STATE OF THE DEPARTMENT

Henry Kautz
Department of Computer Science
University of Rochester

December 10, 2012
Research Highlights
Programming Systems: the End of Cache Monopoly

- Unified theory of locality
- Peer-aware program optimization
- Software-hardware collaborative caching
- Chen Ding, Xiaoya Xiang, Xiaoming Gu, Bin Bao
Environmentally Friendly Super Capacitor Energy Buffering

- Replace batteries in remote field systems
- Adaptive power/energy control
- Integrated hardware/software support
- CS: Amal Fahad, Zhuan Chen, Kai Shen
- ECE: Tolga Soyata, Gaurav Sharma, Wendi Heinzelman, ...
“Sharpening” Knowledge
Extracted from the Web

Len Schubert, Jonathan Gordon, Karl Stratos, Adina Rubinoff
“Sharpening” Knowledge Extracted from the Web

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Len Schubert, Jonathan Gordon, Karl Stratos, Adina Rubinoff
Crowd Everything
**Self-Correcting Crowds** (2012).

**Crowd Memory: Learning in the Collective** (2012).

**Speaking With** (2012).

**A Readability Evaluation of Real-Time Crowd Captions in the Classroom** (2012).

**Online Quality Control for Real-Time Crowd Captioning** (2012).

**Crowdsourcing Subjective Fashion Advice Using VizWiz: Challenges and Opportunities** (2012).
TwitterHealth

- Datamining social media to
  - Track disease
  - Discover factors that influence health
  - Provide real-time interventions
- Adam Sadilek, Henry Kautz, Andrew Abumoussa, Andrew Reinders
Theorem

There are election systems (even having poly-time winner problems) that under the standard definitions have poly-time manipulation (resp. bribery, control) algorithms, yet we cannot manipulate (resp. bribe, control) them in polynomial time.

Sorry... but we were following std. complexity theory wisdom.

Barth, Orlik
Tovey, Trick

Edith H., Lane P., Papp

We're sorry... but RICHT!

Integer Factoring Is in Polynomial Time (so RSA Falls!)

Lane Hemaspaandra, Curtis Mendon
Awards

Best Visual Effects
Jiebo Luo

* Multifaceted social multimedia-based prediction of 2012 US Elections

* Automatic analysis of cataract surgery videos
Awards

Best Publication

Trajectory
Henry Kautz

* Thanks to
  * Yi Chu
  * Walter Lasecki
  * Tivadar Papai
  * Adam Sadilek
  * Young Song
Awards

Greatest Service
Michael Scott
Michael Scott

* Program chair for ASPLOS 2012
* Study group on transactional memory of the ISO C++ standardization committee
* Secretary of the Faculty Senate
* Recording Secretary of the Phi Beta Kappa chapter
* Faculty advisory board for the Interfaith Chapel
* Search committee for the new Director of Religious and Spiritual Life
* Search committee for Senior Vice President for Research
* HSEAS Computing and Networking Advisory Committee
* HSEAS Research Strategy Committee
* University Council on Sustainability
Curtis Award for Excellence in Undergraduate Teaching

“Lane [Hemaspaandra] possesses the trifecta of qualities that make an excellent teacher, namely the ability to explain material clearly, a broad and deep understanding of the material leading to very precise exposition, and an engaging style that establishes a strong rapport with his students.”
Undergraduate Awards
Undergraduate Awards

* CRA Finalist or Honorable Mention: Kyle Murray, Adina Rubinoff, Darcey Riley

* Newton Prize for Undergraduate Research: Kyle Murray

* Rob Rouzer Student Life Award: Bradey Halpern

* 1st Place UR Pumpkin Carving Contests: John Hinkel, Xu Wang
Undergrad Outcomes
Undergrad Outcomes

* Employers
  * Google
  * Amazon
  * Microsoft
  * Factset
  * Apple
  * Toyota
  * 7 others...
Undergrad Outcomes

* Employers
  * Google
  * Amazon
  * Microsoft
  * Factset
  * Apple
  * Toyota
  * 7 others...

