

College of Engineering Update

Lance R. Collins

Dean of Engineering

October 30-31, 2014



Agenda

- College leadership update
- Faculty update
 - New hires
 - Awards
 - Research Expenditures
- Enrollment and Diversity Update
- Student Project Teams
- General updates
 - Co-op & Career Services Initiatives
 - Facilities Update
 - Campaign Now Update
 - Branding Update
- NYC Tech Campus Update

Associate Dean for Research and Graduate Studies



Emmanuel Giannelis
Associate Dean for Research
and Graduate Studies

- Joined Cornell in 1987.
- Walter R. Read Professor of Engineering, Department of Materials Science
- Former Director of Department of Materials Science and Engineering, Cornell University
- Degrees received
 - B.S. in Chemistry, University of Athens, Greece, 1980
 - Ph.D. in Inorganic Chemistry, Michigan State University, 1985
- Research Interests – Nanomaterials for energy, biomedical, transportation, infrastructure, and environmental applications. Internationally recognized as one of the leading research groups in polymer nanocomposites.

Director of Applied and Engineering Physics



Lois Pollack
Director of Applied and
Engineering Physics

- Joined Cornell in 2000.
- Professor of Applied and Engineering Physics
- Recipient of Swanson Excellence in Teaching Award (Cornell University) 2003
- National Science Foundation Career Award 2004
- Degrees received
 - B.S. in Physics, Brandeis University, 1983
 - Ph.D. in Physics, MIT, 1989
- Research Focus – Developing and applying physics-based tools to gain insight into outstanding problems in molecular biology.

Chair of Computer Science



Fred Schneider
Chair of
Computer Science

- Joined Cornell in 1978.
- Samuel B. Eckert Professor of Computer Science
- Elected NAE 2011
- Degrees received
 - B.S. Computer Science and Electrical Engineering, Cornell University, 1975
 - M.S. Computer Science, State University of New York at Stony Brook, 1977
 - Ph.D. Computer Science, State University of Stony Brook, 1978
- Research Focus – Concurrent and distributed systems for high-integrity and mission-critical applications.

Chair of Earth and Atmospheric Sciences



Richard Allmendinger
Chair of
Earth and Atmospheric Sciences

- Joined Cornell in 1984.
- Professor of Earth and Atmospheric Sciences
- Former Associate Dean for Diversity, College of Engineering, Cornell University
- Recipient of Career Contribution Award from the Structure and Tectonics Division of the Geological Society of America, 2012.
- Degrees received
 - A.B. Cornell University, 1975
 - Ph.D. Stanford University, 1979
- Research Interest – structural geology with a focus on understanding brittle upper crustal deformation during earthquakes and at longer scales during foreland fold-thrust belt deformation.

New Faculty

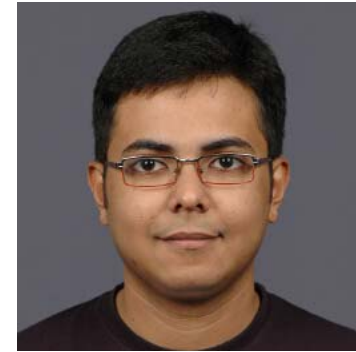
(arriving Summer-Fall 2014)



Erik Andersen
Asst. Professor, CS



Ross Knepper
Asst. Professor, CS



Karthik Sridharan
Asst. Professor, CS



Jeffrey Moses
Asst. Professor, AEP



Damian Helbling
Asst. Professor, EAS



Gregory McLaskey
Asst. Professor, CEE



Sara Pryor
Professor, EAS

New Faculty

(arriving Summer-Fall 2014)



Benjamin Cosgrove
Asst. Professor, BME



Geoffrey Abers
Professor, EAS



Rebecca Barthelmie
Professor, MAE



Dimitry Savransky
Asst. Professor, MAE



Daniel Selva
Asst. Professor, MAE



Matthew Paszek
Asst. Professor, CBE

Faculty moving to Cornell Tech



Doug Stayman
*Assoc. Professor & Associate Dean
Johnson/Marketing*

Major Faculty Awards

- **American Academy of Arts and Sciences**
 - Provost Kent Fuchs
- **Association for Computing Machinery, Distinguished Service Award**
 - Juris Hartmanis (CS)
- **SIAM (Society for Industrial and Applied Mathematics), Fellow**
 - Christine Shoemaker (CEE/ORIE)
- **Office of Naval Research Young Investigator Program Award**
 - Roseanna Zia (CBE)
- **NSF CAREER Awards**
 - Xiling Shen (ECE)
 - Eilyan Bitar (ECE)

Major Faculty Awards

- **ACM SIGGRAPH's Significant New Researcher Award**
 - Noah Snavely (CS)
- **American Institute of Chemical Engineer's William Grimes Award**
 - Lance Collins
- **2014 AGU Fellow, American Geophysical Union**
 - Teresa Jordan (EAS)
- **Royal Academy of Engineers, International Fellow**
 - Tom O'Rourke (CEE)
- **Packard Fellow**
 - Lena Kourkoutis (AEP)

National Academy of Construction



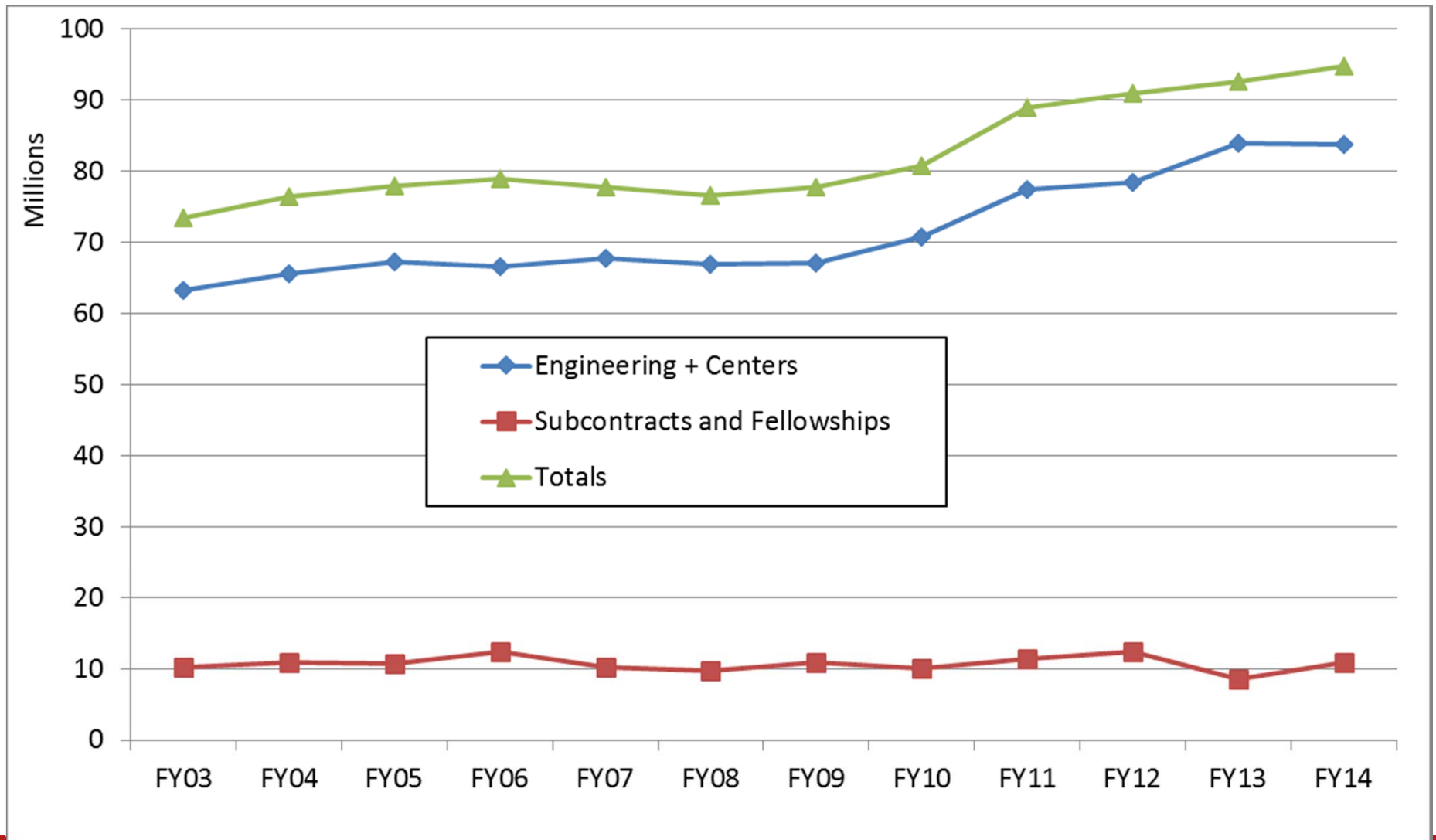
Ken Arnold

B.C.E. '63

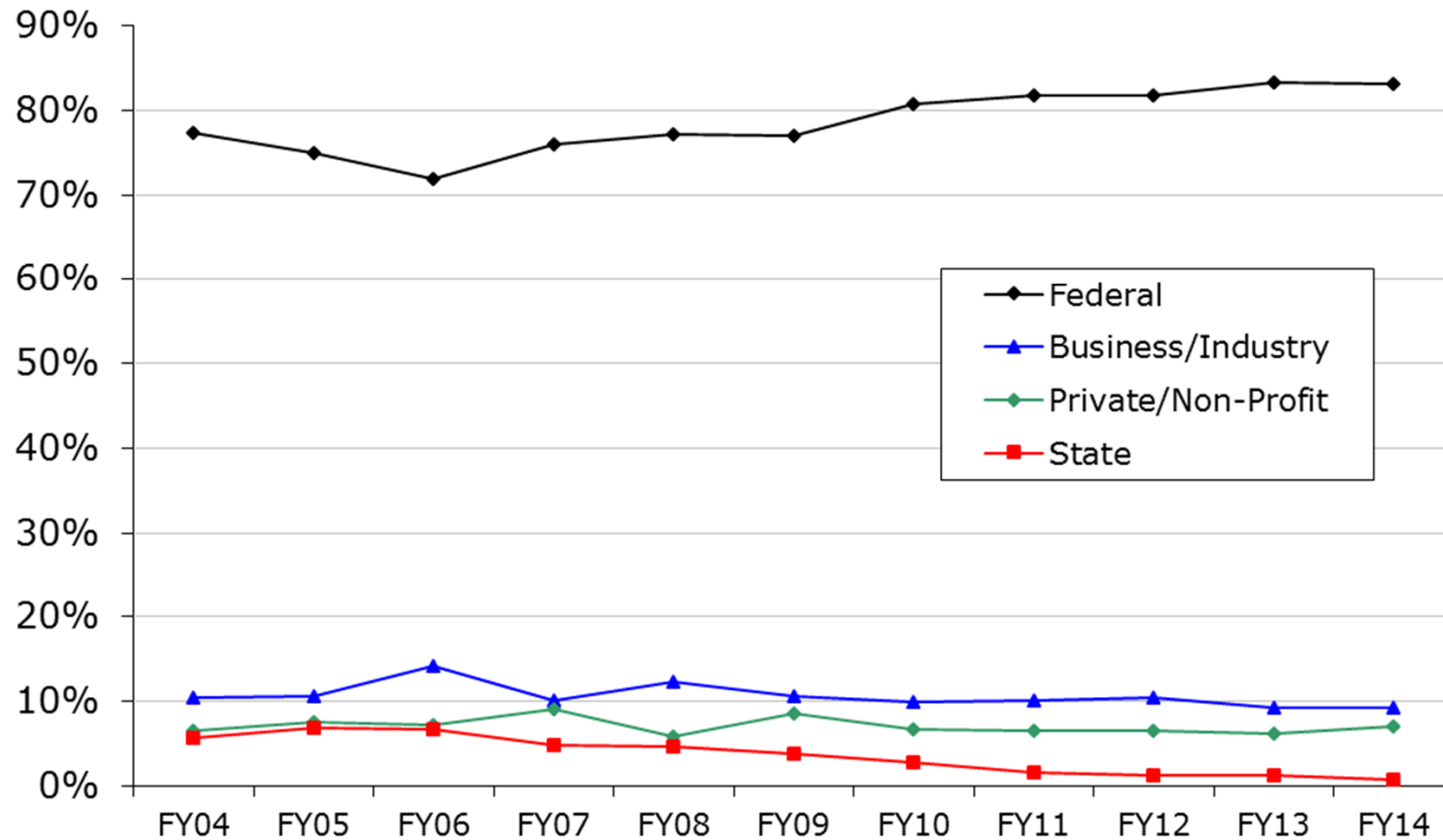
WorleyParsons

- Elected to National Academy of Construction.
- To be inducted on October 24, 2014, at the NAC Annual Meeting in Austin, Texas.
- Arnold is a major contributor to the design and operation of offshore and onshore oil production systems.
- Co-author of two facilities design textbooks and has written more than 50 articles on safety, project management, and facilities design.
- Honorary Emeritus ECC member since 2012.

