

Program

All talks will be presented in the **Mountain Lake Room**. All poster sessions will be held next door in the **Bay Room**. All meals will be served in the **Granhall**.

WEDNESDAY, MARCH 10

4:00 – 6:00 pm Meeting registration and check-in (Pre-Function Area, Mountain Lake Room)

Poster Session I and Reception

4:30 – 6:00 pm Posters 64-100 (Bay Room)
Sponsored by FEI Life Sciences

6:00 – 7:15 pm **DINNER** (Granhall)

Session I: Hybrid Approaches to Macromolecular Filaments

7:15 - 7:25 pm Welcome, **Wesley I. Sundquist**, Meeting Chair

7:25 - 7:30 pm Introduction, **Ronald A. Milligan**, Session Chair
Professor of Cell Biology, The Scripps Research Institute, La Jolla, USA

7:30 – 8:10 pm **Thomas D. Pollard**, Keynote Speaker
Combining structure at all levels with kinetics to understand actin-based motility and cytokinesis
Sterling Professor and Chair of Molecular, Cellular and Developmental Biology, Yale University, New Haven, USA

8:10 - 8:40 pm **Edward H. Egelman**, Platform Speaker
Polymorphism and heterogeneity in protein polymers: Implications for evolutionary divergence
Professor of Biochemistry and Molecular Genetics, University of Virginia, Charlottesville, USA

8:40 - 8:55 pm **Thomas Marlovits**, Abstract-Selected Speaker
Topology and organization of the Salmonella typhimurium type III secretion needle complex components
Principal Investigator, Research Institute of Molecular Pathology (IMP) and Institute of Molecular Biotechnology, Austrian Academy of Sciences (IMBA), Vienna, Austria

8:55 – 9:10 pm **Owen Pornillos**, Abstract-Selected Speaker
Structural analysis of the mature HIV capsid
Assistant Professor, Department of Molecular Physiology and Biological Physics, University of Virginia, Charlottesville, USA, and Scientific Associate, Department of Cell Biology, The Scripps Research Institute, La Jolla, USA

9:10 – 9:25 pm **Peijun Zhang**, Abstract-Selected Speaker
Cryo-EM structure of HIV-1 capsid assembly reveals novel intersubunit interfaces critical for HIV-1 capsid function
Assistant Professor, Department of Structural Biology, University of Pittsburgh School of Medicine, Pittsburgh, USA

9:25 - 10:25 pm Cash bar

THURSDAY, MARCH 11

7:30 - 8:30 am **BREAKFAST** (Granhall)**Session II: Hybrid Approaches to Membrane Complexes**

- 8:30 - 8:35 am Introduction, **William Weis**, Session Chair
Professor of Structural Biology, Stanford University, Palo Alto, USA
- 8:35 - 9:05 am **William Weis**, Platform Speaker
Structural insights into G protein coupled receptor activation
Professor of Structural Biology and of Molecular & Cellular Physiology, Stanford University, School of Medicine, Palo Alto, USA
- 9:05 - 9:35 am **Timothy A. Springer**, Platform Speaker
Toward the structure of the epidermal growth factor receptor on intact cells
Latham Family Professor of Pathology, Immune Disease Institute, Harvard Medical School, Boston, USA
- 9:35 - 10:05 am **Félix Rey**, Platform Speaker
The high resolution X-ray structures of the precursor p62/E1 and mature E3/E2/E1 complexes of chikungunya virus, combined with available cryo-EM reconstructions of alphavirus particles, provide detailed insight into virion architecture and priming for fusogenicity.
Director of Virology, Institute Pasteur, Paris, France.
- 10:05 - 10:35 am **BREAK** (coffee and tea provided)
- 10:35 - 11:05 am **Lukas K. Tamm**, Platform Speaker
New insight into SNARE complex folding and fusion pore formation by NMR and millisecond single vesicle fusion kinetics
Harrison Professor of Molecular Physiology and Biological Physics, University of Virginia, Charlottesville, USA
- 11:05 - 11:35 am **Harvey T. McMahon**, Platform Speaker
Membrane bending and remodeling
Neurobiology Group Leader, MRC Laboratory of Molecular Biology, Cambridge, UK
- 11:35 - 12:05 pm **Winfried Weissenhorn**, Platform Speaker
Structural insight into enveloped virus budding
Professor, Unit for Virus Host Cell Interactions, UMI 3265 University Joseph Fourier-EMBL-CNRS, Grenoble, France.
- 12:05 pm **LUNCH** (Granhall)
- 12:30 pm **Ski bus departure** (Homewood Mountain Resort)

