The State of the College of Science and Engineering

Steven L. Crouch
Dean

November 24, 2015
The State of the College of Science and Engineering, 2015

Faculty and staff awards
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Faculty and staff awards...
Regents Professors:

- Vipin Kumar, Computer Science and Engineering
- Larry Edwards, Earth Sciences

McKnight Presidential Chair:

- Marc Hillmyer, Chemistry
McKnight Land-Grant Professors:

• Rafael Fernandes, Physics

• Matthew Johnson, Biomedical Engineering

• Dan Knights, Computer Science and Engineering
McKnight Land-Grant Professors (cont’d):

- **Will Northrup**, Mechanical Engineering
- **Kechun Zhang**, Chemical Engineering and Materials Science
Horace T. Morse Award for Outstanding Contributions to Undergraduate Education:

• *R. Lee Penn*, Chemistry

• *Frank Kelso*, Mechanical Engineering
Award for Outstanding Contributions to Postbaccalaureate, Graduate, and Professional Education:

- Philippe Buhlmann, Chemistry

- David Kohlstedt, Earth Sciences

- Shashi Shekhar, Computer Science and Engineering
John Tate Award for Excellence in Undergraduate Advising:

- **Chris Leighton**, Chemical Engineering and Materials Science

Mullen/Spector/Truax Women’s Leadership Award:

- **Cindy Cattell**, Physics
Sara Evans Faculty Scholar/Leader Award:

- **Rhonda Franklin**, Electrical and Computer Engineering

- **Christy Haynes**, Chemistry
George W. Taylor Awards:

• Career Development:  
  Gregg Musiker, Mathematics

• Teaching: Ravi Janardan, Computer Science and Engineering
George W. Taylor Awards (cont’d):

- Research: *Tian He*, Computer Science and Engineering

- Service: *Wayne Gladfelter*, Chemistry
Charles E. Bowers Teaching Award:

*Zongxuan Sun ("Sunny"), Mechanical Engineering*

Guillermo Borja Award:

*Mo Li, Electrical and Computer Engineering*
CSE Distinguished Professorship Award:

- Victor Barocas, Biomedical Engineering
- Carol Shield, Civil, Environmental, and Geo-Engineering
- Kim Stelson, Mechanical Engineering
President’s Award for Outstanding Service:

*Kim Dockter*, Senior Director of External Relations,
CSE Dean’s Office

Bill Tolman — Chair of Award Committee
President’s Award for Outstanding Service (cont’d):

Willard Miller, Jr., Professor Emeritus, Mathematics

That’s Peter Olver standing in for Willard!
Election to the National Academy of Engineering:

*Michael Tsapatsis*, Chemical Engineering and Materials Science

For design and synthesis of zeolite-based materials for selective separation and reaction.
Election to the American Academy of Arts and Sciences:

*Don Truhlar, Chemistry*

For seminal contributions to computational chemical dynamics.
2014 Oliver Buckley Prize, American Physical Society:

- *Allen Goldman*, Physics

IEEE Fourier Award for Signal Processing:

- *Georgios Giannakis*, Electrical and Computer Engineering

AAAS Award for Public Engagement with Science:

- *Jim Kakalios*, Physics
2015 Beckman Young Investigator:

• *David Flannigan*, Chemical Engineering and Materials Science

  ($750,000 grant!)

2015 Packard Fellowship:

• *Xiang Cheng*, Chemical Engineering and Materials Science

  ($875,000 grant!)
Research highlights ...
Steve Campbell, PI, Electrical and Computer Engineering; Minnesota Nano Center (MNC):

5 years, $4.5 million; the MNC is a site for the NSF National Nanotechnology Coordinated Infrastructure (NNCI) program
Christy Haynes, co-PI, Chemistry; Associate Director

5 year, $20 million NSF grant for the Center for Sustainable Nanotechnology (CSN); University of Wisconsin is the lead institution
The NOvA detector in Northern Minnesota is operational and provided the first evidence of oscillating neutrinos in August 2015.

*Marvin Marshak*, Physics and Astronomy, is PI on the project.
Student Information...

Graduating...

