

## CSB435: Regulatory Networks and Systems in Molecular Biology

Schedule of lectures, assignments and reading: (I-VI refer to topics in the course outline)

Jan. 14: (I)

Jan. 21: (I) reading: Sauer et al. *Science* 2007

Jan. 28: (II) reading: *A Genetic Switch* Pg. 10-46

Feb. 4: (II) reading: *A Genetic Switch* Pg. 46-65, 109-122 **Paper explained/assigned**

Feb. 11: (III) reading: *A Genetic Switch* Pg. 78-82, St-Pierre & Endy *PNAS* 2008

Feb. 18: (III) reading: Ideker et al. *Science* 2001, **Paper proposal due**

Feb. 25: **Midterm Examination**

Mar. 3: (IV) reading: *The Cell Cycle* Pg. 2-9

Mar. 10: (IV) reading: Holt et al. *Nature* 2008

Mar. 24: (V) **Paper Due**

Mar. 31: (VI) reading: Shen-orr et al. *Nat. Genetics* 2002

April. 7: (VI)

Required Reading:

Sauer U, Heinemann M, Zamboni N. Getting closer to the whole picture. *Science*. 2007 Apr 27;316(5824):550-1

Ptashne M. *A Genetic Switch*, 3rd edition (2004) CSHL Press

St-Pierre F, Endy D. Determination of cell fate selection during phage lambda infection. *Proc Natl Acad Sci U S A*. 2008 Dec 30;105(52):20705-10. Epub 2008 Dec 19.

Ideker T, Thorsson V, Ranish JA, Christmas R, Buhler J, Eng JK, Bumgarner R, Goodlett DR, Aebersold R, Hood L. Integrated genomic and proteomic analyses of a systematically perturbed metabolic network. *Science*. 2001 May 4;292(5518):929-34.

Section from Morgan DO, *The Cell Cycle: Principles of Control* New Science Press 2007

Holt LJ, Krutchinsky AN, Morgan DO. Positive feedback sharpens the anaphase switch. *Nature*. 2008 Jul 17;454(7202):353-7.

Shen-Orr SS, Milo R, Mangan S, Alon U. Network motifs in the transcriptional regulation network of *Escherichia coli*. *Nat Genet*. 2002 May;31(1):64-8.

Recommended Reading:

Arkin A, Ross J, McAdams HH. Stochastic Kinetic Analysis of Developmental Pathway Bifurcation in Phage  $\lambda$ -Infected *Escherichia coli* Cells. *Genetics*. (1998) 149: 1633-1648

Ferrell JE Jr, Tsai TY, Yang Q. Modeling the cell cycle: why do certain circuits oscillate? *Cell*. 2011 Mar 18;144(6):874-85.