

# GLOBAL FRONTIERS IN SCIENCE AND TECHNOLOGY

June 11-14, 2018 • UC Berkeley

Hosted by Berkeley Global Science Institute  
Sponsored by Hangjin Education



## About the Program

The discoveries made in the world of science and technology are incredibly fast-paced, competitive, and global. On a daily basis, scientific leaders are creating disruptive innovations, new materials, technologies, and products, fresh and novel ideas, and rapidly expanding technology start-ups. This is the everyday reality of the scientific and technological environment at UC Berkeley.

To compete and lead effectively in the science and technology sectors of the global economy, senior executives need to constantly be in the know about the latest technologies and innovations in order to evolve and improve their portfolio of investments and skills, with particular focus on driving innovation and leading with an entrepreneurial mindset. The Global Frontiers in Science and Technology program, is focused on helping with just that: providing participants with an up-close view of the cutting edge, world-class research being carried out at UC Berkeley and the San Francisco Bay Area. Furthermore, this program provides exposure to newly developed materials and insight into where the science and technology sector, as a whole, is moving towards (or in some cases, away from). Through seminars by world-renowned scholars, tours of world-class research facilities, and experiences with some of the top scientists and technologists in the world, the participants will leave the program with an edge over their competitors and will be well-positioned to succeed in their own business' innovations as well as in new business creation.

## UC Berkeley College of Chemistry

The central mission of the College of Chemistry is advancing society through education and research, and we have made it our business to fulfill this mission, year in and year out, for more than 140 years.

Our two departments, the Department of Chemistry and the Department of Chemical & Biomolecular Engineering, provide fundamental and applied studies of an outstanding caliber. In addition, faculty members and students from both departments regularly participate in multidisciplinary collaborations with researchers from other campus units, as well as with private industry, national laboratories and other universities.

The remarkable breadth and depth of resources available to Berkeley College of Chemistry students readies them as chemists and chemical engineers to address some of society's most urgent 21st-century issues — resource scarcity, climate change and global health. Equipped with intellectual mastery of the latest scientific and engineering tools, our graduates enter the work arena with unmatched preparation, supported by a world-class faculty, innovative pedagogy, first-rate research, outstanding peers, and the rich educational milieu of UC Berkeley and its environs.

UC Berkeley is rated the best university in the world in both Science and Chemistry by the 2016 Academic Ranking of World Universities (ARWU). US News & World Report ranked our chemistry and chemical engineering graduate programs at #1 and #2 nationwide.

During the 20th century, College of Chemistry faculty and researchers at Lawrence Berkeley National Laboratory were responsible for discovering ten elements that were added to the Periodic Table: Neptunium (1940), Plutonium (1941), Americium (1944), Curium (1944), Berkelium (1949), Californium (1950), Mendeleevium (1955), Nobelium (1958), Lawrencium (1961), and Seaborgium (1974), the only element to be named for a living person.

