

DIVISION OF BIOLOGICAL SCIENCES



Letter from the Dean



Dear Friend,

Among my top priorities is continuing to cultivate an inclusive and welcoming community in the Division of Biological Sciences for all of its members. I'd like to highlight here new developments in this regard that support our faculty.

This past spring, a faculty steering committee completed a comprehensive report entitled the Future of Biology 2, with specific recommendations to help guide the development of diversity, equity, inclusion, belonging, and justice (DEIBJ) initiatives at multiple levels across the life sciences. We have begun implementing the report's ideas, such as providing subsidy dedicated to child care support for tenure-track faculty (see story on page 10). A second recommendation we are pursuing is the new Life Sciences Inclusive Faculty Mentorship Program, a three-year pilot involving departments in three colleges. The mentorship program is intended to foster belonging for junior faculty of diverse identities, improve faculty advancement and success, and create a stronger community.

Regarding faculty, I noted in my previous letter how this division is partnering with other units on campus to recruit young, interdisciplinary scientists. In collaboration with the Division of Computing, Data Science, and Society, we've begun a search for a faculty member who will advance fundamental understanding of cancer using artificial intelligence informed by genomic and other "omics" data. We're grateful to philanthropists Jeffrey Huber and Angel Vossough for making this new position possible (see story on page 6).

With generous support from an anonymous donor, we will soon work with the School of Public Health to recruit a joint faculty chair in zoonotic diseases — those that transfer from animals to infect humans, such as SARS-CoV-2. This is an exciting, emerging field of biology with enormous practical value. Both of these faculty positions complement Health and Basic Discovery, one of Berkeley's organizing themes for multidisciplinary research that impacts the public good.

The Division of Biological Sciences engages with the public through this newsletter and other means. We continue to co-sponsor, with the Division of Mathematical & Physical Sciences, a popular virtual series of engaging talks by faculty and students about recent research discovery. "Basic Science Lights the Way" has been an unexpected and uplifting outcome of the pandemic. This year, the division began offering intimate immersive experiences in campus labs and in the field for our alumni and friends (see story on page 9). We are planning more opportunities next year so that you can interact with our faculty and student community. In the meantime, be well, be in touch, and thank you for your interest and support!

Warmest Regards,

A handwritten signature in black ink that reads "Michael Botchan". The signature is fluid and cursive, with a long horizontal stroke extending from the end.

Michael Botchan, Ph.D.
Dean of Biological Sciences

If you need any of these materials in an alternative format, including electronic, large print or braille, please contact Melanie VandenBerghe at mevanden@berkeley.edu to make a request. Please allow 7-10 days in cases of brailled materials requests.

COVER PHOTO: A dense bed of mollusk shells marks a portion of the Purisima Formation exposed at Capitola Beach. The formation preserves fossilized remains of sharks, whales, seals, and other marine animals. See story on page 9.



Neuroscience Comes into Its Own

Already the focus of substantial research and graduate education, neuroscience is planning to become a new department and major in the Division of Biological Sciences. Having a dedicated Department of Neuroscience will elevate Berkeley's profile and enhance its discovery potential in this fast-evolving field.

"The work of this department will be centered on understanding the brain — from molecules to mind, from cells to computation, and from science to society," says **Dan Feldman**, professor of neurobiology and past director of Berkeley's neuroscience doctoral program. He chaired a faculty committee that proposed the new department.

Many universities already offer a neuroscience major, which tends to be popular with students. Among UC campuses, Berkeley stands out in lacking a comprehensive neuroscience major for undergraduates. Elsewhere, undergraduate neuroscience programs tend to be situated in either a biology or psychology department, but Berkeley will follow the lead of MIT and Brown University in establishing a fully integrated department.

Because neuroscience intrinsically links multiple levels of investigation, an integrated structure that spans molecular to computational to behavioral approaches is essential to advance research and training in the field. Home to a broad array of neuroscientists



Dan Feldman

working across all these levels, Berkeley can construct a truly comprehensive educational experience.

That will include a distinctive emphasis on understanding neural computation. **"The brain is a biological computer," Feldman says, "and how it actually computes is a fundamental mystery."**

Solving that mystery will require the combined expertise of biologists, computer scientists, engineers, chemists, and psychologists. Berkeley's department will be organized around four focal areas: Molecular & Cellular Neuroscience, Circuit Systems & Behavioral Neuroscience, Cognitive Neuroscience, and Computational Neuroscience.

