name of company/ institution: Carnegie Department of Global Ecology Website: https://www-legacy.dge.carnegiescience.edu/
Mission (if a company): "The Carnegie Institution for Science is a private organization that conducts basic research for the benefit of humanity."
Supervisor: Kelsey Foster

OBJECTIVE:
Wetlands are the largest naturally occurring source of methane emissions. Our objective was to determine the primary drivers of methane fluxes in Continental US(CONUS) wetlands, with the idea that if we can understand the drivers of methane fluxes, we can better predict them — thereby enabling more accurate predictions of future methane emissions from these sites.

METHODS:
Data for this research was retrieved from the FLUXNET-CH4 dataset. Modeling was performed using linear regression via the statsmodels library in Python. Resulting graphs were plotted using the matplotlib library.

RESULTS & DISCUSSION:
Results indicate a positive relationship between temperature and CH4 Flux, a negative relationship between CH4 Flux and water table depth, and a negative relationship between Precipitation and methane flux. However, the results are not cut and dry and should not be taken as final indicators of methane flux predictors.

ACKNOWLEDGEMENTS:
Thank you to my beautiful family, to Kelsey Foster for mentoring me, and to the SLI team for supporting me and keeping me engaged when I felt like giving up. It is truly an honor to have been a part of something so great.
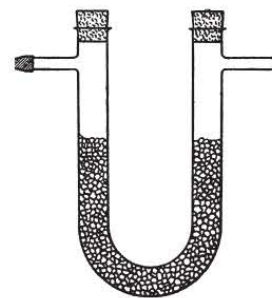
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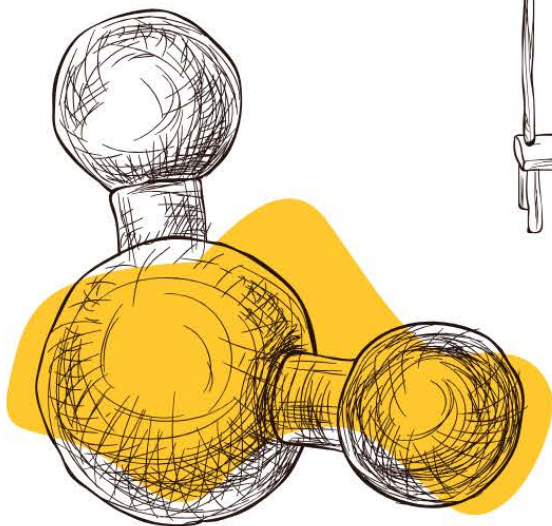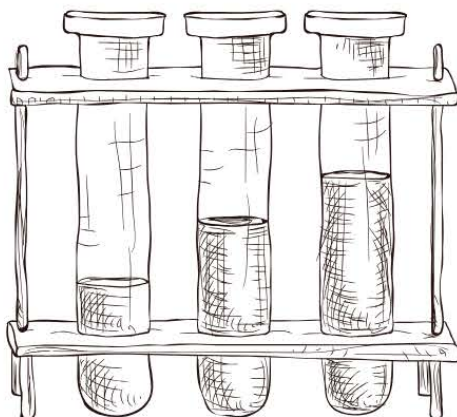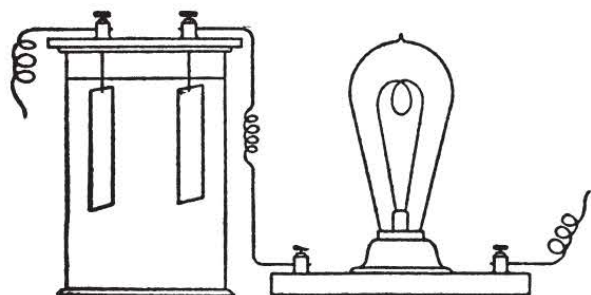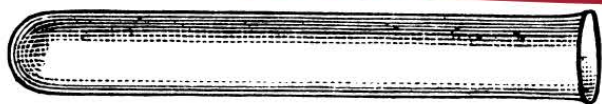
Making molecules dance with light

Anna Robledo Molina
Summer 2023

About me:
Hometown: E Palo Alto
Major: Biology
Year of Graduation: 2025

Placement:
Name of Organization: Stanford University, Chemistry Department, Martinez Group
Website: https://chemistry.stanford.edu/
Supervisor: Diptarka Hait

Objective: The goal of the internship was to determine how a molecules bond react when subjected to light, as well as the breaking point of such bonds when subjected to light

Methods: To determine the exact moments in which the molecules bond would break i had to first start a literature research as well as have background information on topics involving math and chemistry, we later moved on to applications such as IQmol in order to observe the molecule, through this app we are able to interact with the molecule, as well as alter the state of the molecule and determine the bond lengths; we then moved on to coding for which we used Spyder, in spyder we developed a code that would help us gather all bond lengths of specific time periods of the molecule.

Results & DIscussion: The final result after adding and analyzing all bond lengths would be determining the exact time a bond on the molecule would break when light hit it, as well as what bond would break. Understanding how molecules react when subjected to light can help scientist better understand molecules as well as further investigations and even reenforce already known information.

Acknowledgements:
Marrisa E Yanez, SLI STEM Workforce Specialist
Sophia Kim, SLI Director
Diptarka Hait,
SLI Internship Program

SLI STEM Internship

Realizing Quantum Anomalous Hall Effect using Magnetic Interference

Calvin Anderson
Summer 2023

About Me:
- Hometown: Cupertino, California
- Major: Electrical Engineering
- Year of Graduation: 2023

Placement:
Organization: Betty & Gordon Moore's Materials Science Building @ Stanford University
Website: https://suzukilab.stanford.edu
Mission: To realize the Quantum Anomalous Hall Effect by leveraging the Magnetic Proximity Effect.
Supervisors: Daisy O'Mahoney, Yuri Suzuki, Suzuki lab

Objective:
The Quantum Anomalous Hall Effect(QAHE) is a phenomenon observed at room temperature which results in a drop in longitudinal resistance to 0 when hall resistance is quantized. This result with 0 resistance material implies large consequences to science as dissipationless material could solve potential energy crisis problems and give rise to bizarre new technologies. QAHE can be realized using a stack of four materials. The substrate, the buffer layer, the magnet, and the topological insulator. My project focus was on optimizing the buffer layer.

Methods:
Methods utilized in manufacturing our layers was a process known as pulsed laser deposition(PLD). To optimize our samples we used an oven for annealing and a heater in the vacuum chamber for PLD process. To further observe results, we used X-Ray Diffraction(XRD) to attain results for crystallinity in our samples and Atomic Force Microscopy(AFM) to check for surface roughness. Furthermore, there involved usage of Superconducting Quantum Interference Device(SQUID) to check for magnetization of the sample.

Results and Discussion:
In order to stack our magnet and topological insulator atop our buffer layer, two characterizations needed to be optimized. A desired attribute of our magnetic layer made of Lithium aluminum ferrite oxide is a magnetization pointing in a hard direction. This can be achieved with perpendicular magnetic an isotope which demands good surface crystallinity across our buffer layer and a wider lattice parameter which is hence the choice of Cobalt Chromate. This crystallinity increases as temperature rises. Another attribute is surface smoothness to stack materials well; which has an inverse relationship with temperature. The optimized temperature emerged at 500C deposition temperature where surface roughness RMS value was 0.24nm and a peak emerged in the XRD.
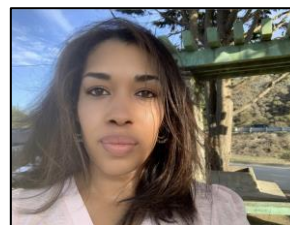
Elucidating Structure and Properties in a New Class of Solvents
Nicole Nelson
Summer 2023

ABOUT YOU:
- Hometown: Columbus, Ohio
- Major: Biochemistry
- Year of graduation from Foothill College: 2025

PLACEMENT:
Name of institution: Stanford University
Website: https://chemistry.stanford.edu
Supervisor: Dr. Kimberley Carter-Fenk

OBJECTIVE:
The overall goal of the project is to design a fuel cell electrolyte that has the ability to operate at high temperatures. My role in the internship was to perform and analyze various analytical chemistry techniques to help identify chemical properties of molecules.