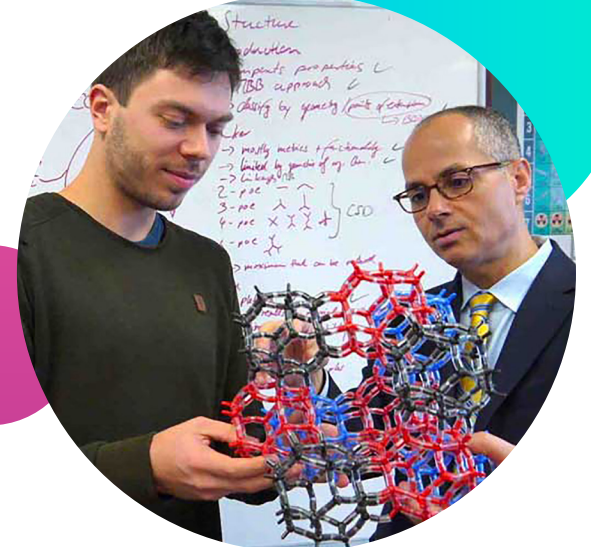
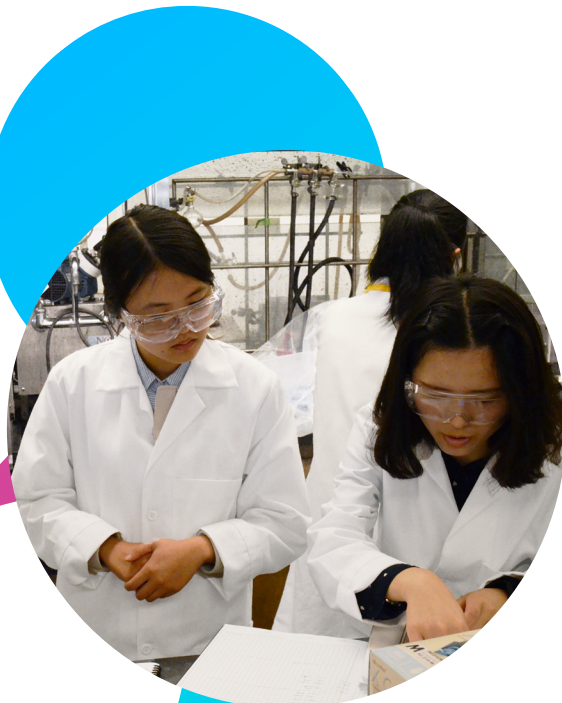
The College of Chemistry boasts 13 Nobel Prizes among its faculty and alumni.

# Berkeley Global Science Institute

The ability to perform science and innovation is distributed unequally; only scientists from few countries have the means to address problems affecting the world (science exclusivity). Developing countries lack the reliability of a rigorous scientific culture. This is often perpetuated by the absence of strong scientific leadership and sustainable mentoring traditions, corruption and unethical scientific practices, lack of an idea generation system, or underdeveloped institutional foundations.

The Berkeley Global Science Institute (BGSi) was established to address the 'science exclusivity' problem and to promote an even distribution of research capacity throughout the world. BGSi's mission is to partner with institutions of learning abroad to establish freestanding centers of global science, in which emerging scholars can plug into impactful research that focuses on solving local problems before they become global. Each center of global science is founded upon a partnership with both a higher education institution and their respective local and national governments. Our activities at the local level involve: (i) establishing state-of-the-art research infrastructure; (ii)

recruiting local, regional, and international research talent; (iii) preparing funding from local and national governments; (iv) establishing industrial collaborations; (v) producing high impact publications in prestigious journals and magazines; (vi) connecting local emerging scholars to the global science community; (vii) providing new opportunities for emerging scholars through mentorship; and (viii) using science as a language and tool for peace and prosperity. The research that is identified and developed is based on the host country's societal priorities, but in all centers, research programs have focused on at least one of the following sectors: agriculture, education, environment, energy, or water. Through BGSi's work, research programs have been initiated in various forms and to various extents in Vietnam, Indonesia, Malaysia, Argentina, Jordan, Saudi Arabia, Mexico, South Korea, China, Kuwait, United Arab Emirates, and Japan. In these places, >1000 international emerging scholars (students and early career researchers) have benefited from our partnership with >200 international emerging scholars benefiting from direct mentorship. As a result, >85 high impact research articles, many of which are in the most prestigious journals ever achieved by these countries, and patents have been jointly published in the last 5 years.



# 11

## Monday

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Robo-Berkeley: Insights into Artificial Intelligence

Location: Stanley Hall 106

**09:15 - 10:30**

**Keynote Seminar: Daniel M. Kammen**

Class of '35 Distinguished Chair in Energy, UC Berkeley

**10:30 - 10:45**

**Coffee Break**

**10:45 - 12:00**

**Michael I. Jordan**

Pehong Chen Distinguished Professor of Electrical Engineering and Computer Science, UC Berkeley

**12:00 - 14:00**

**Lunch**

Location TBD

**14:00 - 15:15**

**Yi Ma**

Professor-in-Residence of Electrical Engineering and Computer Sciences, UC Berkeley

**15:15 - 15:30**

**Coffee Break**

**15:30 - 16:45**

**Pieter Abbeel**

Professor of Electrical Engineering and Computer Science, UC Berkeley

**18:00**

**Dinner**

Location TBD

# 12

## Tuesday

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Nanotechnology for Clean and Renewable Forms of Energy