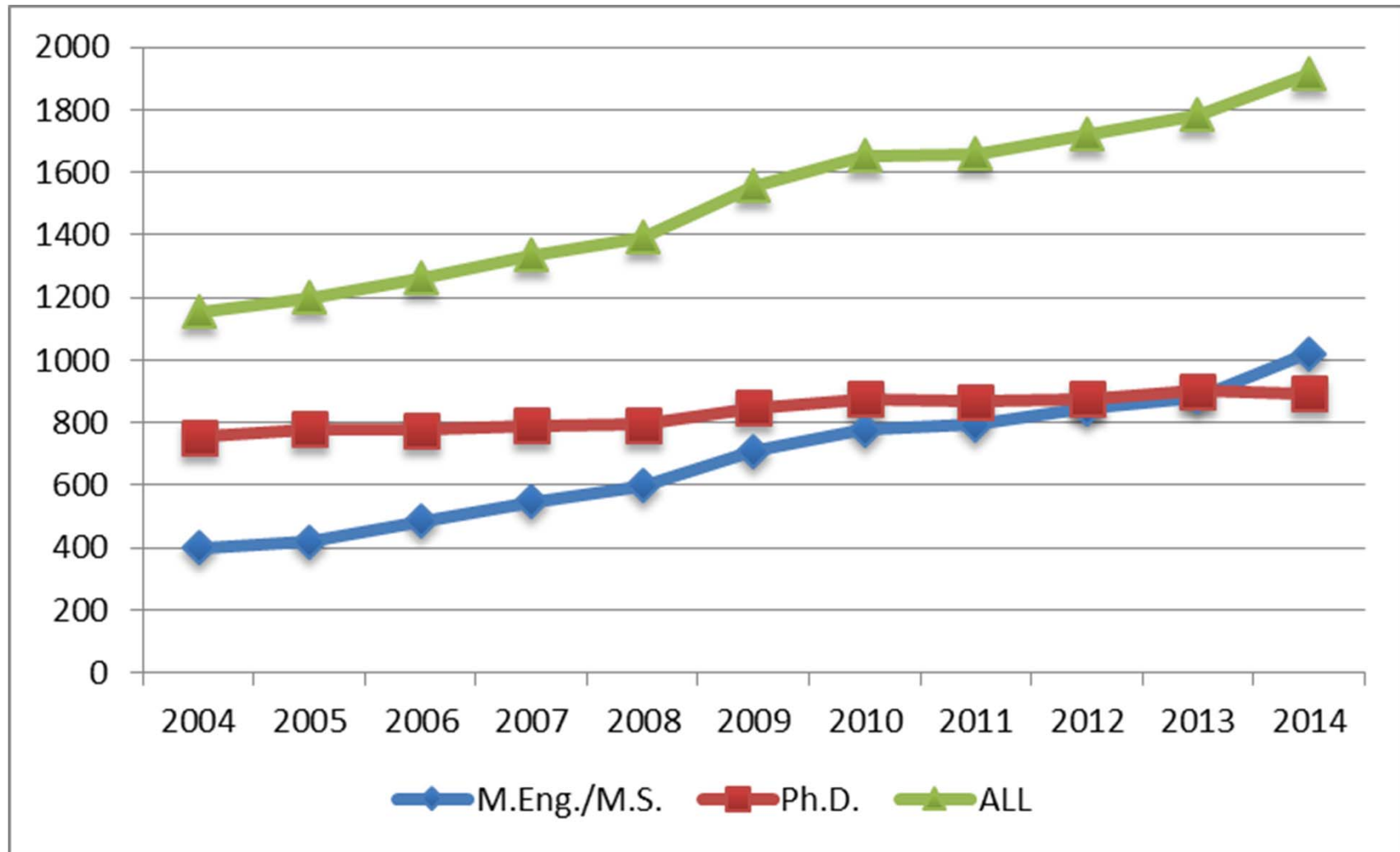
Research Expenditures



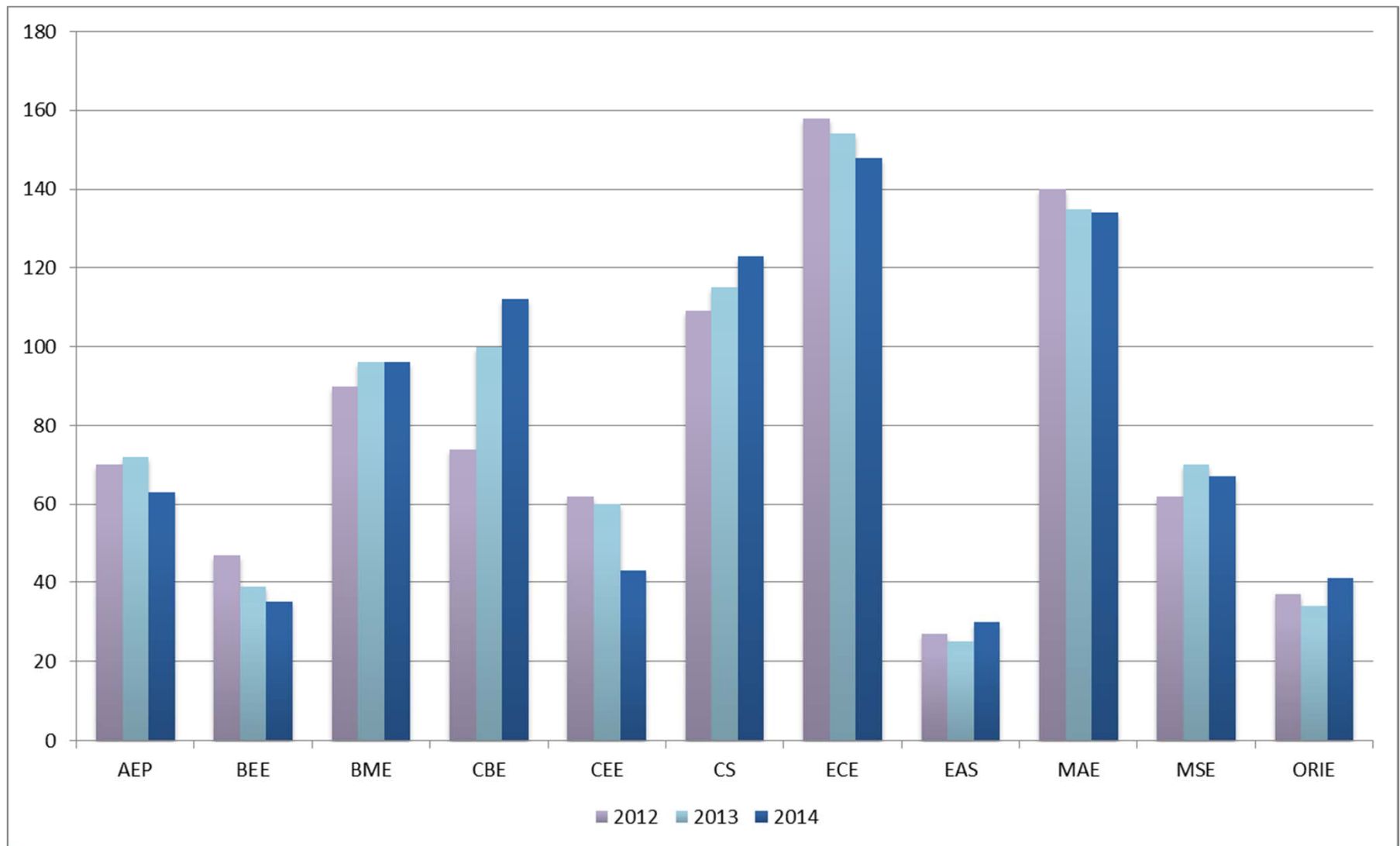
Percent Distribution of Research Expenditures