METHODS:
The molecules used to analyze was Imidazole. We used several methods to find the chemical properties of the molecules. UV-VIS Spectroscopy is a quantitative technique used to measure how much a chemical substance absorbs light. The fluorometer is used to measure the amount of light emitted by a sample. A calorimeter was used to measure the heat production. All of these techniques were used to identify the intensity of light to produce electricity at specific temperatures.

RESULTS & DISCUSSION:
We found the characteristics of imidazole and from the results of the spectrum we could decide if this molecule would be sufficient use to produce a fuel cell membrane. The behavior of the molecule will be continue to be analyzed with other mixtures.

ACKNOWLEDGEMENTS:
- Sophia Kim, SLI Director
- Dr. Marissa Yanez, SLI Director
- Dr. Molina Ghandi, Instructor
- Dr. Kimberly Carter-Fenk, Mentor
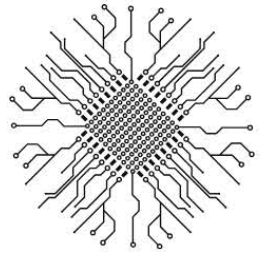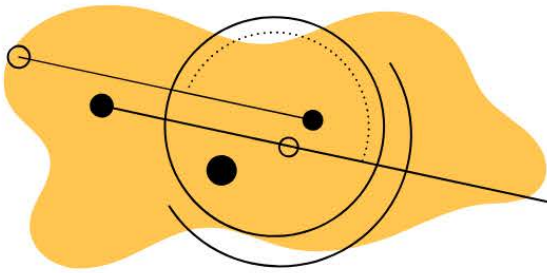
Computer Science

Modeling Intralayer Interactions of Atomically Thin Transition-Metal-Dichalcogenides (TMD) Materials
Loni Halsted
Summer 2023

ABOUT YOU:
- Hometown: Bay Area, CA
- Major/ certificate: Computer Science A.A Transfer
- Transfer institution: UC Santa Cruz
- Year of graduation from Foothill College: 2023

PLACEMENT:
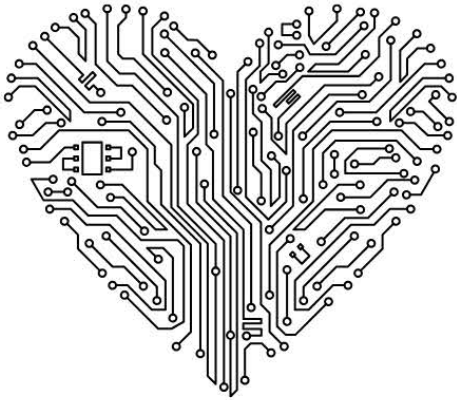Name of company/ institution: Stanford Material Science and Engineering Dept.
Website: https://jornada.stanford.edu/
Supervisor: Felipe Jornada & Johnathan Geogaras

OBJECTIVE:
Create a model and process to model the intralayer and interlayer interactions of TMD material MoS_2 using machine learning. We hope to better understand the interactions which occur when layers of atomically thin materials are stacked upon each other, to further study their unique optical and electrical properties.

METHODS:
First, using the 2H phase of MoS_2 create a dataset using Quantum Espresso of 1000 runs of atomic position and associated energies and forces for intralayer interactions. Then, using the dataset, set and tune model parameters using Nequip extension Allegro. Third, check the model file accuracy to test the dataset and deploy the model using Nequip. Finally, using the deployed model file, compare the output properties of phases within the scope of the dataset (2H) and those outside (1T) to known values.

RESULTS & DISCUSSION:
In my work, I found that tuning the parameters of the training, such as neighbor interaction or interaction complexity, did not have a strong effect on the outcome of model accuracy. As for my model, in comparing the accuracy of the properties for application within the dataset (2H) versus outside (1T), I found that while my model accurately predicts within the scope of the data, it does not accurately predict an application outside. In conclusion, the dataset must account for the specific application, or a more general dataset must be used.

ACKNOWLEDGEMENTS:

SmileyBot
Norlando Gamez-Torres
Summer 2023

ABOUT ME:
- Hometown: San Jose, CA
- Major/ certificate: Computer Science
- Transfer institution: San Jose State University
- Year of graduation from Foothill College: 2023

PLACEMENT:
Name of company/ institution: Stanford Graduate School of Business
Website: https://rcpedia.stanford.edu/
Supervisor: Wonhee Lee

OBJECTIVE:
I worked as part of Stanford GSB's Research Hub (Data, Analytics, and Research Computing Group or DARC) to develop a generative AI-powered chatbot designed to assist researchers with their research computing needs.

METHODS:
In order to create this chatbot, I first needed to collect user query data from various sources. These sources included Slack, Gmail, and the FAQ page from the Research Hub's website. To collect this data, I used Slack's API to find and collect the Slack data, Gmail's API to collect the Gmail data, and web scraping techniques to collect the FAQ page data. After collecting the data, I organized it using a library called Pandas, making it easy to use in training. I then created sentence embeddings for each user query, which made it so that if a user asked the chatbot a question, the chatbot could then use cosine similarity to find the most similar answer to the question being asked. The chatbot used OpenAI's GPT-4 model in order to curate the most accurate answers.

RESULTS & DISCUSSION:
The chatbot was launched to the users and feedback was gathered in order to improve the functionality of the chatbot. Due to the popularity of the GPT-4 model, the chatbot took about 10-20 seconds longer than anticipated in order to generate an answer. Normally, users with questions or queries would need to wait for a DARC team member to respond, but now users can access this chatbot 24 hours a day, 7 days a week.

ACKNOWLEDGEMENTS:
- Wonhee Lee, Senior Research Analytics Scientist @ Stanford GSB DARC
- Jeff Ott, Research, Research Analytics Scientist @ Stanford GSB DARC
- Savannah McCoy, Data Engineer @ Stanford GSB DARC
- Sophia Kim, SLI Director
- Marissa Yanez, SLI STEM Workforce Specialist

SLAC Internship
Oscar Botello
Summer 2023

ABOUT ME:
- Residence: East Palo Alto, California
- Major/ certificate: Computer Science
- Year of graduation from Foothill College: 2025

PLACEMENT:
Name of company/ institution: SlAC National Accelerator Laboratory
Website: https://www6.slac.stanford.edu/
Supervisor: Nicole Neveu

OBJECTIVE:
Comb through and sort output data from particle accelerator.

METHODS:
I started off learning the basics. Going through training to understand how I would be moving forward in terms of my work. I learned how to use GitHub and navigate my terminal. Then did some PyDM training putting those into practice. Separating Profiler Data from Regular data and sorting for assigned objectives was what the practice led to.

