Date	Instructor	Theme	Subject	Article	Link
Tue 9/1	Xue	Genetic and Phenotypic Variation	Mutation and resistance	SE Luria & M Delbruck, Mutations of bacteria from virus sensitivity to virus resistance, Genetics 28, 491-511 (1943).	https://www.genetics.org/content/28/6/491
Thu 9/3	Xue		Bacterial persistence	NQ Balaban, J Merrin, R Chait, L Kowalik & S Leibler, Bacterial persistence as a phenotypic switch, Science 305, 1622-1625 (2004).	https://doi.org/10.1126/science.1099390
Tue 9/8	Xue	Phenomenological Models	Bacterial growth laws	M Scott, CW Gunderson, EM Mateescu, Z Zhang & T Hwa, Interdependence of cell growth and gene expression: origins and consequences, Science 330, 1099-1102 (2010).	https://doi.org/10.1126/science.1192588
Thu 9/10	Xue		Cell-size maintenance	S Jun & S Taheri-Araghi, Cell-size maintenance: universal strategy revealed, Trends Microbiol 23(1), 4–6 (2015).	https://doi.org/10.1016/j.tim.2014.12.001
Tue 9/15	Xue	Dimensional Reduction	Behavioral dynamics	GJ Stephens, B Johnson-Kerner, W Bialek & WS Ryu, Dimensionality and dynamics in the behavior of C. elegans, PLoS Comput Biol 4, e1000028 (2008).	https://doi.org/10.1371/journal.pcbi.1000028
Thu 9/17	Dixit		Gene expression	L Haghverdi, F Buettner & FJ Theis, Diffusion maps for high-dimensional single-cell analysis of differentiation data, Bioinformatics 31(18), 2989–2998 (2015).	https://doi.org/10.1093/bioinformatics/btv325
Tue 9/22	Xue	Dynamical Systems and Networks	Ecological stoichiometry	T Andersen, JJ Elser & DO Hessen, Stoichiometry and population dynamics. Ecol Lett 7(9), 884–900 (2004).	https://doi.org/10.1111/j.1461-0248.2004.00646.x
Thu 9/24	Dixit		Genetic circuit	MB Elowitz & S Leibler, A synthetic oscillatory network of transcriptional regulators, Nature 403, 335-338 (2000).	https://doi.org/10.1038/35002125
Tue 9/29	Dixit	Material and Energy Balance	Flux Balance Analysis	JS Edwards, RU Ibarra & BO Palsson, In silico predictions of Escherichia coli metabolic capabilities are consistent with experimental data, Nat Biotechnol 19, 125–130 (2001).	https://doi.org/10.1038/84379
Thu 10/1	Dixit		Thermodynamic constraints	DA Beard, SD Liang & H Qian, Energy balance for analysis of complex metabolic networks, Biophys J 83(1), 79–86 (2002).	https://doi.org/10.1016/S0006-3495(02)75150-3
Tue 10/6	Dixit	Statistical Descriptions	Protein sequences	F Morcos, A Pagnani, B Lunt, A Bertolino, DS Marks, C Sander, R Zecchina, JN Onuchic, T Hwa & M Weigt, Direct-coupling analysis of residue coevolution captures native contacts across many protein families, Proc Natl Acad Sci USA 108 (49), E1293 (2011).	https://doi.org/10.1073/pnas.1111471108
Thu 10/8	Dixit		Neural activity	L Meshulam, JL Gauthier, CD Brody, DW Tank & W Bialek, Coarse graining, fixed points, and scaling in a large population of neurons, Phys Rev Lett 123, 178103 (2019).	https://doi.org/10.1103/PhysRevLett.123.178103
Tue 10/13	Xue	Representation and Encoding	Associative memory	JJ Hopfield, Neural networks and physical systems with emergent collective computational abilities, Proc Natl Acad Sci USA 79, 2554 (1982).	https://doi.org/10.1073/pnas.79.8.2554