* Graduate Schools
  * MIT
  * Johns Hopkins
  * Northwestern
  * Fordham
Internships
Internships

* Google
* Microsoft
* Amazon
* Mathworks
* Khan Academy
* Xerox Fellowship
* Factset Research
* Chattanooga Startup contest
* DNC in DC
* White House Web intern
* Intel
* Deutsche Bank
* ITS Center
* EMC
* Fidelity Investments
* Mindspark interactive
* Siemens
* 3Forge
* UC Santa Barbara
* Pitt. Science of Learning Ctr.
* U. of Chicago
* URCS
Undergraduate Education
# Undergraduate Education

<table>
<thead>
<tr>
<th>Year</th>
<th>Majors Per Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>30</td>
</tr>
<tr>
<td>2014</td>
<td>47</td>
</tr>
<tr>
<td>2015</td>
<td>40 +</td>
</tr>
<tr>
<td>2016</td>
<td>53 +</td>
</tr>
</tbody>
</table>
## Undergraduate Education

<table>
<thead>
<tr>
<th></th>
<th>Majors Per Class</th>
<th></th>
<th>Student Hours Taught</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2013</strong></td>
<td>30</td>
<td><strong>2009-10</strong></td>
<td>3472</td>
</tr>
<tr>
<td><strong>2014</strong></td>
<td>47</td>
<td><strong>2010-11</strong></td>
<td>4120</td>
</tr>
<tr>
<td><strong>2015</strong></td>
<td>40 +</td>
<td><strong>2011-12</strong></td>
<td>5228</td>
</tr>
<tr>
<td><strong>2016</strong></td>
<td>53 +</td>
<td><strong>2012-13</strong></td>
<td>5500 (est)</td>
</tr>
</tbody>
</table>
Proposals

* Submitted: 30
* Funded: 8
* Refused: 10
* Pending: 12
* Success Rate: 26%

What would you do?

Good luck for your draw on Wed 09 Sep 09

Your numbers
A 05 11 32 37 47 49
B 02 11 23 28 35 38
C 04 09 10 35 42 45

Dream Number
You’ve not entered 0542820
MARK ‘YES’ TO GIVE YOUR DREAM NUMBER ITS CHANCE OF WINNING!

3 plays x £1.00 for 1 draw = £3.00
WATCH NATIONAL LOTTERY XTRA FREEVIEW CH45 FROM 8.45AM

6462-034004517-088979 019541 Term. 44461501
NATIONAL TRENDS
NSF FY13 BUDGET
Up 5% overall 8.6% CISE

NSF Twenty Year Budget History by Account
in Millions of Current Dollars

Research & Related Activities
Education & Human Resources
Academic Research Infrastructure
Major Research Equipment & Facilities Construction
Agency Operations & Award Management
Office of Inspector General
National Science Board
OneNSF Framework

- Cyber-enabled Materials, Manufacturing, and Smart Systems (CEMMS) – $247 million / $91 million CISE

- Cyberinfrastructure Framework for 21st Century Science and Engineering (CIF21) – $106 million / $16 million CISE

- Expeditions in Education (E2) – $49 million / $4 million CISE

- NSF Innovation Corps (I-Corps) – $19 million / $6 million CISE

- Integrated NSF Support Promoting Interdisciplinary Research and Education (INSPIRE) – $63 / $4 million CISE

- Secure and Trustworthy Cyberspace (SaTC) – $110 million / $69 million CISE

- Science, Engineering, and Education for Sustainability (SEES) – $203 million / $11.5 million CISE
Figure 3. Total Ph.D. Production (CS & CE, US and Canada)

Source: Table 11: PhD Production and Pipeline by Department
Figure 1. Average CS majors per U.S. CS Department

Source: Table 6: Total Bachelor’s Enrollment by Department Type
Big Data

The Big Data Landscape

Apps
- Vertical
  - Predictive
  - Policing
- Ad/Media
  - MetaMarkets
  - Collective
- Business Intelligence
  - Oracle
  - Hveiron
- Analytics and Visualization
  - Tableau

Data As A Service
- FICO
- FICO
- Informatica

Infrastructure
- Analytics
  - Hortonworks
  - MapR
- Operational
  - Couchbase
  - 10gen
- As A Service
  - NoSQL
  - MongoDB
- Structured DB
  - Oracle
  - MySQL
150 attendees
35 presentations
23 external speakers

Matthew Blackwell
Assistant Professor of Political Science, University of Rochester
Matthew Blackwell is an Assistant Professor of Political Science at the University of Rochester. His research focuses on American politics and political methodology. In American politics, he studies campaigns, the effectiveness of negative advertising, and Congressional staff networks. In methods, he works on dynamic causal inference, missing data, panel data, and social network analysis.

Rajeev Raizada
Assistant Professor, Cornell
In July 2013, Rajeev Raizada will be starting as an Assistant Professor in the Department of Brain & Cognitive Sciences at the University of Rochester. He is currently in the Psychology Department at Cornell. More information about his research and downloadable publications can be found at http://raizadalab.org.
"Ultimately, Big Data offers the potential for a kind of Copernican Revolution in knowledge. It won't come easily; it may cost us much of the privacy we now hold dear. And it won't come soon.... But the upside is so staggering that few will refuse it. After all, we now have the chance to become the center of our own knowledge universe."