Location: Stanley Hall 106

**09:00 - 10:45**

**Ted Sargent**

University Professor; Vice President, International, University of Toronto

**10:45 - 11:00**

**Coffee Break**

**11:00 - 12:00**

**Tour of the College of Chemistry + California Research Alliance by BASF**

at UC Berkeley

**12:00 - 14:00**

**Lunch**

Location TBD

**14:00 - 15:15**

**Ravi Prasher**

Director of Energy Storage and Distributed Resources Division at Lawrence Berkeley National Laboratory

**15:15 - 15:30**

**Coffee Break**

**15:30 - 17:00**

**Peidong Yang**

S.K. and Angela Chan Distinguished Professor of Energy, UC Berkeley

**18:00**

**Dinner**

Location TBD

# 13

## Wednesday

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Science and Technology as Solutions to Societal Challenges

Location: Stanley Hall 106

**09:00 - 10:45**

**Nicholas B. Dirks**

Professor of History and Anthropology; Chancellor, UC Berkeley, 2013-2017

**10:45 - 11:00**

**Coffee Break**

**11:00 - 12:15**

**Inez Fung**

Professor of Atmospheric Science, UC Berkeley

**12:15 - 14:00**

**Lunch**

Location TBD

**14:00 - 15:15**

**Horst Simon**

Deputy Director of Lawrence Berkeley National Laboratory

**15:15 - 15:30**

**Coffee Break**

**15:30 - 16:45**

**Max Auffhammer**

George Pardee Professor of International Sustainable Development, UC Berkeley

**18:00**

**Dinner**

Location TBD

# 14

## Thursday

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Bio-Engineering and the Re-Invention of Genetic Research

Location: Stanley Hall 106

**09:00 - 11:00**

**Tour of Advanced Light Source Synchrotron and Molecular Foundry**

at Lawrence Berkeley National Laboratory

**11:00 - 12:15**

**Jay D. Keasling**

The Hubbard Howe Jr. Distinguished Professor of Biochemical Engineering, UC Berkeley

**12:15 - 14:00**

**Lunch**

Location TBD

**14:00 - 15:15**

**Jennifer Doudna**

Li Ka Shing Chancellor's Professor in Biomedical and Health, UC Berkeley

**15:15 - 15:30**

**Coffee Break**

**15:30 - 17:00**

**Eva Nogales**

Professor of Biochemistry, Biophysics and Structural Biology, UC Berkeley

**17:00 - 18:00**

**Closing Ceremony**

Presented by Douglas S. Clark, Dean of the College of Chemistry, UC Berkeley



## Daniel M. Kammen

Class of '35 Distinguished Chair in Energy, UC Berkeley

**Monday, 09:15 - 10:30**

### 5 Notable Awards

- 2016 U.S. Science Envoy by the U.S. Department of State
- 2011 American Association for the Advancement of Science (AAAS) Fellow
- 2010 Clean Energy Fellow to the Americas (Named by Secretary of State Hillary R. Clinton)
- 2007 Distinguished Citizen Award, Commonwealth Club of California
- 2007 Nobel Peace Prize as a part of the Intergovernmental Panel on Climate Change

### Biography

Prof. Daniel Kammen has served as a contributing or coordinating lead author on various reports of the Intergovernmental Panel on Climate Change (IPCC) since 1999, the organization that shared the 2007 Nobel Peace Prize. During 2010-2011, Prof. Kammen served as the World Bank Group's Chief Technical Specialist for Renewable Energy and Energy Efficiency, in which he provided strategic leadership on policy, technical, and operational fronts. The aim is to enhance the operational impact of the World Bank's renewable energy and energy efficiency activities while expanding the institution's role as an enabler of global dialogue on moving energy development to a cleaner and more sustainable pathway.

Prof. Kammen was appointed the first Environment and Climate Partnership for the Americas (ECPA) Fellow by Secretary of State Hillary R. Clinton in April 2010. Kammen is the Founding Director of the Renewable and Appropriate Energy Laboratory (RAEL), Co-Director of the Berkeley Institute of the Environment, and Director of the Transportation Sustainability Research Center. He has founded, or is on the board of, over 10 companies, and has served the State of California and U.S. Federal Government in expert and advisory capacities.

