Electronic Devices Colloquium
Feb. 21, 2008

Issa Batarseh
School of EECS Director
University of Central Florida
Orlando, FL
batarseh@mail.ucf.edu
Harris Corp. Engineering Center

New 100,000 sq.ft. home of the
School of EECS

The Most Significant Gift of $6M
University of Central Florida

Then

1969 – Enrollment: 1,948 Students

Now

2007 – Enrollment: 48,500 Students

UCF Stands For Opportunity
UCF Facts

- **Mission:** to be America’s leading partnership research university

- Sixth largest university in the U.S.
  - 48,497 Students (55% female, 93% in-state)
  - 7,200 Graduate Students & 9,300 Faculty & Staff
  - Engineering & CS 4,936 UG 990 Grad 5,926 Total
  - 2nd highest number of National Merit Scholars

- Main Orlando campus & 12 regional sites including six Florida Community Colleges

- Twelve colleges, including new College of Medicine Admitting Students in 2009

- Over 160,000 degrees awarded, including 1,600 plus doctoral degrees
UCF Facts

- UCF Extensive Distributed Learning & Campus Infrastructure
- Advanced learning spaces
  - 80% of classrooms multimedia-equipped
- UCF $950M Budget, $1.7 B local economic impact
- Top ten employer in Central Florida
- Over $105 Million in Sponsored Research
- Central Florida Research Park (UCF Research Park)
  - 1,027 acres, 116 companies,
  - Over 8,000 employees
  - $1.4 Billion in economic impact
  - $2 Billion in DoD contracts
- One of leading M&S business hubs in America
College of Engineering & Computer Science

- UCF College of Engineering and Computer Science (CECS) has an enrollment of more than 5,000 undergraduate and 1,100 graduate students.
- CECS is ranked in the top 9% of colleges for the number of Bachelor's degrees, top 10% for the number of Master's degrees, and top 12% for the number of PhD degrees awarded in engineering.
- EECS ranked 2nd after Georgia Tech in head count
CECS Programs of Study

- Computer Science
- Information Technology
- Civil Engineering
- Environmental Engineering
- Construction Engineering
- Electrical Engineering
- Computer Engineering
- Engineering Technology
- Industrial Engineering
- Aerospace Engineering
- Mechanical Engineering

School of EECS
School of EECS
Programs of Study

BS, MS and Ph.D. degrees in:

• Computer Science
• Information Technology*
• Electrical Engineering
• Computer Engineering

*IT is a BS only degree at this time
EECS Vision

To be among the premier Schools of Electrical Engineering and Computer Science and be ranked among the top 50 departments in the nation by 2011.
School of EECS
Strategic Plan Objectives

- Achieve national prominence in strategic research areas of computer science, engineering computer, and electrical engineering.
- Achieve national leadership in EECS education.
- Achieve success in helping develop/advance Florida’s/US Hi-Tech economy.
EECS Priorities

• **Retain and Recruit** outstanding faculty and attract high quality students

• Promote and expand multi-disciplinary research

• Continue to update and develop quality graduate and undergraduate curricula

• Strengthen industrial outreach

• Promote faculty, students, and teaching and research programs!
EECS Focus Areas

- **Bioinformatics and Systems Biology**
  - EECS leading a new interdisciplinary MS (and eventually Ph.D.) program with 2 other colleges
  - Includes “biologically-inspired” computing

- **Entertainment Engineering**
  - Graphics, Vision, Co-operative behaviors, Immersive Environments, Robotics, Modeling, Simulation and Training

- **Energy**
  - Renewable energy, grid-based networks, power electronics
EECS Research

- EECS reached $8.8 million in new funded research for FY 2006-2007
- Total Expenditure $7M
- Average of $140k/Faculty
Program Rankings

US News and World Report:

- **2005** – none were ranked.
- **2006** – EE ranked 76, and CpE was not ranked
- **2007** – EE ranked 69, and CpE ranked 67
- **2008** – EE ranked 67, and CpE ranked 69

NRC – National Research Council:

- **1993** – EE Ranked 77
- **2008** – to be announced in April

Public University Ranking:

