

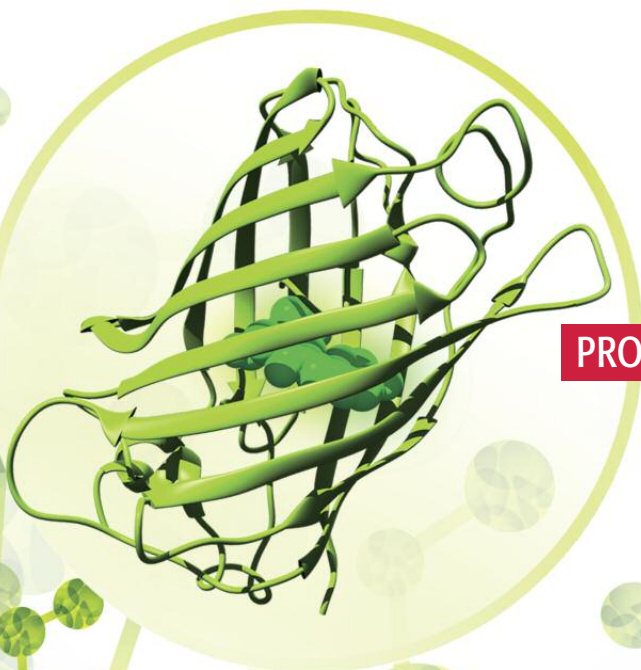


BioMaPS Institute for
Quantitative Biology

Graduate Program in
Computational Biology and
Molecular Biophysics

Interdisciplinary Quantitative Biology **BOOT CAMP** January 6-17, 2014

Rutgers University, Piscataway, NJ



PROGRAM

Center for Integrative
PROTEOMICS
Research

RUTGERS
THE STATE UNIVERSITY
OF NEW JERSEY



Interdisciplinary Quantitative Biology Boot Camp

The Center for Integrative Proteomics Research, home to the BioMaPS Institute for Quantitative Biology and the BioMaPS Graduate Program in Computational Biology and Molecular Biophysics, is delighted to be hosting the first annual Rutgers Interdisciplinary Quantitative Biology Boot Camp designed to augment education for quantitative and biological scientists. Our overarching goal is to introduce students of all ages to the value of integrating biology and medicine with mathematics, physics, chemistry, computer science, statistics and biostatistics, and engineering.

The immersive two-week Boot Camp will provide broad introductory exposure to the language, culture, and experimental/theoretical underpinnings of molecular biology, macromolecular biochemistry/biophysics, structural biology, computational biology, systems biology, and bioinformatics.

Instruction will take the form of lectures on fundamental aspects of biology, a broad range of collaborative hands on wet- and dry-laboratory practical exercises (including simulations of biological phenomena using statistical physics, mathematical modeling, and computational chemistry), tours of some of Rutgers' state-of-the-art facilities for interrogating biological phenomena, student-driven topics-of-the-day, fun activities for relaxing at multiple points each day, and two end-of-week networking opportunities.

The final afternoon of the Boot Camp will be devoted to a student Symposium on Fluorescent Proteins that will synthesize experimental data and the results of computational analyses gathered on five evolutionarily related fluorescent proteins. Symposium materials will be incorporated into a comprehensive web resource for Fluorescent Proteins hosted by the Research Collaboratory for Structural Bioinformatics Protein Data Bank.

The Boot Camp would not have been possible without tireless efforts of more than forty contributors from across the entire Rutgers system.


Special thanks go out to Bernie Cariaga, Don Corrette, and Sam Shelley of the Center for Integrative Proteomics Research.

Wet Laboratory facilities and support were generously furnished by Professor Andrew Vershon and Dr. Janet Mead of the Waksman Institute of Microbiology.