The Department of Neuroscience aims to launch as soon as next year with about three dozen faculty, drawn primarily from the departments of Molecular & Cell Biology and Psychology. Other affiliated faculty will come from the College of Chemistry, the Department of Electrical Engineering and Computer Sciences, the Herbert Wertheim School of Optometry & Vision Science, and other departments.

Since 2000, the Helen Wills Neuroscience Institute, with more than 70 faculty

An image of dendritic spines on neurons in the mouse cortex, produced using new microscopy technology developed by HWNI member and Nobel laureate Eric Betzig.

from 12 departments, has served as the campus nexus for neuroscience research and the previous home for the doctoral program. Berkeley receives around 400 applications each year from prospective neuroscience doctoral candidates but can enroll only 12 students. With philanthropic support, one goal of the new department is to double the doctoral program's capacity.

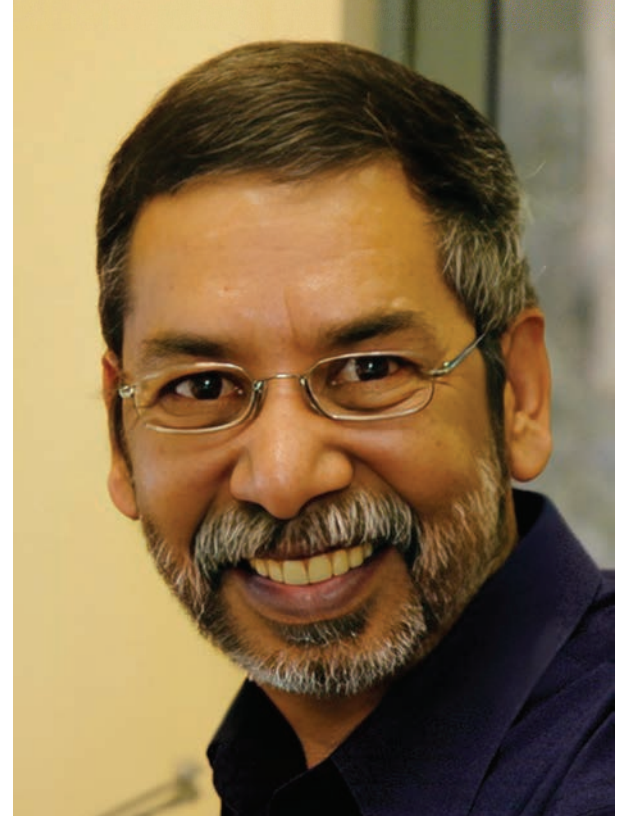
At least 150 undergraduates per year are likely to declare the neuroscience major. Students will choose among core and elective courses that survey the breadth of the science as well as neuroscience's connections to society. A new hands-on lab course will hone skills in experimental, analytical, and computational methods. Another required course will focus on effective scientific explanation and communication. An optional capstone experience will enable students to participate in firsthand lab research or produce a research paper on a relevant topic.

Says Feldman, **"Establishing this department will consolidate Berkeley's role as a national leader in neuroscience, drive cutting-edge research, and improve the education we provide to our students."**

Award Honors Legacy of Revered Faculty Member

Among more than a dozen awards that the Department of Molecular & Cell Biology (MCB) bestows on outstanding undergraduate students, one has been recently renamed to reflect the considerable contributions to the department by the late Professor Nilabh Shastri. With a generous endowment established by his wife, **Amita Shastri**, the **Nilabh Shastri Memorial Award for Outstanding Immunologist** will be awarded in perpetuity each spring, to recognize the highest academic achievement in coursework and research by a graduating senior in the Division of Immunology and Molecular Medicine.

Current Shastri Memorial Award recipient **Frank Liu '22** graduated in May after earning dual bachelor's degrees in MCB and electrical engineering and computer sciences (EECS). He is currently completing a master's degree in EECS at Berkeley and plans to pursue a joint M.D./Ph.D. program next.



Nilabh Shastri

“This award truly means a lot to me, especially as someone who has loved pursuing immunology and cancer biology research since a young age,” says Liu. “In the future, my goal is to be able to blend my research expertise in cancer immunology with my knowledge of computer science and artificial intelligence in order to develop next-generation cancer therapeutics. Earning this award has inspired me to continue pushing myself in hopes that one day I can achieve these goals.”

