# College of Engineering and Computer Science (CECS)



College of Engineering and Computer Science

**Dean's Presentation** 

**CECS ACCOMPLISHMENTS** 

UNIVERSITY OF CENTRAL FLORIDA

## **Prologue -** Purpose and Content

- The *purpose of this presentation* is *twofold*:
  - **Purpose 1:** Highlight the **College's Accomplishments**
  - **Purpose 2:** Carve a **Path Forward** for the College relying on its past accomplishments, current strengths and projected strengths
- The *content of this presentation* is split into *three distinct sections:* 
  - Section A: Provide a quick snapshot of the current state of the College within the context of UCF's Strategic Plan (STATE OF CECS)
  - Section B: Provide select College's accomplishments (last 5 years) within the context of CECS's strategic plan, that has five goals, all within the context that we serve a diverse student population:
    - G1: Create a Better, Bigger Research Enterprise (RESEARCH ENTERPRISE)
    - G2: Enhance the Quality and Quantity of Graduate Studies (GRADUATE ENTERPRISE)
    - G3: Grow and Develop Faculty (FACULTY GROWTH)
    - G4: Enhance the Undergraduate Experiences (UNDERGRADUATE ENTERPRISE)
    - G5L Become the Nation's Technology Partner Leader (PARTNERSHIPS)
  - Section C: Provide a roadmap for CECS Moving Forward (CECS FUTURE)



## **Prologue –** Take-Aways

- I would hope that the presentation leaves you with the following important take-aways:
  - **Take-Away 1:** The College's student population (UG, G) has grown over the last 5 years. There is less emphasis on growing the population (especially UG population) than ever before. An interest of growing the graduate student population and changing the mix (instate, out-of-state) is the likeliest path forward.
  - **Take-Away 2:** There have been significant efforts by a good number of faculty, with staff support, to support clusters of excellence in research (FCIs, others). These clusters have reached a level of maturity and some sustained excellence. We would want to preserve the excellence of clusters and support new groups/initiatives of future excellence (SIP (Strategic Investment Program) Initiatives, OE (Operational Excellence) Initiatives).
  - Take-Away 3: There have been significant efforts by students, supported by faculty and staff, to create pockets of excellence driven by a particular passion that they have within their discipline. These pockets have demonstrated sustained excellence (e.g., eli^2, EXCEL, UCF Programming, C3 Team, others). We would want to preserve these pockets and create an environment for the creation of new pockets of excellence.
  - **Take-Away 4:** There have been significant efforts by faculty and staff to pursue educational innovations. These innovations have shown success. We want to expand these innovations and pursue new ideas for educational excellence.
  - **Take-Away 5:** All clusters, pockets of excellence, articulated in this presentation, rely for their success in collaborations that cross disciplinary barriers. It is reassuring to know that these successes will spur new interdisciplinary collaborations.



## **Prologue –** Take-Aways

- I would hope that the presentation leaves you with the following important take-aways:
  - Take- Away 6: All clusters, pockets of excellence, articulated in this presentation, require the collective wisdom, innovation and hard work of many individuals. The few slides that delineate their accomplishments does not do them justice.
  - Take-Away 7: The College and UCF find themselves at the beginning of a significant
    institutional transformation because of the high infusion of new blood (SIP hires, OE hires).
    I trust that we will all help our junior faculty grow. I also trust that we will give them the
    opportunity to lead us in new directions with their research and educational innovations.
  - **Take-Away 8:** The College's hired a good number of junior faculty in the previously strong hiring cycles (2015-2018). Now the college is poised again to hire a good number of junior faculty due to new UCF investments (SIP hires, OE hires). The predominance of new faculty in our ranks is a strength that can lead us to new heights of excellence never aspired before. We should embrace this strength.
  - **Take-Away 9:** The roadmap for the future of CECS is not carved in stone. What is shown in this presentation is one possible future with many different facets. I anticipate that five years from now the future will be different by the many opportunities/challenges that our faculty, students and staff must embrace/navigate through to create a better future for CECS and UCF students.
  - Take-Away 10: A good number of excellent accomplishments are reported in this
    presentation. Nevertheless, several challenges remain. An important challenge is the new
    enterprise system and the staff reorganization. Another one is to embrace the
    interdisciplinary opportunities that SIP, and OE are affording us and create, expand our
    research strengths and the associated educational benefits. These challenges, and others
    not mentioned, are challenges that I am confident a lot of us would want to tackle within
    our realm of expertise and associated efforts.



## Acknowledgements

- This presentation is a result of *feedback and slides provided by various CECS*, UCF stakeholders (faculty, staff, others) and I want, from the outset, to thank them for their contributions.
- This presentation does not comprehensively reflect all the individual and collective accomplishments of the College. Some choices needed to be made of what should be included and what not, and I take full responsibility for these choices.
- It is evident in this presentation *how big of a role our partners in industry and government and other individuals have played* in the current successes of CECS. This includes the chair of the Dean's Advisory Board, members of the Dean's Advisory Board as well as many individuals, UCF alumni and others, that the CECS Development Office has interacted with throughout the years.
- It is not always evident in this presentation how important for the College's success are the contributions of CECS's dedicated staff members. It is important from the outset to thank them for their contributions, contributions that require leadership and hard work.
- One can argue that the *last five years have been exceptionally challenging*. For one *COVID happened*. This deck of slides is an *Accomplishments* deck, and the challenges are almost always implicit in the narratives. The collective of people, within CECS and outside CECS, who helped in driving forward the College's mission know about these challenges. I owe all of you a big thank you for the many accomplishments, and a *21-22 that has been a record year* for many educational and research accomplishments.