Website: [kammen.berkeley.edu](http://kammen.berkeley.edu)

## Michael I. Jordan

Pehong Chen Distinguished Professor of Electrical Engineering and Computer Science, UC Berkeley

**Monday, 10:45 - 12:00**



### Biography

Prof. Michael I. Jordan is the Pehong Chen Distinguished Professor in the Department of Electrical Engineering and Computer Science and the Department of Statistics at the University of California, Berkeley.

His research interests bridge the computational, statistical, cognitive and biological sciences, and have focused in recent years on Bayesian nonparametric analysis, probabilistic graphical models, spectral methods, kernel machines, and applications to problems in distributed computing systems, natural language processing, signal processing, and statistical genetics. He is widely recognized as a world-renown expert in machine learning, statistics, and artificial intelligence. In 2016, *Science* magazine reported him as the world's most influential computer scientist. Prof. Jordan is a member of the National Academy of Sciences, a member of the National Academy of Engineering, and a member of the American Academy of Arts and Sciences. He is a Fellow of the American Association for the Advancement of Science. Prof. Jordan received his Ph.D. in cognitive science from the University of California, San Diego.

Website: [people.eecs.berkeley.edu/~jordan/](http://people.eecs.berkeley.edu/~jordan/)

### 5 Notable Awards

- 2016 International Joint Conference on Artificial Intelligence Award for Research Excellence
- 2015 David E. Rumelhart Prize
- 2010 Member, National Academy of Sciences and National Academy of Engineering
- 2009 Association for Computing Machinery and Association for the Advancement of Artificial Intelligence Allen Newell Award
- 2006 Institute of Electrical and Electronics Engineers Neural Pioneer Award



## Yi Ma

Professor-in-Residence of Electrical Engineering and Computer Sciences, UC Berkeley

**Monday, 14:00 - 15:15**

### 5 Notable Awards

- 2016 Top 50 of the World's Most Influential Authors in Computer Science, *Science Magazine*
- 2016 The World's Highly Cited Researchers ranked by Clarivate Analytics of Thomson Reuters
- 2015 National 1000 People Plan Distinguished Scholar of China
- 2014 Distinguished Speaker of the Year, China Computer Federation (CCF)
- 2014 Shanghai Academic Leaders Program Award

### Biography

Prof. Yi Ma's research interests include computer vision, compressive sensing, machine learning, and intelligent systems. Recent research topics include the relationships between low-dimensional models and deep networks, sparse representation and low-rank approximation for high-dimensional data, clustering and classification of high-dimensional data, and reconstruction of 3D structures from images. His work has found broad applications in areas such as segmentation of natural images, face recognition, aligning and rectifying images. He is the first author of the textbook *An Invitation to 3-D Vision*, published by Springer in 2003. His new book, *Generalized Principal Component Analysis*, was recently published by Springer in 2016. He is a Co-Founder of a light-field 3D acquisition startup company Plex-VR Digital Technology (Shanghai), established in early 2016. Aside from UC Berkeley, Ma also holds Adjunct Professorships at the University of Electronic Science and Technology of China, the University of Science and Technology of China, and the Shanghai Jiao Tong University in China.

[Website: yima.csl.illinois.edu/](http://yima.csl.illinois.edu/)

## Pieter Abbeel

Professor of Electrical Engineering and Computer Sciences, UC Berkeley

**Monday, 15:30 - 16:45**

### Biography

Prof. Pieter Abbeel joined the faculty at UC Berkeley in 2008, with an appointment in the Department of Electrical Engineering and Computer Sciences. He is the Director of the UC Berkeley Robot Learning Lab and is the Co-Founder, President, and Chief Scientist at Embodied Intelligence.

Prof. Abbeel has developed apprenticeship learning algorithms, which have enabled advanced helicopter aerobatics, including maneuvers such as tic-tocs, chaos and auto-rotation. His group enabled the first end-to-end completion of reliably picking up a crumpled laundry article and folding it, and has pioneered deep reinforcement learning for robotics, including learning locomotion and visuomotor skills. His work has been featured in many popular press outlets, including BBC, *New York Times*, *MIT Technology Review*, and *Wired*. His current research focuses on robotics and machine learning with particular focus on deep reinforcement learning, deep imitation learning, deep unsupervised learning, meta-learning, learning-to-learn, and AI safety.