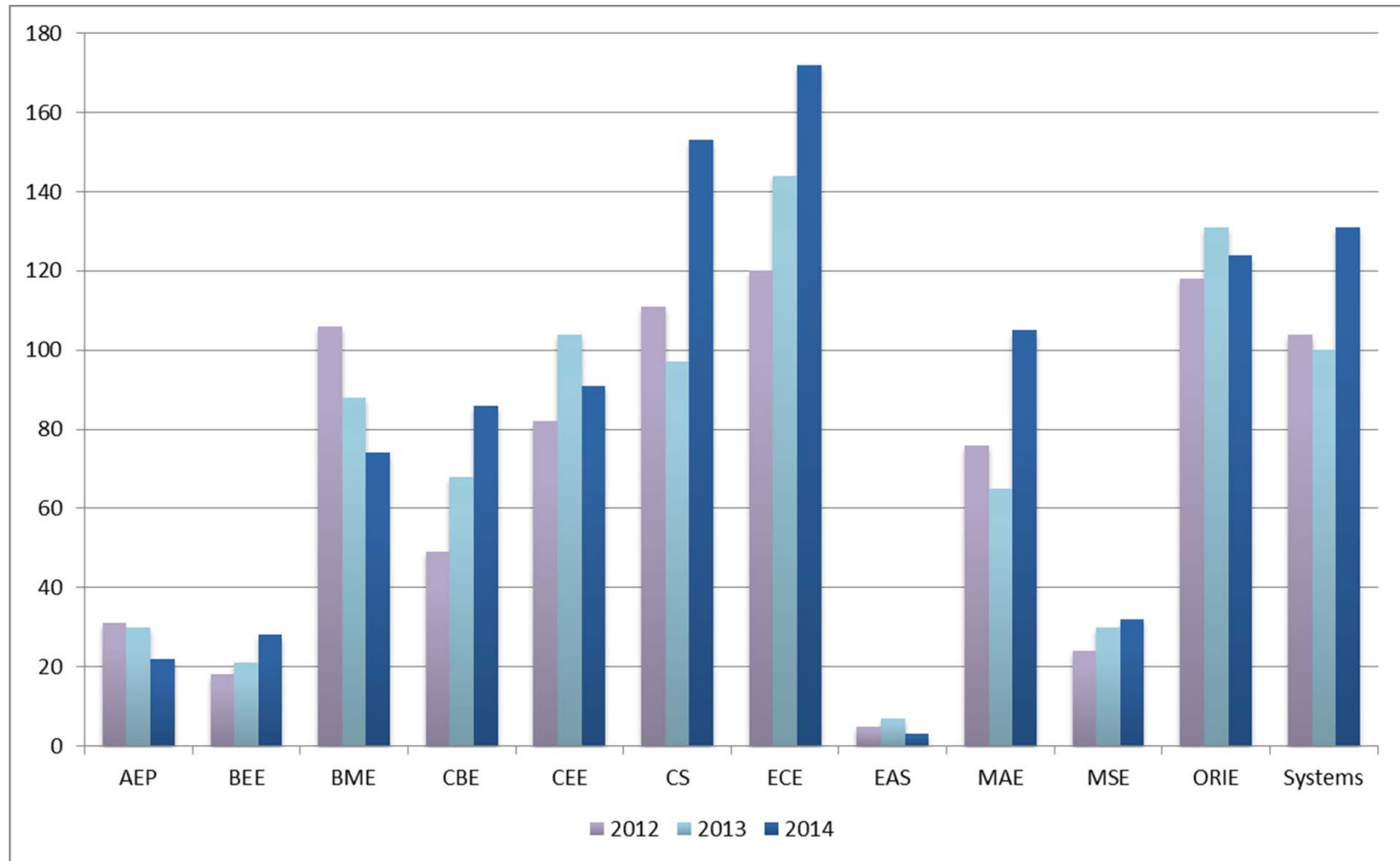
Graduate Student Enrollment



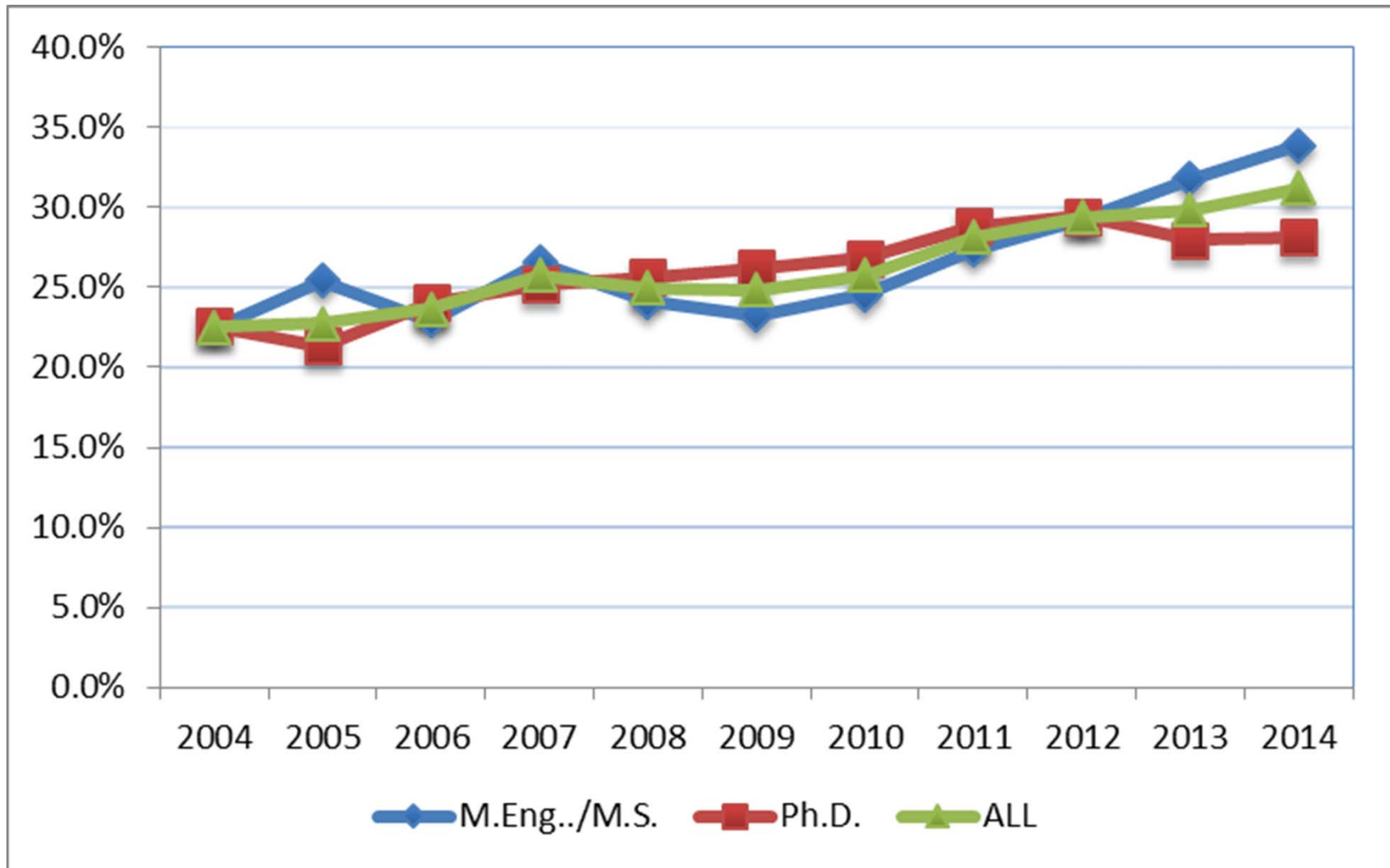
PhD Enrollment by Field



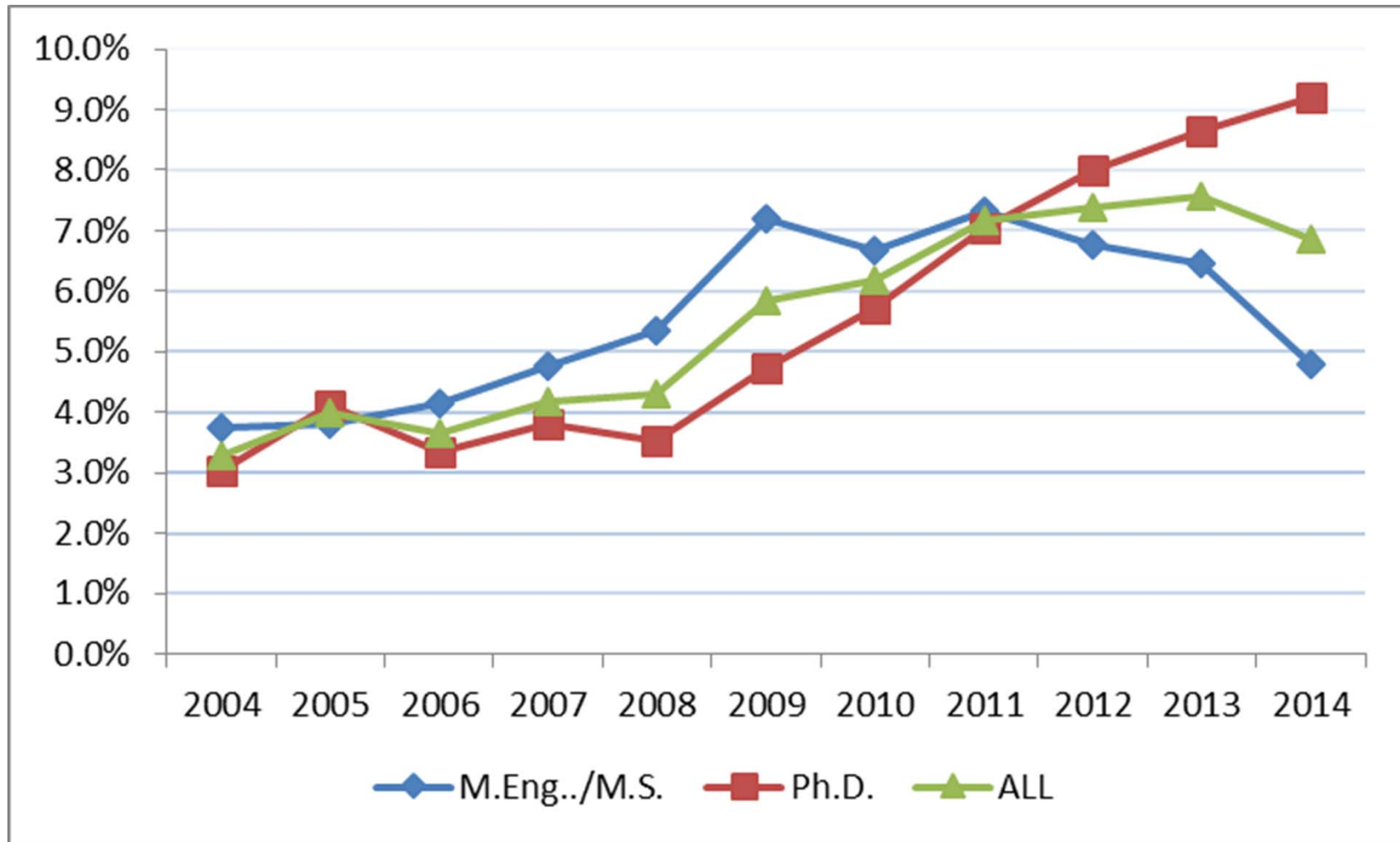
M.Eng/MS Enrollment by Field



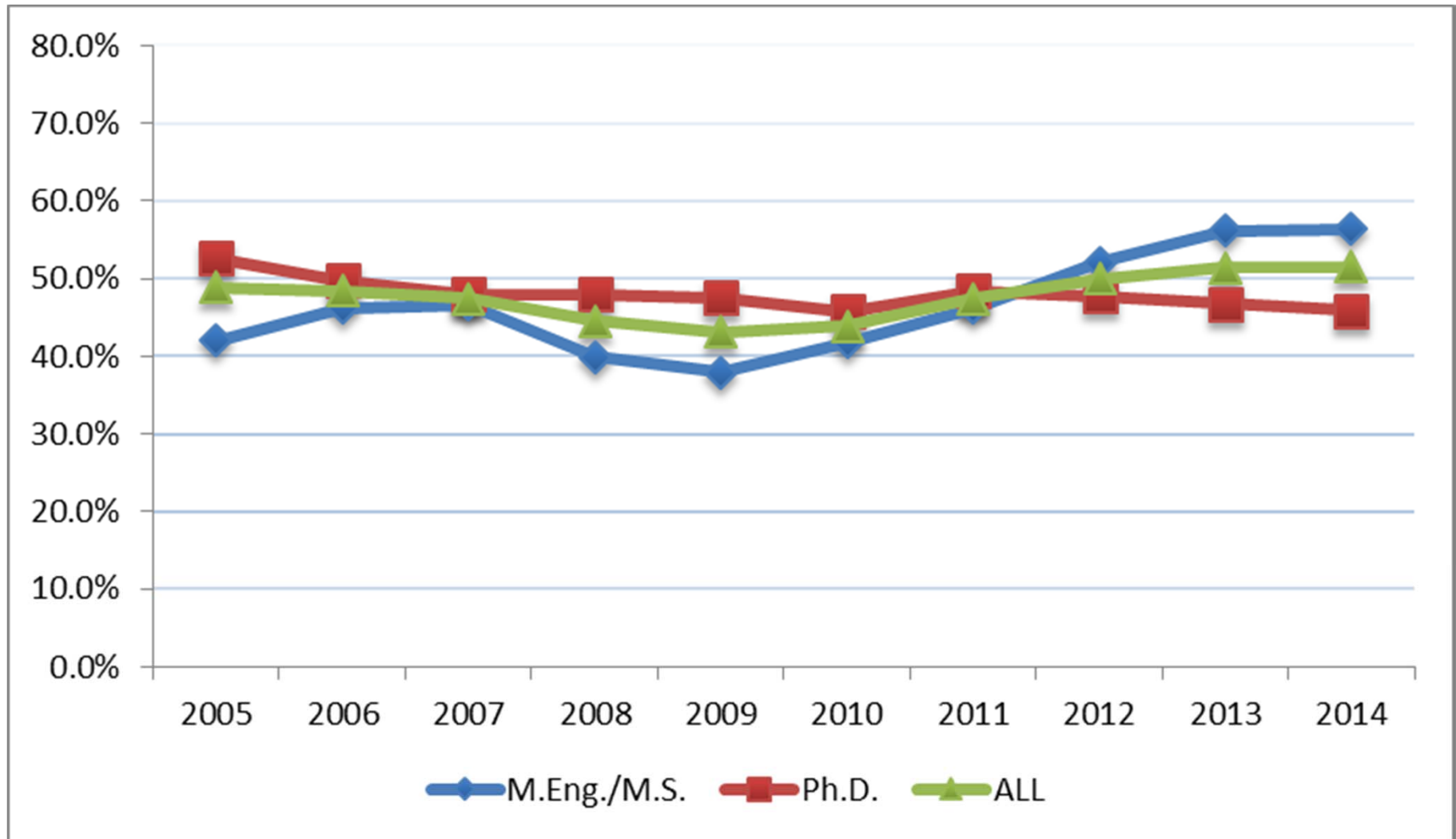
Graduate Student Enrollment Women



Graduate Student Enrollment Under-represented Minorities



Graduate Student Enrollment International

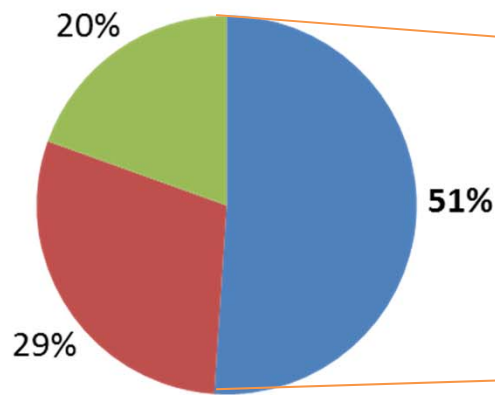


First-year PhD Funding

- Goal:
 - Increase funding to support all 1st year PhD students on fellowships
- Concerns regarding 1st year students on funded on TAs and GRAs:
 - Insufficient time to build relationships with faculty
 - Poor research specialization choices
 - Lack of knowledge about fields
 - Poor yield against peer institution fellowship offers
 - Attrition
 - Loss to College of approximately \$3.7M/year
 - 45% of total attrition occurs in 1st year
 - PhD production factors in college ranking

