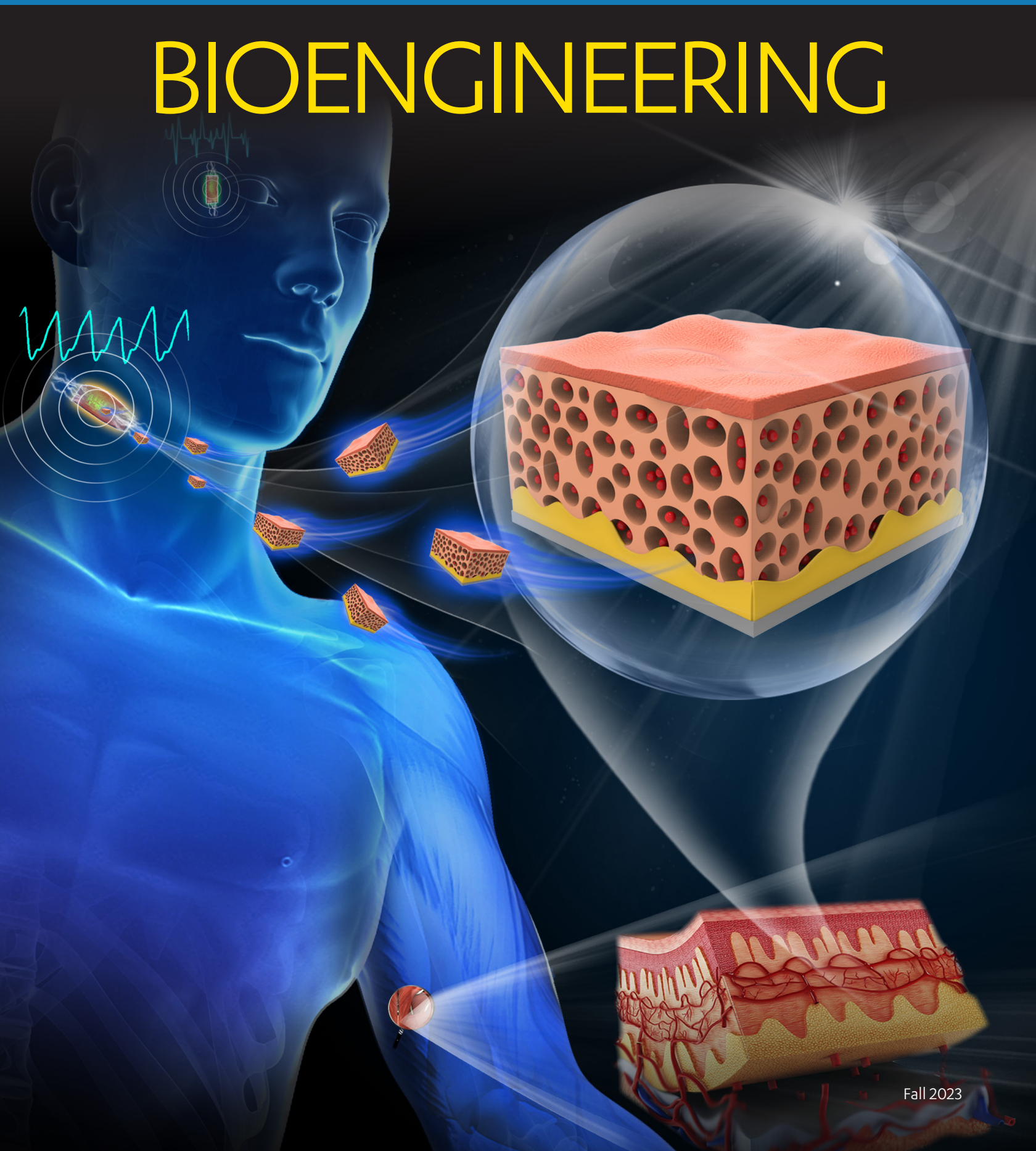
UCLA Samueli
School of Engineering

BIOENGINEERING



Fall 2023

Performing cutting-edge research that benefits society and training future leaders for a wide range of possible bioengineering careers.

Message from the Chair

The Bioengineering Department at the UCLA Samueli School of Engineering takes immense pride in commemorating a year of remarkable growth and achievements. We extend a warm welcome to two exceptional additions to our faculty — Mireille Kamariza and Jaimie Stewart. Their expertise and dedication are set to enrich our already extraordinary journey. Our junior faculty members have left an indelible mark with significant milestones and accomplishments. We congratulate Liang Gao and Aaron Meyer for becoming tenured professors, a testament to their unwavering commitment to excellence and scholarly prowess. Notably, Jun Chen's outstanding scientific contributions have garnered recognitions, such as the Shu Chien Early Career Award and the V.M. Watanabe Excellence in Research Award. Jennifer Wilson leads the development of the co-op program, creating invaluable experiential learning avenues within the industry for our students.

The NSF Engineering Research Center PATHs-UP continues to drive groundbreaking research and technological advancements in diagnosis and point-of-care solutions. Meanwhile, the NIH training grants forged between UCLA and Caltech offer a golden opportunity for postdoctoral training at the interdisciplinary juncture of engineering and medicine. Our dedication to advancing education is exemplified by the acquisition of a transformative new education grant. This ambitious endeavor aims to redefine undergraduate education by seamlessly integrating project-based learning and real-world problem-solving into the undergraduate curriculum through strategic partnerships with research centers, industry and the medical center; while championing equity, diversity and inclusion.

In the realm of student development, we are guided by the wisdom of industry advisors and the invaluable support of our alumni network. The industry advisory board shares its sagacious insights, while our esteemed alumni offer essential networking avenues and career guidance. The tireless efforts of the Bioengineering Graduate Association, the Biomedical Engineering Society (BMES) chapter and other student organizations have yielded an abundance of opportunities for learning, networking and career growth. Furthermore, the innovative BE-Connection hours provide a platform where faculty, staff and students converge, nurturing a culture of diversity and inclusivity that is integral to our community.

Together, we embark on a journey defined by innovation, collaboration and education — all converging to sculpt the leaders of tomorrow. Join us as we soar to new heights, propelled by the spirit of exploration and the pursuit of excellence. Go Bruins!

Song Li, Ph.D.

Chancellor's Professor and Chair

2023-2024

41
Core and joint faculty

6
PECASE and NIH Director's New Innovator Award

3
National Academy members

213
Graduate students

23
AIMBE members

288
Undergraduate students

THE MISSION OF THE BIOENGINEERING DEPARTMENT at the UCLA Samueli School of Engineering is to perform cutting-edge research that benefits society and to train future leaders for a wide range of possible bioengineering careers by producing graduates who are well-grounded in the fundamental sciences, adept at addressing open-ended problems and highly proficient in rigorous analytical engineering tools necessary for lifelong success.

