FOOTHILL COLLEGE
SCIENCE LEARNING INSTITUTE

SLI STEM Internships Summer 2023: Project Catalog

CHECK BACK PERIODICALLY BECAUSE THIS DOCUMENT MAY BE EDITED. WE WILL MAKE NOTE OF EDITS ON THE WEBPAGE.

Edited 4/14/23 – see project 21 revised description.

The following are the possible internship projects you will be working on this summer if selected. In your application, you will be asked to mark all that you are interested in. You may select no more than 5 to apply to.

There are two parts of this catalog:

- **Quick Links Table of Contents** – contains key information about each project. Click on the hyperlink to go to the full description below.
- **Project Full Descriptions** – read each project's full description to make sure this is a project you are interested in. In your application, you will want to explain your interest in each of your selected projects.

You will see that some projects are listed multiple times because they are interdisciplinary or cross disciplinary. Click here to see a complete Project List.

Read through each description carefully to see if

1) You have the skills that the mentor/ supervisor is asking for.
2) You have an interest in the project.
3) The modality works for you – several of these are in-person, either fully or partially. You will need to provide your own transportation to the institution and some have parking fees.
4) Use this as a guide as you fill out the application. READ IN FULL DETAIL!

Important dates for the Summer 2023 Internship Program:

- Before end of spring quarter – program orientation for all interns
- Monday, July 3rd – required training for all interns
- Wednesday, July 5th – all internships starts
- Friday, September 1st – last day of 9 week internships
- Friday, September 8th – last day of 10 week internships

If you have any questions, please reach out to the SLI Director, Sophia Kim at kimsophia@fhda.edu or Marissa Yañez at yanezmarissa@fhda.edu. We are happy to provide support with the application process. Find out more at the website: https://foothill.edu/sli/internships/summer.html

---

QUICK LINKS TABLE OF CONTENTS

BE SURE TO REVIEW THE FULL DESCRIPTION BELOW THIS TABLE OF CONTENTS!

****Some projects are cross-disciplinary and may appear under multiple disciplines***

BIOLOGY/ CHEMISTRY				
Project Title	**Keywords**	**Required Skills**	**Modality**	**Institution/ Company**

1. Protein 610 from Mesoplasma florum – expression, purification, and crystallization	**Biochemistry, Molecular_Biology, Lab**	The work requires manual dexterity as we used pipettors and tiny tools to handle crystals. Knowledge on preparing buffer solutions, using pH-meter, balances, calculating molarity, are good to have, but not necessary.	Fully in-person/ Mostly hands-on, in-lab experience	Stanford University: ChEM-H
2. Immune receptor distribution and binding to immune cells in membrane systems derived from cancer cells	**Cancer Biology, Cancer Research, Fluorescence Microscopy**	Interest in basic cell biology and fluorescence microscopy	Fully in-person/ Mostly hands-on, in-lab experience	Stanford University: OBGYN
3. Understanding the dynamics of harmful algal blooms through the lens of trait-based ecology	**Machine Learning, Ecology, Environmental Science, Applied Math**	1 quarter of Computer Science or equivalent is required. Basic knowledge of programming in a language such as Julia, Matlab, Python, or R is preferred but not necessary. Interest in ecology or environmental science is highly desired.	Hybrid - remote/ online with some in-person opportunities/ Mostly on the computer, computational research	Carnegie Institute for Science: Global Ecology
4. Research & Development Intern @ Digbi Health	**Research, Gut Health**	A passion and interest in food, nutrition, health. Basic understanding of common types of cuisine is preferable. Excellent written communication skills. Science research experience is preferable but not required. A strong command of the English language and the ability to write a compelling story is a plus. Data collection and analysis skills are a plus.	Fully remote/ online/ Mostly on the computer, computational research, Mostly literature search, background research	Digbi Health (Mountain View, CA)
8. Synthesis of Single Chain Nanoparticles as Enzyme Mimics	**Chemistry, Polymers**	Excitement about the project, willingness to learn and work in a group, attentiveness to safety, and good communication. General chemistry is preferred, but not required.	Fully in-person/ Mostly hands-on, in-lab experience	San Jose State University: Department of Chemistry
13. Investigation for Protein Stabilizing Compounds in Liquid and Hydrogel Solutions at Intact Therapeutics	**Cancer Treatment, Cell Culture, Biotech**	At least one quarter of Biology and/or Chemistry with Lab Required. Student should have a basic understanding of lab safety and how to document experiments. Basic data analysis/visualization using spreadsheets is helpful as well.	Mostly in-person (50-80%) with some remote research work./ Mostly hands-on, in-lab experience	Intact Therapeutics: R&D (Palo Alto, CA)
14. Inducing Magnetism in a Topological Insulator by Interfacing with a Magnetic Insulator	**Microelectronics, Advanced Materials Synthesis, Quantum mechanics**	An intro general chemistry course and a physics course on electronics and magnetism is preferred but not required.	Fully in-person/ Mostly hands-on, in-lab experience	Stanford University: Applied Physics / Materials Science and Engineering
15. Process Associate @ EMD	**Semiconductor Industry, Chip Manufacturing, Process Engineering**	Ideally the student is a Physics, Chemistry or Engineering Major; Completion of 1 quarter of Chemistry with Lab is preferred, but not required.	Fully in-person/ Mostly hands-on, in-lab experience	EMD Electronics/Intermolecular (San Jose, CA)

19. Molecular Biology Internship @ Standard BioTools (Project 1)	**Biotechnology, Health, Genomics, Microfluidics**	At least one quarter of introductory biology or equivalent. At least one quarter of science with a lab is preferred.	Fully in person; mostly hands-on, in-lab experience	Standard BioTools (South San Francisco, CA)
23. Elucidating Structure and Properties in a New Class of Solvents	**Chemistry, Data Analysis**	At least one quarter of General Chemistry is recommended.	OK with any modality - will leave it up to the student/ Mostly on the computer, computational research, Mostly hands-on, in-lab experience	Stanford University: Department of Chemistry
24. Making molecules dance with light	**Quantum Mechanics, Computational Chemistry**	At least the first quarter of the chemistry series is required (Chem 1A). At least one quarter of Calculus (Math 1A) is helpful, but not required as the computer will do most of the math. An interest in quantum mechanics is useful, but not required.	Hybrid - remote/ online with some in-person opportunities/ Mostly on the computer, computational research, Mostly literature search, background research	Stanford University: Department of Chemistry
26. How does strawberry agricultural intensity in California affect the function of microbial symbionts in the honeybee gut?	**Biology, Microbiology, Computer Science, Data Science**	General Biology courses preferred but not required, the desire to learn computer programming in R (the student will be trained on this)	OK with any modality - will leave it up to the student/ Mostly on the computer, computational research	Stanford University: Biology
28. Understanding natural selection by mapping genes to cells and tissues of the Drosophila body	**Evolutionary Biology, Genomics, Data Science**	Required - Familiarity with computers. 1 quarter of Computer-Science (1A, 2A, 3A etc.) or equivalent is highly desired. Independent problem solving. Desired - knowledge or strong desire to learn basic introductory topics in: Cell and molecular biology (topics and wet lab experience) is highly desired. An interest in learning more about: Evolutionary biology, Math, Programming (R, Python, Bash), Linux, Genomics	Fully in-person/ Mostly on the computer, computational research, Mostly literature search, background research, Can involve some hands-on wet lab work	Stanford University: Department of Biology
32. 140 years of insect herbivory trends measured through preserved plant specimens	**Plant Biology, Image processing, data analysis, statistical analysis**	Interest in biology and/or ecology preferred. The motivation to learn to program in R is desired. Necessary skills and knowledge will be taught.	OK with any modality until August 5th. After that, remote/online./ Mostly on the computer, computational research	Carnegie Institution for Science: Department of Global Ecology
33. The structure and resilience of ecological interaction networks in marine microbes	**Microbiology, Data Analytics, Data Visualization**	Student should have at least one quarter of computer-science (or equivalent, required. Some statistics knowledge or a course in statistics is helpful, but not required.	Hybrid - remote/ online with some in-person opportunities/ Mostly on the	Carnegie Institution for Science: Department

			computer, computational research	of Global Ecology
37. Evaluation of invasive water hyacinth as a sustainable absorbent material for use in local manufacture of disposable menstrual pads in riverine communities	**Public Health, Sustainability, Women's Health**	Enthusiasm and eagerness to learn about this project will be privileged more than any specific skillsets or knowledge. General chemistry knowledge/lab experience may be preferred but not necessary.	Fully in-person/ Mostly hands-on, in-lab experience	Stanford University: Department of Materials Science and Engineering/ Department of Bioengineering
38. Resilience of photosynthesis in the Arctic	**Climate Change, Environmental Science, Artic Ecosystems, Data Analysis**	We look for a student who is interested in climate change impacts on ecosystems. Coursework in biology or earth system science helps but is not required. Experience in programming and data analysis is helpful but again not required (can learn on the job).	OK with any modality - will leave it up to the student/ Mostly on the computer, computational research	Carnegie Institution for Science: Department of Global Ecology

COMPUTER SCIENCE/ DATA SCIENCE				
Project Title	**Keywords**	**Required Skills**	**Modality**	**Institution/ Company**
3. Understanding the dynamics of harmful algal blooms through the lens of trait-based ecology	**Machine Learning, Ecology, Environmental Science, Applied Math**	1 quarter of Computer Science or equivalent is required. Basic knowledge of programming in a language such as Julia, Matlab, Python, or R is preferred but not necessary. Interest in ecology or environmental science is highly desired.	Hybrid - remote/ online with some in-person opportunities/ Mostly on the computer, computational research	Carnegie Institute for Science: Global Ecology
4. Research & Development Intern @ Digbi Health	**Research, Gut Health**	A passion and interest in food, nutrition, health. Basic understanding of common types of cuisine is preferable. Excellent written communication skills. Science research experience is preferable but not required. A strong command of the English language and the ability to write a compelling story is a plus. Data collection and analysis skills are a plus.	Fully remote/ online/ Mostly on the computer, computational research, Mostly literature search, background research	Digbi Health
9. Lung Tumor Segmentation in CT images	**Machine Learning, Cancer treatment, Biotech, Biomedical Data Science**	Interest in Biomedical Research. Some coding experience	Hybrid - remote/ online with some in-person opportunities/ Mostly on the computer, computational research	Stanford: Department of Biomedical Informatics Research
11. Building a Smiley Service Bot with GPT	**Machine Learning, Natural Language Processing, Chatbot, GPT**	Preferences will be given to applicants who meet the following criteria: - Cumulative GPA of 2.5 or above - No prior internship experience - Financial Aid needs	Hybrid - remote/ online with some in-person opportunities/ Mostly on the computer,	Stanford University: Research Hub at the Graduate

		- Computer Science major or basic python programming skills is helpful (e.g., completion of 1 quarter of python or equivalent is preferred)	computational research	School of Business
12. Mechanical Technician @ iSono Health	**Ultrasound Imaging, Women's Health**	Good hands on ability. Good mechanical and spatial abilities. Experience with 3D CAD software is a plus. Desire to learn about small robotic components and accessories.	Fully in-person/ Mostly hands-on, in-lab experience/	iSono Health: (South San Francisco)
17. Program Evaluation Assistant	**Program Evaluation, Program Design, Design Thinking, Data Science, Data Analysis, Data Visualization, Quality Analysis, Research**	No prior coursework is required for this position. Enthusiasm to support community college faculty and learners will be preferred over specific skillsets, as long as applicant is willing to learn. General familiarity, or willingness to learn in the fields of education, research, program evaluation design, survey design, and basic qualitative and quantitative data analysis is preferred.	Mostly online/remote with some hybrid/in-person opportunities./ Mostly on the computer, computational research, Evaluation design, survey design and administration, focus group design/administration, qualitative & quantitative data analysis.	Stanford University: Stanford Digital Education
18. Using machine learning to study next-generation, atomically thin materials	**Machine Learning, Quantum Technology, Computation**	Rudimentary programming (e.g., python) required. Knowing how to use the linux/unix command line is desired but not required.	Prefer in-person, but can partially accommodate some remote component/ Mostly on the computer, computational research	Stanford University: Materials Science and Engineering
20. Engineering Internship @ Standard BioTools (Project 2)	**Biotechnology, Health, Genomics, Microfluidics**	At least 1 quarter of computer-science or equivalent is required (preferably in Python or C#). Exposure to engineering concepts (EE/MechE) is preferred.	Fully in person: Mostly on the computer, computational research	Standard BioTools (South San Francisco, CA)
21. RSL: Guided internship in biomedical imaging	**Radiology, Biomedical Imaging**	Motivated students of any scientific background are welcome to apply. Familiarity with basic coding skills (Matlab/python) would help, but is not essential.	TWTH on site/ A combination of computational research and dry lab work with both hands-on and observational opportunities/ /	Stanford University: Radiology Research
25. Developing virtual histology for early diagnosis of skin cancer	**Machine Learning, Medical Imaging, Diagnostics**	Ideally the student has taken at least one quarter or equivalent of computer science in python. Students should have an interest in learning machine learning models.	Hybrid - remote/ online with some in-person opportunities/ Mostly on the computer, computational research, Mostly literature search, background research	Stanford University: Medical School

