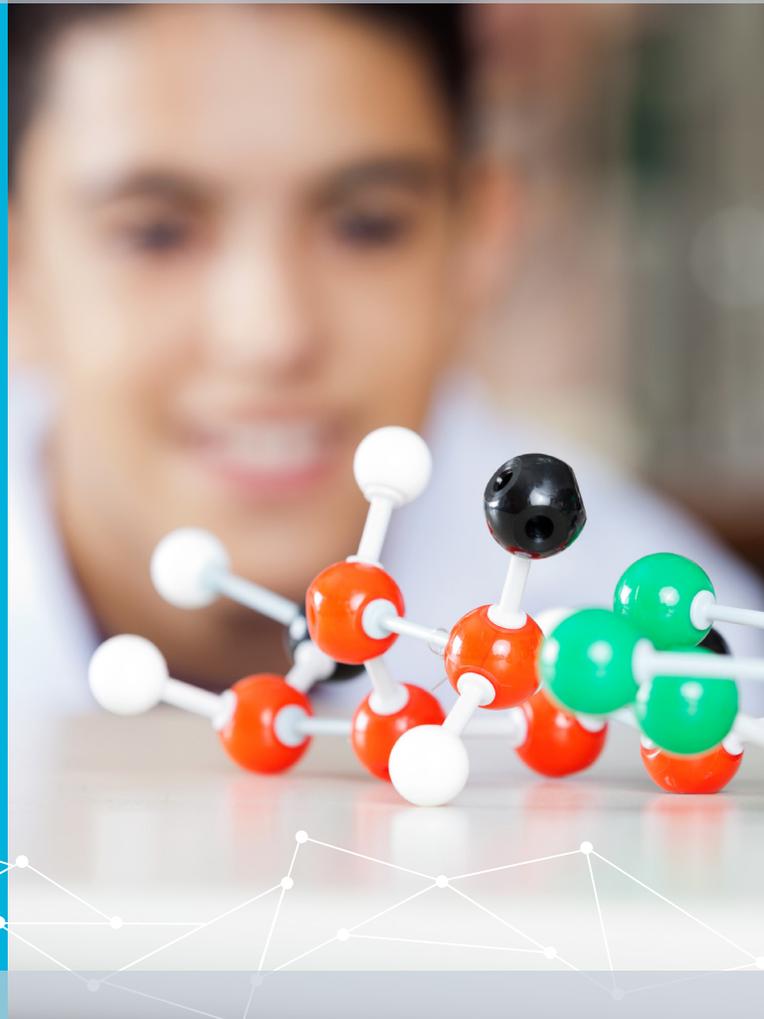


GUIDING OUTSTANDING LEARNERS TO DISCOVER (GOLD)