NOTE: Laptop computers are required for sessions designated with this icon

MONDAY, January 6th

MORNING	8:30 AM	<i>Welcome and Overview</i> , Stephen Burley and Gail Ferstandig Arnold Waksman Auditorium	
	9:00 AM	<i>Big Bang</i> , Jennifer Morgan (Award-Winning Author)	
	9:45 AM	Coffee Break	
		MOLECULES OF LIFE: Proteins	
	10:05 AM	• <i>Understanding Protein Structural Elements</i> , Helen Berman	
	10:50 AM	• <i>Function Follows Form</i> , Stephen Burley	
	11:35 AM	• <i>The Protein Folding Problem and Chaperones</i> , Babis Kalodimos	
	12:20 PM	Team Organization Meeting, Stephen Burley	
	12:35 PM	Pizza Lunch Proteomics main lobby	
AFTERNOON	1:20 PM-5:00 PM	OPTION A* Waksman, Rm. 19** Wet Lab <i>Introduction to the wet lab</i> , Gail Ferstandig Arnold <i>Crystallization of lysozyme</i> , Disha Patel	OPTION B* Proteomics, Rm. 120  Amber Project Workshop (Part 1 of 3) <i>Molecular modeling with Amber</i> : David Case, Darrin York, Tai-Sung Lee
	5:00 PM*	Team Organization Meeting, Proteomics, Rm. 120	



TUESDAY, January 7th

MORNING	8:00 AM	Student-led activities, Proteomics ground floor lobby	
	8:40 AM	Student-selected topic of the day, Waksman Auditorium	
		MOLECULES OF LIFE: Nucleic Acids, Waksman Auditorium	
	9:00 AM	• <i>DNA</i> , Wilma Olson	
	9:50 AM	• <i>RNA</i> , Helen Berman	
	10:20 AM	Coffee Break	
	10:40 AM	<i>Understanding Genomes</i> , Joachim Messing	
	11:30 AM	<i>Understanding Proteomes</i> , Gaetano Montelione	
	12:20 PM	<i>Recapitulation of morning session</i> , Stephen Burley	
	12:35 PM	Lunch (independent)	
AFTERNOON	1:15 PM	OPTION A* Waksman, Rm. 19 Wet Lab , Gail Ferstandig Arnold <i>Transformation of E.coli with plasmids encoding green, cherry, orange, citrine, and cerulean fluorescent proteins (FPs)</i>	OPTION B* Proteomics, Rm. 120  Mathematica Workshop Nicolas Clauvelin <i>Computational analysis of DNA using data from the Protein Data Bank</i>
	5:00 PM	Student-led activities, Proteomics ground floor lobby	



* Most afternoon sessions are expected to go until ~5 PM and will be followed by student-led activities in the Proteomics ground floor lobby (as will be indicated on easels outside the lecture room)

** Escorts will be provided from Rm. 120


WEDNESDAY, January 8th

MORNING	8:00 AM	OPTION A Student-led activities, Proteomics ground floor lobby	OPTION B Waksman, Rm. 19 Wet Lab , Gail Ferstandig Arnold <i>Observation of transformation plates; Inoculation of minicultures</i>
	8:40 AM	Student-selected topic of the day, Waksman Auditorium	
	9:00 AM	MACROMOLECULAR MACHINES , Waksman Auditorium	
	9:30 AM	• <i>Introduction to the Central Dogma</i> , Stephen Burley	
	10:20 AM	Coffee Break	
	10:40 AM	• <i>RNA → Protein</i> , Stephen Burley	
	11:30 AM	• <i>DNA → Novel Proteins</i> , Sagar Khare	
12:15 PM	<i>Recapitulation of morning session</i> , Stephen Burley		
12:30 PM Lunch (independent)			
AFTERNOON	1:15 PM	 <i>Methods of DNA Cloning and Sequencing</i> , Joseph Bauman (Open to all) Proteomics, Rm. 120	
	2:45 PM	Coffee Break	
	3:05 PM	 <i>Methods for Protein Sequence Analysis and Alignment: From Sequence to Structure to Function</i> , Kalyan Das (Open to all)	
	4:35 PM	Wet Lab , <i>Inoculation of micultures</i> , Gail Ferstandig Arnold Waksman, Rm. 19	
	5:00 PM	Student-led activities, Proteomics ground floor lobby	