26. How does strawberry agricultural intensity in California affect the function of microbial symbionts in the honeybee gut?	**Biology, Microbiology, Computer Science, Data Science**	General Biology courses preferred but not required, the desire to learn computer programming in R (the student will be trained on this)	OK with any modality - will leave it up to the student/ Mostly on the computer, computational research	Stanford University: Biology
27. Machine learning based tropical cyclone simulator	**Machine Learning, Environmental Science**	Having completed 2 quarters (or equivalent) in Python is required. Proficiency in Matlab is desired but not required. Some exposure to atmospheric science is preferred; Exposure to machine learning is helpful.	Hybrid - remote/ online with some in-person opportunities/ Mostly on the computer, computational research	Stanford University: School of Medicine/Woods Institute of Environment
28. Understanding natural selection by mapping genes to cells and tissues of the Drosophila body	**Evolutionary Biology, Genomics, Data Science**	Required - Familiarity with computers. 1 quarter of Computer-Science (1A, 2A, 3A etc.) or equivalent is highly desired. Independent problem solving. Desired - knowledge or strong desire to learn basic introductory topics in: Cell and molecular biology (topics and wet lab experience) is highly desired. An interest in learning more about: Evolutionary biology, Math, Programming (R, Python, Bash), Linux, Genomics	Fully in-person/ Mostly on the computer, computational research, Mostly literature search, background research, Can involve some hands-on wet lab work	Stanford University: Department of Biology
29. Electric Racing Car Dashboard Project Intern @ ECM	**Electric Cars, Linux, Android, C++, C, Artificial Intelligence (AI), Internet of Things (IoT), Machine Learning**	At least one quarter of computer-programming or equivalent (can be self-taught) is required; for example completion of one of the following CS 30, CS64A, CS 2A.B.C series or equivalent is required. Students should have a strong desire to pick up programming skills.	Combination of in-house and remote. We prefer that you spend as much time as you can with us in our offices in Santa Clara. That way we can bounce ideas off each other and you can learn how to work in a team. Although both projects contain a large software component, there will also be hardware and hands-on, in-lab experience.	ECM (Engine Control and Monitoring) (Santa Clara, CA)
30. Electric Vehicle Charging Project Intern @ ECM	**Electric Cars, Linux, Android, C++, C, Artificial Intelligence (AI), Internet of Things (IoT), Machine Learning**	At least one quarter of computer-programming or equivalent (can be self-taught) is required; for example completion of one of the following CS 30, CS64A, CS 2A.B.C series or equivalent is required. Students should have a strong desire to pick up programming skills.	Combination of in-house and remote. We prefer that you spend as much time as you can with us in our offices in Santa Clara. That way we can bounce ideas off each other and you can learn	ECM (Engine Control and Monitoring) (Santa Clara, CA)

			how to work in a team. Although both projects contain a large software component, there will also be hardware and hands-on, in-lab experience.	
33. The structure and resilience of ecological interaction networks in marine microbes	**Microbiology, Data Analytics, Data Visualization**	Student should have at least one quarter of computer-science (or equivalent, required. Some statistics knowledge or a course in statistics is helpful, but not required.	Hybrid - remote/ online with some in-person opportunities/ Mostly on the computer, computational research	Carnegie Institution for Science: Department of Global Ecology
34. Supporting a Prostate Cancer Treatment Planning Platform	**Cancer Treatments, Software Engineering**	Experience with a programming language such as Go, C#, Java, Java-script, Python etc through coursework or personal projects. At least 1 quarter of computer-science or equivalent required. Interest in the medical field.	Will likely be entirely remote, unless the student is able to be in the Los Angeles area, in which case hybrid opportunities are available.	Avenda Health: Engineering Team (Culver City, CA)
36. Microprocessor Integrated Circuit design using 2-D GUI CAD tool	**Semiconductors, 2-D or 3-D design, Minecraft, Legos**	This project would appeal to students who liked using Minecraft, Legos or something similar (yet this is not a requirement); CS10 is a plus but not absolutely required.	Hybrid - remote/ online with some in-person opportunities/ On the computer, hands on design	Aril Computer Corp: Engineering (Los Gatos, CA)
38. Resilience of photosynthesis in the Arctic	**Climate Change, Environmental Science, Artic Ecosystems, Data Analysis**	We look for a student who is interested in climate change impacts on ecosystems. Coursework in biology or earth system science helps but is not required. Experience in programming and data analysis is helpful but again not required (can learn on the job).	OK with any modality - will leave it up to the student/ Mostly on the computer, computational research	Carnegie Institution for Science: Department of Global Ecology
39. Software tools for particle accelerators	**Particle Acceleration, Electricity & Magnetism**	No experience required.	OK with any modality - will leave it up to the student/ Mostly on the computer, computational research	SLAC: Accelerator Directorate
40. Responses of wetlands methane emissions to warming	**Global Warming, Wetlands, Ecology, Environmental Science**	Coursework in any of the following fields would be helpful: environmental science, chemistry, biology, computer science, data science, or statistics. Interest in learning how to use programming skills to analyze data or experience doing so. A willingness to learn and try new things!	OK with any modality - will leave it up to the student/ Mostly on the computer, computational research	Carnegie Institute for Science/Stanford University: Department of Global Ecology/Department of Earth System Science

41. Machine Learning. Mixture of Experts (MoE) Models Intern	**Machine Learning, AI, Simulation, Big Data, AWS**	Basic to strong programming skills (Python or C++) required. Exposure to machine learning and data science concepts (either self-taught or through coursework/previous training/ projects etc.) is highly preferable.	2-3 days per week in person (minimum) at the Mountain View site as part of a team, the rest can be remote.	Esperanto Technologies (Mountain View, CA)

ECOLOGY/ ENVIRONMENTAL SCIENCE				
Project Title	**Keywords**	**Required Skills**	**Modality**	**Institution/ Company**
3. Understanding the dynamics of harmful algal blooms through the lens of trait-based ecology	**Machine Learning, Ecology, Environmental Science, Applied Math**	1 quarter of Computer Science or equivalent is required. Basic knowledge of programming in a language such as Julia, Matlab, Python, or R is preferred but not necessary. Interest in ecology or environmental science is highly desired.	Hybrid - remote/ online with some in-person opportunities/ Mostly on the computer, computational research	Carnegie Institute for Science: Global Ecology
27. Machine learning based tropical cyclone simulator	**Machine Learning, Environmental Science**	Having completed 2 quarters (or equivalent) in Python is required. Proficiency in Matlab is desired but not required. Some exposure to atmospheric science is preferred; Exposure to machine learning is helpful.	Hybrid - remote/ online with some in-person opportunities/ Mostly on the computer, computational research	Stanford University: School of Medicine/Woods Institute of Environment
32. 140 years of insect herbivory trends measured through preserved plant specimens	**Plant Biology, Image processing, data analysis, statistical analysis**	Interest in biology and/or ecology preferred. The motivation to learn to program in R is desired. Necessary skills and knowledge will be taught.	OK with any modality until August 5th. After that, remote/online./ Mostly on the computer, computational research	Carnegie Institution for Science: Department of Global Ecology
33. The structure and resilience of ecological interaction networks in marine microbes	**Microbiology, Data Analytics, Data Visualization**	Student should have at least one quarter of computer-science (or equivalent, required. Some statistics knowledge or a course in statistics is helpful, but not required.	Hybrid - remote/ online with some in-person opportunities/ Mostly on the computer, computational research	Carnegie Institution for Science: Department of Global Ecology
38. Resilience of photosynthesis in the Arctic	**Climate Change, Environmental Science, Artic Ecosystems, Data Analysis**	We look for a student who is interested in climate change impacts on ecosystems. Coursework in biology or earth system science helps but is not required. Experience in programming and data analysis is helpful but again not required (can learn on the job).	OK with any modality - will leave it up to the student/ Mostly on the computer, computational research	Carnegie Institution for Science: Department of Global Ecology

40. Responses of wetlands methane emissions to warming	**Global Warming, Wetlands, Ecology, Environmental Science**	Coursework in any of the following fields would be helpful: environmental science, chemistry, biology, computer science, data science, or statistics. Interest in learning how to use programming skills to analyze data or experience doing so. A willingness to learn and try new things!	OK with any modality - will leave it up to the student/ Mostly on the computer, computational research	Carnegie Institute for Science/Stanford University: Department of Global Ecology/Department of Earth System Science

ENGINEERING/ PHYSICS				
Project Title	**Keywords**	**Required Skills**	**Modality**	**Institution/ Company**
1. Protein 610 from Mesoplasma florum – expression, purification, and crystallization	**Biochemistry, Molecular_Biology, Lab**	The work requires manual dexterity as we used pipettors and tiny tools to handle crystals. Knowledge on preparing buffer solutions, using pH-meter, balances, calculating molarity, are good to have, but not necessary.	Fully in-person/ Mostly hands-on, in-lab experience	Stanford University: ChEM-H
4. Research & Development Intern @ Digbi Health	**Research, Gut Health**	A passion and interest in food, nutrition, health. Basic understanding of common types of cuisine is preferable. Excellent written communication skills. Science research experience is preferable but not required. A strong command of the English language and the ability to write a compelling story is a plus. Data collection and analysis skills are a plus.	Fully remote/ online/ Mostly on the computer, computational research, Mostly literature search, background research	Digbi Health
5. Manufacturing Engineering Intern @ geCKo Materials	**Manufacturing Engineering, Materials Science, 3D Printing, Prototyping**	● Proficient MS Office/Google Suite skills (esp. Excel), specifically the intern should be able to do graphs & pivot tables within excel; ● Comfortable learning CAD software (Fusion 360) and CNC programming ● Interest in mechanical and/or manufacturing engineering that caters to the space, robotics and drone industries. ● Strong writing skills is desirable.	Fully in-person/ Mostly hands-on, manufacturing, prototyping and QA testing experience	geCKo Materials
6. Improving Specimen Preparation for Atomic Scale Characterization	**Nano-tech, Fabrication, 3-D Printing**	No skills required, though experience with tools or fabrication will be beneficial.	Fully in-person/ Mostly hands-on, in-lab experience	Stanford University: Nano Shared Facilities

7. Examination of equity in drinking water system consolidations	**Data Analysis, Data Science, Public Health, Equity, Mixed Methods Research**	Students should be self-motivated, imaginative, and curious about the topics. Proficiency with Excel or an equivalent coding language for data analysis is preferred, but not required. However, the desire to learn a data analysis coding language is a must as the student will be trained in this area. Experience with Qgis, ArcGIS, or another spatial analysis tool are preferred, but not required.	Fully remote/ online/ Mostly on the computer, computational research, Mostly literature search, background research	Stanford University: Department of Civil and Environmental Engineering
9. Lung Tumor Segmentation in CT images	**Machine Learning, Cancer treatment, Biotech, Biomedical Data Science**	Interest in Biomedical Research. Some coding experience	Hybrid - remote/ online with some in-person opportunities/ Mostly on the computer, computational research	Stanford: Department of Biomedical Informatics Research
12. Mechanical Technician @ iSono Health	**Ultrasound Imaging, Women's Health**	Good hands on ability. Good mechanical and spatial abilities. Experience with 3D CAD software is a plus. Desire to learn about small robotic components and accessories.	Fully in-person/ Mostly hands-on, in-lab experience/	iSono Health: (South San Francisco)
14. Inducing Magnetism in a Topological Insulator by Interfacing with a Magnetic Insulator	**Microelectronics, Advanced Materials Synthesis, Quantum mechanics**	An intro general chemistry course and a physics course on electronics and magnetism is preferred but not required.	Fully in-person/ Mostly hands-on, in-lab experience	Stanford University: Applied Physics / Materials Science and Engineering
15. Process Associate @ EMD	**Semiconductor Industry, Chip Manufacturing, Process Engineering**	Ideally the student is a Physics, Chemistry or Engineering Major; Completion of 1 quarter of Chemistry with Lab is preferred, but not required.	Fully in-person/ Mostly hands-on, in-lab experience	EMD Electronics/Intermolecular (San Jose, CA)
16. Electrical Engineer Intern in a Semiconductor R&D Fab @ EMD	**Electrical Engineer, Mechanical Engineer, Chemical Engineer, Systems Engineer**	Knowledge of HW Engineering principles, digital logic, analog circuits and its hardware implementations	Fully in-person/ Mostly hands-on, in-lab experience	EMD Electronics (San Jose, CA)
18. Using machine learning to study next-generation, atomically thin materials	**Machine Learning, Quantum Technology, Computation**	Rudimentary programming (e.g., python) required. Knowing how to use the linux/unix command line is desired but not required.	Prefer in-person, but can partially accommodate some remote component/ Mostly on the computer, computational research	Stanford University: Materials Science and Engineering
20. Engineering Internship @ Standard BioTools (Project 2)	**Biotechnology, Health, Genomics, Microfluidics**	At least 1 quarter of computer-science or equivalent is required (preferably in Python or C#). Exposure to engineering concepts (EE/MechE) is preferred.	Fully in person: Mostly on the computer, computational research	Standard BioTools (South San Francisco, CA)

21. RSL: Guided internship in biomedical imaging	**Radiology, Biomedical Imaging**	Motivated students of any scientific background are welcome to apply. Familiarity with basic coding skills (Matlab/python) would help, but is not essential.	TWTH on site/ A combination of computational research and dry lab work with both hands-on and observational opportunities/ /	Stanford University: Radiology Research
24. Making molecules dance with light	**Quantum Mechanics, Computational Chemistry**	At least the first quarter of the chemistry series is required (Chem 1A). At least one quarter of Calculus (Math 1A) is helpful, but not required as the computer will do most of the math. An interest in quantum mechanics is useful, but not required.	Hybrid - remote/ online with some in-person opportunities/ Mostly on the computer, computational research, Mostly literature search, background research	Stanford University: Department of Chemistry
25. Developing virtual histology for early diagnosis of skin cancer	**Machine Learning, Medical Imaging, Diagnostics**	Ideally the student has taken at least one quarter or equivalent of computer science in python. Students should have an interest in learning machine learning models.	Hybrid - remote/ online with some in-person opportunities/ Mostly on the computer, computational research, Mostly literature search, background research	Stanford University: Medical School
27. Machine learning based tropical cyclone simulator	**Machine Learning, Environmental Science**	Having completed 2 quarters (or equivalent) in Python is required. Proficiency in Matlab is desired but not required. Some exposure to atmospheric science is preferred; Exposure to machine learning is helpful.	Hybrid - remote/ online with some in-person opportunities/ Mostly on the computer, computational research	Stanford University: School of Medicine/Woods Institute of Environment
29. Electric Racing Car Dashboard Project Intern @ ECM	**Electric Cars, Linux, Android, C++, C, Artificial Intelligence (AI), Internet of Things (IoT), Machine Learning**	At least one quarter of computer-programming or equivalent (can be self-taught) is required; for example completion of one of the following CS 30, CS64A, CS 2A.B.C series or equivalent is required. Students should have a strong desire to pick up programming skills.	Combination of in-house and remote. We prefer that you spend as much time as you can with us in our offices in Santa Clara. That way we can bounce ideas off each other and you can learn how to work in a team. Although both projects contain a large software component, there will also be hardware and hands-on, in-lab experience.	ECM (Engine Control and Monitoring) (Santa Clara, CA)
30. Electric Vehicle Charging Project Intern @ ECM	**Electric Cars, Linux, Android, C++, C, Artificial Intelligence (AI), Internet of Things (IoT), Machine Learning**	At least one quarter of computer-programming or equivalent (can be self-taught) is required; for example completion of one of the following CS 30, CS64A, CS 2A.B.C series or equivalent is required. Students should have a strong desire to pick up programming skills.	Combination of in-house and remote. We prefer that you spend as much time as you can with us in our offices in Santa Clara. That way we can bounce ideas off each other and you can learn how to work in a team. Although both projects contain a large software	ECM (Engine Control and Monitoring) (Santa Clara, CA)

			component, there will also be hardware and hands-on, in-lab experience.	
36. Microprocessor Integrated Circuit design using 2-D GUI CAD tool	**Semiconductors, 2-D or 3-D design, Minecraft, Legos**	This project would appeal to students who liked using Minecraft, Legos or something similar (yet this is not a requirement); CS10 is a plus but not absolutely required.	Hybrid - remote/ online with some in-person opportunities/ On the computer, hands on design	Aril Computer Corp: Engineering (Los Gatos, CA)
37. Evaluation of invasive water hyacinth as a sustainable absorbent material for use in local manufacture of disposable menstrual pads in riverine communities	**Public Health, Sustainability, Women's Health**	Enthusiasm and eagerness to learn about this project will be privileged more than any specific skillsets or knowledge. General chemistry knowledge/lab experience may be preferred but not necessary.	Fully in-person/ Mostly hands-on, in-lab experience	Stanford University: Department of Materials Science and Engineering/Department of Bioengineering
39. Software tools for particle accelerators	**Particle Acceleration, Electricity & Magnetism**	No experience required.	OK with any modality - will leave it up to the student/ Mostly on the computer, computational research	SLAC: Accelerator Directorate