Special Methods Workshop: Molecular Machines

- 4:30 - 4:35 pm Introduction, **Michael S. Chapman**, Session Chair
Professor, Department of Biochemistry & Molecular Biology, School of Medicine, Oregon Health & Science University, Portland, USA
- 4:35 - 4:50 pm **Lu Gan**, Abstract-Selected Speaker
The smallest eukaryote has a reduced mitotic spindle
Postdoctoral Associate, Division of Biology and Howard Hughes Medical Institute, California Institute of Technology, Pasadena, USA

THURSDAY, MARCH 11 (CONTINUED)

- 4:50 – 5:05 pm **Katja Lammens**, Abstract-Selected Speaker
Structural investigation of the bacterial MRE11-RAD50 complex by X-ray crystallography and SAXS
Postdoctoral Associate, Center for Integrated Protein Science Munich (CIPSM) and Munich Center for Advanced Photonics at the Gene Center, and Department of Chemistry and Biochemistry, Ludwig-Maximilians-University, Munich, Germany
- 5:05 - 5:20 pm **Ye Xiang**, Abstract-Selected Speaker
Crystallographic insights into the autocatalytic assembly mechanism of a bacteriophage tail spike
Postdoctoral Associate, Department of Biological Sciences, Purdue University, West Lafayette, USA
- 5:20 - 5:35 pm **Xiangan Liu**, Abstract-Selected Speaker
Structural study of cyanophage P-SSP7 using cryo-EM and cryo-ET
Postdoctoral Associate, National Center for Macromolecular Imaging, Baylor College of Medicine, Houston, USA
- 5:35 - 5:50 pm **Francis T. F. Tsai**, Abstract-Selected Speaker
Structure of a prion-remodeling machine
Associate Professor, Departments of Biochemistry and Molecular Biology, and Molecular and Cellular Biology, Baylor College of Medicine, Houston, USA
- 5:50 – 6:05 pm **Enrico Malito**, Abstract-Selected Speaker
Insights into the supermolecular structure of the native pili of Streptococcus pneumoniae
Research Scientist, Genomics Institute of the Novartis Research Foundation, San Diego, USA, and Novartis Vaccines, Siena, Italy
- 6:00 – 7:30 pm **DINNER** (Granhall)

Session III: Hybrid Approaches to Dynamic Assemblies

- 7:30 - 7:35 pm Introduction, **Félix Rey**, Session Chair
Director of Virology, Institute Pasteur, Paris, France.
- 7:35 - 8:15 pm **Stephen C. Harrison**, Keynote Speaker
Hybridizing electron microscopy and single-molecule imaging
Giovanni Armenise-Harvard Professor in Basic Biomedical Sciences, Harvard Medical School, and Howard Hughes Medical Institute Investigator, Boston, USA
- 8:15 - 8:45 pm **James Berger**, Platform Speaker
Catching a motor in the act: the molecular basis for translocation and biased movement in hexameric helicases
Professor of Biochemistry and Molecular Biology, Department of Molecular & Cell Biology, University of California, Berkeley, USA
- 8:45 – 9:00 pm **Paul S. Freemont**, Abstract-Selected Speaker
Structural insights of the P97 AAA ATPase chaperone and its adaptor complexes using cryo-EM approaches
Professor, Centre for Structural Biology, Division of Molecular Biosciences, Imperial College London, South Kensington Campus, London, UK
- 9:00 - 9:30 pm **Hassane S. Mchaourab**, Platform Speaker
EPR-based hybrid methods for protein structure and dynamics
Professor of Molecular Physiology and Biophysics, Vanderbilt Medical Center, Nashville, USA