## Outline

- CECS at a Glance
- CECS Vision, Mission, Goals
- Teaching Enterprise (Enrollments, Diversity, Quality; Degree Productivity, Trends, Employability; UTA-ULA Program)
- Pockets of Excellence, Initiatives (Honors College, Engineering Leadership and Innovation Institute (eli2); EXCEL; UCF Programming; Collegiate Cyber Competition Team (C3); Limbitless Solutions; NSF Computer Vision REU; Collegiate Work Experiences Program (CWEP); Diversity Efforts/Office of Diversity and Inclusion (ODI) in CECS)
- Research, Graduate Enterprise (Research Funding Productivity; Scholarly Productivity; Technology Transfer; Graduate Programs, Enrollments, Degrees; USNews Graduate School Rankings; Notable Research Facts; CECS Strengths, Current; CECS Strengths, Future)
- Resources Brought (BOG, FCI Hires, Traditional Hires, SIP Hires, OE Hires, Other Support)
- Special Initiatives (Philanthropy, UTVS, CECS Virtual Seminar Series, NAC, ASEMFL)
- Resources (Past, Near Future)
- Path Forward (Research and Education Enterprise, Education Enterprise, Special Initiatives, Collaborations, State-National Visibility)



#### **CECS at a Glance**





**CECS:** Brief Facts

- The College houses 6 Departments
  - Civil, Environmental and Construction (CECE)
  - Computer Science (CS)
  - Electrical and Computer Engineering (ECE)
  - Industrial Engineering and Management Systems (IEMS)
  - Mechanical and Aerospace Engineering (MAE)
  - Materials Science and Engineering (MSE)
- There are two affiliate ROTC units, Army and Air Force
- The College has three buildings
  - Engineering 1 (130,000 sq. feet),
  - Engineering 2 (105,000 sq. feet) and
  - L3Harris Engineering Center (113,000 sq. feet))
- The College currently has over 11,000+ undergraduates and 2,000+ graduates; total 13,000+ students
- The College has awarded (up to Summer 2022) 47,000+ degrees (47,332 degrees)
  - 35,065 BS degrees; first degrees 1974-1975 (55 degrees); **35,000+ degrees**
  - 10,266 Masters degrees; first degrees 1974-1975 (15 degrees); 10,000<sup>th</sup> degree Spring 2022; 10,000+ degrees
  - 2,001 Ph.D.'s; first degree 1980-1981 (1 degree, CS); 2,000<sup>th</sup> degree Summer 2022; 2,000+ degrees



#### **CECS** Vision, Mission, Goals



## **CECS, Vision, Mission**

#### **CECS Vision:**

Our vision is to be among the *nation's top producers of engineering and computer science workforce talent* in terms of scale and excellence, and to lead the next generation of engineers and computer scientists in *advancing research and education that impacts the global society*.

#### **CECS Mission:**

The mission of the College of Engineering and Computer Science is to:

- Provide high-quality, broad-based education, and experiential learning in engineering and computer science
- Create knowledge through pioneering scholarship and impactful research
- Enrich our students' development and leadership skills
- Aggressively leverage technology to enhance educational efficiency and quality
- Nurture the inherent innovation and leadership of our students
- Address pressing local, state, national, and international issues in support of the global community.



## **CECS Focus and Goals (G1- G5)**



All goals are interrelated All goals are influenced by Goal 5 (G5), the partnership goal



#### **Teaching Enterprise** Enrollments, Diversity, Quality



Note 1: CECS serves a diverse student population Note 2: CECS's teaching mission is big

#### **CECS 2022 Enrollments**

2022 Numbers: 11,539 UGs, 2,005 Gs (1,340 MS, 650 Ph.D.'s), 13,544 TOTAL

Minorities UGs: 4,700 (43.03%) Female UGs: 2,381 (20.63%) International UGs: 576 (4.99%)

Minorities Gs: 520 (**38.43%**) Female Gs: 496 (**24.74%**) International Gs: 635 (31.67%)

Fall 2022 Numbers: UGs up by 228, Gs up by 19 (compared to Fall 2021)

Fall 2022 Honors: 503 students, SAT, ACT, GPA 1,473, 32.6, 4.52

Fall 2022 Honors: 46% of 503 students (232 students) are CECS; SAT, ACT, 1,472, 32.9

Fall 2022 Honors: 79 National Merit Scholars; 33 of them (41.77%) are CECS students

Fall 2022 Honors: 164 Provost Scholars; 87 of them (53.05%) are CECS students

2022-2023 Honors, Totals: 2,379 Burnet Honors Scholars; 938 (39.4%) are CECS scholars



#### Teaching Enterprise Degree Productivity, Trends, Employability



#### **CECS** Degrees

Note: CECS is fulfilling its vision of being a top producer of engineering & computer science talent

Degrees	UG	MS	Ph.D.'s	Total
21-22	2,094	449	149	2,692
20-21	1,927	423	134	2,484
19-20	1,688	442	129	2,259
18-19	1,533	390	108	2,030
17-18	1,381	401	100	1,882
16-17	1,357	322	81	1,760
15-16	1,356	388	89	1,833
14-15	1,240	329	77	1,646
13-14	1,068	384	83	1,535
12-13	1,002	346	68	1,416

The *number of undergraduate degrees* have been increasing consistently or staying stable The *number of MS degrees* have been fluctuating in the low and upper 300's influenced by the graduation dates of 2-year professional Masters programs in CECS; last five years the degrees are in the 400-range The *number of Ph.D. degrees*, in the last five years, are inching up, consistently

#### CECS Degrees

Note: CECS's graduates find jobs, a strong testament of the quality of the college's graduates

	Degrees	UG	MS	Ph.D.'s	Total	Carl and
7 7 9	21-22	2,094	449	149	2,692	
	20-21	1927	423	134	2,484	
1 80	19-20	1688	442	129	2,259	1 <sup>2</sup>
	18-19	1533	390	108	2,030	

**Of the 18-19 UCF Graduates (2,030), ~1,150 stay in Florida** (1533 BS, 390 MS, 108 Ph.D.'s)

- BS employed 88.1%, 66%.1 stayed in Florida, 893 students
- MS employed 90.5%, 55.2% stayed in Florida, 195 students
- Ph.D employed 92.7%, 52.7% stayed in Florida, 53 students
   According to Aviation Week (Fall 2020)
- UCF is ranked as the No. 1 workforce talent provider to the Aerospace and Defense industry
- UCF is ranked No. 2 in the quality of the talent provided to the <sup>16</sup> Aerospace and Defense industry



CECS FACI

Note: CECS is fulfilling its vision of being a top producer of engineering & computer science talent

UCF

## 2021 ASEE Data (20-21 Data; UG Degrees)

TD: Total Degrees; M: Minority Degrees; W: Degrees to Women; R: Rank nationally



#### **UTA-ULA Program** Undergraduate Teaching and Learning Assistants Program



## **CECS UTA-ULA Program**

- Framed in Fall 2020 with CARES Act/HEERF funding, the UTA-ULA program selects and assigns highly accomplished current CECS undergraduate students as assistants to selected CECS undergraduate courses
- Responsibilities:
  - UTAs grade (10hrs/week)
  - ULAs provide target instruction/recitation support both in an out of the classroom (10hrs/week)
- About 300 applications and about 120 selected per academic term
- All students FERPA trained and ethics trained; all ULAs undergo mandatory Learning Assist training (5 to 6 one-hour discussions)



FERPA Family Educational Rights & Privacy Act

G4: Enhance the Undergraduate Experience

UTA-ULA addresses Goal G4

HEERF III Higher Education mergency Relie<u>f Fun</u>



## **CECS UTA-ULA Program**

 Program will continue with nearly \$400K of recurring funding!!!