He currently advises a number of companies including Dishcraft Robotics, Off World, Preferred Networks, TensorFlight, Traptic, onai, and inzone.ai

[Website: people.eecs.berkeley.edu/~pabbeel/](http://people.eecs.berkeley.edu/~pabbeel/)



### 5 Notable Awards

- 2018 Diane McEntyre Award for Excellence in Teaching
- 2018 International Joint Conference on Artificial Intelligence Fellow
- National Science Foundation Faculty Early Career Development Program Award
- 2011 *MIT Technology Review* Top 35 Innovators under 35 (TR35)
- Presidential Early Career Award for Scientists and Engineer



## Ted Sargent

University Professor;  
Vice President, International, University of  
Toronto

**Tuesday, 09:00 - 10:45**

### 5 Notable Awards

- 2017 Somorjai Visiting Miller Professorship at UC Berkeley
- 2014 Fellow, Canadian Academy of Engineering and Royal Society of Canada
- 2012 Steacie Prize for Innovative Research in Solar Cell Technology
- 2011 Institute of Electrical and Electronics Engineers (IEEE) Fellow
- 2009 American Association for the Advancement of Science Fellow

### Biography

Prof. Edward (Ted) Sargent's research deploy innovations in materials chemistry to address key challenges in sustainable energy. Prior to his work, the optoelectronics community built devices for light sensing and energy conversion principally using materials composed of perfect, pure semiconductors known as epitaxial crystals. Sargent devoted his attention to making practical devices using 'soft materials' – materials that could conveniently and cost-effectively be processed from the solution (liquid) phase. By tackling this challenge, Sargent set the stage to make path-breaking advances at the forefront of this new field. He has disseminated his advances in the top interdisciplinary scientific journals and has addressed a broad audience on the impact of modern nanotechnology through his widely translated book *The Dance of Molecules*. Professor Sargent was appointed Vice President, International of the University of Toronto in June, 2016. He is a distinguished researcher and holds the rank of University Professor as well as the Canada Research Chair in Nanotechnology. He is Founder and Chief Technology Officer of InVisage Technologies and a Co-Founder of Xagenic.

Website: [light.utoronto.ca/](http://light.utoronto.ca/)

## Ravi Prasher

Director of Energy Storage and Distributed  
Resources Division at Lawrence Berkeley  
National Laboratory

**Tuesday, 14:00 - 15:15**

### Biography

Prof. Ravi Prasher's primary research interests are fundamental and applied studies of nano-to-macroscale thermal energy process and systems, using both theoretical and experimental methods. Some topics of current interest include thermal transport in lithium ion batteries, microelectronics thermal management using microfluidics, solar thermal energy conversion, high density thermochemical storage, thermoelectrics, solar thermal desalination and heat and mass transfer in roll-to-roll manufacturing process. Prasher is the Director of Energy Storage and Distributed Resources Division (ESDR) at LBNL, which conducts research and development in energy conversion, storage, and distribution. Prior to joining LBNL, Ravi was the VP of Product Development of Sheetak Inc., a startup developing thermoelectric energy converters. Ravi was one of the first program directors at Advanced Research Projects Agency-Energy (ARPA-E) where he created two programs on cooling/heating of buildings and thermal storage for applications ranging from climate conditioning of electric vehicles and high temperature solar thermal power plants. Prior to joining ARAP-E, Ravi was the Technology Development Manager of thermal management group at Intel.

