



THE
PROTEIN
SOCIETY



32ND ANNUAL SYMPOSIUM

BOSTON

JULY 9 - 12, 2018

PROGRAM



www.proteinsociety.org



PROGRAM

DAY 1 - MONDAY, JULY 9, 2018

Opening Plenary Session 8:30 - 9:10 a.m. | Salons E and F

- 8:30 - 8:35 a.m. *Intro & Welcome from The Protein Society President*
Charles L. Brooks III, University of Michigan
- 8:35 - 8:40 a.m. *Presentation of the 2017 Christian B. Anfinsen award to Lewis Kay*
- 8:40 - 9:10 a.m. *Solution NMR: Why Bother?*
Lewis Kay, University of Toronto, Canada

Coffee Break | 9:10 - 9:40 a.m. | Gloucester

CONCURRENT MORNING SESSION 1 Propagating Aggregated Conformational States 9:40 - 11:30 a.m. | Salon E

- 9:40 - 9:45 a.m. *Introduction from Chair*
Dennis Özcelik, University of Copenhagen, Denmark
- 9:45 - 10:15 a.m. *Remembering the Past: A New Form of Protein-Based Inheritance*
Dan Jarosz, Stanford University; California, United States
- 10:15 - 10:45 a.m. *Amyloids: From the Origin to the End of Life*
Roland Riek, ETH; Zurich, Switzerland
- 10:45 - 11 a.m. *Quantifying Nucleation In Vivo Reveals the Physical Basis of Prion-Like Phase Behavior*
Randal Halfmann, Stowers Institute for Medical Research; Missouri, United States
- 11 - 11:30 a.m. *The Formation of Functional Amyloid Fibrils by Viral Proteins that Modulate Host Cell Death Pathways*
Margaret Sunde, University of Sydney; Australia

CONCURRENT MORNING SESSION 2 Protein See the Light! Triggered Conformational and Functional Changes 9:40 - 11:30 a.m. | Salon F

- 9:40 - 9:45 a.m. *Introduction from Chair*
Michael Thompson, University of California; San Francisco; California, United States
- 9:45 - 10:15 a.m. *A Shape-Shifting Protein Coordinates Timekeeping by the Cyanobacterial Circadian Clock*
Carrie Partch, University of California, Santa Cruz; California, United States
- 10:15 - 10:45 a.m. *Circadian Rhythms from Coupled ATPase Domains*
Mike Rust, The University of Chicago-Illinois; United States
- 10:45 - 11 a.m. *Interplay Between Active and Inactive States in Light-sensing Histidine Kinase EL346*
Igor Dikiy, The City University of New York Advanced Science Research Center; New York, United States
- 11 - 11:30 a.m. *A Molecular Movie of Structural Changes in the Light-Driven Proton Pump Bacteriorhodopsin*
Eriko Nango, Spring-8/SACLA; Kyoto, Japan

LUNCH

11:30 a.m. - 1:30 p.m.

Networking Lunch (*RSVP-ONLY EVENT*) | Third Floor Atrium

Boxed Lunch Pick Up Station | Gloucester

Poster Displays & Exhibits Open | Gloucester

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PROGRAM

DAY 1 - MONDAY, JULY 9, 2018

CONCURRENT AFTERNOON SESSION 3

Creativity in Drug Discovery

1:30 - 4:30 p.m. | Salon E

- 1:30 - 1:35 p.m. *Introduction from Chair*
Hyuntae Na, Penn State Harrisburg;
Pennsylvania, United States
- 1:35 - 2:05 p.m. *Targeting Cancer Using Small Molecule Degraders*
Nathanael Gray, Harvard University; Massachusetts;
United States
- 2:05 - 2:35 p.m. *Electrophile Fragment Screening as a Rapid Method
for Covalent Probe Discovery*
Nir London, Weizmann Institute of Science;
Rehovot, Israel
- 2:35 - 2:50 p.m. *Massively Parallel Protein Design to Develop Enzymes
for Next-Generation Chemotherapy*
Brahm Yachnin, Rutgers University; New Jersey,
United States

Coffee Break | 2:50 - 3:15 p.m. | Gloucester

- 3:15 - 3:45 p.m. *Constraining Evolution -- Avoiding Drug Resistance:
Lessons from Viruses*
Celia Schiffer, University of Massachusetts Medical
School; Massachusetts; United States
- 3:45 - 4 p.m. *The Structural Basis for CARD9 and CARD11
Autoinhibition*
Michael Holliday, Genentech, California, United States
- 4 - 4:30 p.m. *A Structural Mechanism for Directing Inverse Agonism
of PPAR?*
Douglas Kojetin, The Scripps Research Institute;
California, United States

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CONCURRENT AFTERNOON SESSION 4

Proteins in Control of Membranes

1:30 - 4:30 p.m. | Salon F

Introduction from Chair

Elizabeth Draganova, Tufts University;
Massachusetts; United States

1:30 - 1:35 p.m.

