Cold Spring Harbor Laboratory
MEETINGS & COURSES PROGRAM

X-Ray Methods in Structural Biology

October 15th – October 30th

Beckman – Middle Floor

INSTRUCTORS:

William Furey	University of Pittsburgh, Pittsburgh, PA
Alexander McPherson	University of California Irvine, Irvine, CA
Anastassis Perrakis	Netherlands Cancer Institute, Amsterdam, Netherlands
James Pflugrath	Rigaku Americas, The Woodlands, TX
Paul Adams	Lawrence Berkeley Laboratory, Berkeley, CA

ASSISTANT:

Matthew Whitley	University of Pittsburgh, Pittsburgh, PA

PARTICIPANTS:

Marina Candido Primi	The Scripps Institute, Jupiter, FL
Chengcheng Fan	California Institute of Technology, Pasadena, CA
Kaushik Hatti	Cambridge Institute for Medical Research, Cambridge, United Kingdom
Eta Isiorho	Auburn University, Auburn, AL
Christine Jao	Genentech, San Francisco, CA
Dmitri Kudryashov	Ohio State University, Columbus, OH
Bronwyn Lyons	University of British Columbia, Vancouver, Canada
Lisandro Otero	Leloir Institute Foundation, Buenos Aires, Argentina
Nina Salustros	University of Copenhagen, Copenhagen, Denmark
Shantanu Shukla	University of Tennessee, Knoxville, TN
Taylor Stevens	California Institute of Technology, Pasadena, CA
Kevin Tamadonfar	Washington University in St. Louis, St. Louis, MO
Julieanne Vo	La Trobe Insittute for Molecular Sciences, Thomastown, Australia
Kathy Wei	University of California Berkeley, Berkeley, CA
Amy Whitaker	University of Kansas Medical Center, Kansas City, KS
Shiji Zhao	University of California Irvine, Irvine, CA

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Monday Oct. 15 **8:30 am**	**Anastassis Perrakis, Netherlands Cancer Institute, Amsterdam, Netherlands** "Overview of Crystallography"
Monday Oct. 15 **9:30 am**	**Alexander McPherson, University of California Irvine, Irvine, CA** "Crystallization of Macromolecules – basic theory"
Monday Oct. 15 **10:45 am**	**Janet Newman, CSIRO, Parkville, Australia** "Crystallization Practice"
Monday Oct. 15 **1:00 pm**	**Martin Caffrey, Trinity College, Dublin, Ireland** "Membrane Protein Crystallization"
Tuesday Oct. 16 **8:30 am**	**Alexander McPherson, University of California Irvine, Irvine, CA** "Symmetry, Periodicity, Unit Cells, Space Groups, Miller Planes, & Lattices"
Tuesday Oct. 16 **9:30 am**	**James Pflugrath, Rigaku Americas, The Woodlands, TX** "Cryo-crystallography"
Tuesday Oct. 16 **10:45 am**	**Gary Gilliland, Janssen Research & Development, Spring House, PA** "Maximizing Crystallization Success through Seeding"
Tuesday Oct. 16 **1:00 pm**	**Janet Newman, CSIRO, Parkville, Australia** "Modern approaches towards crystallization"
Wednesday Oct. 17 **8:45 am** **10:00 am** **11:00 am**	**Alexander McPherson, University of California Irvine, Irvine, CA** "Waves, Vectors, & Complex Numbers " "Fundamental diffraction relationships & Bragg's Law, diffraction pattern formation, reciprocal space" "Fourier transforms, electron density"
Thursday Oct. 18 **8:45 am**	**Robert Sweet, Brookhaven National Laboratory, Shoreham, NY** "I. Explaining the Ewald Sphere and its value II. X-ray sources & detectors, and their properties"
Thursday Oct. 18 **10:00 am**	**James Pflugrath, Rigaku Americas, The Woodlands, TX** "Data Collection and Processing"
Thursday Oct. 18 **11:00 am**	**Dominika Borek, UT Southwestern Medical Center, Dallas, TX** "X-ray data processing, scaling and merging"