Current First-Year PhD Funding

Type of Funding
Total Cost: \$9.8M*

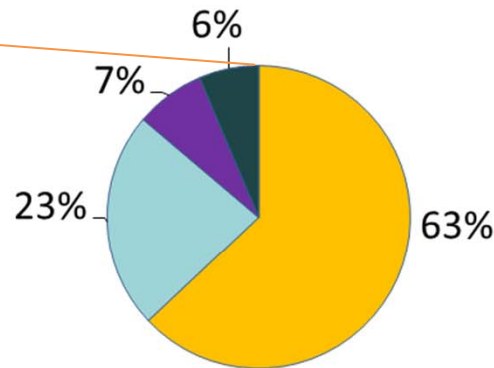


■ Fellowships, \$5M

■ GRAs, \$2.9M

■ TAs, \$1.9M

Fellowship Sources:
Total Cost: \$5.0M



■ Unrestricted, \$3.1M

■ Gifts & Endowments, \$1.2M

■ Graduate School, \$0.4M

■ Federal, \$0.3M

Options to increase fellowship funding:

- **Gifts and endowments for fellowships.**
 - Endowment of \$1.4M for one PhD fellowship
- **Federally-funded training grants for first-year students.**
 - Promote interdisciplinary research.
 - Cover 60% of cost, balance supplemented with college funds

**2013–2014 academic year funding for 1st year PhD students*

Towards New Destinations

- Institutional diversity planning initiative
- Developed by the University Diversity Council
- Started 2012-2013, now in 3rd year
- Each college and unit selects five annual initiatives that best match their particular contexts and goals.
- These become areas of focused effort.
- Each unit reports annually on progress.

Organizing Rubric

- The framework is structured according to four core principles:
 - **COMPOSITION**
 - **ENGAGEMENT**
 - **INCLUSION**
 - **ACHIEVEMENT**
- Composition refers to the demographic make-up
- Engagement reflects personal, social, and professional commitment to institutional goals and activities; retention
- Inclusion comprises climate and interpersonal relations
- Achievement reflects levels of attainment for underrepresented individuals or groups

2014-'15 TND Plan

- **Faculty composition**
 - Search oversight, targets of opportunity, dual careers
- **Graduate student composition, engagement and achievement**
 - Sloan Foundation and Colman endowment funded minority Ph.D. program: fellowships, leadership, professional development, community building. Co-Host Graduate Horizons Conference.
- **Undergraduate achievement**
 - NSF funded CUES Program – to increase retention of URM and first generation students.
- **Staff inclusion**
 - College wide messaging at departmental staff meetings, college wide staff meeting with Ordinary People, followed by discussion and social event
- **Ph.D. student orientation**
 - Use interactive theater to bring an awareness of impacts of microaggressions, implicit bias, stereotype threat, and tokenism

DPE Selected Highlights 2013-2014

- Launched the Colman Leadership Program for PhD Students.
- First year of expanded Sloan/Colman Fellowships.
- First year of the CUES Program.
- Expanded reach of LSAMP through partnerships with several campus programs.
- Hosted the STEM Men of Color Symposium.
- 7 Sloan/Colman Fellows awarded NSF Fellowships in Spring 2014.
- Co-Hosted the EWISE (Empowering Women in Science & Engineering) Symposium.



STEM
MEN OF COLOR
Make Our Celebration Count
Cornell University
ACCESS TO KNOWLEDGE & EMPOWERMENT SYMPOSIUM
FEBRUARY 1, 2014

KEYNOTE SPEAKERS
Each keynote a recipient of the U.S. Presidential Award for Excellence in STEM Mentoring

CALVIN MACKIE
JUAN GILBERT
CARLOS CASTILLO CHAVEZ

Special Guest Presenter
Young Guru
Engineer to Jay-Z

Featured Lecturer
Valerie Young

FEATURED WORKSHOPS

- Recognizing & Overcoming the Imposter Syndrome
- Blazing a Trail: Defining Your Own Measures of Success (A Candid Behind Closed Doors Panel Discussion with Cornell Alumni Industry Leaders)
- Shifting Gears: Code Switching & Professionalism
- Building Your Brand
- Workshops for High School Students and much more...

Cornell University
Beck Center Statler Hall

- Registration & Workshops 8:30am-5:30pm
- Reception 5:30pm

Continental Breakfast & Lunch included with registration

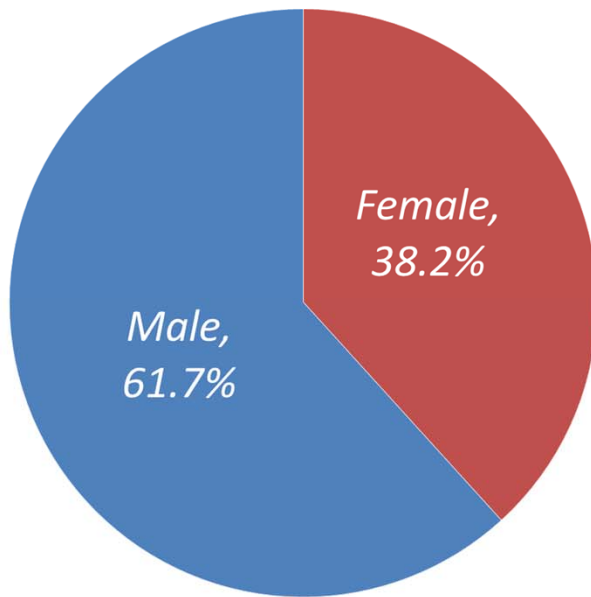
Free Registration for Cornell students, Cornell staff, Cornell faculty, & MOCC Inc. Special Alumni Guests
\$45 Registration Fee for all other participants

SPONSORS | Cornell University Diversity Programs in Engineering Cornell University Graduate School Cornell University McNair Scholars Program Men of Color Council Inc. Cornell University Diversity Council Lockheed Martin Corporation Cornell University Office of Academic Diversity Initiatives Cornell University School of Hotel Administration & Cornell University Library Hip Hop Collection

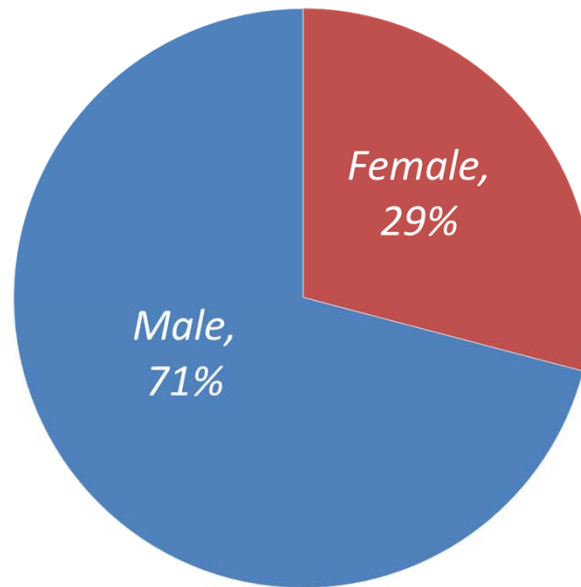
<http://tiny.cc/CUSTEMMOCSYM>

Gender Demographics

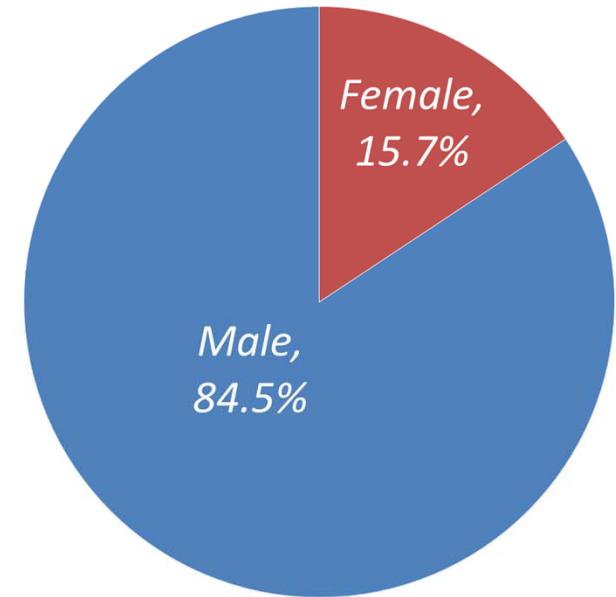
Undergraduate



Graduate



Faculty



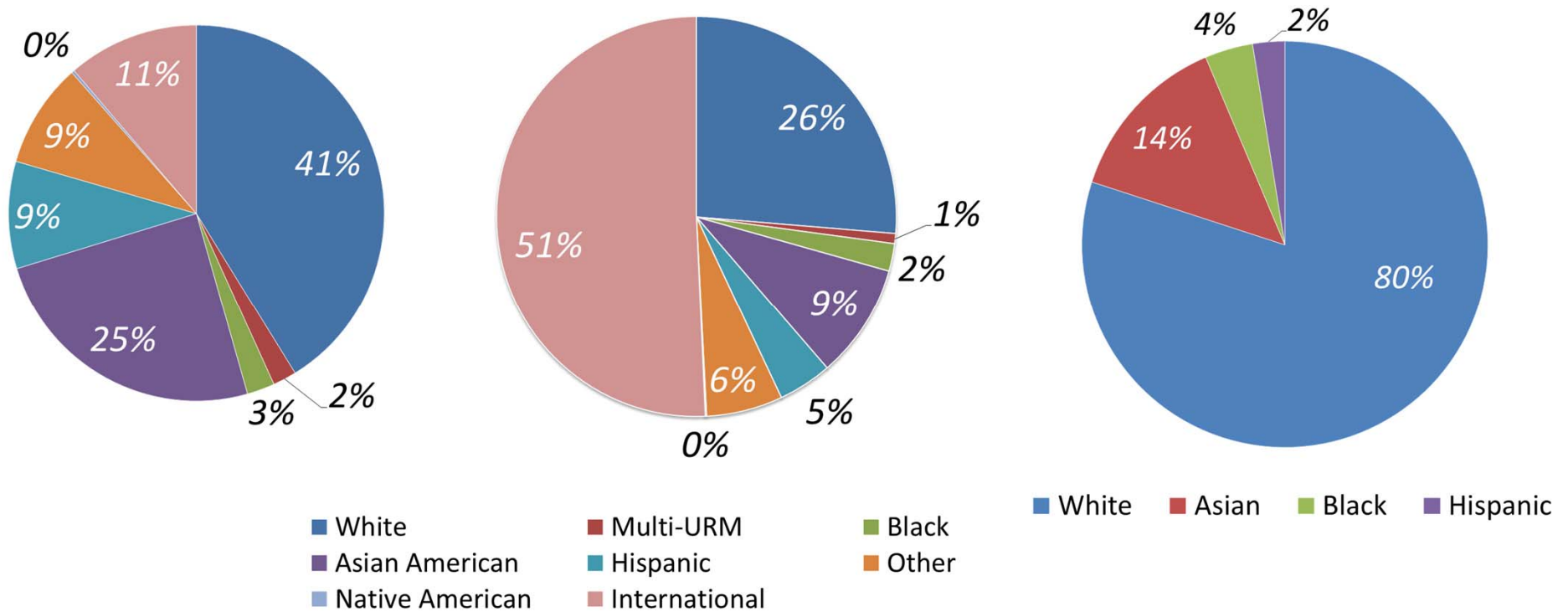
Representation of Women – National Averages:

Undergraduate: 18%

Graduate: 23%

Faculty: 14%

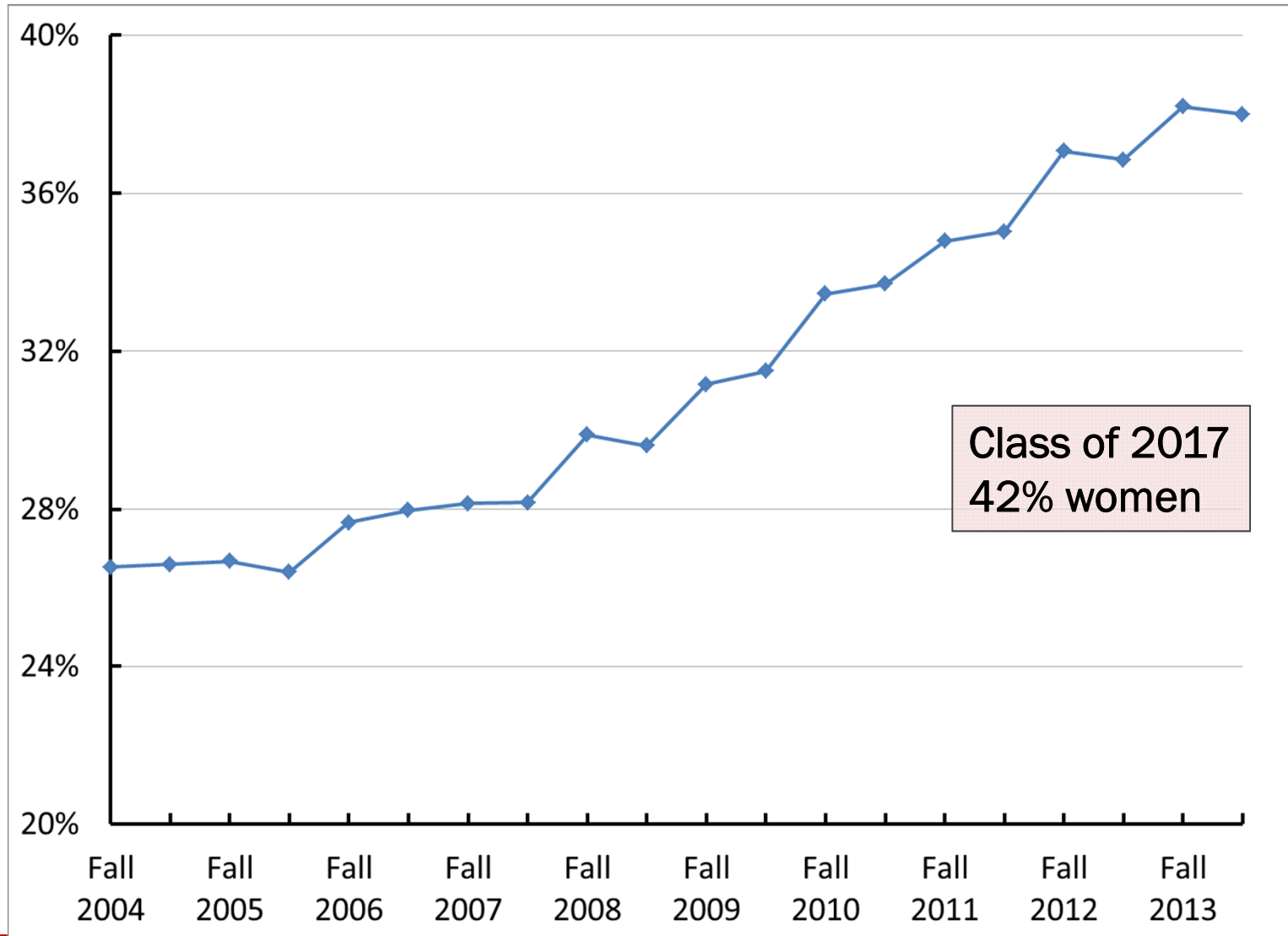
Race/Ethnicity Demographics



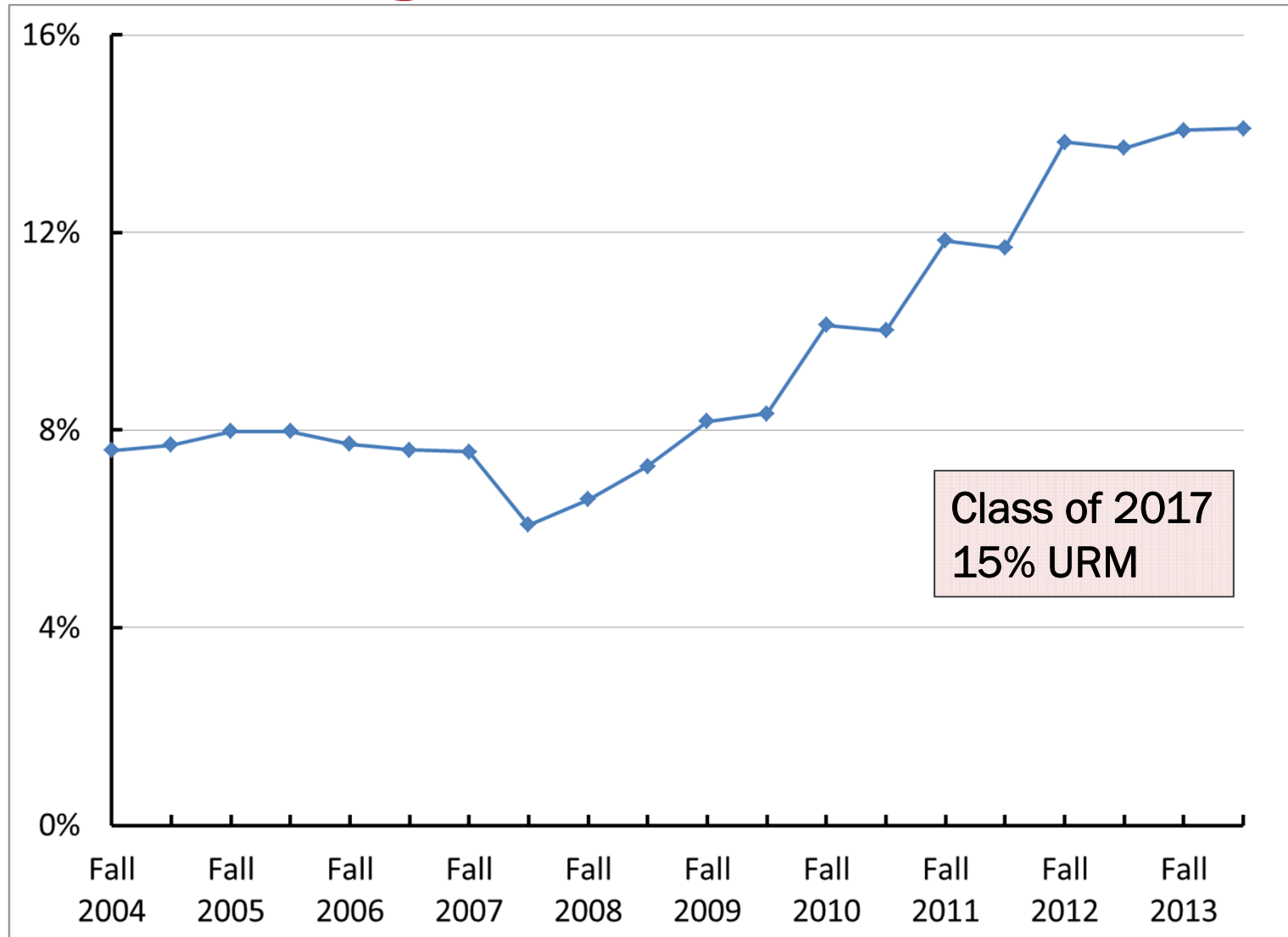
Underrepresented Minorities (URM) – Cornell and National Averages:

	Undergraduates	Graduates	Faculty
Cornell:	14%	7%	6%
National:	16%	7%	6%

Women Undergraduate Enrollment



URM Undergraduate Enrollment



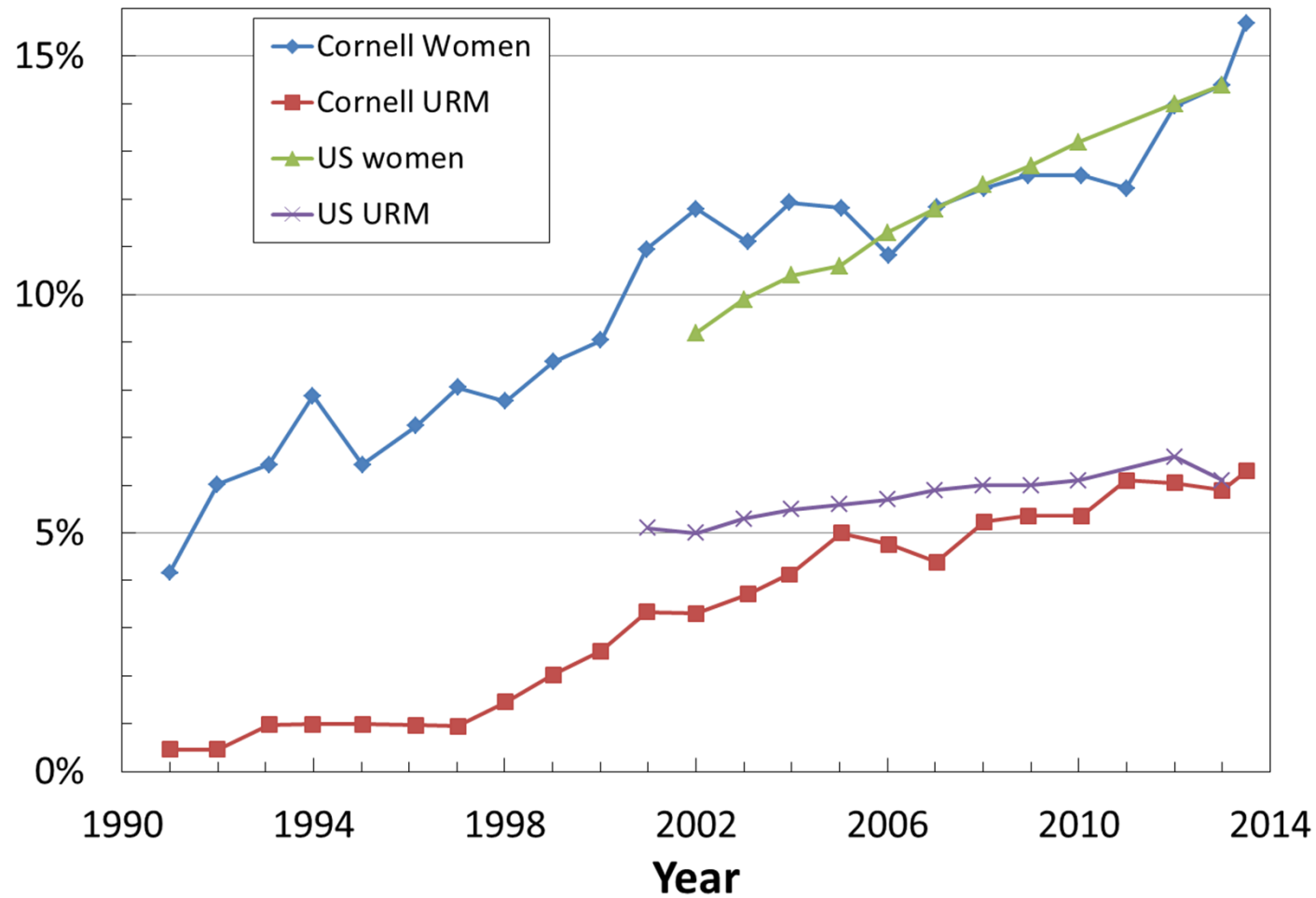
Undergraduate completions

Class entered in 2009

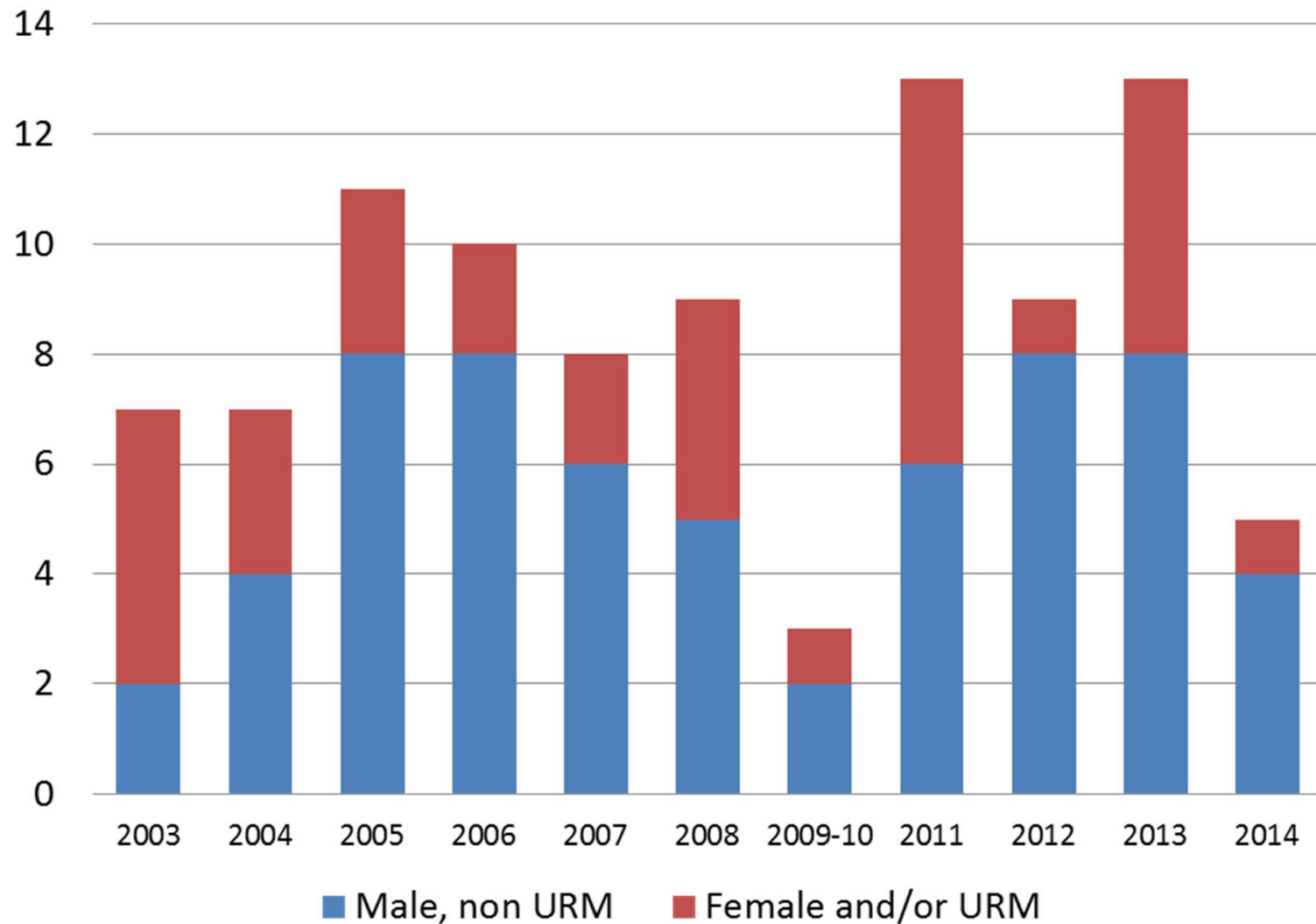
Students entering College of Engineering and completing B.S. in Engineering, or bachelors anywhere at Cornell, %

	BS Engr	Bachelors Cornell
Men	83.1	90.1
Women	82.2	94.1
URM	82	87.6
International	79.8	86.2
Overall	82.8	91.6

Faculty Diversity



Faculty Hiring by Year



Academic Year
2014-15

24 Teams

1014 Student Participants

1/5 of engineering students

Every Engineering Major and all Colleges at
Cornell represented

Nearly half of the leadership is women

Microcosm of student body

Team Budget Proposals: \$1,024,357.56
($\frac{1}{4}$ Internal, $\frac{1}{4}$ Fundraising, $\frac{1}{2}$ In Kind)

Experiential Learning Lab (ELL)
Opened 2005 and is soon to be renovated!



CornellEngineering STUDENT PROJECT TEAMS



Building off 2013-14 Success

- AguaClara took 26 students on a fully funded trip to Honduras.
- ChemE Car won Regionals and will compete November 16 at Nationals in Atlanta.
- Baja won the Iron Team Award! Best overall performer at all 3 North American events.
- Concrete Canoe returned to the National stage.
- CMR and DBF have finished in the top 10 for the past 3 years
- FSAE returned to the design finals.
- CRT collaborated with BU to send first university rocket to space by 2016.
- CUAir continued its prowess with 1st in Mission and 2nd Overall.

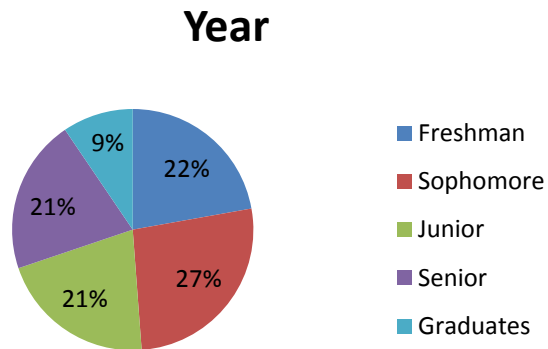


Building off 2013-14 Success

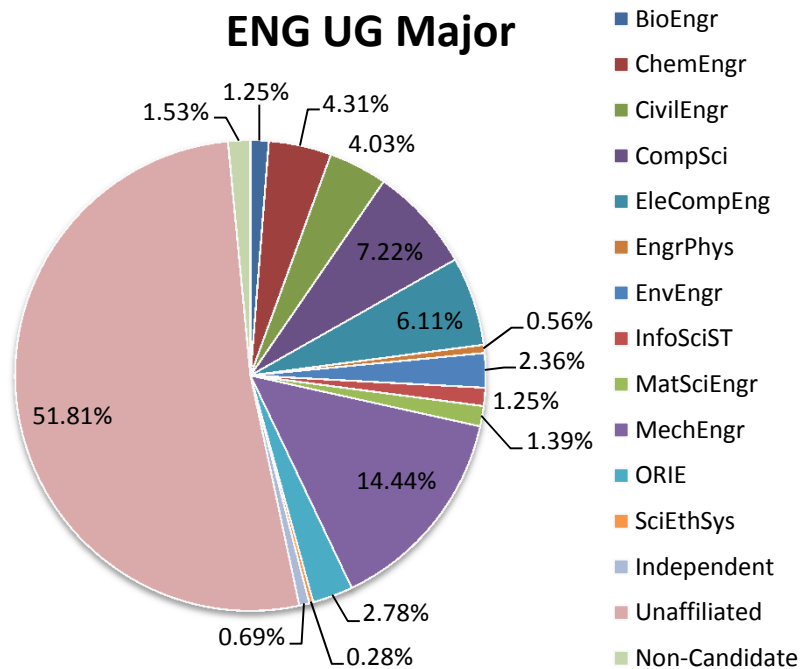
- CUAUV won their 6 world championships in 12 years.
- CUGEM received the Best Human Practices Advance award.
- CUSat launched and communicated with their satellite.
- EWH received third place for their passively cooling vaccine refrigeration device for their first submission.
- EWB went to Bolivia for their first implementation trip.
- EERI Seismic design survived all 3 ground motions receiving a 1st place in resilience category and finished in 9th overall at their first competition.
- Steel Bridge received 1st in construction speed, display, and economy at regionals.



