



Welcome to the

2018 Purdue Cryo-EM Symposium!

Nov. 6th - 8th

150 YEARS OF
GIANTLEAPS™

Welcome to the 2018 Purdue Cryo-EM Symposium!

The goal of this meeting is to gather cryo-EM enthusiasts from around the globe to discuss topics including sample preparation, data collection, image processing, and other aspects of cryo-EM.

We are hosting a range of speakers that will share their progress and recent developments within the cryo-EM community. Our keynote speaker this year is Dr. Richard Henderson from MRC Laboratory of Molecular Biology.



2018 Purdue Cryo-EM Symposium Speakers

Leifu Chang	Purdue
Yifan Cheng	UCSF
Wah Chiu	Stanford
Tamir Gonen	UCLA
Yuan He	NWU
Richard Henderson	MRC-LMB
Grant Jensen	Caltech
Hong Jin	UIUC
Werner Kuhlbrandt	MPI
Jun Liu	Yale
Steven J Ludtke	BCM
Alfonso Mondragon	NWU
Daniela Nicastro	UTSW
Abbas Ourmazd	UWM
Eduardo Perozo	U Chicago
Vinothkumar Ragunath	NCBS
Michael Rossmann	Purdue
John Rubinstein	U Toronto
Phoebe Stewart	Case Western
Peijun Zhang	Oxford
Minglei Zhao	U Chicago
Z. Hong Zhou	UCLA

Selected Short Talks

Jennifer Cash	U Michigan
Gail Hardy	IU
Jiansen Jiang	NIH
Chuan Xiao	UTEP
Rui Yan	Purdue
Guimei Yu	Purdue

2018 Purdue Cryo-EM Symposium Organizers

Co-chairs

Leifu Chang (Assistant Professor, Department of Biological Sciences)

Wen Jiang (Professor, Department of Biological Sciences)

Committee members

William Cramer (Henry Koeffler Distinguished Professor, Department of Biological Sciences)

Richard Kuhn (The Trent and Judith Anderson Distinguished Professor in Science, Department of Biological Sciences and the Krenicki Family Director, Purdue Institute of Inflammation, Immunology and Infectious Disease)

Angeline Lyon (Assistant Professor, Department of Chemistry and Department of Biological Sciences)

Nicholas Noinaj (Assistant Professor, Department of Biological Sciences)

Michael Rossmann (Hanley Distinguished Professor of Biological Sciences, Department of Biological Sciences)

Cynthia Stauffacher (Professor and Associate Head, Department of Biological Sciences)

John Tesmer (Walther Professor Cancer of Structural Biology, Department of Biological Sciences)

Supporting Staff

Rebecca Fulk (Research Administrative Coordinator, Purdue Institute of Inflammation, Immunology and Infectious Disease)

Clinton Gabel (Graduate Student, Department of Biological Sciences)

Brenda Gonzalez (Web Designer, Graduate Student, Department of Biological Sciences)

Rebecca Harding (Secretary, Department of Biological Sciences)

Melanie Lindsay (Research Administrative Coordinator, Purdue Institute of Inflammation, Immunology and Infectious Disease)

2018 Purdue Cryo-EM Symposium

Schedule of Events

Day 1 - Tuesday, November 6th

4:00pm – 6:00pm

Registration and reception

6:00pm – 7:15pm

Dinner

7:15pm – 7:20pm

Welcome and Opening Remarks

Richard Kuhn | Purdue

7:20pm – 9:00pm

Scientific Session 1

Chair: Richard Kuhn

7:20pm – 8:00pm

Michael Rossmann | Purdue

The Structure of Zika Virus

8:00pm – 8:30pm

Wah Chiu | Stanford

Cryo-EM of Chaperonins

8:30pm – 9:00pm

Werner Kühlbrandt | Max Planck

Cryo-EM of Energy-Converting Membrane Protein Complexes



2018 Purdue Cryo-EM Symposium

Schedule of Events

Day 2 - Wednesday, November 7th

7:30am – 8:30am

Breakfast

8:30am – 8:40am

Welcome statement

Suresh Garimella | Purdue

8:40am – 10:10am

Scientific Session 2: Virus Structures

Chair: John Tesmer

8:40am – 9:05am

Jun Liu | Yale

High-Throughput Cryo-Electron Tomography: Visualizing Transient
Channel during Viral Infection