Thu 10/15	Hagen		Olfaction codes	B Malnic, J Hirono, T Sato & LB Buck, Combinatorial receptor codes for odors, Cell 96(5), 713-723 (1999).	https://doi.org/10.1016/S0092-8674(00)80581-4
Tue 10/20	Hagen	Sensing and Navigation	Concentration sensing	HC Berg & EM Purcell, Physics of chemoreception, Biophys J 20, 193 (1977).	https://doi.org/10.1016/S0006-3495(77)85544-6
Thu 10/22	Hagen		Bacterial chemotaxis	HC Berg & DA Brown, Chemotaxis in Escherichia coli analysed by three-dimensional tracking, Nature 239, 500–504 (1972).	https://doi.org/10.1038/239500a0
Tue 10/27	Hagen	Stochastic Fluctuations	Stochastic gene expression	MB Elowitz, AJ Levine, ED Siggia & PS Swain, Stochastic gene expression in a single cell, Science 297, 1183 (2002).	https://doi.org/10.1126/science.1070919
Thu 10/29	Guan		Transcriptional burst	I Golding, J Paulsson, SM Zawilski & EC Cox, Real-time kinetics of gene activity in individual bacteria, Cell 123(6), 1025 (2005).	https://doi.org/10.1016/j.cell.2005.09.031
Tue 11/3	Guan	Nonequilibrium Dynamics	Active matter	A Yildiz, JN Forkey, SA McKinney, T Ha, YE Goldman & PR Selvin, Myosin V walks hand-over-hand: Single fluorophore imaging with 1.5-nm localization, Science 300, 2061 (2003).	https://doi.org/10.1126/science.1084398
Thu 11/5	Hagen		Kinetic proofreading	JJ Hopfield, Kinetic proofreading: A new mechanism for reducing errors in biosynthetic processes requiring high specificity, Proc Nat Acad Sci USA 71, 4135 (1974).	https://doi.org/10.1073/pnas.71.10.4135
Tue 11/10	Hagen	Pattern Formation	Turing pattern	AM Turing, The chemical basis of morphogenesis, Phil Trans R Soc Lond B237, 37 (1952).	https://doi.org/10.1098/rstb.1952.0012
Thu 11/12	Guan		Embryonic development	CP Brangwynne, CR Eckmann, DS Courson, A Rybarska, C Hoege, J Gharakhani, F Julicher & AA Hyman, Germline P granules are liquid droplets that localize by controlled dissolution/condensation, Science 324, 1729 (2009).	https://doi.org/10.1126/science.1172046
Tue 11/17	Guan	Novel Phases of Matter	Phase separation	P Li, S Banjade, HC Cheng, S Kim, B Chen, L Guo, M Llaguno, JV Hollingsworth, DS King, SF Banani, PS Russo, QX Jiang, BT Nixon & MK Rosen, Phase transitions in the assembly of multivalent signalling proteins, Nature 483, 336 (2012).	https://doi.org/10.1038/nature10879
Thu 11/19	Xue		Collective behavior	T Vicsek, A Czirok, E Ben-Jacob, I Cohen & O Shochet, Novel type of phase transition in a system of self-driven particles, Phys Rev Lett 75, 1226 (1995).	https://doi.org/10.1103/PhysRevLett.75.1226
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Tue 12/1	Guan	Optical Limit and Imaging	Single-molecule detection	J Elf, GW Li & XS Xie, Probing transcription factor dynamics at the single-molecule level in a living cell, Science 316, 1191 (2007).	https://doi.org/10.1126/science.1141967
Thu 12/3	Guan		Super-resolution techniques	M Bates, B Huang, GT Dempsey & X Zhuang, Multicolor super-resolution imaging with photo-switchable fluorescent probes, Science 317, 1749 (2007).	https://doi.org/10.1126/science.1146598
Tue 12/8					