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

*Department of
Industrial Engineering and Management
Systems*



UCF

**College of Engineering
and Computer Science**

UNIVERSITY OF CENTRAL FLORIDA

Department of Industrial Engineering and Management Systems (IEMS)

Faculty and Students	Faculty	Lecturers	Doctoral Students	Master Students
Number	19	2	65	225

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



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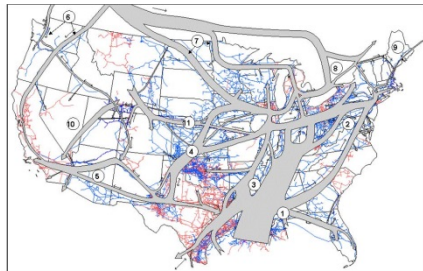
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Department of Industrial Engineering and Management Systems (IEMS)

Operations Research

➤ Qipeng Phil Zheng, Adan Vela, Rick Biehl

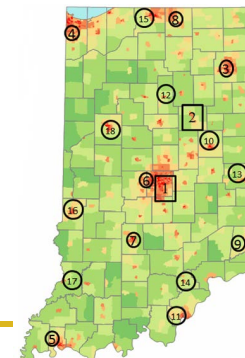
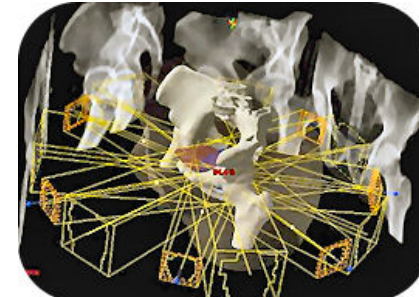
Energy Systems Economics,
Management, Sustainability,
Security



Transportation, Evacuation
Modeling, Pricing, Planning



Healthcare Management,
Modeling, Planning



Department of Industrial Engineering and Management Systems (IEMS)

□ Modeling and Optimization of Complex Networks

➤ Vladimir Boginski, Qipeng Zheng

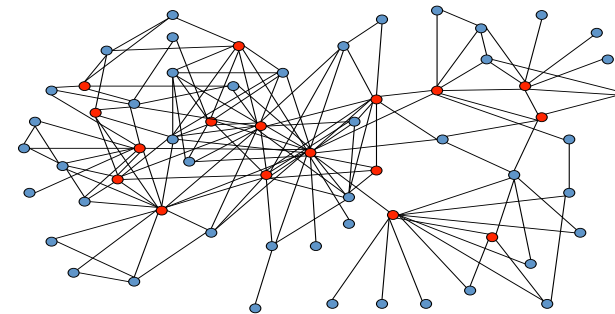
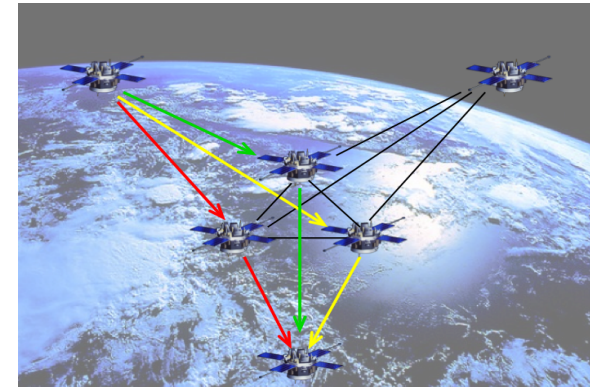
□ Motivation: *Attack tolerance* of networks with respect to multiple node and/or link failures