9:05am – 9:30am

Phoebe Stewart | Case Western

Cryo-EM and Cryo-ET Studies of Viral Nanoparticles

9:30am – 9:55am

Hong Zhou | UCLA

Visualizing RNA Genome Transcription in Action

9:55am – 10:10am

Chuan Xiao | UTEP

Giant Marine Virus Sample Preparation and Data Collection for
Cryo-EM

2018 Purdue Cryo-EM Symposium

Schedule of Events

Day 2 - Wednesday, November 7th

10:10am – 10:30am

Coffee break

10:30am – 12:00pm

Scientific Session 3: Membrane Protein Structures

Chair: William Cramer

10:30am – 10:55am

Yifan Cheng | UCSF

Single Particle Cryo-EM of TRP Channels

10:55am – 11:20am

Eduardo Perozo | U Chicago

Structural Basis of Voltage-Dependent Gating in Ion Channels and Enzymes

11:20am – 11:45am

John Rubinstein | U Toronto

Structural Studies of Rotary ATPases

11:45am – 12:00pm

Jiansen Jiang | NIH

Pushing Size Limit of Small Membrane Proteins using an Entry-Level Electron Microscope

12:00 – 1:30pm

Lunch

2018 Purdue Cryo-EM Symposium

Schedule of Events

Day 2 - Wednesday, November 7th

1:30pm – 4:00pm

Free time

4:00pm – 5:00pm

Poster session

5:00pm – 6:30pm

Scientific Session 4: Method Developments

Chair: Nicholas Noinaj

5:00pm – 5:25pm

Tamir Gonen | UCLA

MicroED: Conception, Practice and Future Opportunities

5:25pm – 5:50pm

Steve Ludtke | Baylor

Bispectral Invariants and Deep Learning in Cryo-EM and Cryo-ET

5:50pm – 6:15pm

Abbas Ourmazd | U. Wisconsin Milwaukee

"Structure" in Structural Biology

6:15pm – 6:30pm

Rui Yan | Purdue

Applications of S2 Power Spectra in Cryo-EM Images

6:30pm – 8:00pm

Dinner

**Check out our
campus tours
during free time!
Tour guides will be
departing from
Shively at 1:45pm.**

2018 Purdue Cryo-EM Symposium

Schedule of Events

Day 3 - Thursday, November 8th

7:30am – 8:30am

Breakfast

8:30am – 10:00am

Scientific Session 5: Cryo-Electron Tomography

Chair: Wen Jiang

8:30am – 8:55am

Grant Jensen | Caltech

The Future of Structural Biology: Lots of Electron
Cryotomography!

8:55am – 9:20am

Daniela Nicastro | UT Southwestern

Probing the Molecular Organization of Cells and Organelles using
Cryo-Electron Microscopy

9:20am – 9:45am

Peijun Zhang | Oxford

Tales of Two Assemblies

9:45am – 10:00am

Gail Hardy | IU

Identification of the *Caulobacter crescentus* Holdfast Anchor
Complex using Electron Cryotomography

