

Board of Trustees Retreat
University of Central Florida
May 13, 2016

UCF FAIRWINDS Alumni Center
Boardroom
8:30 a.m. – 4:00 p.m.

AGENDA

8:30 – 9:00 a.m.	Continental Breakfast	Boardroom
9:00 – 9:15 a.m.	Welcome	Marcos Marchena
9:15 – 9:25 a.m.	Advancing Preeminence at UCF	Dale Whittaker
9:25 – 10:15 a.m.	Programs of Strategic Emphasis Modeling and Simulation Optics Student Counseling Aerospace Engineering Digital Media	Paul Wiegand Bahaa Saleh Pamela Carroll Yoav Peles Rudy McDaniel
10:15 – 10:30 a.m.	Break	Boardroom
10:30 – 11:00 a.m.	Programs of Strategic Emphasis (Continued) Interactive Entertainment Health Management Informatics Hospitality Management	Ben Noel Reid Oetjen Abraham Pizam
11:00 – 11:05 a.m.	Funding	Dale Whittaker
11:05 – 11:20 a.m.	Successes Centers and Institutes	Dale Whittaker Paul Wiegand
11:20 – 11:50 a.m.	Where Do We Go From Here? ICAMR Applied Research Institute Faculty Clusters	Chester Kennedy David Metcalf Chris Parkinson
11:50 – 12:00 noon	Wrap-Up	Dale Whittaker

12:00 noon – 1:00 p.m.

Lunch

CFE Arena

1:00 – 2:15 p.m.

[Research Benchmarking and Strategies](#)

Dale Whittaker

2:15 – 2:30 p.m.

Break

Boardroom

2:30 – 3:15 p.m.

[Central Florida Higher Education Competitors](#)

Dale Whitaker

3:15 – 4:00 p.m.

Discussion

All

Top Academic Programs and National Preeminence



May 13, 2016



National Academic Preeminence

- What it is
- What it means
- Reputation through impact

- This session considers the resources necessary to advance strong academic programs at UCF to national preeminence

National Preeminence Rankings

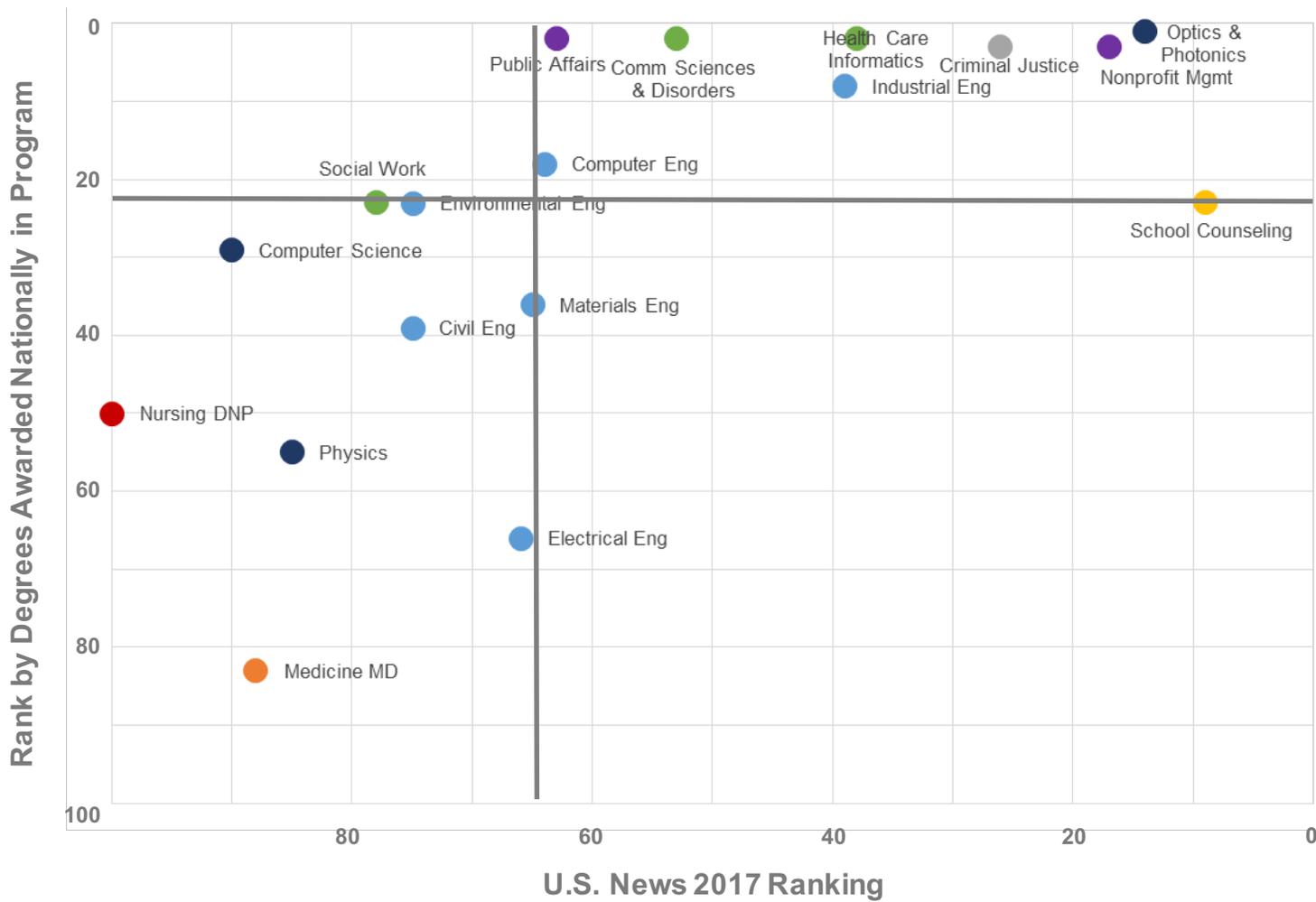
- Various rankings can serve as proxy for national preeminence, including:
 - *U.S. News and World Report* – Best Graduate Colleges
 - *The Princeton Review* – Top Gaming Programs

U.S. News Graduate Program Rankings

- “Specialty” rankings based solely on nominations from school deans from the list of schools surveyed
- Can select up to 10 top programs in each area
- Numerically ranked in descending order based on number of nominations received
- At least seven nominations must be received to be ranked



U.S. News Rank to Degree Volume Rank



Program	U.S. News Rank	Degree Volume Rank
Civil Eng	75	39
Comm Sciences & Disorders	53	2
Computer Eng	64	18
Computer Science	90	29
Criminal Justice	26	3
Electrical Eng	66	66
Environmental Eng	75	23
Health Care Informatics	38	2
Industrial Eng	39	8
Materials Eng	65	36
Medicine MD	88	83
Nonprofit Mgmt	17	3
Nursing DNP	100	50
Optics & Photonics	14	1
Physics	85	55
Public Affairs	63	2
School Counseling	9	23
Social Work	78	23
MEDIAN	65	23

● Education	● Health	● Nursing	● Science
● Engineering	● Medical	● Public Affairs	● Social Sciences & Humanities



Orlando Megatrends and UCF's strengths

- Nation's largest cluster of modeling, simulation, and training companies
- Orlando has a \$9 billion digital media industry and is among nation's top 10 largest digital media clusters
- Top producing region for engineers in aviation, aerospace, and defense industry
- First U.S. destination to surpass 60 million tourists

Intellectual Anchor for Industry Clusters

- Rosen College of Hospitality Management in heart of tourism corridor
- College of Medicine in Lake Nona Medical City
- Institute for Simulation and Training in Central Florida Research Park
- UCF Downtown for digital media and healthcare technology in our urban core
- ICAMR for advanced manufacturing and next-generation technologies in Osceola County

Academic Program Presentations

Graduate Programs

- Modeling and Simulation
- Optics
- Student Counseling

Graduate and Undergraduate Programs

- Aerospace Engineering
- Digital Media
- Interactive Entertainment
- Health Management Informatics

Undergraduate Programs

- Hospitality Management

Modeling and Simulation for Training Graduate Program (MST)

Modeling and Simulation Overview

- **The only truly trans-disciplinary program within UCF**

General Content Areas of Focus



Simulation Modeling and Analysis



Simulation in Health Care



Human Systems in Modeling and Simulation



Computer Visualization in Modeling and Simulation



Interactive Simulation and Intelligent Systems



Simulation Infrastructure



Simulation Management

The UCF Modeling and Simulation curricula permit students to customize their learning across UCF based on their educational and career experience, interests, and goals. Currently involves five colleges.

Graduate Programs and Enrollment



Joseph J. LaViola, Jr,
Ph.D.
Graduate Program
Director



Sabrina Gordon,
M.A.
Graduate Program
Coordinator

Programs Offered

- 
- 1 Modeling and Simulation Ph.D.
 - 2 Modeling and Simulation M.S.
 - 3 Modeling and Simulation of Technical Systems Graduate Certificate (G.C.)
 - 4 Modeling and Simulation of Behavioral Cybersecurity Graduate Certificate (G.C.) **NEW!**

Graduates



Grand Total 398

Since 2001 through
Spring 2016

Would like to grow from 150 students enrolled each year to 250 by academic year 2019-20

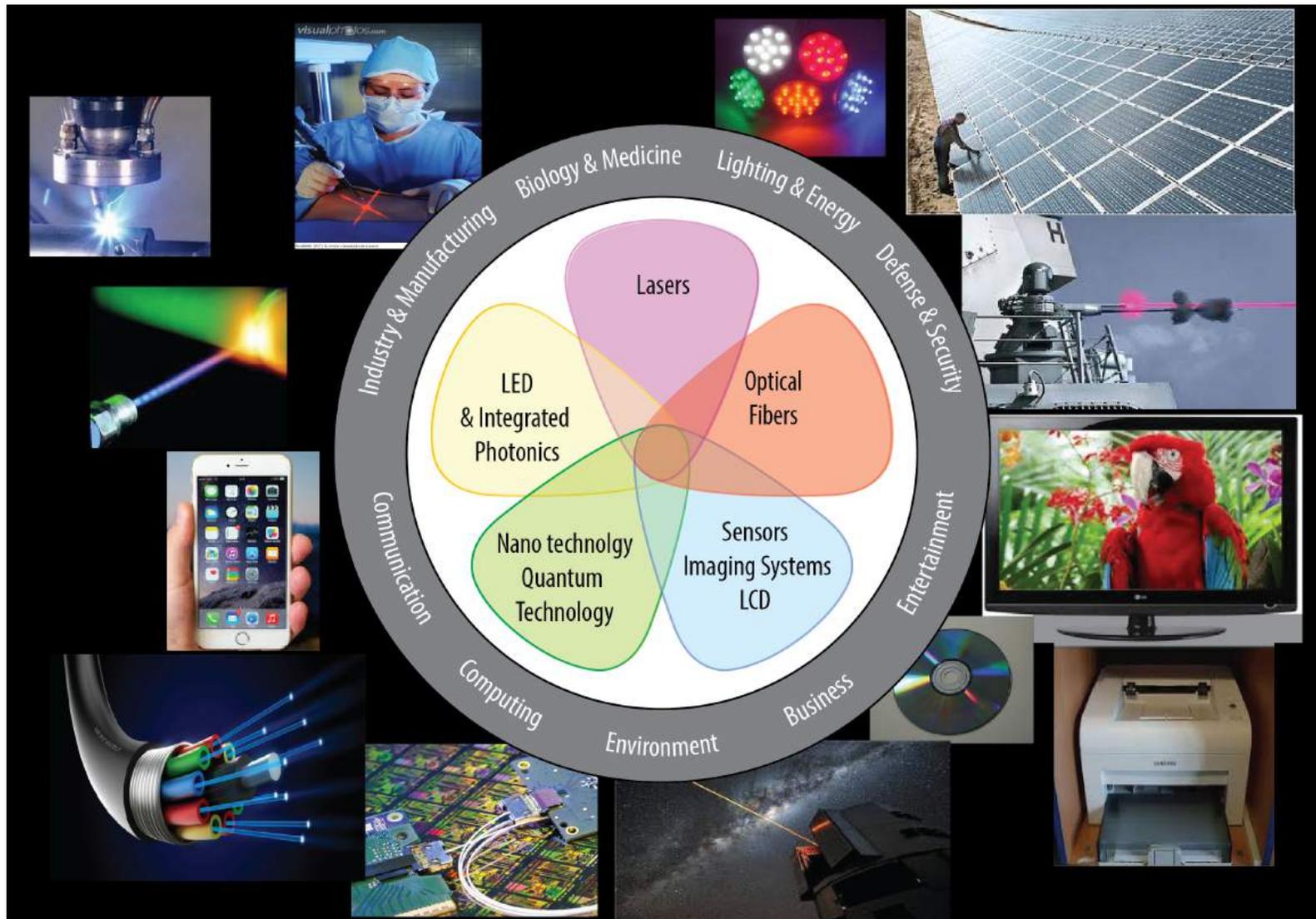
Where Modeling and Simulation Is Expanding

- **Substantial growth opportunity in health modeling and simulation**
 - College of Nursing has created certificate program
 - Medical City, College of Medicine, College of Nursing, and COHPA
 - VA Hospital and VA SIMLEARN center in Orlando
- **Human aspects of cyber security – Certificate created**
 - Adversary culture and behavior capture and modeling
 - Individual behavior and team aspects of cyber defense
 - Insider threat behavior, modeling, and mitigation
- **Unmanned systems**
 - Human-system interface for robots
 - Incorporate robots into teams
 - Modeling team and ambient culture

Modeling and Simulation Program Needs

- **Recognition as an academic unit**
 - Ability to grant tenure
 - Ability to have SCHs, more access to graduate research assistants
- **Faculty**
 - Historically primarily Institute for Simulation and Training research faculty members and adjuncts
 - Hiring two tenure-earning faculty members, with plans to hire three more
 - Need better mechanisms for recognition of cross-unit teaching, co-teaching
 - Funding to support research faculty to teach
- **Support for students**
 - New lab equipment and funding for conferences for students
 - Additional support for master's and doctoral students and administrative support
 - Funding for pilot studies in conjunction with other academic units

Preeminence in Biomedical Optics and Biophotonics



College of Optics and Photonics Overview

- **Rankings**
 - National Research Council: Top 5-12 among Electrical Engineering Ph.D. programs
 - *U.S. News*: 14th top atomic, molecular, and optical sciences program
- **Faculty**
 - World-renowned scholars, fellows, editors of top journals, and leaders of professional societies
- **Students and Graduates**
 - 280 Ph.D. degrees awarded
 - 400 master's degrees awarded
 - New B.S. degree program with growing enrollment
- **Research**
 - About \$15 million in external funding in 2015
 - 280 patents
 - Industrial affiliates program with 62 companies in 2016
 - 26 spin-offs and 5 incubated startups

Targets and Benchmarks

- **Targets**

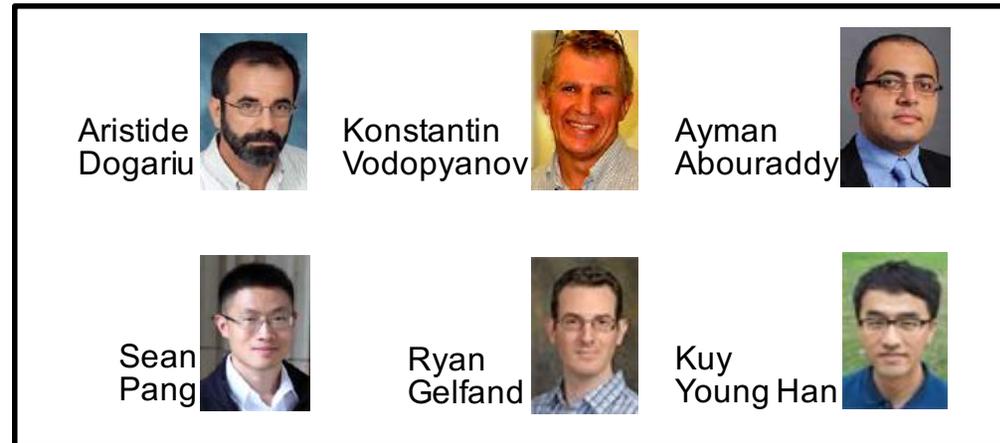
- Convert our nascent, fragmented bio research into a mature program integrated with clinical research at UCF College of Medicine and Orlando hospitals
- Funding targets:
 - 5 National Institutes of Health R21 grants (\$300,000-\$400,000 per grant)
 - 3 National Institutes of Health R01 grants (> \$1 million per grant)

- **Benchmarks**

- The biophotonics program at Beckman Institute (UC Irvine or University of Illinois Urbana-Champaign)
- A campus-wide institute similar to BIO5 Institute at University of Arizona (led by a Ph.D. professor and an M.D. professor)

Biophotonics Faculty and Partnerships

UCF Biophotonics Faculty



Potential Partnerships:

- Center for Research and Education in Optics and Lasers (CREOL)
- College of Engineering and Computer Science
- College of Medicine
- College of Sciences
- International Consortium for Advanced Manufacturing Research (ICAMR)
- NanoScience Technology Center at UCF

Optics and Photonics Program Needs

- **Faculty**
 - Establish a chaired professorship and recruit an eminent senior scientist, along with three junior faculty members
 - New faculty cluster with joint appointment in COM and in partnership with existing faculty will provide critical mass to secure large funding and possibly an externally-funded center or institute

- **Resources**
 - Salaries and startup for new faculty hires
 - Office and lab space
 - 1,000 square feet for offices
 - 2,000 square feet for labs on main campus
 - Additional lab space in COM and access to clinical facilities

Counselor Education Program



CEDHP Counselor Education Graduate Program Ranks Ninth Nationally

Department of Child, Family, and Community Sciences
College of Education and Human Performance

Counselor Education Program Overview

UCF Counselor Education Program

- Ranked ninth by *U.S. News & World Report*
- Nationally accredited by CACREP
- Prepares counseling professionals to work in schools, universities, community mental health settings, institutions, hospitals, and private practices throughout Florida
- 285 graduate students enrolled

Degrees	Credits Hours	Enrollment
Marriage, Couple, & Family Therapy (M.A.)	63 credits	62 graduate students
Mental Health Counseling (M.A.)	63 credits	135 graduate students
School Counseling (M.A., M.Ed.)	60 credits	63 graduate students
Ph.D. in Education, Counselor Education	84 credits	25 doctoral students

Faculty and Community Engagement Vision

Faculty and Program Excellence

Vision: Premier counselor education faculty and program in the country

- 1. Program Ranking**
 - Ninth-best graduate program, *U.S. News & World Report* (Spring 2016)
- 2. World-Renowned Faculty and Program**
 - Four ACA Fellows
 - ACES Outstanding Counselor Education Program
- 3. Significant Federal External Research Funding**
 - Project Harmony, 2015-20; \$9.7 million
 - Project Together, 2011-15; \$8.7 million
- 4. Professional Leadership and Impact**
 - National journal editors
 - Faculty member citations

Community Engagement

Vision: Greatest partnership counselor education program in the country

- 1. Marriage and Family Research Institute (MFRI)**
 - Provides couple and relationship education to over 7,000 low-income and culturally-diverse couples and individuals in Central Florida
- 2. Community Counseling and Research Center (CCRC)**
 - 1,800 community members served annually, equating to \$1.8 million saved by the community
- 3. Counseling Partnership with Seminole County Public Schools**
 - Provides over 500 free after-school counseling sessions to Title I elementary school students and their families annually

Path to Preeminence Over Next Five Years

- **Program Ranking and Recognition**
 - Increase “Best Graduate Program” ranking in *U.S. News & World Report*
 - Continue to receive programmatic national award recognition
- **Faculty Excellence and Impact**
 - Increase number of ACA Fellows
 - Increase number of faculty scholarly research citations
- **Significant External Research Funding**
 - Increase external federal research funding by \$1 million
- **Community Engagement**
 - Continue enhancing partnerships with school districts and agencies
- **Maximize Counselor Education Doctoral Students’ Research Productivity**
 - Continue increasing Ph.D. student graduates’ placement in tenure-track positions at research-intensive universities