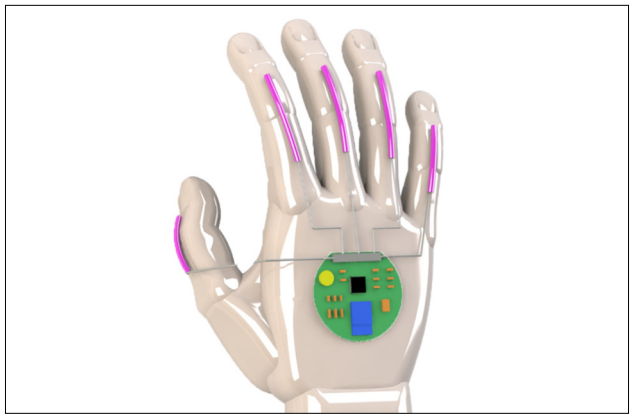
Over the past few years, our Bioengineering Department has established a vibrant undergraduate degree program and recruited excellent faculty with diverse backgrounds who are directing innovative research programs. Our bioengineering faculty bring an extensive range of expertise to the department, with specialties including bioengineering, chemistry, materials science, chemical engineering, physics, electrical engineering and medicine. This broad range of experience has proved to be extremely valuable in preparing and teaching our undergraduate curriculum. Our faculty and students have been recognized by many awards at national and international levels.

OUR CORE FACULTY

Jun Chen

Assistant Professor

Jun Chen is currently an assistant professor in the UCLA Bioengineering Department. His research focuses on soft bioelectronics and smart textiles for personalized health care. He has published two books and 270 journal articles, as corresponding author for 170 of them in Chemical Reviews (2), Chemical Society Reviews (2), Nature Materials (2), Nature Electronics (4), Nature Biomedical Engineering (1), Nature Communications (5), Science Advances (3), Joule (3), Matter (10), Advanced Materials (12) and many others. With a current h-index of 101, Chen was identified as one of the world's most influential researchers in the field of materials science in Web of Science. Beyond research, he is an associate editor of Biosensors and Bioelectronics, Med-X, Textiles and VIEW Medicine. He is an advisory editorial board members of Matter, Cell Reports Physical Science, Materials Today Energy, Nano-Micro Letters, Nano Trends and The Innovation.

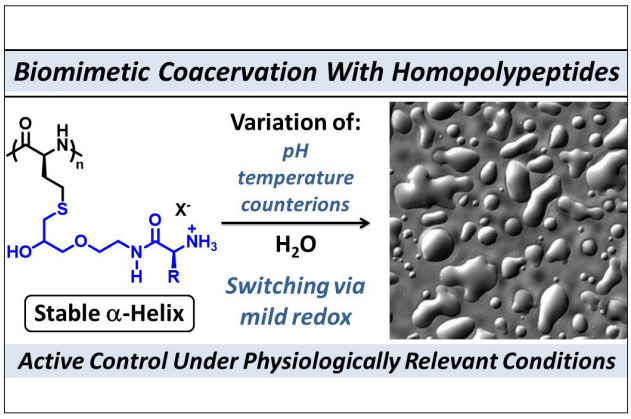


RESEARCH AREA/SPECIALTY:
Biosensors and bioelectronics

Timothy Deming

Distinguished Professor

Research in the Deming Lab is focused on synthesis, processing, characterization and evaluation of biological and biomimetic materials based on polypeptides. These materials are studied since they can be prepared from renewable resources or be biocompatible, biodegradable and possess unique self-assembling properties. We utilize innovative chemistry techniques to synthesize materials with properties that rival the complexity found in biological systems. The polymers are then processed into ordered assemblies, which are characterized for both nanoscale structure as well as biological function. Current efforts are focused on commercialization of polypeptide hydrogels for treatment and prevention of infection and for cosmetic applications.



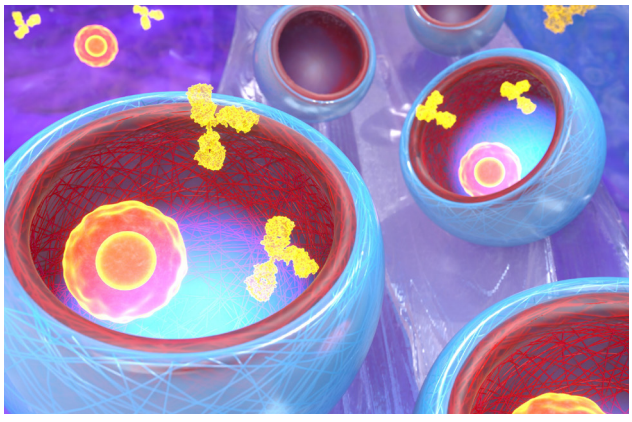
RESEARCH AREA/SPECIALTY:
Bioinspired materials, polymers, functional polypeptides

OUR CORE FACULTY

Dino Di Carlo

Armond and Elena Hairapetian Chair in Engineering and Medicine

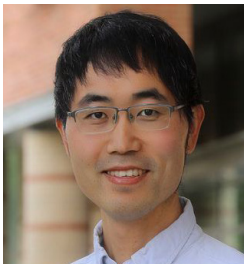
The Di Carlo Lab works at the intersection of micro-, nano- and information technology and biology — spanning fundamental investigations in fluid flow and single-cell behavior to clinical and industrial applications. Di Carlo has been a pioneer in the field of inertial microfluidics. The group has used inertial fluid dynamic effects to manipulate particles, cells and fluids in precise ways, enabling the isolation and preparation of samples of blood and other fluids and performing single-cell analysis. These innovations have led to the first FDA-cleared diagnostic test that measures the mechanical properties of cells to detect sepsis early. His lab continues to innovate, most recently with advancements in the "lab on a particle" field, enabling the democratization of functional single-cell analysis using standard life science instruments.



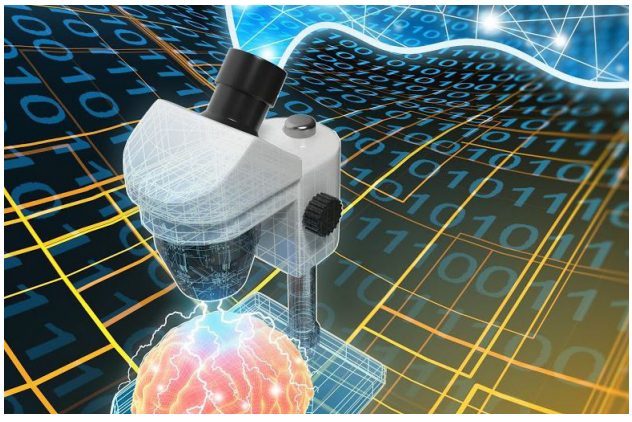
RESEARCH AREA/SPECIALTY:
Lab on a particle, smart biomaterials, microfluidics

Liang Gao

Associate Professor



Gao's research group specializes in advancing optical imaging technologies to deepen our understanding of cell and tissue biology and transform disease diagnosis. Their work has resulted in more than 70 peer-reviewed publications in renowned journals such as Nature, Nature Communications, Science Advances, PNAS, Physics Report and the Annual Review of Biomedical Engineering, along with 10 patents. Currently, the team focuses on multidimensional optical bioimaging, building systems that capture multiple photon characteristics simultaneously, maximizing information acquisition from a single measurement. Notably, Gao and his researchers developed the world's fastest 2D and 3D cameras, enabling imaging of transient biological events at microscopic scales, and the world's first full-throughput snapshot hyperspectral imaging system, recognized with the R&D 100 Award and creating a significant impact across scientific communities.