10:00 – 10:30am

Coffee break

2018 Purdue Cryo-EM Symposium

Schedule of Events

Day 3 - Thursday, November 8th

10:30am – 12:00pm

Scientific Session 6: Structure of Protein Complexes - I

Chair: Cynthia Stauffacher

10:30am – 10:55am

Leifu Chang | Purdue

Structural Basis for the DOCK2-ELMO Complex in RAC Activation

10:55am – 11:20am

Hong Jin | UIUC

Structural Basis of Translation Termination

11:20am – 11:45am

Alfonso Mondragon | Northwestern

Novel DNA/Gyrase Intermediates Observed by Cryo-EM

11:45am – 12:00pm

Guimei Yu | Purdue

Cryo-EM Study of an Oncogenic Tyrosine Phosphatase

12:00pm – 1:30pm

Lunch

1:30pm – 2:30pm

Keynote lecture

Chair: Leifu Chang

Richard Henderson | MRC-LMB

**Single Particle Electron Cryomicroscopy: Theory, Practice, and
Prospects**

2018 Purdue Cryo-EM Symposium

Schedule of Events

Day 3 - Thursday, November 8th

2:30pm – 4:00pm

Scientific Session 7: Structure of Protein Complexes - II

Chair: Angeline Lyon

2:30pm – 2:55pm

Yuan He | Northwestern

**Cryo-EM Visualization of Eukaryotic Transcription Initiation
Machineries**

2:55pm – 3:20pm

Vinothkumar Kutti Ragunath | NCBS - India

A Novel Metal-Bound Active Site in a Hydrolytic Enzyme

3:20pm – 3:45pm

Minglei Zhao | U Chicago

**Structural Studies of Type-II AAA+ ATPases using Single-
Particle Cryo-EM**

3:45pm – 4:00pm

Jennifer Cash | U Michigan

**Regulation of P-Rex1 by Beta Gamma Subunits, Captured
through Single-Particle Cryo-EM**



2018 Purdue Cryo-EM Symposium Posters

1 | **Nestor Zaluzec** Soft Matter and Biosystems Microanalysis by Analytical Electron Microscopy

2 | **Ziao Fu** The Structural Basis for Release Factor Activation during Translation Termination

3 | **Austin Dixon** Generating Properly Folded Neurotensin Receptor-1 Through Cell-Free Protein Synthesis

4 | **Edoardo Dimprima** The Deadly Touch: Protein Denaturation at the Air-Water Interface and How to Prevent It

5 | **Ellen Zhong** Testing the Limits of Modern Heterogeneous Reconstruction Algorithms: the Autophagy Initiation Complex

6 | **Herve Celia** Structural Investigation of the Ton Membrane Protein Complex, a Bacterial Molecular Motor

7 | **Audray Harris** Probing the Organization and Conformation of Influenza Virus Hemagglutinin by Cryo-Electron Microscopy with Insights for Universal Influenza Vaccine Development

8 | **Qianglin Fang** First Near-Atomic Structure of a Giant Virus

9 | **Elisabeth Garland-Kuntz** Structural Insights into Phospholipase-C Activity: Direct Observation of Conformational Dynamics

10 | **S. Saif Hasan** Structural Insights into the Entry and Antibody Neutralization of Eastern Equine Encephalitis Virus



2018 Purdue Cryo-EM Symposium Posters

- 11 | **Thomas Klose** Structural Studies of Tupanvirus
- 12 | **Madhumati Sevvana** Cryo-EM Structures of the Mature Zika Virus and its Complex with a Potent Virus-Specific Antibody
- 13 | **Chen Sun** Sub-3 Å Apoferritin Structures Determined With Single Position Of Volta Phase Plate and the Full Range of Phase Shift
- 14 | **Matthew Therkelsen** Flaviviruses have Imperfect Icosahedral Symmetry
- 15 | **Frank Vago** The 2.6 Å Cryo-EM Structure of GII.4 Norovirus VA387 in Complex with its Cellular Attachment Factor
- 16 | **Ravi Yadav** Structural Insight into NmLbpB's Interaction with Human Lactoferrin
- 17 | **Genki Terashi** De Novo Main-Chain Modeling for EM Maps using MAINMAST
- 18 | **Philip Baldwin** A Quality Assessment of the Sampling of Projection Views in Cryo-EM based on the Estimate of Effect on (Global) SSNR
- 19 | **Ignacio Mir Sanchis** Cryo-EM Approach to Study Staphylococcal Mobile Genetic Elements' Replication: Helicase Loading and Translocation
- 20 | **Wei-Jen Tang** Ensemble Cryo-EM Elucidates the Mechanism of Insulin Capture and Degradation by Human Insulin Degrading Enzyme
- 21 | **Fuxing Zeng** Translation Termination on mRNAs Lacking a Stop Codon
- 22 | **Pierce O'Neil** Structure of Tetanus Neurotoxin and Nanodisc Complexes

2018 Purdue Cryo-EM Symposium Posters

23 | **Kelly Manthei** Examination of the LCAT-HDL Complex

24 | **Min Su** goCTF: Geometrically Optimized CTF Determination for Single-Particle Cryo-EM

25 | **Agnieszka Ruszkowska** Structural Insights into the RNA Methyltransferase Domain of METTL16

26 | **Yan Zhang** CCT Conformational Space Elucidated by Elastic Network Model Analysis of Cryo-EM Data

27 | **Gavin Rice** Structural Characterization of Venom Peptide – Ion Channel Complexes: How the Resolution Revolution Can Improve Drug Discovery