Aerospace Engineering Program



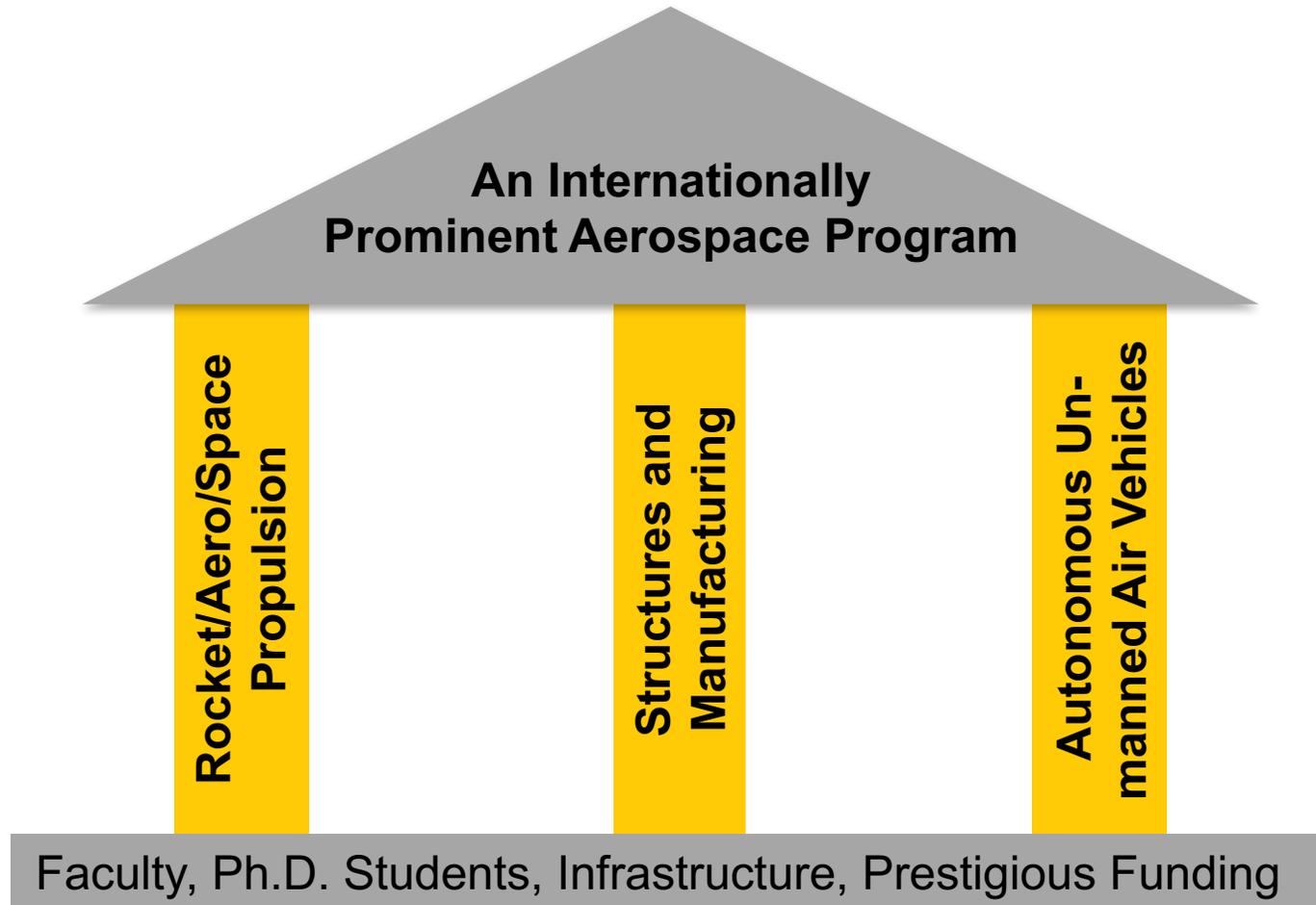
Aerospace Engineering Overview

- **Seven Core Faculty Members**
- **One Center**
 - Center for Advanced Turbomachinery and Energy Research (CATER)
 - Seven core faculty from the aerospace, mechanical, and civil engineering programs



- **Research Areas**
 - Combustion
 - Propulsion
 - Aerodynamics
 - Structural dynamics and adaptive structures
 - Mechanics of aerospace materials and structures
 - High-temperature coatings
 - Alternative fuels
 - Laser diagnostics
 - Shock wave physics and chemistry
 - Control for single or cooperative vehicles
 - Guidance and navigation
- **Research Expenditures**
 - \$1 million – \$1.5 million annually

Vision: Areas of Excellence



Traits of a Prominent Aerospace Program



- High-caliber faculty, including National Academy of Engineering (NAE) members
- Top 20 program in the nation, according to *U.S. News & World Report*
- Two or three distinct areas of excellence
- Unique, multi-million dollar infrastructure
 - High-end subsonic, transonic, and supersonic wind tunnel facilities
- Excellent Ph.D. students
 - Enrollment: 40-50
 - Graduation rate: 10-15 annually
- Publications in elite journals
- Large, prestigious funding awards
 - Several multi-million dollar, multi-year awards
 - Average annual research expenditure of \$300,000-\$400,000 per faculty member
- High visibility across government agencies and scientific communities

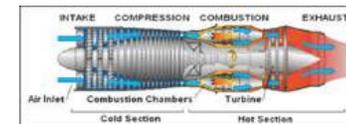
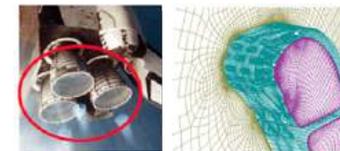
Pillar One: Rocket/Aero/Space Propulsion

- **People**

- Five new faculty lines to add to the existing 11 current or incoming CATER faculty
- 20 Ph.D. fellowships
- Four post-doctoral associates

- **Infrastructure**

- High-temperature, high-pressure wind tunnels
- Flexible additive manufacturing TestBed
- High-pressure shock tube



- **Strategic Collaborators**

- Institute for Simulation and Training, College of Optics and Photonics, International Consortium for Advanced Manufacturing Research, Physics, and Chemistry

- **Funding**

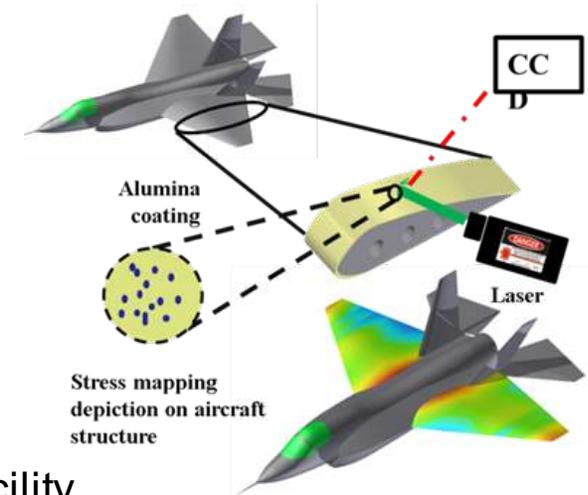
- NASA, U.S. Department of Defense, GE, Aerojet Rocketdyne, Pratt & Whitney, Airbus, Blue Origin, and ATK Orbital

- **Funding Target**

- \$5 million per year of new funding

Pillar Two: Structures and Manufacturing

- **People**
 - Three new faculty lines
 - Five Ph.D. fellowships
 - Five post-doctoral associates
- **Infrastructure**
 - Structures and structural dynamics integrity testing facility
 - Advanced manufacturing facility (laser and e-beam additive and removal)
- **Strategic Collaborators**
 - College of Optics and Photonics, International Consortium for Advanced Manufacturing Research, Institute for Simulation and Training, and Florida Space Institute
- **Funding Target**
 - \$2 million per year of new funding



Pillar Three: Autonomous, Un-manned Air Vehicles

- **People**

- A National Academy of Engineering member
- Two new faculty lines (aerodynamics, operation, and traffic management)
- Three Ph.D. fellowships
- Two post-doctoral associates



- **Infrastructure**

- 20-foot high, 2,000-square-foot hanger
- Test field

- **Strategic Collaborators**

- College of Engineering and Computer Science, Institute for Simulation and Training, Kennedy Space Center, and agriculture stations around Florida

- **Potential Funding Resource**

- National Science Foundation, Air Force Office of Scientific Research, Florida Transportation, Army, Office of Naval Research, U.S. Department of Agriculture

- **Funding Target**

- \$2 million per year of new funding

Preeminence in Digital Media Programs



Digital Media Overview

- **Rankings**

- *Animation Career Review*: No. 20 out of 50
- *Top 50 Game Design Schools and Colleges in the U.S., 2016*: No. 5 out of 10 in the South

- **Faculty and Students**

- 18 faculty and about 800 undergraduate majors within the School of Visual Arts and Design

- **Degree Programs**

- Undergraduate emphasis on game design, web design, and character animation
- B.A., M.A., and M.F.A. programs and alliance with Texts and Technology Ph.D. program

- **Research**

- Interdisciplinary backgrounds bridging storytelling, art, and technology

Benchmarks

- **Rankings:** *The Princeton Review, Animation Career Review, U.S. News & World Report, The Chronicle of Higher Education*
- **Benchmark institutions:** University of Florida, Carnegie Mellon's Entertainment Technology Center, Georgia Tech
- Academic program review
- State performance metrics
- Student engagement metrics
- External research funding data
- Data indicating impact on local, regional, and state economy (internships secured, career placement, etc.)



Vision and Path to Preeminence

ZOOTOPIA CREW

Kendall Litaker ('09), Asst. Technical Director

Mike Navarro ('09), Character Technical Director

Michael Woodside ('08), Animator

Elissa Cordero Hansen ('06), Stereoscopic Artist



Vision

- To offer premier digital media undergraduate programs and nationally-recognized graduate programs known for academic rigor, technological innovation, community engagement, and economic impact

Path to Preeminence

- Facilitate “lab to classroom” and “classroom to lab” models for student-engaged research collaborations
- Build nationally recognized models for student support, advising, and alumni success
- Create a strong externally-funded research program (more than \$2 million a year) with graduate student involvement
- Catalyze entrepreneurship and commercialization for student- and faculty-led initiatives
- Support active and vibrant industry partnerships, especially downtown

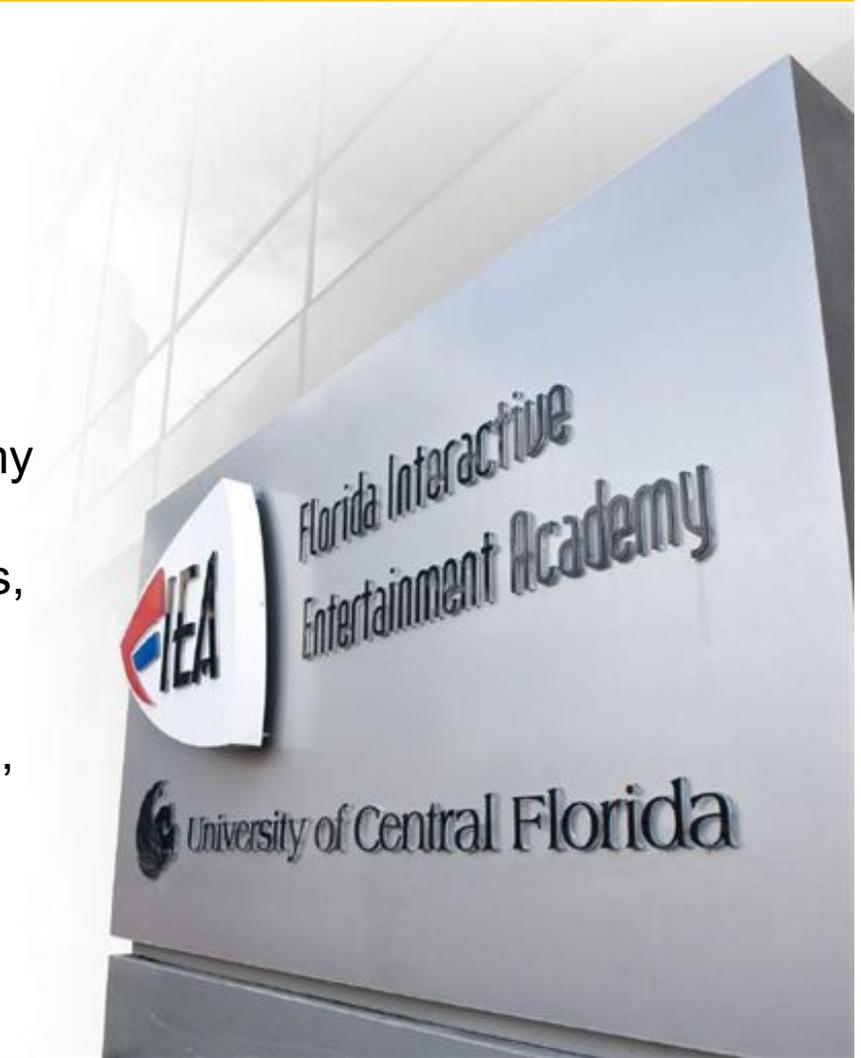
Digital Media Program Needs

- Bring UCF in line with top-tier national programs in terms of student-faculty instructional ratios
- Allow more time for conducting research and mentoring graduate students
- Create a research cluster with senior leadership in an emerging research area of strategic importance to UCF (e.g., Internet of things, VR, games, or mobile)

M.S. Interactive Entertainment

Who We Are

The Florida Interactive Entertainment Academy and UCF's Center for Emerging Media are home to a diverse group of teachers, learners, and industry professionals collaborating in a creative environment that emphasizes high-production values, cutting-edge technologies, and time-tested production techniques.



Interactive Entertainment Overview

Top 5 National Recognition

- Currently ranked No. 1 by *The Princeton Review* for North American Graduate Programs

What Works?

- **Innovative Learning Models**
 - Student development focus
 - Rigor and consistent advising
- **Access**
 - Connector to learning environments
 - Pipeline to community and industries
- **Impact**
 - Diverse employment creator
 - Global branding
 - Life-long learning



Program Results

- Over 80 percent of each class hired in desired field
- 130+ companies have hired graduates
- Average starting salary of \$63,000
- Credibility with industries

Competitive programs include: University of Southern California, Southern Methodist University, Carnegie Mellon, and University of Utah



Moving Forward

Vision

FIEA will be the anchor of a leading education and industry cluster that will enable Central Florida to compete with Silicon Valley and Central Texas as the East Coast leader and a global technology hub

Metrics

- Industry leader in job creation – placement rate and average starting salaries
- *The Princeton Review* – No. 1-ranked North American Graduate Program (top five since inception)
- Recognized as a community partner
- Expand in strategic areas of research and partnerships

Paths to Greater Preeminence

Entrepreneurship

- Expand FIEA Ventures and startup opportunities

Leadership (Academy)

- Development and diversity focus
- Production and art specific
- Additional faculty and staff

Research

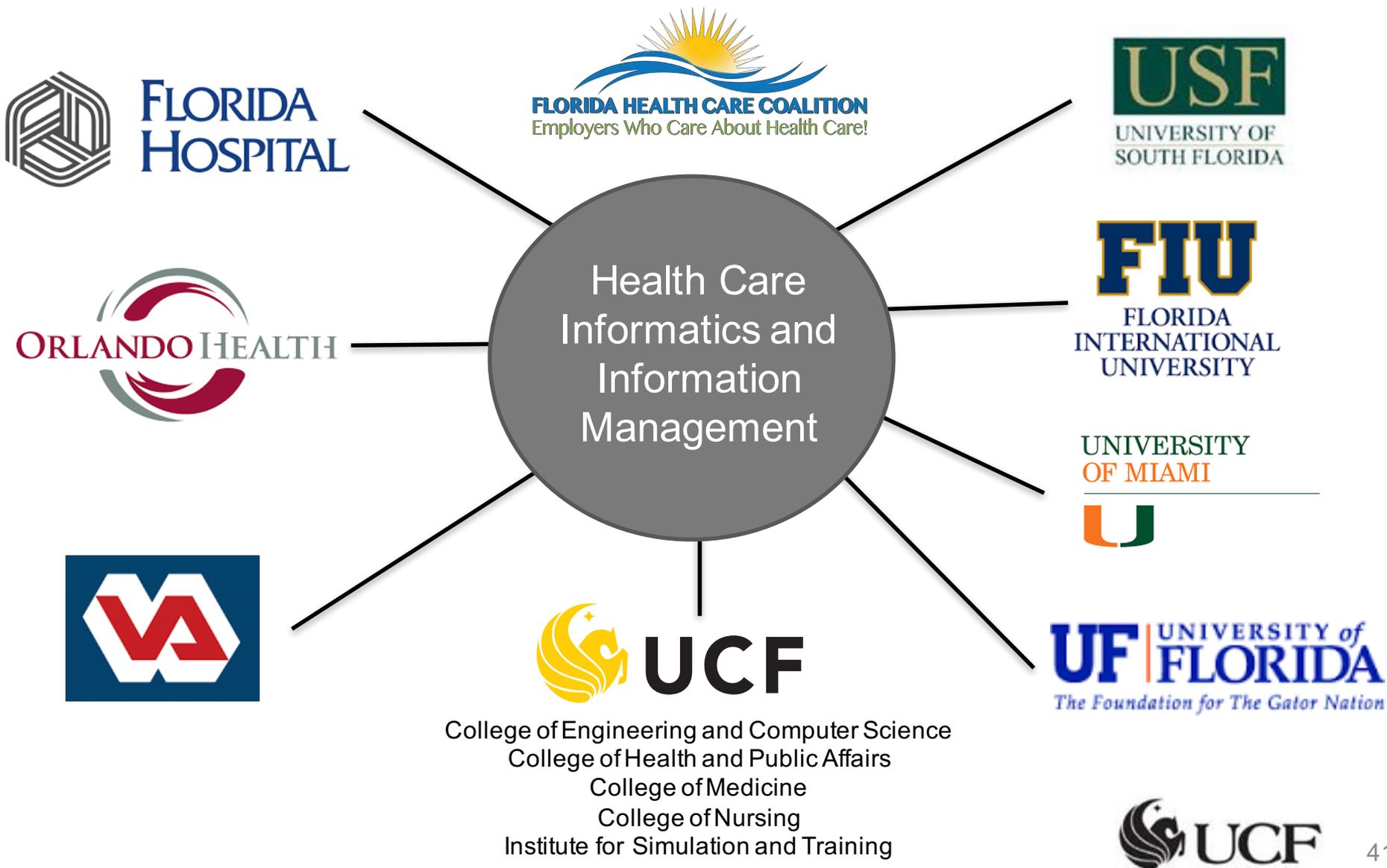
- UCF colleges and target industries
- Collaboration with FIEA Ventures
- STEM funding opportunities



Health Management and Informatics

**“Using Informatics to Connect Individuals,
Communities, and Populations”**

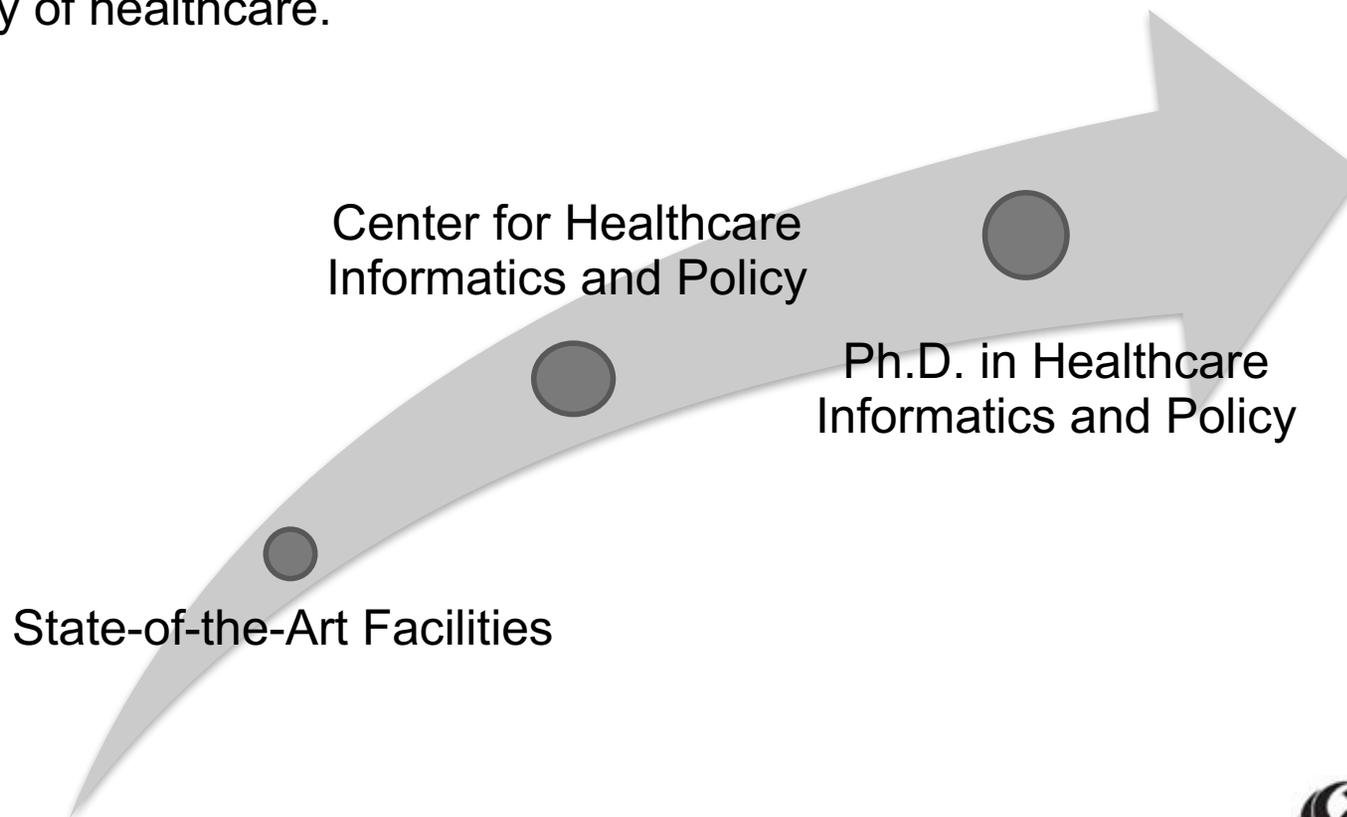
Health Management and Informatics Overview



Path to National Preeminence

Vision

Become the premier informatics program in the nation by leveraging informatics to connect individuals, communities, and populations; thus, transforming the delivery of healthcare.