Website: [prasherlab.lbl.gov/](http://prasherlab.lbl.gov/)



### 5 Notable Awards

- 2009 Elected Fellow of American Society of Mechanical Engineers
- 2006 Outstanding Young Engineer of the Year Award, Components and Packaging Society, IEEE,
- IEEE Society Award for Very Significant Contribution to the CPMT Phoenix Chapter
- Intel Achievement Award (Highest Award for Technical Achievement in Intel)
- 2005 elected Senior Member of IEEE





## Peidong Yang

S.K. and Angela Chan Distinguished Professor of Energy, UC Berkeley

**Tuesday, 15:30 - 17:00**

### 5 Notable Awards

- 2016 Member of the National Academy of Sciences
- 2016 Nano Research Award
- 2015 World Outstanding Chinese Award
- 2015 U.S. Department of Energy E. O. Lawrence Award
- 2008 *Scientific American* 50 Award

### Biography

Prof. Peidong Yang's research is focused on the synthesis of new classes of materials and nanostructures, with an emphasis on developing new synthetic approaches and understanding the fundamental issues of structural assembly and growth that will enable the rational control of material composition, micro/nano-structure, property, and functionality. Yang has been ranked as the top materials scientist and among the top 10 chemists of the decade 2000-2010 by Thomson Reuters, in order of citation impact. As one of the leaders of the Joint Center for Artificial Photosynthesis, a DOE Energy Innovation Hub awarded in 2010, he coordinates efforts to develop materials that use sunlight to convert water to fuel. Aside from his research activities, Prof. Yang is a Founding Member of the Scientific Advisory Board at Nanosys, a nanomaterials company, and he is also the Founder of Alphabet Energy. Additionally, he serves as Director of the BASF California Research Alliance, a multidisciplinary research institute with an emphasis on new materials and their applications, biosciences, and related technologies.

Website: [nanowires.berkeley.edu/](http://nanowires.berkeley.edu/)

## Nicholas B. Dirks

Professor of History and Anthropology; Chancellor, UC Berkeley, 2013-2017

**Wednesday, 09:00 - 10:45**

### Biography

Prof. Nicholas B. Dirks was named the 10th Chancellor of the University of California, Berkeley in 2012, and served in that role between June 1, 2013 and July 1, 2017. An internationally renowned historian and anthropologist, he is a leader in higher education and well-known for his commitment to and advocacy for accessible, high-quality undergraduate education, to the globalization of the university, and to innovation and collaboration across the disciplines and between universities and outside partners. While Chancellor, Dirks launched an undergraduate initiative, which occasioned unprecedented cooperation among the Deans of the Undergraduate Colleges and the appointment of the first Vice Chancellor of Undergraduate Education. Dirks invested in major research collaborations in neuroscience and genomics, developed a close working relationship with UCSF, and helped negotiate UC Berkeley's participation in the \$600 million-dollar Chan Zuckerberg Biohub. Before coming to UC Berkeley, he was the Executive Vice President for the Arts and Sciences and Dean of the Faculty at Columbia University, where he improved and diversified the faculty, putting special emphasis on interdisciplinary and international initiatives.

Website: [nicholasbdirks.com](http://nicholasbdirks.com)



### 5 Notable Awards

- 2014 Honorary Ph.D., Tsinghua University
- 2014 American Association for the Advancement of Science Fellow
- 2005 Senior Fellow, Council on Foreign Relations
- 2002 Lionel Trilling Award for Best Book (*Castes of Mind*)
- 1989-1991 Guggenheim Fellow



## Inez Fung

Professor of Atmospheric Science, UC Berkeley

**Wednesday, 11:00 - 12:15**

### 5 Notable Awards

- Contributor to the 2007 Nobel Peace Prize awarded to the United Nations Environmental Programme Intergovernmental Panel for Climate Change
- 2007 National Center for Atmospheric Research Community Climate System Model Distinguished Achievement Award
- 2006 World Technology Network Award for the Environment
- 2005 *Scientific American* 50 Award
- 2001 Member, National Academy of Sciences

### Biography

Prof. Inez Fung's group studies the interactions between climate change and biogeochemical cycles and focuses on the processes that maintain and alter the composition of the atmosphere, and hence the climate. A question driving her research is how atmospheric CO<sub>2</sub> and climate will co-evolve, and what we can do about it. She continues to analyze atmospheric, land, and ocean observations pertinent to the carbon cycle, and to synthesize them in atmospheric transport models to infer how CO<sub>2</sub> sources and sinks have been changing. Her research also uses the coupled carbon-climate model to project how land and ocean carbon sinks will change with accelerating global warming and with human activities; an unsurprising finding is that the droughts have diminished, and will continue to diminish, the land uptake of CO<sub>2</sub>. To understand the life cycle of water itself and how plants both respond to and change the water in the soils, she has embarked on a new and exciting project – the HydroWatch Project – to monitor and model water in the atmosphere, trees, soils, rock fractures, and streams.