- 2007: 38
- 2008: 34
# EECS Faculty Count

<table>
<thead>
<tr>
<th>Tenured/ Tenure-Track Faculty</th>
<th>Visitors/ Lecturers</th>
<th>Total Faculty for 2006-2007</th>
<th>Projected New Hires for 2008-2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>7</td>
<td>67</td>
<td>1-2?</td>
</tr>
</tbody>
</table>

One of the 10 largest *combined* EECS academic units in the nation in terms of student enrollment and faculty size.
EECS Faculty Recruiting

- 10 Tenure-track faculty joined EECS in the past 2 years from:
  - MIT, Caltech, UT-Austin, Michigan, Brown, UMass, etc.

- This year, recruited Marwan Simaan, UCF’s first National Academy of Engineering faculty member
  - Part of the 21st Century World Class Scholar program

Also recruited Dan van der Weide with CREOL

- Over 525 applicants!
## EECS Technical Areas

Our TT-faculty are grouped into the following 8 focus areas

<table>
<thead>
<tr>
<th></th>
<th>Focus Area</th>
<th>Core Faculty</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Computer Systems and VLSI</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>Algorithms and Software Systems</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>Intelligent Systems and Machine Learning</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>Computer Networks</td>
<td>8</td>
</tr>
<tr>
<td>5</td>
<td>Signal Processing and Systems</td>
<td>8</td>
</tr>
<tr>
<td>6</td>
<td>Micro- and Nano-Systems</td>
<td>7</td>
</tr>
<tr>
<td>7</td>
<td>Computer Vision and Graphics</td>
<td>9</td>
</tr>
<tr>
<td>8</td>
<td>Electromagnetics and Optics</td>
<td>6</td>
</tr>
</tbody>
</table>
## EECS Enrollment

<table>
<thead>
<tr>
<th>TOTAL Undergraduate Headcount</th>
<th>1885</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL Graduate Headcount</td>
<td>478</td>
</tr>
<tr>
<td>TOTAL HEADCOUNT</td>
<td>2,363</td>
</tr>
</tbody>
</table>
# Undergraduate Enrollment

**AY (2006-2007)**

<table>
<thead>
<tr>
<th>Undergraduate Program Enrollment</th>
<th>Total UGD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer Engineering</td>
<td>417</td>
</tr>
<tr>
<td>Computer Science</td>
<td>638</td>
</tr>
<tr>
<td>Electrical Engineering</td>
<td>528</td>
</tr>
<tr>
<td>Information Technology</td>
<td>302</td>
</tr>
<tr>
<td><strong>TOTAL Undergraduate</strong></td>
<td><strong>1,885</strong></td>
</tr>
</tbody>
</table>
Graduate Enrollment
AY (2006-2007)

<table>
<thead>
<tr>
<th>Graduate Program Enrollment</th>
<th>M.S.</th>
<th>Ph.D</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer Engineering</td>
<td>67</td>
<td>55</td>
<td>122</td>
</tr>
<tr>
<td>Computer Science</td>
<td>45</td>
<td>121</td>
<td>166</td>
</tr>
<tr>
<td>Electrical Engineering</td>
<td>83</td>
<td>107</td>
<td>190</td>
</tr>
<tr>
<td>TOTAL Graduate Enrollment</td>
<td>195</td>
<td>283</td>
<td>478</td>
</tr>
</tbody>
</table>
BS Enrollment

EECS Undergraduate Enrollment

- Fall 2006:
  - Total enrolled in the College: 4771
  - Enrolled in EECS: 2039

- Fall 2005:
  - Total enrolled in the College: 4503
  - Enrolled in EECS: 2009

UCF Stands For Opportunity
MS Enrollment

EECS Masters Enrollment

Fall 2006

196 enrolled in EECS

Fall 2005

215 enrolled in EECS

478 total enrolled in the College

552 total enrolled in the College

EECS

CECS

UCF Stands For Opportunity

SCHOOL OF ELECTRICAL ENGINEERING & COMPUTER SCIENCE
Ph.D. Enrollment

EECS Ph.D. Enrollment

Fall 2006:
- 282 enrolled in EECS
- 514 total enrolled in the College

Fall 2005:
- 292 enrolled in EECS
- 520 total enrolled in the College

UCF Stands For Opportunity
BS Degrees Conferred ’05-’06

575 total B.S. in the College

385 B.S. in EECS
MS Degrees Conferred ’05-’06

M.S. Degrees Conferred AY ’05-’06

274 total M.S. in the College
145 M.S. in EECS

CECS
ECE

UCF Stands For Opportunity

School of Electrical Engineering & Computer Science
Ph.D. Degrees Conferred '05-'06