**Operational Excellence (OE) Funds** 

- Measures of success:
  - DFW rates
  - Feedback from faculty
  - Feedback from students in courses
- Exploring uniformity with other colleges (Optics and Photonics, College of Medicine (Burnett School of Biomedical Sciences), College of Sciences



Do you want to make a difference in the classroom? UCF's College of Engineering and Computer Science (CECS), College of Science (COS), College of Medicine (COM), and College of Optics and Photonics (CRECU) seek outstanding undergraduate students to provide instructional support for select undergraduate courses. If you qualify, you may serve as either an undergraduate teaching assistant or an undergraduate learning assistant during the upcoming fall 2020 and spring 2021 semesters. You can fulfill several roles, depending on the nature of the course or lab to which you are assigned. The position is paid and offers great opportunity for professional development.



#### Going forward, UTAs and ULAs will be assigned to courses for maximum impact

- High DFW rate courses (10% or higher)
- High enrollment courses (i.e., greater than 100 enrollees)
- Critical path courses
- 3000-level courses

Example:

EGN 3365 (~11-27%DFW; ~300-396 students)

Thee UTAs assigned Fall 2022



#### **Pockets of Excellence, Initiatives** Honors College



G4: Enhance the Undergraduate Experience

#### The Burnett Honors College: 2022-2023 at a Glance





Updated October 2022

## Fall 2022 Honors Cohort

College_Name	College of 🖵	gineer	ing and Com
Count of EmplID	Column L 🔻		
Row Labels 🗸	Female	Male	Grand Total
Asian or Pacific Islander	16	26	42
Black or African American		2	2
Hispanic or Latino	8	38	46
Multi-racial	6	8	14
Not Specified	2	6	8
White (not of Hispanic origin)	25	95	120
Grand Total	57	175	232

College_Name		College of Eng 🖵
Row Labels	Ŧ	Count of EmplID
Aerospace Engineering Pending		39
Civil Engineering Pending		8
Computer Engineering Pending		16
Computer Science (BS)		88
Electrical Engineering Pending		14
Environmental Engineering Pending		5
Industrial Engineering Pending		3
Information Technology (BS)		1
Materials Science and Engineering Pendin	g	3
Mechanical Engineering Pending		45
Undecided Engineering		10
Grand Total		232

Row Labels	Count of EmpliD	Count of EmplID2	Average of Max_ACT	Average of Max_RSAT
College of Arts and Humanities	26	5.2%	31.8	1484.7
College of Business Administration	26	5.2%	32.2	1442.3
College of Community Innovation and Education	n 6	1.2%	32.0	1474.0
College of Engineering and Computer Science	232	46.1%	32.9	1471.8
College of Health Professions and Sciences	30	6.0%	30.7	1460.0
College of Hospitality Management	7	1.4%	32.8	1416.7
College of Medicine	89	17.7%	33.4	1490.5
College of Nursing	2	0.4%	32.0	1510.0
College of Optics and Photonics	3	0.6%	32.0	1465.0
College of Sciences	74	14.7%	32.2	1466.0
College of Undergraduate Studies	3	0.6%		1473.3
College Undecided	5	1.0%	31.3	1485.0
Grand Total	503	100.0%	32.6	1472.5



#### **Pockets of Excellence, Initiatives** Engineering, Leadership, Innovation, Institute (eli^2)



## Lifelong Engagement.

## Our Students Participate in a Set of Meaningful Experiences



#### The Undergraduate "All Get Some, Some Get All" Program is Intentional on the Impact



	1,000s	1)	L3Harris Gathering Lab	5) 6)	Inspire Students to Join the Engineering Journey (EGS 1006 presentation) Inspire Students to Join the Own their Academic Journey & Provide a Roadmap (EGS 1007 presentation)			10) 11)	Senior Design Boot Camp Maker Spaces
Number of Students Engaged in the Program Element	100s					7) 8) 9)	NAE Grand Challenges Competition (in EGS 3030) Google Sprint Competition (in EGS 3031) Leaders Up Close Seminar Series (EGS 3030/3031)	12) 13) 14)	Engineering Leadership & Innovation (EGS 4624) Professional Development Workshops Development Circles
	10s	2) 3) 4)	Hope & Proud Breakfast Freshman Social eli <sup>2</sup> Interns and Student Committee					15) 16) 17) 18)	Engineering Leadership Minor/Certificate Engineering Leadership Capstone (EGS 4950) Engineering Entrepreneurship (EGS 4641) eli2 Interns and Student Committee
			Build Community		Enhance Awareness	E	nhance Understanding		Enhance Capability
		Intent of the Experience							

#### We Deliver the "All Get Some, Some Get All" Integrated Program Across Four Years Supported by the Maker Spaces



#### We Deliver the "All Get Some, Some Get All" Integrated Program Across Four Years Supported by the Maker Spaces



#### Maker Spaces: What We Want to See and Hear





#### LM Cyber Innovations Lab



LM Cyber Innovations Lab is financially supported by Lockheed Martin (LM) The support reflected the LM interest in the Hack@UCF Club (~300 members) The support reflected the LM interest in the successes of the Collegiate Competition Cyber (C3) Team A cyber committee (students (C3), C3 advisor, faculty, LM) meet regularly to address student needs LM Lab is used for training and gathering of Hack@UCF members, teaching, guest lectures, other purposes



