




Single-Particle Cryo-Electron Microscopy
Rutgers-New Jersey Cryo-Electron Microscopy and Tomography Facility

 Laptops are required for sessions designated with this icon.
 All sessions are in Proteomics 120 unless designated otherwise.



WEEK 1**Tuesday, January 3**

9:00 AM	Welcome and Orientation Stephen K. Burley and Gail Ferstandig Arnold	1:00 PM	Career Byte: Branching Out: Meeting Colleagues! Maria Qadri
9:20 AM		2:00 PM	Organizational Meeting Stephen K. Burley and Dennis Thomas
9:40 AM	History of Electron Microscopy Dennis Thomas		Review of Boot Camp program and goals; Organization of participants into teams
10:30 AM		3:00 PM	Core Facility Tours: Mass Spectrometry Facility, CryoEM Plunger, Cryo-Electron Microscope, Negative Stain Imaging Electron Microscope Facility
11:00 AM	What Makes a Good Sample for Structural Studies Stephen K. Burley and Dennis Thomas		Welcome Reception, Proteomics Lobby
12:00 PM		5:00 PM	BINGO Mixer and Science BINGO
	Lunch Served – Proteomics First Floor Lobby		



Wednesday, January 4

9:00 AM	Objectives for Days 2-4 Stephen K. Burley and Dennis Thomas	1:00 PM	Career Byte: Resources Available at Rutgers Career Services; How to Make a Winning CV or Resume Joe Scott
9:15 AM		1:30 PM	Organizational Meeting Stephen K. Burley and Dennis Thomas
10:00 AM	Gel Electrophoresis Sample Loading by Participants	1:45 PM	 Hands-On Mass Spectrometry Data Interpretation Peter Lobel and Team
10:45 AM		3:10 PM	Coffee/Tea Served
11:05 AM	Assessing Molecular Weight/Composition II Peter Lobel	3:30 PM	 Hands-On Gel Electrophoresis Data Interpretation Joe Marcotrigiano and Team
12:00 PM			
	Lunch (independent)		

Thursday, January 5


9:00 AM	Report Out Participants	1:00 PM	Career Byte: Giving an Engaging Presentation Jerome Kukor
9:15 AM		1:30 PM	Organizational Meeting Stephen K. Burley and Dennis Thomas
10:00 AM	Producing, Purifying and Characterizing Samples of Macromolecular Machines Stephen K. Burley	1:45 PM	 Hands-On Analytical Gel Filtration Joe Marcotrigiano and Team
10:45 AM		3:10 PM	Coffee/Tea served
11:15 AM	Assessing Monodispersity and Size Davide Comoletti	3:30 PM	 Hands-On Light Scattering Data Analysis Eddy Arnold and Team
12:00 PM			
	A Single-Molecule Super-Resolution Microscopy View of Macromolecular Complexes in Cells Sang-Hyuk Lee		
	Lunch (independent)		

Friday, January 6



9:00 AM	Report Out Participants	1:00 PM	Career Byte: Rutgers iJOBS; The Elevator Pitch Janet Alder
9:15 AM		1:30 PM	 Sample Grid Plunging, Data Screening, Preparation for and Acquisition of Data, and Preprocessing of Images* Dennis Thomas and Wei Dai
10:00 AM	CryoEM Workflow: Test Tube → Images Dennis Thomas	3:10 PM	Coffee/Tea served
10:45 AM		3:30 PM	 Sample Grid Plunging, Data Screening, Preparation for and Acquisition of Data, and Preprocessing of Images* (Cont.)
11:05 AM	Choosing Your Buffer and Plunging Conditions Dennis Thomas	5:00 PM	Networking Event
12:00 PM			
	Round Table: In-Class Review of Participant Sample Characteristics and Next Steps Dennis Thomas		
	Lunch (independent)		

* Participants will have an opportunity to have qualified samples plunged and screened for image quality and initial data acquisition (possibly over the weekend).