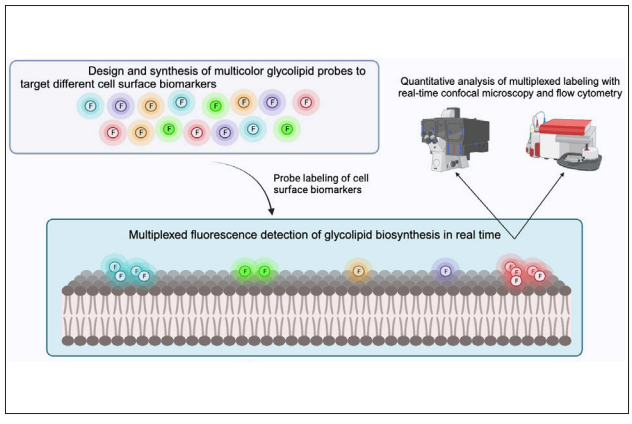
RESEARCH AREA/SPECIALTY:
Biophotonics, biomedical imaging instrumentation, computational optical imaging

OUR CORE FACULTY

Mireille Kamariza

Assistant Professor

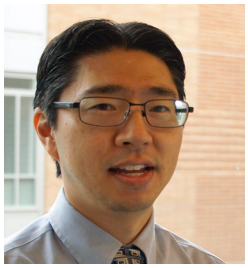
The Kamariza group utilizes new frontiers in carbohydrate and nucleic acid chemistry to design biosensors for the study of microbial processes and to engineer versatile, easily implementable toolkits for the detection, study and treatment of infectious agents. Specifically, the research focuses on bacteria and parasites, including: (1) investigating glycoconjugate biomarkers for pathogen drug-susceptibility testing; (2) developing predictable approaches to selectively detect pathogenic 3D structures; (3) designing and evaluating CRISPR-based systems to probe and study microbial infections. Ultimately, the Kamariza Laboratory aims to leverage modern understanding of molecular concepts to innovate, develop and deliver modern technologies to advance human health.



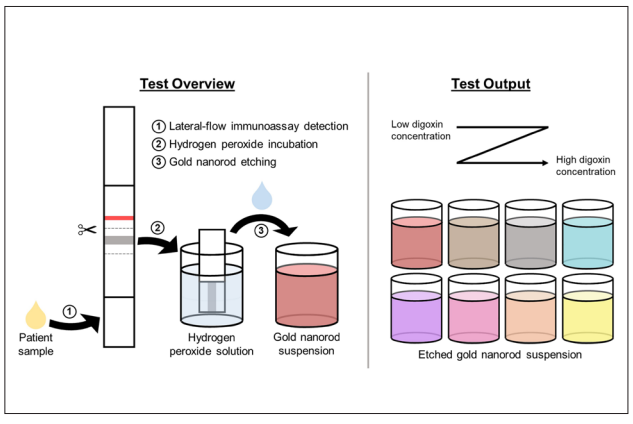
RESEARCH AREA/SPECIALTY:
Imaging, diagnostics, CRISPR, fluorescent dyes, infectious diseases

Daniel Kamei

Professor



The COVID-19 pandemic showed the world the importance of paper-based point-of-care (POC) diagnostics. The Kamei Laboratory has been developing next-generation POC diagnostics to further improve their capabilities. To improve sensitivity, the Kamei research group was the first to combine the concentration of biomolecules via aqueous two-phase systems with their detection via the lateral-flow immunoassay. His team also discovered the novel phenomenon of macroscopic phase separation on paper that allowed the simultaneous concentration and detection of target molecules on paper. Additionally, the Kamei Laboratory became the first to automate biomarker concentration, capture and signal enhancement on a paper-based device. To go beyond simple binary yes/no readouts, his group developed quantitative POC devices through use of colors associated with gold nanorod etching, barcode lateral-flow immunoassays and hydrogel beads of specific compositions.



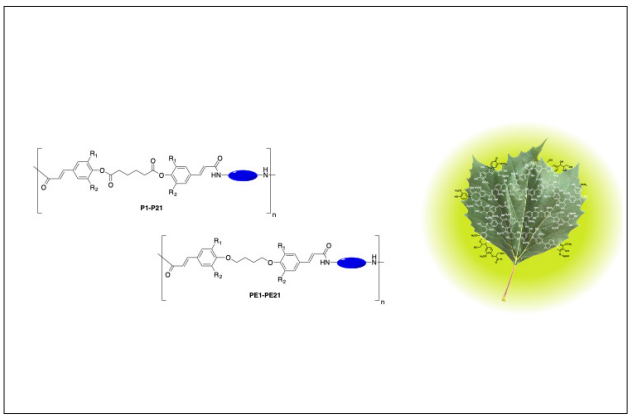
RESEARCH AREA/SPECIALTY:
Point-of-care diagnostics, automation, molecular thermodynamics, transport and kinetic phenomena

OUR CORE FACULTY

Andrea Kasko

Professor

Kasko leads a multi-disciplinary research program at the UCLA Department of Bioengineering focused on the synthesis and characterization of novel polymeric materials, specifically dynamically controllable biomaterials and biomimetic and bio-derived materials. Her group synthesizes a variety of small molecule, oligomeric and polymeric compounds. Research in the Kasko Lab can be grouped into five areas: (1) photodegradable biomaterials; (2) glycomimetic materials; (3) drug-releasing wound dressings; (4) cationic biomaterials for interrogating innate immunity and non-viral gene delivery; and (5) polymeric materials derived from biomass.