RESULTS & DISCUSSION:
Unfortunately I didn't get to see the full potential of my project. I got to finish one of my projects which was very rewarding but it could've been better. I tried my best but there was too little time left at the end when I finally got the hang of things. I was able to sort the data assigned accordingly but I was unable to include the file that each data set came with. When I finished writing my code I was able to import any file that was provided and sort the data which was very satisfying. If I had more time I think I'd be able to see it sort all the data as well as connect it with the file. If this was completed scientists would have been able to extract whatever file they needed based on the according data.
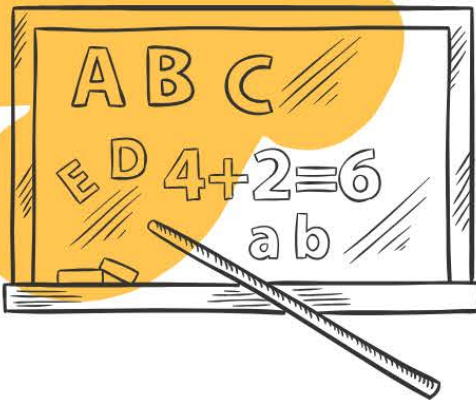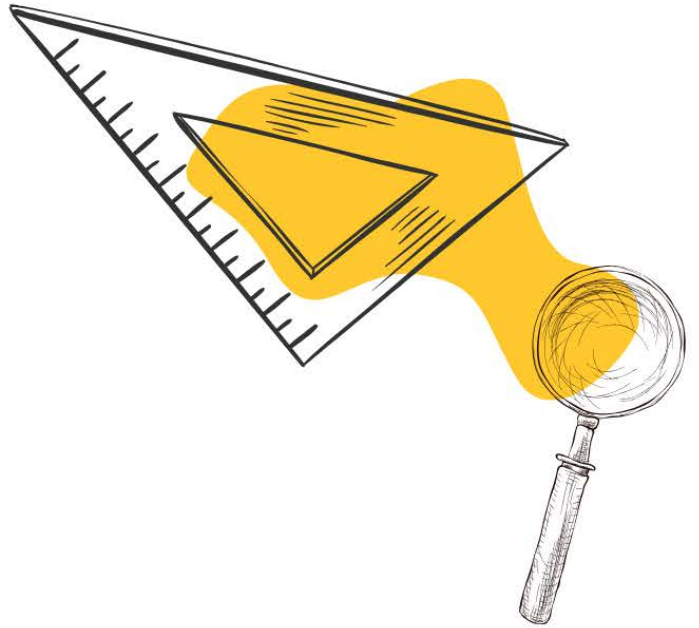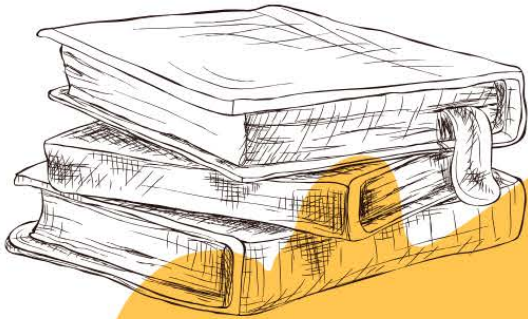
ACKNOWLEDGEMENTS:
Nicole Neveu, SLAC Staff Scientist
Marissa Yanez, SLI
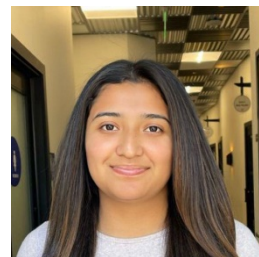Sophia Kim, SLI

Education

Pre- STEM Summer Institute Leadership Fellow
Daisy Rodriguez
Summer 2023

About Me:
- Hometown: San Jose, California
- Major: Biological Sciences
- Transfer Institution: University of California Davis
- Year of graduation from Foothill College: Spring 2025

Placement:
- Name of company/ institution: Foothill Community College for the Pre-STEM Summer Institute as a leadership fellow
- Website: https://foothill.edu/sli/techcore/summer-institute.html
- Supervisor: Sophia Kim

Objective:
The goal that we had for this internship was to give insight to incoming STEM students by giving them workshops and advice on how to navigate the college school system and the dos and don'ts of being a STEM student. Personally, I was looking forward for the students to feel comfortable with one another and with us - the fellows - because we could end up taking classes together and I think that it is best to have a community rather than none; especially in community college because the majority of students are first-generation like myself.

Methods:
The methods we took into account were: leadership, kindness, and motivation. There were some students who needed a little "push" to get comfortable and ask questions, therefore, we were responsible for trying our best to include them in the conversation or create one with them personally to make sure they knew how important they were to us. We showed kindness and motivation to them for the same reason, I remember what it felt like to start college. It was intimidating especially in STEM because of how competitive it is and so I, along with the other fellows, tried our best to show the students that they are seen.

Results & Discussion:
The results of our project were as follows: Students' confidence increased in both data science and math, Students' interest changed/grew by possible major changes, Students gave great presentations at the end of the program; everyone presented nicely & was prepared to answer questions, and creating community because students have already reached out for further help. We were able to help the students in these ways but we also created a draft of an application that the STEM students at Foothill can take advantage of. This app consists of academic/on-campus resources, self-care resources, and [internship] opportunities.

Acknowledgements:
Lastly, I would like to thank Sophia Kim, Marissa Yañez, and the PSI students for giving us this opportunity to grow and to learn a lot about what it means to be a leader.

Pre- STEM Summer Institute Internship
Danna Avila
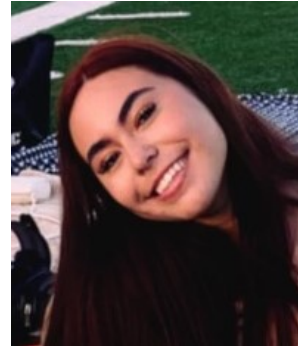Summer 2023

ABOUT YOU:
- Hometown: Sunnyvale
- Major/ certificate: Public Health
- Year of graduation from Foothill College: 2024

PLACEMENT:
Name of company/ institution: Science Learning Institute
Institute Website: https://foothill.edu/sli/pre-stem/
Supervisor: Sophia Kim

OBJECTIVE:
The goal of this internship was to prepare incoming students and give them the utmost support. My personal objective was to build a comfortable relationship with the students by sharing my personal experiences and how I navigated through them. I was also able to teach them very useful tricks that I use for college. We also had a math readiness class not to necessarily show them how to do math but it was to show them different ways to approach each math problem. Our data science class showed the students ways to create a research project and how to successfully look for data online.

METHODS:
To get prepared for our facilitator role we had two weeks of training in which we learned different teaching methods and even took a personality test to see what method matched the best with our personality. Most of those two weeks consisted of creating our lesson plan and practicing our presentation in our small group. We also did the same thing with our icebreakers. Specifically for my workshop I started by looking into sub-themes that supported my large idea. After doing that I found it easier to work on my slides first and then work on my actual lesson plan. Most of my workshop was made up of activities that helped the students grasp onto the idea I was trying to point out.

RESULTS & DISCUSSION:
At the end of the program we were able to see the confidence that the students had achieved. This was portrayed during their data science project presentations, they were able to successfully answer every question that was asked and they knew all the information to the point. We were also able to provide a safe and comfortable space for all the students, enough for them to reach out and ask for additional help.

ACKNOWLEDGEMENTS:
Sophia Kim, SLI Director
Marissa Yanez, SLI STEM Workforce Specialist

SLI Leadership Fellow for PRE-STEM Summer Institute

GlycelMarie Brady
Summer 2023

ABOUT ME:
- Hometown: Sunnyvale
- Major/Certificate: Computer Science
- Year Of Graduation From Foothill College: 2024

PLACEMENT:

Name of Organization: Pre-Stem Summer Institute
Website: https://foothill.edu/sli/pre-stem/summer-institute.html
Supervisor: Sophia Kim

OBJECTIVE:

The goal of the internship was to help prepare incoming pre-stem college students for their first year at Foothill, but also create a community of underrepresented minorites in STEM. In this project I was trying to help incoming students feel welcomed for their first year and inform students of the many resources of Foothill.

METHODS:

For my project I used lesson plans that had a detailed schedule of how my workshop was supposed to Run, I then prepared my slides and had my supervisor and team look into my work before finalizing my workshop.

RESULTS & DISCUSSION:

The results of my project was my students at the end of the three week program was able to present their final poster presentations with confidence, and my students were informed of the many resources here at foothill.

ACKNOWLEDGEMENTS:

Sophia Kim - Supervisor & SLI STEM Director
Marissa Yanez - SLI STEM Workforce Specialist
Pre-Stem Students

FLI-Sci Research Institute Internship
Melissa Posas
Summer 2023

About Me:
- Hometown: San Jose, California 95128
- Major: Radiology
- Institution: Foothill College

Placement:
Name of organization: FLI SCI (First Generation Low Income Scientists)
Website: https://flisci.org/
Mission: Expose Underrepresented minority of students to professionals and researchers in STEM fields, provide a network of support to the URM of students, and provide access to educational STEM resources.
Supervisor: Gabriel Reyes

Objective:
My objective for this internship was essentially working in three major areas. My First area that I consecutively worked on for 10 weeks was reading scholarly articles, totaling at about 15. My second Focus being Qualitative analysis on students' open ended responses. This is where I learned qualitative coding methods, Analyze open-ended responses from pre-post surveys, and Interpret the results. Lastly I developed an interview protocol with questions that emerged from collecting and analyzing common themes in the open-ended responses and the scholarly articles read.