## **Our Partners Make a Difference**



Program	Partners
Undergraduate Create Professional Contributors at UG Level	TEXAS   INSTRUMENTS     INSTRUMENTS     Inielsen     Inielsen     Inielsen     Inielsen     Inielsen
Graduate Create Program/Project Leaders at the Graduate Level	EADY FOR WHAT'S NEXT SIEMENS LOCKHEED MARTIN A NORTHROP GRUMMAN
<b>Executive</b> Enable Organizational Leaders at the Executive Level	Image: Supply     Image: Sup

# **Pockets of Excellence, Initiatives**The EXCEL Program at UCF

## The EXCEL Program at UCF Program Specifics

- The EXCEL program started in 2006 through an NSF STEP grant (\$1.8M, 5-Year Grant)
- The EXCEL program is *interdisciplinary* and involves all STEM Colleges (*CECS, COS, COM, COP*)
- The EXCEL program:
  - Recruits 300 freshmen STEM students
  - Offers to these students enhanced educational experiences in freshmen and sophomore years to increase their success
- EXCEL's enhanced educational experiences include:
  - Careful monitoring of students' performance in math and science courses; intervention, as needed
  - Connect with faculty, students, staff, STEM role models to enhance student engagement
  - Free tutoring services at the EXCEL Center
  - Sophomore undergraduate research experiences
  - Creating an overarching learning community (EXCEL)

G4: Enhance the Undergraduate Experience

EXCEL addresses Goal G4



#### EXCEL impacts 1<sup>st</sup> Year Retention, 4<sup>th</sup> and 6<sup>th</sup> Year Graduation

Note: EXCEL serves a diverse student population

#### The EXCEL Program at UCF Program Outcomes

Measure	<b>EXCEL</b>	Control	Diff.	Improve			
Avg. Total Ret + Grad (06-21)	60%	45%	15%	33%			
Avg. Male Ret + Grad (06-21)	63%	48%	14%	29%			
Avg. Female Ret + Grad (06-21)	56%	41%	15%	37%			
Avg. AA Ret + Grad (06-21)	56%	43%	13%	30%			
Hispanic Ret + Grad (06-21)	63%	50%	13%	26%			
Avg. Graduation 06-16 Cohorts	55%	37%	18%	49%			
EXCEL has impacted 5,000+ students (17 cohorts) EXCEL improves STEM graduation by 49% EXCEL improves retention of diverse groups							
G4: Enhance the Undergraduate	EXCEL addr	esses Goal G4	Last 5-Year • 35% H • 10% A • 43% V	EXCEL Cohorts ispanics A Vomen			



UCF

EXCEL impacts 1<sup>st</sup> Year Retention, 4<sup>th</sup> and 6<sup>th</sup> Year Graduation
# **Pockets of Excellence, Initiatives**The UCF Programming Team



# UCF Programming Team

#### **UCF Programming Team Accomplishments:**

- Has been in *existence* for more than 30 years
- UCF has won the Southeast Regional (SE) Programming Competition 60% of the time. In 2022 SE Regionals UCF L teams placed: 1, 2, 5, 9, 12, 13, 15.
- UCF *advanced to the World Finals* **11** *times in a row* (0.1% of the teams in the world advance to the World Finals).
- In the 2017, 2018 World Programming Finals, UCF came 13<sup>th</sup> in the world (1<sup>st</sup> in the US), 10<sup>th</sup> in the world (1<sup>st</sup> in North America), respectively.
- UCF ranked 3<sup>rd</sup> in North America at the 2020 World Programming Finals, 17<sup>th</sup> in the World.
- UCF has been the host of the NAC (North America Competition) events in 2021 and 2022; 50 of the best NA programming teams compete at NAC for a spot in the World Finals.
- UCF ranked 6<sup>th</sup> in North America at the 2021 World Programming Finals, 30<sup>th</sup> in the World.



#### G4: Enhance

the Undergraduate Experience

UCF Programming addresses G4

Impacts Foundation Attainment, National Visibility, Quality of Students



### **Pockets of Excellence, Initiatives** College Cyber-Security Competition (C3) Team



### UCF's Collegiate Cyber Competition (C3) Team



#### UCF Collegiate Cybersecurity Competition Team (C3) Team

- Was founded in 2013
- Has won their Regional (Southeast or at large) Collegiate Cyber Defense Competition 9 out of the 10 times that it competed
- Has won the National Collegiate Cyber Defense Competition three times in arrow, 2014, 2015, 2016, 2021, 2022
- Has ranked 2<sup>nd</sup> in the National Collegiate Cyber Defense Competition three times in a row, 2018, 2019, 2020
- No other team in the US has won as many trophies in the National Collegiate
   Cyber Defense Competition as the C3 team at UCF
   CECS FACT

G4: Enhance the Undergraduate Experience

Cyber Team addresses G4



Impacts Foundation Attainment, National Visibility, Quality of Students

# **Pockets of Excellence, Initiatives**Limbitless Solutions



G4: Enhance the Undergraduate Experience





OUR MISSION:

Providing access for children & adults to bionics & assistive tech that are powerful and expressive.





Empowering students to use their creative design & research skills to change the world.





#### In 2005, an estimated 1.6 million people in the US had a limb difference: 541,000 people had an upper-arm limb difference.

This value was projected to double by 2050.

Adams et al Ziegler-Gr**(11999)** et al (2008)



Cignini et al (2012)

Parker et al (2010)

McGimpsey et al (2010)

Wright et al (1995)













The partnership with <u>OREGON HEALTH AND SCIENCE UNIVERSITY</u> on Limbitless' first clinical trial concluded as of September 2022. The OHSU and Limbitless teams completed year three of the planned one-year clinical trial and continued to support the families via telehealth throughout the pandemic. Data analysis is underway for future publication.



Limbitless Solutions expanded to a 5,000+ square foot facility in the Central Florida Research Park in September 2021. The new facility triples our space with a dedicated manufacturing area, enlarged K-12 outreach section and enhanced student collaboration zone. New equipment arrived in 2022, including a larger CNC machine for injection molding creation. The student program expanded, now averaging 45+ students per semester.