A highly regarded teacher, Nilabh Shastri inspired many. He valued rigorous research and scholarship and was also a generous mentor and collaborator. In 2000, Shastri was recognized with Berkeley's Distinguished Teaching Award.

Shastri began his career at Berkeley in 1987 as an assistant professor and remained on the faculty for more than 30 years, until he accepted a position at Johns Hopkins University in 2018. Shastri became a world-renowned expert on the molecular mechanisms of antigen processing and made important discoveries that enhanced our understanding of how T cells in the immune system recognize viruses or cancer cells. Now, promising undergraduates who will be among tomorrow's leaders of immunology will carry forward Shastri's legacy and make their own scientific advances.

Molecular & Cell Biology Divisions Take New Direction

Among the six current research divisions of the Department of Molecular & Cell Biology, a shift in emphasis for research and teaching has been signaled by updated names for two divisions and the creation of a brand new department.

Faculty in the **Division of Immunology and Molecular Medicine** (IMM), formerly known as Immunology and Pathogenesis, chose this name to better reflect the breadth of current research and future growth opportunity. Because the immune system plays a role in many diseases, IMM's researchers hope to harness or manipulate the immune system or other molecular pathways for therapeutic benefit.

The **Division of Molecular Therapeutics** (MTx) will launch next summer with a sharper focus on interdisciplinary collaboration to convert fundamental discoveries into clinical advances and treatments. Faculty in MTx share a mindset of therapeutics discovery and development — using genome editing, stem cells, organoid models, and other approaches to understand and treat a range of diseases.

A third departmental division, Neurobiology, will become part of the new **Department of Neuroscience** (see story on previous page).

Genes Reveal Dynamic Human History

Priya Moorjani compares the human genome to “a beautiful mosaic,” full of intricate patterns that contain depths of information. **“Our DNA holds the story of our ancestors,”** says Moorjani, assistant professor in the Department of Molecular & Cell Biology. “We use this to learn who our ancestors were in the past, what they have shared with us, and how their legacy is still retained in our genome.”

In June, Moorjani uncovered a surprising aspect of that ancestral legacy. Published in the journal *PLOS Genetics*, a study led by postdoctoral researcher Rémi Tourné, undergraduate student Gillian Chu, and Moorjani showed that many human populations have a history of strong, recent founder events. A founder event happens when a large portion of a population descends from a small number of founding individuals. As a result, the population’s genetic diversity decreases, while the risk of recessive genetic diseases can increase.

The individuals in a founder population share large blocks of their genome with each other, inherited by descent from relatively few ancestors. As time passes, these blocks will become smaller due to the crossover events that occur in each generation during meiosis. The characteristic rate of crossovers provides a kind of molecular clock. By comparing the number and length of shared blocks in a population, Moorjani and colleagues could estimate when a founder event occurred as well as the ancestral population’s approximate size.

In order to learn about how frequent founder events were across human populations during the past 20,000 years, the research team examined genetic data

from 460 geographically diverse present-day and ancient human groups. The results were striking: More than 60% of the sampled modern populations had experienced a significant founder event in the previous two hundred generations. Peoples from Oceania and the Americas had the highest frequency of founder events.

“There are many, many groups that have had small population sizes in their recent past,” says Moorjani. The smaller the population size, the stronger the founder event signature left behind in the genome. Founder events were more common in island populations compared to continental ones. Subsistence strategy was also a factor, with hunter-gatherer groups tending to have more founder events than populations of farmers or pastoralists.

Many groups in India, where Moorjani traces her own ancestry, also show evidence of

strong founder events. This is the case for the Onge people, who number only about 100 individuals on the Andaman Islands. But even the few million Vysya people of Uttar Pradesh had a strong founder event in the past that increased the frequency by 100 times of a very rare genetic mutation that can cause paralysis in response to some anesthetics.

Founder events often expose the descendant population to higher risk of rare or recessive genetic diseases as harmful mutations can spread more readily through a small population, as documented among the Amish, Finns, and Ashkenazi Jews. Says Moorjani, **“This is why studying genetics is really powerful, because we can find out information about ourselves that we can use for betterment of our lives, for reducing the burden of diseases, and improving treatments.”**



Priya Moorjani

TWO GIFTS SUPPORT TOP CAMPAIGN PRIORITIES

At the outset of Light the Way: The Campaign for Berkeley, Chancellor Carol T. Christ identified her two highest priorities for the campus: increasing the number of new faculty and expanding fellowship support for graduate students. A pair of recent gifts from generous donors to the Division of Biological Sciences will help advance each of those goals.