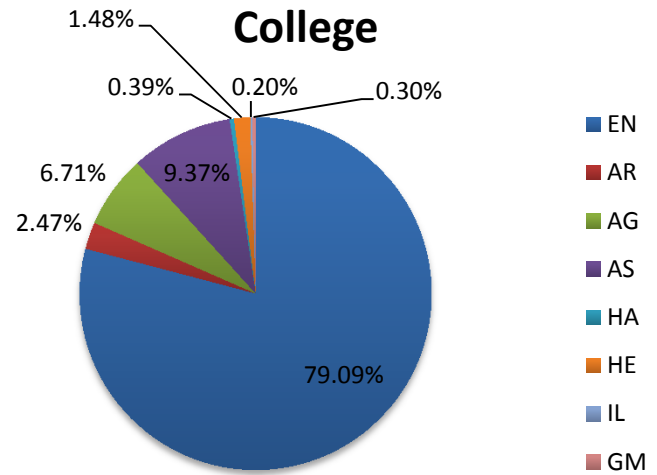
2014-15 Participants



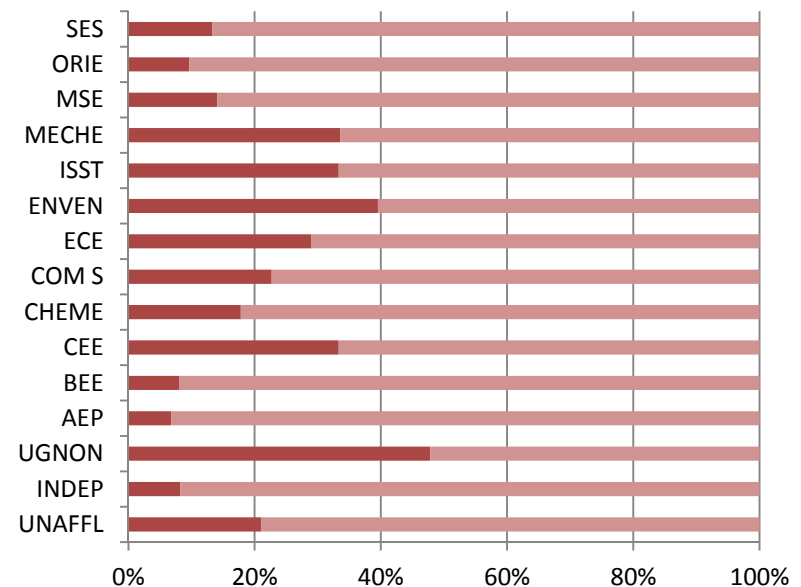
ENG UG Major



College

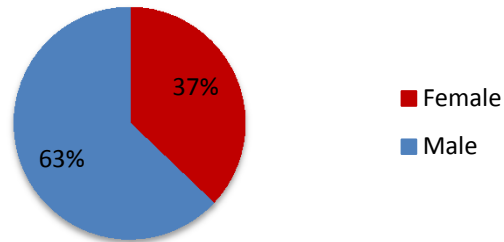


Participation by ENG UG Major

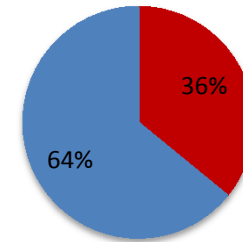


Gender

Teams Total

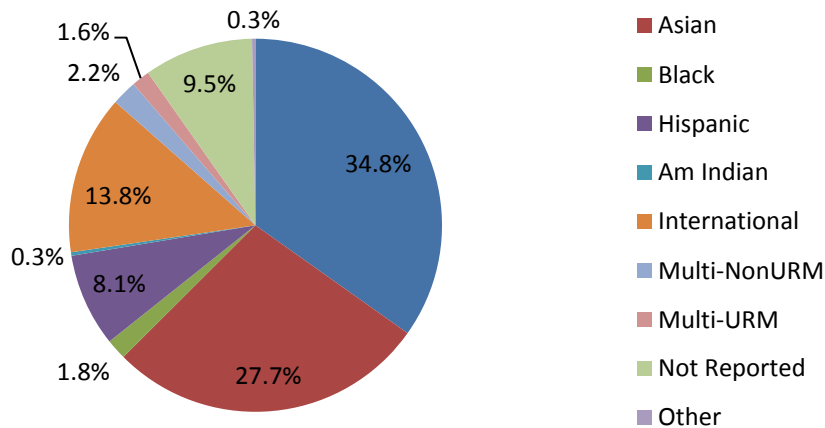


ENG UG Teams

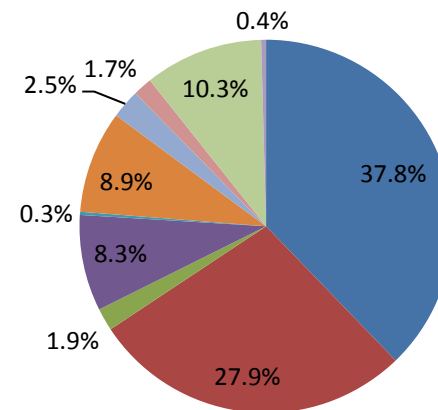


Ethnicity

Teams Total



ENG UG Teams



1014 Student Participants

720 ENG UG Student Participants



Engineering Co-op & Career Services Initiatives

- **BS Engineering Average Entry Level Salaries** increased 3.1% to \$72,287.
- **BA/BS Computer Science Average Entry Level Salaries** approaching mid-\$90Ks.
- **270 Employers & 7,800 students** attended the two-day University Career Fair in September.
- **NYC Recruiting Forum for 75 Employers:** CFEM and Ithaca & Tech Campuses presented.
- **Continued Discussions with State of Michigan Economic Development Council** to engage Cornellians in anticipated tech job growth – the Council attended Cornell Career Fair.

Engineering Co-op & Career Services Initiatives

- **Online STEM Career Development Course:** Collaborating on SUNY funded project with Binghamton, Buffalo, and Oswego – online course to be offered to STEM students statewide.
- **ThinkBIG Startup Trek** – Early stage startups recruited for interns / full-time.
- **Discussions to further engage local StartUP New York** companies in student recruitment.
- **Kessler Fellows Program:** Additional \$1M pledge for Program Support last Spring.

College Facilities Update October, 2014

Facilities: Key Thrust Area

- Recruit students and faculty
- Retain faculty
- Advance research innovation
- Enhance learning environments
- Support new pedagogy
- Sustain long term COE goals

Master Plan Update

- **New Construction**

- Gates Hall– Dedication celebrated
- New BME Building – Beginning study phase

- **Major Renovations on Quad**

- Kimball Hall – in construction; Upson mezzanine labs built
- New façade plan –1st application for Upson designed
- Upson Hall – construction documents under development

- **Individual Department / Building Projects**

- For new faculty and programs; to distribute available space

New Construction

- **Gates Hall** - bright, open, interactive, collaborative, engaging



- **New BME Building** – for new undergraduate program
 - Wet lab research, instructional labs & department home
 - Site adjacent to Weill: vivarium; bio research cluster



Major Renovations on Quad

- **Kimball Hall** – Upson mezzanine; wet labs (interim BME, others)



- **New façade plan** – align performance & aesthetics with Engineering accomplishments and aspirations



- **Upson Hall** – MAE, project teams, renewal



Others

- **Hollister** – environmental & mass spectrometer labs completed.
- **Snee** – geochemistry cleanroom in construction.
- **Bard & Duffield** – Faculty labs starting construction & design.
- **Olin** – Unit Operations lab and project space in design.
- **Rhodes** – Relocation of computer labs from Carpenter planned.
- **Carpenter** – SE lab in design, Johnson studio planned, consolidated Student Services & Administration planned.
- **Ongoing** – faculty startups, classrooms, public spaces, maintenance, other departmental, energy conservation.

College of Engineering Cornell Now Campaign Update

Campaign Progress

Cornell Now Goal	\$185,000,000
Cornell Now Total	\$178,600,000 (as of 10/23/14)
* Cornell Now Campaign Ends 12/31/15	
Fiscal Year 2014 Goal	\$ 30,000,000
Fiscal Year 2014 Total	\$ 56,430,000
Fiscal Year 2014 Annual Fund Goal	\$ 1,700,000
Fiscal Year 2014 Annual Fund Total	\$ 1,889,981
Fiscal Year 2015 Goal	\$ 66,000,000
Fiscal Year 2015 Total	\$ 7,100,000 (as of 10/23/14)
Fiscal Year 2015 Annual Fund Goal	\$ 2,000,000
Fiscal Year 2015 Annual Fund Total	\$ 173,636 (as of 10/23/14)

Engineering College Council Comparative Participation Rate

All data Fiscal Year 2014

Arts and Sciences	100%
Architecture, Art, and Planning	67%
CALS	89%
Athletics	76%
Computing and Information Sciences	60%
Engineering	76%
Hotel	89%
Human Ecology	87%
ILR	71%
Johnson School of Graduate Management	88%
Lab of Ornithology	83%
Law	92%
Library	88%
Museum	100%
Plantations	100%
Vet	100%

CornellEngineering

Breaking Rules to Advance Engineering Science

**Brand Update
October 2014**

**We continue to
define...Breaking the Rules
to...**

The excitement and buy-in grows...

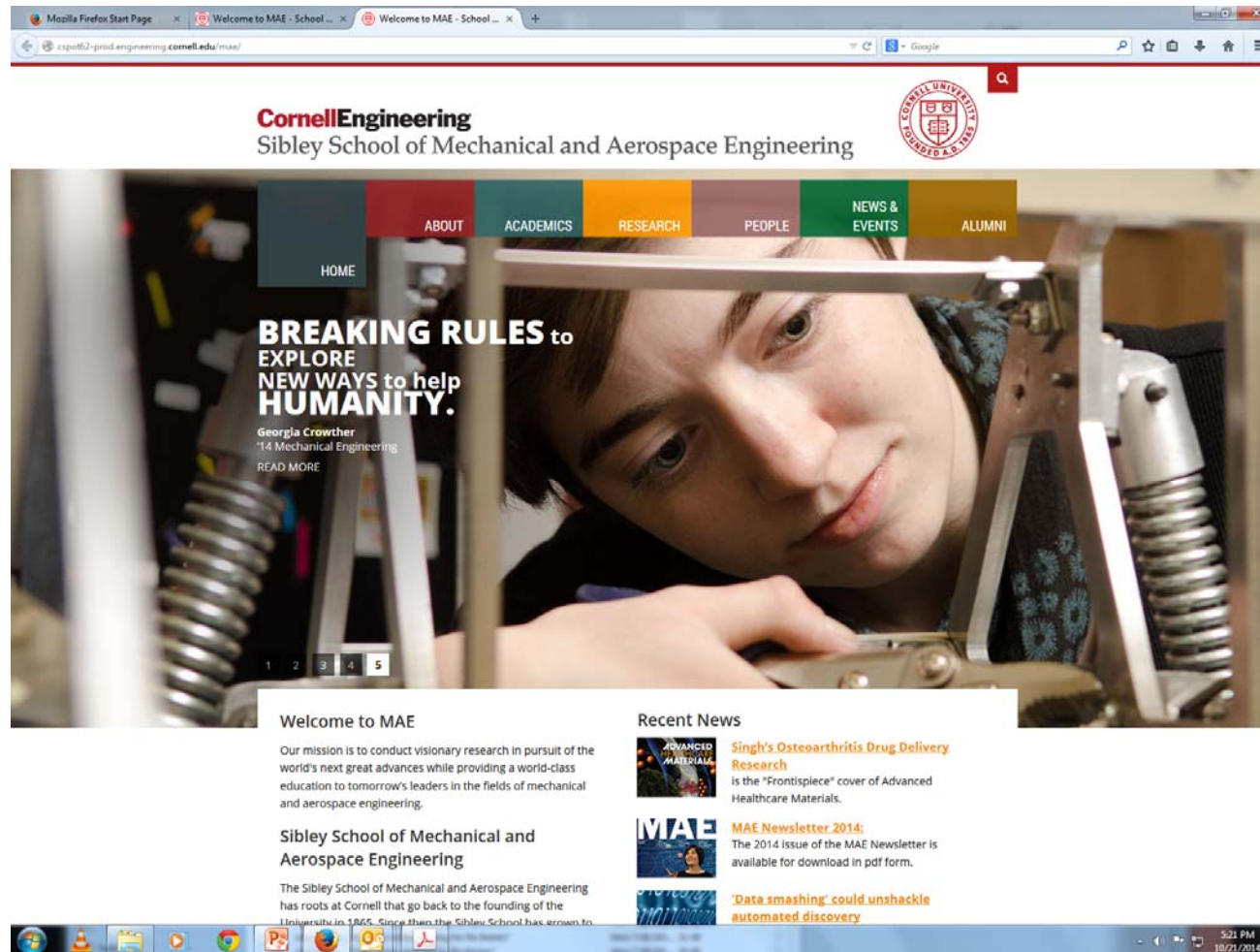
New Engineering Website



School/Department Magazine Designs





School/Department Web sites-Being Reskinned



School/Department Flyers

CornellEngineering
Department of Biomedical Engineering

Biomedical Mechanics

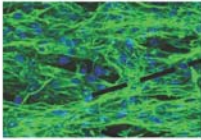
The study of biomechanics is the foundation for many areas in Biomedical Engineering. Traditionally, whole organs and tissues have been analyzed for global material properties, but more recent approaches have developed detailed understanding of biomechanics at the cell and molecular length scales. Furthermore, the influence of mechanical forces on biological processes (mechanobiology) plays critical regulatory roles in many physiological and disease processes. Cornell's Biomedical Mechanics research team has a rich 40+ year history of collaborations between engineers, life scientists, veterinary, and medical professionals and continues to pioneer new fundamental and applied directions in this exciting field.

A research program of top notch engineering, veterinary, and medical schools has enabled Cornell to pursue unparalleled breadth and depth in biomechanical and mechanobiological inquiry. Our research subjects extend across 10 orders of magnitude in length, from nanoscale mechanics in bone to cardiac function in large animal models. Cornell is also pushing the frontiers of biomechanical analysis towards the meso-scale of elemental tissue structure, creating new theory, computational models, and experimental test systems. We have additionally combined these platforms with genetic and molecular tools to discover new functional principles of heterogeneous biological structures and tailor their mechanical performance.

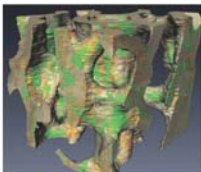
Some specific faculty projects

Prof. Jan Lammerting's lab is developing and applying novel experimental techniques to probe subcellular mechanics and the cellular response to mechanical stimulation, with a particular focus on the cell nucleus. They are investigating to what extent impaired nuclear mechanics and increased cellular sensitivity to mechanical strain contribute to human diseases such as muscular dystrophy and cardiomyopathies, and whether increased nuclear deformability could also aid metastatic cancer cells to spread through the human body.

Prof. Cynthia Reinhart-King's lab studies the role of tissue mechanics in atherosclerosis and tumor growth and metastasis. Implementing techniques such as Traction Force Microscopy and Atomic Force Microscopy in combination with tailored biomaterials and molecular biology approaches, her lab is uncovering how tissue mechanics influence cell-cell and cell-matrix interactions.



Fibroblasts aligned by cyclic biaxial stretch in 3D culture. (Butcher)





Sub-micron scale fluorescent imaging of bone formation (orange and green patches) in cancellous bone taken from an animal with osteoporosis. (Hernandez)

Biomedical Mechanics.indd 1

10/6/14 4:15 PM

CornellEngineering
Department of Biomedical Engineering

BME M.Eng Immersion Term
First-hand experience in a clinical environment

Who:
Selected BME Master of Engineering students

What:
Get exposure to the clinical environment in an intensive hands-on experience with three components:

- Pre-hospital orientation and skills/protocol introduction
- One week hospital rotations
- Post-week assignment and wrap-up meeting


When:
Multiple offerings per year, currently, pre-Fall term, Winter Immersion, or Spring break

Where:
Robert Packer Clinical Research Foundation and Hospital located in Sayre, PA and Cortland Regional Hospital located in Cortland, NY

Why:
Each Master of Engineering participant will have the first-hand experience of shadowing physicians in a variety of specialties such as surgical oncology, cardiovascular surgery, vascular surgery, interventional radiology, pathology, orthopedics, ICU, trauma and ER. Participants will also have access to the Skills Laboratory where they will have one-to-one instruction using medical simulation equipment such as virtual bronchoscopes and even a computerized woman in labor.