- 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



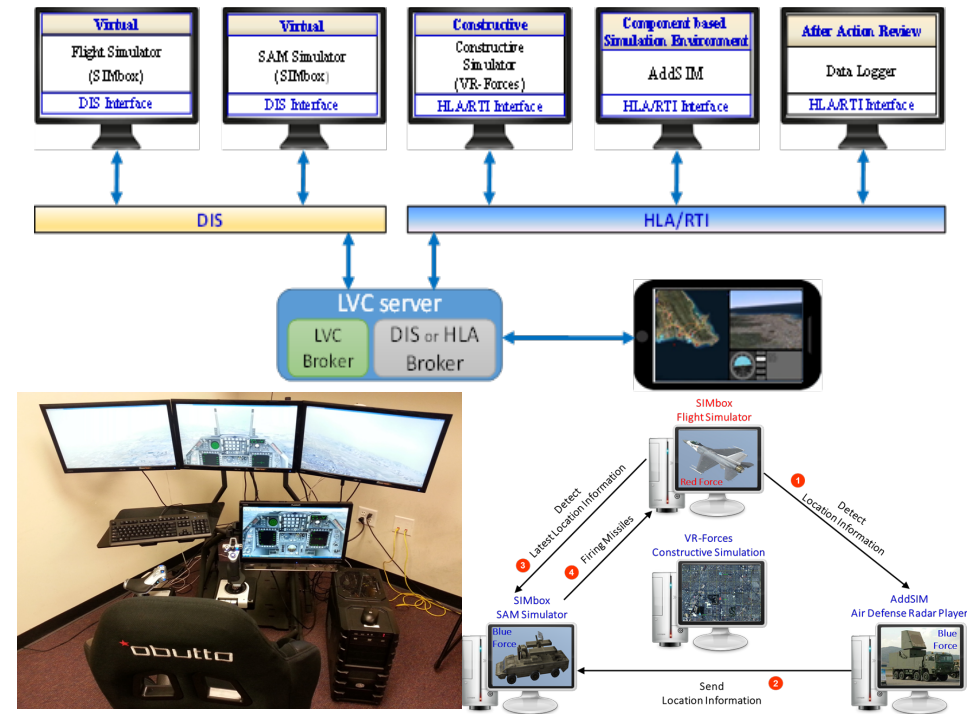


Department of Industrial Engineering and Management Systems (IEMS)

□ Modeling and Simulation

➤ Gene Lee, Luis Rabelo, Robert Proctor

- 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.

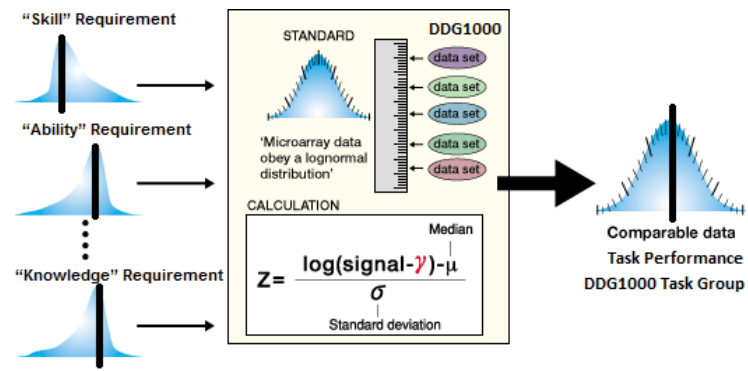
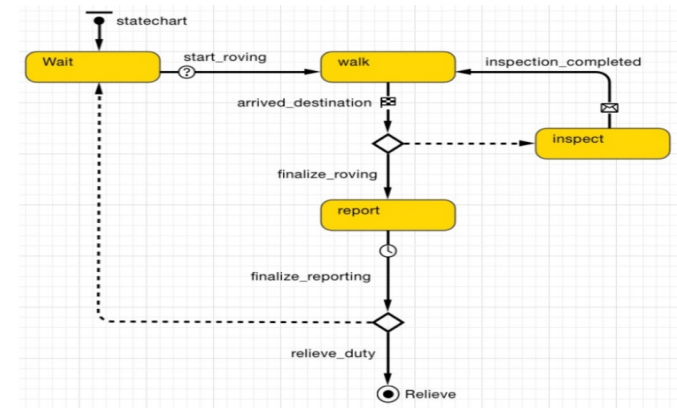
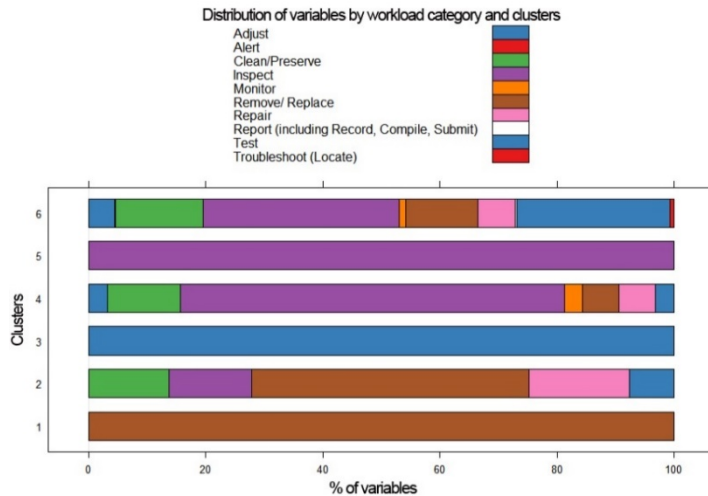