A \$3 million pledge from **Jeffrey Huber** and **Angel Vossough** will be matched as part of the university's STEM Chair Challenge to create both a tenured faculty endowed chair and a new position for a junior faculty member. The first holder of the **Jeffrey Huber and Angel Vossough Chancellor's Chair in Computational Biomedicine** will be a faculty member in either Biological Sciences or the Division of Computing, Data Science, and Society (CDSS), who will mentor the assistant professor holding a joint appointment in both divisions. A search is underway for the new faculty member, someone who employs statistics and machine learning to develop therapies for cancer.

Huber is the founding CEO and Vice Chairman of GRAIL, a healthcare company focused on new technologies for early cancer detection. He chairs the CDSS Advisory Board. Vossough



MIDS '22, a former network engineer at Cisco Systems, is a social entrepreneur and alumna of Berkeley's School of Information.

"Berkeley has so much potential for innovation and diversity and to provide access to cutting-edge research and education to students from all backgrounds." says Huber. "Through our gift, we hope that this position can bring new research insights to the field that will ultimately change cancer outcomes and save lives."

Competition for top graduate students is fierce, and competitive financial fellowships make a crucial difference in convincing them to study at Berkeley. The **Dr. Saul and Gordon Kit Fellowship** will enable promising graduate students to pursue advanced education in animal virology, including virus pathogenesis and cellular antiviral defenses, virus-associated tumor biology/biochemistry, and viral vaccines.

Established with a \$1 million pledge from **Gordon Kit M.A. '78**, the fellowship honors his late father. **Saul Kit '48, Ph.D. '51** studied biochemistry at Berkeley as a G.I. Bill undergraduate. After earning his doctorate, he embarked on a long and distinguished research career, ultimately becoming Professor and Head of the Division of Biochemical Virology at Baylor College of Medicine. Among his accomplishments was co-inventing, with his son Dr. Malon Kit, Omni-Vac PRV, the first genetically engineered live viral vaccine approved for use in the United States and Japan.

Intending to emulate his father's scientific career, Gordon earned a bachelor's degree in biochemistry from Columbia University and a master's degree in molecular biology from Berkeley. But a compelling course in First Amendment law diverted him into a 30-year career as a patent attorney and Partner with the Washington, D.C. law firm Sughrue Mion PLLC.

"I hope my gift will inspire and facilitate the next generation of scientists to follow in the footsteps of my father," says Gordon Kit. "The goal of the fellowship is to give graduate students the opportunity to fulfill their academic dreams, when they otherwise might not be able to."



Master's in Biotechnology Set to Launch

As an undergraduate student from the East Coast, **Roger J. Kang '98** found Berkeley to be “a completely different world” and was fascinated by the diversity of student backgrounds and life experiences. Kang studied economics at Berkeley before joining his family's company, Princeton Biomeditech Corporation, where he serves as vice president of business development and president of its marketing arm, LifeSign LLC. Princeton Biomeditech develops and manufactures advanced rapid diagnostic products, specializing in point-of-care tests for fertility, infectious diseases, and other uses. The company's combined rapid test for Covid-19 and influenza, provided to the university at a significant discount, aided the campus's initial response to the pandemic.

“There is so much opportunity at Berkeley,” recalls Kang of his student days. Now, thanks to his generosity, students will have even more opportunity. Having

established the **Kang Family Fellowship** a decade ago to support graduate students in biotechnology, the Kang family has recently pledged \$1 million to help launch the Master's in Biotechnology program.

This new degree program would not have been possible without a \$500,000 contribution from **Richard K. Robbins**, founder and principal of Wareham Development. The company's real estate portfolio around San Francisco Bay includes fixtures of the region's biotech and biomedical industries. Robbins's campus philanthropy also supports the Center for Emerging and Neglected Diseases and research in green chemistry, and he is committed to providing education access for underrepresented students.

With emphasis on entrepreneurship, technology innovation, and interdisciplinary work, the one-year master's program

will prepare its graduates for roles in the biotechnology or pharmaceutical industry as program managers, clinical trial coordinators, or regulatory officers, among other potential career paths. The first cohort of 12 students, to be known as the **Kang Family Masters Class in Biotechnology**, will arrive in 2023. Plans call for the program to gradually grow to admit up to 60 students per year. A quarter of the funds raised from tuition will be reinvested to provide scholarships for undergraduates from underrepresented groups.