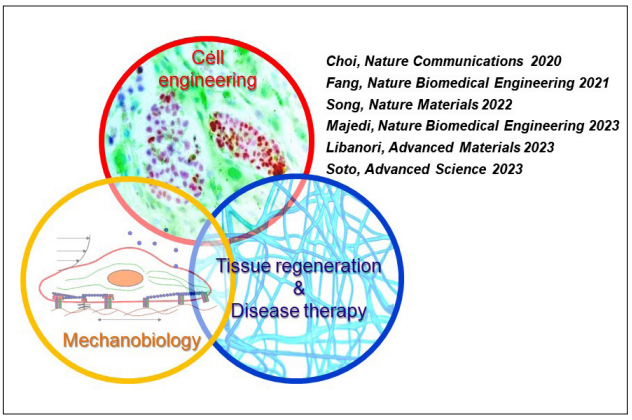


RESEARCH AREA/SPECIALTY:
Polymeric biomaterials and bio-derived materials

Song Li

Chancellor's Professor and Chair of Bioengineering Department

The Li Lab is focused on cell engineering, mechanobiology, biomaterials and tissue engineering. Stem cells and reprogrammed cells have broad applications in regenerative medicine, disease modeling and drug screening. The Li Lab integrates bioengineering technologies and molecular analysis to study how biophysical factors, such as mechanical cues and the micro/nano structure of biomaterials, regulate cell fate determination and epigenetic changes, with the goal of translating fundamental findings into cell engineering technologies. At tissue level, the regeneration process requires the coordination of immune cells, stem cells and resident cells in the microenvironment. The Li Lab investigates the mechanisms of tissue remodeling, and develops multidisciplinary approaches to engineer cells, biomaterials, drug delivery systems and biophysical factors to promote the regeneration of functional tissues.



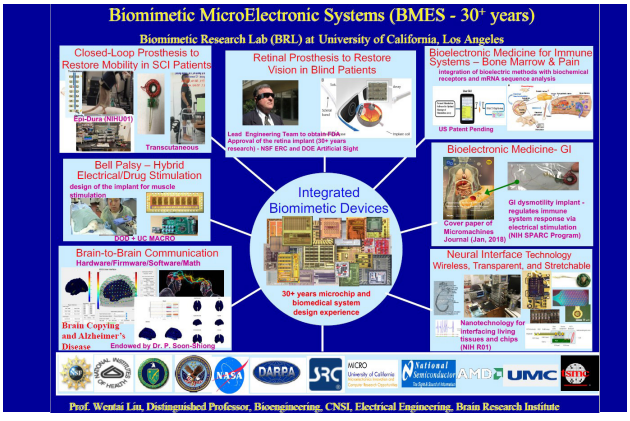
RESEARCH AREA/SPECIALTY:
Cell engineering, mechanobiology, biomaterials, immunoengineering, tissue engineering

OUR CORE FACULTY

Wentai Liu

Distinguished Professor

The Biomimetic Research Laboratory (BRL) engages in interdisciplinary research of bionic engineering and neural prosthesis. The integration of science, engineering and technology supports the aims of: (1) regaining eyesight for the blind; (2) restoring motor function for the paralyzed; (3) replenishing the cognition impaired; (4) reanimating automatic nerves and (5) brain-to-brain communication. Since the early stages of retinal prosthesis in 1988, BRL has led the engineering efforts for vision restoration in blind patients. Notably, BRL has the unique credential of retinal prosthesis development from conception to the final implant. These efforts led to successful commercial implants (code name Argus-II by Second Sight) for blind patients, receiving both CE Mark in 2011 and US FDA approval in 2013.

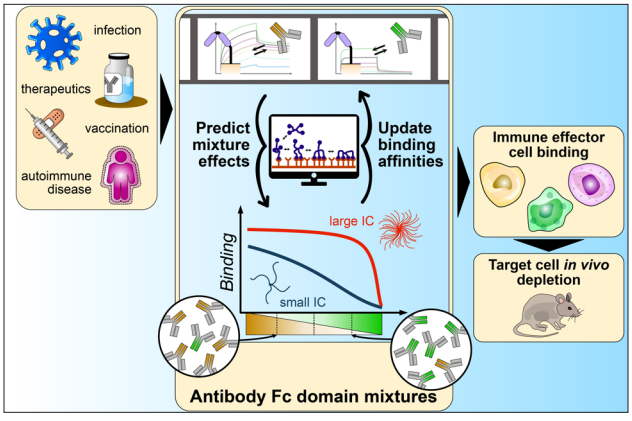


RESEARCH AREA/SPECIALTY:
Neuroengineering, neural prosthesis

Aaron Meyer

Associate Professor

The Meyer Lab develops experimental and computational strategies to measure, model, and therapeutically manipulate cell-to-cell communication. These techniques are applied to understand the basis of immune dysfunction and develop better immunotherapies against autoimmune disorders and cancer. Specifically, they have contributed to designing engineered cytokines under clinical evaluation for treating autoimmune disorders and uncovered new mechanisms by which cancer evades the immune system by disrupting cytokine communication and antibody-mediated immunity. The lab's computational strategies center around the idea that cell responses are multidimensional — for example, they vary across time, cell types, environmental cues and tissue context. To explore data that systematically measure several dimensions, the lab develops and implements tensor factorization methods to explore these data and advocates for others to use them.



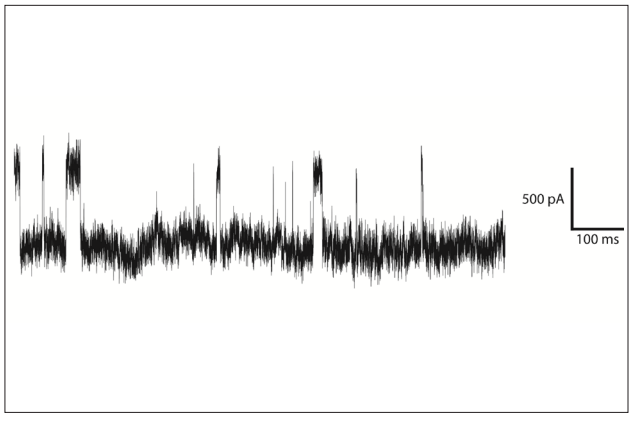
RESEARCH AREA/SPECIALTY:
Immune engineering, systems biology, machine learning

OUR CORE FACULTY

Jacob Schmidt

Undergraduate Vice Chair and Professor

The Schmidt Lab has a device-centered focus, primarily covering sensor and instrumentation development. The group has studied the use of protein and inorganic nanopores for single specifically sensing of nucleic acids and proteins. In these measurements, changes in the electrical conductance of an electrolyte-filled nanopore are monitored to detect individual molecules and other small objects entering or occluding the pore. The size, shape and identity of these molecules can be inferred from analysis of the measured conductance signals. Detecting single molecules enables use of very small analyte volumes — a long term goal is single cell protein characterization.

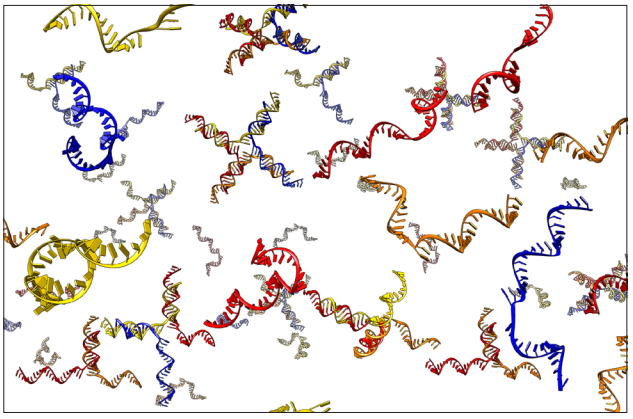


RESEARCH AREA/SPECIALTY:
Sensor and instrumentation development

Jaimie Stewart

Assistant Professor

The Stewart Lab harnesses the structural and functional programmability of RNA for the design, synthesis and characterization of RNA materials. RNA is a promising molecule with a wide range of applications due to its inherent biological functionality. However, there are significant challenges in developing RNA-based diagnostics and therapeutics, such as rapid degradation, intracellular delivery and unwanted immunogenicity. The Stewart Lab applies concepts from biology, chemistry, nanotechnology and engineering to understand fundamental RNA self-assembly principles and build nano- and microstructures capable of interfacing with biological systems. The Stewart Lab uses computational models and experimental approaches for the design and synthesis of RNA materials that are robust, stimuli-responsive and capable of controlling cell fate to advance applications in molecular sensing and regenerative medicine.