Methods & Materials:
The materials I mainly used were from 140 student open-ended responses that we took from previous cohorts. Using both qualitative analysis and qualitative coding I put the responses into categories by themes and codes to best fit the students' answers. Now for my methods we then categorized those themes Varying from proximity to science, previous educational experiences, scientific motivations, Fli Sci's program impact, interpersonal traits, as well as categorizing those responses that didn't fit into the set codes we already had.

Results & Discussions:
Having read these scholarly articles, interpreted the open ended responses and found sources of my own, I found a constant list of themes that were most recurring. These specific themes all portrayed critical roles in not just students, but scientists, academic faculty, and the general public creating hardship and barriers. As someone who was reading these articles I got to see from the sidelines just what those barriers were and who so many people are really being held back from pursuing what they want today in the world of STEM.

Acknowledgements:
- Gabriel Reyes, Fli Sci Executive Director
- Sophia Kim: SLI Director & Marissa Yanez: SLI STEM Workforce Specialist
- Dr.Miloni Gandhi, ITRN Course Instructor

SLI STEM Internship

Program Evaluation Assistant
Paloma Gutierrez Macias | Summer 2023

ABOUT YOU:
- Hometown: Colima, Colima, Mx
- Major: Women's Studies
- Year of graduation from Foothill College: 2024

PLACEMENT:
Name of company/institution: Stanford Digital Education
Website: https://digitaleducation.stanford.edu/
Mission: We incubate and support digital education initiatives across the University that serve the public good. We help develop Stanford's online and hybrid education strategies and strengthen its capacity to carry them out.
Supervisor: Michael Acedo

OBJECTIVE:
Identify areas of improvement in the Digital Education area to decrease sex and gender bias.

METHODS:
My analysis of quantitative and qualitative data from the National Education Equity Lab consisted of 6 surveys totaling 762 responses from the scholar year *2022-2023*.

RESULTS & DISCUSSION:
Results
These are my top 3 findings from the student surveys:
-*Gender:* I identified that women were spending considerably more time doing homework than their male counter-parts, but were earning lower grades. Before coming up with actions we have to investigate deeper to provide solutions to address this imbalance.
-*General:* Students responded that they consistently struggle with basic math. My recommendation is that we offer math tutoring to high school students in the same way that it is offered to Higher Education students.
-*Skills:* Many students responded that they lack research paper reading skills. My recommendation is to provide a research paper aid segment on Canvas that would teach, among other things, how to identify legitimate sources of information.
Discussion
The lack of intersectionality awareness in the curriculum of Higher Education limits the college experience for the student. Building curriculum that includes the student's diversity can create an environment that will promote learning for students from underserved communities.

ACKNOWLEDGEMENTS:
I will be forever grateful with the Marissa, Sophia (SLI department) and Michael (Stanford Digital Education) for making this experience available to us.
Nazario A. Ayala, for being the best at home IT support. To my Mom and sister for being present even from afar.
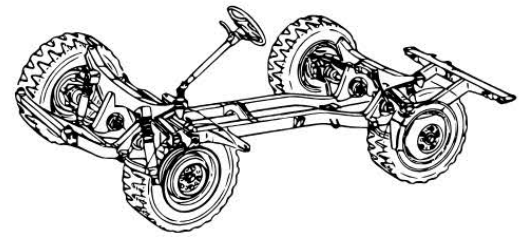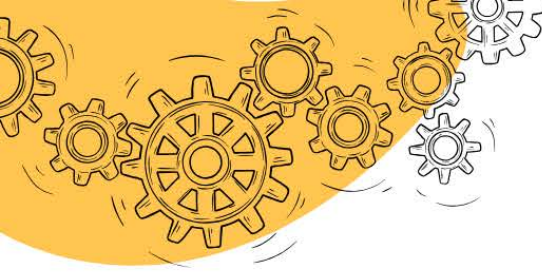
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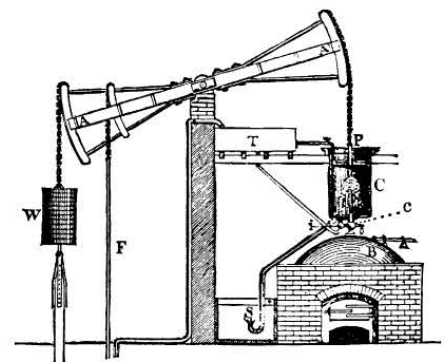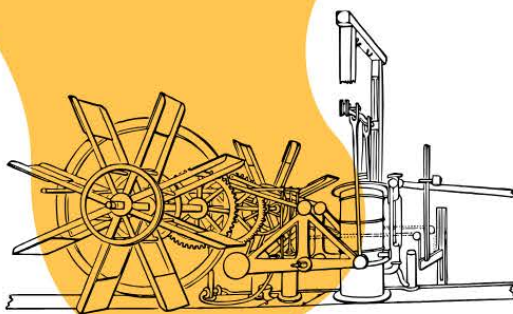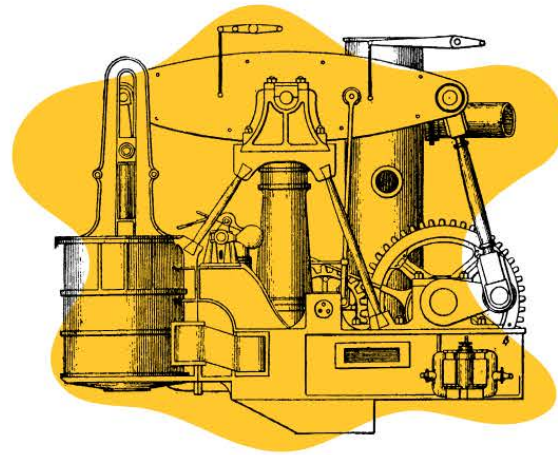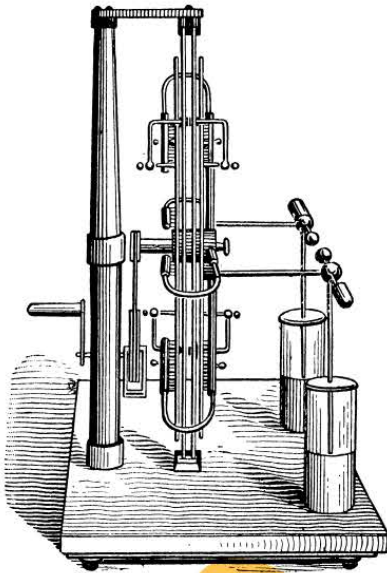
Intern @EMD Electronics
Alan Duong
Summer 2023

ABOUT YOU:

- Home Town: San Jose
- Major/certificate: Mechanical Engineer
- Transfer institution: UC Irvine
- Year of graduation from Foothill College: 2023
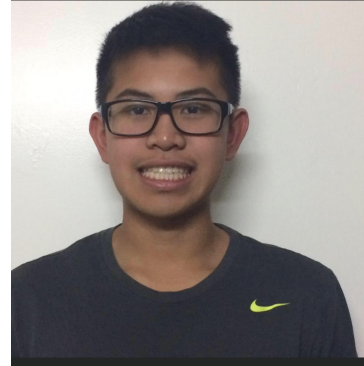
PLACEMENT:

Name of company/institution: EMD Electronics
Website: https://www.emdgroup.com/en
Mission: Dedicated to being the trusted supplier of high-tech materials, services and specialty chemicals for the electronics, automotive and cosmetics industries.
Supervisor: Stephanie Limon

OBJECTIVE:

To build an ALD chamber lid from looking at a mechanical drawing, learning cleanroom protocols for a semiconductor fab, CAD some mechanical drawings, perform a leak check.

METHODS:

To build the ALD chamber, I have to find all of the parts and put them aside in the gray room. From there, I would separate all of the nuts, bolts or any parts with multiple quantities in front of my workspace so I do not have to run back and forth finding the parts. The only parts that are left in the box are anything big that takes up too much space in my workspace. Looking at the mechanical drawings, first I would target the internal section because if I start the external section, then it would be very difficult to fit all of the parts internally afterwards. It is also to wear gloves and safety glasses to prevent fingerprints and hazards.