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WEEK 2**Monday, January 9**

9:00 AM	Welcome Stephen K. Burley and Gail Ferstandig Arnold Cryo-Electron Microscopy: Resolution Revolution Stephen K. Burley The Electron Microscope – Physics, Optics, and the Electron as a Photon Dennis Thomas Electron Detection and Image Formation Dennis Thomas <i>Coffee/Tea Served</i> Image Contrast – Contrast Transfer Function (CTF) Determination and Correction; The Phase Plate Dennis Thomas <i>Lunch (independent)</i>	1:00 PM	Career Byte: Securing an Industrial Position Edward Sherer Organizational Meeting Stephen K. Burley and Dennis Thomas  Workshop – Introduction to Image Processing; Assignment of Starting Models and Datasets; What is “Good” Data? Image Evaluation, CTF and Particle Selection <i>Coffee/Tea Served</i>  Workshop – Starting Model Generation: De Novo from Class Averages, Common Lines Methods, Blobs, or Pre-Existing Models from Databases; Limitations and Pitfalls Dennis Thomas
9:15 AM		1:30 PM	
9:35 AM		2:00 PM	
10:10 AM		3:10 PM	
10:55 AM		3:30 PM	
11:15 AM		5:00 PM	Welcome Reception, Proteomics Lobby



Tuesday, January 10

9:00 AM	Report Out Participants Filaments, Motors, Soluble Proteins, Membrane Proteins, Viruses, Symmetric, Asymmetric - One Size Does Not Fit All; Introduction to Image Processing Philosophy Dennis Thomas <i>Coffee/Tea Served</i> Keynote Lecture: The Structure of Zika Virus as Determined Using Cryo-EM Michael Rossmann, Purdue University <i>Lunch Served – Proteomics Main Lobby</i>	1:00 PM	 Career Byte: GradFund Teresa Delcorso Ellmann and Senem Kaptan ; Being Organized; Making Business Cards Gail Ferstandig Arnold Organizational Meeting; Molecular Origami Stephen K. Burley and Dennis Thomas  Workshop – Reference-Free Alignment/Classification of Particle Datasets; Processing of Image Data Dennis Thomas <i>Coffee/Tea Served</i>  Workshop – Factors Affecting Image Processing, Noise, Heterogeneity; The Einstein or Mona Lisa Effect Dennis Thomas
9:15 AM		1:45 PM	
9:40 AM		2:15 PM	
10:00 AM		3:30 PM	
11:30 AM		3:50 PM	

Wednesday, January 11

9:00 AM	Report Out Participants Common Methods/Software Packages – The Image Processing Toolbox Dennis Thomas Classification Methods – 2D, 3D; Maximum Likelihood Dennis Thomas <i>Coffee/Tea Served</i>  Structure Validation: Is the Structure Right? What is the Resolution? How Do I Know? Deposition to the PDB and EMDB Databases Cathy Lawson How to be a Rutgers CryoEM User Dennis Thomas <i>Lunch (independent)</i>	1:00 PM	 Career Byte: Finding Jobs and Collaborators Using LinkedIn Gail Ferstandig Arnold Organizational Meeting Stephen K. Burley and Dennis Thomas  Workshop – Structure Visualization: How to Look at a Three-Dimensional Map and Interpret It Brian Hudson, Shuchismatta Dutta, and Christopher Markosian <i>Coffee/Tea Served</i>  Workshop – Molecular Modeling: Fitting Atomic Structures, Strategies for Rigid Body versus Flexible Fitting; Molecular Dynamics Dennis Thomas, David Case, and Matthew Miller
9:15 AM		1:30 PM	
9:50 AM		1:45 PM	
10:25 AM		3:10 PM	
10:45 AM		3:30 PM	
11:30 AM		5:00 PM	Downtown Meeting, Meet in Proteomics Lobby

Thursday, January 12

9:00 AM	Report Out Participants  Workshop – Molecular Modeling: Fitting Your Data Using the PDB and Databases to Evaluate and Interpret Your Results Dennis Thomas <i>Coffee/Tea Served</i>  Workshop – Preparing Your Results for Publication: How Do I Make CryoEM Structures Clear and Understandable? Structure Informs Biology! Dennis Thomas <i>Lunch (independent)</i>	1:00 PM	Round Up Dennis Thomas, Stephen K. Burley, Wei Dai, Gail Ferstandig Arnold Structural Data Analysis; Preparation for Final Presentation Career Byte: Being All You Can Be and Showing It Larry Jacobs Structural Data Analysis; Preparation for Final Presentation (Cont.) <i>Coffee/Tea available throughout afternoon</i>
9:15 AM		1:15 PM	
10:30 AM		3:00 PM	
10:50 AM		3:30 PM	
12:00 PM			

Friday, January 13

9:00 AM	Finalization of Presentation <i>Coffee/Tea available throughout morning</i> <i>Lunch Served</i>	1:00 PM	Final Presentation <i>Coffee/Tea available</i>
12:00 PM		3:00 PM	Networking with “Speed Dating” and Group-Style Meet and Greet <i>Reception with Special Dessert</i>