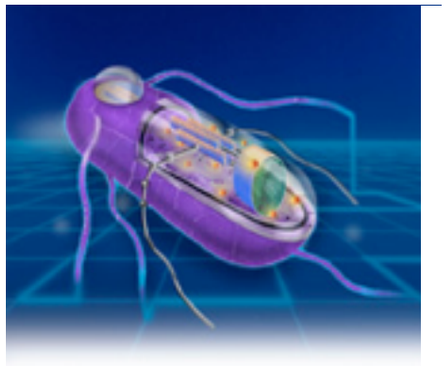
Fall 2016

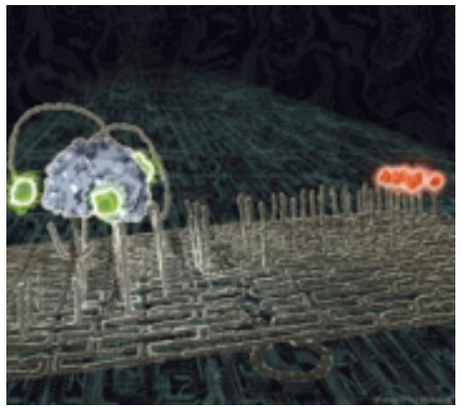
Systems Biology 204:

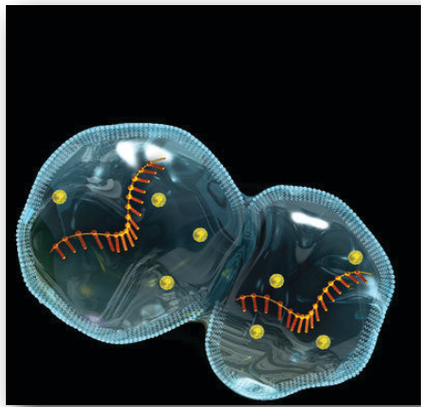
Biomolecular Engineering and Synthetic Biology

Synopsis

A course focusing on the rational design, construction, and applications of nucleic acid and protein-based synthetic molecular and cellular machinery and systems. Students are mentored to produce substantial term projects, which are tailored to each student's strengths and interests.







Instructors

George Church, William Shih, Peng Yin

Guest lecturers

Ed Boyden, Jeremy Gunawardena, Gäel McGill,
Johan Paulsson, Jack Szostak, Jeff Way

Logistics

Meeting time: Mon. Wed. 2:30 pm - 3:59 pm
Location: Room 521, Wyss Institute, 3 Blackfan Circle, Boston
Contact: Weidong Xu (Teaching Fellow) wxu@g.harvard.edu
Peng Yin (Professor) py@hms.harvard.edu

Syllabus

Day / Date	Lecturer	Title
Wed. Aug. 31	William Shih	Biomolecular primitives
Mon. Sep. 5	N/A	University Holiday (Labor Day)
Wed. Sep. 7	William Shih	Software demo: nanoEngineer for nanostructure visualization
Mon. Sep. 12	William Shih	DNA origami
Wed. Sep. 14	William Shih	Software demo: caDNAno for DNA origami design
Mon. Sep. 19	Peng Yin	DNA bricks
Wed. Sep. 21	Peng Yin	DNA circuits and machines
Mon. Sep. 26	Peng Yin	Software demo: sequence designer/ molecular compiler -- TA
Wed. Sep. 28	Peng Yin	Barcoding and imaging life with DNA
Mon. Oct. 3	Peng Yin	Probing and programming life with DNA/RNA
Wed. Oct. 5	Peng Yin	DNA-based nanofoundries
Mon. Oct. 10	N/A	University Holiday (Columbus Day)
Wed. Oct. 12	George Church	Genome engineering
Mon. Oct. 17	William Shih	DNA-based single molecule tools
Wed. Oct. 19	Jeff Way	Synthetic circuits in living cells
Mon. Oct. 24	Jeff Way	Engineered Protein Pharmaceuticals
Wed. Oct. 26	George Church	Homologous recombination, gene therapy, tissue engineering, evolution
Mon. Oct. 31	William Shih	In vitro Evolution
Wed. Nov. 2	Jeremy Gunawardena	Modeling biological systems
Mon. Nov. 7	Johan Paulsson	Designing synthetic gene circuits for precise and robust dynamics
Wed. Nov. 9	Jack Szostak	Protocell design (Veteran's day, class in session)
Mon. Nov. 14	Gäel McGill	Biovisualization Tools & Design: Communication, Data Exploration & Mental Models
Wed. Nov. 16	Guest lecturer	TBD
Mon. Nov. 21	Ed Boyden	Tools for Analyzing and Controlling Biological Systems
Wed. Nov 23	N/A	Thanksgiving recess begins
Mon. Nov. 28	Students	Final project presentations
Wed. Nov. 30	Students	Final project presentations

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