Assessing Impact

- Registered Health Information Administrator (RHIA) pass rate 90 percent (National average 75 percent)
- Enrollment increase of 20 percent by 2020
- Top 5 informatics program nationally within five years
- Nationally-recognized and ranked Ph.D. program by Year 10
- Center for Healthcare Informatics and Policy will secure at least \$1 million in external funding by Year 4
- Become the leader and preferred partner for healthcare informatics research

Rosen College of Hospitality Management



Leading the Way of Hospitality Education



Hospitality Management Overview

- **The fastest-growing and the second-largest hospitality management program in the world**
 - Consistently ranked among the top three or top five programs worldwide

Undergraduate programs

- Hospitality Management
- Foodservice and Lodging Management
- Event Management
- Entertainment Management

Program tracks

- Theme Parks and Attractions Management
- Professional Tennis Management

Graduate programs

- Hospitality and Tourism Management M.S.
- M.S. dual degrees with Portugal, Italy, and China
- M.S. for medical students
- Destination Marketing and Management (Certificate)
- Event Management (Certificate)
- Hospitality Management Ph.D. (only one in Florida, one of seven in U.S.)

Minors

- Hospitality Management
- Event Management

How did we do it?

By leveraging size and location to create and sustain a culture of hospitality, entrepreneurship, and innovation



Vision and Core Values

Vision

- Be the recognized leader in hospitality and tourism education, research, scholarship, and industry partnership worldwide
- Be ranked as the world's No. 1 comprehensive hospitality management program by 2020

Mission

- Four-year mission to explore new fields of endeavor, to seek out new educational and research opportunities, and to boldly go where no hospitality program has gone before

Core Values

- Professionalism
- Leadership
- Service

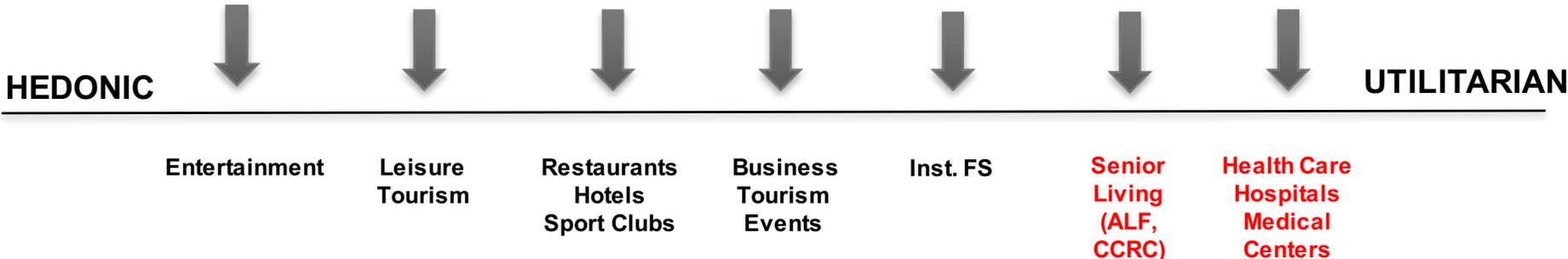
Benchmarking Institution

- Cornell Hotel School



Road Map for the Future

HOSPITALITY MANAGEMENT AND THE HEDONIC-UTILITARIAN SCALE



Hospitality Management Program Needs

Enabling the Rosen College to be the best of its kind by expanding its reach into the healthcare industry

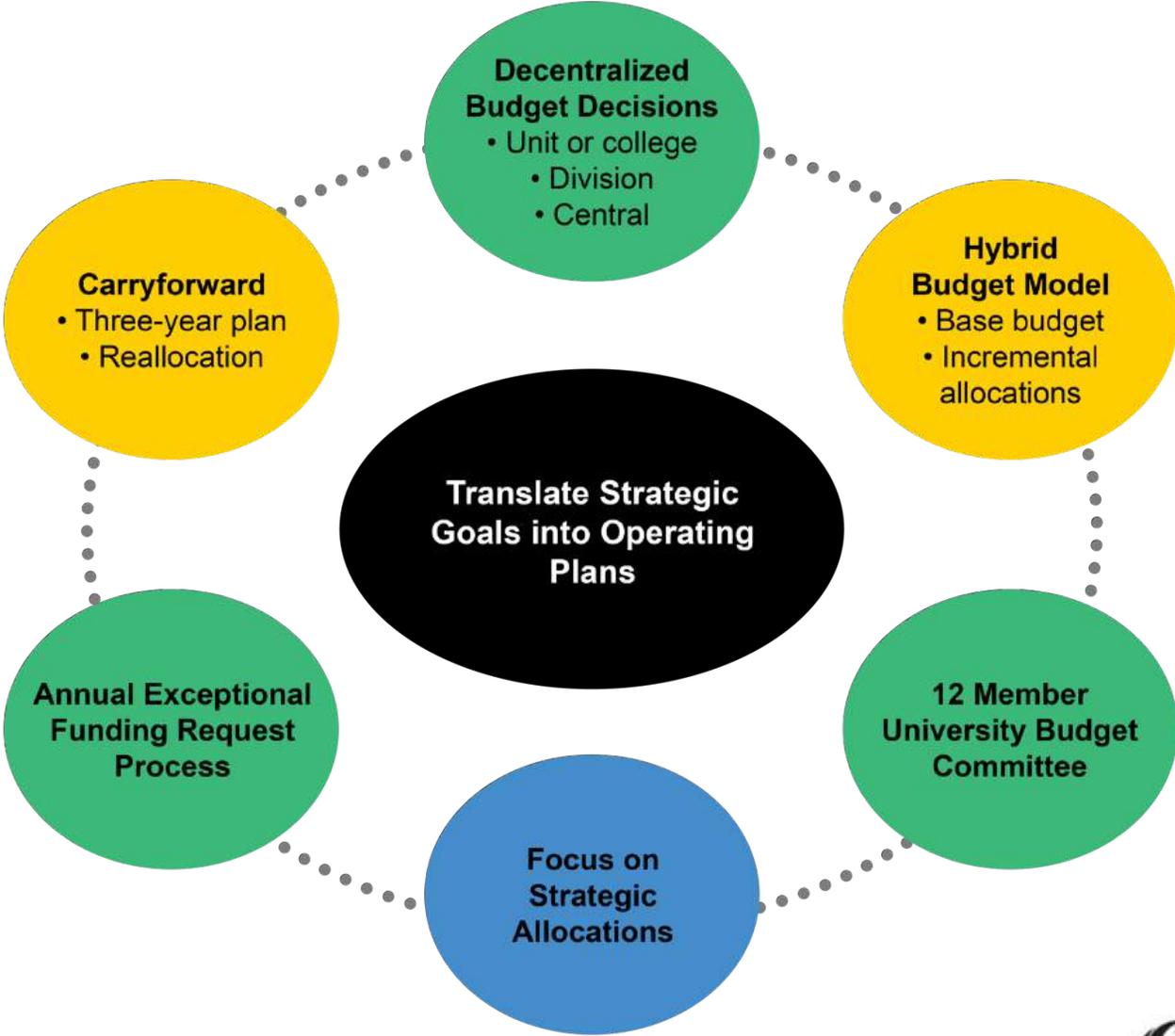
- Create an undergraduate degree program in **Senior Living Management in partnership with the College of Nursing**
 - This degree will prepare young women and men to work in the burgeoning industry of institutionalized senior living industry
 - A close examination of the operation of all senior living facilities will reveal that the highest common denominator among all of them is the provision of hospitality services such as accommodation, food service, recreation, entertainment, and opportunities to socialize
 - Medical and nursing services are crucial, as they are the “push” factor that bring clients to these facilities in general, but the quality of hospitality services are the “pull” factor that make clients choose one facility over another



Core Strategies to Achieve Preeminence

- How do we get there?
 - Investing in key talent
 - Investing in infrastructure
 - Defining our distinctive strengths and discovering areas of opportunity
 - Making tough decisions

University Budget Process



Learning from Our Successes

- History of innovation and entrepreneurship
- Developing nationally-renowned centers and institutes of excellence
- Faculty-driven academic programs that leverage our strengths and find unique areas of opportunity

Contributions of the Centers and Institutes



Major UCF Research Centers and Institutes

- Institute for Simulation and Training (IST)
- Center for Research and Education in Optics and Lasers (CREOL)
- Florida Solar Energy Center (FSEC)
- Florida Space Institute (FSI)
- NanoScience Technology Center (NSTC)
- Center for Research in Computer Vision (CRCV)
- Advanced Materials Processing and Analysis Center (AMPAC)
- Burnett School of Biomedical Sciences (BSBS)

Centers and Institutes' Accomplishments

- Four offer internationally-recognized research and graduate programs
 - Institute for Simulation and Training (IST)
 - Center for Research and Education in Optics and Lasers (CREOL)
 - NanoScience Technology Center (NSTC)
 - Center for Research in Computer Vision (CRCV)
- Very high impact on the Florida economy
 - New companies created and new patents awarded
- Four units consistently produce more than 50 percent of all research grants within UCF
 - College of Engineering and Computer Science, IST, CREOL, and College of Sciences
- Pioneering how UCF will substantially grow research
 - Research faculty and trans-disciplinary clusters



Creating New Opportunities

- ICAMR
- Applied Research Institute
- Faculty Cluster Initiative

ICAMR

The world's first
industry-led consortium
(501c6 non-profit) for
the manufacturing of
smart sensors

**International Consortium
for Advanced Manufacturing Research**

Goals

World-class facility that supports state-of-the-art R&D and positions Central Florida to be an early leader in the evolution of the global \$32.5 trillion per year sensor-driven economy.



Startup Funding of Over \$200 Million



Osceola County

- **\$168 million** from Osceola County
- **Design, build, and equip** 100,000-square-foot center
- **20 acres**, plus in-kind support for power, water, and waste disposal



UCF

- **\$10 million** non-state and non-tuition funds to design and build center and start-up costs
- **\$7 million** in-kind for focused hires and resource support
- **30-year lease** of center from Osceola County at \$1 per year



FHTCC

- **\$1 million** for initial operating cost
- **Up to \$5 million** matching funds over five years for specific research projects
- **\$750,000** from USF, FIU, and UF



State of FL

- **\$5 million** per year for operations
- **\$10 million** tools and equipment
- **\$2 million** QACF



STATE UNIVERSITY SYSTEM of FLORIDA
Board of Governors



A New Era of International Collaboration



Innovation networks and open innovation programs that bring industry, universities, and governments together

Industry

- Emerging technologies
- Opens access to lowest-cost manufacturing



Government

- State of Florida
- National research labs and agencies
- Attract joint funds

Universities

- Universities in U.S., Europe, and Asia
- Enables competitive pursuits in expanded areas of interest
- New ideas and approaches



Suppliers

- Equipment
- Materials
- Software
- Industry R&D labs and programs

Industry and Government



Increasing industry and government interest in ICAMR

- Enabled UCF to secure a significant role on the MIT-lead and Department of Defense-sponsored \$300 million+ smart fiber National Network of Manufacturing Innovation (NNMI)
- Lead partner for a \$349 million advanced sensors DOC NNMI (under evaluation)
- Supporting University of Texas on a \$200 million+ Department of Energy initiative (under evaluation)
- Finalizing our design center concept (announcement expected July 2016)
- First multi-million dollar industry project for the design center identified
- Building complete March 2017



UCF Applied Research Institute

- Launched by the Research Foundation to assist in securing large collaborative research projects and enhance the university's interdisciplinary work and growing partnerships
- Help bridge the technology “valley of death” – the chasm that often occurs between basic research and innovation
- Create a centralized location where faculty members can team together to apply for grants, and where students can find resources, training, and research opportunities in areas where funding is available
- Initially focus on areas that align with Florida's economic development needs, such as photonics, modeling and simulation, engineering, and biomedicine

Faculty Cluster Initiative

- Interdisciplinary teaching and research initiative hiring 33 new faculty members
 - Cyber Security and Privacy
 - Energy Conversion and Propulsion
 - Genomics and Bioinformatics
 - Prosthetic Interfaces
 - Renewable Energy Systems
 - Sustainable Coastal Systems
- Each of these clusters involves faculty members from multiple colleges and departments – many from UCF's top 100-ranked programs by *U.S. News & World Report*

Why Faculty Clusters?

- Exploring solutions to today's toughest scientific and societal challenges at the fringes of disciplines – with broad applications across different issues
- Hiring top talent who will advance UCF's impact as a metropolitan research university
- Developing new academic programs and research opportunities

What Makes UCF's Faculty Clusters Unique?

- **Renewable Energy Systems (RISES)**
 - Engineering, Computer Science, Photovoltaics (CREOL), Public Administration and Policy, Business Administration
 - No interdisciplinary power systems graduate programs currently exist
 - Builds upon UCF's local industry partnerships and federal funding priorities
- **Cyber Security and Privacy**
 - Computer Science, Electrical and Computer Engineering, Psychology, Industrial Engineering and Management Systems, Modeling and Simulation, Political Science, Statistics
 - Ties multiple disciplines together within a strategic framework
 - Builds upon UCF's prominence in cyber security – 3-time collegiate cyber defense national champions and new NSA Center of Academic Excellence in Cyber Defense

Concluding Thoughts

- Importance of our strategic planning process
- The need to leverage our unique strengths in Central Florida environment
- The courage to make decisions that will produce the greatest impact

Top Academic Programs and National Preeminence



May 13, 2016



National Academic Preeminence

- What it is
- What it means
- Reputation through impact

- This session considers the resources necessary to advance strong academic programs at UCF to national preeminence

National Preeminence Rankings

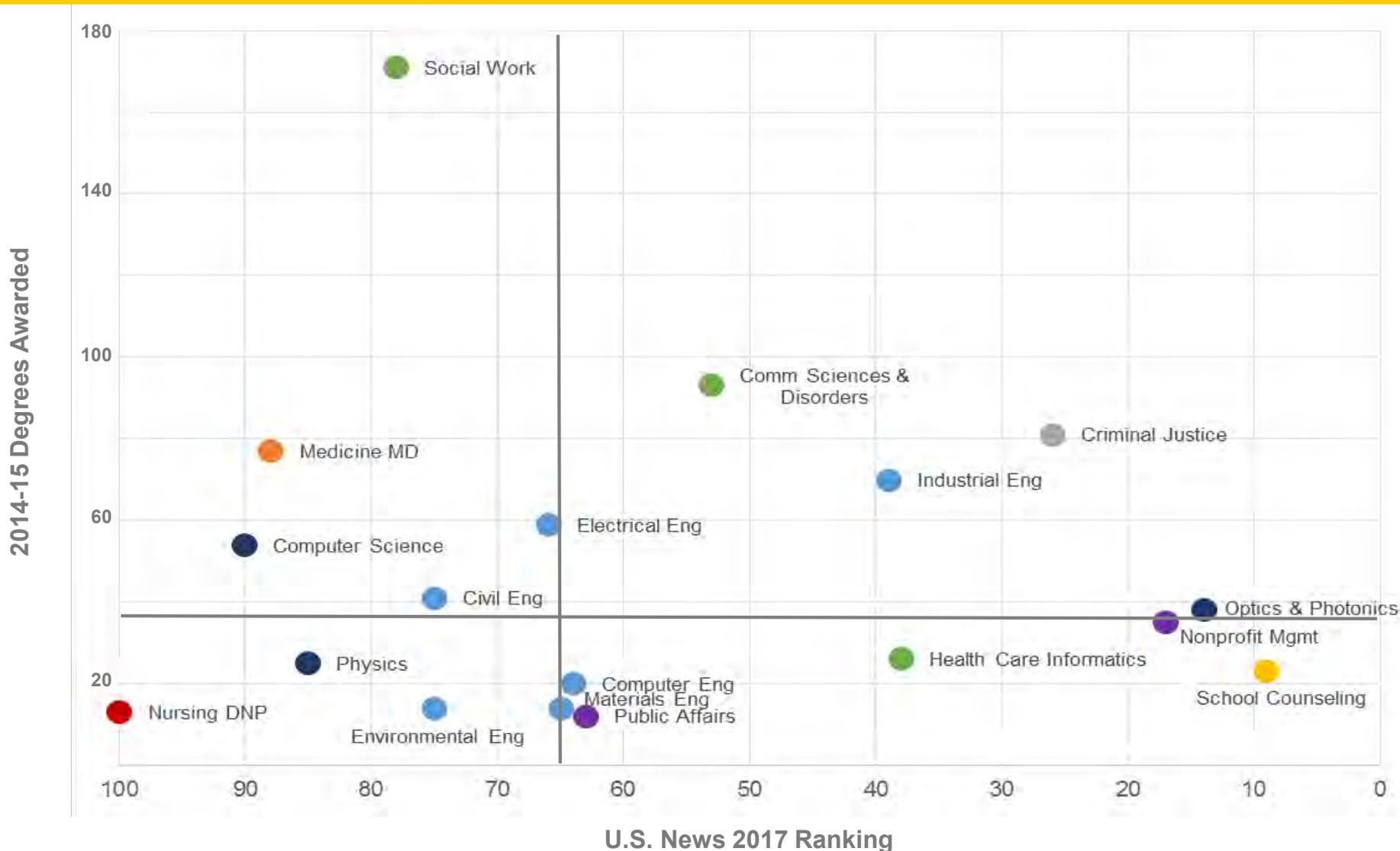
- Various rankings can serve as proxy for national preeminence, including:
 - *U.S. News and World Report* – Best Graduate Colleges
 - *The Princeton Review* – Top Gaming Programs

U.S. News Graduate Program Rankings

- “Specialty” rankings based solely on nominations from school deans from the list of schools surveyed
- Can select up to 10 top programs in each area
- Numerically ranked in descending order based on number of nominations received
- At least seven nominations must be received to be ranked



Graduate Program Rankings vs. Degrees Awarded



Orlando Megatrends and UCF's strengths

- Nation's largest cluster of modeling, simulation, and training companies
- Orlando has a \$9 billion digital media industry and is among nation's top 10 largest digital media clusters
- Top producing region for engineers in aviation, aerospace, and defense industry
- First U.S. destination to surpass 60 million tourists

Intellectual Anchor for Industry Clusters

- Rosen College of Hospitality Management in heart of tourism corridor
- College of Medicine in Lake Nona Medical City
- Institute for Simulation and Training in Central Florida Research Park
- UCF Downtown for digital media and healthcare technology in our urban core
- ICAMR for advanced manufacturing and next-generation technologies in Osceola County

Academic Program Presentations

Graduate Programs

- Modeling and Simulation
- Optics
- Student Counseling

Graduate and Undergraduate Programs

- Aerospace Engineering
- Digital Media
- Interactive Entertainment
- Health Management Informatics

Undergraduate Programs

- Hospitality Management

Modeling and Simulation for Training Graduate Program (MST)



MODELING & SIMULATION
GRADUATE PROGRAM

Modeling and Simulation Overview

- **The only truly trans-disciplinary program within UCF**

General Content Areas of Focus



Simulation Modeling and Analysis



Simulation in Health Care



Human Systems in Modeling and Simulation



Computer Visualization in Modeling and Simulation



Interactive Simulation and Intelligent Systems



Simulation Infrastructure



Simulation Management

The UCF Modeling and Simulation curricula permit students to customize their learning across UCF based on their educational and career experience, interests, and goals. Currently involves five colleges.