THURSDAY, MARCH 11 (CONTINUED)

9:30 - 9:45 pm **BREAK** (coffee and tea provided)

9:45 - 10:15 pm **Michael P. Sheetz**, Platform Speaker
Hybrid approaches for studying the transduction of matrix forces into critical signals
William R. Kenan, Jr. Professor of Cell Biology and Chair of Biological Sciences, Columbia University, New York, USA

10:15 - 10:30 pm **Yao Cong**, Abstract-selected Speaker
4.0 Å resolution cryo-EM structure of the mammalian chaperonin TRiC/CCT reveals its unique subunit arrangement
Postdoctoral Associate, National Center for Macromolecular Imaging, Baylor College of Medicine, Houston, USA

10:30 - 11:30 pm Cash bar

FRIDAY, MARCH 12

7:30 - 8:30 am **BREAKFAST** (Granhall)**Session IV: Computational Approaches to Hybrid Analysis**

- 8:30 - 8:35 am Introduction, **Michael G. Rossmann**, Session Chair
Hanley Distinguished Professor of Biological Science, Purdue University, West Lafayette, USA
- 8:35 - 9:05 am **James H. Prestegard**, Platform Speaker
Larger proteins and protein complexes with sparse NMR/MS data and computational prediction
Professor of Chemistry & Biochemistry, Complex Carbohydrate Research Center, University of Georgia, Athens, USA
- 9:05 - 9:35 am **Jianwei (John) Miao**, Platform Speaker
X-ray diffraction microscopy and its application in structural biology
Professor of Physics and Astronomy, University of California, Los Angeles, USA
- 9:35 - 10:05 am **Andrej Sali**, Platform Speaker
Computational integration of diverse structural and kinetic data for visualizing macromolecular assemblies and processes
Professor and Vice Chair of Biopharmaceutical Sciences, Department of Bioengineering and Therapeutic Sciences, University of California, San Francisco, USA
- 10:05 - 10:20 am **Gregory A. Voth**, Abstract-Selected Speaker
Systematic multiscale simulation of biomolecular assemblies
Distinguished Professor of Chemistry and Director, Center for Biophysical Modeling and Simulation, University of Utah, Salt Lake City, USA
- 10:20 - 11:05 am **BREAK** (coffee and tea provided) and **Group Photo**
- 11:05 - 11:35 am **Niels Volkman**, Platform Speaker
The best of all worlds: Reliable atomic models of large assemblies by multiscale combination of structural information
Associate Professor of Bioinformatics and Systems Biology, Burnham Institute for Medical Research, La Jolla, USA
- 11:35 - 12:05 pm **Phoebe L. Stewart**, Platform Speaker
Development of hybrid methods utilizing cryo-EM and de novo protein structure prediction methods
Professor of Molecular Physiology and Biophysics, Vanderbilt University Medical Center, Nashville, USA
- 12:05 pm **LUNCH** (Granhall)
- 12:30 pm **Ski bus departure** (Squaw Valley Resort – SIGN UP REQUIRED)

Poster Session II

- 4:30 – 6:00 pm Posters 101-137 (Bay Room) Refreshments served
Sponsored by Emerald BioStructures
- 5:15 – 5:30 pm **Marc Storms**, FEI Life Sciences Presentation (Mountain Lake Room)
Towards hybrid approaches: Latest developments in ambient and cryo electron microscopy

- 5:30 – 5:45 pm **Cory Gerdtz**, Emerald BioStructures Presentation (Mountain Lake Room)
Nanovolume optimization of protein crystal growth using the microcapillary protein crystallization system
- 6:00 – 7:30 pm **DINNER** (Granhall)

FRIDAY, MARCH 12 (CONTINUED)

