MISSOURI SYMPOSIUM on
MOLECULAR BIOPHYSICS

STRUCTURAL ELECTRON MICROSCOPY
BOND LIFE SCIENCES CENTER
UNIVERSITY OF MISSOURI
APRIL 25-26TH, 2019
This is the third Missouri Symposium on Molecular Biophysics, all three of which have been at the University of Missouri. The goals of these symposia are to showcase important and emerging areas of biophysics and to provide opportunities for interaction among those interested in biophysics. Seed funding for this series was provided by Mizzou Advantage. Additional support has been provided by University of Missouri departments, Schools and Colleges, the Office of Research, as well as registration fees, and through generous vendor support.

The first symposium was held in March 2011 with the theme of single-molecule biophysics. This meeting brought together over 150 researchers from MU and nearby institutions to learn about this emerging area of biophysics from experts from across the country, including keynote speaker Stephen Block, a pioneer in the use of optical tweezers. The second symposium, in March 2013, focused on membrane biochemistry, and featured a keynote address from Douglas Rees, a major figure in determining atomic-resolution structures of membrane proteins. Both symposia were coordinated by Gerald Hazelbauer after being awarded the Mizzou Advantage seed funds.

The third Missouri Symposium on Molecular Biophysics, this time with the theme of “Structural Electron Microscopy”. The speakers will discuss diverse applications of electron microscopy to the determination of high-resolution structure, including viruses and proteins (cryoEM single particle analysis), small organic molecules (micro electron diffraction), and materials (aberration-corrected STEM on electronic materials). Our keynote speaker is Wah Chiu, from Stanford University, a world-renowned leader in the field of cryo-electron microscopy for viral and protein structure determination. Other speakers include Tamir Gonen, Todd Yeates, Phoebe Stewart, Lena Kourkoutis, Elizabeth Wright, Michael Stowell and Jeff Lengyel. In addition, a poster session will provide opportunities to learn about research by symposium attendees.

We look forward to expanding and further developing the University of Missouri System’s Excellence in Electron Microscopy, especially with an eye towards precision medicine. We appreciate your participation.
APRIL 25-26TH, 2019 • BOND LIFE SCIENCES CENTER
UNIVERSITY OF MISSOURI

MU Bond Life Sciences Center
1201 Rollins Street
Columbia, Missouri 65211-7310
Email: lifesciences@missouri.edu
Tel: 573-882-0093

Doors close:
Thursday: until 9:30pm
Friday: until 6pm

Internet:
Network: Tiger-Wifi Guest
Password: Respect&Responsibility

Speaker hotel: The Broadway, 1111 E. Broadway

Speaker Shuttle: Courtesy of Kevin Munoz

★ Post-symposium Reception:
Sager Braudis Art Gallery 1025 E Walnut St

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Wah Chiu received his BA in Physics (1969) and PhD in Biophysics (1975) from the University of California, Berkeley. He is a professor in the Department of Bioengineering, Department of Microbiology and Immunology and the SLAC National Accelerator Laboratory at Stanford University. He is a pioneer in methodology development for electron cryo-microscopy. His work has made multiple transformational contributions in developing single particle electron cryo-microscopy as a tool for the structural determination of molecular machines towards atomic resolution.

For three decades, Dr. Chiu directs a NIH funded 3DEM Resource Center. He has solved many cryo-EM structures including viruses, chaperonins, membrane proteins, ion channels, cytoskeleton protein complexes, protein-DNA complexes, DNA and RNA in collaboration with many scientists around the world. His 3DEM Resource Center continues to establish high standard testing and characterization protocols for cryoEM instrumentation and to develop new image processing and modeling algorithms for cryo-EM structure determination.

Dr. Chiu’s research, collaboration and training efforts have been recognized by his elected membership to the Academia Sinica, Taiwan (2008) and the United States National Academy of Sciences (2012) in addition to several honors including the Distinguished Science Award from the Microscopy Society of America (2014) and the Honorary Doctorate of Philosophy from the University of Helsinki, Finland (2014).
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April 26th, 2019: Symposium (all sessions in Monsanto Auditorium)

7:00-8:00am Pastries, coffee, tea & water (Monsanto Lobby)

8:00-8:15am Tommi A. White, Electron Microscopy Core & Biochemistry
   “Welcome and Introduction”

8:15-9:00am Tamir Gonen, Professor, UCLA
   “MicroED: conception, practice and future opportunities”