2021 Science *for Youth* Intensive Program

REMOTE COACHING & 4-WEEK LABORATORY INTERNSHIP

Berkeley
UNIVERSITY OF CALIFORNIA



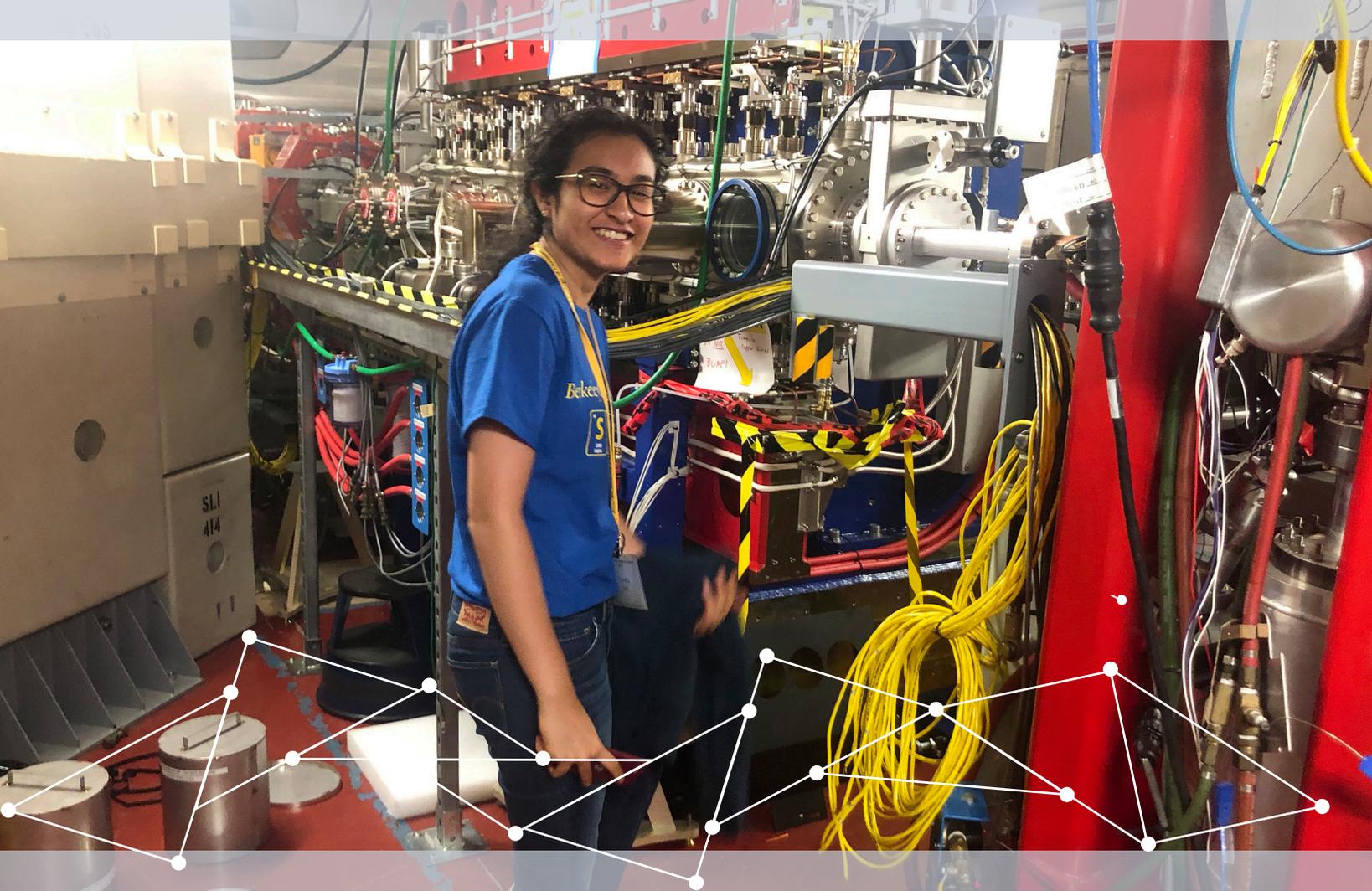
About SYIP

SYIP is intended for the most accomplished high school students who are passionate about learning and doing scientific research in chemistry, biochemical chemistry, material science, physics, or related fields, and who are focused on maximizing their future success in college.

Selected students are paired with an assigned mentor in a faculty research group. The mentor provides 9 months of remote coaching beginning October 2020. Students learn about the mentor's current research, strategies, and aims in preparation for a 4-week onsite internship in the assigned mentor's research laboratory beginning July 2021.

During the 4-week internship, students shadow their assigned mentor to assist with data analysis and non-hazardous laboratory procedures, and attend seminars and group meetings. Students will get an in-depth view into concept development, methods design, decision making, scientific processes, and inner workings of world-renowned laboratories that develop advanced technologies and solutions to society's current issues.





SYIP is unlike any other program!

BROUGHT TO YOU BY UC BERKELEY FACULTY AND SCHOLARS.

The Science for Youth Intensive Program is administered and delivered by the College of Chemistry at UC Berkeley and is led by globally recognized and highly influential faculty. The College's Department of Chemistry is ranked NUMBER ONE in the world!

OBSERVE AND EXPERIENCE CUTTING-EDGE RESEARCH.

SYIP teaches students to think for themselves, learn to apply theory, communicate effectively, work in a team, and hone skills that set a UC Berkeley student apart from the others. Students are afforded a unique opportunity to learn about cutting-edge research that is currently being done on campus. Students participate, observe, and experience the workings of world-class research laboratories when onsite for 4-weeks.

PROVIDES INVALUABLE INSIGHT INTO THE COLLEGE APPLICATION PROCESS AND COLLEGE LIFE.

