Instrumentation and Measurement

Faculty: Mark Bathe, Paul Blainey, Ed Boyden, Alan Grodzinsky, Jongyoon Han, Anders Hansen, Maxine Jonas, Alan Jasanoff, Roger Kamm, Amy Keating, Robert Langer, Harvey Lodish, Scott Manalis, Katharina Ribbeck, Peter So, Julie Sutton, Bruce Tidor, Krystyn Van Vliet, Steve Wasserman

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Description: The instrumentation and measurement concentration will build a foundation in the physical principles underlying Nature’s machinery from both a theoretical and experimental perspective spanning single molecule measurements of biological motors to cell and tissue level machinery. The area encompasses foundational subjects in experimental biophysics including introduction of advanced measurements such as imaging and spectroscopy and skills used to build instrumentation.

Guide for class selection: Any three courses from the list below may be taken to satisfy this concentration.

Restricted Electives

2.131 Advanced instrumentation and measurement (U)
Prereq: Permission of Instructor

2.180 Biomolecular Feedback Systems
Prereq: Biology (GIR), 18.03, or permission of instructor

2.671 Measurement and instrumentation (U)
Prereq: 2.001 or 2.01; 2.003 or 2.03; 2.086; Physics II

2.676 Micro/Nano Engineering Laboratory
Prereq: 2.001, 2.003, 2.671, and Coreq: (2.005 or (2.051 and 2.06)); or permission of instructor

2.71 Optics (U)
Prereq: Physics II GIR; 18.03; 2.004, 2.04A, 2.04B; or permission of instructor

2.715 Optical Microscopy & Spectroscopy for Biology and Medicine (G) same as 20.487
Prereq: permission of instructor

2.717 Optical Engineering (G) same as MAS.857
Prereq: 2.710 or permission of instructor

6.002 Circuits and Electronics (U)
Prereq: Physics II GIR; coreq: 18.03

6.003 Signals and systems (U)
Prereq: Physics II (GIR); 2.087 or 18.03

6.071 Electronics, Signals, and Measurement (U)
Prereq: 18.03

10.28 Chemical-Biological Engineering Laboratory
Prereq: ((5.07 or 7.05) and (5.310 or 7.003)) or permission of instructor

12.373 Field Oceanography
Prereq: Biology (GIR), Chemistry (GIR), and permission of instructor

20.381 Biological Engineering Design II
Prereq: 20.380

20.315 Physical Biology
Prereq: 5.60, 20.110, or permission of instructor