

CoE 2020

College of Engineering Aspiration:
The College of Engineering at Cornell University will be widely recognized as a top-five engineering college in undergraduate and graduate studies

University	Engineering Undergrad	Engineering Grad
Princeton	MIT	MIT
Harvard	Stanford	Stanford
Yale	Berkeley	Berkeley
Columbia	Caltech	Georgia Tech
Caltech	Georgia Tech	Illinois
MIT	Illinois	Carnegie Mellon
Stanford	Michigan	Caltech
U. Chicago	Carnegie Mellon	Texas-Austin
Penn	Cornell	Michigan
Duke	Purdue	Cornell

Cornell is tied with Brown for 15th

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CoE 2020

Vision

The College of Engineering Strategic Plan is centered around two complementary objectives

- The college will directly impact major challenges facing our world;
- The college will produce leaders who take the world in new directions, solving problems and creating new opportunities

Enabling Goals:

1. To recruit, retain and enable a diverse community of exceptional faculty, students and staff
2. To educate undergraduate and graduate students to become global leaders
3. To be world leaders in important areas of research
 - a) to sustain and expand our leadership role in: advanced materials; complex systems, network science and computation; and nanoscience
 - b) to be the premier research university in the emerging areas of energy and the environment; and bioengineering
4. To increase our interactions with industry; and create a fertile environment for entrepreneurial activities for faculty and students

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Roles of College and Departments

- College
 - Money
 - Space
 - Lines
 - **Strategic plan**
- Departments
 - Faculty hiring
 - Department strategic plans

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Faculty Hiring

- Based on college demographics, we estimate needing to hire ~60 faculty over next 5 years
- Corresponds to roughly 12-15 searches per year
- We are approaching this number with help from faculty renewal fund

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Strategic Planning Process

- Departments produced plans (AEP, **BEE**, BME, CBE, CEE, **CS**, EAS, ECE, MSE, MAE, ORIE)
- College cross-cutting committees developed draft plans
- Through a series of lunches the hiring plans were made consistent
- Dean will post a draft plan for D&C's, CCC's and community to react to

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Strategic Planning Process

- Disruptive event: December 2010, Mayor Bloomberg announces competition to select a partner to create an applied sciences campus focused on innovation
- Cornell's bid submitted today
- How does this impact the strategic plan?

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Education

- Core mission of university
- Primary “deliverable” of university is well trained students
- Fundamentally limited by faculty size
- Should it evolve? Is it evolving? At the right pace?

Charlie Seyler will present on the Undergraduate Education

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Master of Engineering

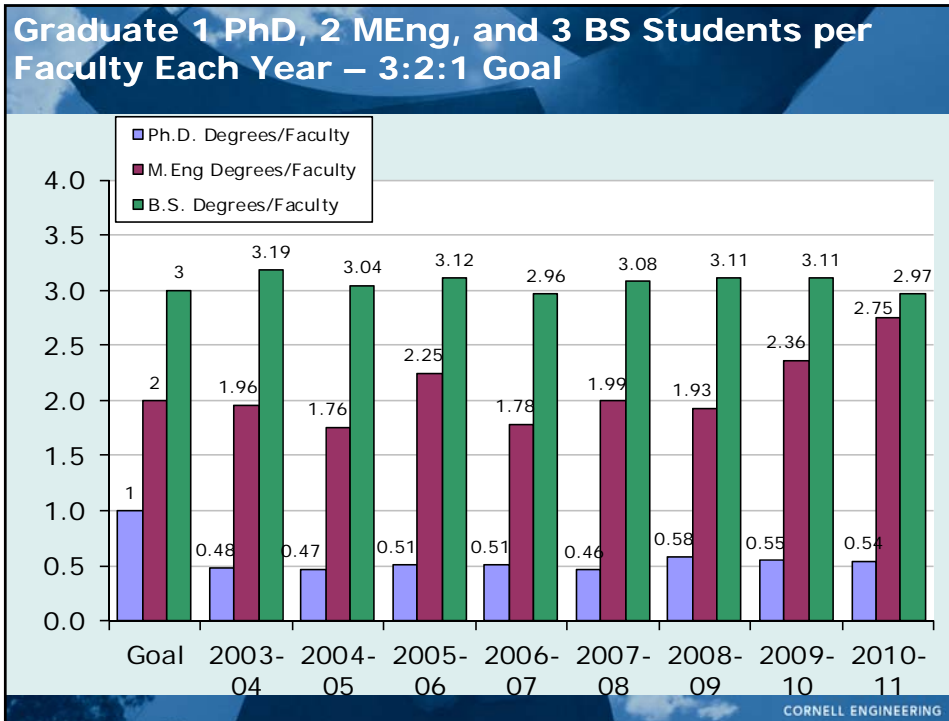
Strengths	Weaknesses	Opportunities	Threats
Students receive value from degree	Not uniform across all fields	Growth in demand came at good time	Other universities creating MEng type programs
More popular than ever	Difficult to manage large class sizes	MEng provides a valuable resources to <u>some</u> fields	Lack of coherent course structure in some fields
Hands-on experience unique	Seen as a "cash cow"	Budget model change may relieve MEng as "cash cow"	Benign neglect
			PhD program