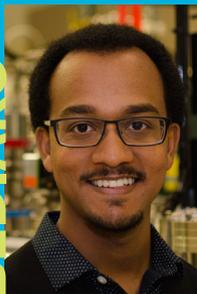
During the 4-week onsite experience, students stay in UC Berkeley dormitories, are chaperoned by UC Berkeley undergraduate students, and receive learning opportunities outside of the laboratory. Students visit Lawrence Berkeley National Laboratory, gain insight about the college application process from the UC Berkeley Admissions Office, and engage in discussions with UC Berkeley undergraduates and faculty mentors.

CONTINUOUS INTERACTION WITH BERKELEY PROFESSORS AND STUDENTS.

SYIP provides multiple opportunities for students to interact with and learn from distinguished scientists over the course of a year. This continuous interaction will better inform UC Berkeley professors and mentors when writing recommendation letters.

Participating Faculty

BEDIAKO



KWABENA BEDIAKO

INORGANIC MATERIALS CHEMISTRY, ELECTROCHEMISTRY, LOW-DIMENSIONAL MATERIALS, QUANTUM TRANSPORT, OPTOELECTRONICS

Research efforts involve the mesoscopic investigation of interfacial charge transfer and charge transport in two-dimensional (2D) materials and heterostructures. The design of materials with modular interfaces that can be controlled at atomically precise length scales to study and overcome contemporary challenges in electrochemical energy conversion and quantum electronics are emphasized.

CLARK



DOUG CLARK

BIOCHEMICAL ENGINEERING, BIOCATALYSIS, AND ENZYME ENGINEERING

Research in the Clark Lab is in the field of biochemical engineering with particular emphasis on enzyme technology and bioactive materials, extremophiles and extreme enzymes, cell culture, and metabolic flux analysis. Current research interests include biocatalysis in novel environments, enzyme engineering, the cultivation and genomics of thermophiles and barophiles, and the integration of p450 into bioengineered systems. The Clark lab is extremely active in all areas of biofuels research from feedstock breakdown to fuels synthesis.

Participating Faculty

DUEBER



JOHN DUEBER

METABOLIC ENGINEERING, BIOPRODUCTION, COMBINATORIAL EXPRESSION

The Dueber Lab develops strategies for introducing designable, modular control over living cells. They are particularly interested in generating technologies for improving engineered metabolic pathway efficiency and directing flux. Their projects have applications in the development of biofuels, specialty chemicals, and environmentally friendly processes.

HARTWIG



JOHN HARTWIG

ORGANIC CHEMISTRY, ORGANOMETALLIC CHEMISTRY, AND CHEMICAL BIOLOGY

Professor Hartwig's research group focuses on the discovery and understanding of new reactions of organic compounds catalyzed by transition metal complexes and artificial metalloenzymes. These findings result from a combination of organic synthesis, organometallic synthesis, protein design and evolution, and mechanistic analysis of catalytic systems. The Hartwig group is currently investigating both small-molecule catalysts and artificial metalloenzymes for selective reactions of organic molecules.

Participating Faculty

KEAVENY



TONY KEAVENY

ORTHOPAEDIC BIOMECHANICS, TISSUE ENGINEERING, DESIGN OF BONE-IMPLANT SYSTEMS, MECHANICAL BEHAVIOR OF BONE, FINITE ELEMENT MODELING AND EXPERIMENTATION

Professor Keaveny specializes in structure-function relationships of bone tissue and whole bones with emphasis on aging, osteoporosis, and clinical translational research. He established and directs the Berkeley Orthopaedic Biomechanics Laboratory within the Department of Mechanical Engineering.

NOMURA



DAN NOMURA

CHEMICAL BIOLOGY, ANALYTICAL CHEMISTRY, AND ORGANIC CHEMISTRY

The Nomura Research Group is focused on developing and applying chemical proteomic and metabolomic platforms to identify and pharmacologically target metabolic drivers of human disease. There are three major research areas: 1) developing and applying chemoproteomic and metabolomic platforms to cure diseases such as cancer, neurodegenerative diseases, and inflammatory disorders; 2) developing chemoproteomic tools and technologies towards massively expanding our capability of developing pharmacological tools and eventually therapeutics against the entirety of the proteome; and 3) developing innovative chemoproteomic and metabolomic strategies for comprehensive assessment of chemical toxicology.

Participating Faculty

SARPONG



RICHMOND SARPONG

ORGANIC AND ORGANOMETALLIC CHEMISTRY

The lab develops total synthesis of biologically active and architecturally complex natural products as a platform for the development of new synthetic methods and strategies. The compounds that are synthesized may ultimately become important tools to study biological systems or provide a starting point for the development of therapeutics.