Graduate Programs and Enrollment



Joseph J. LaViola, Jr,
Ph.D.
Graduate Program
Director



Sabrina Gordon,
M.A.
Graduate Program
Coordinator

Programs Offered

- 
- 1 Modeling and Simulation Ph.D.
 - 2 Modeling and Simulation M.S.
 - 3 Modeling and Simulation of Technical Systems Graduate Certificate (G.C.)
 - 4 Modeling and Simulation of Behavioral Cybersecurity Graduate Certificate (G.C.) **NEW!**

Graduates



Grand Total 398

Since 2001 through
Spring 2016

Would like to grow from 150 students enrolled each year to 250 by academic year 2019-20

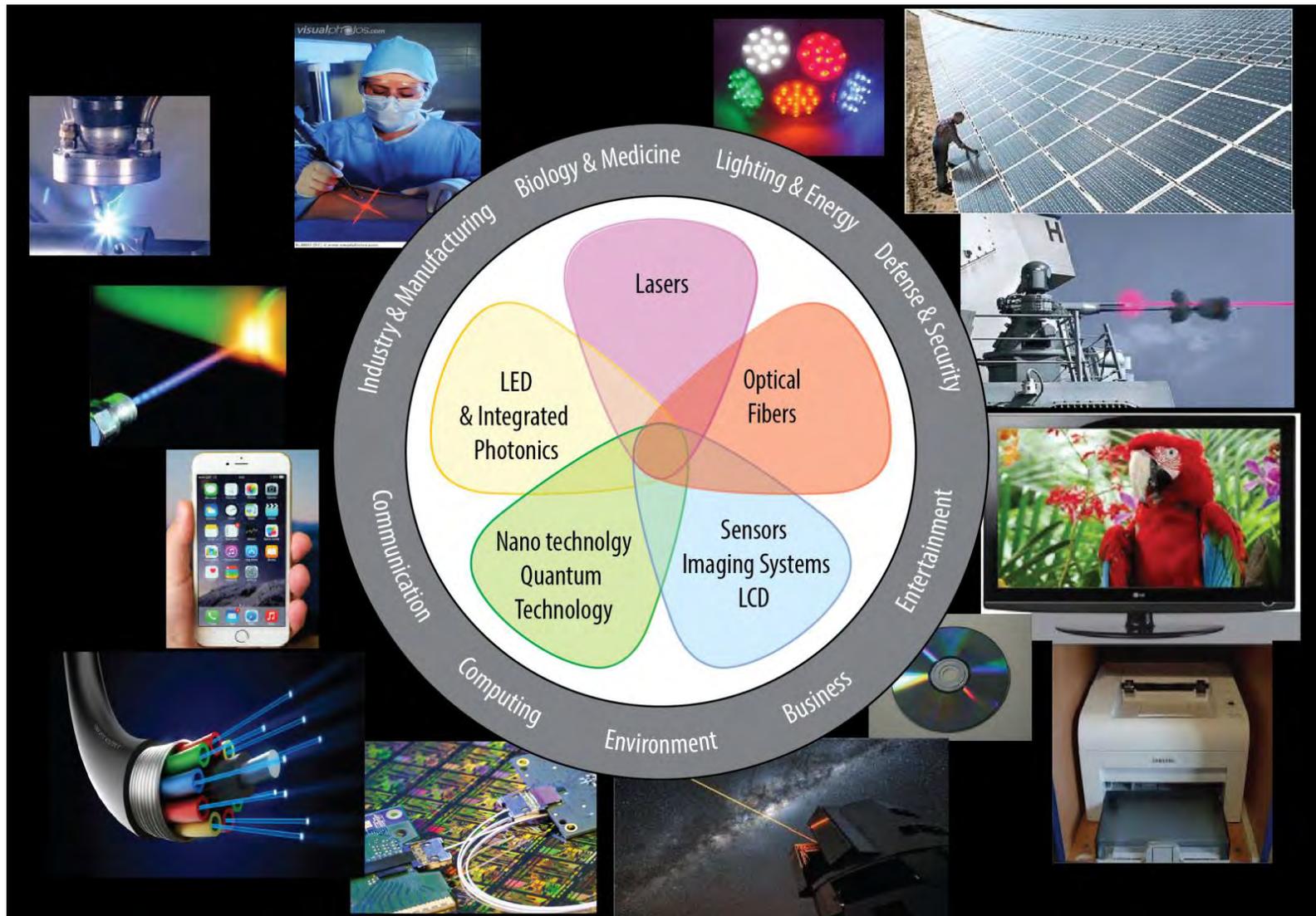
Where Modeling and Simulation Is Expanding

- **Substantial growth opportunity in health modeling and simulation**
 - College of Nursing has created certificate program
 - Medical City, College of Medicine, College of Nursing, and COHPA
 - VA Hospital and VA SIMLEARN center in Orlando
- **Human aspects of cyber security – Certificate created**
 - Adversary culture and behavior capture and modeling
 - Individual behavior and team aspects of cyber defense
 - Insider threat behavior, modeling, and mitigation
- **Unmanned systems**
 - Human-system interface for robots
 - Incorporate robots into teams
 - Modeling team and ambient culture

Modeling and Simulation Program Needs

- **Recognition as an academic unit**
 - Ability to grant tenure
 - Ability to have SCHs, more access to graduate research assistants
- **Faculty**
 - Historically primarily Institute for Simulation and Training research faculty members and adjuncts
 - Hiring two tenure-earning faculty members, with plans to hire three more
 - Need better mechanisms for recognition of cross-unit teaching, co-teaching
 - Funding to support research faculty to teach
- **Support for students**
 - New lab equipment and funding for conferences for students
 - Additional support for master's and doctoral students and administrative support
 - Funding for pilot studies in conjunction with other academic units

Preeminence in Biomedical Optics and Biophotonics



College of Optics and Photonics Overview

- **Rankings**
 - National Research Council: Top 5-12 among Electrical Engineering Ph.D. programs
 - *U.S. News*: 14th top atomic, molecular, and optical sciences program
- **Faculty**
 - World-renowned scholars, fellows, editors of top journals, and leaders of professional societies
- **Students and Graduates**
 - 280 Ph.D. degrees awarded
 - 400 master's degrees awarded
 - New B.S. degree program with growing enrollment
- **Research**
 - About \$15 million in external funding in 2015
 - 280 patents
 - Industrial affiliates program with 62 companies in 2016
 - 26 spin-offs and 5 incubated startups

Targets and Benchmarks

- **Targets**

- Convert our nascent, fragmented bio research into a mature program integrated with clinical research at UCF College of Medicine and Orlando hospitals
- Funding targets:
 - 5 National Institutes of Health R21 grants (\$300,000-\$400,000 per grant)
 - 3 National Institutes of Health R01 grants (> \$1 million per grant)

- **Benchmarks**

- The biophotonics program at Beckman Institute (UC Irvine or University of Illinois Urbana-Champaign)
- A campus-wide institute similar to BIO5 Institute at University of Arizona (led by a Ph.D. professor and an M.D. professor)

Biophotonics Faculty and Partnerships

UCF Biophotonics Faculty



Potential Partnerships:

- Center for Research and Education in Optics and Lasers (CREOL)
- College of Engineering and Computer Science
- College of Medicine
- College of Sciences
- International Consortium for Advanced Manufacturing Research (ICAMR)
- NanoScience Technology Center at UCF

Optics and Photonics Program Needs

- **Faculty**
 - Establish a chaired professorship and recruit an eminent senior scientist, along with three junior faculty members
 - New faculty cluster with joint appointment in COM and in partnership with existing faculty will provide critical mass to secure large funding and possibly an externally-funded center or institute

- **Resources**
 - Salaries and startup for new faculty hires
 - Office and lab space
 - 1,000 square feet for offices
 - 2,000 square feet for labs on main campus
 - Additional lab space in COM and access to clinical facilities

Counselor Education Program



CEDHP Counselor Education Graduate Program Ranks Ninth Nationally

Department of Child, Family, and Community Sciences
College of Education and Human Performance

Counselor Education Program Overview

UCF Counselor Education Program

- Ranked ninth by *U.S. News & World Report*
- Nationally accredited by CACREP
- Prepares counseling professionals to work in schools, universities, community mental health settings, institutions, hospitals, and private practices throughout Florida
- 285 graduate students enrolled

Degrees	Credits Hours	Enrollment
Marriage, Couple, & Family Therapy (M.A.)	63 credits	62 graduate students
Mental Health Counseling (M.A.)	63 credits	135 graduate students
School Counseling (M.A., M.Ed.)	60 credits	63 graduate students
Ph.D. in Education, Counselor Education	84 credits	25 doctoral students

Faculty and Community Engagement Vision

Faculty and Program Excellence

Vision: Premier counselor education faculty and program in the country

- 1. Program Ranking**
 - Ninth-best graduate program, *U.S. News & World Report* (Spring 2016)
- 2. World-Renowned Faculty and Program**
 - Four ACA Fellows
 - ACES Outstanding Counselor Education Program
- 3. Significant Federal External Research Funding**
 - Project Harmony, 2015-20; \$9.7 million
 - Project Together, 2011-15; \$8.7 million
- 4. Professional Leadership and Impact**
 - National journal editors
 - Faculty member citations

Community Engagement

Vision: Greatest partnership counselor education program in the country

- 1. Marriage and Family Research Institute (MFRI)**
 - Provides couple and relationship education to over 7,000 low-income and culturally-diverse couples and individuals in Central Florida
- 2. Community Counseling and Research Center (CCRC)**
 - 1,800 community members served annually, equating to \$1.8 million saved by the community
- 3. Counseling Partnership with Seminole County Public Schools**
 - Provides over 500 free after-school counseling sessions to Title I elementary school students and their families annually

Path to Preeminence Over Next Five Years

- **Program Ranking and Recognition**
 - Increase “Best Graduate Program” ranking in *U.S. News & World Report*
 - Continue to receive programmatic national award recognition
- **Faculty Excellence and Impact**
 - Increase number of ACA Fellows
 - Increase number of faculty scholarly research citations
- **Significant External Research Funding**
 - Increase external federal research funding by \$1 million
- **Community Engagement**
 - Continue enhancing partnerships with school districts and agencies
- **Maximize Counselor Education Doctoral Students’ Research Productivity**
 - Continue increasing Ph.D. student graduates’ placement in tenure-track positions at research-intensive universities

Aerospace Engineering Program



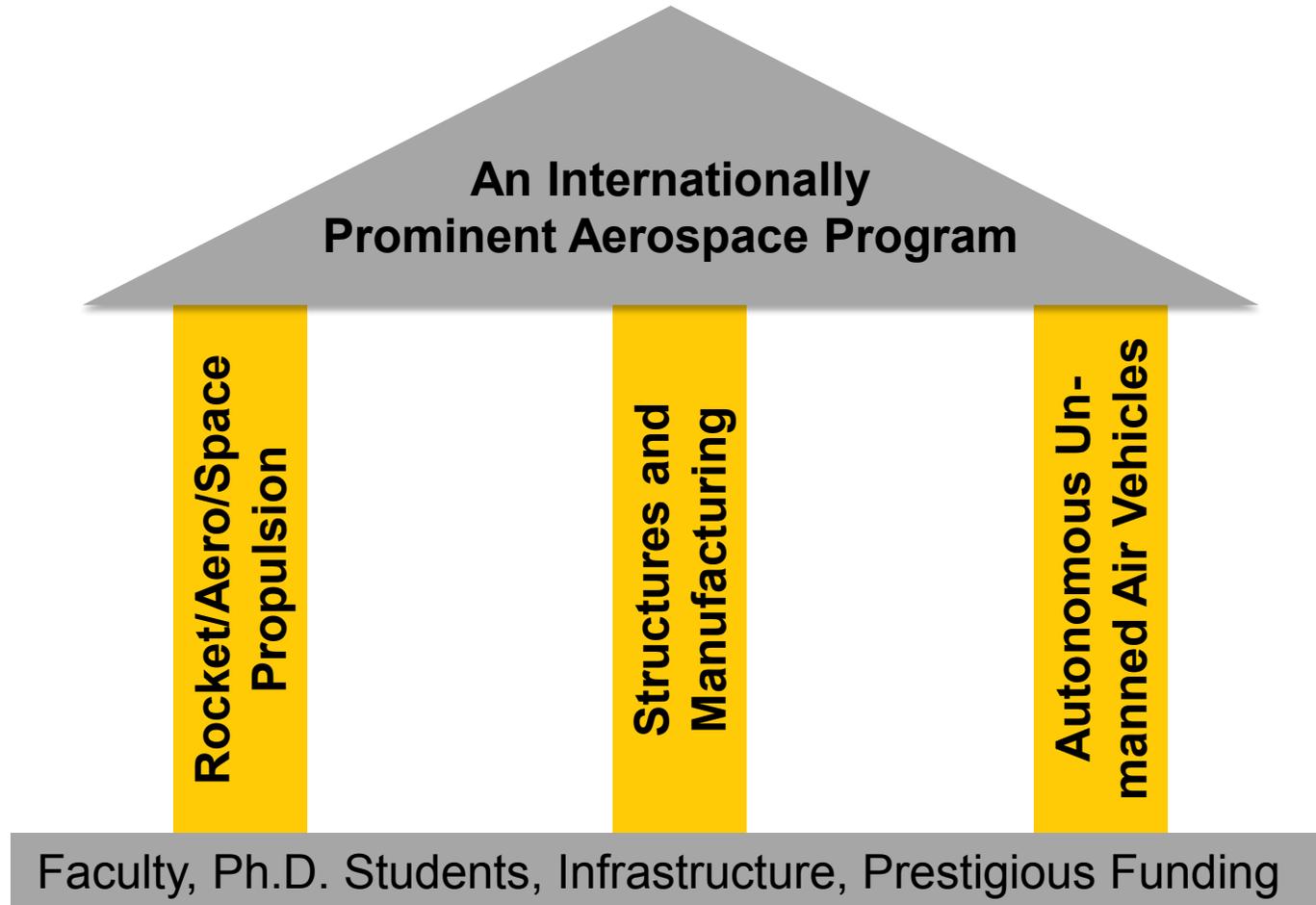
Aerospace Engineering Overview

- **Seven Core Faculty Members**
- **One Center**
 - Center for Advanced Turbomachinery and Energy Research (CATER)
 - Seven core faculty from the aerospace, mechanical, and civil engineering programs



- **Research Areas**
 - Combustion
 - Propulsion
 - Aerodynamics
 - Structural dynamics and adaptive structures
 - Mechanics of aerospace materials and structures
 - High-temperature coatings
 - Alternative fuels
 - Laser diagnostics
 - Shock wave physics and chemistry
 - Control for single or cooperative vehicles
 - Guidance and navigation
- **Research Expenditures**
 - \$1 million – \$1.5 million annually

Vision: Areas of Excellence



Traits of a Prominent Aerospace Program



- High-caliber faculty, including National Academy of Engineering (NAE) members
- Top 20 program in the nation, according to *U.S. News & World Report*
- Two or three distinct areas of excellence
- Unique, multi-million dollar infrastructure
 - High-end subsonic, transonic, and supersonic wind tunnel facilities
- Excellent Ph.D. students
 - Enrollment: 40-50
 - Graduation rate: 10-15 annually
- Publications in elite journals
- Large, prestigious funding awards
 - Several multi-million dollar, multi-year awards
 - Average annual research expenditure of \$300,000-\$400,000 per faculty member
- High visibility across government agencies and scientific communities

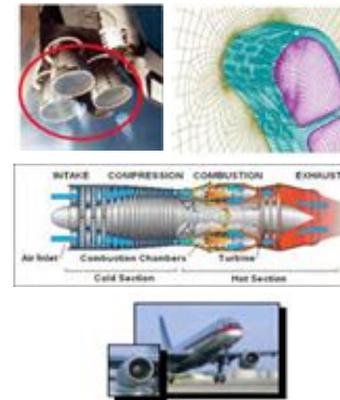
Pillar One: Rocket/Aero/Space Propulsion

- **People**

- Five new faculty lines to add to the existing 11 current or incoming CATER faculty
- 20 Ph.D. fellowships
- Four post-doctoral associates

- **Infrastructure**

- High-temperature, high-pressure wind tunnels
- Flexible additive manufacturing TestBed
- High-pressure shock tube



- **Strategic Collaborators**

- Institute for Simulation and Training, College of Optics and Photonics, International Consortium for Advanced Manufacturing Research, Physics, and Chemistry

- **Funding**

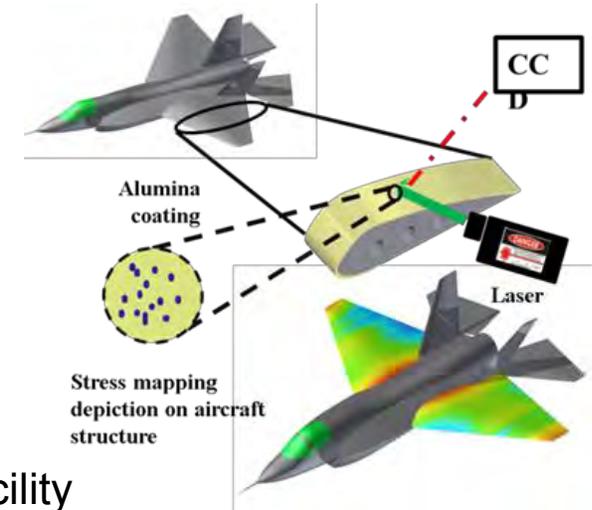
- NASA, U.S. Department of Defense, GE, Aerojet Rocketdyne, Pratt & Whitney, Airbus, Blue Origin, and ATK Orbital

- **Funding Target**

- \$5 million per year of new funding

Pillar Two: Structures and Manufacturing

- **People**
 - Three new faculty lines
 - Five Ph.D. fellowships
 - Five post-doctoral associates
- **Infrastructure**
 - Structures and structural dynamics integrity testing facility
 - Advanced manufacturing facility (laser and e-beam additive and removal)
- **Strategic Collaborators**
 - College of Optics and Photonics, International Consortium for Advanced Manufacturing Research, Institute for Simulation and Training, and Florida Space Institute
- **Funding Target**
 - \$2 million per year of new funding



Pillar Three: Autonomous, Un-manned Air Vehicles

- **People**

- A National Academy of Engineering member
- Two new faculty lines (aerodynamics, operation, and traffic management)
- Three Ph.D. fellowships
- Two post-doctoral associates



- **Infrastructure**

- 20-foot high, 2,000-square-foot hanger
- Test field

- **Strategic Collaborators**

- College of Engineering and Computer Science, Institute for Simulation and Training, Kennedy Space Center, and agriculture stations around Florida

- **Potential Funding Resource**

- National Science Foundation, Air Force Office of Scientific Research, Florida Transportation, Army, Office of Naval Research, U.S. Department of Agriculture

- **Funding Target**

- \$2 million per year of new funding

Preeminence in Digital Media Programs



Digital Media Overview

- **Rankings**

- *Animation Career Review*: No. 20 out of 50
- *Top 50 Game Design Schools and Colleges in the U.S., 2016*: No. 5 out of 10 in the South

- **Faculty and Students**

- 18 faculty and about 800 undergraduate majors within the School of Visual Arts and Design

- **Degree Programs**

- Undergraduate emphasis on game design, web design, and character animation
- B.A., M.A., and M.F.A. programs and alliance with Texts and Technology Ph.D. program

- **Research**

- Interdisciplinary backgrounds bridging storytelling, art, and technology

Benchmarks

- **Rankings:** *The Princeton Review, Animation Career Review, U.S. News & World Report, The Chronicle of Higher Education*
- **Benchmark institutions:** University of Florida, Carnegie Mellon's Entertainment Technology Center, Georgia Tech
- Academic program review
- State performance metrics
- Student engagement metrics
- External research funding data
- Data indicating impact on local, regional, and state economy (internships secured, career placement, etc.)



Vision and Path to Preeminence

ZOOTOPIA CREW

Kendall Litaker ('09), *Asst. Technical Director*
Mike Navarro ('09), *Character Technical Director*
Michael Woodside ('08), *Animator*
Elissa Cordero Hansen ('06), *Stereoscopic Artist*



Vision

- To offer premier digital media undergraduate programs and nationally-recognized graduate programs known for academic rigor, technological innovation, community engagement, and economic impact

Path to Preeminence

- Facilitate “lab to classroom” and “classroom to lab” models for student-engaged research collaborations
- Build nationally recognized models for student support, advising, and alumni success
- Create a strong externally-funded research program (more than \$2 million a year) with graduate student involvement
- Catalyze entrepreneurship and commercialization for student- and faculty-led initiatives
- Support active and vibrant industry partnerships, especially downtown

Digital Media Program Needs

- Bring UCF in line with top-tier national programs in terms of student-faculty instructional ratios
- Allow more time for conducting research and mentoring graduate students
- Create a research cluster with senior leadership in an emerging research area of strategic importance to UCF (e.g., Internet of things, VR, games, or mobile)

M.S. Interactive Entertainment

Who We Are

The Florida Interactive Entertainment Academy and UCF's Center for Emerging Media are home to a diverse group of teachers, learners, and industry professionals collaborating in a creative environment that emphasizes high-production values, cutting-edge technologies, and time-tested production techniques.



Interactive Entertainment Overview

Top 5 National Recognition

- Currently ranked No. 1 by *The Princeton Review* for North American Graduate Programs

What Works?

