



Applied + Engineering Physics

CORNELL ENGINEERING



Degree Programs and Research Areas

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)

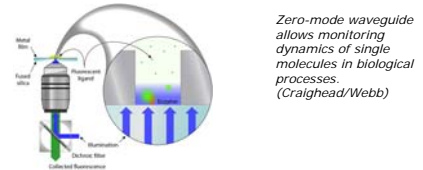
Achievements

#1 Ranking – 2005-2008
 Undergraduate engineering specialties:
 Engineering Science/Engineering Physics
 Friday, August 22, 2008

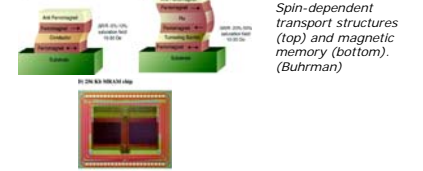


- 1 Cornell University
- 2 University of California-Berkeley
- 3 University of Michigan-Ann Arbor
- 4 California Institute of Technology
- 5 University of Illinois-Urbana-Champaign IL
- 6 Pennsylvania State University-University Park

Nanobiotechnology led by AEP faculty



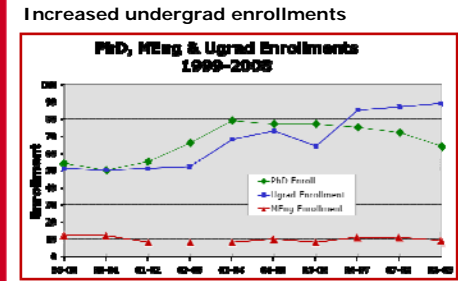
Spintronics led by AEP faculty



Faculty Awards
 R. Buhrman elected American Academy of Arts & Sciences
 H. Craighead elected National Academy of Engineering
 D. Muller Microscopy Society young scientist award

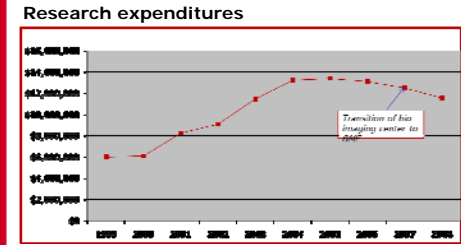
Physical Sciences Building
 Ground breaking fall 2007, planned occupancy fall 2010

Trends

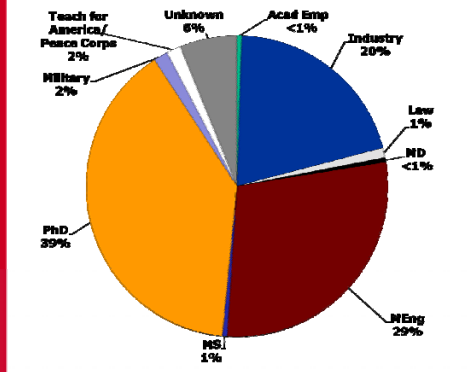


University leadership
 Center directors, vice provost

One professor under 40 years old



Undergraduate Placement 1999-2008



Priority Goals

- 4-5 young faculty hires 2009-2013**
 Critical to hire women, under-represented minorities, focus on youth
- Diversity: undergrad, grad, faculty**
 Proactive, targeted searching and recruiting
 Tracking of strong candidates earlier in career
- PhD recruiting**
 Multi-year fellowships
- Development of graduate curriculum**
 Currently minimal



Above: Artist rendering of Physical Sciences Building from East Ave.
 Right: Aerial photo of construction site August 08

Physical Sciences Building Project Goals

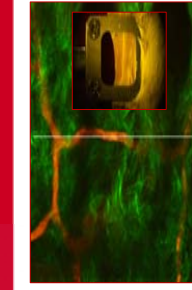
- Increase the amount and quality of space for research and instruction.
- Create a unified, state-of-the-art facility reflecting the world-class quality and status of Cornell's Physical Sciences.
- Enhance the overall character and quality of the Physical Sciences' facilities to improve recruitment and retention of top quality researchers, faculty and students.
- Strengthen physical linkages within the existing facilities, among departments and across campus to encourage increased interaction among people in various disciplines.
- Provide more shared resources to support interdisciplinary work.

Challenges

- Faculty turnover**
 Costs of recruiting new faculty: time, money
 Bridge funding of new faculty
 Dual-career recruiting
- Diversity: undergrad, grad, faculty**
 Tolerance of risk in hiring
 Increase applicant pools
- PhD recruiting**
 Attractors: fellowships, enhance curriculum
- MEng Program**
 Currently small, ~10/year
 Expansion could yield revenue stream
 Expansion through group projects clashes with our 1-on-1 culture - advising challenge

Opportunities

- Faculty turnover**
 Opportunity: creation of uniformly-strong department
 Opportunity: development of grad curriculum
- Diversity: undergrad, grad, faculty**
 Faculty diversity increases student diversity
 Development of URM pipeline
 Access to increased federal funding
- PhD recruiting**
 Route to greater research productivity
- Physical Sciences Building**
 Major upgrade of undergrad labs
 World-best research facilities
 Major attraction for future grad students, faculty



Research directions
 Endoscopic biimaging
 Silicon photonics (with ECE)
 Energy (basic science)

How to position AEP?
 Continue focus on fundamentals
 Recruit best, intellectually-agile

Semiconductor nanocrystals injected into blood (red) allow imaging of circulation deep in tissue, through skin. (Wise/Webb)