2007 Boulder Summer School
Biological Physics
July 2 – July 27, 2007
Schedule

Week 1: July 2 – 6, Location: Duane G125

Monday, July 2

9:30 - 10:00 AM	Welcome
10:00 - 10:30	Break
10:30 - 12:00	Physics Problems in Early Embryonic Development, Part I (Bialek)
1:30 - 3:00 PM	Physics Problems in Early Embryonic Development, Part II (Gregor)
3:00 - 3:30	Break
3:30 - 5:00	Construction Plans for Cells and Organisms (Kondev)

Tuesday, July 3

10:00 - 11:30 AM	Biopolymers (Nelson)
1:30 - 3:00 PM	Life's Processes: Stopwatches at Many Scales (Kondev)
3:00 - 3:30	Break
3:30 - 5:00	Molecular Motors, Part I (Betterton)

Wednesday, July 4

Independence Day: No Classes

Dinning hall will be closed during Lunch time. Box lunches will be available at breakfast.

Thursday, July 5

10:00 - 11:30 AM	Tethered Particle Motion as a Diagnostic of DNA Conformation (Nelson)
1:30 - 2:00 PM	Rods, Ropes and Chromosomes (Kondev)
3:00 - 3:30	Break
3:30 - 5:00	Molecular Motors, Part II (Betterton)

Friday, July 6

10:00 - 11:30 AM	Physics Problems in Early Embryonic Development, Part III (Gregor)
1:30 - 3:00 PM	Maximum Likelihood Methods (Nelson)
3:00 - 3:30	Break
3:30 - 5:00	Tutorial: Bayesian Statistics (Wiggins)
5:00 - 7:00	Kittredge Pond BBQ

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(Tenative) Schedule

Week 2: July 9 – 13, Location: Duane G125

	Monday, July 9
9:00 - 10:30 AM	Tutorial: Noise and Fluctuations (Bialek)
10:30 - 11:00	Break
11:00 - 12:30 PM	Biological Applications of the Physics of Diffusion: Part I (Setayeshgar)
2:00 - 3:30	Life at Low Reynolds Number and Bacterial Chemotaxis (Wingreen)
	Tuesday, July 10
9:00 - 10:30 AM	Bacterial Chemotaxis Signaling Network as a Model System (Wingreen)
10:30 - 11:00	Break
11:00 - 12:30 PM	Tutorial: Nonlinear Dynamics (Sengupta)
2:00 - 3:30	Tutorial: Ion Channels and Neural Dynamics (Bialek)
5:15 - 7:30	Flagstaff Mountain Cookout (dinner and hiking)
	Buses leave Kittredge at **5:15PM** , **sharp**.
	Wednesday, July 11
9:00 - 10:30 AM	Biophysical Aspects of Bacterial Geometry (Wingreen)
10:30 - 11:00	Break
11:00 - 12:30 PM	Modeling Stochastic Gene Expression (Swain)
2:00 - 3:30	Linear Networks and How Neurons Do Integrals (Goldman)
	Thursday, July 12
9:00 - 10:30 AM	Network Dynamics and Cell Physiology (Tyson)
10:30 - 11:00	Break
11:00 - 12:30 PM	Measuring Stochastic Gene Expression (Swain)
2:00 - 3:30	Modeling Signal Transduction Networks, Part I (Shraiman)
7:00 - 9:00	Poster Session I (11^{th} floor of GamowTower)
	Friday, July 13
9:00 - 10:30 AM	Lessons from Modeling the Eukaryotic Cell Cycle (Tyson)
10:30 - 11:00	Break
11:00 - 12:30 PM	Robustness in Neural Networks (Goldman)
2:00 - 3:30	Modeling Signal Transduction Networks, Part II (Shraiman)
5:00 - 6:30	Kittredge Pond BBQ
7:00 – 9:00	Poster Session II (second viewing) (11^{th} floor of Gamow Tower)