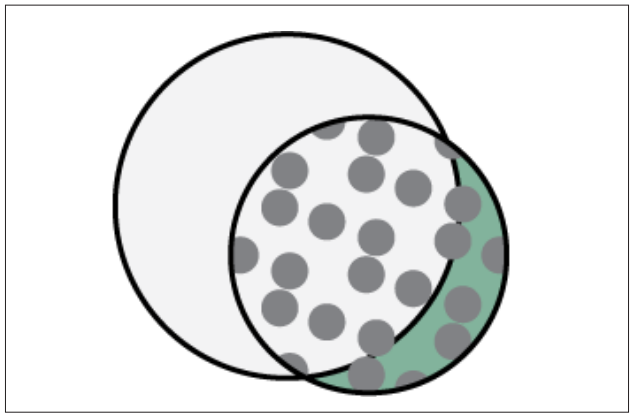
RESEARCH AREA/SPECIALTY:
RNA nanotechnology, nucleic acids, self-assembly, functional biomaterials

OUR CORE FACULTY

Jennifer Wilson

Assistant Professor

The Lab for the Understanding of Network Effects (LUNE) studies how proteins downstream of drug targets affect drug-induced phenotypes — the ability to mitigate disease or cause side effects. Drugs are traditionally developed to alter the function of proteins within cells — usually proteins that are malfunctioning and have causal relationships to disease. However, proteins in the cell exist in large, complex networks — they interact with each other and rarely exist in isolation. Even well-designed drugs that alter the function of a target protein have ripple effects through protein networks. It's widely appreciated that drug effects propagate through protein networks, but the downstream effects are not routinely considered during target protein selection. LUNE aims to design models that anticipate downstream drug effects during initial therapeutic design.

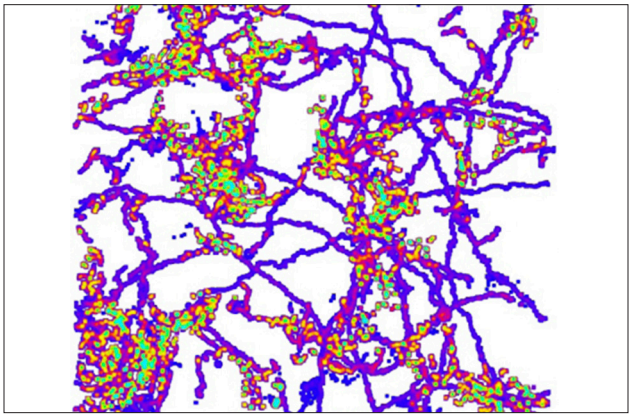


RESEARCH AREA/SPECIALTY:
Data Science, networks, graph theory, drug models

Gerard Wong

Professor

The Wong Lab uses multi-disciplinary approaches to solve problems in infectious diseases, auto-immune disorders and inflammation, with implications for respiratory diseases, cardiovascular disease and cancer. Wong's honors include: the Beckman Young Investigator Award, Alfred P. Sloan Fellowship, Sackler Distinguished Speaker and Goll Lectureship. He is a fellow of the American Physical Society, a fellow of the American Academy of Microbiology, and a fellow of the American Institute for Medical and Biological Engineering. His group has produced 13 professors since 2006. The lab's current research directions include bacterial biofilm communities, innate immunity, autoimmune diseases, antibiotic design, machine learning, neurodegenerative diseases, viral replication, programmed cell death and COVID-19.

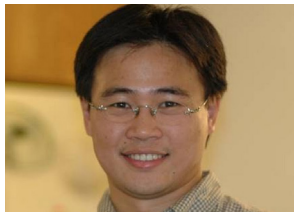


RESEARCH AREA/SPECIALTY:
Immunity and antimicrobial, biofilms, fundamental science

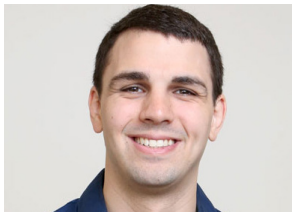
OUR JOINT FACULTY

Corey Arnold
Professor, Radiological Sciences

Amjad Askary
Assistant Professor, Molecular, Cell and Developmental Biology



Pei-Yu "Eric" Chiou
Professor and Vice Chair, Mechanical and Aerospace Engineering

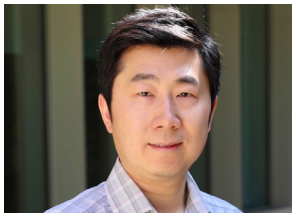


Tyler Clites
Assistant Professor, Mechanical and Aerospace Engineering

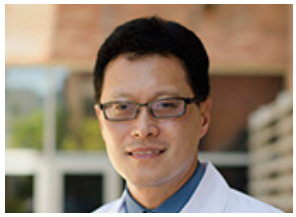
Linda Demer
Professor and Vice Chair, Medicine

Benjamin Ellingson
Professor, Radiology

Elisa Franco
Associate Professor, Mechanical and Aerospace Engineering



Weizhe Hong
Professor, Biological Chemistry, Neurobiology



Tzung Hsiai
Professor, Medicine and Maud Cady Guthman Endowed Chair in Cardiology

William Hsu
Professor, Radiological Sciences

Shantanu H. Joshi
Associate Professor, Neurology

Pirouz Kavehpour
Professor, Mechanical and Aerospace Engineering

Chang-Jin "CJ" Kim
Distinguished Professor, Mechanical and Aerospace Engineering and Volgenau Endowed Chair in Engineering

Debiao Li
Professor, Medicine

Neil Lin
Assistant Professor, Mechanical and Aerospace Engineering

Arash Naeim
Professor, Medicine and Yomtoubian Endowed Chair in Cancer and Risk Science

OUR JOINT FACULTY

Aydogan Ozcan
Professor, Electrical and Computer Engineering and Volgenau Chair for Engineering Innovation