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Human System Integration

Waldemar Karwowski, Tareq Ahram, Edgar Franco, Kevin Muhs

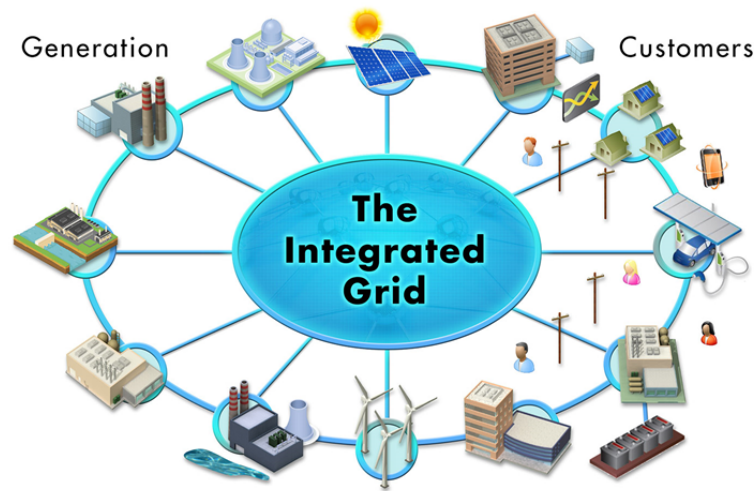
- We are developing a framework for modeling human performance variability and nonlinear behavior, including estimation of task execution times under generic naval ship performance conditions to meet critical response time and other mission criteria.



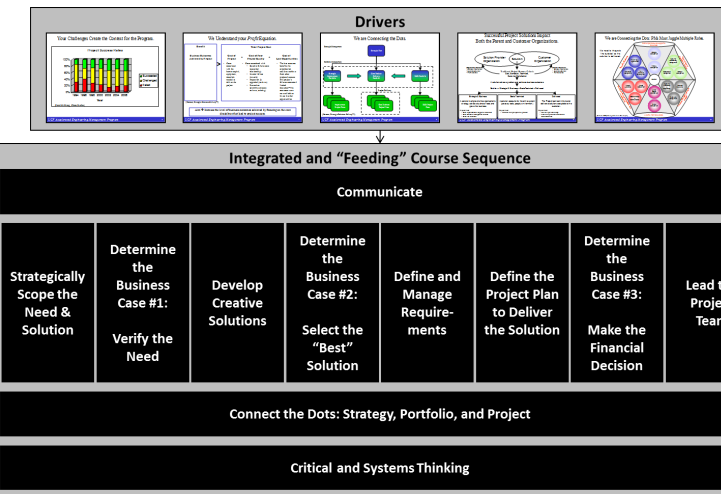
Department of Industrial Engineering and Management Systems (IEMS)

❑ 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



Delivering Innovative Solutions Grad Program



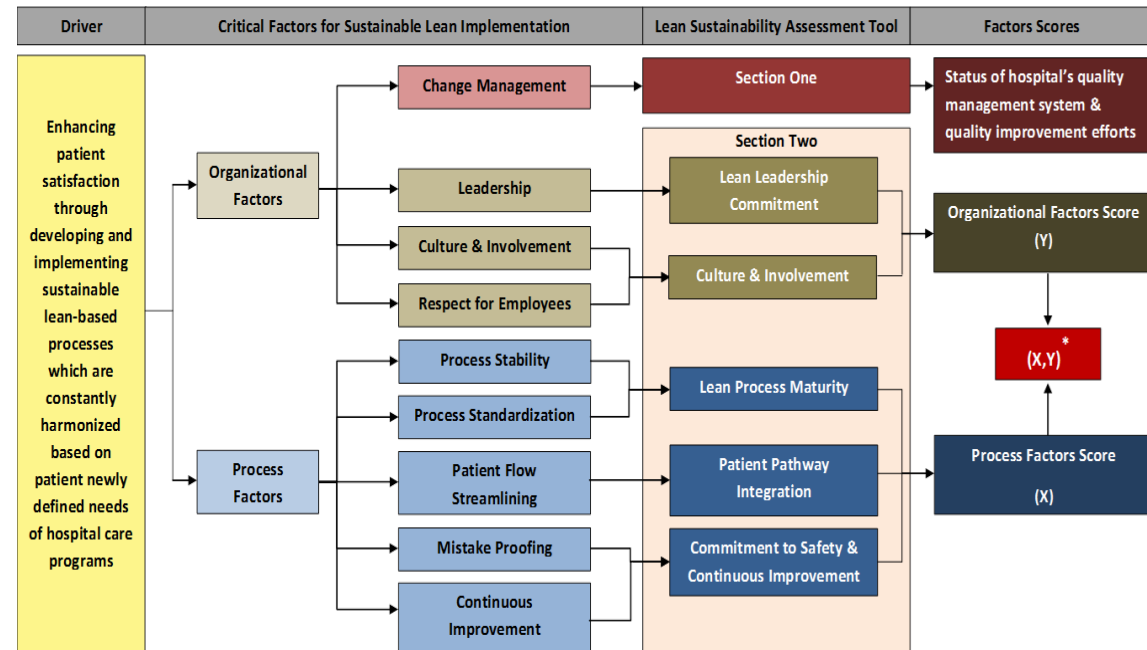
Department of Industrial Engineering and Management Systems (IEMS)