#### Manufacturing

- Fused Deposition Modelling 3D printers
  - Six machines (ABS and support material)
    - Build volume: 254 x 254 x 305 mm
  - Two soluble support removal tanks
- Laser cutter with HEPA filter
  - Class IV CO2 45-watt Laser in Class 1 enclosure
  - o Build volume: 515 x 455 x 50 mm
- Vacuum Thermoforming machine

   Build area: 230 x 280mm
- 5 axis CNC mill
  - Spindle speed: 1,000-50,000 RPM
  - $\circ$  Air cooled
- 3 axis CNC mill (.75 hp)
  - Spindle speed: 10,000 RPM
  - 10" x 6.25" x 10" travel
- 3axis CNC mill (1.5hp)
  - Spindle speed: 10,000 RPM
  - 14" x 7.5" x 13.25"
- CNC lathe
  - $\circ~$  Spindle speed: 180 to 5,000 RPM

- Air compressor for tools and cleaning
- Automotive spray airbrush paint stations
  - $\circ~$  Two five-foot-wide fume hoods
  - $\circ$  2500 cfm exhaust fan
- Electronics Assembly & Prototyping
  - SMT Automated placing computer aided manufacturing
  - $\circ$  Reflow oven
  - $\circ~$  Two soldering stations
- Wireless electromyography testing station





Summer 2022 Student Participation



#### **Cumulative Student Participation**



**Total Semester Applications** 



#### FY 2022 Participation by Gender



#### Awards & Recognition

- Orlando Business Journal: Inno Fire Awards (Top award in category)
- Florida Sterling Manufacturing Business Excellence Award: 2022 Finalist
- Public Interest Registry: Health & Healing global non-profit of the year (Top award in category)

#### **Collaborative Video Production Features**

- Amazon Prime Video "The College Tour": <u>UCF special segment</u>
- "Project Lead The Way" Alumni Spotlight: <u>Program Overview</u> and <u>UCF</u> <u>Student Feature</u>
- Visit Orlando & Orlando Economic Partnership: National campaign for <u>"Unbelievably Real"</u>
- PIR .ORG Awards: <u>Health & Healing Category Winner</u>
- Microsoft's 343 Studios: <u>Halo Infinite x Limbitless Solutions arm</u> <u>announcement</u>
- WKMG/News 6: Florida's Fourth Estate Explores Limbitless Solutions



# **2022 FINALISTS**

### ORLANDO Business Journal



# **Pockets of Excellence, Initiatives**NSF Computer Vision REU at UCF



G4: Enhance the Undergraduate Experience

### CRCV's 35-Year NSF REU

CRCV's NSF REU, Longest Running REU in the Nation

**NSF REU addresses Goal G4** 

REU is an NSF funded program that supports STEM undergraduates' summer research experiences and aims to attract talented undergraduates into research careers.

In its 35th year, UCF has the longest running REU in the nation and is led by Mubarak Shah and Co-PI Niels Lobo with computer vision as its intellectual focus.

Mubarak Shah leads the Center for Research in Computer Vision, housed in CECS



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In CRCV's REU, students are given access to lab facilities, interact with faculty and graduate students, participate in workshops and special presentations, and work on a specific project that often leads to a published article. In the Summer 2022 program, however, students conducted the program 100% virtually due to the COVID-19 pandemic. This included social events, graduate school workshop and a poster session where I addressed the students and presented them certificates of accomplishment.

Details can be found at <a href="https://www.crcv.ucf.edu/nsf-projects/reu/reu-2022/">https://www.crcv.ucf.edu/nsf-projects/reu/reu-2022/</a>

Our REU model is described in this CACM (Communication of ACM) article.

**Excellence begets Scale:** CRCV's NSF REU sustained excellence for 35 years in a row has impacted the professional pathways of approximately 350 students





/iewpoints

#### G4: Enhance the Undergraduate Experience

## CRCV's 35-Year NSF REU

CRCV, through NSF's REU, has already supported summer research experiences of more than 340 students from 112 different schools all over the U.S. In the last 5 years, 19 of these students were UCF students. During this time, REU participants have more than 90+ publications.

Some notable REU successes:

- > Robert Franceschini, 89-90 REU student, completed his Ph.D. in 1999 and is now a Fellow at SAIC
- > Jim Davis, a 93-94 REU student, went to MIT to earn his Ph.D., he is now a CS professor at MIT
- > Paul Smith, 2001 REU student, received UCF's first ever Barry Goldwater award for his REU project
- > Tamara Berg, 07-08 REU student, earned her Ph.D. from UC Berkeley, she is now an Associate Profe
- Cody Seibert's, 2012 REU student, publication on "Multi-Source Multi-Scale Counting in Extremely Dense Crowd Images Conference" is the highest cited REU publication with 891 citations.

**NSF REU addresses Goal G4** 

- > Arjun Watane, 2014 REU student, received the Order of the Pegasus award from UCF
- Irene Tanner, 2018 REU student, received Honors Undergraduate Thesis Scholarship and NSF Fellowship
- > Ngoc Ta, 2019 REU student, is currently a research intern at Sandia National Laboratories
- > Aaron Ott, 2019 REU student, received his M.S. from NC State, he is now an Engineer at Aurora Flight Sciences
- Jenna Bates, 2020 REU student, is a research intern at Microsoft

UCF celebrated the 30 year NSF REU in Summer of 2017. Among the invited presenters were Shree Nayar, Columbia University, an NAE, and Moshe Vardi, Rice University, NAE and NAS

CRCV's 35-year running NSF REU program provides national visibility to CECS, UCF as the program reaches out to students and peers (chairs, deans, others) to market its appeal and recruit a summer's REU crop

CRCV's alumni base provide an excellent opportunity for CECS to further engage them in the affairs of the College, especially ongoing CRCV's NSF REU efforts

# **Excellence begets Scale:** CRCV's NSF REU sustained excellence for 35 years in a row has impacted the professional pathways of approximately 350 students





ation's Longest-Running NSF Research Experience for Undergraduates Site

#### Opening Doors to the Nation's Brightest Undergraduate Research



### **Pockets of Excellence, Initiatives** Collegiate Work Experiences Program (CWEP)



### Lockheed Martin College Work Experience Program (CWEP)



### Lockheed Martin College Work Experience Program

- The Lockheed Martin College Work Experience Program (CWEP) has been a successful collaboration between UCF and LM since 1981.
- CWEP is one of the most successful student work experience programs in the nation.
- The program is offering students real world experience at two locations in Orlando, Florida.