[Website: atmos.berkeley.edu/~inez/](http://atmos.berkeley.edu/~inez/)

## Horst Simon

Deputy Director of Lawrence Berkeley National Laboratory

**Wednesday, 14:00 - 15:15**

### Biography

Prof. Horst Simon is an internationally recognized expert in computer science and applied mathematics and the Deputy Director of Lawrence Berkeley National Laboratory (Berkeley Lab). Simon joined Berkeley Lab in early 1996 as Director of the newly formed National Energy Research Scientific Computing Center (NERSC) and was one of the key architects in establishing NERSC at its new location in Berkeley. Under his leadership, NERSC enabled important discoveries for research in fields ranging from global climate modeling to astrophysics. Simon was also the Founding Director of Berkeley Lab's Computational Research Division, which conducts applied research and development in computer science, computational science, and applied mathematics.

Simon's research interests are in the development of sparse matrix algorithms, algorithms for large-scale eigenvalue problems, and domain decomposition algorithms for unstructured domains for parallel processing. He was a member of the NASA team that developed the NAS Parallel Benchmarks, a widely used standard for evaluating the performance of massively parallel systems.

[Website: lbl.gov/Publications/Deputy-Director/bio.html](http://lbl.gov/Publications/Deputy-Director/bio.html)



### Notable Awards and Distinctions

- 2009 Gordon Bell Award
- 1988 Gordon Bell Award
- Co-Editor of the biannual TOP500 list that tracks the most powerful supercomputers worldwide
- Member of the NASA team that developed the NAS Parallel Benchmarks, a widely used standard for evaluating the performance of massively parallel systems



## Max Auffhammer

George Pardee Professor of International Sustainable Development, UC Berkeley

**Wednesday, 15:30 - 17:00**

### 5 Notable Awards

- 2011 - Present Research Associate, National Bureau of Economic Research
- 2009 Campus Distinguished Teaching Award
- 2007 Cozzarelli Prize, National Academies of Sciences
- 2007 Sarlo Distinguished Mentoring Award
- 2007 College of Natural Resources Outstanding Assistant Professor Award

### Biography

Prof. Max Auffhammer joined the faculty at UC Berkeley in 2003. He received his B.S. in environmental science from the University of Massachusetts at Amherst in 1996, a M.S. in environmental and resource economics at the same institution in 1998, and a Ph.D. in economics from UC San Diego in 2003. His research focuses on environmental and resource economics, energy economics, and applied econometrics. He is a Research Associate at the National Bureau of Economic Research in the Energy and Environmental Economics group, a Humboldt Foundation Fellow, and a lead author for the Intergovernmental Panel on Climate Change (IPCC).

Professor Auffhammer serves on the editorial board of the *Journal of Environmental Economics and Management*. His research has appeared in *The American Economic Review*, *The Review of Economics and Statistics*, *The Economic Journal*, the *Proceedings of the National Academies of Sciences*, the *Journal of Environmental Economics and Management*, *The Energy Journal*, and other academic journals.

Website: [auffhammer.com/](http://auffhammer.com/)

## Jay D. Keasling

The Hubbard Howe Jr. Distinguished Professor of Biochemical Engineering, UC Berkeley

**Thursday, 11:00 - 12:15**

### Biography

Prof. Jay Keasling is considered one of the foremost authorities in synthetic biology, especially in the field of metabolic engineering. Keasling's current research is focused on engineering chemistry inside microorganisms, an area known as metabolic engineering, for production of useful chemicals or for environmental cleanup. In much the same way that synthetic organic and industrial chemistry has allowed chemists and chemical engineers to produce from fossil fuel resources chemicals that we use every day, metabolic engineering can revolutionize the production of some of the same useful chemicals and more from renewable resources, like sugar and cellulosic biomass. For many years, work in metabolic engineering was limited by the lack of enzymes to perform the necessary chemistry and tools to manipulate and monitor the chemistry inside cells. Seeing a need for better genetic tools, Keasling began working on genetic tool development, an area now known as synthetic biology. Keasling's laboratory has developed or adopted many of the latest analytical tools to troubleshoot our genetic manipulations. Keasling's laboratory has applied metabolic chemistry to a number of real-world problems including the production of the antimalarial drug artemisinin and drop-in biofuels.