An important part of every student's Master of Engineering experience is the 6 credit project. If the student chooses the Pre-Fall term week, the potential exists to join a project in the area of surgical technology with a clinical sponsor and a Cornell engineering mentor for a year-long practical experience in this important area of BME.

More information:
Please contact Belinda Floyd, bh42@cornell.edu, 607-255-2573



www.bme.cornell.edu

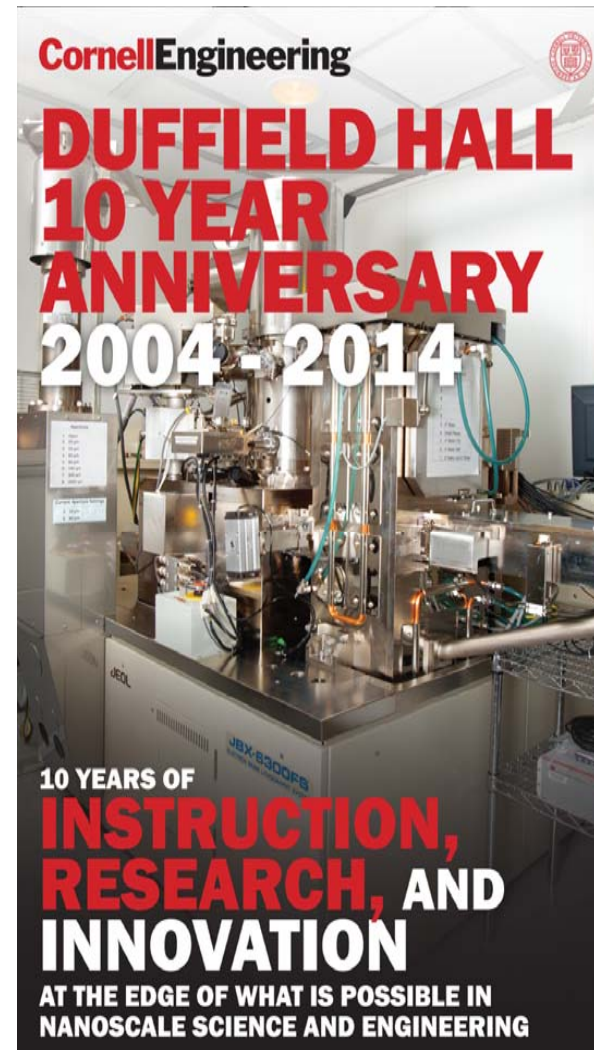
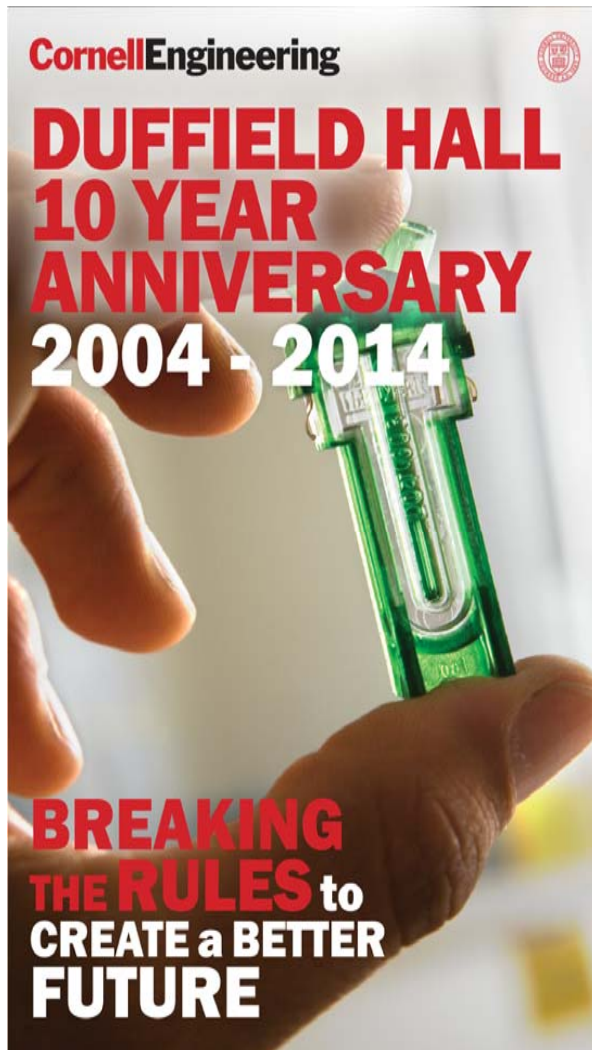
BME Immersion.indd 1

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Magazine Re-Design




Marketing Banners



Harris Interactive Stats

List as many top engineering schools as you can.

- **2013**
5 out of 3206 named Cornell as the first school they listed
- **2014**
8 out of 2016 said Cornell as the first school they listed

1%  In the number of people who named Cornell Engineering on their list
In the number of people who have heard of Cornell Engineering.

Harris Interactive Stats

What is the overall quality of Cornell Engineering compared to the 20 best engineering programs in the country?

2103

31% placed Cornell in top 5, 77% in the top 10.

2104

36% placed Cornell in top 5, 76% in the top 10.

5%↑

Harris Interactive Stats

Words that come to mind when you think of Cornell Engineering:

Word	2013	2014
Prestigious	47%	47%
Competitive	40%	45%
Creative	25%	32%
Visionary	24%	30%
Entrepreneurial	17%	20%
Conventional	16%	17%
Tenacious	6%	9%
Predictable	6%	6%
Insular	3%	4%
Rebellious	1%	3%


Harris Interactive Stats

Do you agree with the statement:

“The Cornell College of Engineering attracts independent-minded students and faculty who are willing to break the rules of established thinking in order to produce engineering breakthroughs?”

2013: 31% Agreed, 8 % Disagreed

2014: 34% Agreed, 7 % Disagreed

3% 

Next Steps...

- **Continue to spread the word through stories**
- **Engage constituents with the brand via social media campaign**
- **More videos of people breaking the rules**
- **Integration with our admissions processes**
- **Innovation events that capture the “breaking the rules” spirit (celebrate it)**
- **Brand events and sharing among the alumni**

An abstract background featuring a large, stylized, black-outlined geometric shape, possibly a cube or a complex polygon, set against a blurred image of a yellow and orange train or bus in motion. The overall color palette is dominated by black, white, yellow, and orange.

Cornell Tech

**We develop pioneering leaders and
technologies for the digital age**

Fall 2014

The Vision

A new graduate school for a new age

- Tech is becoming inseparable from other industries, human activity
- Creating digital age products and services involves new skills
- The “high risk” research of the late 20th century is not being done today

Joan and Irwin Jacobs Institute

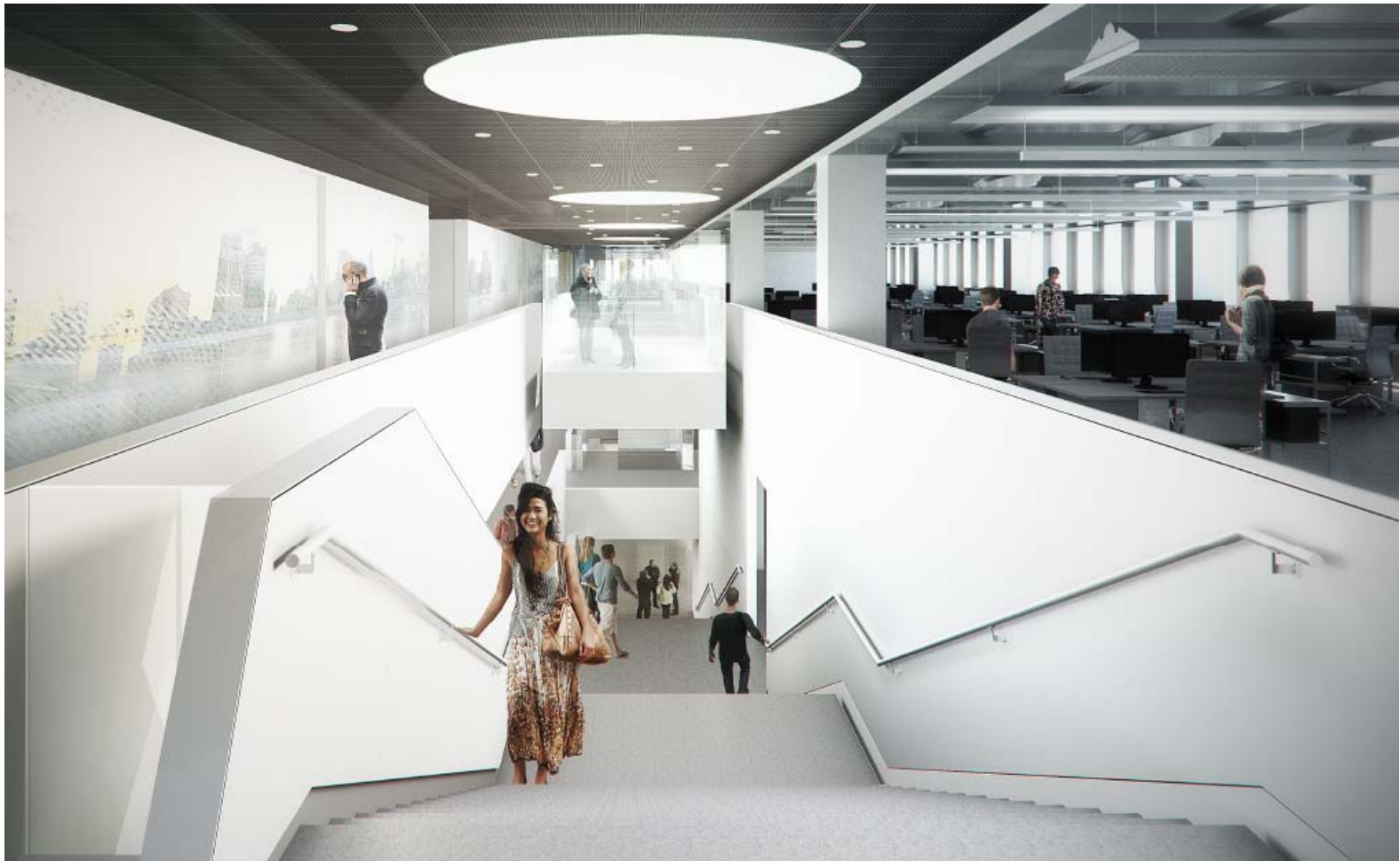
- Technion-Cornell joint institute at heart of the new campus
- Focal point for inter-disciplinary research and masters programs
 - Connective Media, Healthier Life, Built Environment
- Sandbox for new R&D activities



The 2017 Campus



Open Plan Collaborative Space



Scale 2017 and Beyond

- Ultimately around 2500 students and 200+ permanent faculty
- Jacobs Institute programs about a third
- Expect ~25 faculty and 300 or more students by 2017-18 school year
- Currently a dozen permanent faculty plus visitors

100+ Students this Fall



Broader, Bigger Tech in NY

- The jobs of tomorrow are tech jobs, but tech is more than software engineering
- Attract and retain more talent in multi-faceted NY environment
- Current curricula at all levels attractive to narrow segment of potential talent
- Actively engaged with K-12 teachers and schools

Strategic Corporate Engagement

- Universities, companies traditionally aligned around student recruiting
- Research partnerships rare and tend to be driven by individual faculty
- We aim to create long-term strategic engagements that guide both Cornell Tech and the companies we work with

Thank you!

Lance R. Collins
Dean of Engineering

October 30-31, 2014