9:00-9:45am Phoebe Stewart, Professor, Case Western Reserve
   “CryoEM and CryoET Studies of Viral Nanoparticles”

9:45-10:15am BREAK (light refreshments in Monsanto Lobby)

10:30-11:15am Todd Yeates, Professor, UCLA
   “Designing protein assemblies for modular imaging of small proteins by Cryo-EM”

11:15-noon Jeffrey Lengyel, Principal Scientist ThermoFisher Scientific
   “The latest and greatest technological advances in CryoEM”

Noon-1:30pm LUNCH (McQuinn Atrium, Bond Life Sciences Center)

1:30-2:15pm Elizabeth Wright, Professor, Univ. of Wisconsin
   “Structural Studies of Virus Assembly by Cryo-Electron Tomography”

2:15-3:00pm Lena Kourkoutis, Assistant Professor, Cornell University
   “Cryo-Electron Microscopy at the Crossroads of Life and Physical Sciences”

3:00-3:30pm BREAK (light refreshments in Monsanto Lobby)

3:30-4:15pm Michael Stowell, Associate Professor, University of Colorado
   “Cryo-EM structure of OSCA1.2 from Oryza sativa: Mechanical basis of a putative hyperosmolality-gated channel.”

4:15-4:45pm Michael Chapman, MU Biochemistry Professor and Chair,
   Closing Remarks: “Missouri: looking into the future”

6:00-8:00pm Reception (Sponsored by ThermoFisher Scientific)
   Sager Braudis Art Gallery, 1025 East Walnut Street
**SPEAKER SUMMARY**

**Wah Chiu, Stanford University**  
**“CryoEM of Molecular Machines”**  
For over 3 decades Dr. Chiu has lead methodology development for electron cryo-microscopy. His work has made multiple transformational contributions in developing single particle electron cryo-microscopy as a tool for the structural determination of molecular machines towards atomic resolution. He currently oversees the National CryoEM Center at Stanford/SLAC.

**Tamir Gonen, UCLA**  
**“MicroED: conception, practice and future opportunities”**  
Dr. Gonen pioneered the field of “Micro Electron Diffraction” that is garnering much interest from numerous fields for quick high resolution structure determination of crystalline small molecules as well as crystalline proteins.

**Phoebe Stewart, Case Western Reserve**  
**“CryoEM and CryoET Studies of Viral Nanoparticles”**  
Dr. Stewart is using cryoEM to characterize targeted gene therapy and other nanoscale treatments including viruses, viral/host factor complexes, engineered adenovirus-based vaccines, DNA double-strand break repair complexes, and circadian clock protein complexes.

**Todd Yeates, UCLA**  
**“Designing protein assemblies for modular imaging of small proteins by cryo-EM”**  
Dr. Yeates has been able to determine the structure of a protein much smaller than 50 kDa which can be successfully visualized when attached to a large protein scaffold designed to hold 12 copies of the attached protein in symmetric and rigidly defined orientation.

**Jeffrey Lengyel, ThermoFisher Scientific**  
**“The latest and greatest technological advances in CryoEM”**  
Dr. Lengyel is Lead Principal Scientist for Thermofisher Scientific (formerly FEI Company) educating his customers on their microscopy tools and other related cutting-edge technologies.

**Elizabeth Wright, University of Wisconsin**  
**“Structural Studies of Virus Assembly by Cryo-Electron Tomography”**  
Dr. Wright has developed novel methods to perform correlative light and electron microscopy at cryogenic temperatures, preserving ultrastructural details to visualize events occurring during viral infection at the micro- and nanoscales, with light and electrons respectively.

**Lena Kourkoutis, Cornell University**  
**“Cryo-Electron Microscopy at the Crossroads of Life and Physical Sciences”**  
Dr. Kourkoutis develops and applies novel electron microscopy techniques to advance the fundamental understanding of materials and devices, extending the reach of aberration corrected STEM to cryogenic temperature, providing access to a broad range of electronic phases that emerge during cooling of quantum materials and also allows the study of processes that occur at liquid-solid interfaces.

**Michael Stowell, University of Colorado**  
**“Cryo-EM structure of OSCA1.2 from Oryza sativa: Mechanical basis of a putative hyperosmolality-gated channel”**  
Dr. Stowell studies how cells (neurons, plants) communicate, especially across membranes, using structural methods (X-ray crystallography, cryoEM and tomography) and their subsequent alteration upon disease onset.
Thank you to our sponsors for their generous support!