Jacob Rosen
Professor, Mechanical and Aerospace Engineering

Dan Ruan
Associate Professor, Radiation Oncology

Sophia Sangiorgio
Professor, Orthopaedic Surgery

Vivek Shetty
Distinguished Professor, Dentistry

Kalyanam Shivkumar
Professor, Medicine

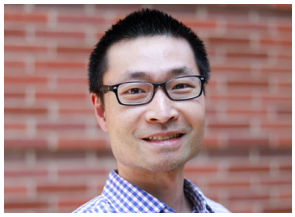
Maie St. John
Professor, Thomas C. Calcaterra, M.D. and Chair in Head and Neck Surgery

Yi Tang
Professor, Chemical and Biomolecular Engineering and Ralph M. Parsons Foundation Chair in Chemical Engineering

Michael Teitell
Professor, Pathology and Laboratory Medicine

Cun-Yu Wang
Chair and No-Hee Park-Endowed Professor, Division of Oral and Systemic Health Sciences

Paul Weiss
UC Presidential Chair, Distinguished Professor, Chemistry and Biochemistry



Holden Wu
Associate Professor, Radiology

Yang Yang
Professor, Materials Science and Engineering and Carol and Lawrence E. Tannas, Jr. Endowed Chair in Engineering

BIOENGINEERING RESEARCH AREAS:

Molecular, Cellular and Tissue Engineering

This field of emphasis covers novel therapeutic development across all biological length scales from molecules to cells to tissues. The emphasis of research is on the fundamental basis for diagnosis, disease treatment and redesign of molecular, cellular and tissue functions. In addition to quantitative experiments required to obtain spatial and temporal information, quantitative and integrative modeling approaches at the molecular, cellular and tissue levels are also included within this field. Although some of the research will remain exclusively at one length scale, research that bridges any two or all three length scales are also an integral part of this field. Graduates of this program will be targeted principally for employment in academia, government research laboratories and the biotechnology, pharmaceutical and biomedical industries.

Biomedical Devices and Instrumentation

This field of emphasis is designed to train bioengineers interested in the applications and development of instrumentation used in medicine and biotechnology. Examples include the use of lasers in surgery and diagnostics, new micro electrical machines for surgery, sensors for detecting and monitoring of disease, microfluidic systems for cell-based diagnostics, new tool development for basic and applied life science research and controlled drug delivery devices. The principles underlying each instrument and specific clinical or biological needs will be emphasized. Graduates of this program will be targeted principally for employment in academia, government research laboratories, and the biotechnology, medical devices and biomedical industries.

Biomedical Imaging

This field consists of the following two subfields: Biomedical Imaging Hardware Development (BIHD), Biomedical Signal and Image Processing (BSIP).

BI Subfield 1: Biomedical Imaging Hardware Development (BIHD)

The BIHD graduate program prepares the students for a career in developing imaging hardware for medical diagnosis and intervention applications. Students will learn the physical basis of biomedical imaging modalities, such as optical imaging, CT and MRI. Through the structured curriculum and lab activities, the students will experience the excitement of cutting-edge hardware research, hone skills in analytical thinking and communications and gain knowledge of imaging techniques that are used in the biomedical field.

BI Subfield 2: Biomedical Signal and Image Processing (BSIP)

The BSIP field prepares students for a career in the acquisition and analysis of biomedical signals and images; and enables students to apply quantitative methods applied to extract meaningful information for both clinical and research applications. Students in the BSIP program have the opportunity to focus their work over a broad range of modalities including electrophysiology, optical imaging methods, MRI, CT, PET and other tomographic devices and/or on the extraction of image features such as organ morphometry or neurofunctional signals and detailed anatomic/functional feature extraction. The career opportunities for BSIP trainees include medical imaging instrumentation and engineering positions in industry, academic research in the application of advanced engineering and analysis skills to the study of anatomy and function and imaging physicists for clinical and research support in major medical centers.

Biomedical Data Sciences

The Biomedical Data Sciences (BDS) trains students to be experts in the use of computational, statistical and machine learning tools for solving biomedical problems. BDS is intended for science and engineering students interested in how data science tools can operate alongside other areas of bioengineering to solve problems in areas including pattern recognition, prediction, control, measurement and visualization. Students will be trained in the algorithmic and statistical fundamentals of the field. In total, this area fosters the development of students who go on to become data scientists with the unique ability to actively interface with practitioners in other areas of bioengineering and medicine.

NeuroEngineering

The NeuroEngineering (NE) field empowers biology-focused students to execute projects utilizing state-of-the-art technology such as microelectromechanical systems (MEMS), signal processing and photonics. Simultaneously, engineering-oriented students address neuroscience-based problems, spanning from neurological disorder treatment to sensory information processing. NE students pursue a specialized curriculum that seamlessly integrates neuroscience and engineering, fostering efficient interdisciplinary collaborations.

OUR STAFF

Daphne-Jane Dizon
Management Services Officer
Manages all aspects of the department, including faculty and staff personnel and payroll actions, staff supervision, and department and student budget/fund management.

Sarah Matautia
Fund Manager
Manages pre- and post- award administration for department faculty, coordinates effort reporting and close out of awards.

Emilia Rodriguez-Vera
Administrative Specialist
Manages the BE 299 seminar series, department events, website and social media. Coordinates travel and entertainment for department guests, speakers, etc. Serves as the front desk coordinator and provides assistance on all administrative matters.

Lili Bulhoes
Graduate Student Affairs Officer
Oversees bioengineering's M.S. and Ph.D. program, graduate student payroll and funding and admissions. Provides prospective and current graduate student advising.

Janet Lin
Senior Fund Manager
Oversees both Materials Sciences and Engineering and Bioengineering departments pre- and post- award administration for faculty, coordinates effort reporting and close out of awards.

UCLA Bioengineering Alumni Advisory Board (AAB)

The UCLA Bioengineering Alumni Advisory Board's mission is to promote the communication, growth and shared activities of the UCLA bioengineering alumni, faculty and students.

The AAB members offer unique inputs to help the department understand the needs of industry, academia and the medical professions; insights into how well the department is meeting the bioengineering needs of the future and knowledge of current trends in the industry, including suggestions for keeping the curriculum and degree programs current. They also provide input to academics, research, outreach, advocacy and development.

The members represent a cross-section of the alumni of the department and of the major areas of the bioengineering field.

The AAB meets annually, and following its mission, is involved in several activities, including the annual Discover UCLA Engineering Day, Bioengineering Research Day, ongoing student mentorship, career development advising and the ABET accreditation process every six years.

Industrial Advisory Board

The Bioengineering Department is supported by the industrial advisory board.

This board has diverse representation from career paths that need bioengineering graduates, including Biotech (Amgen and Genentech), Medtech (Edwards and Medtronics), entrepreneurs, patent attorneys, etc. Many of the members are UC alums as well!

The goal of the IAB is to increase interactions between industry and students and faculty. This includes participating in department events, providing input for curriculum development, mentoring students, providing opportunities for students to obtain industrial experience and establishing collaborations with faculty.