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.

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

- 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)
- ❖ Lt. Col. Gregory Fortier, (M.S., '06) Commands the US Army Aviation Flight Test Directorate (AFTD)
- ❖ 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	Harris
Lockheed Martin	Federal Express/UPS
Walt Disney Parks & Resorts	American Express
Siemens	Google
Florida Hospital	Boeing
NBC Universal	Mitsubishi Power Systems

Jobs for Industrial Engineering Graduates

Manufacturing Engineer	Project\Technical Manager
Logistics Engineer	Supply Chain Engineering
Planning and Analytics	Operations Analyst
Systems Engineer	Cost Engineer
Decision Analyst	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*



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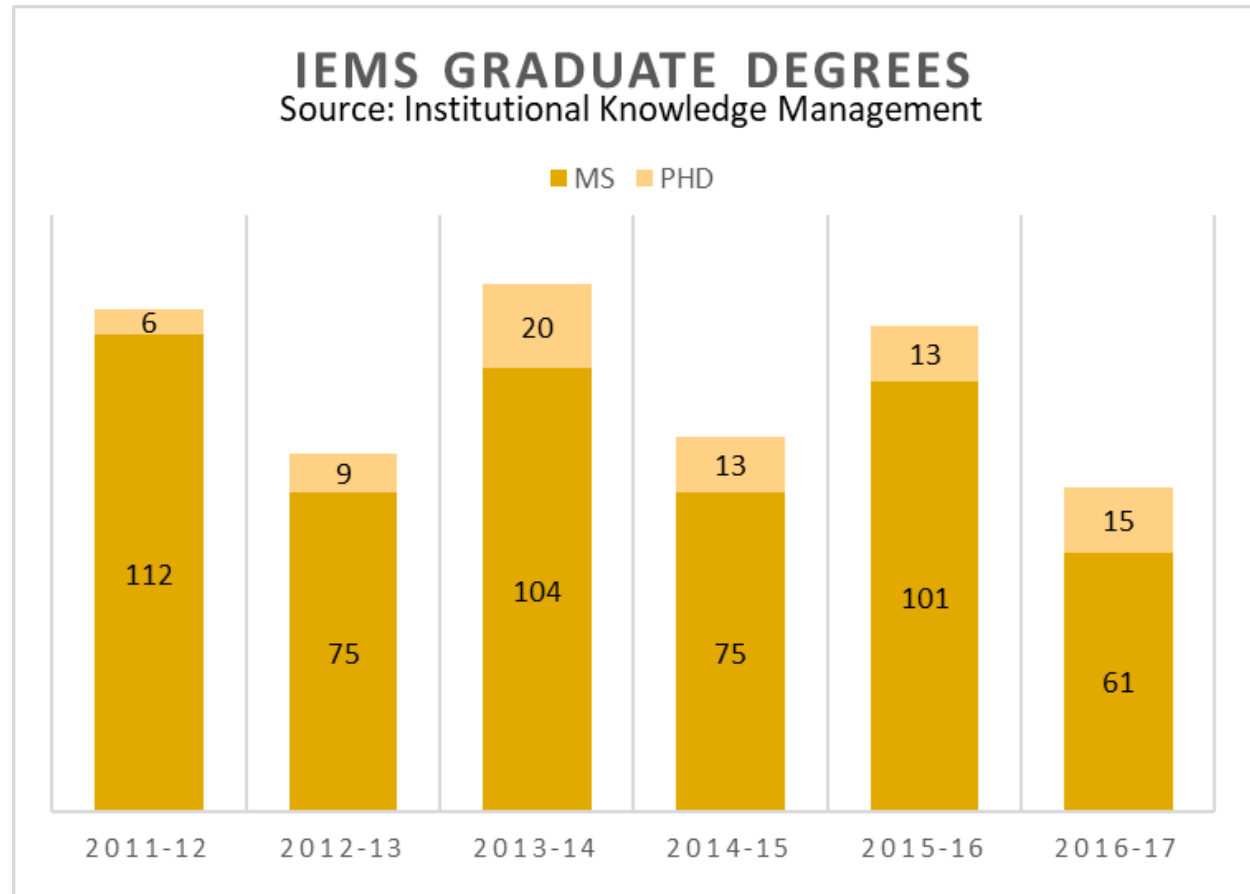
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UNIVERSITY OF CENTRAL FLORIDA