Thursday Oct. 18 **1:00 pm**	**James Holton, University of California, San Francisco, CA** "Beamline basics / Data collection strategies at the beamline"
Friday Oct. 19 **8:45 am**	**Andrea Thorn, University of Hamburg, Hamburg, Germany** "Twinning in crystallography"
Friday Oct. 19 **10:00 am**	**William Furey, University of Pittsburgh, Pittsburgh, PA** "Introduction to the phase problem, Phasing Methods, and Patterson Space"
Friday Oct. 19 **11:00 am**	**James Holton, University of California, San Francisco, CA** "Radiation damage"
Friday Oct. 19 **1:00 pm**	**Dominika Borek, UT Southwestern Medical Center, Dallas, TX** "Anisotropy, order-disorder, and radiation damage in practice"
Friday Oct. 19 **7:00 pm**	**Clyde Smith, Stanford University, Stanford, CA** "Serial Femtosecond Crystallography methods at XFELS and synchrotrons"
Saturday Oct. 20 **8:45 am** **10:00 am** **11:00 am**	**William Furey, University of Pittsburgh, Pittsburgh, PA** "Basic phasing theory: Isomorphous Replacement and Anomalous Scattering" "Phase improvement by solvent flattening and NCS averaging" "Direct Methods Introduction"
Saturday Oct. 20 **1:00 pm** **1:30 pm**	**Andrea Thorn, University of Hamburg, Hamburg, Germany** "Assessing data quality" "Experimental phasing with SHELXC/D/E"
Wednesday Oct. 24 **8:45 am**	**Thomas Terwilliger, Los Almos National Laboratory, Los Almos, NM** "Automated experimental phasing"
Wednesday Oct. 24 **10:00 am**	**Paul Emsley, MRC Laboratory of Molecular Biology, Cambridge, United Kingdom** "Map Interpretation and model building"
Wednesday Oct. 24 **11:00 am**	**Thomas Terwilliger, Los Almos National Laboratory, Los Almos, NM** "Automated model building and other things"
Wednesday Oct. 24 **1:00 pm**	**Paul Emsley, MRC Laboratory of Molecular Biology, Cambridge, United Kingdom** "Advanced Coot"
Thursday Oct. 25 **8:45 am**	**Randy Read, University of Cambridge, Cambridge, United Kingdom** "Molecular replacement – how does it work?"
Thursday Oct. 25 **10:00 am**	**Paul Adams, Lawrence Berkeley Laboratory, Berkeley, CA** "Structure refinement – what is it?"
Thursday Oct. 25 **11:00 am**	**Randy Read, University of Cambridge, Cambridge, United Kingdom** "Molecular replacement – making models"
Thursday Oct. 25 **1:00 pm**	**Wayne Hendrickson, Columbia University, New York, NY** "MAD and SAD Phasing"

Thursday Oct. 25 **7:00 pm**	**Anastassis Perrakis, Netherlands Cancer Institute, Amsterdam, Netherlands** "Automated model building in ARP/wARP"
Friday Oct. 26 **8:45 am**	**Paul Adams, Lawrence Berkeley Laboratory, Berkeley, CA** "Low Resolution Structure Refinement"
Friday Oct. 26 **10:00 am**	**Gerard Kleywegt, European Bioinformatics Institute, Cambridge, United Kingdom** "Structure Validation"
Friday Oct. 26 **11:00 am**	**Jane Richardson, Duke University, Durham, NC** **Christopher Williams, Duke University, Durham, NC** "Validation with MolProbity"
Saturday Oct. 27 **10:00 am** **1:00 pm**	**Anastassis Perrakis, Netherlands Cancer Institute, Amsterdam, Netherlands** "Water molecules and side chains – decision making" "Automated data processing and structure solution in ISYS/CCP4i"
Saturday Oct. 27 **1:30 pm**	**Jane Richardson, Duke University, Durham, NC** **Anastassis Perrakis, Netherlands Cancer Institute, Amsterdam, Netherlands** "The CSHL picture competition & software suggestions for pics & movies"
Sunday Oct. 28 **8:30 am**	*Advanced topics, to be determined with student input*
Sunday Oct. 28 **10:00 am**	**Anastassis Perrakis, Netherlands Cancer Institute, Amsterdam, Netherlands** "Automated model rebuilding with PDB_REDO"
Sunday Oct. 28 **11:00 am**	**James Conway, University of Pittsburgh, Pittsburgh, PA** "Introduction to cryo-EM"
Sunday Oct. 28 **1:00 pm**	**Dale Tronrud, The Light and Electron Works, Springfield, OR** "Electron density maps / Would you publish it?"
Saturday Oct. 27 **7:00 pm**	**Jane Richardson, Duke University, Durham, NC** **Christopher Williams, Duke University, Durham, NC** "Cold Spring Harbor Validation Horror Show"
Monday Oct. 29 **8:30 am**	*Advanced topics, to be determined with student input*
Monday Oct. 29 **9:45 am**	**Bil Clemons, California Institute of Technology, Pasadena, CA** "Routes towards crystallizing membrane proteins"
Monday Oct. 29 **10:45 am**	**Jane Richardson, Duke University, Durham, NC** "Presentation of structures: history and perspectives"