RESULTS AND DISCUSSION:

There are 4 subassemblies to build the ALD chamber lid and I was tasked with two. I have successfully built both subassemblies within 3 days and from there I did miscellaneous tasks around the company such as practicing safety protocols in the FAB and CADing old designs.

ACKNOWLEDGEMENTS:

- Stephanie Limon
- Kevin Tong
- Leonardo Espinoza Zuniga
- Annette Barboza

Women's Health - Ultrasound Imaging

Ashley Acevedo
Summer 2023

ABOUT ME:
Hometown: Hemet California
Major/ certificate: Nursing
Year of graduation from Foothill College: 2024
Name of company/ institution: iSono Health
Website: https://isonohealth.com/
Mission: Maker of ultrasound imaging equipment. Provide automatic 3D ultrasound scans in support of women's health. This women's lead company will make ultrasound breast imaging more accessible.
Supervisor: Tony D'Alessandro

OBJECTIVE:
The project goal was to help build, test and approve breast scanners. Also, give feedback and implement improvements to the device. I was looking to accomplish this project by learning the software system called Arena and knowing how to run a breast scan on a patient.

METHODS:
For the project I worked with a breast scanner, sonic mini, microscope and the software Arena. I would use a sonic mini which was a 3D printer that we made pieces for the device. Afterwards, I would use a microscope and a blade to make sure the edges were clean, and then I would use a nail filer to smooth it down.When I would use the Arena software, I would do changes and updates files into the system. The breast scanner, I would run different tests and I got to do scans on a half inflatable body.

RESULTS & DISCUSSION:
During my last week at my internship, I was making changes and uploading files in Arena. It has to be approved by two people. After that my change is approved, the software will change to what was submitted by the person who did the changes. The other thing I was working on was seeing which material would best with polypro, there were two materials that worked best with polypro. The two materials were pc/ bayblend and pc/abs makrolon. However, the materials they are going to use are pc/ bayblend with polypro. If I was there longer I would be able to bring women in to do a free scanner for them, this way they can have a feeling for the device. I do have a list of women that I will be happy to provide them. This way these ladies can get a free scan and be able to provide their feedback on the breast scanner. This experience at iSono Health, made me realize that there is more to the medical field. In my future, I want to be part of a team who is working on medical devices for women's health. When I become a nurse practitioner, the area I want to focus on is women's health. I want to start focusing and understanding about the medical devices that there are, when it comes to the patient, ask me questions I want to be able to provide the answer they are looking for.

ACKNOWLEDGEMENTS:
Tony: Thank you for being my mentor and opening my eyes to engineering and medical devices.
Shadi: Thank you for showing me how to do a breast scan.
Marissa: Thank you for coming to my chemistry class, because if you did not I would not have known about this internship.
Sophia: Thank you for checking up on me and hosting the Stanford trip, it was an amazing opportunity to see their campus and their laboratories.
Foothill Science Learning Institute (SLI): Thank you for funding my internship.
Foothill College: Thank you for giving me and other students the opportunity to expand our interest or try new things, this was something new for me.

geCKo Materials Internship
Efrain Camacho
Summer 2023

ABOUT YOU:
- Hometown: San Jose
- Major/ certificate: Mechanical Engineering
- Year of graduation from Foothill College: Spring 2024

PLACEMENT:
- Name of company/ institution: geCKo Materials
- Website: https://www.geckomaterials.com/
- Mission (if a company): geCKo Materials is a bio-inspired Dry Adhesive that is ultra-strong, reusable, leaves no residue, and requires no force to detach. This enables current solutions to revolutionize while being cost saving and energy efficient. This also opens up new applications in industrial automation, robotic gripping, space & defense and more.
- Supervisors: Capella Kerst, Dan Hurley

OBJECTIVE:
The goal of the internship was to create a mechanical pull tester to test the geCKo Material Dry Adhesive (gMDA). My specific role in the project was to focus on the design and hardware of the mechanical pull tester.

METHODS:
I used various methods to complete the project. To create the design of the MPT, I learned 360 Fusion to create CAD models of my ideas. Once I created CAD models that I liked, I prototyped the designs by using various materials. From wood and cardboard to 3d printed parts and 80/20 Aluminum. I also aided with other aspects of the project, I learned to do simple coding to use Arduinos and presented progress of the project to the rest of the team at geCKo.

RESULTS & DISCUSSION:
At the end of the internship, a functioning mechanical pull tester was created. This mechanical pull tester facilitated the testing of the gMDA. Not only does it allow testing to be faster, but it is also more accurate. Personal results from the internship where the hard skill and soft skills I learned through the experience of being treated like an engineer in a company. I learned CAD modeling, prototyping, 3D printing and coding. I also learned to give professional presentations, write professional research papers for the aid of the team along with learning to work with other people with different skills and backgrounds.

ACKNOWLEDGEMENTS:
Dan Hurly, Head of Engineering
Capella Kerst, CEO
Sophia Kim, SLI Director
Marrisa Yanez, STEM Workforce Specialist

Making Non-porous Sheets for Menstrual Pads with Deep Eutectic Solvent
Fatima Sanchez
Summer 2023

ABOUT ME:
- Hometown: Mexico City/ Redwood City
- Major/ certificate: Health Sciences
- Year of graduation from Foothill College: 2024

PLACEMENT:
Name of company/ institution: Prakash Lab/Stanford University
Website: https://web.stanford.edu/group/prakash-lab/cgi-bin/labsite/
Supervisor: Anton Molina & Anesta Kothari

OBJECTIVE:
Learn to conduct experiments to design a material that has high strength, hydrophobicity, and flexibility to use in a menstrual pad. This includes literature research as well as material characterization.

METHODS/ PROCESS:
This program is nine weeks long. I went through multiple training sessions to ensure laboratory safety during the first part of the program. At the same time, I was able to observe my mentor during the procedures. Later on, I had the opportunity to learn about the procedure through a scientific journal, and I was then able to conduct research independently. I produced eight batches to extract the lignin from the fibers to create the third layer of the pad. The lignin was laminated using the heat press process, so I used several substrates like newspaper, paper towel, Kim wipe, construction paper, tracing paper, and Sisal. I collected the data of the performance from these materials. As a final step, I ran tests on the laminated sheets to measure their flexibility, strength, and hydrophobicity.

RESULTS & DISCUSSION:
During the summer I was first introduced to reading scientific journals. I found the value of this practice before diving into the experimental process because I had a better understanding of the procedures that we applied in our research project. While conducting the research I learned how to manage to work in multiple experiments at the time, as well as, learning new processes that I never encountered before. I valued the data collection and analysis because it was a different experience than following a giving structure. Learning about the lamination process was something new for me and applying different substrates gave an idea of a possible hypothesis because we used well-known materials.
 Last but not least, the community also played a role in this internship, during the launching of Foldscope 2.0 by helping others to build it.

ACKNOWLEDGEMENT:
Director of SLI: Sophia Kim
Professor: Manu Prakash/Prakash Lab
Mentor: Anton Molina & Anesta Kothari
Program Coordinator: Ty Baker
Engineering Faculty: Marissa Yanez

Genomics Testing for Biological Microfluidics Applications Internship

Jorge Adrian Mayorga
Summer 2023

ABOUT ME:
Hometown: San Jose, California
Major/Certificate: Biology/Molecular Biology
Transfer Institution: UC Santa Cruz, Fall 2023
Year of graduation from Foothill College: Spring 2023

PLACEMENT:
Name of Company: Standard Biotools
Website: https://www.standardbio.com/
Mission: The mission at Standard Biotools is to design, manufacture, and sell biological research equipment which can provide reliable and repeatable results with an emphasis on quality in order to give scientists better insight and better outcomes to their results and scientific discoveries.
Supervisors: Mackenzie Bullock & Mike Gonzales

OBJECTIVE: I had several minor objectives/projects such as modifying the standard thermal cycling procedure of a gene expression application in order to find a middle ground for the PCR cycle speed and troubleshooting an intensity issue on the PCR system. However, the main objective was to assist the R&D team by helping them finalize the testing and reports for the 24.192 IFC Chip and its applications so that it can be released by its release date of October 2023. My personal objective was to be in charge of carrying out the validation testing for the new application with a 100% success rate and assisting in data analysis in order to make sure that everything is working within the passing parameters.