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Doctorate

Strengths	Weaknesses	Opportunities	Threats
Students receive strong mentoring from faculty	Too small (see next slide)	Budget model for campus under discussion	Rankings are most closely tied to research and PhD program
Group sizes are comparatively small	MEng "competes" for faculty time and energy	Faculty renewal (lower average age of faculty)	Lack of courses could hurt student recruiting
Frontier research in broad areas	Course offerings can be meager		Faculty demographics
Unique facilities in some fields			

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Graduate Recommendations

- Reduce the MEng enrollment
 - Not necessarily uniformly; close some
 - Make quality of projects uniform; market properly; and focus on “entrepreneurship”
- PhD Program
 - Grow to 5 PhD students/faculty
 - Increase Fellowships, national and philanthropy
 - Enhance course offerings (tied to MEng)
 - Make this a high priority—long term commitment
 - Recover tuition in new budget model

Research

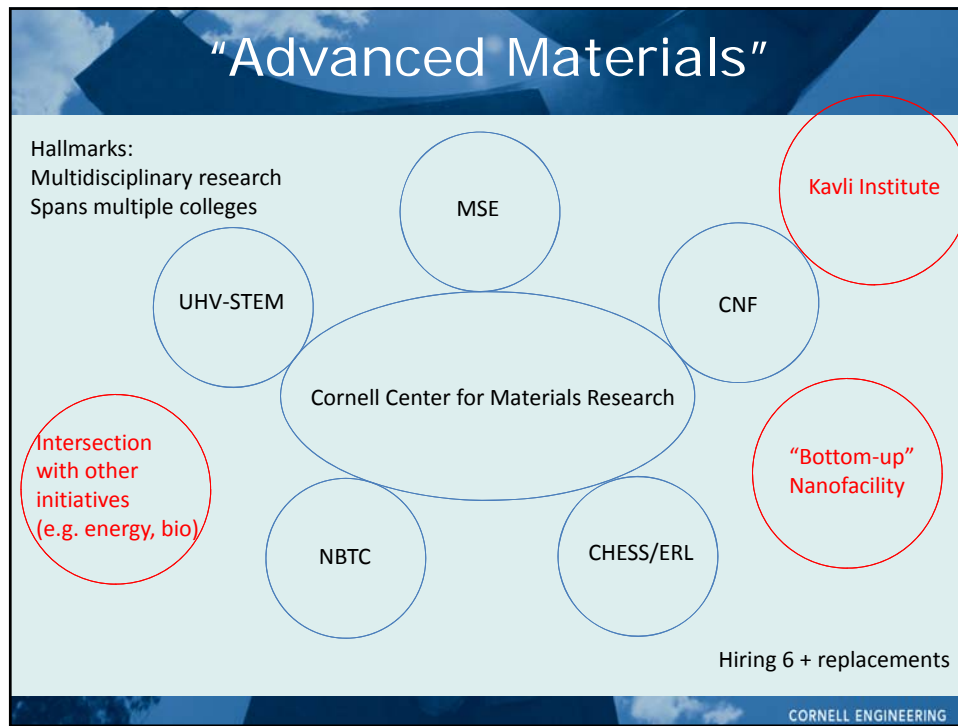
- Strongest initiatives are “bottom up”
- Strategic Plan Thrust Areas
 - Advanced Materials
 - Complex systems, network science and computation
 - Sustainable energy and environment
 - Bioengineering
 - **Nanotechnology**
- Dean’s office supports research thrusts through funds, staff and strategic hiring

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Advanced Materials

Strengths	Weaknesses	Opportunities	Threats
CCMR anchors this effort; around since 1950's	Some aging facilities	Future of CNF is nanomaterials	Many other nano groups forming
Iconic strength of CoE; well organized and strategic		Develop a “bottom up” national nano facility	Historic strength in mechanics aging; needs to be renewed
Leverages nanotech beautifully			Must constantly reinvent to stay current and exciting
Flexible, e.g., “energy materials”			

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Complex systems, network science and computation

Strengths	Weaknesses	Opportunities	Threats
Deep domain knowledge across CoE and CIS	No organizing entity beyond CIS	Cornell can be an international leader	Future of CAM must be decided to preserve strength
CIS structure allows these activities to be ubiquitous	CAM needs to be rethought, moved out of OVPR	This activity brings disparate groups together	Residual stress from MAE/TAM merger
Center for Applied Math an asset	Constituencies don't collaborate	Opportunities to create a center of excellence	Must resolve calculus sequence for engineers
Strong computational faculty across CoE	Computational Sci is not where it used to be in the 1980's		Is there an organizing thread?