Website: [keaslinglab.lbl.gov/](http://keaslinglab.lbl.gov/)



### 5 Notable Awards

- 2014 National Academy of Inventors
- 2014 Innovator Award – Biosciences, *Economist Magazine*
- 2012 Heinz Award for Technology, the Economy and Employment, Heinz Family Foundation
- 2010 Presidential Green Chemistry Challenge Award, United States Environmental Protection Agency
- 2006 Scientist of the Year, *Discover Magazine*



## Jennifer Doudna

Li Ka Shing Chancellor's Professor in Biomedical and Health, UC Berkeley

**Thursday, 14:00 - 15:15**

### 5 Notable Awards

- 2017 Japan Prize
- 2016 Tang Prize
- 2016 Heineken Prize
- 2015 Gruber Prize in Genetics
- 2015 Breakthrough Prize in Life Sciences

### Biography

Prof. Jennifer Doudna is the world's leading figure in what is referred to as the "CRISPR revolution" for her fundamental work and leadership in developing CRISPR-mediated genome editing. In her seminal 2012 paper, *A programmable dual-RNA-guided DNA endonuclease in adaptive bacterial immunity*, Doudna was the first to propose that CRISPR/Cas9 could be used for programmable gene editing, which is considered as one of the most significant discoveries in the history of biology. Their work has since been further developed by many research groups for applications ranging from fundamental protein research to treatments for diseases including sickle cell anemia, cystic fibrosis, Huntington's disease, and HIV. Doudna holds several positions as Professor in the Department of Chemistry and Chemical Engineering and Department of Molecular and Cell Biology at UC Berkeley. She has been an investigator with the Howard Hughes Medical Institute since 1997. She also directs the Innovative Genomics Institute, a joint UC Berkeley-UC San Francisco center and holds Li Ka Shing Chancellor's Professorship in Biomedicine and Health and is the Chair of the Chancellor's Advisor Committee on Biology at UC Berkeley.

Website: [doudnalab.org/](http://doudnalab.org/)

## Eva Nogales

Professor of Biochemistry, Biophysics and Structural Biology, UC Berkeley

**Thursday, 15:30 - 17:00**

### Biography

Professor Eva Nogales's lab is dedicated to gaining mechanistic insight into two important areas of eukaryotic biology: central dogma machinery in the control of gene expression, and cytoskeleton interactions and dynamics in cell division. The unifying principle in her work is the study of macromolecular assemblies as whole units of molecular function by direct visualization of their architecture, functional states, and regulatory interactions. To gain a molecular understanding of their systems of interest, her lab uses state-of-the-art cryo-electron microscopy (cryo-EM) and image analysis, as well as biochemical and biophysical assays. Her work has uncovered aspects of cellular function that are relevant to the treatment of cancer and other diseases. During her post-doctoral work in the Ken Downing lab, she was the first to determine the atomic structure of tubulin by electron crystallography. Prof. Nogales is a Howard Hughes Medical Institute Investigator and also a Professor of Biochemistry, Biophysics, and Structural Biology as well as a Senior Faculty Scientist at Lawrence Berkeley National Laboratory.

Website: [cryoem.berkeley.edu/](http://cryoem.berkeley.edu/)



### 5 Notable Awards

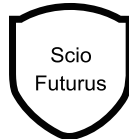
- 2016 Mildred Cohn Award in Biological Chemistry, American Society for Biochemistry and Molecular Biology
- 2015 Dorothy Crowfoot Hodgkin Award, the Protein Society
- 2015 Elected Member of U.S. National Academy of Sciences
- 2015 Distinguished Role Model in the Life Sciences, Northwestern University
- 2005 Chabot Science Award for Excellence

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