- **Innovative Learning Models**
 - Student development focus
 - Rigor and consistent advising
- **Access**
 - Connector to learning environments
 - Pipeline to community and industries
- **Impact**
 - Diverse employment creator
 - Global branding
 - Life-long learning



Program Results

- Over 80 percent of each class hired in desired field
- 130+ companies have hired graduates
- Average starting salary of \$63,000
- Credibility with industries

Competitive programs include: University of Southern California, Southern Methodist University, Carnegie Mellon, and University of Utah



Moving Forward

Vision

FIEA will be the anchor of a leading education and industry cluster that will enable Central Florida to compete with Silicon Valley and Central Texas as the East Coast leader and a global technology hub

Metrics

- Industry leader in job creation – placement rate and average starting salaries
- *The Princeton Review* – No. 1-ranked North American Graduate Program (top five since inception)
- Recognized as a community partner
- Expand in strategic areas of research and partnerships

Paths to Greater Preeminence

Entrepreneurship

- Expand FIEA Ventures and startup opportunities

Leadership (Academy)

- Development and diversity focus
- Production and art specific
- Additional faculty and staff

Research

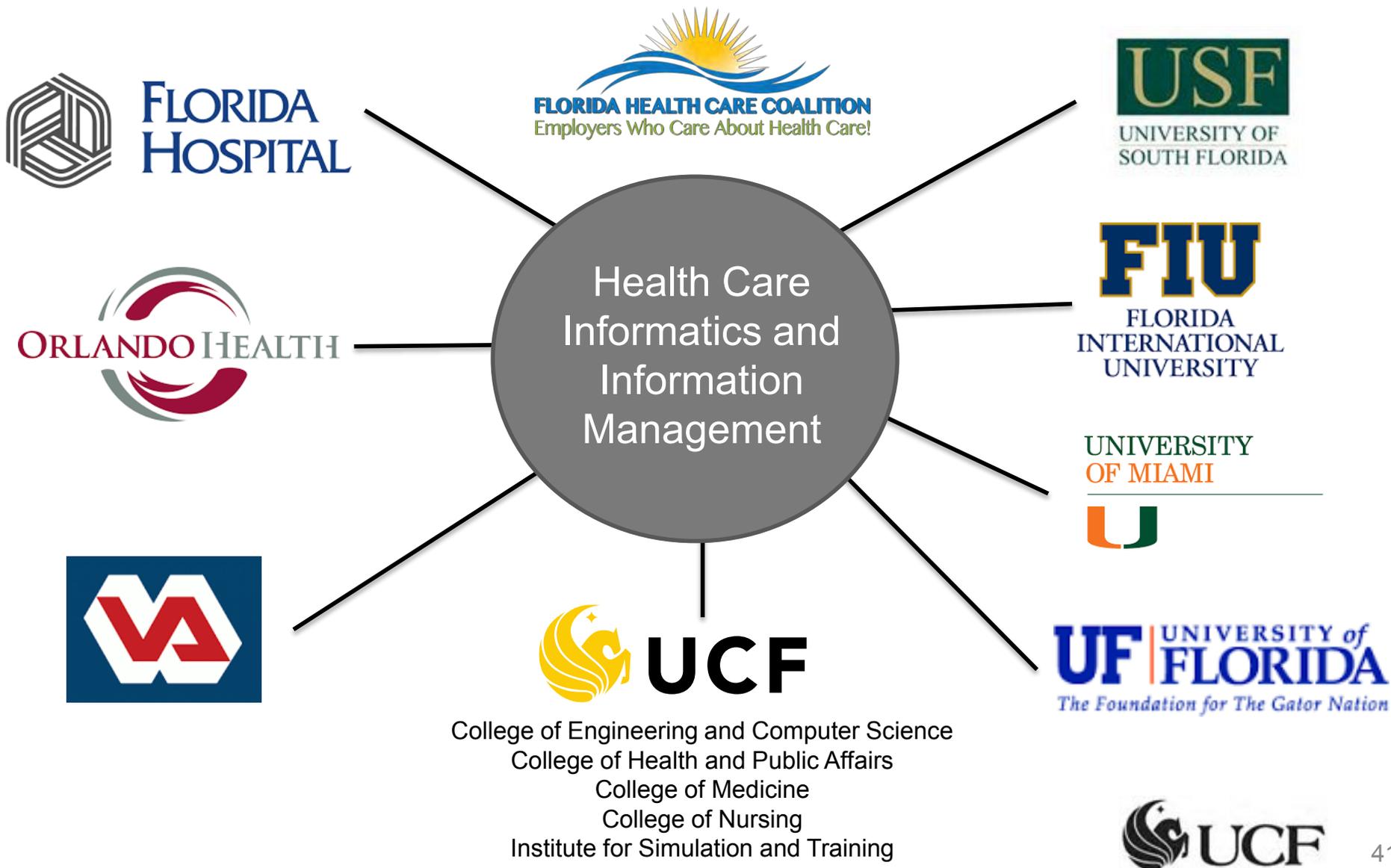
- UCF colleges and target industries
- Collaboration with FIEA Ventures
- STEM funding opportunities



Health Management and Informatics

**“Using Informatics to Connect Individuals,
Communities, and Populations”**

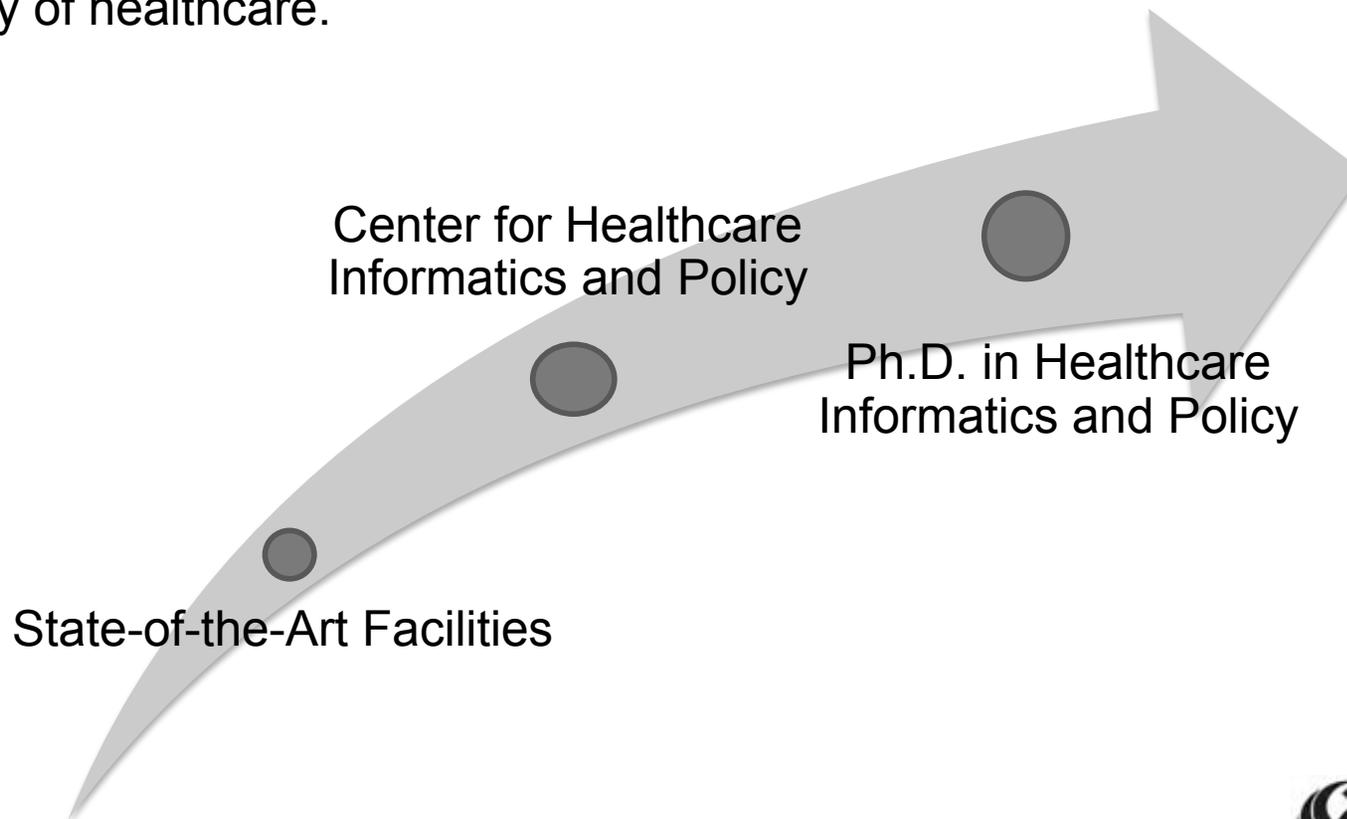
Health Management and Informatics Overview



Path to National Preeminence

Vision

Become the premier informatics program in the nation by leveraging informatics to connect individuals, communities, and populations; thus, transforming the delivery of healthcare.



Assessing Impact

- Registered Health Information Administrator (RHIA) pass rate 90 percent (National average 75 percent)
- Enrollment increase of 20 percent by 2020
- Top 5 informatics program nationally within five years
- Nationally-recognized and ranked Ph.D. program by Year 10
- Center for Healthcare Informatics and Policy will secure at least \$1 million in external funding by Year 4
- Become the leader and preferred partner for healthcare informatics research

Rosen College of Hospitality Management



Leading the Way of Hospitality Education



Hospitality Management Overview

- **The fastest-growing and the second-largest hospitality management program in the world**
 - Consistently ranked among the top three or top five programs worldwide

Undergraduate programs

- Hospitality Management
- Foodservice and Lodging Management
- Event Management
- Entertainment Management

Program tracks

- Theme Parks and Attractions Management
- Professional Tennis Management

Graduate programs

- Hospitality and Tourism Management M.S.
- M.S. dual degrees with Portugal, Italy, and China
- M.S. for medical students
- Destination Marketing and Management (Certificate)
- Event Management (Certificate)
- Hospitality Management Ph.D. (only one in Florida, one of seven in U.S.)

Minors

- Hospitality Management
- Event Management

How did we do it?

By leveraging size and location to create and sustain a culture of hospitality, entrepreneurship, and innovation



Vision and Core Values

Vision

- Be the recognized leader in hospitality and tourism education, research, scholarship, and industry partnership worldwide
- Be ranked as the world's No. 1 comprehensive hospitality management program by 2020

Mission

- Four-year mission to explore new fields of endeavor, to seek out new educational and research opportunities, and to boldly go where no hospitality program has gone before

Core Values

- Professionalism
- Leadership
- Service

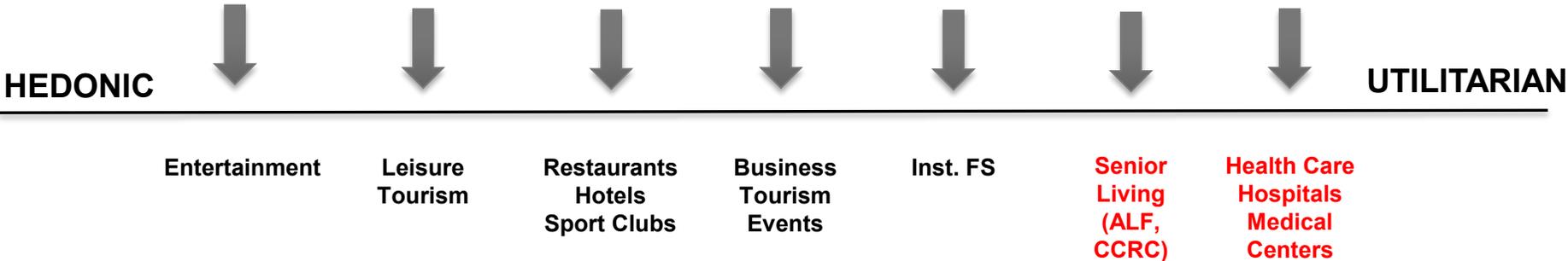
Benchmarking Institution

- Cornell Hotel School



Road Map for the Future

HOSPITALITY MANAGEMENT AND THE HEDONIC-UTILITARIAN SCALE



Hospitality Management Program Needs

Enabling the Rosen College to be the best of its kind by expanding its reach into the healthcare industry

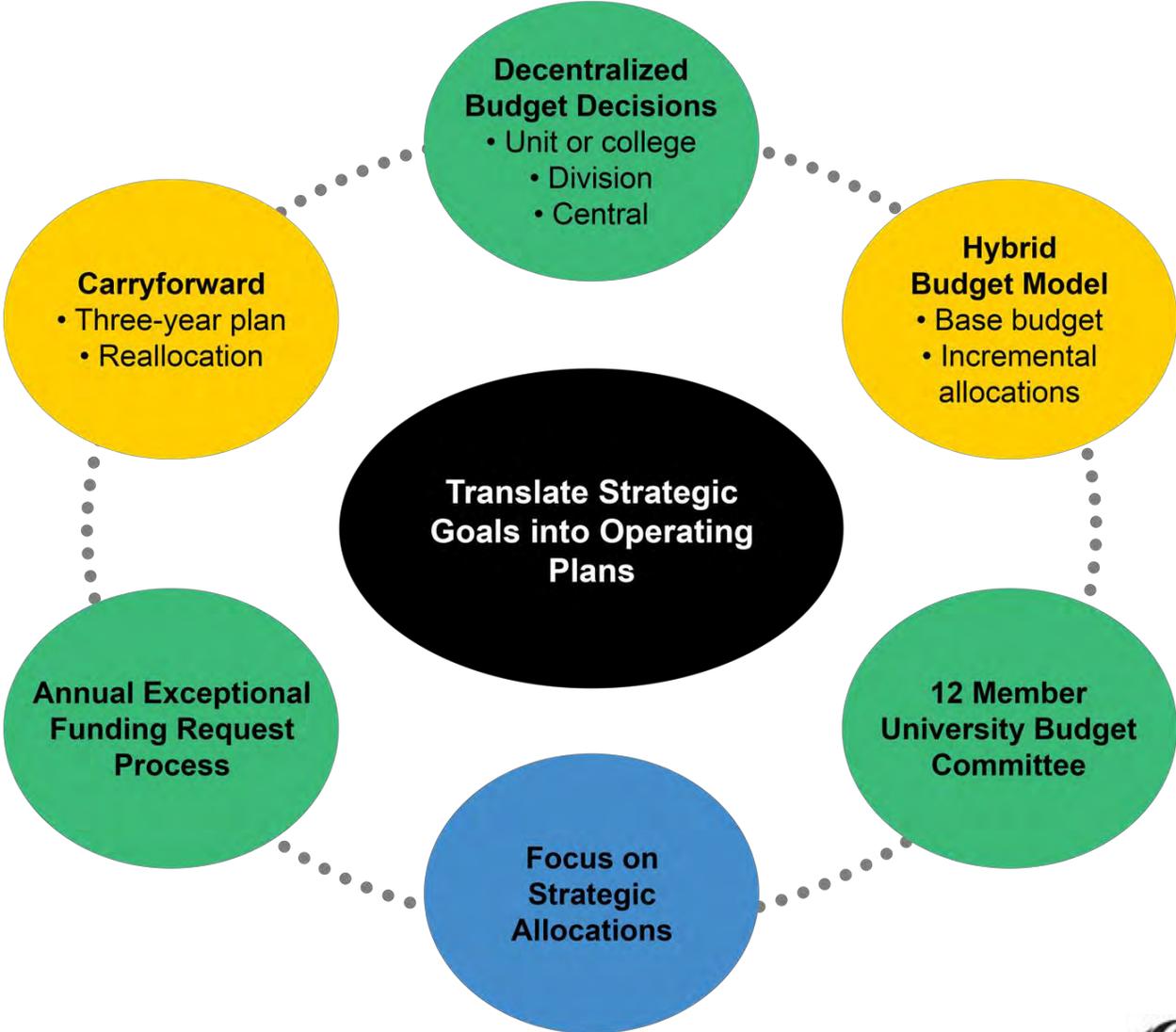
- Create an undergraduate degree program in **Senior Living Management in partnership with the College of Nursing**
 - This degree will prepare young women and men to work in the burgeoning industry of institutionalized senior living industry
 - A close examination of the operation of all senior living facilities will reveal that the highest common denominator among all of them is the provision of hospitality services such as accommodation, food service, recreation, entertainment, and opportunities to socialize
 - Medical and nursing services are crucial, as they are the “push” factor that bring clients to these facilities in general, but the quality of hospitality services are the “pull” factor that make clients choose one facility over another



Core Strategies to Achieve Preeminence

- How do we get there?
 - Investing in key talent
 - Investing in infrastructure
 - Defining our distinctive strengths and discovering areas of opportunity
 - Making tough decisions

University Budget Process



Learning from Our Successes

- History of innovation and entrepreneurship
- Developing nationally-renowned centers and institutes of excellence
- Faculty-driven academic programs that leverage our strengths and find unique areas of opportunity

Contributions of the Centers and Institutes



Major UCF Research Centers and Institutes

- Institute for Simulation and Training (IST)
- Center for Research and Education in Optics and Lasers (CREOL)
- Florida Solar Energy Center (FSEC)
- Florida Space Institute (FSI)
- NanoScience Technology Center (NSTC)
- Center for Research in Computer Vision (CRCV)
- Advanced Materials Processing and Analysis Center (AMPAC)
- Burnett School of Biomedical Sciences (BSBS)



Centers and Institutes' Accomplishments

- Four offer internationally-recognized research and graduate programs
 - Institute for Simulation and Training (IST)
 - Center for Research and Education in Optics and Lasers (CREOL)
 - NanoScience Technology Center (NSTC)
 - Center for Research in Computer Vision (CRCV)
- Very high impact on the Florida economy
 - New companies created and new patents awarded
- Four units consistently produce more than 50 percent of all research grants within UCF
 - College of Engineering and Computer Science, IST, CREOL, and College of Sciences
- Pioneering how UCF will substantially grow research
 - Research faculty and trans-disciplinary clusters



Creating New Opportunities

- ICAMR
- Applied Research Institute
- Faculty Cluster Initiative

ICAMR

The world's first
industry-led consortium
(501c6 non-profit) for
the manufacturing of
smart sensors

**International Consortium
for Advanced Manufacturing Research**

Goals



World-class facility that supports state-of-the-art R&D and positions Central Florida to be an early leader in the evolution of the global \$32.5 trillion per year sensor-driven economy.



Startup Funding of Over \$200 Million



Osceola County

- **\$168 million** from Osceola County
- **Design, build, and equip** 100,000-square-foot center
- **20 acres**, plus in-kind support for power, water, and waste disposal



UCF

- **\$10 million** non-state and non-tuition funds to design and build center and start-up costs
- **\$7 million** in-kind for focused hires and resource support
- **30-year lease** of center from Osceola County at \$1 per year



FHTCC

- **\$1 million** for initial operating cost
- **Up to \$5 million** matching funds over five years for specific research projects
- **\$750,000** from USF, FIU, and UF



State of FL

- **\$5 million** per year for operations
- **\$10 million** tools and equipment
- **\$2 million** QACF



STATE UNIVERSITY SYSTEM of FLORIDA
Board of Governors



A New Era of International Collaboration



Innovation networks and open innovation programs that bring industry, universities, and governments together

Industry

- Emerging technologies
- Opens access to lowest-cost manufacturing



Government

- State of Florida
- National research labs and agencies
- Attract joint funds

Universities

- Universities in U.S., Europe, and Asia
- Enables competitive pursuits in expanded areas of interest
- New ideas and approaches



Suppliers

- Equipment
- Materials
- Software
- Industry R&D labs and programs



Industry and Government



Increasing industry and government interest in ICAMR

- Enabled UCF to secure a significant role on the MIT-lead and Department of Defense-sponsored \$300 million+ smart fiber National Network of Manufacturing Innovation (NNMI)
- Lead partner for a \$349 million advanced sensors DOC NNMI (under evaluation)
- Supporting University of Texas on a \$200 million+ Department of Energy initiative (under evaluation)
- Finalizing our design center concept (announcement expected July 2016)
- First multi-million dollar industry project for the design center identified
- Building complete March 2017



UCF Applied Research Institute

- Launched by the Research Foundation to assist in securing large collaborative research projects and enhance the university's interdisciplinary work and growing partnerships
- Help bridge the technology “valley of death” – the chasm that often occurs between basic research and innovation
- Create a centralized location where faculty members can team together to apply for grants, and where students can find resources, training, and research opportunities in areas where funding is available
- Initially focus on areas that align with Florida's economic development needs, such as photonics, modeling and simulation, engineering, and biomedicine

Faculty Cluster Initiative

- Interdisciplinary teaching and research initiative hiring 33 new faculty members
 - Cyber Security and Privacy
 - Energy Conversion and Propulsion
 - Genomics and Bioinformatics
 - Prosthetic Interfaces
 - Renewable Energy Systems
 - Sustainable Coastal Systems
- Each of these clusters involves faculty members from multiple colleges and departments – many from UCF's top 100-ranked programs by *U.S. News & World Report*

Why Faculty Clusters?

- Exploring solutions to today's toughest scientific and societal challenges at the fringes of disciplines – with broad applications across different issues
- Hiring top talent who will advance UCF's impact as a metropolitan research university
- Developing new academic programs and research opportunities

What Makes UCF's Faculty Clusters Unique?