28 | **Bianka Holguin** Mutations in Small Heat-Shock Protein 27 Affect Phosphorylation Regulated Chaperone Activity

29 | **Lauren Jackson** Architecture of Mammalian Retromer by Single Particle Cryo-EM

30 | **Michael Sheedlo** Cryo-EM Analysis of the TcdB-Frizzled-2 Interaction

31 | **Heather Kroh** *Clostridium difficile* Toxin TcdB Bound to Bezlotoxumab F(ab')₂ Reveals a Distinct Conformation that May Influence Toxin Neutralization

32 | **Andrei Fokine** Tomogram Averaging using a Locked Self-Rotation Function

33 | **Perla A. Pena Palomino** Role of C1QL3 as a Synaptic Organizer in Specific Subsets of Neurons in Brain: Structural Studies of C1QL-Mediated Complexes

34 | **Brenda Gonzalez** Virtual Reality Training Tools for Cryo-EM

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2018 Purdue Cryo-EM Symposium Shuttle Schedule

Shuttles operate on a continuous loop and are subject to
changes based on traffic and weather

Day 1 - Tuesday, November 6th

<i>Times</i>	<i>Pickups/Drop offs</i>
3:45pm – 5:00pm	Stadium • PGG • Lilly • Hotel
9:00pm – 10:00pm	Stadium • PGG • Lilly • Hotel

Day 2 - Wednesday, November 7th

<i>Times</i>	<i>Pickups/Drop offs</i>
7:15am – 8:30am	Stadium • PGG • Lilly • Hotel
1:30pm – 4:00pm	Stadium • Mackey • Team Store • PGG • Lilly • Hotel • HOCK
8:00pm – 9:00pm	Stadium • PGG • Lilly • Hotel

Day 3 - Thursday, November 8th

<i>Times</i>	<i>Pickups/Drop offs</i>
7:15am – 8:30am	Stadium • PGG • Lilly • Hotel
4:00pm – 5:00pm	Stadium • PGG • Lilly • Hotel

Key

Stadium – Ross Ade Stadium

PGG – Purdue Grant Street Garage

Lilly – Lilly Hall of Life Sciences

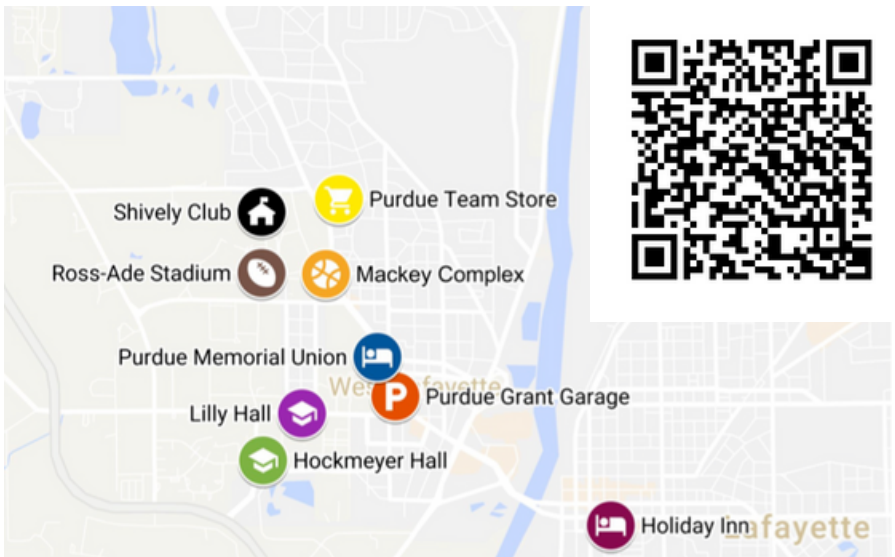
HOCK – Hockmeyer Hall of Structural Biology

Hotel – Holiday Inn City Center Downtown Lafayette

Team Store – Official Purdue Team Store

Mackey – Purdue Mackey Arena Northwestern Entrance

Map



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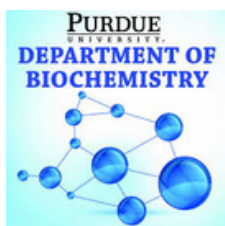
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