Session V: Hybrid Approaches to Global Analyses

- 7:30 - 7:35 pm Introduction, **Mark Yeager**, Session Chair
Andrew P. Somlyo Professor and Chair of Molecular Physiology and Biological Physics,
University of Virginia, Charlottesville, USA
- 7:35 - 8:05 pm **Wolfgang Baumeister**, Platform Speaker
Structures of the 26S proteasome and tripeptidylpeptidase II revealed by hybrid approaches
Director, Max-Planck-Institute of Biochemistry, Department of Structural Biology, Martinsried,
Germany
- 8:05 - 8:35 pm **Cheryl Arrowsmith**, Platform Speaker
The structural genomics consortium: Structural and chemical biology of human proteins of medical importance
Senior Scientist, Ontario Cancer Institute and Department of Medical Biophysics, University of
Toronto, Toronto, Canada
- 8:35 - 9:05 pm **Jonathan Weissman**, Platform Speaker
Biology without bias: new tools for interrogating biological systems
Professor of Cellular and Molecular Pharmacology and Howard Hughes Medical Institute
Investigator, University of California San Francisco, San Francisco, USA
- 9:05 - 9:15 pm **BREAK** (coffee and tea provided)
- 9:15 – 9:45 pm **Carol Robinson**, Platform Speaker
When Proteomics Meets Structural Biology
Royal Society Professor of Chemistry, Oxford University, Oxford, UK
- 9:45 – 10:00 pm **Thomas U. Schwartz**, Abstract-Selected Speaker
Toward the atomic structure of the nuclear pore complex by combining crystallographic and mass-spectrometric data
Associate Professor, Department of Biology, Massachusetts Institute of Technology, Cambridge,
USA
- 10:00 - 10:15 pm **Ralf Ficner**, Abstract-Selected Speaker
Structure and dynamics of nuclear transport complexes
Professor, Department of Molecular Structural Biology, University of Göttingen, Göttingen,
Germany
- 10:15 - 11:15 pm Cash bar

SATURDAY, MARCH 13

7:30 - 8:30 am **BREAKFAST** (Granhall)**Session VI: Hybrid Approaches to Cell Biology**

8:30 - 8:35 am Introduction, **Jenny Hinshaw**, Session Chair
Principle Investigator, NIDDK, National Institutes of Health, Laboratory of Cell Biochemistry and Biology, Bethesda, USA

8:35 - 9:05 am **David A. Agard**, Platform Speaker
Conformational dynamics, structure & functional interactions of hsp90 Chaperones
Professor of Biochemistry and Biophysics and Howard Hughes Medical Institute Investigator, University of California at San Francisco, San Francisco, USA

9:05 - 9:35 am **Dorit Hanein**, Platform Speaker
Seeing the structural organization of the actin cytoskeleton at the lamella, in situ cryo-electron tomography
Associate Professor of Infectious Diseases, Burnham Institute for Medical Research, La Jolla, USA

9:35 - 10:05 am **Carolyn Larabell**, Platform Speaker
Putting molecules in context with soft X-ray tomography
Director, National Center for X-ray Microscopy and Physical Biosciences Division, Lawrence Berkeley National Laboratory, Berkeley, USA and Professor of Anatomy, University of California, San Francisco, USA

10:05 - 10:35 am **David Wemmer**, Platform Speaker
Protein mechanics of sigma54 transcriptional activator
Professor of Chemistry, University of California, Berkeley, USA

10:35 - 11:05 am **BREAK** (coffee and tea provided)

11:05 - 11:35 am **Jack Johnson**, Platform Speaker
Time resolved studies of virus maturation: a hybrid methods approach
Professor of Molecular Biology, The Scripps Research Institute, La Jolla, USA

11:35 - 11:50 am **John A. Tainer**, Abstract-Selected Speaker
Combined SAXS and crystallography defines dynamic ATPase machines and their disease-causing mutations
Professor, Lawrence Berkeley National Lab, Skaggs Institute for Chemical Biology, and The Scripps Research Institute, Department of Molecular Biology, La Jolla, CA

