Graduate Studies in Engineering and Computer Science at the University of Central Florida

Department of Industrial Engineering and Management Systems
Department of Industrial Engineering and Management Systems (IEMS)

<table>
<thead>
<tr>
<th>Faculty and Students</th>
<th>Faculty</th>
<th>Lecturers</th>
<th>Doctoral Students</th>
<th>Master Students</th>
</tr>
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<tbody>
<tr>
<td>Number</td>
<td>19</td>
<td>2</td>
<td>65</td>
<td>225</td>
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</tbody>
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Research Areas:
- Operations research
- Complex adaptive systems
- Engineering analytics
- Network science and optimization
- Modeling and simulation
- Engineering management
- Business incubation/entrepreneurship
- Quality engineering
- Human-system integration
- Neuroergonomics & neurotechnology
- Systems engineering
- Healthcare systems

Facts of Interest:
Research funding from:
- Air Force Research Laboratory (AFRL)
- Defense Advanced Research Projects Agency (DARPA),
- Office of Naval Research (ONR)
- National Science Foundation (NSF)

- NAE faculty members:
  - Gavriel Salvendy
  - Deborah Nightingale

- MS Healthcare Systems Engineering Track offered fully online
Department of Industrial Engineering and Management Systems (IEMS)

- Operations Research
  - Qipeng Phil Zheng, Adan Vela, Rick Biehl

- Energy Systems Economics, Management, Sustainability, Security
- Transportation, Evacuation Modeling, Pricing, Planning
- Healthcare Management, Modeling, Planning
Motivation: *Attack tolerance* of networks with respect to multiple node and/or link failures

- **Defender’s perspective:** can one guarantee certain attack tolerance levels subject to multiple, possibly geographically correlated failures? **Identifying attack-tolerant network cluster configurations**

- **Attacker’s perspective:** can one effectively disconnect a network so that nodes and/or links are attacked in an optimal fashion? **Identifying critical elements in complex networks**
Complex Adaptive Systems and Engineering Analytics
Ivan Garibay, Waldemar Karwowski, Adan Vela
We do advanced research in interoperability of simulation systems (in particular Live, Virtual, and Constructive (LVC)). For successful LVC simulations, especially the importance of achieving interoperability of the simulation system, integration of infrastructure and composability of the underlying models is being emphasized in the Modeling & Simulation (M&S) as well as many application areas in space exploration and defense systems. We have worked with NASA, ONR, and the Agency for Defense Development (ADD) of South Korea.
We are developing a framework for modeling human performance variability and nonlinear behavior, including estimation of task execution times under generic naval ship performance conditions to meet critical response time and other mission criteria.
Engineering Management

- Robert Hoekstra, Tim Kotnour, Tom O’Neal, Heather Keathley, Luis Rabelo
- We are focused on understanding how to help engineering and computer science professionals develop their ability, burning desire and confidence to deliver world changing solutions
- Focus Areas: The processes and tools for Creativity, Innovation, (Technology) Strategy, and Organizational Transformations
Quality Management: Quantifying Sustainability of Lean Implementation in Healthcare Organizations

Ahmad K. Elshennawy, Rick Biehl

As healthcare organizations started to implement lean, there is a need for assessment tools that help the implementing organizations measure the progress they do towards sustainable lean implementation.

The proposed framework proved to be capable of assessing the level of adopting characteristics of sustainable lean implementation in hospitals even if lean is not adopted as a major component of the organization’s management system.

These scores will be projected on the Lean Sustainability Assessment Space to quantify the observed sustainability levels of implementing lean in surveyed departments/hospitals.
Thomas O’Neal, Tim Kotnour, Dale Jackson, Oscar Rodriguez, Ivan Garibay, Cameron Ford

UCF awarded EDA grants to further expand I-Corps activities

U.S. Secretary of Commerce Penny Pritzker and Sen. Bill Nelson announce funding two initiatives that will advance innovation and capacity-building activities in regions across the country.

Harness the power, influence and entrepreneurial ecosystem of the nation’s second largest university.

Become involved in the Florida Innovation Network – Learn more!
Notable CECS Graduate Alumni
Department of Industrial Engineering and Management Systems (IEMS)

- Kelvin Manning (M.S., ‘02) Associate Director, NASA John F. Kennedy Space Center.