THURSDAY, January 9th

MORNING	8:00 AM	Student-led activities, Proteomics ground floor lobby	
	8:40 AM	Student-selected topic of the day, Waksman Auditorium	
	9:00 AM	STATISTICAL PHYSICS AS IT APPLIES TO BIOLOGY , Proteomics, Rm. 120	
	10:25 AM	Coffee Break	
	10:45 AM	 • <i>Stochastic modeling of cell-to-cell variability of gene expression</i> Anirvan Sengupta	
12:00 PM Lunch (independent)			
AFTERNOON	12:45 PM	OPTION A Waksman, Rm. 19 Wet Lab , Gail Ferstandig Arnold <i>Inoculation of maxicultures for production of the FPs; Purification of FP-encoding plasmids Preparation of agarose gels; Induction of protein expression in cultures (overnight)</i>	OPTION B Proteomics, Rm. 120  Amber Project Workshop (Part 2 of 3) <i>Molecular modeling with Amber</i> David Case, Darrin York, Tai-Sung Lee
		5:00 PM	Student-led activities, Proteomics ground floor lobby


FRIDAY, January 10th


MORNING	8:00 AM	OPTION A Student-led activities, Proteomics ground floor lobby	OPTION B Waksman, Rm. 19 Wet Lab , Steven Tuske <i>Harvesting of Cells;</i> <i>Preparation of bacterial lysates,</i>
	8:40 AM	Student-selected topic of the day, Proteomics, Rm. 120	
	9:00 AM	OPTION A Proteomics, Rm. 120  FoldIt Workshop , Srinivas Annavarapu, Sagar Khare <i>Computational modeling of protein folding and mutation</i>	OPTION B Waksman, Rm. 19 Wet Lab , Steven Tuske <i>Protein purification using nickel columns; Electrophoresis of proteins and plasmids</i>
	1:30 PM	Lunch (independent)	
AFTERNOON		MATHEMATICAL MODELING OF BIOLOGICAL PHENOMENA Proteomics, Rm. 120	
	2:00 PM	• <i>Deterministic modeling of chemical reactions</i> , Zahra Aminzare	
	3:40 PM	Coffee Break	
	4:00 PM	• <i>Overview of cancer and stochastic model/simulations of colon cancer</i> , David Axelrod	
	5:00 PM	<i>Recapitulation of the afternoon session</i> , David Axelrod	
	5:15 PM	Networking event	

MONDAY, January 13th


MORNING	8:00 AM	Student-led activities, Proteomics ground floor lobby	
	8:40 AM	Student-selected topic of the day, Proteomics, Rm. 120	
	9:00 AM	CANCER BIOLOGY LECTURES Proteomics, Rm. 120/126 • <i>What is cancer? How does one classify different cancers?</i> Shridar Ganesan	
	10:00 AM	Coffee Break	
	10:45 AM	• <i>Description of The Cancer Genome Atlas (TCGA)</i> , Chang Chan	
	12:15 PM	Lunch (independent)	
AFTERNOON	1:00 PM	CANCER BIOLOGY TUTORIAL , Proteomics, Rm. 120/126  • <i>Introduction to R; clustering/analysis of TCGA data to characterize DNA sequences expression profiles leading to treatment plans</i> , Chang Chan, Saurabh Laddha	
	3:00 PM	Coffee Break	
	3:20 PM	 • <i>Completion of tutorial; Recapitulation</i> , Shridar Ganesan and team	
	5:00 PM	Student-led activities, Proteomics ground floor lobby	



TUESDAY, January 14th

MORNING	8:00 AM	Student-led activities, Proteomics ground floor lobby
	8:40 AM	Student-selected topic of the day, Proteomics, Rm. 120
	9:00 AM	 <i>Protein Visualization, Analysis, and Comparison</i> Shuchismita Dutta and Stephen Burley, Proteomics, Rm. 120/126
	10:45 AM	Coffee Break
	11:05 AM	<i>Mass Spectrometry</i> , Peter Lobel
	11:45 AM	<i>Tools to Study Macromolecular Interactions: SPR</i> , Nilgun Tumer, Xiao-Ping Li
	12:30 PM	<i>Recapitulation of the morning session</i> , Stephen Burley
	12:45 PM	Lunch (independent)