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"Complex Systems, Network Science, and Computation"

Physical networks
Social networking
Mining data for information
Complexity/emergent behavior

Complex Systems

Center for Applied Math

Network Science

Computation
Large Facility???

Is this a college construct, or organic growth?

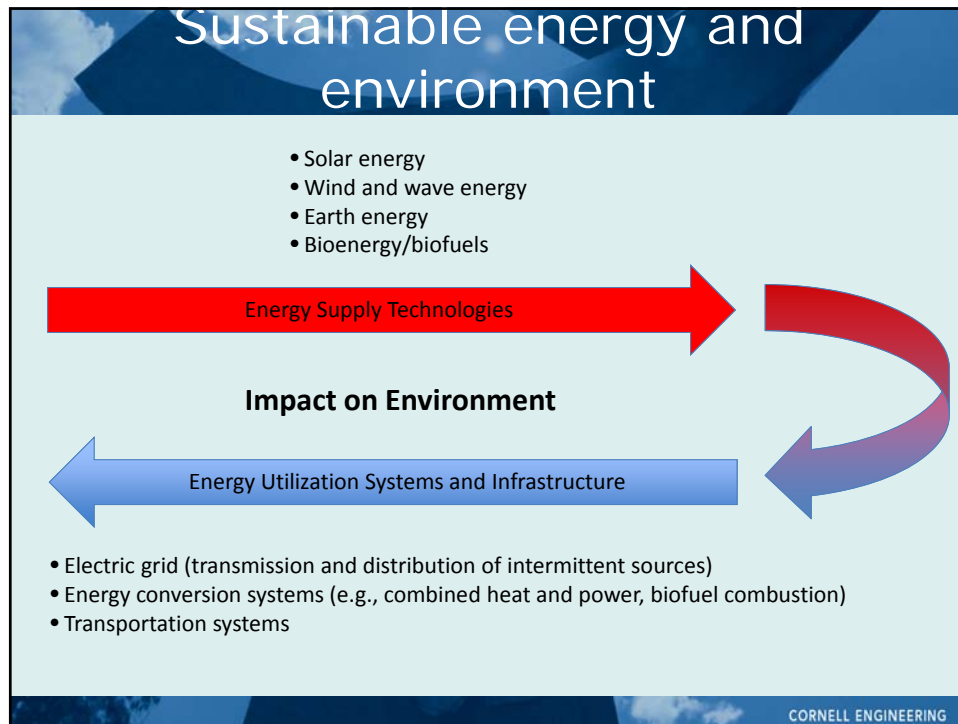
30 hires

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Sustainable energy and environment

Strengths	Weaknesses	Opportunities	Threats
Leverage existing core strengths across college	Age of principal players	Cornell can be an international leader	Retrofitting faculty into new areas takes time
ACSF is organizing community across campus; Cornell's unique ability to collaborate	No recognized leadership in several areas	This is the defining "grand challenge" of our lifetime	The time to strike is now; other schools are developing this area as well
Forward looking research on built environment	Funding at the national level is uneven and commitment uncertain	The breadth and depth of Cornell cannot be matched by any institution	Upcoming retirements of key individuals
Research oriented utilities group			Will this be a passing fad?

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Strategic Plan for Philanthropy

- Overall shift in fundraising strategy at Cornell (central to hybrid)
- Colleges are responsible for reaching campaign goals in conjunction with the provost
- Colleges have much more autonomy

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Aspects not discussed

- Diversity
- Staff strategic plan
- Global education
- Industry & entrepreneurship
- Surprises
 - Instigated new conversations among the leadership
 - Collective sense of mission (taking into account the larger community)
 - Harder to decide what you won't do (e.g., Nanotechnology not stand alone)

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Where do we go from here?

- I will be drafting a plan based on inputs from D&C's and CCC's
- Share with leadership
- Share with broader community
 - Visit departments
 - Present to other interests groups (e.g., students, staff, alumni)
 - Modify and finalize based on feedback

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Impact of NYC Tech Campus

- How does the NYC campus proposal impact the CoE Strategic Plan?
- What are the potential benefits?
What are the potential challenges (non financial)?
- How can we manage the risks of the NYC campus?

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