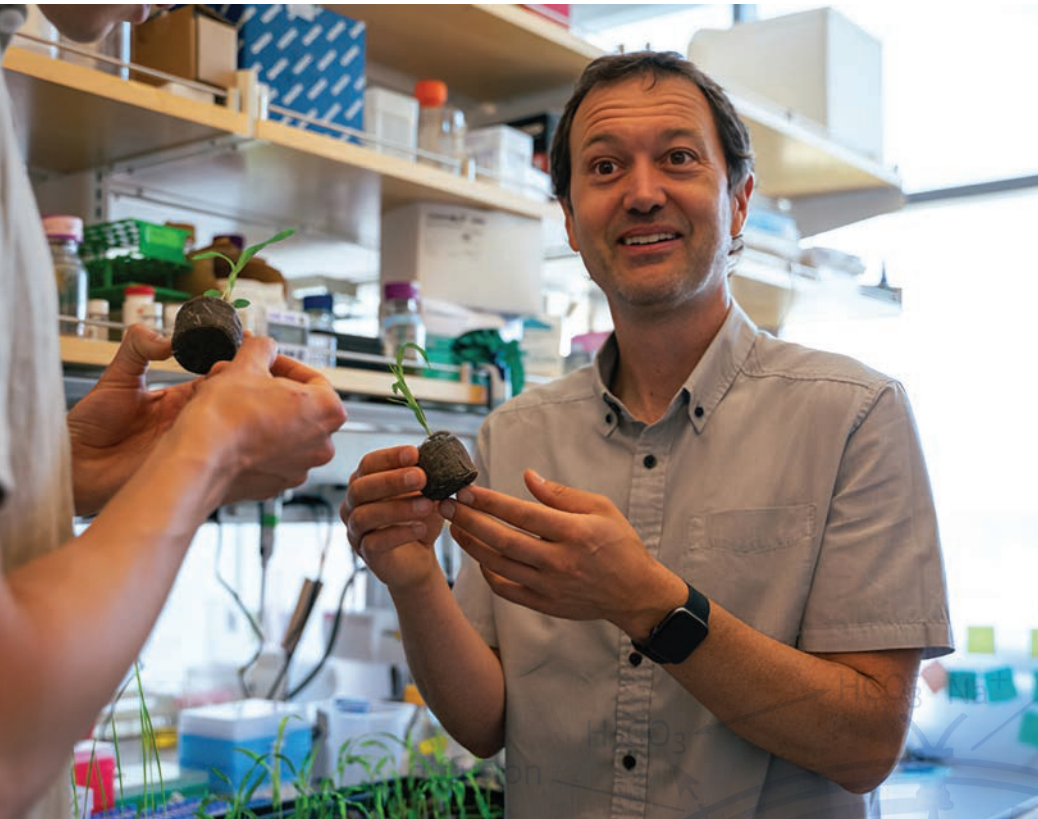
In planning the Master's in Biotechnology curriculum, program developers surveyed industry leaders, who expressed a need for employees who are skilled in the latest key technologies such as CRISPR gene editing, who have experience at the lab bench and in bioinformatics, plus some savvy about biotech's business and regulatory aspects. Commencing with a new summer lab course covering research techniques with stem cells, CRISPR, RNA-seq, and data analysis, the program continues with fall courses that delve into bioinformatics and genomics, biotechnology finance, scientific communication, and other topics. In the spring term, shorter courses highlight drug discovery, cancer therapeutics, clinical trial management, and manufacturing. Students will also be expected to complete an internship in a campus lab or biotech firm.

Serving as the program's Kang Family Director is **Kunxin Luo** of the Department of Molecular & Cell Biology (MCB). Participating MCB faculty members will include Andrew Dillin, Lin He, Dirk Hockemeyer, Nicholas Ingolia, Sarah Stanley, and Robert Tjian, along with lecturers Robert Beatty and Robin Ball.

“Our master's program responds to the current boom in biotechnology,” says Luo. **“We intend to provide hands-on research and internship experiences in addition to multidisciplinary courses that meet the needs of the modern biotechnology and pharmaceutical industries.”**



CRISPR Takes On Climate Challenge



David Savage

A decade ago, the journal *Science* published a paper with an inauspicious and technical title: “A Programmable Dual-RNA-Guided DNA Endonuclease in Adaptive Bacterial Immunity.” The paper described CRISPR-Cas “molecular scissors” technology as a way to precisely edit DNA, and it launched a continuing revolution in life science laboratories and biomedical companies and clinical trials for novel treatments for genetic diseases.