TOSTE



DEAN TOSTE

ORGANIC AND ORGANOMETALLIC CHEMISTRY

Organic and organometallic chemistry are employed in the development of new synthetic methods, enantioselective catalysts and strategies for the synthesis of natural products. Research is primarily aimed towards the development of catalysts and catalytic reactions and methods for organic synthesis.

Participating Faculty

WANG



FENG WANG

ULTRA-FAST NANO-OPTICS

The lab is interested in light-matter interaction in condensed matter physics, with an emphasis on novel physical phenomena emerging in nanoscale structures and at surfaces/interfaces. When electrons and phonons are confined in nanometer scale or at surface/interfaces, they respond differently to external stimuli. They investigate the unique nature and dynamics of such excited states using advanced laser spectroscopy techniques. Current projects include studying graphene optics, optical spectroscopy of individual nanotubes, plasmonics, and spectroscopy of oxide surfaces/interfaces.

XU



TING XU

POLYMERS, BIOMATERIALS, MATERIALS CHEMISTRY

Professor Xu's group focuses on a fundamental understanding of the physics of assemblage on multiple length scales leading to the design and assembly of functional thin films with tailored functionalities and characterization of de novo designed peptides.



Remote Coaching and Laboratory Internship

9-MONTH REMOTE COACHING:

OCTOBER 2020 THROUGH JULY 2021

Selected students will be matched to a laboratory that fits their interests as well as the laboratory's needs and preferences based upon the student's demonstrated qualifications and maturity. Each student will be paired with a mentor from the laboratory who will communicate with the student once or twice per month remotely through email and/or live chat. The student and mentor will work together to determine the best method and frequency for communicating. The objective of the remote coaching will be to provide the student with continuous learning, as well as an understanding and familiarity with the laboratory's research and more advanced scientific concepts in preparation for the 4-week onsite experience.

4-WEEK ONSITE LEARNING

JULY 11 TO AUGUST 7, 2021

During the 4-week experience on the historic UC Berkeley campus, students will spend the majority of the time in the assigned faculty research group. The student will attend group meetings, research seminars, assist with data analysis and simple, non-hazardous procedures under the supervision of his/her mentor. The student will get an in-depth view into concept development, methods design, decision making, scientific processes, and inner workings of world-renowned laboratories that develop advanced technologies and solutions to society's issues.

At the conclusion of their internship, the students will present their findings to their peers and mentors. Students who successfully complete the full 10-month program will be provided a completion certificate by the Dean of the College and may receive a reference letter from their mentor based on the student's performance.





Student Experiences



JENNIFER GRANNEN

SYIP introduced me to the beauty of research and chemical engineering through the scope of grad school. Because of this program, I am now planning on pursuing a PhD in the future! I feel so lucky to have participated in such a unique program!

UC Berkeley Chemical Engineering Class of 2022



DANIEL LEE

SYIP was the most fun I've had any summer, and it's pretty amazing to see Professor John Arnold, who taught one of the classes, now as the Undergraduate Dean of the College of Chemistry!

UC Berkeley Chemistry Class of 2022



FRANCESCA STEPANOV

The SYIP program was the most amazing 2 months of my summer. I established amazing connections to peers who were also interested in chemistry and with my mentor who pushed me to understand scientific concepts on a more advanced level. I believe that the SYIP experience has been a catalyst for my love for chemistry as well as research science.

UC Berkeley Natural Resources Class of 2023



Eligibility

Rising students entering grades 9-12 and who have taken general or introductory chemistry are encouraged to apply. Successful applicants will be among the top 10% of their respective class. Applicants must be available for an in-person or remote interview to be considered for the program.

Program Details

There is a non-refundable application fee of \$75. This fee will be applied towards the total tuition and fees of US \$14,750 if accepted. Tuition includes room and board, course materials, UC Berkeley “swag”, excursions, access to facilities, and official completion certificates signed by the dean of the College.

We will be accepting applications until all slots are filled. SYIP has the capacity for 30 qualified scholars to join.

Apply Online

<https://www.eiseverywhere.com/2021syip>



Contact Us

For questions about the **Science for Youth Intensive Program** contact us at:

Gold Programs

goldprograms@berkeley.edu

Suzanne Sutton

suttons@berkeley.edu

Or visit our website at:

chemistry.berkeley.edu/gold/syip