- **Renewable Energy Systems (RISES)**
 - Engineering, Computer Science, Photovoltaics (CREOL), Public Administration and Policy, Business Administration
 - No interdisciplinary power systems graduate programs currently exist
 - Builds upon UCF's local industry partnerships and federal funding priorities
- **Cyber Security and Privacy**
 - Computer Science, Electrical and Computer Engineering, Psychology, Industrial Engineering and Management Systems, Modeling and Simulation, Political Science, Statistics
 - Ties multiple disciplines together within a strategic framework
 - Builds upon UCF's prominence in cyber security – 3-time collegiate cyber defense national champions and new NSA Center of Academic Excellence in Cyber Defense

Concluding Thoughts

- Importance of our strategic planning process
- The need to leverage our unique strengths in Central Florida environment
- The courage to make decisions that will produce the greatest impact

Research Benchmarking and Strategies



May 2016



UCF Research Benchmarking

- How do research expenditures at UCF compare to the research accomplished by our peers?
- Review research expenditures for UCF, three preeminent institutions, three aspirational peers and three comparison peers
- Consider core strategies and opportunities for UCF research

UCF Research Comparison

- Benchmarking data source: 2014 National Science Foundation Higher Education Research and Development Survey (NSF HERD)
 - Total Research and Development (R&D) Expenditures
 - Detailed Federal R&D Expenditures
 - Total R&D by Broad Disciplines
- Expenditures by UCF unit
- Awards by UCF unit

Comparison Group Characteristics (IPEDS, Fall 2013)

UCF			
	Medical School	Land Grant	FT Tenure/ Tenure Track Faculty
University of Central Florida			750

Preeminent Institutions			
	Medical School	Land Grant	FT Tenure/ Tenure Track Faculty
Ohio State University-Main Campus			2,492
University of Florida			2,011
The University of Texas at Austin			1,898

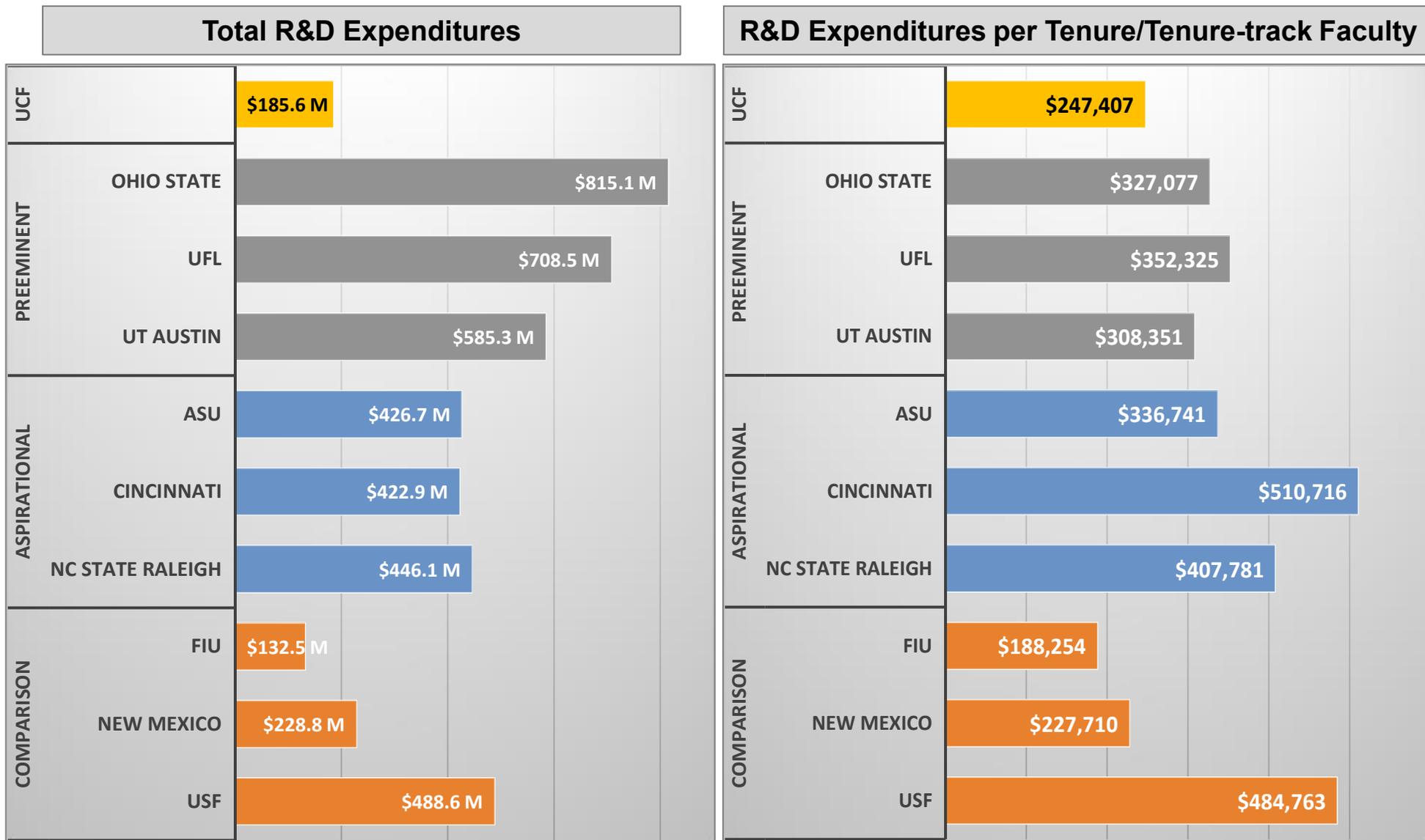
Aspirational Peers			
	Medical School	Land Grant	FT Tenure/ Tenure Track Faculty
Arizona State University			1,267
North Carolina State University at Raleigh			1,094
University of Cincinnati			828

Comparison Peers			
	Medical School	Land Grant	FT Tenure/ Tenure Track Faculty
Florida International University			704
University of South Florida-Main Campus			1,008
University of New Mexico-Main Campus			1,005

Source: Integrated Postsecondary Education Data System, Fall 2013



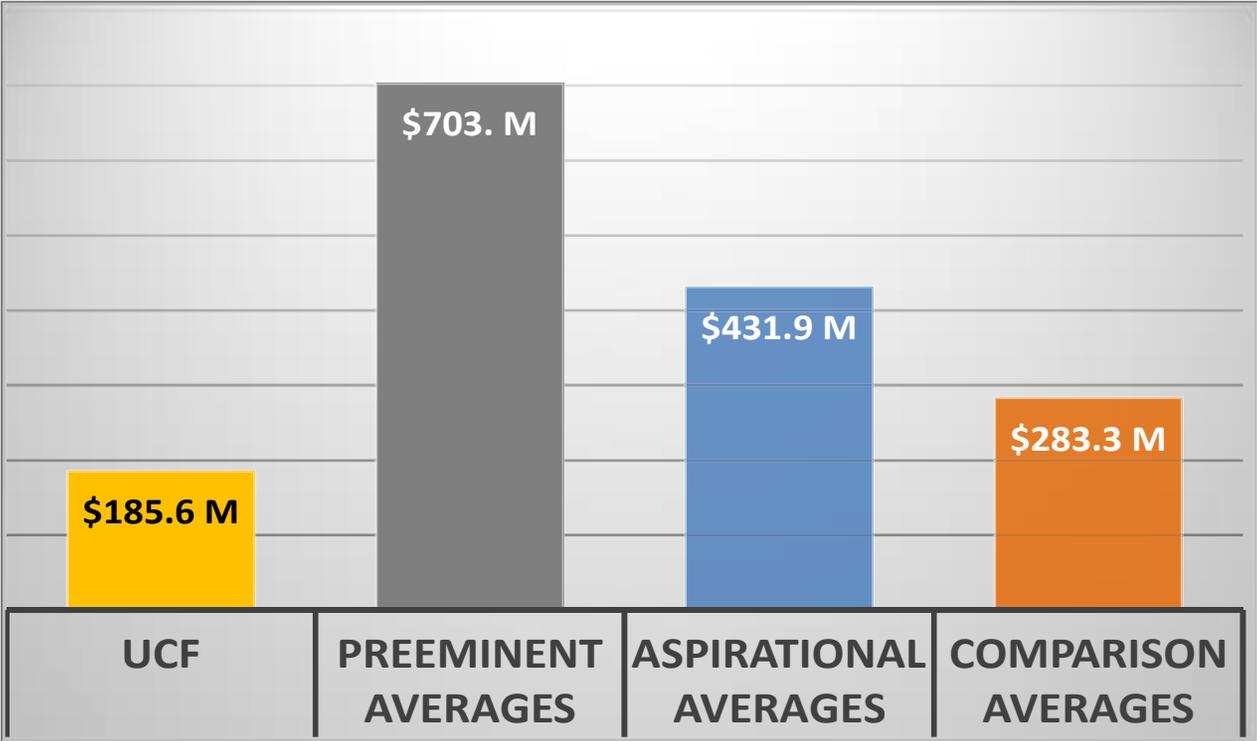
Total R&D Expenditures



Source: 2013-14 NSF Higher Education Research and Development Survey and Integrated Postsecondary Education Data System, Fall 2013



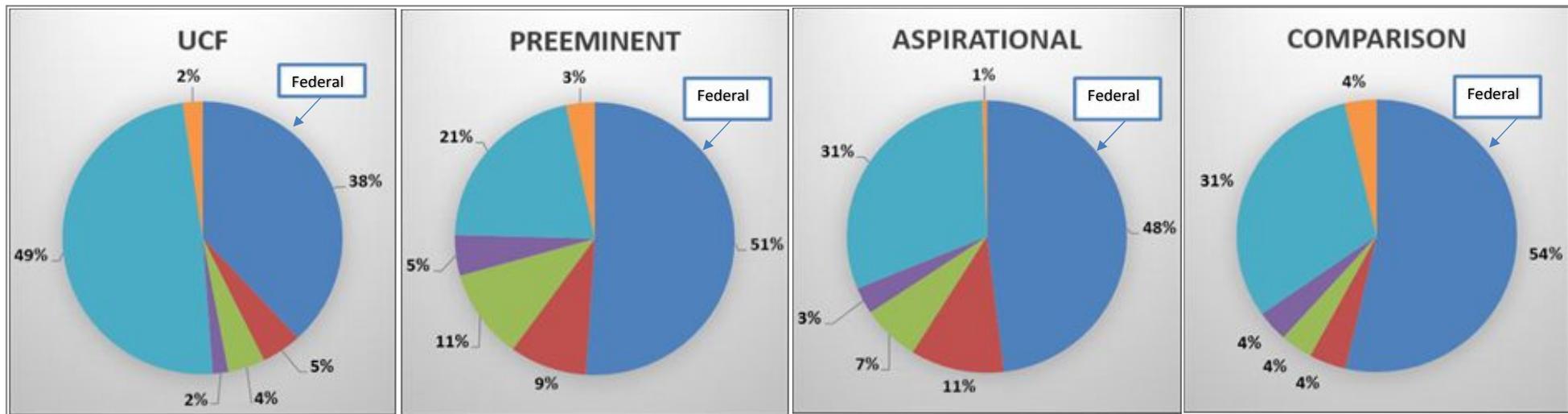
Average R&D Expenditures by Peer Group



Source: 2013-14 NSF Higher Education Research and Development Survey



R&D Expenditures and Funding Sources



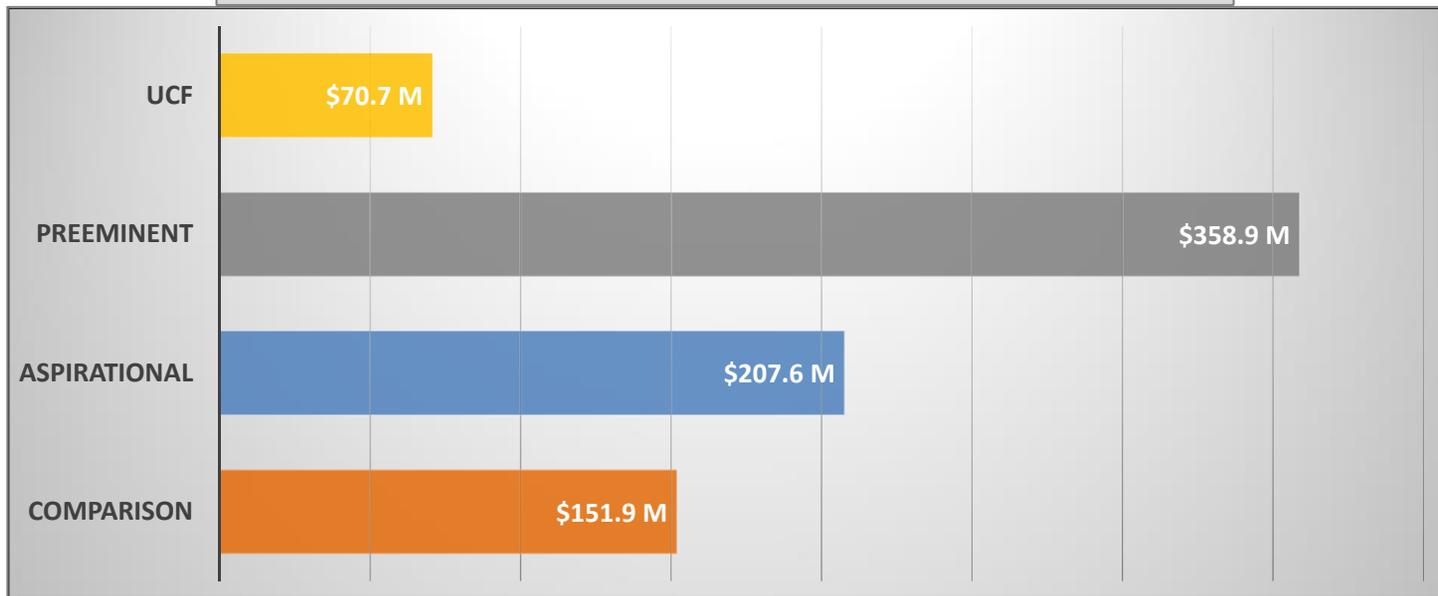
	Comparison	Aspirational	Preeminent	UCF
■ Federally Financed	\$151.9 M	\$207.6 M	\$358.9 M	\$70.7 M
■ State & Local Govt. Financed	\$12.1 M	\$46.7 M	\$62.7 M	\$8.6 M
■ Business Financed	\$10.6 M	\$29.1 M	\$74.9 M	\$8. M
■ Nonprofit Financed	\$10.4 M	\$13.7 M	\$33.8 M	\$3.3 M
■ Institutionally Financed	\$87.9 M	\$132.5 M	\$149.5 M	\$90.8 M
■ All Other Sources	\$10.5 M	\$2.4 M	\$23.2 M	\$4.2 M

Source: 2013-14 NSF Higher Education Research and Development Survey

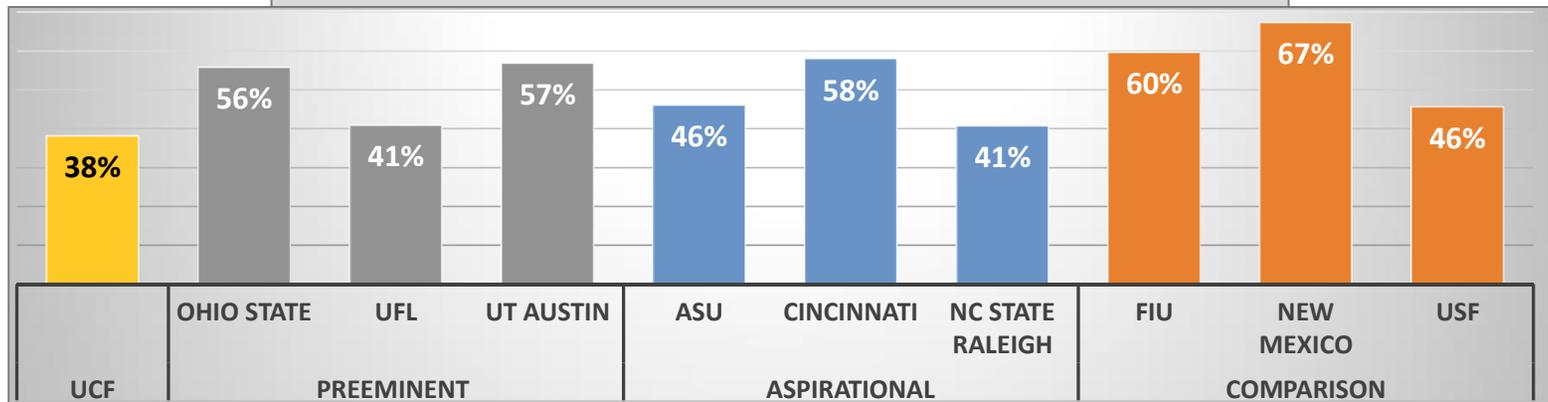


Federally Financed R&D Expenditures

Average Federally Financed R&D Expenditures



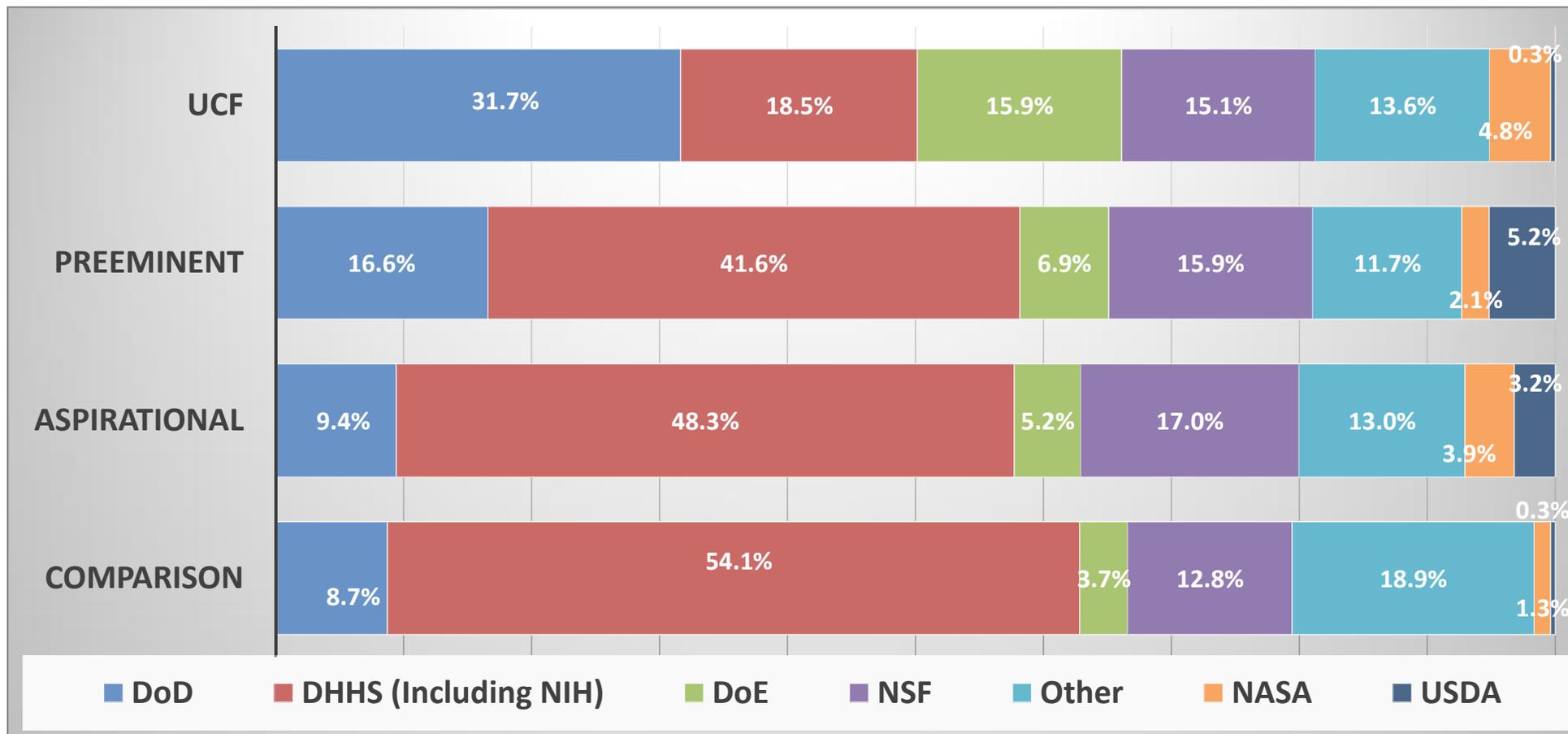
% of Federally Financed R&D Expenditures



Source: 2013-14 NSF Higher Education Research and Development Survey



Distribution of Federal Funding by Agencies



Source: 2013-14 NSF Higher Education Research and Development Survey



Other Federal Funding by Federal Agencies

	Total	ED	Other	USAID	DOT	NIST	VA	DOL	Commerce
UCF	\$8.9 M	\$1.8 M	\$0.2 M		\$1.3 M		\$0.2 M		\$1.1 M
Preeminent	\$38.9 M	\$16.6 M	\$1.5 M	\$3.3 M	\$6.5 M		\$1.8 M	\$2.3 M	\$3.3 M
Aspirational	\$26.7 M	\$2.8 M	\$18. M	\$0.4 M	\$0.7 M	\$2.6 M	\$1.7 M		\$0.5 M
Comparison	\$30.8 M	\$8.9 M	\$0.3 M	\$16.9 M	\$5.8 M		\$4.6 M	\$2.6 M	\$1.6 M

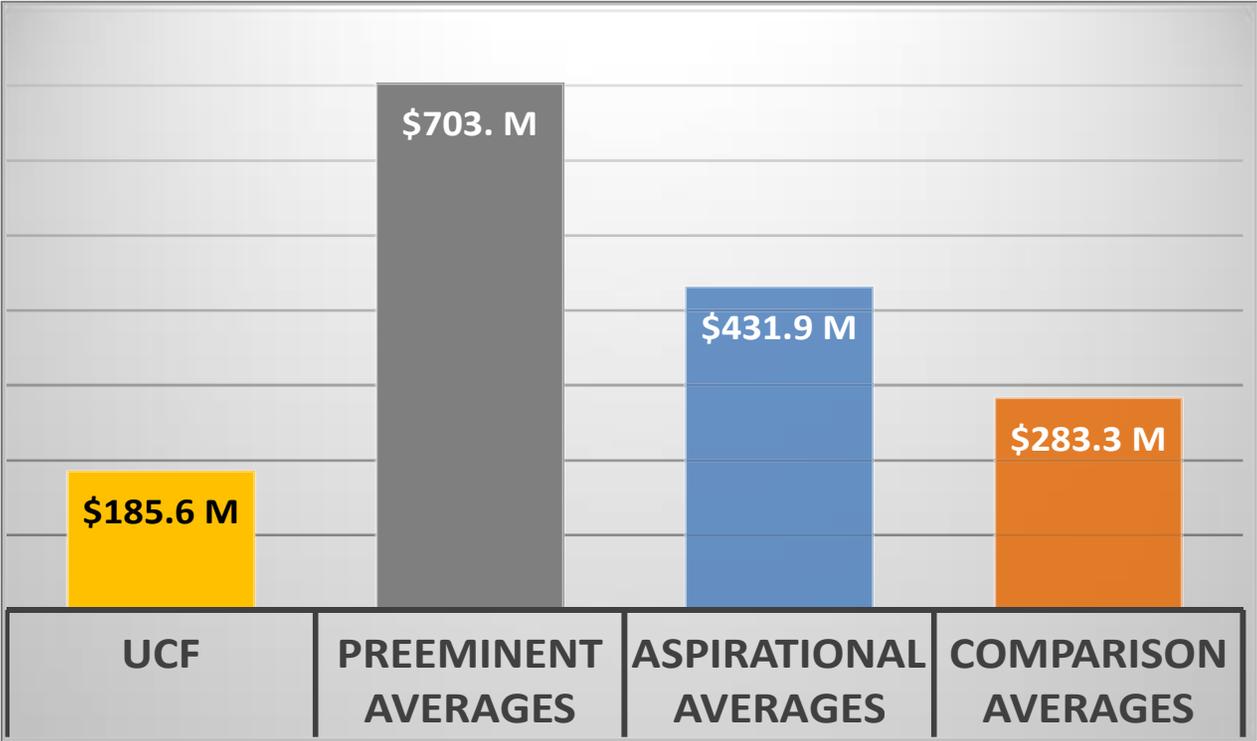
	DOS	Interior	OPM	USGS	SBA	NOAA	EPA	DOJ	NIJ	Treasury
UCF		\$1.3 M			\$1.2 M			\$0.8 M		
Preeminent	\$2.5 M	\$2.6 M					\$1.2 M			\$0.4 M
Aspirational		\$1.2 M		\$1.3 M		\$1. M	\$0.7 M	\$0.5 M		
Comparison	\$1.4 M	\$1.7 M	\$1.4 M		\$1.3 M		\$0.6 M	\$0.5 M	\$0.5 M	