# Lockheed Martin College Work Experience Program

- Over 2,500 student headcount since 2009
- Millions of \$\$'s invested since 1988
- Stakeholders:
  - UCF Students
  - UCF Career Services
  - UCF College of Engineering and Computer Science
  - UCF Office of Research
  - Lockheed Martin



# **CWEP** is Different than an Internship

- CWEP is a contractual arrangement between UCF and Lockheed Martin (LM) that offers students relevant, real-world work experience.
- While in the program students maintain full-time enrollment with the UCF. CWEP differs from Internships or Co-op in that it is not for academic credits.
- Participation in CWEP is not tied to the academic calendar.
- Students may enter the program at any time during the semester.
- CWEP is open to all majors, but participants are primarily from the College of Engineering and Computer Science, and the College of Business.
- Career Services administers the program, student apply to specific opportunities within the company, and LM managers interview and select candidates.
- Students must be able to commit to at least two full consecutive semesters, but they may stay in the program longer.



# Lockheed Martin College Work Experience Program Impact

- More hires from UCF than any other university
- UCF First Destination Survey (FDS) data says:
  - Lockheed Martin is the #1 employer for CECS and COB grads
  - Lockheed Martin is the # 4 employer for all UCF majors
- Student pay range: \$11.22 to \$24.07 per hour
- Average salary of students leaving CWEP: **\$59,357**
- 2018/2019 FDS average salary for graduating UCF students: **\$45,560**



### Lockheed Martin College Work Experience Program (CWEP) ROI

Students	UCF	Lockheed Martin
<ul> <li>Relevant Experience</li> <li>Skills &amp; Competencies</li> <li>Networking Opportunities</li> <li>Increased Employability Potential and Competitive wages</li> </ul>	<ul> <li>Collective Impact: Significant Revenue</li> <li>Pre-Eminence Metric: Research Credit</li> <li>Collective Impact: Student Transformational Experience</li> <li>PFB Metrics: Employability (#1), Average Salary (#2)</li> </ul>	<ul> <li>Creates a talent pipeline</li> <li>Helps LM with their Project Efforts</li> <li>Brands LM name on UCF campus, a HIS</li> <li>Sustained, long- term partnership with UCF</li> <li>Top notch student employees that do not impact headcount limits</li> </ul>



# Lockheed Martin College Work Experience Program (CWEP) ROI





# **Pockets of Excellence, Initiatives**Diversity Efforts



#### These efforts address the overarching diversity goal of CECS's Strategic Plan (SP)

### Pockets of Excellence, Initiatives





### **Office of Diversity Initiatives (ODI) IGNITE events**

#### IGNITE (On-Campus)

IGNITE (Impact, Grow, Network, Innovate, Translate and Educate) offers students information and recruiting sessions with the world's leading industries in engineering and computer science.

#### **Essential Information:**

Program Initiation: Fall 2014 Number of Sessions: 12-24 Annual Participants: Over 2,000 COVID-19 Response: Fall 2020 IGNITE sessions were held virtually via Zoom



## Research, Graduate Enterprise



G1: Create Better, Bigger Research Enterprise G2: Increase the Quality and Quantity of the Graduate Enterprise

G5: Become Nation's Technology Partner Leader

#### Research Awards – 3 Year Average



**3-YEAR AVERAGE of CECS RESEARCH AWARDS** 

CECS RESEARCH AWARDS in Millions



**Increase in Awards in 10 years:** From \$22.89M to \$54.4M Change \$31.51M (137.7% up)

**Highest Funding ever in CECS:** FY 22; **\$54.4** 

**Best performances:** FY18, FY19, FY20, FY22

Awards of T/TE faculty in CECS from OR reports



G1: Create Better, Bigger Research Enterprise G2: Increase the Quality and Quantity of the Graduate Enterprise

G5: Become Nation's Technology Partner Leader

#### **Research Awards Per Faculty**



#### PER FACULTY AWARDS

Increase in Awards per faculty in 10 years: From \$189.2K to \$323.8M Change \$134.6K (71.1% up)

Increase in Faculty in 10 years: 121 to 168 Change 47 (39% up)

Highest per faculty Funding ever in CECS: FY 22; \$323.8K

**Best performances:** FY18, FY19, FY20, FY22



G2: Increase the Quality and Quantity of the Graduate Enterprise G5: Become Nation's Technology Partner Leader

#### Research Expenditures – 3 Year Average

3-YEAR AVERAGE of CECS RESEARCH EXPENDITURES



#### CECS RESEARCH EXPENDITURES in Millions



Increase in Expenditures in 10 years: From \$20.37M to \$41.07M Change \$20.7M (101.6% up)

Highest expenditures ever in CECS: FY 22; \$41.07

Best performances: Linear increase



G1: Create Better, Bigger Research Enterprise G2: Increase the Quality and Quantity of the Graduate Enterprise G5: Become Nation's Technology Partner Leader

#### **Research Faculty Expenditures**



PER FACULTY EXPENDITURES

Increase in Expenditures Per Faculty in 10 years: From \$168.3K to \$244.5K Change \$76K (45.2% up)

Increase in Faculty in 10 years: 121 to 168 Change 47 (39% up)

Highest Expenditures per Faculty ever in CECS: FY 22; \$244.5K

**Best performances:** FY19, FY20, FY22



## Research, Graduate Enterprise

Scholarly Productivity



G1: Create Better, Bigger Research Enterprise G2: Create Better, Bigger Graduate Enterprise

### Research, Graduate Enterprise

#### Scholarly Productivity



- CECS produces annually an average of approximately 8+ pubs per T/TE faculty
- According to 2021 ARWU, UCF is ranked 6 in the US in the area of Transportation Science and Technology
- According to cs.rankings.org, UCF is ranked: 8 (Visualization), 11 (Computer Vision), 11 (Comp. Biology and Bioinformatics), 23 (Computer Architecture), 26 (Human Computer Interaction), 30 (Computer Architecture)



## Research, Graduate Enterprise

Technology Transfer



# Research, Graduate Enterprise

#### Technology Transfer


# **Research, Graduate Enterprise** Graduate Programs, Enrollments, Degrees





### **College of Engineering and Computer Science**

### **CECS Graduate Programs**

#### Graduate Certificate (GC) Programs

- Computer Forensics
- Construction Engineering
- Data Analytics
- Guidance Controls and Dynamics
- Healthcare Systems
  Engineering
- Mixed Reality Engineering
- Project Engineering
- Quality Assurance
- Structural Engineering
- Systems Engineering
- Technologies for Smart Communities
- Transportation Engineering