1:35 - 2:05 p.m.

*Structural and Mechanistic Studies on the Dynamin
GTPase*

Oliver Daumke, Max Delbrück Center for Molecular
Medicine; Berlin, Germany

2:05 - 2:35 p.m.

Expanding Roles for the ESCRT Machinery

Phyllis Hanson, Washington University;
Missouri; United States

2:35 - 2:50 p.m.

*Protein Science Best Paper Award Winner
Becn2 Interacts With Atg14 Through a Metastable
Coiled-Coil to Mediate Autophagy*
Minfei Su, Weill Cornell Medical College;
New York, United States

Coffee Break | 2:50 - 3:15 p.m. | Gloucester

3:15 - 3:45 p.m.

*Chaperoning SNARE Assembly to Control Membrane
Fusion*

Fred Hughson, Princeton University,
Princeton, New Jersey; United States

3:45 - 4 p.m.

*Structure of the Human TRPM4 Ion Channel in a Lipid
Nanodisc*

Henriette Autzen, University of California San Francisco;
California, United States

4 - 4:30 p.m.

*The Initiation of Ubiquitin-Independent Mitophagy by
Atg32*

Michael Ragusa, Dartmouth College;
New Hampshire, United States

POSTERS OPEN, EXHIBITS, MIX & MINGLE

4:30 - 6:30 p.m. | Gloucester

Baseball Game (Red Sox vs. Rangers)

7:10 - 10:00 p.m. | Fenway Park

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PROGRAM

DAY 2 - TUESDAY, JULY 10, 2018

NEW MEMBER WELCOME BREAKFAST/MEMBER BUSINESS MEETING

7:30 - 8:15 a.m. | Berkeley Room

CONCURRENT MORNING SESSION 5

Functional Protein Dynamics and Allostery

8:30 - 11:45 a.m. | Salon E

- 8:30 - 8:35 a.m. *Introduction from Chair*
Mylene Ferrolino, St. Jude Children's Research Hospital; Tennessee, United States
- 8:35 - 9:05 a.m. *Ultra-Fast Photoswitching in Fluorescent Proteins Observed by Time-Resolved Serial Femtosecond Crystallography*
Martin Weik, IBS; France
- 9:05 - 9:35 a.m. *Improved Physical Models Enable the Investigation of Molecular Recognition in Intrinsically Disordered Proteins at Atomistic Resolution*
Paul Robustelli, DE Shaw Research; New York, United States
- 9:35 - 9:50 a.m. *Protein Science Best Paper Award Winner Single-Molecule Imaging Reveals the Translocation and dna Looping Dynamics of Hepatitis C Virus Ns3 Helicase*
Chang-Ting Lin, Johns Hopkins University; Maryland, United States

COFFEE BREAK | 9:50 - 10:15 a.m. | Gloucester

- 10:15 - 10:45 a.m. *The Evolution of Dynamic Amino Acid Interaction Networks Around the Catalytic Cycle of a Tryptophan Synthase*
David Boehr, Pennsylvania State University; Pennsylvania, United States
- 10:45 - 11:15 a.m. *Allosteric Tuning of Hsp70 Molecular Chaperones*
Lila Gierasch, U Mass Amherst; Massachusetts, United States
- 11:15 - 11:45 a.m. *Simulating the Dynamics of GTPases on the Ribosome*
Paul Whitford, Northeastern University; Massachusetts, United States

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CONCURRENT MORNING SESSION 6

Proteins in the Microbiome and Immune

8:30 - 11:45 a.m. | Salon F

- 8:30 - 8:35 a.m. *Introduction from Chair*
Mikaela Stewart, Texas Christian University; Texas, United States
- 8:35 - 9:05 a.m. LAPS Exchange Speaker
Metallo- β -lactamases: a Tug of War between Bacteria and the Immune System for the available Zn(II)
Alejandro Vila, IBR/Universidad Nacional de Rosario, Santa Fe; Argentina
- 9:05 - 9:35 a.m. *Structural Biochemistry of Cellular Proteins Usurped by Viruses*
Blanton Tolbert, Case Western Reserve University; Ohio, United States
- 9:35 - 9:50 a.m. *Interrogating a Multidrug Efflux Membrane Protein Transporter Involved in Bacterial Antibiotic Resistance Using Structural Mass Spectrometry*
Zainab Ahdash, King's College, London, UK