MATH				
Project Title	**Keywords**	**Required Skills**	**Modality**	**Institution/ Company**
3. Understanding the dynamics of harmful algal blooms through the lens of trait-based ecology	**Machine Learning, Ecology, Environmental Science, Applied Math**	1 quarter of Computer Science or equivalent is required. Basic knowledge of programming in a language such as Julia, Matlab, Python, or R is preferred but not necessary. Interest in ecology or environmental science is highly desired.	Hybrid - remote/ online with some in-person opportunities/ Mostly on the computer, computational research	Carnegie Institute for Science: Global Ecology
9. Lung Tumor Segmentation in CT images	**Machine Learning, Cancer treatment, Biotech, Biomedical Data Science**	Interest in Biomedical Research. Some coding experience	Hybrid - remote/ online with some in-person opportunities/ Mostly on the computer, computational research	Stanford: Department of Biomedical Informatics Research
12. Mechanical Technician @ iSono Health	**Ultrasound Imaging, Women's Health**	Good hands on ability. Good mechanical and spatial abilities. Experience with 3D CAD software is a plus. Desire to learn about small robotic components and accessories.	Fully in-person/ Mostly hands-on, in-lab experience/	iSono Health: (South San Francisco)

MEDICINE/ PUBLIC HEALTH				
Project Title	**Keywords**	**Required Skills**	**Modality**	**Institution/ Company**
1. Protein 610 from Mesoplasma florum – expression, purification, and crystallization	**Biochemistry, Molecular_Biology, Lab**	The work requires manual dexterity as we used pipettors and tiny tools to handle crystals. Knowledge on preparing buffer solutions, using pH-meter, balances, calculating molarity, are good to have, but not necessary.	Fully in-person/ Mostly hands-on, in-lab experience	Stanford University: ChEM-H
2. Immune receptor distribution and binding to immune cells in membrane systems derived from cancer cells	**Cancer Biology, Cancer Research, Fluorescence Microscopy**	Interest in basic cell biology and fluorescence microscopy	Fully in-person/ Mostly hands-on, in-lab experience	Stanford University: OBGYN
4. Research & Development Intern @ Digbi Health	**Research, Gut Health**	A passion and interest in food, nutrition, health. Basic understanding of common types of cuisine is preferable. Excellent written communication skills. Science research experience is preferable but not required. A strong command of the English language and the ability to write a compelling story is a plus. Data collection and analysis skills are a plus.	Fully remote/ online/ Mostly on the computer, computational research, Mostly literature search, background research	Digbi Health
7. Examination of equity in drinking water system consolidations	**Data Analysis, Data Science, Public Health, Equity, Mixed Methods Research**	Students should be self-motivated, imaginative, and curious about the topics. Proficiency with Excel or an equivalent coding language for data analysis is preferred, but not required. However, the desire to learn a data analysis coding language is a must as the student will be trained in this area. Experience with Qgis, ArcGIS, or another spatial analysis tool are preferred, but not required.	Fully remote/ online/ Mostly on the computer, computational research, Mostly literature search, background research	Stanford University: Department of Civil and Environmental Engineering
9. Lung Tumor Segmentation in CT images	**Machine Learning, Cancer treatment, Biotech, Biomedical Data Science**	Interest in Biomedical Research. Some coding experience	Hybrid - remote/ online with some in-person opportunities/ Mostly on the computer, computational research	Stanford: Department of Biomedical Informatics Research
10. Clinical utility of dupilumab in eosinophilic esophagitis patients	**Medical Data Review, Data Analysis, Data Visualization**	Willingness to learn, proficiency with spreadsheets and computers usage, interest in medicine, good at writing.	OK with any modality - will leave it up to the student/ Mostly on the computer, computational	Stanford University School of Medicine, Boston Specialists

			research, Mostly literature search, background research	
17. Program Evaluation Assistant	**Program Evaluation, Program Design, Design Thinking, Data Science, Data Analysis, Data Visualization, Quality Analysis, Research**	No prior coursework is required for this position. Enthusiasm to support community college faculty and learners will be preferred over specific skillsets, as long as applicant is willing to learn. General familiarity, or willingness to learn in the fields of education, research, program evaluation design, survey design, and basic qualitative and quantitative data analysis is preferred.	Mostly online/remote with some hybrid/in-person opportunities./ Mostly on the computer, computational research, Evaluation design, survey design and administration, focus group design/administration, qualitative & quantitative data analysis.	Stanford University: Stanford Digital Education
21. RSL: Guided internship in biomedical imaging	**Radiology, Biomedical Imaging**	Motivated students of any scientific background are welcome to apply. Familiarity with basic coding skills (Matlab/python) would help, but is not essential.	TWTH on site/ A combination of computational research and dry lab work with both hands-on and observational opportunities	Stanford University: Radiology Research
22. Optometric Technician - Learn the Job and Then Create a Training Manual to Teach Others	**Optometry, Clinic**	Interest in working in the medical field or as an allied health professional. Good communication skills, friendly and likes working with people.	Mostly in-person with some opportunity to work remotely/ Mostly hands on work with patients, with some online research and document creation.	Cambridge Optometry (Palo Alto, CA)
25. Developing virtual histology for early diagnosis of skin cancer	**Machine Learning, Medical Imaging, Diagnostics**	Ideally the student has taken at least one quarter or equivalent of computer science in python. Students should have an interest in learning machine learning models.	Hybrid - remote/ online with some in-person opportunities/ Mostly on the computer, computational research, Mostly literature search,	Stanford University: Medical School

			background research	
37. Evaluation of invasive water hyacinth as a sustainable absorbent material for use in local manufacture of disposable menstrual pads in riverine communities	**Public Health, Sustainability, Women's Health**	Enthusiasm and eagerness to learn about this project will be privileged more than any specific skillsets or knowledge. General chemistry knowledge/lab experience may be preferred but not necessary.	Fully in-person/ Mostly hands-on, in-lab experience	Stanford University: Department of Materials Science and Engineering/Department of Bioengineering

PSYCHOLOGY/ SOCIAL JUSTICE				
Project Title	**Keywords**	**Required Skills**	**Modality**	**Institution/ Company**
17. Program Evaluation Assistant	**Program Evaluation, Program Design, Design Thinking, Data Science, Data Analysis, Data Visualization, Quality Analysis, Research**	No prior coursework is required for this position. Enthusiasm to support community college faculty and learners will be preferred over specific skillsets, as long as applicant is willing to learn. General familiarity, or willingness to learn in the fields of education, research, program evaluation design, survey design, and basic qualitative and quantitative data analysis is preferred.	Mostly online/remote with some hybrid/in-person opportunities./ Mostly on the computer, computational research, Evaluation design, survey design and administration, focus group design/administration, qualitative & quantitative data analysis.	Stanford University: Stanford Digital Education

STEM EDUCATION/ STEM EMPOWERMENT				
Project Title	**Keywords**	**Required Skills**	**Modality**	**Institution/ Company**
17. Program Evaluation Assistant	**Program Evaluation, Program Design, Design Thinking, Data Science, Data Analysis, Data Visualization, Quality Analysis, Research**	No prior coursework is required for this position. Enthusiasm to support community college faculty and learners will be preferred over specific skillsets, as long as applicant is willing to learn. General familiarity, or willingness to learn in the fields of education, research, program evaluation design, survey design, and basic qualitative and quantitative data analysis is preferred.	Mostly online/remote with some hybrid/in-person opportunities./ Mostly on the computer, computational research, Evaluation design, survey design and administration, focus group design/administration, qualitative & quantitative data analysis.	Stanford University: Stanford Digital Education
31. SLI Leadership Fellow for Summer Institute	**Student Empowerment, Summer Program, Teaching, Mentoring**	No necessary skills, just an open mind, an interest in working with others and building resources for new incoming Foothill students	Fully in-person/ mostly hands-on, outreach and education work	Foothill College: Science Learning Institute
35. Supporting the 2023 FLi Sci Research	**Research, Underrepresented in STEM, Qualitative Research,**	Any courses in science or education would be applicable to this internship. Classes in statistics, math,	Fully remote/ online/ Mostly on the computer, computational research,	Stanford University: Education

Scholars Program	**Quantitative Research**	research methods, or computer programming are helpful but not necessary. This internship is applicable for anyone with an interest in science, medicin	Mostly literature search, background research	

KEEP READING BELOW FOR DETAILED DESCRIPTIONS
OF THE ABOVE OPPORTUNITIES.

Make sure you read the details as you make your selections of what project you'd be interested in!

PROJECT DESCRIPTION DETAILS

Read below for more details on the projects which were briefly described above. Make sure you fully understand the project details as you select up to top 5 choices for your application.

Discipline(s)	Biology, Medicine, Physics
Project Title	**1. Protein 610 from Mesoplasma florum – expression, purification, and crystallization**
Institution and Affiliation	Stanford University: ChEM-H
Keywords	**Biochemistry, Molecular_Biology, Lab**
Mentor/ supervisor	Daniel Fernandez, Staff Scientist
Mentor bio	I'm a quiet person that enjoys much doing research. You mostly find me around the lab, if not I enjoy much biking the area, watching soccer, or reading books.
Project Description	Mesoplasma florum is a small, self-replicating bacterium isolated from the flower of a lemon tree. Its fully sequenced genome comprises less than 1 Mb making it an attractive model organism to study its parasitic cousin Mycoplasma. M. florum genome is believed to code for just 700 functional proteins. What these proteins could functionally do and structurally be is still unknown. Experimental data on many of them is still lacking. A better understanding on this model organism will help us tackle the problem of antibiotic resistance in disease-causing bacteria. We are going to work on protein 610 (hypothetically a peptide hydrolase) from M. florum to profile its function through a combination of in vitro activity assays, biophysical characterization, and X-ray crystallography. To this end, the student will: 1. Learn how to culture Escherichia coli to overproduce protein 610. E. coli is arguably the most commonly used protein factory in any biology laboratory. 2. Purify the protein through chromatography via FPLC. Electrophorese the sample to analyze its purity/abundance. 3. Analyze the stability of the protein at a variety of pH systems using advanced instrumentation including DLS and MST. 4. Crystallize the protein using a variety of crystallization systems with automated instrumentation. 5. Learn how to spot crystals and handle them under a specimen microscope in preparation for X-ray diffraction.
Required Skills	The work requires manual dexterity as we used pipettors and tiny tools to handle crystals. Knowledge on preparing buffer solutions, using pH-meter, balances, calculating molarity, are good to have, but not necessary.
Duration	20 hours per week for 10 weeks (7/5/23 - 9/8/23) - $3800 stipend for students
Modality/ Type of Work	Fully in-person/ Mostly hands-on, in-lab experience
Selection Process	Mentor reviews apps, does interviews, and decides
# of Interns	One intern

Discipline(s)	Biology, Medicine
Project Title	**2. Immune receptor distribution and binding to immune cells in membrane systems derived from cancer cells**
Institution and Affiliation	Stanford University: OBGYN Department, Gynecologic Oncology Division
Keywords	**Cancer Biology, Cancer Research, Fluorescence Microscopy**
Mentor/ supervisor	Malte Renz , Faculty
Mentor bio	I studied Fine Arts and Medicine in Germany. Worked in the basic cell biology labs of the German Cancer Research Center in Heidelberg and the National Institutes of Health in Bethesda, and did my clinical training in the Bronx and at Stanford. It has been my goal to bridge direct patient care and basic research.
Project Description	The project addresses how immune receptors (the so called PD-L1/ PD-1 system) form complexes in the plasma membrane of a cancer cell and how this complex formation is influenced by the binding of immune cells. To this end, we created cancer cell lines that express fluorescently labeled PD-L1 on their membranes (already present in the lab). The student would produce membrane blebs from those cancer cells and thus a semi-in vitro system. The distribution of PD-L1 will be assessed using tools of quantitative fluorescence microscopy. Furthermore, we plan on co-incubating these membrane blebs with activated T-cells (of a T-cell line). We hypothesize that the binding of the T-cell with the transcellular PD-1/ PD-L1 receptor system will result in cluster formation of PD-L1. Insight into the function of the PD-1/ PD-L1 receptor system in the cancer cell will help understand the mechanisms of clinically employed cancer immunotherapy in gynecologic malignancies.
Required Skills	Interest in basic cell biology and fluorescence microscopy
Duration	20 hours per week for 10 weeks (7/5/23 - 9/8/23) - $3800 stipend for students
Modality/ Type of Work	Fully in-person/ Mostly hands-on, in-lab experience
Selection Process	Mentor reviews apps, does interviews, and decides
# of Interns	One intern

Discipline(s)	Biology, Computer Science, Math
Project Title	**3. Understanding the dynamics of harmful algal blooms through the lens of trait-based ecology**
Institution and Affiliation	Carnegie Institute for Science: Global Ecology @ Stanford University
Keywords	**Machine Learning, Ecology, Environmental Science, Applied Math**
Mentor/ supervisor	Jorge Arroyo Esquivel , Postdoctoral Fellow
Mentor bio	I am a postdoctoral fellow in the Carnegie Institution for Science working on implementing machine learning into ecological data to answer ecological questions. I am originally from Costa Rica. Although I'm a first generation student, I've understood the need for conservation of ecosystems from a young age. I feel

	that my mentors in high school and college are an important part of who I am today as a researcher and I want to share that opportunity with somebody else. In my free time I like to learn about new things through Youtube videos and play card and board games with my friends.
Project Description	Harmful algal blooms (HABs) are a major problem of many aquatic environments, where the density of certain species of algae rapidly increases and produce toxins that lead to problems for human and ecosystems health. Trait-based ecology is a framework with the potential to identify what makes toxin-producing algae different from other species of algae and forecast how and when will these nocive algae bloom. Understanding the dynamical differences between these types of algae can allow managers prevent potential HABs from occurring . In addition, these forecasts can also provide time for managers to prepare for an upcoming HAB. In this project we will analyze trait data of different algae species to understand how different traits of toxin-producing algae and their interaction with other traits affect the occurrence of HABs. To do so, we will use a group of novel machine learning methods called data-driven dynamical systems. The intern will be in charge of running numerical experiments, testing different machine learning architectures, and analyzing the results under the guidance of their mentor.
Required Skills	1 quarter of Computer Science or equivalent is required. Basic knowledge of programming in a language such as Julia, Matlab, Python, or R is preferred but not necessary. Interest in ecology or environmental science is highly desired.
Duration	6 - 7 hours per week for 10 weeks (7/5/23 - 9/8/23) - $1200 stipend for students.
Modality/ Type of Work	Hybrid - remote/ online with some in-person opportunities/ Mostly on the computer, computational research
Selection Process	Mentor reviews apps, does interviews, and decides
# of Interns	One intern