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



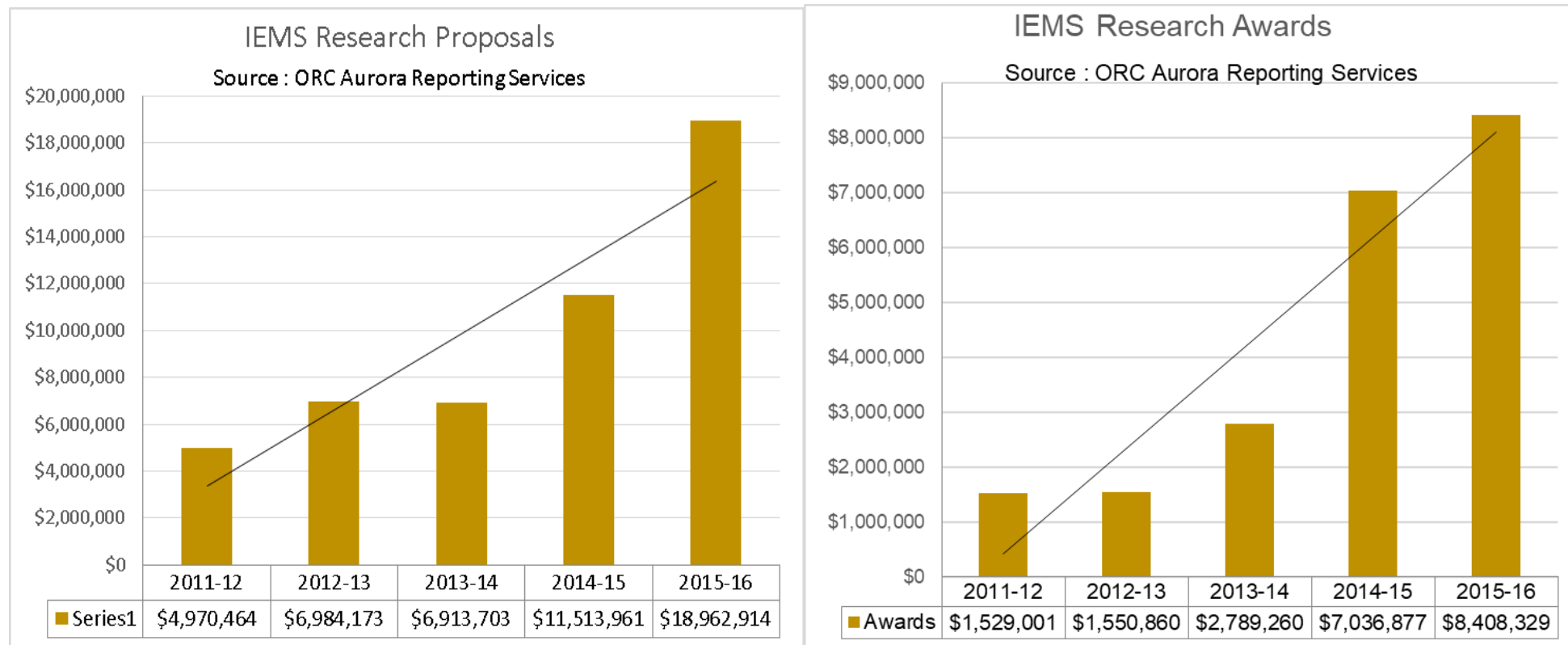
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Research Proposals and Awards