COFFEE BREAK | 9:50 - 10:15 a.m. | Gloucester

- 10:15 - 10:45 a.m. *Structure and Mechanism of an Exceptionally Powerful Motor that Powers Virus Assembly*
Brian Kelch, University of Massachusetts Med School; Massachusetts, United States
- 10:45 - 11:15 a.m. *Weapons to Probes: Using Toxins to Study the Bacterial Cell Wall*
Seemay Chou, University of California San Francisco; California, United States
- 11:15 - 11:45 a.m. *NMR Characterization of Changes in Acid-Stress Bacterial Chaperone HdeA as a Function of pH in Preparation for Activation*
Karin Crowhurst, California State University Northridge; California, United States

LUNCH | 11:45 a.m. - 1:30 p.m.

Boxed Lunch Pick Up Station | Gloucester

11:45 a.m. - 1:30 p.m. | Exhibitor Workshop Pall ForteBio, LLC | Arlington

Noon - 1:30 p.m. | Educator Workshop | St. Botolph

Poster Displays & Exhibits Open | Gloucester

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PROGRAM

DAY 2 - TUESDAY, JULY 10, 2018 (CONT.)

CONCURRENT AFTERNOON SESSION 7

Member-Selected Session

Repetitive, Non-Globular Proteins: Nature to Nanotechnology

1:30 - 4:30 p.m. | Salon E

- 1:30 - 1:35 p.m. *Introduction from Chair*
Mary Munson, University of Massachusetts Medical School; Massachusetts, United States
- 1:35 - 2:05 p.m. *Repeat Protein Scaffolds for the Design of Functional Nanostructures and Biomaterials*
Aitziber Cortajarena, BioGune; San Sebastian, Spain
- 2:05 - 2:35 p.m. *Protein Materials: From Nature to Nanotechnology*
Tijana Grove, Virginia Tech; Virginia, United States
- 2:35 - 2:50 p.m. *Collagen Architecture Regulates the Specificity of Interactions with its Receptors*
Cody Hoop, Rutgers University; New Jersey, United States

Coffee Break I 2:50 - 3:15 p.m. | Gloucester

- 3:15 - 3:45 p.m. *Repetitive Proteins on the Surface of Gram-Positive Bacteria*
Jennifer Potts, University of York, England, UK
- 3:45 - 4 p.m. *Evolution of Environmentally-Enforced, Repeat Protein Topology in the Outer Membrane*
Joanna Slusky, University of Kansas; Kansas, United States
- 4 - 4:30 p.m. *Extensible Protein Scaffolds Based on Beta Solenoids*
James Murray, Imperial College, London; England, UK

CONCURRENT AFTERNOON SESSION 8

Protein Engineering for Genome Engineering

1:30 - 4:30 p.m. | Salon F

- 1:30 - 1:35 p.m. *Introduction from Chair*
James Moody, Brigham Young University, Utah, United States
- 1:35 - 2:05 p.m. *Evolutionary Outcomes of CRISPR-anti-CRISPR Conflict*
Blake Wiendenheft, Montana State University; Montana, United States
- 2:05 - 2:35 p.m. *Talk Title To Be Determined*
Keith Joung, Massachusetts General Hospital; Massachusetts, United States
- 2:35 - 2:50 p.m. *Structural Insights into CRISPR and Anti-CRISPR Systems for Precise Genome Editing*
Fuguo Jiang, University of California Berkeley; California, United States

Coffee Break I 2:50 - 3:15 p.m. | Gloucester

- 3:15 - 3:45 p.m. *CRISPR-Cas Mediated Cleavage of Invading Nucleic Acids*
Yanli Wang, Institute of Biophysics, Chinese Academy of Sciences; Beijing, China
- 3:45 - 4 p.m. *Re-Targeting a Bacterial Assassin: Engineering Plyc Specificity Using Directed Evolution*
Sebastian Broendum, Monash University; Melbourne, Australia
- 4 - 4:30 p.m. LORNE Exchange Speaker
Evolution of an Enzyme from a Solute-Binding Protein
Colin Jackson, Australian National University; Canberra, Australia