#### Master's of Science (MS) Degree Programs

- Aerospace Engineering
- Biomedical Engineering
- <u>Civil Engineering</u>
- Computer Engineering
- Computer Vision
- Computer Science
- Cybersecurity and Privacy
- Data Analytics
- Digital Forensics
- Electrical Engineering
- Engineering Management
- Environmental Engineering
- <u>FinTech\*</u>
- Industrial Engineering
- Materials Science and Engineering
- Mechanical Engineering
- Modeling and Simulation\*
- Systems Engineering
- Travel Technology and Analytics

#### Specialty Graduate Programs

- MS in Engineering Management, Professional Project & Systems Engineering Track (a cohortbased program)
- MS in Data Analytics
- Graduate Certificate in Data Analytics
- MS in Healthcare Systems Engineering Track



- Aerospace Engineering
- Big Data Analytics\*
- Biomedical Engineering
- Civil Engineering
- Computer Engineering
- Computer Science
- Electrical Engineering
- Environmental Engineering
- Industrial Engineering
- Materials Science and Engineering
- Mechanical Engineering
- Modeling and Simulation\*



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	Admit Term	Fall Priority	Fall	Spring	Fall
New for Fall 2021,2022 Also offered as fully online	App. Deadline Domestic (International)	January 15 <sup>th</sup> (January 1 <sup>st</sup> )	July 1 <sup>st</sup> (January 1 <sup>st</sup> )	December 1 <sup>st</sup> (July 1 <sup>st</sup> )	April 1 <sup>st</sup>

\*Interdisciplinary program

Earn your degree

at UCF Online.

G1: Create Better, Bigger Research Enterprise

**CECS Grad Affairs addresses Goal G1** 

G2: Increase Quantity, Quality of Graduate Enterprise

**CECS Grad Affairs addresses Goal G2** 

G1: Create Better, Bigger Research Enterprise

### **CECS** Graduate Enrollment/Degrees



The number of MS degrees awarded have been fluctuating in the low 300's to the mid-400's; recent boosts in the enrollment of full-time MS student is expected to increase degree MS degree production. The **number of PhD degrees awarded** in the last four years has consistently increased at the pace of 8% per year; the number is expected to decrease due to fewer international students from China and Iran In 2021-2022 the 149 PhD graduates produced 312 journals, 439 conferences, 5 book chapters for a total of 756 publications, that is 5.07 publications per student

G2: Increase Quantity, Quality of Graduate Enterprise <

**CECS Grad Affairs addresses Goal G2** 

UCF

# Early Action = Application Fee Waiver

- To encourage prospective PhD students to apply early, CECS will again have its <u>CECS Early Action</u> opportunity
- Complete applications received before November 1<sup>st</sup> application deadline will receive an application fee waiver
- Applications that are received early will be reviewed early
- Simply start your application applynow.graduate.ucf.edu/apply/

This and other specific opportunities target current BS-level students for CECS graduate programs



# **Research, Graduate Enterprise** USNews Graduate School Rankings



## 2023 USNews and World Report CECS' Graduate Programs Rankings

Program	A11 R	Public R	Florida R
Aerospace	55	36	3
Civil	69	48	2
Environmental	66	41	3
Electrical	53	30	2
Computer	50	29	2
Industrial	36	26	2
Materials	49	31	2
Mechanical	75	45	2
CS*	69	40	2
CECS	73	43	2

G2: Increase Quantity, Quality of Grad Enterprise

Rankings impacts Goal G2

## **Research, Graduate Enterprise** Notable Research Facts



## Some Notable Facts



- Fact 1: Aviation Week ranked UCF the No.1 provider of workforce talent for Aerospace and Defense (6 years in a row), No. 2 in quality of graduates' technical skills
- Fact 2: CECS received (average last 3 years) \$48M of research awards
- Fact 3: CECS is (in 2021-2022) produced more than 2,500 engineering and computer science degrees

 Fact 4: CECS (in 2021-2022) produced its 10,000 MS degree and its 2,000<sup>th</sup> Ph.D. degree

 Fact 5: CATER faculty brought, in 2021-2022, on average (per faculty), more than \$750k research funding

## Some Notable Facts



- Fact 6: CECS received 7, 4, 7 NSF
  CAREER Awards in 19-20, 20-21, 21-22, respectively
- Fact 7: The RISES center is in the top 3 centers in the nation (according to DOE EERE funding), managing a research portfolio of \$18M

Fact 8: CyberSP faculty received grants, in 2020-2021, exceeding \$500k per faculty

- Fact 9: Transportation Engineering Science and Technology area was ranked No. 6 in the US by ARWU
- Fact 10: CRCV is ranked 11<sup>th</sup> in computer vision nationwide, according to csrankings.org

## **CECS** Strengths



# **CECS** Strengths, Current



# **CECS Strengths, Future**



The *current CECS strengths* were created by prior UCF investments (*FCIs, BOG investment, traditional hires*) The *future CECS strengths* will rely on existing strengths and the investments made by *SIP and OE CECS strengths* are *shared with other colleges/units* that received support from FCIs, traditional hires, SIP, OE The hires shown for SIP-OE initiatives span multiple/colleges units and are approximate numbers



## Special Initiatives Philanthropy



## Special Initiatives Philanthropy



**CECS** Philanthropy Support

CECS *exceeded the IGNITE Campaign goal* (FY10-Y19) by bringing in \$92.290M, a higher amount than the \$85M goal; IGNITE was a 10-year \$500M campaign for UCF that ended in 2019

For the **IGNITE** campaign CECS had **5** corporate donors with **gifts above \$500k**, **10** private donors with gifts **above \$250k** 

**For FY 20-22** (COVID years) CECS had **21** corporate and private donors with gifts above **\$50k**. Philanthropic support for the College **extends well and beyond the monetary support** shown in the graph (e.g., mentoring support for employability circles, senior design, senior design sponsorship, other) Starting with **FY 23** with a new leadership at the Foundation **CECS is expanding its efforts** to bring in more philanthropic support for the College



## **Special Initiatives** UCF Technology Venture Symposium (UTVS)



## UTVS 2021

*UTVS* is a symposium that brings together UCF students, faculty, alumni to an audience of UCF stakeholders, entrepreneurs, innovators, community leaders and investors to showcase hidden gems that have demonstrated or have commercialization potential

Visit

### https://cecs.ucf.edu/utvs

for more information

UCF Technology Ventures Symposium Find Your Hidden Gem in Central Florida

The Central Florida economy is large and increasingly diverse. Thanks to the influence of UCF and the many high-tech innovation-based industries located here, new ideas, innovations and startups are launching daily. These **HIDDEN GEMS** are little known to those outside Orlando, and ripe for potential investment.