55 total Ph.D. in the College
31 Ph.D. in EECS

CECS
EECS
Ph.D. Degree Production

- CS Ph.D. production 15th in the nation according to CRA
- Oldest CS Ph.D. program in FL, 1st PhD program at UCF
- 0.6 Ph.Ds/TT-faculty/yr ranks with top schools

EECS PhD Degrees Conferred AY 2006-2007

- 2003-2004: 19
- 2004-2005: 29
- 2005-2006: 31
- 2006-2007: 38
EECS Partnerships

- **Harris Corp.** – Naming opportunities, research, student outreach.
- **Coleman Technologies** – DARPA project
- **L³ Communications** – CAVE (computer aided virtual environment) equipment
- **Lockheed Martin** – academic partner to educate their employees with work study programs, special training courses
- **Entertainment Arts** – summer internships for min. of 2 EECS students each year
EECS Outreach

- **Florida Science Olympiad Invitational** – Targets Middle School AND High School students.
- **ACM International Collegiate Programming Contest** – UCF will host this competition here in early 2008; outstanding opportunity – access to the World’s best programmers.
- **UCF High School Programming Contest** – the largest and oldest contest of its kind in Florida, this is an annual event hosted at UCF that is an important recruiting event.
DARPA Urban Challenge

• Complete a 60-mile Urban course safely in less than 6 hours.
• Entry of UCF Knight Rider VIP into the final among 35 teams
• Goals
  - Showcase of technical competence in relevant areas of EE, CpE and CS
  - Industrial-academic collaboration
  - Student participations
  - Visibility
  - National interests

UCF Knight Rider

Finished 7th (MIT, Stanford, CM, VT)
UCF Programming Team

ACM International Programming Contest
Programming Contest Prestige

- Organized by the Association for Computing Machinery (ACM)
- IBM began sponsoring the contest in 1997
- In 11 years since, participation has grown by a factor of 7.5!
- University Participation:
  - 1997 = 560 universities
  - 2007 = 1,756 universities
- Teams Involved:
  - 1997 = 840 teams
  - 1997 = 6,099 teams
UCF’s Unrivaled Success in the ACM Programming Contest