- Grace Bochenek (Ph.D., IE, ’98) Director, National Energy Technology Laboratory (NETL), U.S. Department of Energy

- Adedeji Badiru (Ph.D., IE, ’84) Dean, Graduate School of Engineering and Management at the Air Force Institute of Technology (AFIT)


- Hani Mohammad Aburas (Ph.D., IE, ’02) Mayor of Jeddah, Kingdom of Saudi Arabia
CECS Graduate Students Entering the Workforce
Jobs in Industry, Government and Academia

Department of Industrial Engineering and Management Systems (IEMS)

Employers of Industrial Engineering Graduates
- Northrop Grumman
- Lockheed Martin
- Walt Disney Parks & Resorts
- Siemens
- Florida Hospital
- NBC Universal
- Harris
- Federal Express/UPS
- American Express
- Google
- Boeing
- Mitsubishi Power Systems

Jobs for Industrial Engineering Graduates
- Manufacturing Engineer
- Logistics Engineer
- Planning and Analytics
- Systems Engineer
- Decision Analyst
- Project \ Technical Manager
- Supply Chain Engineering
- Operations Analyst
- Cost Engineer
- Management Engineer
CECS Research Facilities and State-of-the-Art Laboratories
Department of Industrial Engineering and Management Systems (IEMS)

- Synthetic Environment Learning Laboratory
- Interoperability of Simulation Systems Laboratory
- Complex Adaptive System Laboratory
- Applied Operations Research Laboratory
- Human Systems Integration Laboratory
- Ergonomics /Human Factors Laboratory
- Neuroergonomics Laboratory
- Institute for Advanced Systems Engineering
Graduate Enrollment and Degrees

Department of Industrial Engineering and Management Systems (IEMS)

- Ranked #38 in 2017 by US News and World Report (USNWR)
- High productivity of PhD degrees
- Strong partnerships with Central Florida industry

IEMS Research Proposals

- Source: ORC Aurora Reporting Services

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<tr>
<th>Year</th>
<th>Proposals</th>
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<tr>
<td>2011-12</td>
<td>$4,970,464</td>
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<td>2012-13</td>
<td>$6,984,173</td>
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<td>2015-16</td>
<td>$18,962,914</td>
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IEMS Research Awards

- Source: ORC Aurora Reporting Services

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<th>Year</th>
<th>Awards</th>
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<tr>
<td>2012-13</td>
<td>$1,550,860</td>
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<td>2014-15</td>
<td>$7,036,877</td>
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<td>2015-16</td>
<td>$8,408,329</td>
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Note: Thomas O’Neal joined IEMS in 2015
Excellent international reputation about 61% of doctoral enrollment and 55% of Master’s enrollment are international students, including Hispanic and Asian students. *Source: ASEE 2015 College Profiles Graduate Data.*

### Diversity of Students
Department of Industrial Engineering and Management Systems (IEMS)

#### Graduate Gender
- Female: 33%
- Male: 67%

#### Graduate Ethnicity
- African-American: 9%
- Asian: 6%
- Hispanic: 15%
- Other: 61%
Ahmad Elshennawy
- Fellow, American Society for Quality (ASQ)

Charles Reilly
- Fellow, Institute of Industrial Engineers
- Fellow, American Association for the Advancement of Science

Timothy Kotnour
- Fellow, American Society for Engineering Management

Waldemar Karwowski
- Fellow, Institute of Industrial Engineers (IISE)
- Fellow, International Ergonomics Association (IEA)
- Fellow, Human Factors and Ergonomics Society (HFES)
- Fellow, The Ergonomics Society (United Kingdom): F.Erg.S
Major Professional Awards of IEMS Faculty (2012-2017)
Department of Industrial Engineering and Management Systems (IEMS)

- Pamela McCauley, **Jefferson Fellowship** 2015-2016, U.S. State Department
- Jennifer Pazour, 2013 **Young Investigator Award** from Office of Naval Research
- Luis Rabelo, **Forest R. McFarland Award**, Society of Automotive Engineers, September 2013 (Montreal, Canada)
- Luis Rabelo, **Distinguished Engineering Educator Award**, National Engineers Week Honors & Awards Banquet, Engineers’ Council, 2012
- Waldemar Karwowski, **UCF Pegasus Professor** 2016 and **National Professorship Award** by the President of the Republic of Poland, 2012
- Michael Proctor, William R. Jones Outstanding Mentor Award, Florida Education Fund, Fall 2013
- Michael Proctor, Award Recipient, UCF Millionaires Club, 2015