

Siemens Competition 2017 Regional Finals

California Institute of Technology Judges



Richard C. Flagan, Lead Judge

Richard Flagan received his B.S. in mechanical engineering from the University of Michigan, and his S.M. and Ph.D. from the Massachusetts Institute of Technology, also in mechanical engineering. He is the McCollum/Corcoran Professor of Chemical Engineering and Professor of Environmental Science and Engineering at the California Institute of Technology, where he also serves as Executive Officer for Chemical Engineering. Flagan has published over 300 scientific papers, a textbook:

“Fundamentals of Air Pollution Engineering,” and has 19 patents.

He has served as the President of the American Association for Aerosol Research and as Editor-in-Chief of its journal, “Aerosol Science and Technology.” He has received numerous awards for his aerosol research, including the David Sinclair Award of the American Association for Aerosol Research.



Victor Albert

Victor was born in St. Petersburg/Russia and moved to Palm Harbor/Florida at nine years old. He got a BS in physics/math from the [University of Florida](#), and has worked in Los Alamos/New Mexico and [Toronto/Canada](#). He received his Ph.D. in physics from [Yale University](#) in May 2017 and is a postdoc scholar in physics at Caltech. He has been interested in math & science since middle school and aims to stay in

academia for as long as possible. Scientific interests include theoretical quantum mechanics and its applications to physics, chemistry, and computing.



Mario Blanco

Mario Blanco's research career has been centered on the assembly and function of ribonucleoprotein (RNP) complexes. His undergraduate experience as a Biochemistry major at Florida State University involved solving high resolution structures of an RNA modifying RNP and utilizing ensemble fluorescence measurements to identify substrate recognition and positioning. For graduate work, he enrolled in the Cellular and Molecular Biology program at the University of Michigan. His thesis focused on understanding the role structural dynamics play within spliceosome assembly and catalysis. To accomplish this, he developed novel experimental and analytical tools to measure spliceosome structural dynamics using single molecule fluorescence microscopy techniques. Currently, he is a postdoctoral scholar in Mitch Guttman's lab at Caltech, investigating RNA-protein interactions on a recently identified gene product long noncoding RNAs (lncRNAs). RNA-protein interactions are mediated by a variety of factors, RNA sequence and structure being among the most important. The lab is leveraging the power of high throughput sequencing techniques to create comprehensive maps of structural and sequence binding specificities for lncRNA binding proteins.



Alex Cunha

Alexandre Cunha is Director of the Center for Advanced Methods in Biological Image Analysis at Caltech. He is a member of Caltech's Center for Integrative Study of Cell Regulation, where he works developing algorithms and tools for bioimaging processing and for computational plant simulation. He has a doctoral degree in computational science and engineering from Carnegie Mellon University, Pittsburgh, Pennsylvania, and has done postdoctoral work at the Center for Computational Biology at the University of California, Los Angeles. His research interests are in developing fast and effective algorithms for image processing, geometry extraction from images and computer simulations.



Julia Greer

Julia Greer is Professor of Materials Science and Mechanics. She received her BS from MIT in Chemical Engineering and her MS and Ph.D degrees in Materials Science and Engineering from Stanford. The key focus of the Greer group is on creating and studying advanced materials that utilize combination of 3-dimensional hierarchical architectures and nanoscale material size effects. Creation of extremely strong yet ultra-light materials can be achieved by capitalizing on the hierarchical design of 3-dimensional nano-architectures. Such structural meta-materials exhibit superior thermomechanical properties at extremely low mass densities (lighter than aerogels), making these solid foams ideal for many scientific and technological applications. The dominant deformation mechanisms in such “meta-materials”, where individual constituent size (nanometers to microns) is comparable to the characteristic microstructural length scale of the constituent solid, are essentially unknown. To harness the lucrative properties of 3-dimensional hierarchical nanostructures, it is critical to assess mechanical properties at each relevant scale while capturing the overall structural complexity.



Nick Hutzler

Nick Hutzler received his bachelor’s degree in mathematics at Caltech and his Ph.D. in physics at Harvard, working on the ACME electron EDM experiment. He is currently an Assistant Professor of Physics at Caltech, where he is starting an experimental laboratory that will develop techniques to control cold molecules for a variety of applications, in particular, searches for new particles and forces through precision measurement of atomic and molecular properties.



Richard Kueng

Born and raised in Austria, Richard Kueng received a BS in Interdisciplinary Sciences (Chemistry) and a MS in Physics from ETH Zurich (CH). He has worked at the Universities of Cambridge (UK), Freiburg (DE), Sydney (AU) and Cologne (DE), where he received his Dr.-rer.nat (Ph.D) degree in

December 2016. He is currently a Postdoctoral Scholar in Physics and Computer Science at Caltech and pursues an interdisciplinary line of research that addresses topics in signal processing, information theory and quantum mechanics with an emphasis on convex optimization.



Brittany Needham

Brittany Needham got her PhD in Microbiology from the University of Texas at Austin, where she worked to understand and engineer the bacterial surface structure, lipopolysaccharide (LPS) in the laboratory of M. Stephen Trent. LPS provides a barrier against the often-hostile environment encountered by a bacterial cell. The bioactive portion of LPS that anchors the molecule into

the cell surface is lipid A (endotoxin). In its natural, unmodified form, lipid A can over-stimulate the human immune system, leading to severe inflammation and toxic shock.

After graduating in 2014, she began as a post doc in Sarkis Mazmanian's lab. Here, she is studying the gut microbiota and how intestinal bacteria affect diverse host functions. Her main focus is to understand how gut bacteria are involved in the etiology and potential treatment of autism spectrum disorder.



Max Robb

Max was born and raised in Colorado and obtained his B.S. in Chemistry at the Colorado School of Mines where he began research in synthetic polymer chemistry under the guidance of Prof. Daniel M. Knauss. After graduating in 2009, Max carried out his Ph.D. studies in the laboratories of Prof. Craig J. Hawker at the University of California, Santa Barbara. His doctoral research focused broadly on the synthesis of functional organic materials and was recognized by the American Chemical Society with the 2016 Henkel Award for Outstanding Graduate Research in Polymer Chemistry. Max conducted his postdoctoral work with Prof. Jeffrey S. Moore at the University of Illinois, Urbana-Champaign as a Beckman Institute Postdoctoral Fellow prior to joining the Division of Chemistry and Chemical Engineering at Caltech in September 2017.



Zak Staniszewski

Zak Staniszewski is an instrument systems engineer at NASA Jet Propulsion Laboratory, and a former postdoctoral scholar at Caltech. He is currently working on new astrophysics satellite experiments at NASA to explore the early Universe and to test inflation and Big Bang scenarios. He came to Caltech as a Moore fellow in 2009 to work on the Keck Array with Jamie Bock and Andrew Lange in their observational cosmology group. He helped design and build two telescopes at the South Pole station in Antarctica and spent a full winter season running one of them. He specializes in telescope design and assembly, detector development and data analysis. He received his Ph.D. in physics from Case Western Reserve University, where he worked on the South Pole Telescope with Prof. John Ruhl. His Ph.D. resulted in the first ever discovery of galaxy clusters using a millimeter wave telescope.