While progress continues toward CRISPR’s potential to provide efficient and effective medical therapies, scientists are also pursuing the gene editor’s prospects to alter the course of climate change and address challenges to food security. The Innovative Genomics Institute (IGI), founded by CRISPR co-inventor and Nobel laureate Professor **Jennifer Doudna**, has committed to prioritizing Climate and Sustainable Agriculture as one of its four research

pillars, along with Human Health, Advancing Genome Engineering, and Public Impact.

“We’ve understood for some years that CRISPR genome editing could be used to help agriculture adapt to climate change,” says Doudna. “It’s a thrilling new step to apply the same toolkit to carbon removal and address climate change directly.”

Nearly a third of the IGI’s budget will support the sustainable crop and climate area, including a new research program, launched with \$11 million from the Chan Zuckerberg Initiative, that seeks to use genome editing to enhance the natural ability of plants and microbes to capture atmospheric carbon dioxide and store it in soil for long periods.

According to the IGI, global soils have released an estimated 487 billion metric

tons of carbon dioxide due to modern agricultural practices during the past two centuries. The institute has mapped out a three-phase research strategy to develop natural, scalable solutions to spur: removing atmospheric carbon, improving carbon flow in plants, and enabling greater carbon retention in soil.

Associate Professor of Molecular & Cell Biology **David Savage** co-leads a group that will focus on editing rice and sorghum to facilitate drawing in more carbon during photosynthesis and to optimize roots for sequestering that captured carbon. CRISPR technology accelerates the slow process of plant breeding to develop desired traits or remove unwanted ones, so the team may start field trials with new varieties in a few years.

Savage says, “The power of CRISPR is, we now have the ability to essentially make all possible mutations, determine in the lab what the most promising mutations might be, and then take that prioritized list and move it out into the field and assess from there what would work.”

Sorghum has a demonstrated tolerance to drought, salinity, and heat, as well as deep roots, which could help to keep carbon deeper in the soil. Rice is a global staple for 3.5 billion people, but its farming results in high emissions of methane, a more potent greenhouse gas than carbon dioxide. Notes IGI Executive Director Brad Ringeisen, “CRISPR can play a role in limiting agricultural emissions, [and] making crops more resilient to a more variable and extreme climate.”



Alumni Field Trips Explore Life PAST AND PRESENT

“The first thing about fossil discovery,” says Assistant Adjunct Professor **Juan Liu**, **“is that the person walking a long way...has a better chance of finding fossils.”** With this encouragement, Liu and a trio of students from her Department of Integrative Biology lab led a group of Berkeley alumni and friends on a September afternoon excursion at Capitola Beach. Popular with surfers and sunseekers, this beach also provides access to intriguing traces of an ancient marine environment.

The fossils here come from the Purisima Formation, which has a few coastal exposures from Point Reyes to Santa Cruz County. The formation preserves the remains of sharks, whales, seals, and other animals that existed between about three million to seven million years ago.

A keen-eyed observer can spot vertebrate and invertebrate fossils by probing among the pebbles, cobbles, and boulders that have fallen from the adjacent sea cliff. It's hard to miss the prominent sandstone pedestals densely packed with the white shells of clams and other bivalve mollusks, indicating a rapid death and burial.

As an expert on fossil fish and UC Museum of Paleontology Assistant Curator, Liu is on the lookout for shark fossils, which tend to come from a different layer than the conspicuous shell bed. Bony fish are scarce in Purisima strata, while sharks have cartilaginous skeletons that tend not to be preserved. However, Liu says, “Shark teeth are abundant because they're shedding their teeth very often.” Modern sharks shed about one tooth per week. Liu's most memorable “catch” from this locality was the saw-like tooth of a six-gill shark, a primitive member of the modern shark lineage.

Except for an intimidating, palm-sized tooth from a Megalodon (the giant predecessor of great white sharks) that Liu brought from the museum's collection, no shark fossils turned up during this trip. But the fossilized remains of whales — including portions of a skull, articulated vertebrae, angular chunks of ribs and other bones — were embedded in a number of sandstone boulders.