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Bioengineering Graduate Association (BGA)

The Bioengineering Graduate Association (BGA) at UCLA was established to facilitate communication between graduate students and department faculty, encourage the involvement of students in the graduate community and establish platforms for the academic and professional development of its members.

BGA collaborates closely with the department to offer various outreach resources for graduate students. This includes organizing lunch sessions with guest faculty who present at our department's weekly seminar series, coordinating the department's annual recruiting event and research showcase known as BE Research Day, and provide other opportunities for student involvement with undergraduates and peers. BGA strives to enhance the graduate student experience and foster strong relationships within the department.

In addition to its focus on academic success, BGA also provides opportunities for networking with industry professionals through special seminars and alumni panel events. These quarterly gatherings enable BE graduate students to gain insights into career paths in the industry and establish connections with professionals from diverse companies.

Looking ahead to the 2023–2024 academic year, BGA is thrilled to welcome a new cohort of graduate students to our department. We remain committed to facilitating connections between our students and academic as well as career opportunities and we are enthusiastic about the prospects that lie ahead.

BGA leadership team at Bioengineering Research Day in February 2023.

Biomedical Engineering Society (BMES)

The Biomedical Engineering Society (BMES) at UCLA connects students interested in the bioengineering field and promotes close ties with graduate students, faculty, and industry professionals. We help develop well-rounded individuals via social events, community outreach, technical projects, academic guidance and professional development opportunities.

As an organization promoting academic excellence, we offer a variety of events throughout the year, predominantly targeted to those interested in pursuing academia. The most notable are class planning workshops, research mixers to help place students in labs, and graduate/medical school information panels.

Our professional development events and opportunities prepare students for a career in industry. We connect students to alumni and other professionals in the medical device and biotechnology space. Throughout the year, we host company information sessions and workshops to enhance students' profiles (e.g. resume building and establishing a strong LinkedIn page). Our annual biotechnology-focused career fairs provide students with internship and other future job opportunities.

BMES engages in community outreach efforts through our Reaching and Inspiring Students in Engineering (RISE) program. RISE connects volunteers with elementary, middle, and high school students from Title I schools to introduce and teach concepts such as circuits, Arduino coding, and Computer Aided Design (CAD). RISE also organizes Science Days where

students are brought to UCLA to participate in STEM-based activities and campus tours.

Students may also choose to expand their technical knowledge by joining one of our project teams. These teams focus on a variety of skills from learning introductory wet lab techniques to applying their knowledge towards a specific medical or engineering problem. We also offer a workshop series to provide accessible, low-commitment opportunities for technical development.

In addition to promoting professional and academic success, BMES facilitates bonding through mentorship activities and social events. These include events connecting mentees to upperclassmen mentors and quarterly club-wide events such as BMES Banquet, Bake-Off and Fall BBQ.

As BMES looks toward the 2023-2024 academic year, our organization hopes to achieve several goals. We want to further incorporate mental health within the diversity and inclusion conversation, increase and diversify our technical project offerings, and continue to strengthen connections to industry leaders.

CENTER AND TRAINING GRANTS :

UCLA Bioengineering Receives $1M NSF Grant to Transform Undergraduate Education

The recently awarded Revolutionizing Engineering Departments (RED) Adaptation and Implementation (A&I) project aims to integrate evidence-based organizational change strategies into the Bioengineering Department to systematically transform the undergraduate curriculum. This transformation will be centered around project-based learning, real-world problem-solving, industry and clinical partnerships, and promotion of equity, diversity and inclusion (EDI) in education. By doing so, the Bioengineering Department at UCLA seeks to create a learner-centered environment that fosters innovation, improves the learning experience for students, instructors and researchers, and aligns undergraduate education with industry and research demands. The project will focus on three main objectives. Firstly, the integration of real-world projects and comprehensive skill training will be incorporated consistently throughout the curriculum. Secondly, the project will build the necessary infrastructure and culture through partnerships with the university, medical center, and industry to facilitate the transformation of the education program. Lastly, the project will work towards creating an inclusive community for bioengineering training and education at UCLA and beyond, with a focus on promoting EDI in all aspects of the curriculum and educational practices. The outcomes of this project will have broad impacts on bioengineering undergraduate education.

UCLA Bioengineering Receives $17.5M NSF Grant for the PATHS-UP Engineering Research Center

The PATHS-UP Engineering Research Center received an additional $17.5M from the National Science Foundation (NSF) to continue their efforts to democratize access to cutting-edge diagnostics and health systems! Professor Dino Di Carlo, serves as the Deputy Director of the Precise Advanced Technologies and Health Systems for Underserved Populations (PATHS-UP) Center.

The PATHS-UP initiative, led by Gerard Coté at Texas A&M University and in collaboration with UCLA, Rice University, and Florida International University, aims to address the significant challenge of chronic diseases such as diabetes and cardiovascular disease (CVD), particularly in underserved U.S. communities. These areas face higher disease prevalence and reduced access to healthcare, leading to late or undiagnosed cases, with severe outcomes. The ambition of PATHS-UP is to alter this status quo by developing revolutionary, affordable and accurate point-of-care (POC) technologies. The initiative's mission encompasses two primary objectives: to devise innovative and cost-effective health technologies that enhance healthcare accessibility, service quality and life quality while reducing expenses; and to nurture and educate a diverse set of scientists and engineers who will lead future developments to improve health within these communities. To accomplish this mission, PATHS-UP develops two novel systems to monitor critical biomarkers of chronic diseases: a Lab-in-your-Palm (LiyP) and a Lab-on-a-Wrist (LoaW). The LiyP will use innovative amplification biochips, handheld computational imaging and modular spectroscopic instruments. The LoaW will incorporate unique biochemical marker implants and a spectral imager on the wrist to visualize the implant, alongside innovative sensors for biophysical markers like blood pressure and heart rate. Furthermore, PATHS-UP will create advanced algorithms to monitor behaviors like diet and medication intake, as well as predict long-term complications. These systems are

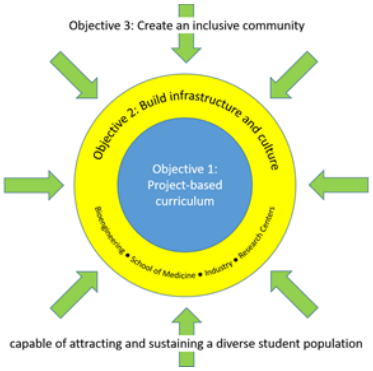
based on rigorous research in biomaterials, nanoscale systems, computational imaging and machine learning.

The systems will be tested via in vitro phantoms, human subject studies and patients within underserved communities. A multi-disciplinary team of engineers, doctors, public health experts, industry professionals and community health leaders will be integral to integrating these transformational systems into communities. The PATHS-UP team aims to ensure these technologies integrate seamlessly into people's lives, rather than just introducing them to the communities. Beyond the health impact, PATHS-UP will also focus on fostering an intellectual community comprising students, post-docs and faculty members. They aim to offer experiential learning and new engineering/public health curricula for college students, research experiences for K-12 students and teachers and opportunities for community engagement. The team has a history of entrepreneurship, having established biomedical companies with students, and they view the innovation ecosystem as a crucial component of the PATHS-UP initiative.