POSTER PRESENTATIONS, EXHIBITS, MIX & MINGLE

4:30 - 6:30 p.m. | Gloucester

MENTORING PANEL

6:45 - 7:45 p.m. | Salon E



PROGRAM

DAY 3 - WEDNESDAY, JULY 11, 2018

CONCURRENT MORNING SESSION 9

Proteostasis: From Midlife Crisis to the Death of Proteins

8:30 - 11:45 a.m. | Salon E

- 8:30 - 8:35 a.m. *Introduction from Chair*
Meghan Breen, University of Michigan;
Michigan, United States
- 8:35 - 9:05 a.m. *Substrate Processing, Conformational Changes, and Mechano-Chemical Coupling of the 26S Proteasome - a Fine-Tuned Molecular Machine*
Andreas Martin, University of California Berkeley;
California, United States
- 9:05 - 9:35 a.m. *The Ups and Downs of Protein Expression Regulation*
Christine Vogel, New York University; New York,
United States
- 9:35 - 9:50 a.m. *The HECT C-terminal Lobe of HERC6 Reveals a Unique Autoinhibitory Domain Swapping Mechanism*
Donald Spratt, Clark University;
Massachusetts, United States

COFFEE BREAK | 9:50 - 10:15 a.m. | Gloucester

- 10:15 - 10:45 a.m. *Dual Chaperone Function in Nascent Protein Folding*
Christian Kaiser, Johns Hopkins University;
Maryland, United States
- 10:45 - 11:15 a.m. *How the Proteasome Selects its Targets for Destruction*
Andreas Matouschek, University of Texas, Austin;
Texas, United States
- 11:15 - 11:45 a.m. *Structural Biology in Cellular Environments Using High Sensitivity n mr*
Kendra Frederick, UT Southwestern;
Texas, United States

CONCURRENT MORNING SESSION 10 Multiplexed Protein Science: Deep Mutational Scanning & Applications

8:30 - 11:45 a.m. | Salon F

- 8:30 - 8:35 a.m. *Introduction from Chair*
Kathryn McMenimen, Mt. Holyoke College;
Massachusetts; United States
- 8:35 - 9:05 a.m. *Talk Title To Be Determined*
Deborah Marks, Harvard University;
Massachusetts, United States
- 9:05 - 9:35 a.m. *Using Next Generation Sequencing to Engineer Protein-based Therapeutics*
Christian Cunningham, Genentech, California,
United States
- 9:35 - 9:50 a.m. *Broad Mutational Scanning Across Protein Families*
Calin Plesa, UCLA; California, United States
- 10:15 - 10:45 a.m. *Understanding Protein-Protein Interactions Through Comprehensive Mapping of Binding Landscapes*
Julia Shifman, Hebrew University of Jerusalem; Israel
- 10:45 - 11:15 a.m. *Using Deep Mutational Scanning to Probe Protein Function, Structure and Regulation*
Doug Fowler, University of Washington,
Washington, United States
- 11:15 - 11:45 a.m. *Solving Protein Structure Using Genetics*
Jorn Schmiedel, Centre for Genomic Regulation;
Barcelona, Spain

LUNCH

11:45 a.m. - 1:30 p.m.

Noon - 1:00 p.m. | Wiley Publisher's Workshop | Arlington Room

11:45 a.m. - 1:30 p.m. | Exhibitor Workshop - Wyatt Technology Corp. | St. Botolph

11:45 a.m. - 1:30 p.m. | Exhibitor Workshop - Nicoya Lifesciences | Berkeley

12:15 - 1:30 p.m. | Undergraduate Research Session | Harvard Room



PROGRAM

DAY 3 - WEDNESDAY, JULY 11, 2018 (CONT.)

PLENARY AWARDS SESSION

1:30 - 5:30 p.m. | Salons E & F

- 1:30 - 1:35 p.m. *Introduction from The Protein Society President*
Charles L. Brooks III, University of Michigan
- 1:35 - 1:40 p.m. *Presentation of the Dorothy Crowfoot Hodgkin Award*
(Sponsored by Rigaku)
- 1:40 - 2:10 p.m. *Protein Folding - On and Off the Ribosome*
2018 Dorothy Crowfoot Hodgkin Award Winner
Susan Marqusee, University of California, Berkeley;
California, United States
- 2:10 - 2:15 p.m. *Presentation of the Carl Brändén Award*
(Sponsored by Genentech)
- 2:15 - 2:45 p.m. *Exploring the Wilds of Structural Biology:
Details, Principles, and Tools*
2018 Carl Brändén Award Winner
Jane and Dave Richardson, Duke University;
North Carolina, United States
- 2:45 - 2:50 p.m. *Presentation of the 2018 Christian B. Anfinsen Award*
- 2:50 - 3:20 p.m. *Single Particle Cryo-EM of Membrane Protein in Lipid
Nanodisc*
Yifan Cheng, University of California San Francisco;
California, United States