This prehistoric beachcombing was one of several immersive trips and tours sponsored by the Division of Biological Sciences and featuring its faculty. Last July, a group explored the tidepools of Fitzgerald Marine Reserve with Associate Professor Seth Finnegan and Adjunct Professor Jonathon Stillman, who respectively study the processes that shape marine biota through time and the physiological effects of ocean acidification. Another fossil-hunting trip this fall, led by Assistant Professor Jack Tseng, visited Red Rock Canyon State Park in the Mojave Desert.

More activities will occur during the spring semester, with possibilities such as observing elephant seals at Drake's Beach, birdwatching in Sunol Regional Wilderness, and investigating the microbiome in a campus lab. To learn more, **contact Ryan Guasco** at rguasco@berkeley.edu.



Juan Liu, left, discussing fossil formation at Capitola Beach

Helping Professors Who Parent



Between teaching, research, university service, and earning tenure, young professors at Berkeley have a lot on their minds. Those who are also raising young children must figure out how to balance their academic responsibilities with the demands and needs at home.

As one parent and professor put it, "...a UC Berkeley college education is substantially more affordable than tuition at a typical Berkeley preschool. In our family, both parents are full-time faculty, so reliable child care is essential." A recent survey of rising faculty members within the Division of Biological Sciences revealed that half of the division's assistant professors needed financial assistance for child care, and another third indicated that such funding could ease their situation.

Due to the generosity of some anonymous donors, the division responded by creating the **Biological Sciences Faculty Child Care Fund**, the first dedicated for this purpose at a UC campus. Open to eligible early-to-mid-career faculty with at least a

half appointment in either the Integrative Biology or Molecular & Cell Biology departments, the fund provides a one-year salary supplement to defray the cost of care at any facility for children under the age of six years.

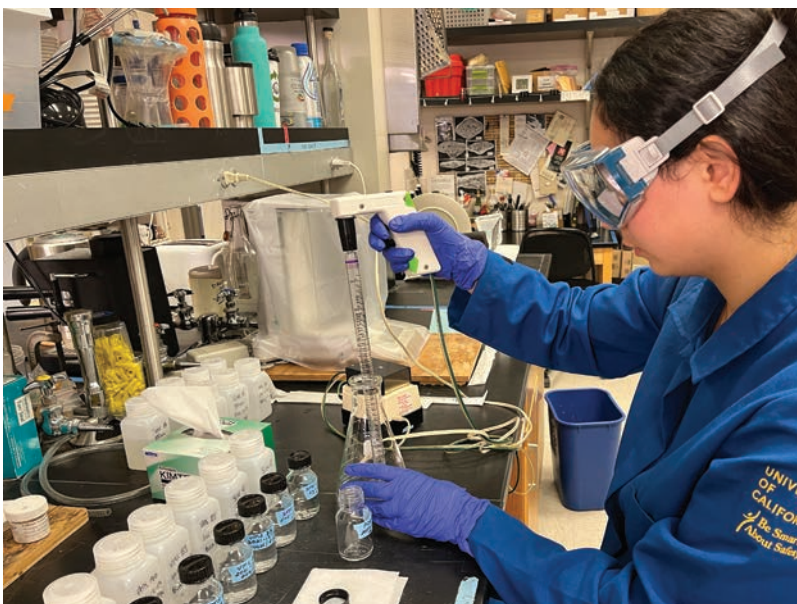
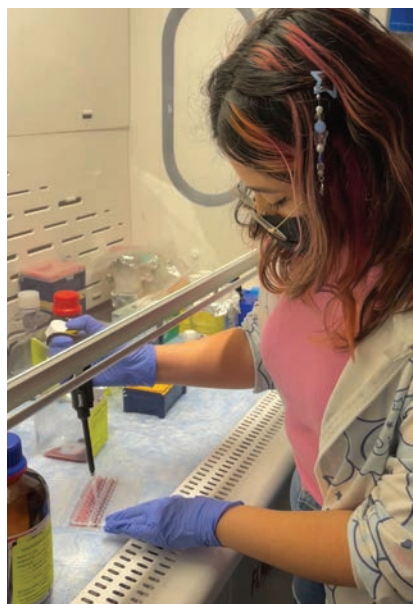
Launched this past spring, the fund had made nine awards by the fall. The amount awarded ranges between \$5,000 to \$10,000, based on family need. While grants at that level cannot cover the full cost of child care, that fact does not diminish the gratitude expressed by faculty who have received this support.

