

Applied + Engineering Physics

CORNELL ENGINEERING

Degree Programs: BS, MEng, PhD

Primary Research Areas

- Nanoscience, condensed matter physics
- Biophysics
- Optical physics and photonics
- Instrumentation development
 - Electron microscopy
 - Ultrashort-pulse lasers
 - Ultrafast coherent x-ray source ERL
 - Nanoscale bio techniques (sorting, sensing)

Rankings:

Engineering Science/Engineering Physics

1. Cornell University (NY)
2. California Institute of Technology*
3. University of California-Berkeley*
4. U. of Illinois-Urbana-Champaign*
5. Massachusetts Inst. of Technology
6. University of Michigan-Ann Arbor*
7. Princeton University (NJ)
8. Univ. of Wisconsin-Madison
9. Harvard University (MA)

Recent Trends

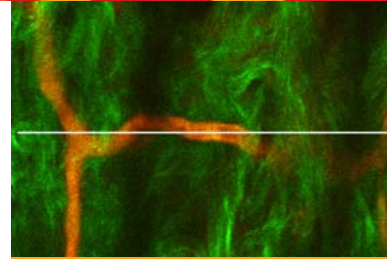
- Increased undergrad enrollments
- University leadership
 - Center directors, vice provost
- Only one professor under 40 years old
- Transfer of bioimaging center to BME
- Physical Sciences Building

Recent Achievements/Recognition

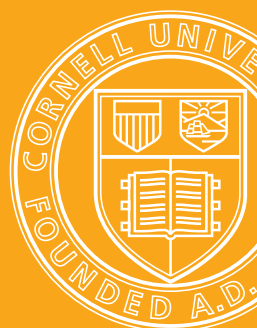
- Nanobiotechnology led by AEP faculty
- Spintronics led by AEP faculty
- USN&WR #1 undergrad program 2005-2008
- H. Craighead elected to National Academy
- D. Muller Microscopy Society young scientist award

Priorities

- 4-5 faculty hires 2009-2013
 - Critical to hire women, under-represented minorities focus on youth
- PhD recruiting
 - Multi-year fellowships
- Development of graduate curriculum
 - Currently minimal



Multiphoton imaging of circulation deep in tissues, with nanocrystal fluoro-phores.

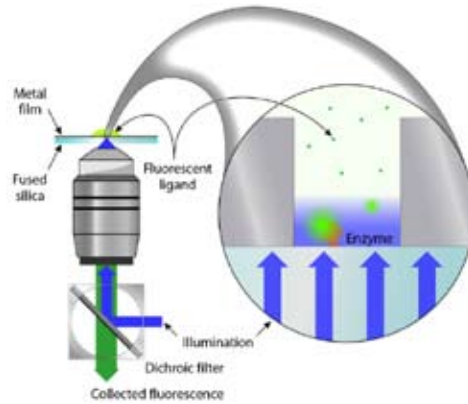


Challenges/Approaches/Opportunities

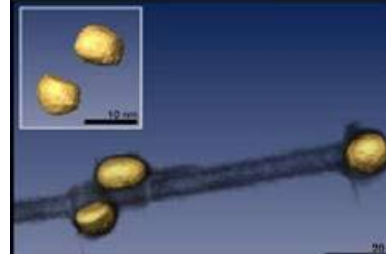
- Faculty turnover
 - Costs of recruiting new faculty: time, money
 - Bridge funding of new faculty
 - Dual-career recruiting
 - Opportunity: creation of uniformly-strong department
 - Opportunity: development of grad curriculum
- Diversity: undergrad, grad, faculty
 - Proactive, targeted searching and recruiting
 - Tracking of strong candidates earlier in career
 - Tolerance of risk in hiring
 - Faculty diversity increases student diversity
 - Development of URM pipeline
 - Access to increased federal funding
- PhD recruiting
 - Attractors: fellowships, enhanced curriculum
 - Route to greater research productivity
- MEng Program
 - Currently small, ~10/year
 - Expansion could yield revenue stream
 - Expansion through group projects clashes with our 1-on-1 culture – advising challenge

Future Directions/Opportunities

- Physical Sciences Building
 - Major upgrade of undergrad labs
 - World-best research facilities
 - Major attraction for future grad students, faculty
- Research directions
 - Endoscopic bioimaging
 - Silicon photonics (with ECE)
 - Energy (basic science)
- How to position AEP?
 - Continue focus on fundamentals
 - Recruit the best and intellectually-agile people



Dynamics of single biomolecules can be studied in a nanoscale waveguide.



Electron micrograph of a carbon nanotube with gold clusters on it.



Artist rendering of Physical Sciences Building from East Ave.