	VAMC	IMLS	DHS	HUD Policy	HUD	NRC	NPS	NEH	CIA	BLM
UCF			\$0.3 M			\$0.5 M		\$0.2 M		
Preeminent		\$0.3 M	\$0.7 M		\$0.3 M	\$0.3 M		\$0.1 M	\$0.2 M	
Aspirational			\$0.2 M	\$0.3 M	\$0.2 M		\$0.2 M	\$0.2 M		\$0.2 M
Comparison	\$0.3 M		\$0.1 M			\$0.1 M				

Source: 2013-14 NSF Higher Education Research and Development Survey



Total R&D Expenditures by Peer Group



Source: 2013-14 NSF Higher Education Research and Development Survey



Broad Discipline and Subdiscipline Areas

Non-Science and Engineering (S&E) Fields

Business & Management, Communication, Education, Humanities, Law, Other Non-S&E, Social Work, Visual and Performing Arts

Engineering

Aeronautical, Bioengineering and Biomedical, Chemical, Civil, Electrical, Mechanical, Metallurgical and Materials

Physical Sciences

Astronomy, Chemistry, Other Physical Sciences, Physics

Life Sciences

Agricultural Sciences, Biological Sciences, Medical Sciences, Other Life Sciences

Social Sciences

Economics, Other Social Science, Political Sciences, Sociology

Computer Sciences

Computer Sciences

Environmental Sciences

Atmospheric, Earth Sciences, Oceanography, Other Environmental Sciences

Other Sciences

Other Sciences

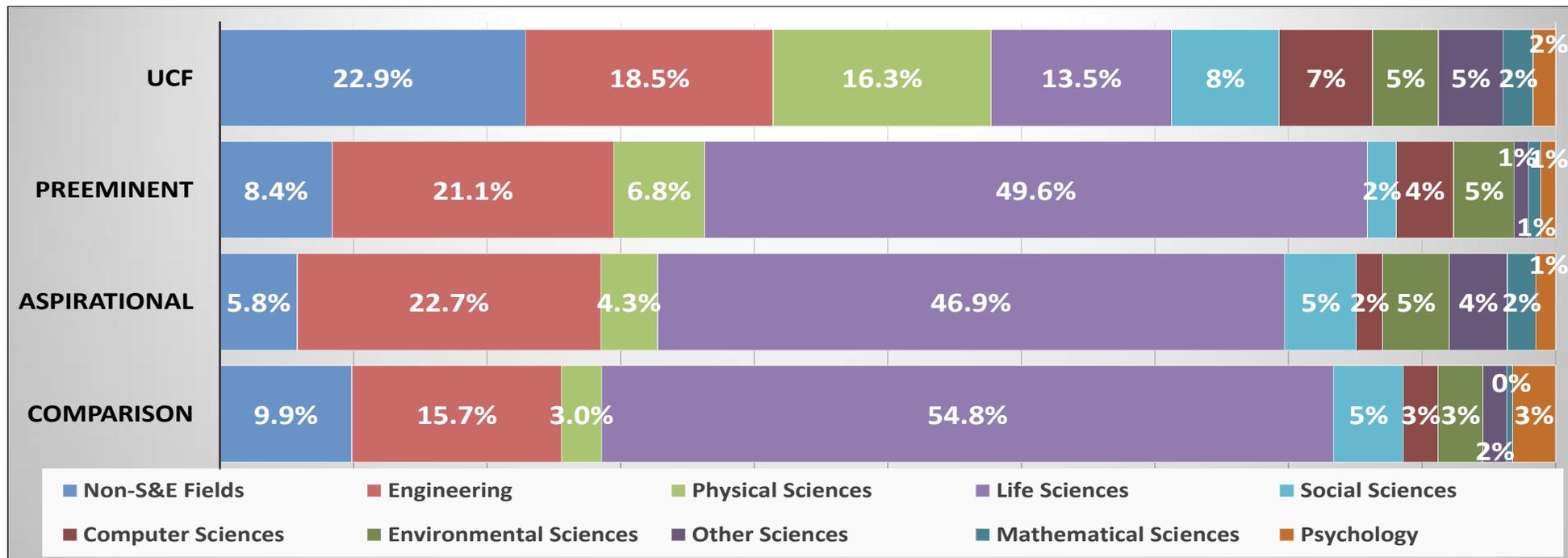
Mathematical Sciences

Mathematical Sciences

Psychology

Psychology

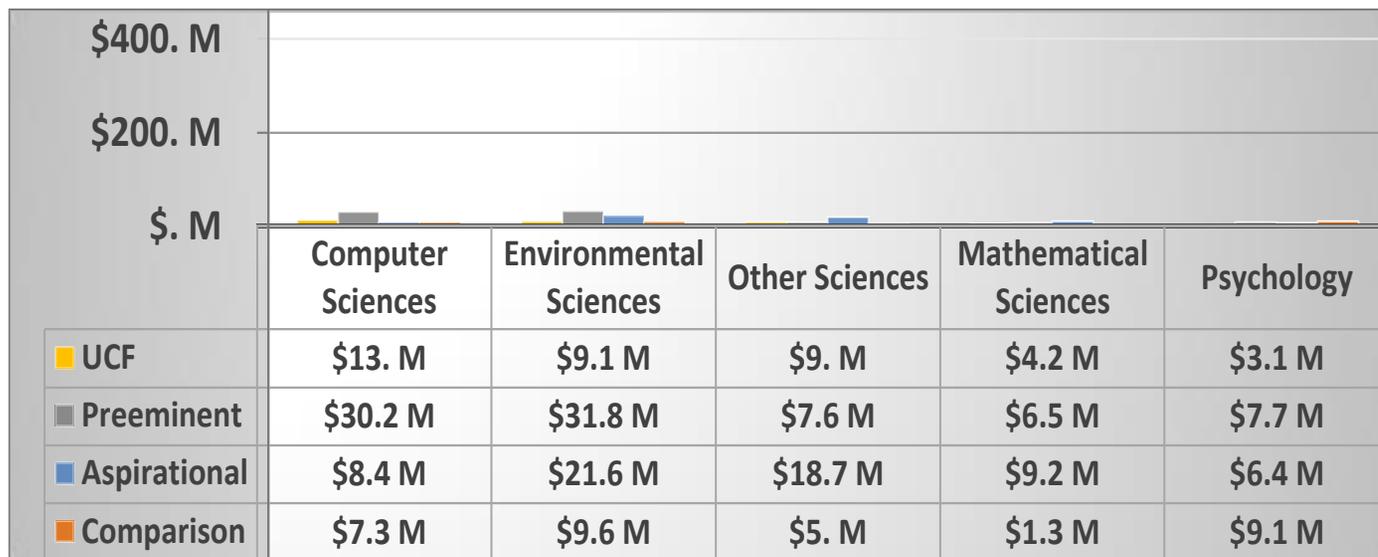
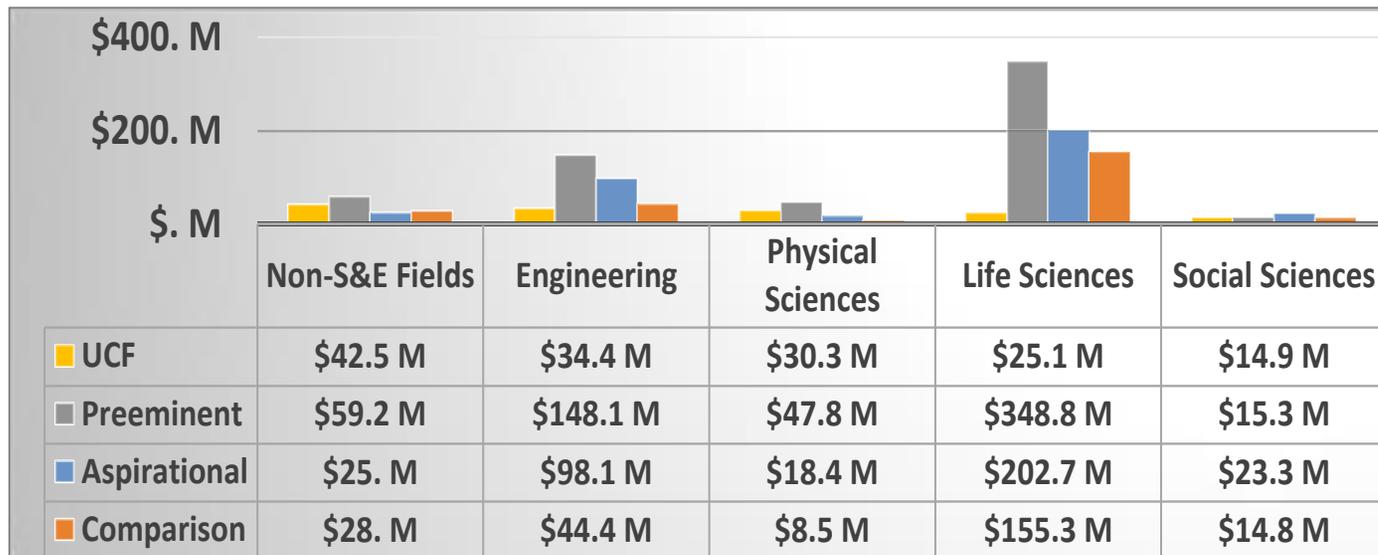
Distribution by Broad Disciplines



Source: 2013-14 NSF Higher Education Research and Development Survey



Total R&D Expenditures by Broad Disciplines

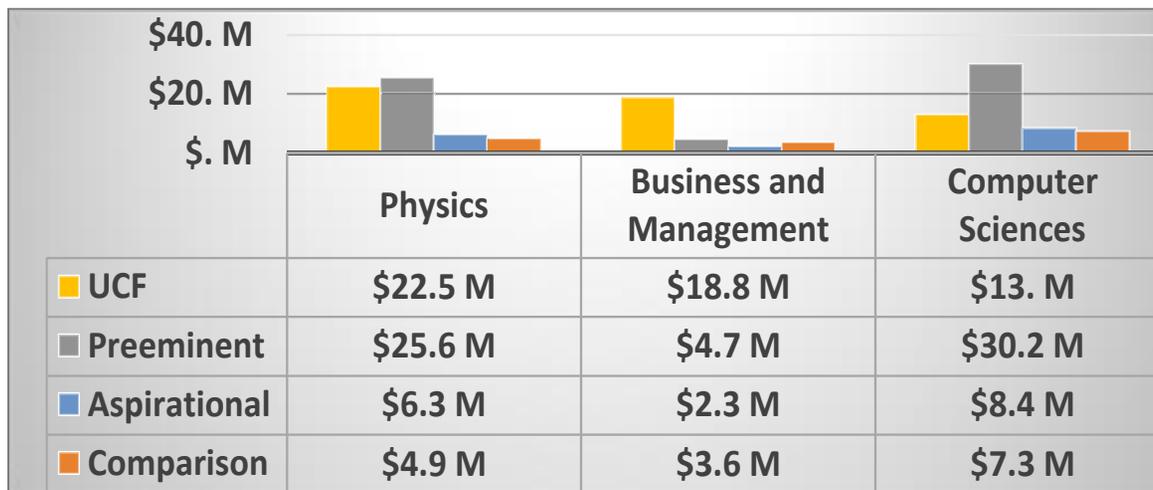


Source: 2013-14 NSF Higher Education Research and Development Survey



UCF Subdisciplines - Highest and Lowest

Average R&D Expenditures in Top Three Programs at UCF



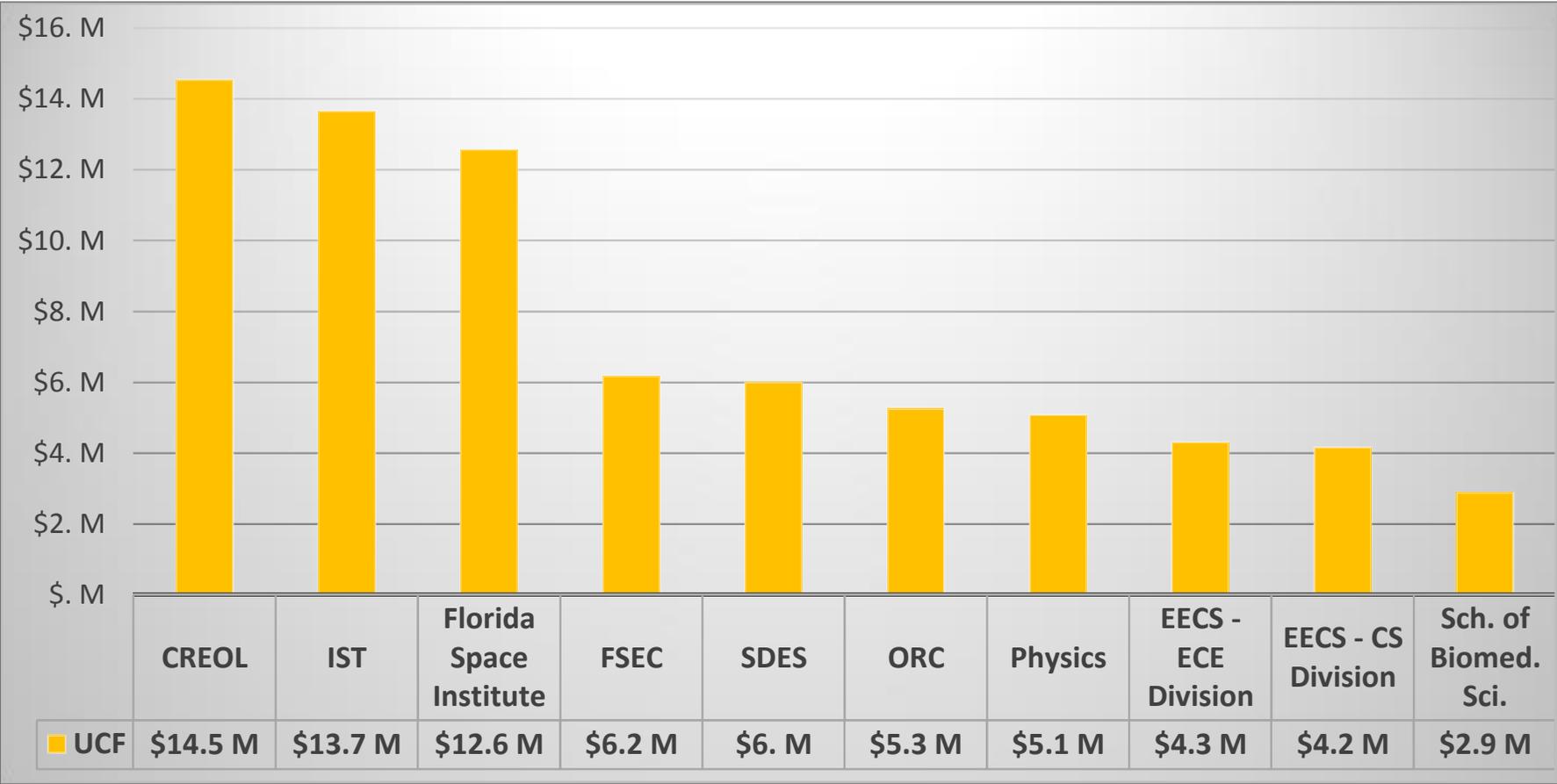
Average R&D Expenditures in Bottom Three Programs at UCF



Source: 2013-14 NSF Higher Education Research and Development Survey



UCF Units with Highest R&D Expenditures



Source: 2014-15 Program Review Data

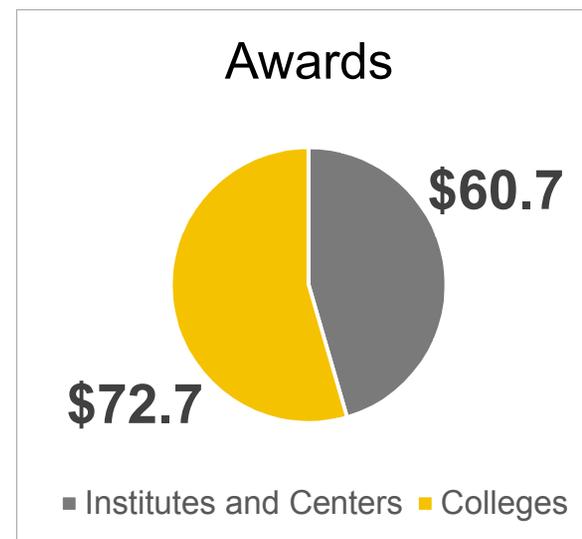


Advancing UCF Research

- What are the strategies for increasing UCF's research activities?
- 2020 research challenge
- Core strategies to enhance research
- External review

UCF Research Awards – Challenge 2020

Unit	Awards
College of Engineering and Computer Science	\$24,433,757
College of Optics and Photonics	\$14,708,936
College of Sciences	\$13,740,768
Burnett School of Biomedical Sciences	\$6,282,913
College of Education and Human Performance	\$5,999,503
College of Health and Public Affairs	\$3,928,377
College of Nursing	\$1,639,248
College of Medicine without Burnett	\$599,082
College of Arts and Humanities	\$561,343
College of Business Administration	\$489,301
Rosen College of Hospitality Management	\$291,028
Institute for Simulation and Training	\$15,625,060
Other	\$13,539,201
Florida Space Institute	\$13,149,186
Office of Research and Commercialization	\$5,472,157
Florida Solar Energy Center	\$5,172,199
NanoScience Technology Center	\$4,710,603
Advanced Materials Processing and Analysis Center	\$1,579,269
Center for Research in Computer Vision	\$1,486,763



Challenge 2020:

\$250 million,
an 87% increase



Core Strategies

- Invest in quality talent
- Invest in critical infrastructure



Investing in Talent

- Using performance funding to grow our faculty
 - Goal of 200 new faculty positions to increase tenured and tenure-track faculty by 25 percent
 - Six inaugural teaching and research clusters focused on developing new academic programs and new research programs
- 2015-16 new faculty members' research awards total more than \$5.1 million

Investing in Infrastructure

- Space is our greatest barrier and top priority for growing research programs
 - 67.1% deficit (618,214 sq ft) in research labs
 - 26.4% deficit (259,853 sq ft) in office space

(Source: Fixed Capital Outlay Space Needs, Florida Board of Governors)
- 15 new academic buildings constructed in last 10 years, adding more than 1 million square feet
 - Physical Sciences, Biomedical, College of Medicine, AMPAC, Simulation, Engineering
 - \$343 million in project costs

Investing in Infrastructure

- Five new academic buildings expected to be acquired or constructed in next three years, adding more than 477,000 square feet
 - Global UCF
 - Interdisciplinary Research and Incubator Facility
 - Trevor Colbourn Hall
 - Partnership IV
 - UCF Downtown Academic Building
- \$160.2 million in total project costs

External Review - Research and Graduate Studies

- **External consultant team**

- Dr. Sethuraman "Panch" Panchanathan, *Executive VP for ASU Knowledge Enterprise*
- Dr. Marion K. Underwood, *Dean of Graduate Studies and Associate Provost at UT Dallas*
- Dr. Caroline Whitacre, *VP for Research at The Ohio State University*

- **Internal representative**

- Dr. David Hagan, *Associate Dean of Academic Programs, College of Optics and Photonics*

External Review Recommendations

- Strategically hire mid-career and senior faculty with funded, programmatic research and incentivize faculty actively engaged in securing funding
- Provide business development for expanding UCF's research portfolio and success, including expanding Washington, D.C., presence and identifying new funding opportunities
- Diversify research portfolio and increase corporate engagement. Focus on key areas of engagement so UCF can become a full-fledged partner with a select number of key industry partners
- Invest in infrastructure and graduate education and post-doctoral training

VP for Research and Dean of Graduate Studies

- National search for a combined leadership position
 - Provide overall vision and advance UCF's impact of discovery by growing graduate education and research in both scale and quality
 - Support interdisciplinary academic programs, institutes, initiatives, and corporate engagement programs
 - Champion post-doctoral programs, sponsored research, partnerships, IP management, and entrepreneurship

Discussion



Central Florida Higher Education Competitors

BOARD OF TRUSTEES RETREAT

MAY 13, 2016

“

A horse never runs so fast as when he has
other horses to catch up and outpace.