Department of Industrial Engineering and Management Systems (IEMS)

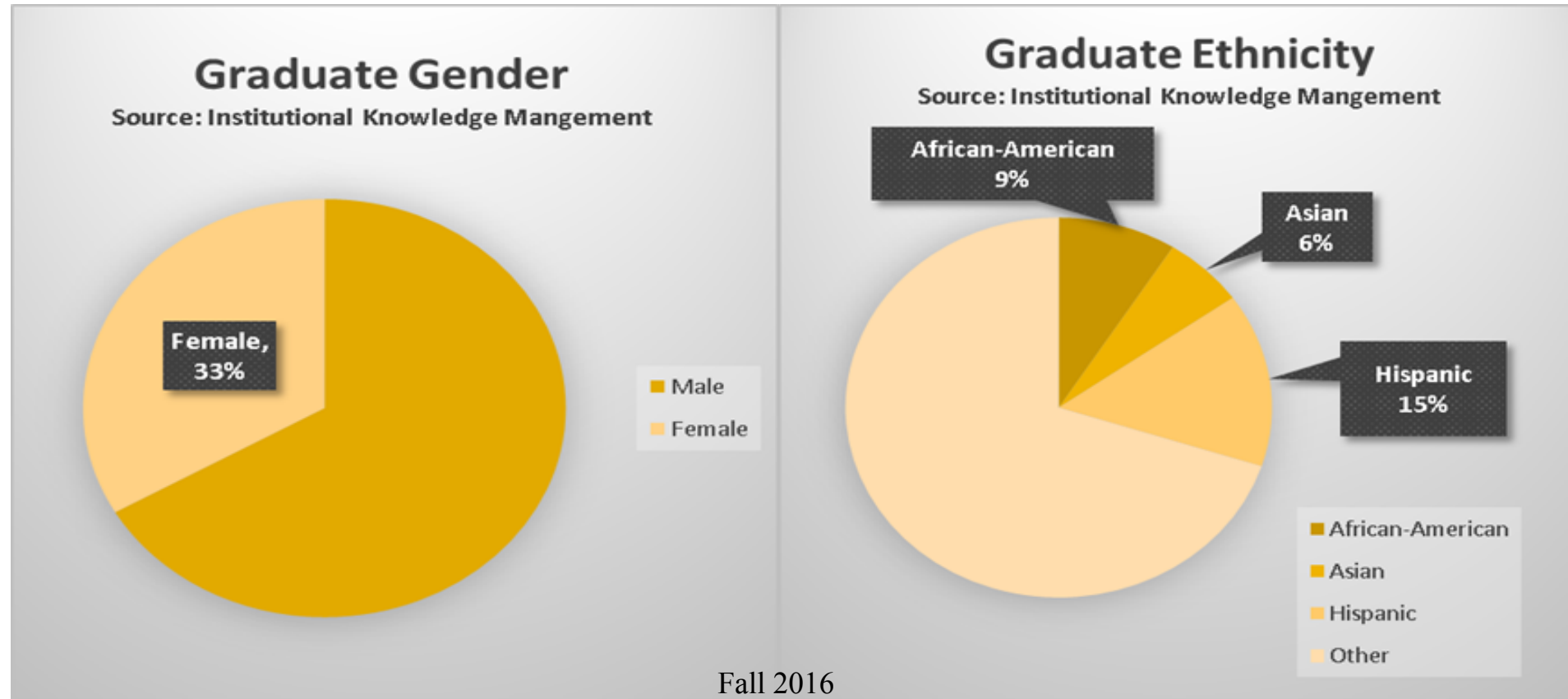
Research Proposals and Awards (2012-2017)



Diversity of Students

Department of Industrial Engineering and Management Systems (IEMS)

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.*



Professional / Engineering Society Fellowships

Department of Industrial Engineering and Management Systems (IEMS)

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 (IIEE)
- ❑ Fellow, International Ergonomics Association (IEA)
- ❑ Fellow, Human Factors and Ergonomics Society (HFES)
- ❑ Fellow, The Ergonomics Society (United Kingdom): F.Erg.S



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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
- ❑ Pamela McCauley - **United Nations Forum on Science, Technology and Innovation** for the Sustainable Development Goals 2016
- ❑ 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