Discipline(s)	Biology, Computer Science, Data Science, Engineering, Medicine, Public Health
Project Title	**4. Research & Development Intern @ Digbi Health**
Company Description	Digbi is a leading value-based, Precision Digital Care Platform for inflammatory insulin, musculoskeletal, gut, skin comorbidities associated with gut and obesity. The risk of these illnesses varies significantly across ethnicity and gender because they are rooted in the interactions between a person's gut microbiome, genetics, and lifestyle risk factors. We are the first company that has successfully integrated gut microbiome, genetic, blood, and lifestyle based risk signals, and provides personalized care for a diverse workforce and their families. Our care programs are vetted and paid by large insurance payers and employers. We are actively pursuing human trials with leading medical schools. Our programs demonstrably deliver superior health outcomes and financial savings to payers and employers.
Company and department	Digbi Health (Mountain View, CA)
Website	https://digbihealth.com/

Keywords	**Research, Gut Health**
Mentor/ supervisor	Esha Sahay, HR manager (Supervisor: TBD)
Mentor bio	TBD
Project Description	-Writes and edits materials for publication and presentation -Library research -Interprets, synthesizes, and analyzes data -Schedules organize and reports on the status of research activities -Plans and modifies research techniques, procedures, tests, equipment or software management -Meets with team lead on regular basis to maintain ongoing communication regarding the quality of the assistant's performance -Performs other related duties as required
Required Skills	A passion and interest in food, nutrition, health. Basic understanding of common types of cuisine is preferable. Excellent written communication skills. Science research experience is preferable but not required. A strong command of the English language and the ability to write a compelling story is a plus. Data collection and analysis skills are a plus.
Duration	15 hours per week for 10 weeks (7/5/23 - 9/8/23) - $2800 stipend for students.
Modality/ Type of Work	Fully remote/ online/ Mostly on the computer, computational research, Mostly literature search, background research
Selection Process	Mentor reviews apps, does interviews, and decides
# of Interns	1 intern

Discipline(s)	Engineering, Manufacturing Engineering, Materials Science
Project Title	**5. Manufacturing Engineering Intern @ geCKo Materials**
Institution and Affiliation	geCKo Materials: Stanford University BDML
Company Description	geCKo Materials manufactures (in the USA) a revolutionary, patented, NASA-certified Dry Adhesive inspired by the unique way a gecko's feet "grip" walls and ceilings, that is currently used on the International Space Station; see short PBS/NOVA video that explains origin of and principles behind the material; Mark Cutkofsky @ Stanford was our founder's PhD. advisor. geCKo is a women owned and minority owned business.
Website	www.geckomaterials.com (Campbell, CA)
Keywords	**Manufacturing Engineering, Materials Science, 3D Printing, Prototyping**
Mentor supervisor	Capella Kerst
Mentor bio	Capella Kerst earned a PhD in Mechanical Engineering from Stanford University, and is the inventor of geCKo Dry Adhesive. She also holds degrees from UC Berkeley and UCLA and is a community college graduate. Capella holds the patents in mass manufacturing of geCKo Materials Dry Adhesive.

Project Description	Design, develop, document, and deploy manufacturing process and quality control standards. Assist with CAD models (Fusion 360), 3-D prototype printing/assembly, and CNC programing, fixture improvement, and ERP application/process development. Engage with customers and suppliers, to understand and fulfill their unique application requirements.
Required Skills	● Proficient MS Office/Google Suite skills (esp. Excel), specifically the intern should be able to do graphs & pivot tables within excel; ● Comfortable learning CAD software (Fusion 360) and CNC programming ● Interest in mechanical and/or manufacturing engineering that caters to the space, robotics and drone industries. ● Strong writing skills is desirable.
Duration	20 hours per week for 10 weeks (7/5/23 - 9/8/23) - $3800 stipend for students
Modality/ Type of Work	Fully in-person/ Mostly hands-on, manufacturing, prototyping and QA testing experience
Selection Process	Mentor reviews apps, does interviews, and decides
# of Interns	One intern

Discipline(s)	Engineering, Physics
Project Title	**6. Improving Specimen Preparation for Atomic Scale Characterization**
Institution and Affiliation	Stanford University: Stanford Nano Shared Facilities
Keywords	**Nano-tech, Fabrication, 3-D Printing**
Mentor/ supervisor	Andrew Barnum , TEM Staff Scientist
Mentor bio	Andrew is a staff scientist at Stanford specializing in electron microscopy. Formally an applications development engineer with Thermo Fisher Scientific and FEI, he also has experience with startups. He received a B.S in applied mathematics from the University of Oregon after first taking classes at Lane Community College, and then received a M.S. in Applied Physics from Portland State University.
Project Description	Electron microscopes… Many samples to be examined under an electron microscope require time-intensive and complicated preparation procedures requiring substantial practice to successfully complete. This project will involve breaking existing procedures into assembly line-like steps and testing how to improve success on each step. For steps utilizing specialized equipment, student will test 3D printed alternatives and contribute design improvements.
Required Skills	No skills required, though experience with tools or fabrication will be beneficial.
Duration	15 hours per week for 10 weeks (7/5/23 - 9/8/23) - $2800 stipend for students
Modality/ Type of Work	Fully in-person/ Mostly hands-on, in-lab experience
Selection Process	Mentor reviews apps, does interviews, and decides
# of Interns	One intern

Discipline(s)	Engineering, Public Health
Project Title	**7. Examination of equity in drinking water system consolidations**
Institution and Affiliation	Stanford University: Department of Civil and Environmental Engineering
Keywords	**Data Analysis, Data Science, Public Health, Equity, Mixed Methods Research**
Mentor/ supervisor	Allisa Hastie , PhD Student
Mentor bio	I am a PhD student studying drinking water equity in the United States. I grew up in the Central Valley, near Fresno, and I enjoy spending time outside and exploring the Bay Area. As a research mentor my goal is to give you the tools and support you need to be able to make the project your own and develop research and technical skills that you can apply in other contexts.
Project Description	We will be examining drinking water system consolidations in California and potentially other western states. When small drinking water systems fail to provide sufficiently clean and reliable water to its customers, merging with another nearby system can provide this new combined system with more income from ratepayers and increase access to improved treatment methods. The state of California also has the authority to mandate consolidation of failing systems. We will specifically be looking at this consolidation process through the lens of equity and determine ways that consolidation may be leaving certain communities or groups behind and how it can be used to advance drinking water equity. In this project the student will examine publicly available data on drinking water safety and state funding for consolidated systems. Specific topics can be directed towards the student's interest and skills. 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 3 drinking water providers, or an in-depth examination of specific types of consolidations based on characteristics of the systems involved.
Required Skills	Students should be self-motivated, imaginative, and curious about the topics. Proficiency with Excel or an equivalent coding language for data analysis is preferred, but not required. However, the desire to learn a data analysis coding language is a must as the student will be trained in this area. Experience with Qgis, ArcGIS, or another spatial analysis tool are preferred, but not required.
Duration	6 - 7 hours per week for 10 weeks (7/5/23 - 9/8/23) - $1200 stipend for students
Modality/ Type of Work	Fully remote/ online/ Mostly on the computer, computational research, Mostly literature search, background research
Selection Process	Mentor reviews apps and decides
# of Interns	One intern

Discipline(s)	Chemistry
Project Title	**8. Synthesis of Single Chain Nanoparticles as Enzyme Mimics**
Institution and Affiliation	San Jose State University: Department of Chemistry
Keywords	**Chemistry, Polymers**

Mentor/ supervisor	Madalyn Radlauer , Assistant Professor of Chemistry
Mentor bio	Hi yall! I'm Madalyn Radlauer, PhD, a chemistry professor at SJSU where I have been since 2017. I grew up in New Orleans, LA, and first came out to CA for my undergraduate studies in Chemistry at Stanford University. As an undergraduate I got an opportunity to do research in synthetic chemistry (specifically learning about polymerization catalysis) with Prof. Bob Waymouth, and I loved it! I did my PhD at Caltech (more catalysis) and a postdoctoral research position at the University of Minnesota - Twin Cities (polymer chemistry) before starting at SJSU. In my six years at SJSU, I have had over 50 research students including 2 summer interns from Foothill. I teach inorganic, organometallic, analytical, and polymer chemistry. Outside of work, I don't have very much time for hobbies, because of my corgi and my 2-year-old taking up most of my time, but I do have a 287-day-streak on Duolingo. :)
Project Description	Our lab is interested in how the molecular environment affects reactivity for catalysts (molecules that facilitate other reactions). Most of the time chemical reactions are just run in solvent where reagents can freely diffuse around the reaction vessel, but we want to know what happens when you confine the catalysts in a larger molecular scaffold. This design is related to an enzyme, where the catalyst is the active site of a larger protein. Our synthetic approach involves making a long chain-like molecule known as a polymer and then crosslinking it to itself to tie it up as a nanoparticle (made from a single chain). These single chain nanoparticles will be attached (covalently) to our catalyst molecules and we will test the reactivity and compare with free floating catalysts to determine what changes. Students on this project will learn chemical synthesis, characterization, and safety skills, as well as have opportunities to practice science communication in group and subgroup meetings.
Required Skills	Excitement about the project, willingness to learn and work in a group, attentiveness to safety, and good communication. General chemistry is preferred, but not required.
Duration	20 hours per week for 10 weeks (7/5/23 - 9/8/23) - $3800 stipend for students
Modality/ Type of Work	Fully in-person/ Mostly hands-on, in-lab experience
Selection Process	Mentor reviews apps, does interviews, and decides
# of Interns	One intern

Discipline(s)	Computer Science, Data Science, Mathematics, Medicine, Physics
Project Title	**9. Lung Tumor Segmentation in CT images**
Institution and Affiliation	Stanford: Department of Biomedical Informatics Research
Lab website	https://med.stanford.edu/gevaertlab.html
Lab description	The Gevaert lab focuses on biomedical data fusion of complex diseases with a particular focus on oncology and cardiovascular diseases. We develop novel machine learning approaches that digest multi-omics, multi-modal or multi-scale data. Previously we pioneered data fusion work using Bayesian and kernel

	methods studying breast and ovarian cancer. Subsequent work concerned the development of methods for multi-omics data fusion. This resulted in the development of MethylMix, to identify differentially methylated genes, and AMARETTO, a computational method to integrate DNA methylation, copy number and gene expression data to identify cancer modules. Additionally, my lab focuses on linking molecular data with cellular and tissue-level phenotypes. This led to key contributions in the field of imaging genomics/radiogenomics involving work in lung cancer and brain tumors. Our work in imaging genomics is focused on developing a framework for non-invasive personalized medicine. In summary, my lab has an interdisciplinary focus on developing novel algorithms for multi-scale biomedical data fusion.
Returning?	Yes, I have previously mentored with SLI
Keywords	**Machine Learning, Cancer treatment, Biotech, Biomedical Data Science**
Mentor/ supervisor	Christoph Sadee, Data Scientist
Mentor bio	I am a Data Scientist in the Geveart lab with a background in Physics and Biochemistry. My interests are in the application of machine learning and mathematical modeling to address medical research problems.
Project Description	In Oncology tumor size is used to determine cancer progression and treatment response. Tumor Segmentation is the process of highlighting a tumor in full in 3D on CT images to measure volume, size, location and other metrics of importance. This process is labor intensive if done manually. Here we aim to automatically perform tumor segmentation for lung cancer tumors using a neural net trained on publicly available data. The goal of the project will be to download data from TCIA with already segmented tumors, retrain the available network on the data and compare its performance to the pre-existing segmentations. Here we aim for a dice score of >.8 for successful segmentation.
Required Skills	Interest in Biomedical Research. Some coding experience
Duration	20 hours per week for 10 weeks (7/5/23 - 9/8/23) - $3800 stipend for students
Modality/ Type of Work	Hybrid - remote/ online with some in-person opportunities/ Mostly on the computer, computational research
Selection Process	Mentor reviews apps and decides
# of Interns	One intern

Discipline(s)	Medicine
Project Title	**10. Clinical utility of dupilumab in eosinophilic esophagitis patients**
Institution and Affiliation	Stanford University School of Medicine, Boston Specialists
Keywords	**Medical Data Review, Data Analysis, Data Visualization**
Mentor/ supervisor	Twan Sia , Medical Student at Stanford Medical School, Research Investigator at Boston Specialists
Mentor bio	I am a low-income first generation, queer Burmese immigrant. I am also a recent graduate of Swarthmore College and a current medical student at Stanford University. My journey to medicine has been propelled by my experience in

	research, and I would like to share that joy with students who are willing to learn. Outside of academics and research, I enjoy creative work such as creative writing, painting, music production, and cooking.
Project Description	Eosinophilic esophagitis is a chronic inflammatory condition of the esophagus where patients may suffer from choking, regurgitation, and difficulty swallowing in response to certain foods. Although there are many treatments available, patients may not be responsive to them. Recently, a new medication called dupilumab has been approved for eosinophilic esophagitis. However, because it is so new, clinicians do not know the best way to use them. At our clinic, we have one of the largest cohorts of patients using dupilumab for eosinophilic esophagitis. Therefore, we would like to do research on their clinical course and share our findings with other researchers. Students will be performing a retrospective chart review. In doing so, students will be engaged with an electronic medical record with patient data and perform data abstraction, formal analysis, and data visualization.
Required Skills	Willingness to learn, proficiency with spreadsheets and computers usage, interest in medicine, good at writing.
Duration	15 hours per week for 10 weeks (7/5/23 - 9/8/23) - $2800 stipend for students
Modality/ Type of Work	OK with any modality - will leave it up to the student/ Mostly on the computer, computational research, Mostly literature search, background research
Selection Process	Mentor reviews apps, does interviews, and decides
# of Interns	One

Discipline(s)	Computer Science, Data Science
Project Title	**11. Building a Smiley Service Bot with GPT**
Institution and Affiliation	Stanford University: Research Hub at the Graduate School of Business
Keywords	**Machine Learning, Natural Language Processing, Chatbot, GPT**
Mentor/ supervisor	Wolee Wonhee Lee, Senior Research Analytics Scientist
Mentor bio	TBD
Project Description	In this project, our intern will work to develop a GPT (Generative Pre-trained Transformer) chatbot, fondly nicknamed SmileyBot, to respond to inquiries from our clients about our research computing services. Because the DARC team offers a variety of support services to facilitate faculty research, we have a vast collection of documentation detailing how to request services and make use of our on-site computing servers. We believe a chatbot would augment this documentation by allowing our clients to interact with this content in a conversational way and, presumably, get instantaneous answers to a wide variety of questions. Over the course of this project, the intern will gain exposure to machine learning, natural language processing, data collection and cleaning, and Slack bot creation. We believe our internship will provide an amazing opportunity to apply state of the art chatbot technology while gaining a diverse set of technical skills. Specific tasks the intern will engage in include the following:

	- Learn about the role of research computing in supporting social science research - Learn how to use APIs for data collection and ML model training - Train ML models using APIs and Python - Examine the provided data corpus and identify issues - Develop data cleaning strategies and clean the data programmatically - Organize input data and write prompts to train the chatbot - Document the data cleaning and model training processes The responsibilities of and expectations for the intern are as follows: - Participate in the initial onboarding meeting prior to the internship to discuss the content and schedule of the internship - Provide input with regard to the topics of research interest and what he or she wants to gain from this internship - Make efforts to complete weekly assignments in time - Maintain good communication with and contact the supervisor when problems arise - Be open to constructive feedback and incorporate it into his or her work We are hoping to work with someone who is interested in learning about natural language processing and how AI can be leveraged to benefit the research community. Please apply if you are interested in our project!
Required Skills	Preferences will be given to applicants who meet the following criteria: - Cumulative GPA of 2.5 or above - No prior internship experience - Financial Aid needs - Computer Science major or basic python programming skills is helpful (e.g., completion of 1 quarter of python or equivalent is preferred)
Duration	20 hours per week for 9 weeks (7/5/23 - 9/1/23) - $3400 stipend for students
Modality/ Type of Work	Hybrid - remote/ online with some in-person opportunities/ Mostly on the computer, computational research
Selection Process	Mentor reviews apps, does interviews, and decides
# of Interns	One intern

Discipline(s)	Data Science, Engineering, Mathematics, Physics
Project Title	**12. Mechanical Technician @ iSono Health**
Institution and Affiliation	iSono Health: (South San Francisco)
Keywords	**Ultrasound Imaging, Women's Health**
Company Description	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.
Website	https://isonohealth.com/
Mentor	Tony D'Alessandro, Dir of Hardware Engineering
Mentor bio	Tony was born in East Oakland and is a graduate of San Francisco State with a BS in Mechanical Engineering.

Project Description	Help to build, test and approve our products. Provide build and test feedback and implement improvements.
Required Skills	Good hands on ability. Good mechanical and spatial abilities. Experience with 3D CAD software is a plus. Desire to learn about small robotic components and accessories.
Duration	15 hours per week for 9 weeks (7/5/23 - 9/1/23) - $2500 stipend for students
Modality/ Type of Work	Fully in-person/ Mostly hands-on, in-lab experience/
Selection Process	Mentor reviews apps, does interviews, and decides
# of Interns	Two interns

Discipline(s)	Biology, Chemistry
Project Title	**13. Investigation for Protein Stabilizing Compounds in Liquid and Hydrogel Solutions at Intact Therapeutics**
Institution and Affiliation	Intact Therapeutics: R&D (Palo Alto, CA)
Keywords	**Cancer Treatment, Cell Culture, Biotech**
Mentor/ supervisor	Chris Zhan, Scientist
Mentor bio	I am a first-generation immigrant who grew up in the east bay. I attended the Peralta Community Colleges before transferring to UC Berkeley, where I received a B.S. in Chemical Engineering and Material Science. I have 7 years of manufacturing and quality experiences in medical devices where I worked with formulations and drug delivery technologies. I am now a formulation scientist at Intact Therapeutics working on the development of a drug delivery platform using thermosensitive hydrogels.
Project Description	Mucositis describes the break down of epithelial cells that line the gastrointestinal (GI) tract, exposing the mucosal tissue or mucosa to ulcerations and infections. When this happens in the mouth or the oral mucosa, it is known as oral mucositis (OM). OM is a common and debilitating complication of cancer treatments such as chemotherapy and radiotherapy. The mouth is one of the most sensitive parts of the body and the pain associated with OM can lead to nutritional problems due to the inability to eat. Pain aside, the open sores in the oral mucosa can also increase the risk of infection for patients. This is bad for cancer patients who are immunocompromised, which is often another side effect of cancer treatment. All these factors together have a significant effect on patient's quality of life and can even lead to a reduction in cancer treatments in some cases to alleviate some of the symptoms . In this internship, the student will contribute to the ongoing research and development efforts aimed to treat and prevent oral mucositis. The work will be focused on the development of an oral topical formulation (like a mouthwash) that can boost epithelial cell regeneration to combat OM. This includes hands-on lab work to prepare prototype formulations and characterize their physical properties; also, a combination of literature research and hands-on lab work to contribute to the development of a cell-based

	bioactivity assay. To the second part, the student will have the opportunity to learn how to grow cells and use them to test how well each of the prototype formulations works on the biological level.
Required Skills	At least one quarter of Biology and/or Chemistry with Lab Required. Student should have a basic understanding of lab safety and how to document experiments. Basic data analysis/visualization using spreadsheets is helpful as well.
Duration	20 hours per week for 10 weeks (7/5/23 - 9/8/23) - $3800 stipend for students
Modality/ Type of Work	Mostly in-person (50-80%) with some remote research work./ Mostly hands-on, in-lab experience
Selection Process	Mentor reviews apps and decides
# of Interns	One intern

Discipline(s)	Chemistry, Engineering, Physics
Project Title	**14. Inducing Magnetism in a Topological Insulator by Interfacing with a Magnetic Insulator**
Institution and Affiliation	Stanford University: Applied Physics / Materials Science and Engineering
Keywords	**Microelectronics, Advanced Materials Synthesis, Quantum mechanics**
Mentor/ supervisor	Daisy O'Mahoney, Phd Candidate
Mentor bio	I am a PhD student at Stanford in the Materials Science and Engineering department (but I work in an Applied Physics lab). I am a first generation student and started my undergrad at Santa Barbara City College. Before transferring to UC Berkeley I was fortunate enough to do a summer research internship similar to this one. This was an incredible and life changing experience for me and not only inspired me to continue in research and apply for a PhD, but it also opened so many doors for me in transferring, getting into multiple research labs at Berkeley and even giving me strong letters of rec for my PhD application. This was an invaluable experience for me and I am so excited to be able to mentor community college students and give the kind of life changing experience that I was fortunate enough to have. A few more things about me, I am queer and nonbinary and I like to do ceramics and play video games in my free time.
Project Description	Topological insulators are very interesting materials for fundamental physics research and additionally have the potential to greatly improve microelectronics. Topological insulators are materials where the bulk of the material is insulating, but the surface is conducting. When a topological insulator is made magnetic, the conducting surface becomes insulating and conduction now only occurs along the edges of the material. These magnetic topological insulators exhibit a phenomenon called the quantum anomalous hall effect (QAHE) which is characterized by the longitudinal resistance dropping to zero. This means dissipation-less conductance and has significant potential for the creation of zero-loss electronic devices which could revolutionize the field of microelectronics.

	However, this has only been observed at very low temperatures (below 2K) with magnetically doped topological insulators. It is hypothesized that the disorder introduced by the doping causes the very low temperature at which this phenomenon occurs. To achieve this zero-loss conductance at room temperature so it can be viable in electronic devices we need to get around the issues from magnetic doping. This project proposes to induce magnetism in a nonmagnetic topological insulator by interfacing it with a magnetic insulator in a thin layered structure. The student will a) Synthesize topological insulator and magnetic insulator thin films via pulsed laser deposition b) Create topological insulator/magnetic insulator layered structure via either deposition or transfer technique and c) Perform electronic, magnetic and structural characterization of the system using a variety of tools in the lab
Required Skills	An intro general chemistry course and a physics course on electronics and magnetism is preferred but not required.
Duration	20 hours per week for 9 weeks (7/5/23 - 9/1/23) - $3400 stipend for students
Modality/ Type of Work	Fully in-person/ Mostly hands-on, in-lab experience
Selection Process	Mentor reviews apps and decides
# of Interns	One intern

Discipline(s)	Chemistry, Engineering, Physics
Project Title	**15. Process Associate @ EMD**
Institution and Affiliation	EMD Electronics (San Jose, CA)
Keywords	**Semiconductor Industry, Chip Manufacturing, Process Engineering**
Company Description	We are EMD Electronics. Ready to explore, break barriers, and discover more? We know you've got big plans – so do we! Our colleagues across the globe love innovating with science and technology to enrich people's lives with our solutions in Healthcare, Life Science, and Electronics. Together, we dream big and are passionate about caring for our rich mix of people, customers, patients, and planet. That's why we are always looking for curious minds that see themselves imagining the unimaginable with us. Everything we do in EMD Electronics is to help us deliver on our purpose of being the company behind the companies, advancing digital living. We are dedicated to being the trusted supplier of high-tech materials, services and specialty chemicals for the electronics, automotive and cosmetics industries. We foster a global collaborative organization made up of individuals who have the passion to win, obsess about the customer, are relentlessly curious and act with urgency. Together, we push the boundaries of science to make more possible for our customers.

Company Website	https://www.emdgroup.com/en
Mentor bio	TBD
Project Description	The intern will learn about the semiconductor industry, how the chips are made, what is metrology and how do we do measurements for devices. Intern will also: • Operate a wide range of equipment including e-testers, metrology equipment, processing equipment, and litho. • Responds to inquiries from other team members, managers, or departments • Supports continuous improvement initiatives in the areas of productivity, yield enhancement, and scrap reduction • Learns, understands, and adheres to established SOP for assigned areas.
Required Skills	Ideally the student is a Physics, Chemistry or Engineering Major; Completion of 1 quarter of Chemistry with Lab is preferred, but not required.
Duration	20 hours per week for 10 weeks (7/5/23 - 9/8/23) - $3800 stipend for students
Modality/ Type of Work	Fully in-person/ Mostly hands-on, in-lab experience
Selection Process	Mentor reviews apps, does interviews, and decides
# of Interns	Two interns

Discipline(s)	Electrical Engineering, Mechanical Engineering, Systems Engineers
Project Title	**16. Electrical Engineer Intern in a Semiconductor R&D Fab @ EMD**
Institution and Affiliation	EMD Electronics (San Jose, CA)
Company Description	We are EMD Electronics. Ready to explore, break barriers, and discover more? We know you've got big plans – so do we! Our colleagues across the globe love innovating with science and technology to enrich people's lives with our solutions in Healthcare, Life Science, and Electronics. Together, we dream big and are passionate about caring for our rich mix of people, customers, patients, and planet. That's why we are always looking for curious minds that see themselves imagining the unimaginable with us. Everything we do in EMD Electronics is to help us deliver on our purpose of being the company behind the companies, advancing digital living. We are dedicated to being the trusted supplier of high-tech materials, services and specialty chemicals for the electronics, automotive and cosmetics industries. We foster a global collaborative organization made up of individuals who have the passion to win, obsess about the customer, are relentlessly curious and act with urgency. Together, we push the boundaries of science to make more possible for our customers.
Keywords	**Electrical Engineer, Mechanical Engineer, Chemical Engineer, Systems Engineer**
Mentor	Stephanie Limon

Website	https://www.emdgroup.com/en
Mentor bio	I am a Latina who was born and raised in San Jose, Ca. I understand we all have different paths to take in life. I am always looking to give back to my community, giving others opportunities to help them reach their education/career goals. I lead a team of 14 male engineers/technicians and 1 female engineer. The team comes from different backgrounds with a common goal to help each other continue to learn.
Project Description	We are a diverse team of collaborators, doers, and problem-solvers who are relentlessly committed to a culture of safety. Candidate will assist with designing and develop drawings including A/C diagrams, D/C schematics, and logic and functional diagrams.
Required Skills	Knowledge of HW Engineering principles, digital logic, analog circuits and its hardware implementations.
Duration	15 hours per week for 10 weeks (7/5/23 - 9/8/23) - $2800 stipend for students
Modality/ Type of Work	Fully in-person/ Mostly hands-on, in-lab experience
Selection Process	Mentor reviews apps, does interviews, and decides
# of Interns	Two interns

Discipline(s)	Data Science, STEM Education/ Empowerment, Psychology, Public Health
Project Title	**17. Program Evaluation Assistant**
Institution and Affiliation	Stanford University: Stanford Digital Education
Keywords	**Program Evaluation, Program Design, Design Thinking, Data Science, Data Analysis, Data Visualization, Quality Analysis, Research**
Mentor/ supervisor	Michael Acedo , Project Manager
Mentor bio	Mike Acedo is a project manager with Stanford Digital Education. Mike attended his undergrad at SJSU, majoring in sociology, which led him down the path to work in education. Having spent over a decade working with education technology, Mike is passionate about using technology and digital tools to help make education more accessible, equitable, and transformative for people from all walks of life. He currently utilizes the skills he has developed throughout his career to contribute to the mission of Stanford Digital Education, in order to help make a positive impact on the next generation of students & educators. Having been born and raised in the SF Bay Area, Mike is also an avid outdoors lover, enjoying all activities from kayaking, sailing, hiking, backpacking, and biking. He is easy going, loves to have fun, but also takes great pride in the work of his team, and its mission toward the social, public good for all.
Project Description	Stanford Digital Education (SDE), Grow with Google (GwG), and Bay ICT of the Bay Area Community College Consortium (BACCC) are collaborating to provide Community College learners with the opportunity to develop and apply their technical skills in Data Analytics through Google's Data Analytics Career Certificates. Students will also have an opportunity to apply their analytical skills

	through project-based learning during Women in Data Science's (WiDS) annual Datathon, housed in Stanford Data Science. Stanford Digital Education is seeking to develop and provide Community College faculty who are offering these certificates, with professional development that equips them with the skills and knowledge to deliver the previously asynchronous material, in a hybrid format directly to community college learners. The program is tentatively scheduled to launch in Summer 2023. We are searching a Program Evaluation Assistant to help measure the impact of the Professional Development Curriculum on participating faculty. This role will be a key member of the evaluation team, and will be tasked with assisting in the design and administration of the evaluation phase of the project. This opportunity will allow the Program Evaluation Assistant to interface directly with the project team, participating Community College Faculty, and other stakeholders, in designing and administering feedback surveys, conducting focus groups, and analyzing quantitative and qualitative feedback data.
Required Skills	No prior coursework is required for this position. Enthusiasm to support community college faculty and learners will be preferred over specific skillsets, as long as applicant is willing to learn. General familiarity, or willingness to learn in the fields of education, research, program evaluation design, survey design, and basic qualitative and quantitative data analysis is preferred.
Duration	6 - 7 hours per week for 10 weeks (7/5/23 - 9/8/23) - $1200 stipend for students
Modality/ Type of Work	Mostly online/remote with some hybrid/in-person opportunities./ Mostly on the computer, computational research, Evaluation design, survey design and administration, focus group design/administration, qualitative & quantitative data analysis.
Selection Process	Mentor reviews apps and decides
# of Interns	One intern

Discipline(s)	Computer Science, Data Science, Engineering, Physics
Project Title	**18. Using machine learning to study next-generation, atomically thin materials**
Institution and Affiliation	Stanford University: Materials Science and Engineering
Keywords	**Machine Learning, Quantum Technology, Computation**
Mentor/ supervisor	Felipe Jornada , Assistant Professor
Mentor bio	I was born and raised in southern Brazil. I came to the US in my 20's to pursue my PhD in Physics at UC Berkeley. I was always excited about combining quantum mechanics and large-scale computer simulations to understand and predict new materials. As an Assistant Professor at Stanford, I feel like my dream has come true, and we have been working on a variety of cutting-edge problems at the intersection of physics, quantum chemistry, materials science, and computer science. I have two small kids, so my current hobbies typically involve them – such as taking them to the Hiller Museum of Aviation in the Bay Area, or parks, or simply catching up with my sleep. Fun fact: my younger, two-years-old son is already playing soccer better than his Brazilian dad.