METHODS: Since there were several projects that I had to handle, there was an array of tools, programs, and applications that I had to use which included (but not limited to) the X9 Real-Time PCR system, SBIO Biomark X SNP Genotyping Analysis Software, the SBIO Biomark X RT-PCR Analysis Software, R Studios software, SBIO Protocol Editor, several versions their IFC Chips, and several different reagents which were all used equally for all of my projects. The steps I followed involved prepping a chip for genomic analysis and then using the software to analyze the data and modifying the PCR thermal procedure in order to run a separate experiment.

RESULTS & DISCUSSION: The results in the end were a 100% success rate within the set parameters which means we passed! The software, hardware, and chemistry were able to work together with no issues which allowed us to move into the final stage of writing up the final report and having a formal data review prior to launching the application so that everything checks out and is ready to go. As for the other two minor projects mentioned, we were able to find the intensity issue which ended up being a faulty camera with the help of the software and hardware team and we were also able to find a middle ground as to how fast you can speed up the thermal cycle procedure without negatively affecting the data.

ACKNOWLEDGEMENTS:
Foothill SLI, Marissa Yanez, Sophia Kim, Mackenzie Bullock, Michael Gonzales, Standard Biotools, Krisma Nunez, Friends & Family, Dr. Ron Painter

Examination of Equity in Drinking Water System Consolidations
*Marisela Landaverde*
Summer 2023

ABOUT YOU:
- Hometown: San Jose CA
- Major/ certificate: Engineering and Math for Transfer
- Transfer institution: San Jose State University
- Year of graduation from Foothill College: Foothill College: 2023

PLACEMENT:
- Name of company/ institution: Osman Lab Civil and Environmental Engineering Department at Stanford
- Website: https://www.osman.science/
- Mission (if a company): Developing data-driven solutions to integrating equity and environmental justice in the design and management of infrastructure systems.
- Supervisor: Allisa Grace Hastie
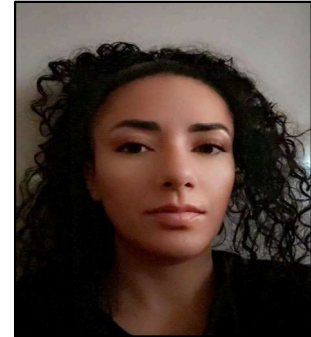
OBJECTIVE:
The goal of this internship was to develop examined publicly available data on drinking water safety and state funding for consolidated systems. Potential areas of investigation include tracing state funding for consolidation projects and post-consolidation support, a case study of a nearby community that is advocating for consolidation of some potentials drinking water providers, or an in-depth examination of specific types of consolidations based on characteristics of the systems involved. Another important objective for this internship were to be exposure to the research process, practice problem-solving with real-world water infrastructure problems, experience working with publicly available drinking water data and develop some familiarity with California resources that support drinking water systems.

METHODS:
I first familiarized myself with some consolidation stories. I read 8 consolidation stories, some of them were from school consolidations and others from mobile home parks. I also read some consolidation research articles Connecting Water Systems for Safe Drinking Water. In the same vein, I explored the State Water Resources Control Board Division of Drinking Water, learned their laws and regulations, and had the opportunity to search their website in order to find more about some of the water quality ricks, also some information about consolidation funding, as grants and loans. Later on, I read the Corona environmental consulting research which main focus is the Cost analysis of California drinking water system mergers they gave an average cost of pipes, wells, pipelines and connections for a water system, in the same line, I read Public Drinking Water System Coverage and Its Discontents: The Prevalence and Severity of Water Access Problems in California's Mobile Home Parks research. I also analyzed data from the 2022-2023 SAFER- Found Expenditure which gave an inside of which law and regulations found different types of water system challenges.

RESULTS & DISCUSSION:
Some of the results from my internship is this Consolidation map, I helped my mentor create using the Google Earth website. Where the blue dot shows the Mobile home consolidation and the yellow dots are the schools consolidation. Something cool about this map is that people can actually see the exact place and realize that the majority of these places are in the middle of nowhere, which makes it difficult to consolidate. From the schools and mobile home data, I was creating many charts to find some pattens. Some interesting to highlight from this date and is represented in the charts is that most of the home funding comes from private sources which represent a total 55% whereas from school 48% of their funding comes from the California water board.

ACKNOWLEDGEMENTS:
- My mentor: Allisa Grace Hastie
- SLI, Sophia, Marissa, and Miloni.
- Osman Lab/ Stanford Civil & Environmental Engineering department, Foothill College & SLI for scholarship funding

Building a Vapor Phase Decomposition Device
Uriel "Yuri" Valencia
Summary 2023

ABOUT YOU:
- Hometown: East Palo Alto, Ca
- Major/ certificate: Associates of Science in Physics. Working towards an Associates of Science in Mathematics, and an Associates for transfer in Engineering.
- Year of graduation from Foothill College: Spring 2024

PLACEMENT:
Name of company/ institution: Stanford Nano fabrication Facilities (SNF)
Website: https://snf.stanford.edu/
Supervisor: Alexander Denton

OBJECTIVE:
Research, design, and develop a Vapor Phase Decomposition Device.

METHODS:
Background information was gathered on what is Vapor Phase Decomposition, the tools, agents, and machinery used to carry this operation, and what materials are appropriate to build our device. Parts were 3D printed from models made using CAD, which were then retrofitted on a 3D printer, which was programmed to scan silicon wafers using water as the scan solution.

RESULTS & DISCUSSION:
Based on the background research we gathered, no one else had attempted to do what we set out to do. A crucial part of the project was to find a way for the device to scan the silicon wafer (have the scan droplet collect the contamination from the wafer). To resolve this issue, it was decided that a 3D printer would be modified, since a 3D printer moves in x, y, and z coordinates, and it could be programmed to scan the wafer by doing shrinking circles (scan from the outside to center of the wafer). Parts designed using CAD were 3D printed, retrofitted onto the extruder head of the 3D printer, and the modified 3D printer was able to successfully collect contamination from a silicon wafer on test trials. If this were manufactured using acid resistant parts, it would save SNF time and money when it comes to testing their manufactured silicon wafer for contamination. This could ultimately be used by other facilities.

ACKNOWLEDGEMENTS:
Jeff Anderosn, Math 2B/ ENG 11 Professor, for encouraging me to sign up for the SLI program back in the Fall of 2022.
Alexander Denton, for giving me this project as an option, and for providing guidance and freedom along the way of this project that we were unsure if a functioning prototype would be produced.
Sophia Kim, Marissa Yañez, and Miloni Gandhi, for providing mentorship guidance log the way.
Daniella Duran, for pairing me with Alexander Denton.
Trevor Jehl, for being an awesome lab partner, and for also challenging me and giving me directions along the course of the project.

Engineering Internship at Standard Biotools
Vy Tran
Summer 2023

ABOUT YOU:
- Hometown: Milpitas
- Major/ certificate: Computer Science
- Year of graduation from Foothill College: 2024

PLACEMENT:
Name of company/ institution: Standard Biotools
Website:
Mission (if a company): "Improving human health through innovative medicines is your mission. Our mission is to provide you with the right, reliable products to *solve your problems*."
Supervisor: Frank Lin, Phong Nguyen

OBJECTIVE:
There were three main objectives for this internship: to understand the software, biological, and mechanical aspects of the company's real-time PCR product, to understand the inner workings between different teams in a corporate setting, and to gain clarity in where I want to take my career.

METHODS:
Over the 10 weeks, I worked on developing an engineering script to automate a diagnostic process for a component within their real-time PCR instrument. I had to learn Python, understand their existing code base, familiarize myself with their in-house engineering control interface, and get comfortable with the iterative nature of the development process. Moreover, I had to learn how to keep proper documentation that would help others understand my ideas when it came time to explain my work.