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Week 3: July 16 – 20, Location: Duane G125

Monday, July 16	
9:00 - 10:30 AM	Gene Expression Data (Wiggins)
10:30 - 11:00	Break
11:00 - 12:30	Open
3:30 - 5:00*	Algorithms for Neural Circuit Reconstruction (Seung)
7:00 - 8:30*	Reconstruction of Brain Circuits Using Electron Microscopy (Chklovskii)
Tuesday, July 17	
9:00 - 10:30 AM	How to Combine Motif-Related Information to Explain Gene Expression Data (Wiggins)
10:30 - 11:00	Break
11:00 - 12:30 PM	Neuroeconomics (Seung)
2:00 - 3:30	Anatomy and Principles of Brain Design (Chklovskii)
7:30 - 9:30	Poster Session II (11th floor of GamowTower)
Wednesday, July 18	
9:00 - 10:30 AM	Synaptic Basis of Reinforcement Learning (Seung)
10:30 - 11:00	Break
11:00 - 12:30 PM	Neuronal Properties and the Maximum Entropy Principle (Chklovskii)
2:00 - 3:30	Reading Groups
7:00 - 8:00	Public Lecture: More perfect than we imagined: A physicist's view of life (Bialek) Room: **Duane Physics, Room: G1B20**
Thursday, July 19	
9:00 - 10:30 AM	What Physics-Inspired Bioinformatics Can Teach Us About Transcription Factor Binding and Evolution, Part I (Callan)
10:30 - 11:00	Break
11:00 - 12:30 PM	Stochastic Dynamics in Simple Models of Evolution, Part I (Desai)
2:00 - 3:30	Journal Club: Kinetic Proofreading
7:00 - 9:00	Poster Session II (second viewing) (11th floor of GamowTower)
Friday, July 20	
9:00 - 10:30 AM	What Physics-Inspired Bioinformatics Can Teach Us About Transcription Factor Binding and Evolution, Part II (Callan)
10:30 - 11:00	Break
11:00 - 12:30 PM	Stochastic Dynamics in Simple Models of Evolution, Part II (Desai)
2:00 - 3:30	Neural Adaptation to the Statistical Structure of the Environment (Fairhall)
5:00 - 6:30	Kittredge Pond BBQ

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Week 4: July 23 – 27, Location: Duane G125

Monday, July 23	
9:00 - 10:30 AM	Genetic Basis of Phenotypic Variation, Part I (Kruglyak)
10:30 - 11:00	Break
11:00 - 12:30 PM	Coordinating Cell Divison with Growth (Coller)
2:00 - 3:30	Direct Observation of Dynamics in Transcription at the Single Molecule Level (Shaevitz)
Tuesday, July 24	
9:00 - 10:30 AM	Genetric Basis of Phenotypic Variation, Part II (Kruglyak)
10:30 - 11:00	Break
11:00 - 12:30 PM	A Brief History of the Cell Cycle (Coller)
2:00 - 3:30	Experimental Techniques in Small Scale Manipulation of Biological Systems (Shaevitz)
Wednesday, July 25	
9:00 - 10:30 AM	Information theory and adaptive neural filtering (Sharpee)
10:30 - 11:00	Break
11:00 - 12:30 PM	Cellular Individuality in the Chemotactic Response of Dictyostelium (Samadani)
2:00 - 2:45	Student Presentations: Subtleties in Multiplicative Random Walks (Clauset and Schwab)
2:45 – 3:30	Genetic Switching (Tanase-Nicola)
Thursday, July 26	
9:00 - 10:30 AM	Molecular Motors (Linden and Chen)
10:30 - 11:00	Break
11:00 - 12:30 PM	Title: TBD (Clark)
2:00 - 3:30	Cellular Individuality in the DNA Repair Mechanism (Samadani)
3:45 – 5:00	Cell mechanics discussion group
Friday, July 27	
9:00 - 10:30 AM	Student Presentations