- UCF has competed the last 25 years
- Southeast Regional Contest Results:
  - First Place – 12 times
  - Second Place – 7 times
  - Third Place – 6 times
- World Contest Final Results
  - Second Place (’87)
  - Fourth Place (’86)
  - Fifth Place (’91)
  - Seventh Place (twice: ’92 & ’94)
<table>
<thead>
<tr>
<th>Year</th>
<th>Regional (Five States, typically 80+ teams)</th>
<th>International (World, typically 6,000+ teams)</th>
</tr>
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<tbody>
<tr>
<td>1982-83</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>17&lt;sup&gt;th&lt;/sup&gt;</td>
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<tr>
<td>1983-84</td>
<td>3&lt;sup&gt;rd&lt;/sup&gt;</td>
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<tr>
<td>1984-85</td>
<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>16&lt;sup&gt;th&lt;/sup&gt;</td>
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<tr>
<td>1985-86</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>4&lt;sup&gt;th&lt;/sup&gt;</td>
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<tr>
<td>1986-87</td>
<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt;</td>
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<td>1987-88</td>
<td>3&lt;sup&gt;rd&lt;/sup&gt;</td>
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<td>1988-89</td>
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<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>5&lt;sup&gt;th&lt;/sup&gt;</td>
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<tr>
<td>1991-92</td>
<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>7&lt;sup&gt;th&lt;/sup&gt;</td>
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<tr>
<td>1992-93</td>
<td>3&lt;sup&gt;rd&lt;/sup&gt;</td>
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<tr>
<td>1993-94</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>7&lt;sup&gt;th&lt;/sup&gt;</td>
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<tr>
<td>1994-95</td>
<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>25&lt;sup&gt;th&lt;/sup&gt;</td>
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<tr>
<td>1995-96</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>30&lt;sup&gt;th&lt;/sup&gt;</td>
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<tr>
<td>1996-97</td>
<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>17&lt;sup&gt;th&lt;/sup&gt;</td>
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<tr>
<td>1997-98</td>
<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>37&lt;sup&gt;th&lt;/sup&gt;</td>
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<tbody>
<tr>
<td>1998-99</td>
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<td>1999-2000</td>
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<td>2000-01</td>
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<td>14&lt;sup&gt;th&lt;/sup&gt;</td>
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<td>2001-02</td>
<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>27&lt;sup&gt;th&lt;/sup&gt;</td>
</tr>
<tr>
<td>2002-03</td>
<td>3&lt;sup&gt;rd&lt;/sup&gt;</td>
<td></td>
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<tr>
<td>2003-04</td>
<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>44&lt;sup&gt;th&lt;/sup&gt;</td>
</tr>
<tr>
<td>2004-05</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>41&lt;sup&gt;st&lt;/sup&gt;</td>
</tr>
<tr>
<td>2005-06</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>56&lt;sup&gt;th&lt;/sup&gt;</td>
</tr>
<tr>
<td>2006-07</td>
<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>44&lt;sup&gt;th&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

The Southeast region includes Florida, Georgia, South Carolina, Alabama, and Mississippi. Among Schools competing in this region are University of Florida, Florida State University, Georgia Tech, Auburn, Clemson, University of South Carolina, and Mississippi State.

The World Contest Finals includes teams from six continents in the world. Countries participating in finals include USA, Russia, Canada, Germany, Netherlands, Japan, China, Mexico, Brazil, Morocco, and Australia.
EECS New Initiatives
Master of Science degree in Digital Forensics (MSDF)

- Provides training in the science and practice of handling computer (digital) evidence: identification, collection, preservation, examination, analysis, reporting, and presentation

- Is an interdisciplinary program (Colleges of Engineering & Computer Science and Health & Public Affairs) led by EECS faculty:
  - EECS (Lang, J. Lee, D. Turgut, C. Zou)
  - ENT (Craiger, Pollitt)
  - Forensic Science (Whitcomb, Sadaka)
  - Criminal Justice/Legal Studies
MSDF (continued)

- Builds upon existing graduate certificate in computer forensics which started in the fall of 2001 with collaboration of EECS, Forensic Science/Chemistry, and the National Center for Forensic Science
- Consists of 30 credit hours with coursework in computer and network forensics, cyber law, forensic science, expert witness in the courtroom, and internship/practicum experience
- Potential partners: law enforcement agencies, community colleges, industry
- Target start date: fall of 2007
The Undergraduate Research Experience (URE) program provides an opportunity to work with and learn from UCF research faculty, their graduate students, and their activities. This program is in addition to other undergraduate research programs, such as UCF’s RAMP. It provides additional opportunities for interested students starting at the freshman level. Students accepted into the receive a contract for $3,000 per academic year, which includes the Fall and Spring semesters.
The EXCEL Program at UCF

- The EXCEL program is a STEP (Science Technology, Engineering and Mathematics Talent Expansion Program) project funded by NSF for 5 years (January 2006 to December 2010) at the level of $1.8M.

- The EXCEL program was one of 19 (out of 197 proposals) that were submitted to NSF in the 2005 STEP cycle (success rate ~ 10%).
The EXCEL Program at UCF

- The EXCEL Program’s objective is to increase the success, in their first two years of college, of students (US and permanent residents) that pursue STEM (Science, Technology, Engineering and Mathematics) disciplines at UCF.
- The EXCEL program has already recruited 184 UCF STEM students in the Fall of 2006.
- Please visit our web-site (www.excel.ucf.edu) to learn more about EXCEL.
THANK YOU!