Job hunting...
Freshmen Applicants to CSE

<table>
<thead>
<tr>
<th>Year</th>
<th>Applicants</th>
</tr>
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<tbody>
<tr>
<td>2000</td>
<td>2000</td>
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<tr>
<td>2005</td>
<td>4000</td>
</tr>
<tr>
<td>2010</td>
<td>8000</td>
</tr>
<tr>
<td>2015</td>
<td>14000</td>
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</table>
Composite ACT for CSE

ACT composite

Year


Admitted
Enrolled

All CSE applicants
Faculty hiring ...
18 new faculty for 2015–16

Aerospace Engineering and Mechanics

Biomedical Engineering

Chemical Engineering and Materials Science

Chemistry

(continued...)
Civil, Environmental, and Geo-Engineering

Computer Science and Engineering

Earth Sciences

Electrical and Computer Engineering

(continued...)
Industrial and Systems Engineering

Mathematics

Mechanical Engineering

Physics and Astronomy
Number of Tenured and Tenure-Track Faculty in CSE

Net gain
Rate: 9.4/yr
Number of Women Faculty in CSE

Net gain
Rate: 5.2/yr
Number of Tenured and Tenure-Track Faculty in CSE

Net gains
Total: 9.4/yr
Men: 4.2/yr
Women: 5.2/yr
What’s next?
Challenges ahead ...

Challenge #1: Chemistry

• Strong student demand for introductory chemistry courses from across the University (35% CLA, 26% CSE, 18% CBS, 10% CFANS, 11% other)

• Current instructional laboratory space does not meet the department’s teaching needs

Challenge #2: Computer Science

• Explosive growth in student demand

• Strong demand for graduates by industry

Facilities and faculty numbers are major concerns in both cases.
Challenge #1 — Chemistry

How to handle outmoded instructional laboratory space?

- Planning has commenced for a new lab building (a renovation of Fraser Hall is one option under consideration). A chemistry lab building project will be included in University’s 2018 Capital Request.

How to address lack of research laboratory space, which limits faculty hiring?

- A renovation of Smith Hall is currently scheduled for inclusion in the University’s 2020 Capital Request. This will permit an expansion of the department’s faculty by at least five people.
Challenge #2 — Computer Science and Engineering

How to handle double-digit growth in student demand?

• An expansion of department is under consideration; how many graduates/year should the University produce?

How to address lack of office and laboratory space, which limits faculty hiring?

• Some relief in 2017-18 when Physics renovation completed; 10-15,000 sq. ft. open in Lind Hall in 2020-21 (?)

How to position the department to best meet the needs of industry?

• Now gathering input from Minnesota companies to develop strategy.
Building projects in (or affecting) CSE, 2015-23

- Tate
- Pillsbury (?)
- Lind (?)
- Fraser (?)
- Smith (?)
- ME; Phase 2 + labs
- ME; Phase 3 (?)
Other possible projects (pending agreement with donors):

• Student work/project spaces in old ECE/ME and CEGE shops
  Completion in spring semester 2016?
  Estimated cost: $1-1.5 million

• Robotics facility in Shepherd Laboratories (two floors)
  Construction to begin late 2017 or early 2018?
  Estimated cost: $10-12 million
Dean search...

- I resigned July 29, 2015 (effective September 1, 2016); 13 months notice
- Committee appointed October 22, 2015
- Search firm retained (Isaacson, Miller)
- Finalists to visit campus March/April 2016?
- Next dean named May/June 2016?

See [cse.umn.edu/deansearch](http://cse.umn.edu/deansearch) for updates
My post-August 2016 plans? Nothing yet!

1987 VW Westfalia
New Mexico 2013
Yellowstone Park 1991

New flower bed 2014
Dahlias 2014
Peonies 2010
Concluding remarks...
Some developments since January 2005...

• **Building projects** completed or in progress: $375 million

• **Funds raised** for faculty, students, facilities, academic program support: $250 million

• **Students**
  
  2005: 2,800 applications; 800 freshmen; ACT 28.0
  2015: 13,100 applications; 1,076 freshmen; ACT 31.5

• **Faculty**
  
  2005-15: hired 150 tenured, tenure-track faculty (32 women); 111 faculty “left” during same time period; net gain 39 people!

• **Sponsored research expenditures** increased by 64% from FY06 to FY15 ($84.6 million to $138.5 million)
The College of Science and Engineering has:

- An accomplished faculty
- A dedicated and capable staff
- Excellent students
- Strong support from industry
- Generous facilities support from the University and the State of Minnesota

All reasons to be optimistic about the future!
Thanks to everyone who helped make my tenure as dean successful (and enjoyable!)

January 1, 2005 to September 1, 2016

11 years, 8 months
On the road again!

Questions?