AFTERNOON	1:30 PM	 SIMULTANEOUS DATA COLLECTION ACTIVITIES*			
		Analysis of DNA Sequencing Data Joseph Bauman Proteomics, Rm. 120	Mass Spectrometry Peter Lobel, Haiyan Zheng Proteomics, Rm. 008	X-ray Crystallography Joseph Marcotrigiano Proteomics, Rm. 126	NMR Spectroscopy Gaetano Montelione, James Aramini, Swapna Gurla CABM, Rm. 241
	5:00 PM	Student-led activities, Proteomics ground floor lobby			


WEDNESDAY, January 15th

MORNING	8:00 AM	Student-led activities, Proteomics ground floor lobby			
	8:40 AM	Student-selected topic of the day, Proteomics, Rm. 120			
	9:00 AM	SIMULTANEOUS OFFERINGS FOR MISSED ACTIVITIES*			
		FoldIt Workshop Srinivas Annavarapu, Sagar Khare Proteomics, Rm. 126 	Amber Project Workshop (Part 3 of 3) David Case, Darrin York, Tai-Sung Lee Proteomics, Rm. 120 	Mathematica Workshop Nicolas Clauvelin Proteomics, Rm. 306 	Wet Lab Overview Gail Ferstandig Arnold Proteomics, Rm. 206
	12:30 PM	Lunch (independent)			


AFTERNOON	1:00 PM	SIMULTANEOUS DATA COLLECTION ACTIVITIES*			
		Differential Scanning Calorimetry David Remeta Location TBA	Fluorescence & Circular Dichroism Spectroscopy Vikas Nanda, Smita Patel Proteomics, Rm. 126	X-ray Crystallography Joseph Marcotrigiano Proteomics, Rm. 120 	NMR Spectroscopy Gaetano Montelione, James Aramini, Swapna Gurla CABM, Rm. 241 
	5:00 PM	Student-led activities, Proteomics ground floor lobby			

* Escorts will be provided from Proteomics, Rm. 120.

THURSDAY, January 16th

MORNING	8:00 AM	Student-led activities, Proteomics ground floor lobby
	8:40 AM	Student-selected topic of the day, Proteomics, Rm. 120
	9:00 AM	<i>Tour at Keck Center for Collaborative Neuroscience</i> , Patricia Morton Escorts from Proteomics, Rm. 120
	10:00 AM	<i>Tours of the RUCDR - Cell culture processing, genomic analyses, and the repository</i> , Jay Tischfield, Michael Sheldon Escorts will be provided from the Keck Center and Proteomics, Rm. 120
	12:00 PM	Lunch (independent)
AFTERNOON	1:00 PM	<i>Flow Cytometry and Confocal Microscopy</i> , Debra Laskin, Theresa Hyejeong Choi, Carol Gardner, Vasanthi Sunil, Escorts will be provided from Proteomics, Rm. 120
	2:10 PM	<i>Successful Sharing – Presentation Skills 101</i> , Daniel King (Open to all) Proteomics, Rm. 120
	2:35 PM	 PREPARATION OF PRESENTATIONS – Sharing of data with teammates; synthesizing an understanding of the team’s FP Coffee available
	5:00 PM	Student-led activities, Proteomics ground floor lobby

FRIDAY, January 17th

MORNING	8:00 AM	Student-led activities, Proteomics ground floor lobby
	8:40 AM	Student-selected topic of the day, Proteomics, Rm. 120
	9:00 AM	 PREPARATION FOR PRESENTATIONS (cont’d) Proteomics, Rm. 120 Comparison of data from the different FP teams; synthesis of an understanding of FPs as a whole. Coffee Available
	12:00 PM	Lunch (independent)
AFTERNOON	1:00 PM	SYMPOSIUM ON FLUORESCENT PROTEINS , Proteomics, Rm. 120
	3:00 PM	Coffee break
	3:20 PM	SYMPOSIUM ON FLUORESCENT PROTEINS (cont’d)
	4:45 PM	After-Action Feedback
	5:00 PM	Networking