Associate Professor Stephan Lammel says that a grant from the fund "provided an enormous financial relief for me and my family." Assistant Professor Priya Moorjani says the program "has been a great help to us, especially this year when our regular child care was closed several times due to COVID-related issues, and so we were sometimes paying double." With child-care expenses for her two children rivaling the mortgage payment, Associate Professor

Gloria Brar echoed the sense of financial relief, adding that **the assistance "makes me feel supported by the Berkeley community during this challenging time. I am immensely grateful that this fund exists."**

With \$120,000 raised to date for the Biological Sciences Faculty Child Care Fund, the division is seeking additional philanthropy in order to provide more awards, larger award amounts, or to extend the age of child eligibility to 12 years. Sustaining this fund will aid efforts to diversify the division's faculty as well by being able to help more dual-career or single-parent families with young children.

"I'm just really excited that we found a way to help faculty with some of the biggest stressors," says Assistant Dean for Finance and Administration Heidi Wagner, "and allow them to spend more time on their research and be successful in their advancement to tenure."



Student researchers Alexia Puerta Cordova and Ines Huret

EXTRAORDINARY UNDERGRADUATE EXPERIENCES Outside of Class

Over summer “break,” undergraduate students in the Division of Biological Sciences pursue myriad research and internship opportunities that Berkeley can provide. Here are three cases in point.

Alexia Puerta Cordova is one of 98 SEED (STEM Excellence through Equity & Diversity) Honors Scholars, a pan-STEM program for undergraduate scientists from underrepresented groups. The program cultivates a collaborative community of scholars who develop agency, identity, and a passion for research, guided by faculty, graduate student, and peer mentors. Alexia affirms that “the staff and community within SEED make me feel valued and supported as a student in STEM.”

Without much prior lab experience, Alexia ventured to the prestigious Fred Hutchinson Cancer Research Center last summer to study thymus regeneration in an immunology lab. She learned a lot by participating in her own project, attending weekly lab meetings, and building skills in several techniques: cell culture and proliferation assays, flow cytometry, and reverse transcription polymerase chain reaction.

Majoring in Molecular & Cell Biology (MCB) with an emphasis in neuroscience, Alexia intends to pursue an M.D. or joint M.D./Ph.D. in the future. She says, “I feel the most fulfilled when I can help others...and medicine provides an excellent opportunity for me to combine my academic curiosities with my values.”

Third-year Integrative Biology major **Ines Huret** spent her summer in the lab of Professor Todd Dawson, investigating the symbiotic relationship between algae and fungi in lichens. After assisting postdoc Inga Conti-Jerpe to collect lichens in the field, Ines learned how to prepare the samples in order to separate algal and fungal cells for later stable isotope analysis.

She found both the field and lab aspects of the work to be rewarding. **“I gained scientific experience in a lab setting, which I believe is essential to study the biological sciences,”** says Ines, who especially appreciated that “...each day in the lab led to a new realization or discovery.” While her experience in the Dawson Lab continues this fall, Ines looks forward to applying these skills to her own future

research project on marine invertebrate symbioses.

Robinson Biology + Business Scholarship recipient **Amandeep Rana** is completing bachelor’s degrees in both MCB and Business Administration through the Robinson Life Science, Business, and Entrepreneurship Program (LSBE), a partnership between Berkeley Haas School of Business and the Division of Biological Sciences.

Growing up in a developing country inspired Amandeep’s interest in healthcare, and he envisioned embarking toward a career as a medical provider. Admission to the selective LSBE program, which bridges scientific inquiry with commercial application and entrepreneurship, “opened up a world of possibilities for me,” Amandeep says. For instance, he’s explored opportunities in biotech, including a recent financial internship with Gilead Sciences. Now, Amandeep says, “My post-graduation plans are to work in the financial industry and work solely with biopharmaceutical companies. I want to make an impact in healthcare...by focusing on innovation in biotech and financial advisory.”



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Virtual Lecture Series Inspires Alumni and Friends



Next spring will bring the sixth season of Basic Science Lights the Way — virtual conversations about current research that feature prominent Berkeley faculty, students, and postdocs. Co-presented by the Division of Biological Sciences and the Division of Mathematical & Physical Sciences, each event packs into one hour accessible presentations about discovery-driven science, moderated discussion, and audience questions.

Reflecting Berkeley's breadth of scientific expertise, previous topics have included: mass extinctions and ancient climatic catastrophes, the science of wellness, and the life of a brain from development to degeneration. Missed any past events? You can access closed-captioned videos of each conversation or check the current schedule at basicscience.berkeley.edu.