RESULTS & DISCUSSION:
The engineering script will be deployed for the field service engineers and product service engineers to use. The "Field Service Bulletin", an internal documentation respository, will be updated to include the script and training will start taking place to guide the engineers on how to implement the script. Throughout the process, I had to work collaboratively with different teams to make sure that the project milestones were met. Overall, I feel like all the above objectives were met. I got an understanding of the instrument that I was writing the algorithm for, I had to wear multiple hats and work with different teams, and I learned that I want to work with embedded systems.

ACKNOWLEDGEMENTS:
- Phong Nguyen, Standard Biotools Associate Director of Engineering
- Frank Lin, Standard Biotools Software Development Manager
- Warren Hinds, Standard Biotools Principal Reliability Engineer
- Lynette Sarandi, Standard Biotools New Product Introduction Engineer
- Sophia Kim, SLI Director
- Marissa Yanez, SLI STEM Workforce Specialist

SLI STEM Internship
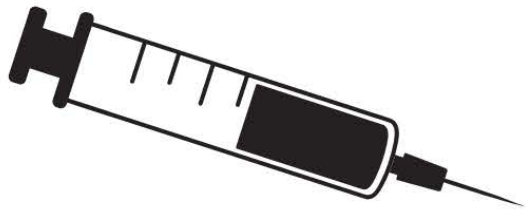
Medicine
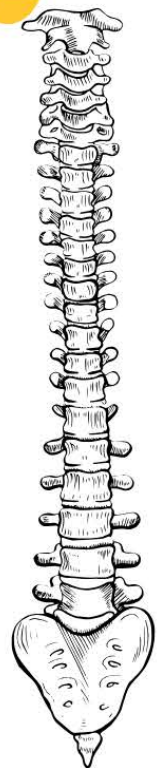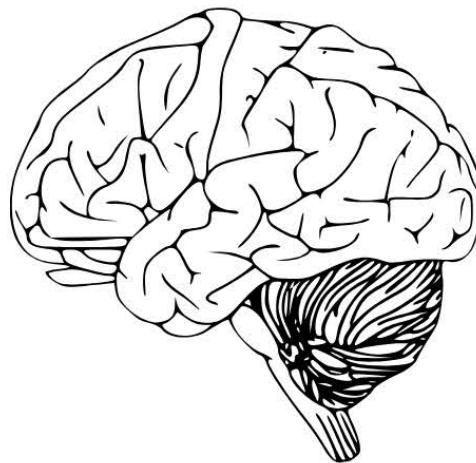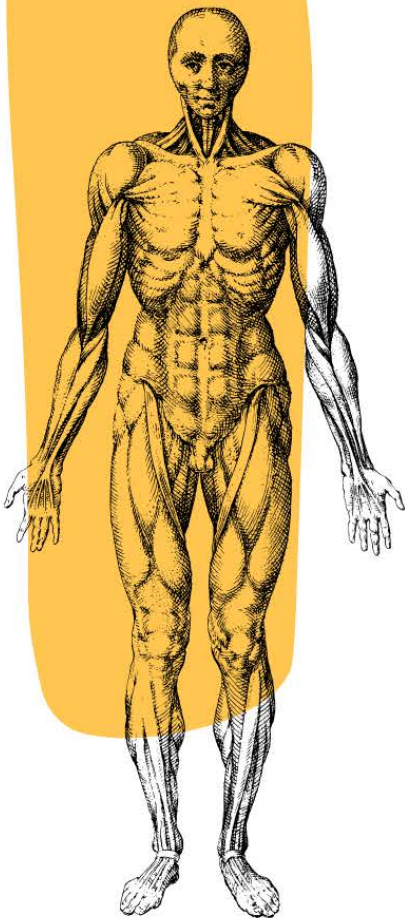
Adding Efficiency to the Optometry Practice
Abimbola Bolarinwa
Summer 2023

ABOUT YOU:
- Hometown: Hayward
- Major/ certificate: Nursing/Public Health
- Year of graduation from Foothill College: 2024

PLACEMENT:
Name of company/ institution: Cambridge Optometry
Website: https://www.cambridgeoptometry.com/
Mission (if a company): Since the beginning, we have stayed focused on our two core values, positive relationships, and innovation, which has made all the difference. We understand the importance of positive, symbiotic relationships between doctors, staff, and patients. These relationships are based on trust, and success is predicated on all parties working on the same team. We also constantly seek innovations in patient care, medical and optical technology, and practice procedures to ensure progress and a bright future for all.
Supervisor: Ben Threlkeld, O.D.

OBJECTIVE:
Creating a guide for ophthalmic technicians was the aim of this internship. Assisting ophthalmologists in patient care is one of the duties of an ophthalmic technician.

METHODS:
During this training, I gained a basic understanding of eye anatomy, ophthalmic optics, and pre-testing equipment. Also, I was able to observe how the optometrist conducted his examinations. In the next step, I practiced using the equipment for pre-testing. An autorefractor, a retinal camera, and a Lensometer were part of the equipment that I used during my internship. The autorefractor is a machine that helps eye doctors determine your eyeglass prescription. is used to determine an individual's prescription by measuring how light is affected as it reflects through the eyeball. The retinal camera is a special device that takes pictures of the back of your eye called the retina. It helps eye doctors see and analyze the health of your retina, blood vessels, and other structures. Lensometer is an instrument used to verify the prescription of eyeglasses or spectacles.

RESULTS & DISCUSSION:
Once the internship was over, I discovered that an ophthalmic technician did in fact assist Cambridge Optometry. due to the fact that Cambridge Optometry conducts ten tests lasting 45 minutes each per day. So, each day, ophthalmic technicians help save about 100 minutes. Consequently, the optometrist could conduct two more exams each day.

ACKNOWLEDGEMENTS:
- Ben Threlkeld, O.D, Cambridge Optometry
- Cindy Threlkeld, O.D, Cambridge Optometry
- Matt Sinder, O.D, Cambridge Optometry
- Sophia Kim, SLI Director
- Marissa Yanez, SLI STEM Workforce Specialist

Clinical utility of dupilumab in eosinophilic esophagitis patients Internship
Amanda Miller
Summer 2023

ABOUT ME
Hometown: Mountain View
Major: Applied Mathematics
Degree: Associate in Science in Mathematics for Transfer
Education: Foothill College - Graduated 2023, UC Berkeley - currently enrolled

PLACEMENT
Name of organization: Stanford Medical School
Mentor: Twan Sia

OBJECTIVE
The goal of the internship was to abstract and analyze data so that clinicians can better treat patients with eosinophilic esophagitis (EoE). EoE is an inflammatory condition of the esophagus that can greatly impact quality of life and is dangerous if left untreated. Dupilumab is a new medication that helps people with EoE when they have failed other treatments. Since the medication is so new, clinicians need more information on dupilumab treatment. Our specific objective was to give clinicians a better timeline of when to perform an endoscopy after dupilumab is started. If performed too early, we don't know if the medication works. If performed too late, the patient may have flared EoE, if the medication is the right treatment.

METHODS
By reviewing and abstracting data from patient charts, I made a raw data set in google sheets. Then I organized this data into sub sheets that consisted of cohorts of patients with common attributes we were analyzing. For example when they had their endoscopy after starting dupilumab. I made flowcharts that explained which patients were in the study and why others were not. After learning about statistical analysis and reviewing medical papers, the cohorts were tested for statistical significance. We then pivoted focus, to find meaningful results in a subgroup of patients.

RESULTS/ DISCUSSION
This subgroup cohort consisted of patients who had received multiple endoscopies after starting dupilumab (most patients only had one). We found that for some patients where dupilumab was not effective in the first endoscopy, was proven to be effective in later endoscopies. This does raise a discussion for the benefits of performing another endoscopy at a later date if the first shows that dupilumab is not effective. More analysis and data collection needs to be done for this hypothesis, but it is an interesting discovery.

ACKNOWLEDGEMENTS
- Twan, for being my mentor through my first experience in research. You made it interactive and allowed me to grow my understanding. Thank you for your patience and guidance.
- Marissa, for helping me feel like I belong in STEM and have the capabilities to reach my academic aspirations without self limitation.
- Sophia, for all that you do for the internships and SLI community.
- Ty, for supporting my journey in personal growth and time management.
- Stanford Medical School, for providing me the chance to be an active part of meaningful research.
- Boston Specialists, for providing the data needed to push EoE research further.
- EoE Cohort patients, Although I did not know them personally, reading their journey through EoE was inspirational and taught me about resilience and compassion.