Project Description	In this project, the student will learn about the exciting family of atomically thin quantum materials and how to study them with cutting-edge computational techniques. The student will learn how to create large-scale models of 2D materials and explore machine-learning models to predict their properties. Ultimately, the student will model a class of novel quantum materials known as twisted heterostructures, where a pair of materials is combined to produce new materials with unusual properties. By simply twisting two otherwise trivial monolayers, these materials can exhibit unusual properties such as superconductivity and can be engineered for emerging quantum technologies.
Required Skills	Rudimentary programming (e.g., python) required. Knowing how to use the linux/unix command line is desired but not required.
Duration	15 hours per week for 10 weeks (7/5/23 - 9/8/23) - $2800 stipend for students
Modality/ Type of Work	Prefer in-person, but can partially accommodate some remote component/ Mostly on the computer, computational research
Selection Process	I would prefer to review a small (3 - 5) set of student applications and pick my 1 or 2 top choices to make offers to. I understand that this will be more time intensive for me.
# of Interns	One intern

Discipline(s)	Biology, Computer Science, Engineering
Project Title	**19. Molecular Biology Internship @ Standard BioTools (Project 1)** **20. Engineering Internship @ Standard BioTools (Project 2)**
Institution and Affiliation	Standard BioTools (South San Francisco, CA)
Keywords	**Biotechnology, Health, Genomics, Microfluidics**
Company Description	Standard BioTools offers powerful tools to study the role of genomics in health, development and in diseases such as cancer, immune disorders and inherited diseases. Our mission is to become an essential solutions partner to the life science industry, with the right, reliable products to solve your health problems.
Company Website	https://www.standardbio.com/ (South San Francisco, CA)
Mentor bio	We will determine the supervisor when the time gets closer - by May 1st
Project Description	We are pleased to offer two distinct projects, please express which project you are interested in when you apply. Project 1: The molecular biology based project will focus on development and testing of genomics applications using our latest microfluidic benchtop instrument. Participants will have the opportunity to learn laboratory skills in the field of molecular biology. In addition the project will provide hands-on opportunities to learn about how hardware and software components of the system interact with the molecular biology experiments they are performing. This is ideal for someone with an interest in molecular biology while also wanting experience and exposure to other technical fields of a biotech company.

	Project 2: This project will focus on hardware and software engineering for the continued development of our benchtop microfluidic instrumentation. Participants will receive hands-on experience with our instruments and test fixtures to learn skills necessary for designing, developing, and testing instrumentation. Get exposure to the software, hardware and molecular biology aspects of the biotechnology industry and how it all comes together in an integrated system.
Required Skills	Project 1: At least one quarter of introductory biology or equivalent. At least one quarter of science with a lab is preferred. Project 2: At least 1 quarter of computer-science or equivalent is required (preferably in Python or C#). Exposure to engineering concepts (EE/MechE) is preferred. For both projects: A willingness to work as part of a team in a fast paced environment is required.
Duration	20 hours per week for 10 weeks (7/5/23 - 9/8/23) - $3800 stipend for students
Modality/ Type of Work	Fully in-person Project 1: Mostly hands-on, in-lab experience Project 2: Mostly on the computer, computational research
Selection Process	Mentor reviews apps, interviews and decides
# of Interns	Two interns

Discipline(s)	Computer Science, Engineering, Medicine, Physics
Project Title	**21. RSL: Guided internship in biomedical imaging** (*NOTE THIS DESCRIPTION WAS REVISED ON 4/14/23)
Institution and Affiliation	Stanford University: Radiology Research
Keywords	**Radiology, Biomedical Imaging**
Mentor/ supervisor	Barbara Bonini , Program manager; Jeremy Dahl, Faculty in Radiology, School of Medicine;
Mentor bio	Stanford RSL has run a successful summer internship program for undergraduates for the past 5 years. Our goal is to encourage future scientists to pursue Biomedical Imaging study through exposure to diverse fields of imaging research. We are especially interested in appealing to students from non-traditional educational backgrounds.
Project Description	The RSL REU program is hosted by the Radiological Sciences Laboratory (RSL) division of the Department of Radiology at Stanford Unviersity. This program is a 10-week, 40 hrs per week program that exposes and involves undergraduate students to academic research in medical imaging. Students are expected to participate in a research project within one of the laboratories in RSL. Projects are strongly technical in nature, and generally involve engineering and physical principles. Students will learn and apply skills such as signal processing, modeling, coding, medical imaging hardware, and artificial intelligence and may be involved in hands-on experimentation that involve medical imaging systems, such as data collection from phantoms, animals, or human subjects. Research topics are numerous but are typically centered around the primary imaging modalities used

	in medical imaging, such as ultrasound, X-Ray, CT, and MRI. Other RSL laboratories include virtual and augmented reality combined with medical imaging. Example projects include novel beamforming algorithms in ultrasound to reduce waveform distortion in overweight patients, MRI pulse sequence design to avoid distortion due to metal implants, artificial intelligence methods for creating high quality CT images using low radiation doses, among many others. As part of the program, students participate in weekly (1-hr) courses on medical imaging and professional development. More detailed information about each lab and typical/potential projects can be found here: https://med.stanford.edu/rsl/education/2022-research-experience-for-undergrads--reu-1.html (the website is for information purposes only; do not apply through this website). Students will be matched with a laboratory/project that best suits their interests
Required Skills	Motivated students of any scientific background are welcome to apply. Familiarity with basic coding skills (Matlab/python) would help, but is not essential.
Duration	40 hours per week for 10 weeks (7/5/23 - 9/8/23) - $7500 stipend for students
Modality/ Type of Work	TWTH on site/ A combination of computational research and dry lab work with both hands-on and observational opportunities/ /
Selection Process	Mentor reviews apps, does interviews, and decides
# of Interns	Two interns

Discipline(s)	Medicine
Project Title	**22. Optometric Technician - Learn the Job and Then Create a Training Manual to Teach Others**
Institution and Affiliation	Cambridge Optometry (Palo Alto, CA)
Keywords	**Optometry, Clinic**
Company Description	Cambridge Optometry is a full-service eye care practice, located in Palo Alto, CA. We believe yearly eye exams are essential to optimizing your vision and maintaining your ocular health. Cambridge Optometry is owned and operated by Benjamin Threlkeld, O.
Company Website	www.cambridgeoptometry.com
Mentor bio	TBD
Project Description	Optometric technicians work in health care clinics helping eye doctors perform eye examinations. They use state-of-the-art equipment to gather key information about the patient's eyes, guiding the optometrist or ophthalmologist's clinical decisions. During this internship, you'll work in a multi-doctor private optometry practice located in Palo Alto. You'll work directly with patients and optometrists to master the skills needed to become an optometric technician. Once you've mastered these skills, you'll work with your mentor doctor to create an

	optometric technician manual, which will be used to train future optometric technicians. The internship is ideal for anyone wanting to work with patients in a medical setting, such as a doctor, nurse, optometrist, dentist, or other allied health professionals. Interns will complete the program with a better understanding of how to communicate with patients, a reference source for future employment or schooling, and an opportunity for future employment in our clinic or other eye care clinics.
Required Skills	Interest in working in the medical field or as an allied health professional. Good communication skills, friendly and likes working with people.
Duration	20 hours per week for 10 weeks (7/5/23 - 9/8/23) - $3800 stipend for students
Modality/ Type of Work	Mostly in-person with some opportunity to work remotely/ Mostly hands on work with patients, with some online research and document creation.
Selection Process	Mentor reviews apps, does interviews, and decides
# of Interns	One intern

Discipline(s)	Chemistry
Project Title	**23. Elucidating Structure and Properties in a New Class of Solvents**
Institution and Affiliation	Stanford University: Department of Chemistry
Keywords	**Chemistry, Data Analysis**
Mentor/ supervisor	Kimberly Anne Carter-Fenk, Postdoctoral Fellow
Mentor bio	I am a Postdoctoral Scholar in the Fayer Lab at Stanford University in the Department of Chemistry. I received my PhD in Physical Chemistry from The Ohio State University and my Bachelor's degree in Chemistry from the College of Wooster. I am a first-generation college student, and I was a commuter student for the entirety of my college career. In my free time, I like to watch documentaries, play the piano, and spoil my cat, Penelope! I am also a member of the Stanford Disability Staff Forum, and I am a mentor in the Disabled in STEM Mentoring Program.
Project Description	Within the past two decades, chemists have discovered a suite of molecules that, when mixed together at a particular ratio, form a liquid that melts at a much lower temperature than its individual component molecules. These liquids, known as deep eutectic solvents, have potentially useful applications in carbon dioxide capture, battery electrolytes, biomass recycling, pharmaceuticals and medical research, and materials synthesis. However, the fundamental principles underlying the chemical and physical properties of these mixtures are not fully understood. To use deep eutectic solvents most efficiently, scientists must be able to predict which mixtures can produce desired properties. Thus, detailed studies of the intermolecular interactions between molecules of deep eutectic solvents are needed to eventually create generalized and predictive models. In this Micro-Internship, the student will perform and/or analyze data from a variety of experimental techniques to elucidate structure-property relationships

	in deep eutectic solvents. For example, the intern can learn how to collect and analyze UV-Vis and fluorescence spectra; or the intern could learn how to measure viscosity and phase transitions. If a fully-remote internship is desired, then the intern could learn how to perform quantum chemistry calculations as well. This project also provides the opportunity for students to learn to code in Python if the student desires.
Required Skills	At least one quarter of General Chemistry is recommended.
Duration	6 - 7 hours per week for 10 weeks (7/5/23 - 9/8/23) - $1200 stipend for students
Modality/ Type of Work	OK with any modality - will leave it up to the student/ Mostly on the computer, computational research, Mostly hands-on, in-lab experience
Selection Process	Foothill SLI team decides
# of Interns	Two interns

Discipline(s)	Chemistry, Physics
Project Title	**24. Making molecules dance with light**
Institution and Affiliation	Stanford University: Department of Chemistry
Keywords	**Quantum Mechanics, Computational Chemistry**
Mentor/ supervisor	Diptarka Hait, Stanford Science Fellow
Mentor bio	I am theoretically a chemist, though some days I feel closer to a physicist. I grew up in India, and then moved to the US after graduating high school. That involved a bit of an adjustment, but I muddled through all the way to a PhD in chemistry from UC Berkeley. I am now a postdoctoral fellow at Stanford, working on computational chemistry as a Stanford Science Fellow. Throughout my academic path, I have greatly benefited from being mentored by senior students and postdocs, whose experience and advice made the process much smoother. I have mentored students in turn during my PhD (both younger graduate students and undergrads) and helped them with their careers. I hope to have the opportunity to work closely with students as a postdoc as well. In addition, I helped organize a program in the UC Berkeley College of Chemistry, where incoming transfer students from community colleges would be paired with a graduate student mentor for advice about research and career. After the program was implemented, I also participated as one of the first set of graduate student fellows. In my spare time, I like cooking, hiking and watching Netflix. I do also like reading about history.
Project Description	Electrons in molecules can absorb light to gain energy and move to higher energy configurations. This excess energy subsequently moves away from the electrons to make the atoms in the molecules move faster. The energy from light can thus be used to drive very specific chemical reactions (by tuning which regions of the molecule absorb energy) or be lost in just heating up the original molecule, with key transformations happening within a trillionth of a second (10^-12 seconds or a picosecond). This project will use computers to study the exact sequence events that happens when a molecule absorbs light, utilizing quantum mechanics to

	understand the perspective of both the electrons and atomic nuclei. This will help us understand how light can be efficiently used to run chemical transformations and avoid undesirable side reactions. Very specifically, we will try to see if bonds between carbon and hydrogen can be easily broken by ultraviolet light in some model molecules, which will help gain insight astrochemical reactions in space as well as health risks associated with exposure to ultraviolet light for humans. In the process, I hope that the student will also learn about how quantum mechanics can be applied to a variety of chemical problems, and maybe even play a little bit with something that strikes their fancy. Computational details: Calculations will be run with the computing cluster associated with the Martinez group at Stanford, using a quantum chemistry software package (TeraChem) that is actively being developed by group members.
Required Skills	At least the first quarter of the chemistry series is required (Chem 1A). At least one quarter of Calculus (Math 1A) is helpful, but not required as the computer will do most of the math. An interest in quantum mechanics is useful, but not required.
Duration	6 - 7 hours per week for 10 weeks (7/5/23 - 9/8/23) - $1200 stipend for students
Modality/ Type of Work	Hybrid - remote/ online with some in-person opportunities/ Mostly on the computer, computational research, Mostly literature search, background research
Selection Process	Mentor reviews apps, does interviews, and decides
# of Interns	One intern

Discipline(s)	Computer Science, Data Science, Engineering, Medicine
Project Title	**25. Developing virtual histology for early diagnosis of skin cancer**
Institution and Affiliation	Stanford University: Medical School
Keywords	**Machine Learning, Medical Imaging, Diagnostics**
Mentor/ supervisor	Yonatan Winetraub, Instructor
Mentor bio	I founded an organization called SpaceIL that sent the first private spaceship to the Moon in 2019. I started SpaceIL in Israel with two friends at a bar, writing down our ideas on a napkin. Today I work at Stanford researching how to diagnose cancer without taking biopsies.
Project Description	The student will join the lab's main project "developing next-generation medical imaging technologies enabling virtual biopsy for early diagnosis and tumor margin detection of skin and brain cancers". The lab combines machine learning and optical imaging to create realistic and accurate histological images of skin tissue to assist clinicians in determining tumor margins and treatment. More specifically, the student will help by evaluating several machine learning models to see how they perform. You would read 1-2 papers and help us implement methods from the paper to improve our algorithm.
Required Skills	Ideally the student has taken at least one quarter or equivalent of computer science in python. Students should have an interest in learning machine learning models.