11:50 - 12:05 pm **Alessandro Vannini**, Abstract-Selected Speaker
Structural biology of RNA polymerase III and its functional complexes
Postdoctoral Associate, Gene Center, Department of Biochemistry, Ludwig-Maximilians-University, Munich, Germany

12:05 pm **LUNCH** (Granhall)12:30 pm **Ski bus departure** (Alpine Meadows)

SATURDAY, MARCH 13 (CONTINUED)

Special Methods Workshop: New Methodology for Hybrid Investigations

- 4:30 - 4:35 pm Introduction, **Suliana Manley**, Session Chair
Assistant Professor of Physics, Institute of Physics of Biological Systems, EPFL-SB-IPSB
Cubotron/BSP, Lausanne, Switzerland
- 4:35 - 4:50 pm **Suliana Manley**, Platform Speaker
Quantitative static and dynamic imaging with photoactivatable fluorescence
Assistant Professor of Physics, Institute of Physics of Biological Systems, EPFL-SB-IPSB
Cubotron/BSP, Lausanne, Switzerland
- 4:50 - 5:05 pm **Bo Huang**, Abstract-Selected Speaker
Visualizing nanoscopic cellular machinery with light: stochastic optical reconstruction microscopy
Assistant Professor, Department of Pharmaceutical Chemistry, Department of Biochemistry and
Biophysics, University of California, San Francisco, USA
- 5:05 - 5:20 pm **Ranjani Krishnan**, Abstract-Selected Speaker
Acidic extracellular pH stimulates activation of integrin $\text{Av}\beta 3$
Graduate Student, Department of Biological Engineering, Massachusetts Institute of Technology,
Cambridge, USA
- 5:20 - 5:35 pm **Hstau Y. Liao**, Abstract-Selected Speaker
On bootstrap techniques for classifying projections in single particle electron microscopy
Research Scientist, Department of Biochemistry and Molecular Biology, Columbia University, New
York, USA
- 5:35 - 5:50 pm **Stefan Jehle**, Abstract-Selected Speaker
Hybrid solid-state NMR/SAXS investigation of a dynamic macromolecular assembly
Postdoctoral Fellow, Department of Biochemistry, University of Washington, Seattle, USA
- 5:50 - 6:05 pm **Barnali N. Chaudhuri**, Abstract-Selected Speaker
*A combined global and local approach to elucidate architectural organization of the PARB-PARS
nucleoprotein assembly*
Research Scientist, Hauptman Woodward Medical Research Institute, and Assistant Professor,
Department of Structural Biology, SUNY, Buffalo, USA
- 6:05 - 7:30 pm **DINNER** (Granhall)

Session VII: Hybrid Approaches to Nanomachines

- 7:30 - 7:35 pm Introduction, **Nobutaka Hirokawa**, Session Chair
Professor of Cell Biology and Anatomy, University of Tokyo, Japan
- 7:35 - 8:05 pm **Alasdair Steven**, Platform Speaker
*Thermodynamic transactions and structural switches in bacteriophage HK97 maturation: Thermo-
cryo-electron microscopy in action*
Chief, Laboratory of Structural Biology Research, NIAMS, National Institutes of Health, Bethesda,
USA
- 8:05 - 8:35 pm **Patrick Schultz**, Platform Speaker
Structure of the integrase-LEDGF complex
Team Leader, Laboratoire de Biologie et Genomique Structurales, IGBMC, Strausberg, France

- 8:35 - 9:05 pm **Peter Cherepanov**, Platform Speaker
Structural basis for retroviral preintegration complex assembly and strand transfer inhibitor action
Reader in Virology (Associate Professor), Imperial College, London, UK
- 9:05 - 9:20 pm **Harry Low**, Abstract-Selected Speaker
Structure of a bacterial dynamin lipid tube provides a mechanism for assembly and membrane curving
Postdoctoral Associate, School of Crystallography, Birkbeck College, London, UK
- 9:30 - 12:00 am Cash Bar and Social Time

SUNDAY, MARCH 14

7:00 – 8:30 am **BREAKFAST** (Granhall)

Departures