COFFEE BREAK | 3:20 - 3:45 p.m. | Gloucester

- 3:45 - 3:50 p.m. *Presentation of the Emil Thomas Kaiser Award* 3:50 -
- 3:50 - 4:20 p.m. *Biological Phase Separations: Mechanisms, Regulation
and Function*
2018 Emil Thomas Kaiser Award Winner
Michael Rosen, University of Texas Southwestern
Medical School; Texas, United States
- 4:20 - 4:25 p.m. *Presentation of the Protein Science Young Investigator
Award* (Sponsored by Wiley)
- 4:25 - 4:55 p.m. *Structural Biology in the Gas Phase: New Techniques
for the Rapid Analysis of Protein Sequence, Structure
and Stability*
Brandon Ruotolo, University of Michigan; Michigan,
United States
- 4:55 - 5:05 p.m. *Presentation of The Protein Society Service Awards*
- 5:05 - 5:30 p.m. *Presentation of Hans Neurath Outstanding Promise
Travel Awards*

POSTERS OPEN, EXHIBITS, MIX & MINGLE

5:30 - 7:30 p.m. | Gloucester

MEMBERS' RECEPTION (all welcome)

8:30 - 10:30 p.m. | Salon F

Presentation of the Best Poster Competition Winners

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PROGRAM

DAY 4 - THURSDAY, JULY 12, 2018

CONCURRENT MORNING SESSION 11 Phase Transitions and Mesoscale Structure 8:30 - 10:35 a.m. | Salon E

- 8:30 - 8:35 a.m. *Introduction from Chair*
Jamie Towle-Weicksel, Rhode Island College;
Rhode Island; United States
- 8:35 - 9:05 a.m. *Disease Mutations and Post-Translational Modifications
Alter Disordered Protein Liquid-Liquid Phase Separation*
Nicolas Fawzi, Brown University;
Rhode Island, United States
- 9:05 - 9:35 a.m. *RNA Structure Encodes Specificity in a PolyQ Protein Phase Separation*
Amy Gladfelter, University of North Carolina;
North Carolina, United States
- 9:35 - 9:50 a.m. *Mechanism and Consequences of Reentrant Phase
Transition of Intrinsically Disordered Proteins*
Priya Banerjee, University at Buffalo, SUNY;
New York, United States
- 9:50 - 10:20 a.m. *Complex Phenotypic Landscape of a Simple Phase-
Separated Protein System*
Emmanuel Levy, Weizmann Institute of Science;
Rehovot, Israel

CONCURRENT MORNING SESSION 12 Beyond 20 Amino Acids: Unnatural Mutagenesis 8:30 - 10:35 a.m. | Salon F

- 8:30 - 8:35 a.m. *Introduction from Chair* **Denise**
Okafor, Emory University;
Georgia; United States
- 8:35 - 9:05 a.m. *Repurposing Ribosomes for Synthetic Biology*
Mike Jewett, Northeastern University; Massachusetts,
United States
- 9:05 - 9:35 a.m. *The RaPID Way to Discover Bioactive Pseudo-Natural
Peptides With Macrocyclic Scaffold*
Hiroaki Suga, University of Tokyo and Peptidream;
Tokyo, Japan

DAY 4 - THURSDAY, JULY 12, 2018 (CONT.)

- 9:35 - 9:50 a.m. *Fluorescent Sensors for Detection of Protein
Carbonylation*
Kamalika Mukherjee, Massachusetts General Hospital,
Harvard University; Massachusetts, United States
- 9:50 - 10:20 a.m. *Genomically Recoded Organisms: Living Foundries for
Producing Genetically-Encoded Materials*
Farren Isaacs, Yale University;
Connecticut, United States

COFFEE BREAK | 10:20 - 10:50 a.m. | Foyer CLOSING PLENARY and 2018 STEIN & MOORE AWARD 10:50 a.m. - 11:45 a.m. Salon E

- 10:50 - 10:55 a.m. *Introduction from The Protein Society President and
Presentation of the Stein & Moore Award Winner*
Charles L Brooks III, University of Michigan
- 10:55 - 11:25 a.m. *A New Approach Towards Diabetes Drug Discovery*
2018 Stein & Moore Award Winner
Raymond Stevens, University of Southern California;
California, United States
- 11:25 - 11:45 a.m. *Closing Remarks from The Protein Society President*
Charles L. Brooks III, University of Michigan