Slicing Light, Revealing Life:
Advancing Cell Segmentation with Non-Invasive Coherence Tomography

Joshua Vera
Summer 2023

ABOUT YOU:
- Hometown: Oakland
- Major/ certificate: Computer Science
- Year of graduation from Foothill College: 2025

PLACEMENT:
Name of institution: Standford University Medical School
Website: [Home | Stanford Medicine](#)
Mission: The mission of this project is to revolutionize the traditional histopathology process by introducing a novel 3D virtual biopsy technology, OCT2Hist, which employs generative neural networks to transform OCT images into H&E histology-like visuals, offering a quicker, non-invasive, and efficient alternative for tracking disease.
Supervisor: Yonatan Winetraub

OBJECTIVE:
My goal of this internship was to visual segmentation, My role in the project has been centered on collecting data from both real and virtual H&E, visually segmenting the cells for comparison between the two, and sourcing relevant research papers and repositories on cell segmentations for machine learning.

METHODS:
The methods I used to complete my project was to first visually segment several images and meticulously distinguish cells within both real and virtual H&E images. My goal was not only to identify these cells but to assess the fidelity of our virtual images in comparison to the real ones. I was also able to complete a Literature Review with relevant research papers and repositories on cell segmentations for machine learning.

RESULTS & DISCUSSION:
The results that my project delivered assessed the accuracy of the virtual design. This segmentation provided a clear, comparative insight into how our virtual biopsies stacked up against traditional methods in cells. By ensuring the virtual images closely mirrored real ones in cell count, we solidified the credibility and reliability of the virtual biopsy technology.

ACKNOWLEDGEMENTS:
- Yonatan Winetraub mentor
- Sophia Kim, SLI
- Marissa Yanez, SLI.

Intact Therapeutics Internship - Oral Mucositis Formulation
Juan Marin Melo
Summer 2023

ABOUT ME:
- Hometown: Mountain View
- Major/Certificate: Biochemistry
- Year of Graduate from Foothill College: 2024

PLACEMENT:
Name of company/ institution: Intact Therapeutics
Website: https://intacttherapeutics.com
Supervisor: Chris Zhan and Ravi Pamnani

OBJECTIVE:
The aim of this internship encompassed the development of a remedy for Oral Mucositis, characterized by open sores within the mouth, a prevalent issue often associated with cancer. Chemotherapy, a prominent cancer treatment, frequently leads to Oral Mucositis as a side effect. Within this context, my mission involved advancing the existing research at Intact Therapeutics, which centers on exploring an oral topical formulation designed to alleviate and manage oral mucositis.

METHODS:
I became familiar with numerous concepts to make contributions to the research. My responsibilities primarily revolved around Cell-Splitting and conducting Assays. I executed ongoing protocols to help maintain and grow the lab's cell culture. Working with these cells, I participated in conducting cell Assays to comprehend the impact of specific components (proteins and poloxamers influencing signaling pathways) on the stimulation of cell proliferation.

RESULTS & DISCUSSION:
The internship revealed findings that enhanced the project's comprehension of the relationship between our designated proteins (R-spondin & Wnt-Proteins) and specific Poloxamers within the broader context of the Wnt-Signaling Pathway. This pathway is responsible for fostering cell proliferation and differentiation. Over the past weeks, I discovered answers as to how each component interacts with each other, overall formulating the best possible solution to treat Oral Mucositis.

ACKNOWLEDGMENTS:
- Ravi Pamnani, Intact Therapeutics CEO
- Chris Zhan, Project Manager and Coordinator
- Sophia Kim, SLI Director
- Marissa Yanez, SLI STEM Workforce Specialist
- Priyal Sarda, Intern

Acknowledgements

We are grateful to all those who help to make this program possible:

Foothill College/ FHDA District

- The SLI Internships team - Dr. Marissa Yáñez, STEM Workforce Specialist; Tyrell Baker, Internship Program Assistant; Sophia Kim, SLI Director
- Dr. Miloni Gandhi - Internship Class Instructor
- Dr. Ram Subramaniam - Dean, STEM Division
- Foothill STEM faculty - referring students and encouraging them to apply
- The FHDA Foundation - for their ongoing support to help SLI fundraise
- Kristina Whalen - President, Foothill College
- SLI Advisory Board Members

Funding for internship stipends provided by

- Labs and companies who cost-shared with us (75% of partners!)
- The Science Learning Institute
- Office of Community Engagement at Stanford
- Individual donors and supporters

We are especially appreciative of and grateful for this summer's mentors. Each mentor is listed in the student's final report. They were an amazingly committed group of individuals, all dedicated to ensuring the most fruitful experience for students.
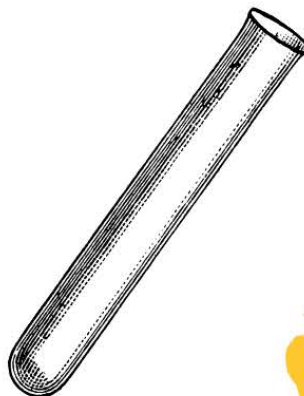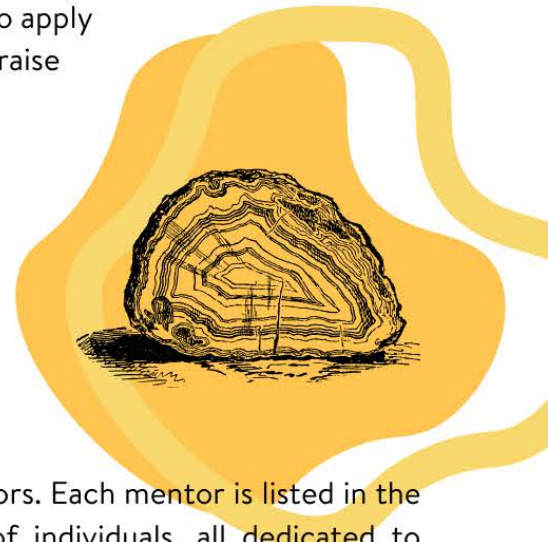
Student Testimonials

The summer 2023 SLI Interns researched an incredible range of topics from hydrogen bondind to machine learning. Many of the interns had some final words about their experience, some of which we share below.

"This internship was the catalyst for personal and professional growth. Because of this internship through SLI, I transformed my imposter syndrome to being confident in my ability to do research. The support from SLI, is life changing and it was an honor to be able to explore my career goals in a supportive and encouraging environment!"

"Because of this internship through SLI, my perspective on the professional world and my place in it has changed as a result of my internship with SLI. I wasn't sure what major or professional route I wanted to pursue before this opportunity arose. But this internship's practical experiences, mentorship, and exposure to real-world problems reinforced my love and commitment to the STEM fields. The biggest adjustment I've noticed is in my confidence. I now approach issues with an analytical perspective, confident in my ability to generate significant solutions."

"Thanks to the internship i was able to find my north star, before my head was all over the place wanting to do everything, unsure of the stem career i wanted but after doing the internship i new that i wanted to continue doing research and found that neuroscience had always been my goal, this also gave me a confidence boost it brought me out of my shell and i am now more confident and sure of myself."

"I learned about project management, lab techniques such as conducting assays, working with cells, and much more. I really appreciate this opportunity, because of it, I see myself more identified with STEM, and I now have a strong foundation with STEM. I no longer fear not knowing enough or how the field works, with this experience."
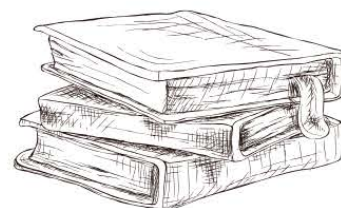
"Because of this internship through SLI, I feel very confident moving forward to pursue my dream career of Data Science. I feel that having the chance to work in such a prestigious environment with so many great minds has helped me develop many skills that will benefit me for life. Also, I have been able to create a LinkedIn and a resume due to this internship, which will help me get another internship in the future."

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