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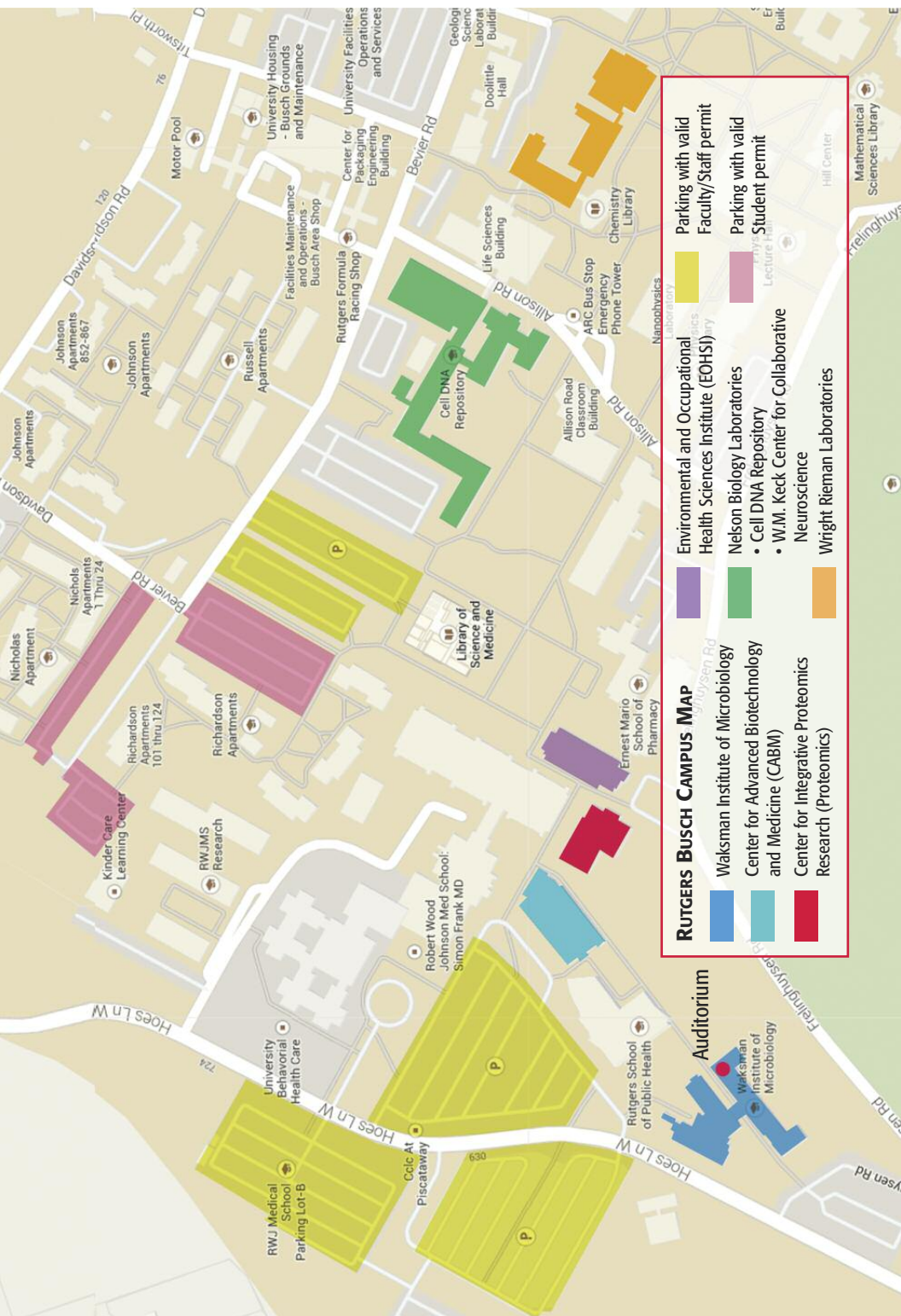
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RUTGERS BUSCH CAMPUS MAP

- Waksman Institute of Microbiology
- Environmental and Occupational Health Sciences Institute (EOHSI)
- Parking with valid Faculty/Staff permit
- Center for Advanced Biotechnology and Medicine (CABM)
- Nelson Biology Laboratories
- Wright Riemann Laboratories
- Center for Integrative Proteomics Research (Proteomics)
- Parking with valid Student permit
- Cell DNA Repository
- W.M. Keck Center for Collaborative Neuroscience

Auditorium

Waksman Institute of Microbiology