BIOE498H/599H: Systems Immunology and Immunoengineering
Credits: 3, Spring 2017, TTh 11:30 – 12:50 PM in DEN 213

Instructor: Dr. Hao Yuan Kueh
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Please email to schedule.

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Principles of biological circuit design
Living systems are exceptionally robust – they often operate with a level of precision, reliability, and versatility that far exceeds that of man-made systems. This course will analyze biological circuits for 1) signal perception, 2) metabolic control, 3) cell fate stabilization, and 4) multi-cellular self-organization, with a focus on understanding design principles that enable them to function robustly in cells. These principles will be utilized for the design and testing of synthetic circuits for various applications.

Specific outcomes: by the end of the course, you should be able to:
- Understand design principles underlying robust operation of biological circuits
- Analyze a range of biological circuits using analytical and numerical approaches.
- Design and build synthetic circuits based on learned design principles

Course website: https://canvas.uw.edu/courses/1137415

Textbooks: There are no required textbooks. All course material will be made available on the course website. The following are recommended readings:
- Systems Biology: Introduction to Pathway Modeling. Sauro H
- An Introduction to Systems Biology: Design Principles of Biological Circuits. Alon U
- Nonlinear Dynamics and Chaos. Strogatz S

Prerequisites by class: Either BIOEN 336, BIOEN 401, CHEME 476/576, BIOEN 423/523, CSE 486/586, EE423/523, or permission of instructor.

Pre-requisites by topic: Ordinary differential equations, linear algebra, basic computer programming, probability theory, high school or basic knowledge of cell and molecular biology