OVID, *Roman Poet*

”

Our Market

63,002

Fall 2015 Enrollment

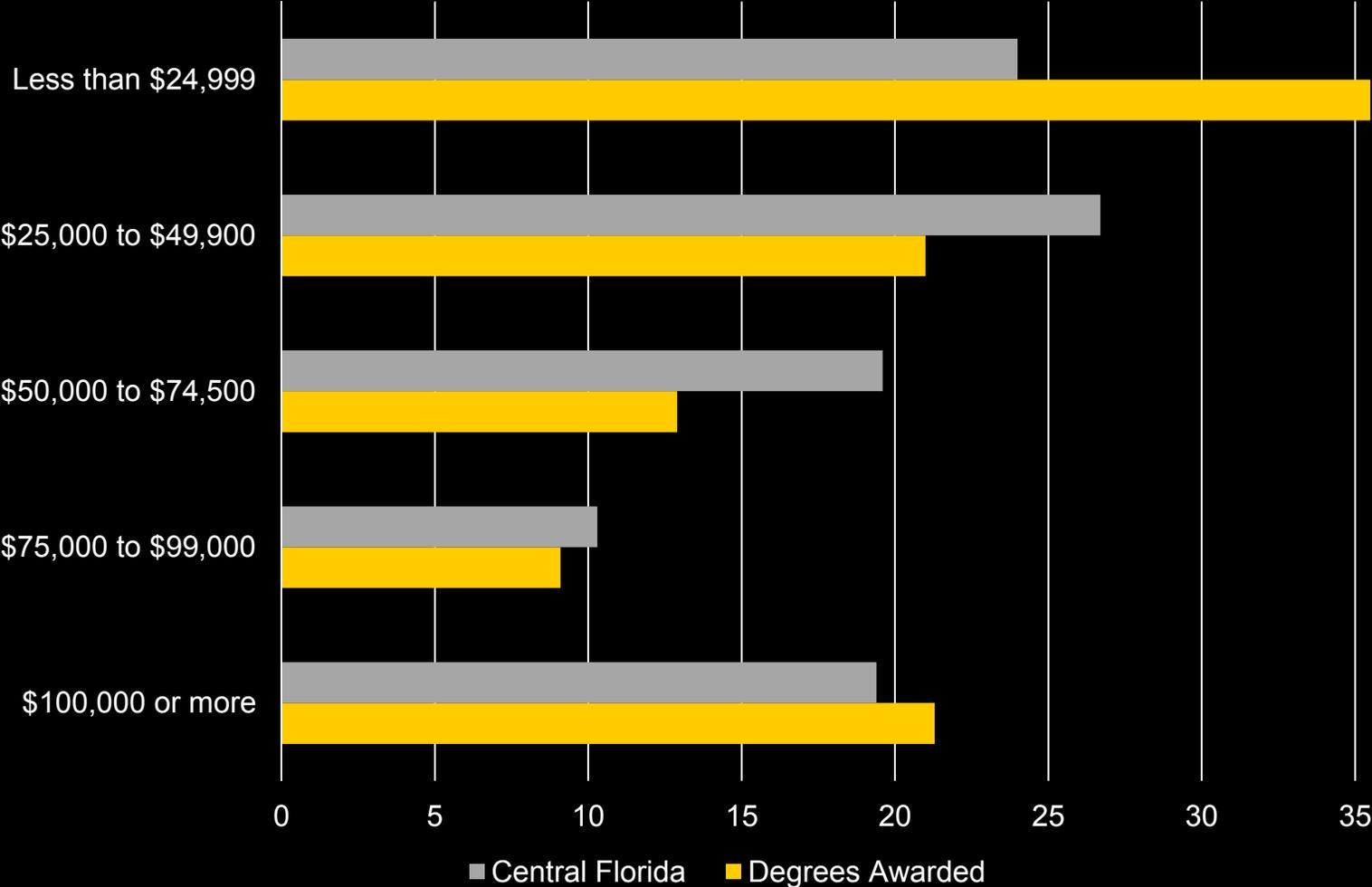
212 Degrees Offered

93 Bachelor's, 84 Master's
31 Doctoral, 3 Specialist, 1 Professional

16,585

Degrees Awarded in 2014

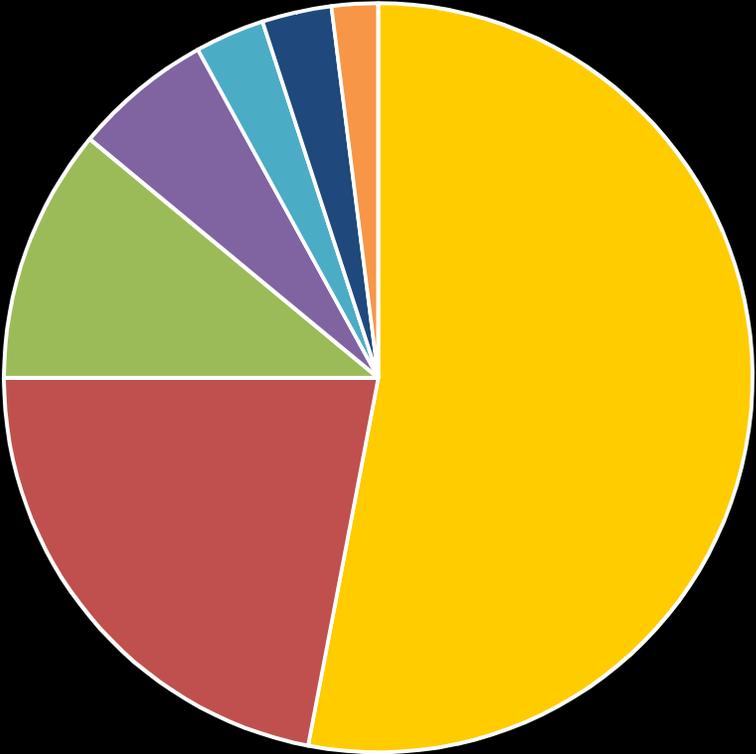
Household Income Distribution



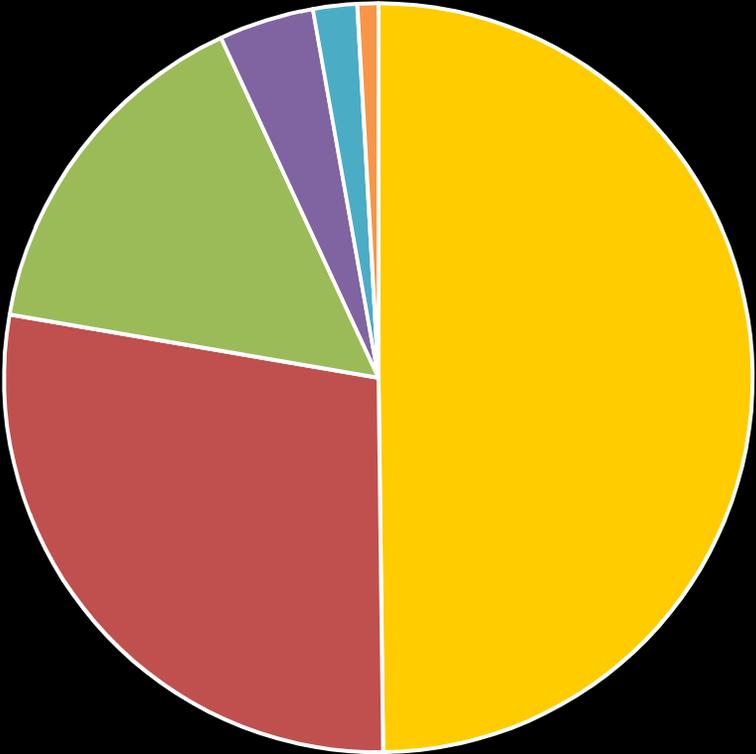
*Provides percentages of Central Florida household incomes, compared with 2014-15 undergraduates graduating.
Sources: 2014 American Community Survey; 2014-15 FAFSA, 42.8% unknown for undergraduates graduating*

Demographics

UCF Student Population



Orlando MSA Population



- White
- Hispanic and Latino
- African-American
- Asian
- Multi-racial
- Other or Not Specified
- Nonresident Alien (UCF only)

Sources: UCF IKM, 2015; Orlando Economic Development Commission, ESRI 2015 - Estimates

Orlando Market

Orlando-Kissimmee-Sanford MSA

2.3 Million
Population

2.1%
Predicted Annual
Growth Through 2019

239,106
Population, Age 18-24

Postsecondary Education Student Pipeline

165,000 Florida high school students graduating annually through 2019-20

63% go on to some postsecondary education

92% of UCF's students are Florida residents

Postsecondary Education Demand

More than 60% of Florida jobs will require postsecondary education or training by 2020

3.8 million more high-quality postsecondary credentials needed by 2025

26.5% increase in postsecondary degrees awarded in Florida from 2008-09 to 2012-13



Our goal is to be a large-scale institution that can meet the needs and the demands for higher education.

JOHN C. HITT



Our Value Proposition

"[UCF is] in the vanguard of an insurgency that aims to demolish the popular belief that exclusivity is a virtue in higher education."

The Washi

Kiplinger

Timely, Trusted Personal Finance Advice and Business Forecasts

"...a seamless pipeline of social mobility."

POLITICO

Forbes

n Gap

Higher Education Providers

40+ postsecondary institutions within a 50-mile radius of UCF's main campus

20+

For-profit institutions

\$19,500

Average Annual Cost

14

Private institutions

5,000

Average
Undergraduate
Enrollment

8

Public institutions

Comparison With For-Profit Institutions

	UCF	University of Phoenix (Orlando)	Keiser University	Strayer University	Kaplan University	Everest University (Orlando)
Total Enrollment	63,002	3,707	19,110	2,769	57,943	23,169
Top Undergraduate	Psychology; Registered Nursing	Business Administration and Management; Criminal Justice and Law Enforcement Administration	Business Administration and Management; Criminal Justice and Safety Studies	Business and Commerce; Criminal Justice and Law Enforcement Administration	Registered Nursing; Business Administration and Management	Business Administration and Management; Securities Services Administration
Top Graduate	Social Work; Business and Commerce	Business Administration and Management; Nursing Education	Business Administration and Management; Physician Assistant	Business Administration and Management; Organizational Leadership	Business Administration and Management; Psychology	Business Administration and Management
Tuition and Fees	\$6,368	\$10,540	\$16,963	\$12,975	\$13,956	\$13,752

Sources: UCF IKM, 2015; total Fall 2014 enrollment for Keiser and Strayer represent Florida numbers, and Phoenix and Everest represent Orlando region, according to Integrated Postsecondary Education Data System (IPEDS); Kaplan data based on its Davenport, IA headquarters, according to IPEDS; top programs defined by degrees conferred, 2014-15; full-time undergraduate tuition and fees, 2014-15, according to IPEDS.

Comparison With For-Profit Institutions

	UCF	University of Phoenix (Orlando)	Keiser University	Strayer University	Kaplan University	Everest University (Orlando)
Percent In-state	92%	90%	78%	98%	1%	17%
Percent Age 24 and under	79%	Not Available	35%	14%	18%	26%
Percent Minority	43%	52%	56%	44%	43%	59%
Retention Rate	89%	50%	74%	43%	40%	36%
Graduation Rate	70%	21%	56%	44%	16%	31%

Sources: UCF IKM, 2015; for non-UCF institutions, comparisons based upon Fall 2014 undergraduate admission data from IPEDS and data from U.S. Department of Education College Scorecard, 2016. For-profit institution data for Keiser and Strayer for Florida students; Kaplan data based on its Davenport, IA headquarters.

Comparison With For-Profit Institutions

	UCF	University of Phoenix (Orlando)	Keiser University	Strayer University	Kaplan University	Everest University (Orlando)
Students Receiving Federal Loans	45%	65%	66%	78%	65%	77%
Students Paying Down Debt	85%	41%	47%	44%	36%	22%
Average Debt	\$18,500	\$35,500	\$27,500	\$39,500	\$30,500	\$27,500
Salary After Graduation	\$43,000	\$53,400	\$29,600	\$51,700	\$34,400	\$25,300

Source: U.S. Department of Education College Scorecard, 2016. For-profit institution data for Keiser and Strayer for Florida students; Kaplan data based on its Davenport, IA headquarters.

Ana G. Méndez University System

2,638 enrolled at Florida campuses in Orlando, Tampa, and Miramar

Offers **bilingual accelerated program**; registered as a discipline-based dual language immersion model

Follows the **50/50 model** of bilingual instruction.
50% of instruction is offered in English and 50% in Spanish

Webster University

Currently enrolls about **350 students** in Orlando

Combining its **Orlando locations downtown**,
across from Amway Center

Offers **graduate programs** in business, human
resources, health administration, counseling, and
cybersecurity

Comparison With Private Institutions

	UCF	Rollins College	Stetson University	Full Sail University	Nova Southeastern University
Total Enrollment	63,002	3,207	4,137	19,285	24,168
Top Undergraduate	Psychology; Registered Nursing	International Business, Trade, and Commerce; Communication	Psychology; Business Administration and Management	Cinematography and Film and Video Production; Animation, Interactive Technology, Video Graphics, and Special Effects	Registered Nursing; Business Administration*
Top Graduate	Social Work; Business and Commerce	Business Administration and Management; Mental Health Counselor	Business Administration and Management; Educational Leadership	Arts, Entertainment, and Media Management; E-Commerce and Electronic Commerce	Business Administration and Management; Teacher Education (Multiple Levels)
Tuition and Fees	\$6,368	\$43,080	\$40,040	\$22,796	\$26,700

* Based upon most degrees conferred in 2014-15 for degree programs offered in Orlando

Sources: UCF IKM, 2015; non-UCF enrollment based upon Fall 2014 numbers, according to IPEDS. Top programs defined by degrees conferred in 2014-15, according to IPEDS. Full-time undergraduate tuition and fees in 2014-15, according to IPEDS.

Comparison With Private Institutions

	UCF	Rollins College	Stetson University	Full Sail University	Nova Southeastern University
Percent In-state	92%	45%	64%	19%	64%
Percent Age 24 and under	79%	84%	96%	51%	56%
Percent Minority	43%	35%	34%	45%	65%
Retention Rate	89%	83%	78%	50%	71%
Graduation Rate	70%	69%	64%	79%	41%

Sources: UCF IKM, 2015; for non-UCF institutions, comparisons based upon Fall 2014 undergraduate admission data from IPEDS and data from U.S. Department of Education College Scorecard, 2016.

Comparison With Private Institutions

	UCF	Rollins College	Stetson University	Full Sail University	Nova Southeastern University
Students Receiving Federal Loans	45%	52%	66%	80%	61%
Students Paying Down Debt	85%	83%	86%	57%	70%
Average Debt	\$18,500	\$27,000	\$27,000	\$30,843	\$26,500
Salary After Graduation	\$43,000	\$42,200	\$42,600	\$34,100	\$46,500

Source: U.S. Department of Education College Scorecard, 2016

Florida State Colleges

4-Year Degrees at DirectConnect Partners

	UCF	Valencia College	Eastern Florida State College	Lake-Sumter State College	Seminole State College	Daytona State College	College of Central Florida
Total Enrollment	63,002	34,818	12,736	3,510	16,567	12,993	7,931
Bachelor's Degrees	93	4	3	1	6	5	3
Overlapping Degrees	9	0	0	0	3	3	3
DirectConnect Students*	6,337	3,828	764	228	1,027	387	103

* 2015-2016 Incoming students



Online Education

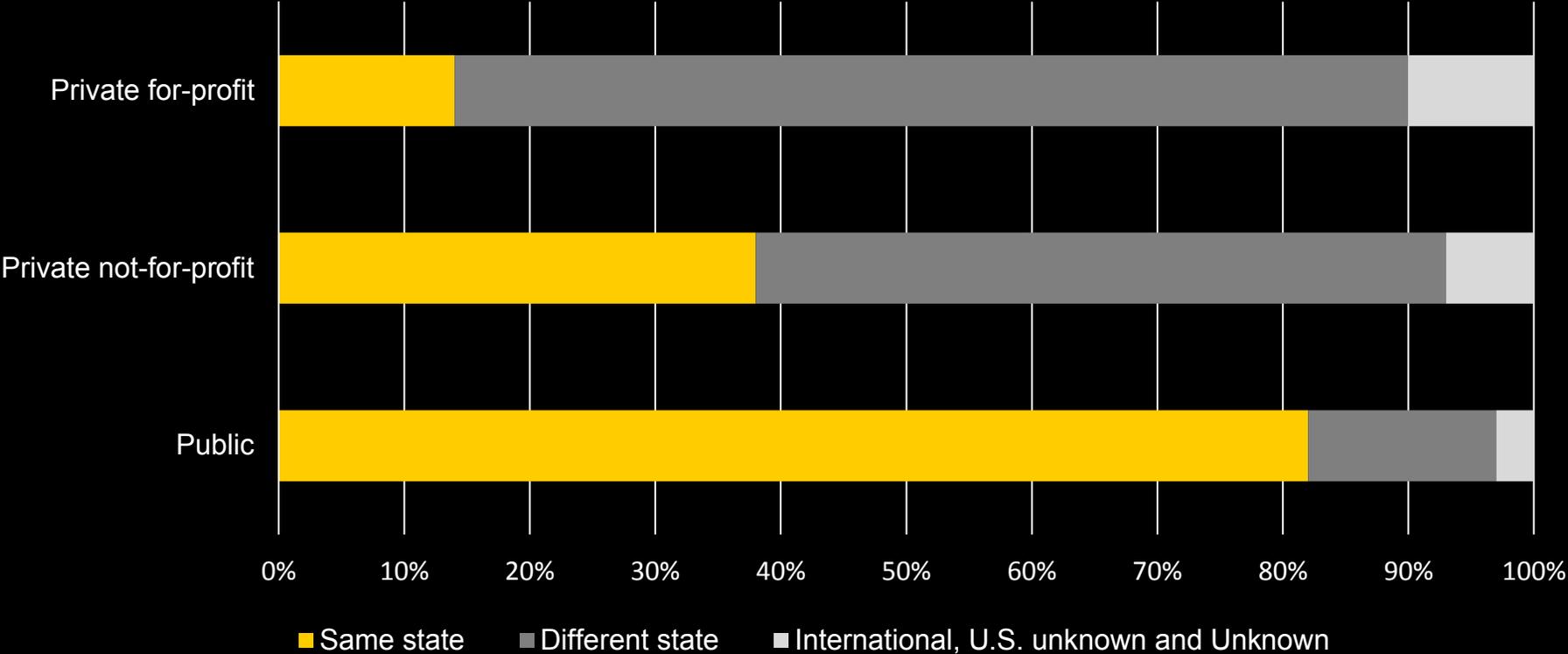
National Trends in Online Learning

More than **one in four students (28%)** now take at least one distance education course (a total of 5.8 million, a year-to-year increase of 217,275).

Public institutions command the largest portion of distance education students, with **72.7% of all undergraduate** and **38.7% of all graduate online learners.**

Public Universities Are Serving Their States

Locations of Students Enrolled Exclusively in Distance Education Courses



Source: 2015 Online Report Card: Tracking Online Education in the United States

Online Education Comparison

	UCF	Arizona State University	University of Florida	University of Miami	Florida International University
Undergraduate Programs	18	60	15	1	20
Graduate Programs	25	45	34	15	19
Undergraduate Credit Hour Costs	\$179 in-state \$327 out-of-state	\$490 to \$553 per credit hour*	\$129 in-state \$552 out-of-state	\$675 per credit hour*	\$216 in-state \$333 out-of-state
Graduate Credit Hour Costs	\$327 to \$1300 per credit hour*	\$492 to \$852 per credit hour*	\$528 in-state \$1253 out-of-state	\$1295 to \$1850 per credit hour*	\$500 in-state \$1500 out-of-state

* No difference in tuition for out-of-state students

Sources: Educational institutions' websites advertising online degree programs

Orlando *Is* An Asset

The **fastest-growing** of the country's 30 largest regions
- U.S. Census Bureau, 2016

Ranked **No. 4** among best U.S. cities for future job growth -
Forbes, 2015

“Best Cities for Innovation” - *Fast Company*



Transfer to UCF, declare a major, raise a hand in class, turn a passion into a career plan, ace the final exam, walk across the stage, make the parents proud, polish the résumé, nail the interview, pick up the check, open a 401k, buy a new car, score the corner office, start a bucket list, sign a mortgage, dream bigger, take the leap and **make it happen.**



Awarding for UCF's Best & Bright Award Best College 2015 gives more students transfer to the University of Central Florida than any other institution in the nation. Find out how scores to UCF transfer from a different website at ucf.edu/impact



Choose the Rosen College of Hospitality Management, discover a passion for making people smile, partner with internationally-renowned faculty, score a life-changing internship, impress the world's travelers, collaborate with industry leaders, orchestrate a seven-course meal, pull off a party for a thousand, walk across the stage, send résumés to six continents, score the dream job, dive into a new culture and **run your own show.**

Orlando is one of the most popular tourist destinations in the country – and UCF's Rosen College of Hospitality Management is right in the heart of it. Earned one of the top five hospitality programs in the world according to ENR/VAZ/MapInfo, our innovative undergraduate and graduate degrees will take your career to the next level. hospitality.ucf.edu