Duration	20 hours per week for 10 weeks (7/5/23 - 9/8/23) - $3800 stipend for students
Modality/ Type of Work	Hybrid - remote/ online with some in-person opportunities/ Mostly on the computer, computational research, Mostly literature search, background research
Selection Process	Mentor reviews apps, does interviews, and decides
# of Interns	One or two interns depending on interview process

Discipline(s)	Biology, Computer Science, Data Science
Project Title	**26. How does strawberry agricultural intensity in California affect the function of microbial symbionts in the honeybee gut?**
Institution and Affiliation	Stanford University: Biology
Keywords	**Biology, Microbiology, Computer Science, Data Science**
Mentor/ supervisor	Magdalena Warren , PhD candidate/ graduate student
Mentor bio	I am Magdalena Warren (she/her), but you can call me Maggie. I am a California native first-generation Chicana, first in my family to graduate college, and fifth year PhD in the Stanford Biology department. I started out at Riverside Community College and finished up my B.S. in Biology at CSU Dominguez Hills. I am a curious nerd by nature, but my work has mostly been in the field of microbial ecology where I have studied how microbes that live within a host organism, such as the honeybee, interact. I have enjoyed tutoring and mentoring students in research, both at CSU Dominguez Hills and at Stanford, and especially love all I learn from working with my mentees. For fun, I run around with my toddler and enjoy reading, swimming, or napping at the beach.
Project Description	Honeybees are important pollinators that, according to the FDA, pollinate about one-third of the foods Americans eat. However, honeybee populations are rapidly decreasing. Recent studies on honeybee health have highlighted the importance of the honeybee microbiome, most focusing on the roles of bacteria in the gut. Some studies have found that commonly used pesticides, herbicides, and insecticides negatively affect the symbiotic bacteria in the honeybee gut, leaving the honeybee unequipped to deal with opportunistic pathogenic microbes. Although our understanding of the honeybee gut microbiome and the effects of these chemicals has grown, the effects of agricultural intensity, i.e., land use change, on the honeybee microbiome are still poorly understood. We propose a project to analyze the taxonomic and functional diversity of the microbes in the gut of honeybees foraging on strawberry farms located on a gradient of increasing agricultural intensity ranging from more natural organic polyculture farms to conventional monocultural farms. Since we have already collected the samples from the various farms, extracted their microbial DNA, and sequenced them, we seek a summer intern to work on analyzing the resulting metagenomes and amplicon sequences. The project will present the opportunity to work with python and R programming languages, utilize bioinformatics pipelines to analyze both types of sequencing data, and statistically analyze and visually present results. Additionally, if student

	would like some experience in the wet-lab, the position could provide opportunities for this.
Required Skills	General Biology courses preferred but not required, the desire to learn computer programming in R (the student will be trained on this)
Duration	6 - 7 hours per week for 10 weeks (7/5/23 - 9/8/23) - $1200 stipend for students
Modality/ Type of Work	OK with any modality - will leave it up to the student/ Mostly on the computer, computational research
Selection Process	Mentor reviews apps and decides
# of Interns	One intern

Discipline(s)	Computer Science, Data Science, Physics
Project Title	**27. Machine learning based tropical cyclone simulator**
Institution and Affiliation	Stanford University: School of Medicine/Woods Institute of Environment
Keywords	**Machine Learning, Environmental Science**
Mentor/ supervisor	Renzhi Jing , Postdoc Researcher
Mentor bio	I am a postdoctoral researcher at Stanford University. I joined Stanford since Oct 2022 and I am currently working on a NIH-funded project on natural hazards and child health. Before joining S tanford I did my phd at Princeton in the department of Civil and Environmental Engineering. I had a mixed background in atmospheric science and data science for my undergrad study. I have worked as a data scientist at Disney+ before I joined Stanford.
Project Description	Tropical cyclones are among the most destructive natural hazards which cause great losses each year. Accurately assessing the risk of tropical cyclone hazards is of significant importance. In this proposed project, the student will work to develop machine learning based models to simulate a tropical cyclone's trajectory over ocean and its intensity decay after making landfall. The first several weeks will include data collection and feature engineering, the student will learn how to get access to storm and other meteorology dataset. In the second half of the project, the student will try different machine learning methods and code a new algorithm, which will be used to simulate storm tracks over ocean based on local meteorological condition.
Required Skills	Having completed 2 quarters (or equivalent) in Python is required. Proficiency in Matlab is desired but not required. Some exposure to atmospheric science is preferred; Exposure to machine learning is helpful.
Duration	15 hours per week for 9 weeks (7/5/23 - 9/1/23) - $2500 stipend for students
Modality/ Type of Work	Hybrid - remote/ online with some in-person opportunities/ Mostly on the computer, computational research
Selection Process	Mentor reviews apps, does interviews, and decides
# of Interns	One intern

Discipline(s)	Biology, Computer Science, Data Science

Project Title	28. Understanding natural selection by mapping genes to cells and tissues of the Drosophila body
Institution and Affiliation	Stanford University: Department of Biology
Keywords	**Evolutionary Biology, Genomics, Data Science**
Mentor/ supervisor	Bernard Kim, Postdoctoral Fellow and James Hemker, Graduate Student in Biology Department at Stanford
Mentor bio	Bernard Kim: I am a postdoc at Stanford University using genomics to understand the mechanisms of evolution at a scale of one to thousands of species. While I have always been interested in technology and science, my interest in a career in science was initially sparked by my community college professors. I transferred to UCLA as a Biology major, and also did a PhD at UCLA in a computational human genomics lab. Today, my research takes place in the field, in the wet lab, and at the computer, and involves a wide variety of skills/techniques including developing and applying cutting-edge genomics technologies for our system, running computer simulations to study evolution, developing new statistical/machine learning approaches to analyze genomic data, and collection of wild *Drosophila* from all over the world. Google Scholar: https://scholar.google.com/citations?user=Yf-fKBoAAAAJ James Hemker: TBD
Project Description	At what level of biological organization (genes, cell types, or tissues) do organisms respond to natural selection, and how predictable is this response across different species? We are sequencing the genomes of thousands of different species of the model system Drosophila, but also many individuals of each species, to better understand these deep questions in evolutionary biology. One major obstacle to this study is the lack of a general map of genes to the types of cells or tissues they are expressed in outside of the model species D. melanogaster. We are addressing this challenge by developing maps of genes to cells and tissues through single-cell transcriptomic sequencing of adult flies from many Drosophila species. During this internship, the student will explore public genomic and proteomic databases and help scientists characterize the biology of genes, cell types, and tissues. Depending on the student's comfort level with programming and data analysis, this project can involve quantifying signatures of molecular evolution at cell and tissue resolution using comparative and population genomic analyses.
Required Skills	Required - Familiarity with computers. 1 quarter of Computer-Science (1A, 2A, 3A etc.) or equivalent is highly desired. Independent problem solving. Desired - knowledge or strong desire to learn basic introductory topics in: Cell and molecular biology (topics and wet lab experience) is highly desired. An interest in learning more about: Evolutionary biology, Math, Programming (R, Python, Bash), Linux, Genomics
Duration	15 hours per week for 10 weeks (7/5/23 - 9/8/23) - $2800 stipend for students
Modality/ Type of Work	Fully in-person/ Mostly on the computer, computational research, Mostly literature search, background research, Can involve some hands-on wet lab work
Selection Process	Mentor reviews apps, does interviews, and decides
# of Interns	One intern

Discipline(s)	Computer Science, Electrical Engineering, Mechanical Engineering
Project Title	**29. Electric Racing Car Dashboard Project Intern @ ECM** **30. Electric Vehicle Charging Project Intern @ ECM**
Institution and Affiliation	ECM (Engine Control and Monitoring) (Santa Clara, CA)
Keywords	**Electric Cars, Linux, Android, C++, C, Artificial Intelligence (AI), Internet of Things (IoT), Machine Learning**
Company Description	Developer and Manufacturer of Automotive-Related Systems
Company Website	www.ecm-co.com
Mentor	Ron Patrick (www.ronpatrickstuff.com) and/or ECM staff engineer
Mentor Bio	Crossed the border from Canada in 1983 in a 1966 Chevelle with $1800. Got PhD in Mechanical Engineering at Stanford in 1989. On-staff at Stanford for three years until I got my Green Card. Started ECM while at Stanford.
Project Description	We have two projects. Select the one that suits you. 1. Electric Racing Car Dashboard Project: All new vehicles have dashboards that integrate with iPhones or Android phones. This allows you to run phone apps on the vehicle's infotainment system (i.e. link the touch screen in the car to the phone). This project requires you to figure out how to link something that isn't a phone to the vehicle's infotainment system. We have a few ideas of how this can be done and your job would be to code things up and see what works. This is a great job for someone who likes to hack/jailbreak computer systems. Depending on how tricky you need to be there may be some of AI and machine learning required. 2. Electric Vehicle Charging Project: We are developing a rapid electric car charger for racing applications. This project requires you to write embedded C code in a Linux SBC (single board computer) that interfaces with the car, the charger, and the world (IoT). This SBC is called BeagleBoard which is basically an Arduino or Raspberry Pi on steroids. This is a great job for someone who wants to build embedded systems/smart products and likes the challenge of interfacing different computer systems.
Required Skills	At least one quarter of computer-programming or equivalent (can be self-taught) is required; for example completion of one of the following CS 30, CS64A, CS 2A.B.C series or equivalent is required. Students should have a strong desire to pick up programming skills.
Duration	15 hours per week for 9 weeks (7/5/23 - 9/1/23) - $2500 stipend for students
Modality/ Type of Work	Combination of in-house and remote. We prefer that you spend as much time as you can with us in our offices in Santa Clara. That way we can bounce ideas off each other and you can learn how to work in a team. Although both projects contain a large software component, there will also be hardware and hands-on, in-lab experience.
Selection Process	Mentor reviews applicants, does interviews, and decides
# of Interns	Two interns

Discipline(s)	Data Science, STEM Education/ Empowerment
Project Title	**31. SLI Leadership Fellow for Summer Institute**
Institution and Affiliation	Foothill College: Science Learning Institute
Keywords	**Student Empowerment, Summer Program, Teaching, Mentoring**
Mentor/ supervisor	Sophia Kim, SLI Director
Mentor bio	Sophia is the director of the Science Learning Institute (SLI) at Foothill. She comes from a background of work in youth leadership and empowerment in low income communities of color. Through SLI, she directs programs which seek to connect students from underrepresented groups in STEM to resources such at Foothill and beyond.
Project Description	The SLI Summer Leadership Fellow will support the PRE-STEM Summer Institute (7/17 - 8/4/23) which is a pre-college program for incoming STEM Foothill students which will be in-person at Foothill this summer. The role will involve organizing college readiness workshops, serving as a peer mentor for students working on data science social impact projects, and working with the whole institute team to build a supportive community for the participants. It's a great opportunity to build your leadership skills, use your knowledge of being a student at Foothill, and make a difference in the lives of students coming to Foothill who want to major in a STEM discipline. You will receive training before the program starts as well have planning time to get ready for the summer institute.
Required Skills	No necessary skills, just an open mind, an interest in working with others and building resources for new incoming Foothill students
Duration	20 hours per week for 10 weeks (7/5/23 - 9/8/23) - $3800 stipend for students
Modality/ Type of Work	Fully in-person/ mostly hands-on, outreach and education work
Selection Process	Foothill SLI team decides
# of Interns	4

Discipline(s)	Biology, Ecology
Project Title	**32. 140 years of insect herbivory trends measured through preserved plant specimens**
Institution and Affiliation	Stanford University, Carnegie Institution for Science: Department of Global Ecology
Keywords	**Plant Biology, Image processing, data analysis, statistical analysis**
Mentor/ supervisor	Haley Flickinger , Visiting Student
Mentor bio	I am a 4th year PhD candidate and member of the Dukes Lab in the Carnegie Department of Global Ecology. During my undergraduate degree, multiple chronic disorders made me believe I had no chance of becoming an ecologist because field work would be too difficult. I wasn't ready to give up though and got a summer job as a field technician. The work was not always pleasant, but it was possible. Most importantly, by getting more experience in a lab, I learned that there is plenty of ecological work to be done that doesn't require field work.

	When I began my PhD in ecology, I designed a study that worked for me with my own physical capabilities in mind. I believe strongly that there's room for everyone in science no matter their identity or physical ability. I'm excited for this mentorship opportunity because it allows students to get paid to explore their interests and find where they fit in the world of science.
Project Description	Plants have the unique ability to convert sunlight and nutrients into food for other organisms. This makes plants the primary producers for ecosystems and the base of food chains. However, when the nutrients available to plants are changed as a result of human activities, the quality of plants as food can change. This has the potential to change how insects feed on plants to maintain their own nutritional requirements. In this study we are looking at how insect feeding on plants compares over the last 140 years of rising atmospheric CO2. The intern will be analyzing images of plant specimens to quantify how much the plants have been eaten and determine what type of insects fed on the plants. All necessary skills will be taught including how to use ImageJ, how to recognize and categorize insect feeding types, and how to statistically analyze the results using R programming language.
Required Skills	Interest in biology and/or ecology preferred. The motivation to learn to program in R is desired. Necessary skills and knowledge will be taught.
Duration	6 - 7 hours per week for 9 weeks (7/5/23 - 9/1/23) - $1100 stipend for students
Modality/ Type of Work	OK with any modality until August 5th. After that, remote/online./ Mostly on the computer, computational research
Selection Process	Mentor reviews apps, does interviews, and decides
# of Interns	One intern

Discipline(s)	Biology, Data Science, Computer-Science
Project Title	**33. The structure and resilience of ecological interaction networks in marine microbes**
Institution and Affiliation	Carnegie Institution for Science: Department of Global Ecology
Keywords	**Microbiology, Data Analytics, Data Visualization**
Mentor/ supervisor	Yi-Chun Yeh , Postdoc
Mentor bio	I'm from Taiwan and a 1st generation college student. I'm an outdoor person, who enjoys hiking, camping, and traveling. I previously graduated from the University of Southern California and am now a postdoctoral fellow at the Carnegie Institution for Science. I'm particularly interested in understanding how marine microorganisms interact with each other and how these interactions affect their functions and stability.
Project Description	Maine microbial community plays an important role in ocean biogeochemical cycling, and their interactions critically determine community dynamics and resilience. Ideally, identifying species interactions, such as predation, relies on direct observations, which are not practically feasible with microbial monitoring. Thus, we need to rely on statistical analyses and time series datasets to reconstruct potential interaction networks.