UCLA/Caltech Joint T32 Training Programs with the David Geffen School of Medicine at UCLA, UCLA Henry Samueli School of Engineering and Applied Science, and Caltech Medical Engineering Department

The University of California, Los Angeles (UCLA) and the California Institute of Technology (Caltech) are partnering to provide a two-year, structured curriculum for training the post-doctoral engineers, biophysical or biomedical scientists into leadership roles in academia and industry. The goal is to strengthen individualized training in advanced sensing and imaging coupled with machine learning for the diagnosis and treatment of cardiometabolic diseases. Each T32 applicant will have co-mentorships: a primary mentor from cardiometabolic medicine and/or a secondary from enabling technologies and/or industry. While iTEAM focuses on technology development and clinical translation, the iCMB focuses on mitigating cardiometabolic orders with the enabling technologies. The UCLA/Caltech training programs welcome applicants with disabilities, from low socioeconomic backgrounds and from racial/ethnic groups under-represented in the biomedical sciences. Following our two effective UCLA/Caltech T32 symposiums at UCLA (September 2021) and at Caltech (March 2022), we coordinated our third symposium in September 2023. This symposium has promoted the next generation of leaders who can be nimble between engineering and medicine and fostered collaboration between UCLA and Caltech via mentor network, and speaker interaction.

These UCLA/Caltech iCMB and iTEAM training programs, led by Tzung Hsiai, are integrated with the newly-funded American Heart Association Network Center for Diversity of Clinical Trials to "Integrate Community Engagement, mHealth, Data Science to Enhance Participation in Clinical Trial Diversity and Cardiometabolic Disparities (AHA iDIVERSE)". The first AHA iDIVERSE and NIH T32 Joint Symposium on April 17, 2023 has further forged collaboration with the faculty and trainees from the Florida International University (Latino-designated institution) and the University of New Mexico (Native American-designated institution). In addition, our T32 mentors have engaged in the National Research Mentoring Network (NRMN) and the Entering Mentoring Training Program to develop a mentoring ethos for leadership, mentorship, and diversity sensitivity training to graduate students and postdoctoral scholars.



AWARDS AND RECOGNITION (2022-2023)

2022

- Initiative of Excellence Visiting Faculty Scholar, University of Bordeaux, France (2022): **Tim Deming**
- Elected Fellow of the International Academy of Medical and Biological Engineering (2022): **Dino Di Carlo**
- Brain and Behavior Research Foundation Young Investigator Award, ACS PMSE Young Investigator Award, Microsystems and Nanoengineering Young Scientist Award, iCANX Young Scientist Award, Selected Participant of US Frontiers of Engineering Symposium, National Academy of Engineering (2022): **Jun Chen**
- Northrop Grumman Excellence in Teaching Award (2022): **Aaron Meyer**
- Eleven Early-Career Researchers to Watch, Nature Medicine (2022): **Mireille Kamariza**
- NIH Brain Initiative Technology Development Award (2022): **Liang Gao**
- NIH MIRA Award (2022): **Jennifer Wilson**
- Yushan Scholar Award, Ministry of Education, Medicine and Technology Award, Formosan Art and Technology Museum (2022): **Wentai Liu**
- Joseph Fraunhofer Award and Robert M. Burley Prize (2022): **Aydogan Ozcan**
- Bruin Development Award, Engineering Society at UCLA (2022): **BMES at UCLA**
- BMES Student Chapter Award Winners (2022): **BMES at UCLA**
- Edward K. Rice Outstanding Bachelor's Student (2022): **Griffith Hughes** (student)

2022 Commencement Awards

- Harry M. Showman Prize: **Griffith Hughes**
- Engineering Achievement Award in Student Welfare: **Rakhi Banerjee,Angela Lu, Griffith Hughes**
- Bioengineering Departmental Honors: **Griffith Hughes** (B.S.), **Jasmine Trinh** (M.S.), **Pei Han** (Ph.D)

2023

- V.M. Watanabe Excellence in Research Award, UCLA Faculty Mentor Award, AHA Transformational Project Award, AHA Innovative Project Award, NIH UCLA CTSI KL2 Translational Science Award , Shu Chien Early Career Award (2023): **Jun Chen**
- Emerging Leader Award, Mark Foundation for Cancer Research (2023): **Aaron Meyer**
- Global Biomaterials Leadership Award, Chinese Association for Biomaterials (2023): **Song Li**
- NIH Maximizing Investiagtors' Research Award (MIRA) (2023): **Liang Gao**
- Alfred P. Sloan Foundation Matter-to-Life Seed Grant (2023): **Jaimie Stewart**
- AIMBE College of Fellows (2023): **Andrea Kasko**
- Donald A. Strauss Public Service Scholarship Foundation Scholarship (2023): **Shilp Shah** (student)
- AJNR Editorial Fellow (2023): **Nicholas Cho** (student)
- NSF Graduate Research Fellowship (2023): **Sophia Shen** (student)
- American Heart Association (AHA) Predoctoral Fellowship (2023): **Rohit Rangwani** (student)
- Orthopaedic Research Society Spine Section Travel Fellowship (2023): **Jenna Wahbeh** (student)
- Materials Research Society (MRS) Graduate Student Gold Award and Arthur Nowick Graduate Student Award (2023): **Gary Chen** (Student)
- MRS Graduate Student Silver Award (2023): **Xun Zhao** (student)
- Undergraduate Research Week Awardee (2023): **Soulaïmane Bentaleb** (student)
- First Prize, Easton Innovation Challenge and First Prize, Lowell Milken Institute-Sandler Prize for New Entrepreneur (2023): **Binru (Andy) Chen** (student)

2023 Commencement Awards

- School-Wide Outstanding Bachelor of Science + Departmental Awards and Honors (Outstanding B.S.): **Kyle Chen**
- Harry M. Showman Prize: **Hossein Montazerianoliaee**
- Chancellor's Service Award: **Brett J. Saucedo**
- Departmental Awards and Honors (Outstanding Ph.D.): **Jaime de Anda**
- Russell R. O'Neill Distinguished Service Award + Engineering Achievement Award in Student Welfare: **Shreesh Karjagi**
- Departmental Awards and Honors (Outstanding M.S.) + Engineering Achievement Award in Student Welfare: **Justin Chen**
- Engineering Achievement Award in Student Welfare: **Soulaïmane Bentaleb, Gianna Brown, Miranda Diaz-Infante, Elsa Dubil, Mary Epperson, Alexa Herbel, Juhi Mehta, Kaitlyn Quesada, Kimberly Stahovich, Katie Wu**

Producing graduates who are well-grounded in the fundamental sciences, adept at addressing open-ended problems, and highly proficient in rigorous analytical engineering tools necessary for lifelong success.

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