	This project will provide students with the opportunity to access marine microbial long-term time series and develop programming skills to analyze and visualize interaction networks. We welcome students who have some basic programming (e.g., R) and statistical knowledge.
Required Skills	Student should have at least one quarter of computer-science (or equivalent, required. Some statistics knowledge or a course in statistics is helpful, but not required.
Duration	6 - 7 hours per week for 9 weeks (7/5/23 - 9/1/23) - $1100 stipend for students
Modality/ Type of Work	Hybrid - remote/ online with some in-person opportunities/ Mostly on the computer, computational research
Selection Process	Mentor reviews apps and decides
# of Interns	One intern

Discipline(s)	Computer Science
Project Title	**34. Supporting a Prostate Cancer Treatment Planning Platform**
Institution and Affiliation	Avenda Health: Engineering Team (Culver City, CA)
Keywords	**Cancer Treatments, Software Engineering**
Mentor/ supervisor	Tom Summers, Software Engineer
Mentor bio	TBD
Project Description	We are looking for a Software Engineering Intern to join Avenda Health to help us rid the world of cancer! You will help lead the way in creating cutting edge medical technology by creating high performance software to empower physicians. For this position we are looking for an intern to help us support our cloud-based cancer therapy planning platform. The software you create will be used to treat thousands of cancer patients and improve their quality of life. (pending feedback from Tom by 3/17)
Required Skills	Experience with a programming language such as Go, C#, Java, Java-script, Python etc through coursework or personal projects. At least 1 quarter of computer-science or equivalent required. Interest in the medical field.
Duration	20 hours per week for 10 weeks (7/5/23 - 9/8/23) - $3800 stipend for students
Modality/ Type of Work	Will likely be entirely remote, unless the student is able to be in the Los Angeles area, in which case hybrid opportunities are available.
Selection Process	Mentor reviews apps, does interviews, and decides
# of Interns	One

Discipline(s)	STEM Education/ Empowerment
Project Title	**35. Supporting the 2023 FLi Sci Research Scholars Program**
Institution and Affiliation	Stanford University: Education
Keywords	**Research, Underrepresented in STEM, Qualitative Research, Quantitative Research**

Mentor	Gabriel Reyes, PhD Student
Mentor bio	My name is Gabriel Reyes, a current PhD student in Developmental and Psychological Sciences at Stanford University on a Knight-Hennessy Scholarship. Originally from Albuquerque, New Mexico and a son of Mexican immigrants, I was the first in my family to graduate from college as a Gates Millennium Scholar, where I earned my Sc.B. in Cognitive Neuroscience from Brown University, as well as an M.S. in Neuroscience & Education from Columbia University. As someone who was born into poverty, I am particularly passionate about science inclusion and promoting people who are systematically excluded from pursuing research experiences as a result of finances; I am a staunch believer that talent is everywhere but opportunities are not. The things I love most in the world are my family (especially my fiancé) , tacos, traveling, movies, and taking long walks (to get tacos).
Project Description	Interns can expect to work on one of three primary areas depending on interests. 1. Literature Review: During this time, we will need help with students going through a set of articles and code them for analysis based on theme and insights from those articles. These have already been identified to address the following questions: What are the current ways that researchers in science education attempt to foster a science identity among high school students? And how many of these articles specifically target minoritized groups based on race, gender, and socioeconomic status? The intern will be responsible for reviewing these articles and coding them to address these two critical questions. Co-authorship for this project is available for interns interested in supporting this project long-term. 2. Qualitative Research Support: In June 2023, we will be conducting 45-min - 1-hour long interviews of each of the FLi Sci Scholars after participating in the first year of the program. The intern would help support the creation of questions to ask during these interviews as well as practice testing them, identifying literature to support these questions, and play a key role in the research strategy for these interviews. Co-authorship for this project is available for interns interested in supporting this project long-term. 3. Quantitative Research Support: By January 2023, applications would have been received by a group of high school students to attempted to apply for the FLi Sci Scholars Program. Interns interested in data analysis will be supported to analyze the data of the most recent applicant pool and integrate that with prior data gathered on science identity among low-income students. Interns will help summarize key statistics of who applied to our program as well as identify trends based on who were interested in our fellowship, what qualities made someone successful in our program, and provide recommendations on recruiting students for our third cohort. This project is ideal for interns interested in learning or growing their R programming and data visualization skills. No prior experience necessary; this is ideal for students eager for their first data project!"
Required Skills	Any courses in science or education would be applicable to this internship. Classes in statistics, math, research methods, or computer programming are helpful but not necessary. This internship is applicable for anyone with an interest in science, medicin
Duration	20 hours per week for 10 weeks (7/5/23 - 9/8/23) - $3800 stipend for students

Modality/ Type of Work	Fully remote/ online/ Mostly on the computer, computational research, Mostly literature search, background research
Selection Process	Mentor reviews apps and decides
# of Interns	One intern

Discipline(s)	Computer Science, Engineering
Project Title	**36. Microprocessor Integrated Circuit design using 2-D GUI CAD tool**
Institution and Affiliation	Aril Computer Corp: Engineering (Los Gatos, CA)
Keywords	**Semiconductors, 2-D or 3-D design, Minecraft, Legos**
Mentor/ supervisor	Tom Riordan, Staff Engineer
Mentor bio	TBD
Project Description	The intern will design a functional unit of a microprocessor using a 2-D GUI CAD tool. For example, students will design an adder, a multiplier, a divider or something similar.
Required Skills	This project would appeal to students who liked using Minecraft, Legos or something similar (yet this is not a requirement); CS10 is a plus but not absolutely required.
Duration	20 hours per week for 10 weeks (7/5/23 - 9/8/23) - $3800 stipend for students
Modality/ Type of Work	Hybrid - remote/ online with some in-person opportunities/ On the computer, hands on design
Selection Process	Mentor reviews apps, does interviews, and decides
# of Interns	One intern

Discipline(s)	Chemistry, Engineering, Public Health
Project Title	**37. Evaluation of invasive water hyacinth as a sustainable absorbent material for use in local manufacture of disposable menstrual pads in riverine communities**
Institution and Affiliation	Stanford University: Department of Materials Science and Engineering/Department of Bioengineering
Keywords	**Public Health, Sustainability, Women's Health**
Mentor/ supervisor	Anton Molina , Research associate
Mentor bio	I'm Anton Molina and currently a PhD student (materials science and engineering) in the Prakash Lab at Stanford University. I am passionate about identifying sustainable materials to benefit society. I began my career in science by studying physics and chemistry at a community college in California and am eager to give back. Outside of the lab I enjoy running, reading, and cooking.
Project Description	Access to menstrual hygiene products is a challenge for nearly 500 million menstruating women and girls around the world. Frequently, improvised alternatives such as cloth rags are employed, often posing a health risk, and many girls are not able to attend school during their menses. Meanwhile, conventional menstrual pads manufactured from synthetic materials that represent an environmental burden. A growing number of small and medium

	scale manufacturers are building menstrual pad production facilities that incorporate locally sourced, bio-based materials to serve local - and particularly rural - markets. Our work has identified that water hyacinth is a promising material feed stock candidate to produce the absorbent component which would be able to serve riverine communities where water hyacinth is regarded as an invasive weed. The goal of this project will be the methods we have developed for other plants and apply them to water hyacinth. We will use simple chemistry to extract absorbent fibers from water hyacinth obtained from our collaborators and characterize the structural, chemical and absorption properties of the obtained materials.
Required Skills	Enthusiasm and eagerness to learn about this project will be privileged more than any specific skillsets or knowledge. General chemistry knowledge/lab experience may be preferred but not necessary.
Duration	15 hours per week for 9 weeks (7/5/23 - 9/1/23) - $2500 stipend for students
Modality/ Type of Work	Fully in-person/ Mostly hands-on, in-lab experience
Selection Process	Mentor reviews apps, does interviews, and decides
# of Interns	One intern

Discipline(s)	Biology, Data Science, Climate Science and Ecology
Project Title	**38. Resilience of photosynthesis in the Arctic**
Institution and Affiliation	Carnegie Institution for Science: Department of Global Ecology @ Stanford University
Keywords	**Climate Change, Environmental Science, Artic Ecosystems, Data Analysis**
Mentor/ supervisor	Wu Sun , Research Associate
Mentor bio	I did my undergraduate study in China and came to the US in 2012 for graduate school. After getting my PhD from UCLA, I moved to the Bay Area in 2019 to start as a Postdoctoral Fellow at the Carnegie Institution for Science's Department of Global Ecology on the Stanford University campus. Now I am a Research Associate at Carnegie. I consider myself an interdisciplinary scientist working at the crossroads of climate science, ecology, and data science. When I'm not at work, you may find me on a hiking trail or camping in a national park.
Project Description	Warming and increasing carbon dioxide concentrations in the atmosphere have boosted photosynthesis in the Arctic. In the cold Arctic climate, photosynthesis is limited by temperature and increases with warming until an optimum temperature is reached. Beyond this optimum temperature, photosynthesis declines with further warming. However, we do not know the exact temperature at which photosynthesis peaks or when warming will start to limit photosynthesis in Arctic ecosystems. In this project, we will examine the response of Arctic photosynthesis to temperature over the past two decades and across climatic gradients. We will do so by combining measurements of photosynthetic capacity and ecosystem carbon fluxes from several North American Arctic sites, including Utqiaġvik, Alaska. Our goal is to gain insights that will inform future trajectories

	of Arctic photosynthesis and carbon budget. We welcome students interested in learning climate change impacts on ecosystems and practicing data analysis skills.
Required Skills	We look for a student who is interested in climate change impacts on ecosystems. Coursework in biology or earth system science helps but is not required. Experience in programming and data analysis is helpful but again not required (can learn on the job).
Duration	20 hours per week for 10 weeks (7/5/23 - 9/8/23) - $3800 stipend for students
Modality/ Type of Work	OK with any modality - will leave it up to the student/ Mostly on the computer, computational research
Selection Process	Mentor reviews apps, does interviews, and decides
# of Interns	One intern

Discipline(s)	Computer Science, Physics, Engineering
Project Title	**39. Software tools for particle accelerators**
Institution and Affiliation	SLAC: Accelerator Directorate
Keywords	**Particle Acceleration, Electricity & Magnetism**
Mentor/ supervisor	Nicole Neveu, Associate Scientist
Mentor bio	I was born and raised in Houston, Texas where I got my undergraduate degree in Electrical Engineering at the local college, University of Houston. Without knowing what I was getting into, I moved north to get my PhD in Physics at Illinois Tech in Chicago. After graduation and too much snow, I moved to SLAC for my 'postdoc'. I've decided to stay for a while, and now I'm an Associate Scientist at SLAC. I love accelerators and I've been having fun working on them! As for other things: I'm addicted to coffee and I have too many succulents/board games/books.
Project Description	In this project students will use Python to design software tools used in the accelerator control room. The direction of the project can be informed by the student's interest, but example projects include: graphical user interfaces to read and display accelerator data using Pydm, python tools to calculate physics parameters based on read back data, python tools to simulate accelerator data for use in debugging code, etc.
Required Skills	No experience required.
Duration	20 hours per week for 10 weeks (7/5/23 - 9/8/23) - $3800 stipend for students
Modality/ Type of Work	OK with any modality - will leave it up to the student/ Mostly on the computer, computational research
Selection Process	Foothill SLI team decides
# of Interns	One intern

Discipline(s)	Data Science, Statistics or Earth Science
Project Title	**40. Responses of wetlands methane emissions to warming**

Institution and Affiliation	Carnegie Institute for Science/Stanford University: Department of Global Ecology/Department of Earth System Science
Keywords	**Global Warming, Wetlands, Ecology, Environmental Science**
Mentor/ supervisor	Kelsey Foster , PhD Student
Mentor bio	Kelsey is a 4th year PhD student in Earth System Science at Stanford studying the terrestrial biosphere. She attended community college and then transferred to UC Berkeley where she graduated with a B.S. in Environmental Science. When she is not working on her research she loves to go hiking, attend dance classes, read books, and watch reality TV.
Project Description	Methane is the second largest contributor to global warming and its concentration in the atmosphere is increasing rapidly. Wetlands are the largest natural source of methane and therefore contribute substantially to this increase. Studies have shown that future warming threatens to dramatically amplify wetland methane emissions so it is important to quantify the how changes in temperature are impacting wetland methane emissions as this will help us better project future methane concentrations. In this project, we will use a large set of flux tower observations of wetland methane emissions (FLUXNET-CH4) to understand how wetland methane emissions respond to temperature across different types of wetlands. We will also examine how climatic and hydrological conditions affect the temperature sensitivity of wetland methane emissions. We welcome students with a keen interest in climate change/ecological problems and gaining experience with data analysis/programming.
Required Skills	Coursework in any of the following fields would be helpful: environmental science, chemistry, biology, computer science, data science, or statistics. Interest in learning how to use programming skills to analyze data or experience doing so. A willingness to learn and try new things!
Duration	20 hours per week for 9 weeks (7/5/23 - 9/1/23) - $3400 stipend for students
Modality/ Type of Work	OK with any modality - will leave it up to the student/ Mostly on the computer, computational research
Selection Process	Mentor reviews apps, does interviews, and decides
# of Interns	One intern

Discipline(s)	Computer Science
Project title	**41. Machine Learning. Mixture of Experts (MoE) Models Intern**
Company	Esperanto Technologies (Mountain View, CA)
Keywords	**Machine Learning, AI, Simulation, Big Data, AWS**
Company website	https://www.esperanto.ai/
Company description	Esperanto develops and markets RISC-V based hardware and associated software to enable efficient deployment of AI or HPC workloads in datacenters and near-edge environments. The company's proprietary technology enables highly compute-energy efficient computing systems at production scale.
Company address	800 W El Camino Real UNIT 410, Mountain View, CA 94040
Supervisor	Sylvain Flamant

Project description	Machine Learning models are getting larger and larger each day. Esperanto company needs to evaluate how recent models such as transformer models and MoE models can be partitioned efficiently using Esperanto ETSoC-1 computing silicon and how the memory bottleneck problem occurring in large models can be addressed by Esperanto hardware and circumvented. Interns will be required working in a team toward that goal. Summer interns will be required to become familiar with "transformers", "attention mechanism" and MoE structures. The project will require the understanding of Models written in Python. It will involve running NLP transformer models on servers and/or on web services like AWS. It might involve modifying and training "tiny" MoE models to better understand the fundamental blocks of new models and the switching between experts as a first step towards scaling up towards larger models. Interns might be asked to compare outputs from a model running on a CPU (or GPU) with the outputs of the same model running on Esperanto hardware. Interns will likely have to work in a "big data" environment.
Required skills	Basic to strong programming skills (Python or C++) required. Exposure to machine learning and data science concepts (either self-taught or through coursework/previous training/ projects etc.) is highly preferable.
Duration	20-40 hours/week for 10 weeks, depending on what student desires (pay starting at $3800)
Modality/ Type of Work	2-3 days per week in person (minimum) at the Mountain View site as part of a team, the rest can be remote.
Selection Process	Mentor reviews apps, does interviews, and decides
# of interns	1 - 2