#### **BRINGING TOGETHER** COMMUNITY ENTREPRENEURS + UCF STUDENT STARTUPS + FACULTY RESEARCHERS + VENTURE INVESTORS

#### Why You Should Attend

- Connect with UCF Commercialization to learn about licensable new technologies
- Learn the process of opportunity recognition, new venture creation
- Understand the importance of finding industry expertise in building a successful venture
- Expand network of interested investors and successful entrepreneurs
- Discover sources of capital and access to new networks of venture investors

UCF'S NEW

- Find hidden gems of innovation that are enticing to entrepreneurs and venture investors
- Influence the commercial potential of innovative new ideas
- Get instant access to innovative teams that are ready to start investible ventures

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2021

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#### **UCF Tech Ventures Symposium Agenda**

8 a.m.	Logion						
8:05 a.m.	Welcome						
8:15 a.m.	First Keynote by Jacon Eichenholz, Entrepreneur and Co-Founder, Luminar Technologies						
9 a.m.	Hidden Gems in a Special Place: Student Experience (Panel)						
9:45 a.m.	Break						
10 a.m.	Hidden Gems in a Special Place: Research Experience (Seven 10-minute presentations + 084)						
11:10 a.m.	Break						
11.15 a.m.	Hidden Gems in a Special Place: Alumni Experience (Five 10-minute presentations + 08A)						
12:05 p.m.	Break						
12:10 p.m.	Hidden Gems in a Special Place: Investor Experience (Panel)						
12:40 p.m.	Lunch						
1:10 p.m.	Second Keynote by Kevin DiMarzio, VP Business Development, Made in Space						
Tracks A and B a	Tracks A and B are simultaneous virtual breakout rooms						
1:50 - 2:40 p.m	TRACK A	TRACK B					
	I-Corps Blackstone Launchpad	Innovation in Focus: Data Analytics License at UCF					
2:40 p.m.	Break						
2:50 - 3:40 p.m.	TRACK A	TRACK B					
	SBIR/STTR	Innovation in Focus: Optics					
	How to Pitch Your Idea	ULF Incubatory lech Grove					
3:40 p.m.	Break						
3:50 p.m.	TRACK C: Competitive Start	up Pitches #1-6					
5:20 p.m.	Announcement of Track C						
	Winner of \$10K Prize and						
	CROSING REMAINS						
Click to register							
CECS.UCF.EDU/UTVS							
		V					
66	College of	Engineering					
UCF and Computer Science							
UNIVERSITY OF CENTRAL FLORIDA							
Dean's Office							
L3Harris Engineering Center #114							
P.O. Box	162993						
Urlando.	FL 52816-2993	>					

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G5: Become Nation's Technology Partner Leader

# UTVS 2021

### UCF Technology Ventures Symposium (17 FEB 2021)

- Over 300 registrations
- Over 100 people in every session throughout the day (8AM-5:30PM)
- > 2 incredible keynotes
- 7 "Research" Presentations
- > 5 "Alumni" Presentations
- 11 "Faculty" Presentations (Data Analytics and Optics)
- 6 Great Panels
- 8 Pitching Companies
- 1 \$10K Winner



UNIVERSITY OF CENTRAL FLORIDA



### G5: Become Nation's Technology Partner Leader

## **UTVS 2022** February 17, 2022

**UTVS** is a symposium that brings together UCF students, faculty, alumni to an audience of UCF stakeholders, entrepreneurs, innovators, community leaders and investors to showcase hidden gems that have demonstrated or have commercialization potential

Visit

### https://cecs.ucf.edu/utvs

for more information

Registered: 350 Attended: 235 Registered and Attended: 183 Event: 2 Keynotes, 5 Research Presentations, 5 Alumni Presentations, 1 Investor Panel, 8 Additional Panels, 7 Pitching Companies; 1 \$10k Award

**UCF Technology Ventures Symposium 2022** Find Your Hidden Gem in Central Florida

The Central Florida economy is large and increasingly diverse. Thanks to UCF's influence and the many high-tech innovationbased industries located here, new ideas, innovations and startups are launching daily. These HIDDEN GEMS are little known to those outside Orlando, and ripe for potential investment.

**BRINGING TOGETHER COMMUNITY ENTREPRENEURS + UCF STUDENT STARTUPS** + FACULTY RESEARCHERS + VENTURE INVESTORS

#### Why You Should Attend

Investors

- Find hidden gems of innovation (post-laboratory, early-stage companies)
- Meet innovators from maturing companies seeking growth capital
- Connect with UCF commercialization experts for licensable new technology
- Influence the commercial potential of new technology ideas
- Identify industry experts for diligence and operational projects

Entrepreneurs & Faculty

- Present to an audience of venture capital investors
- · Discover the ecosystem of new venture creation resources at UCF
- Learn about technology licensing at UCF
- · Find potential contributors and team members
- · Hear the trends and technologies most enticing NFEREA to investors



#### 2022 UCF Technology Ventures Symposium AGENDA

#### Morning & Early Afternoon

- · A.M. Keynote
- Hidden Gems: Student Experience
- Hidden Gems: Researcher Experience
- Hidden Gems: Alumni Experience
- Hidden Gems: Investor Experience • P.M. Keynote

#### Afternoon

- Tracks A and B: simultaneous, early afternoon Track C: late afternoon
- Track A: Entrepreneur-Focused Educational/ Inspirational Sessions
- Track B: Investor-Focused Educational/ Inspirational Sessions
- Track C: Pitch Competition
- and Winner Announcement

About UTVS 2021

More than 240 attended the inaugural UCF Technology Ventures Symposium in February 2021, featuring keynote speakers and UCF alumni Jason Eichenholz '95, '98, co founder and CTO, Luminar Technologies; and Kevin DiMarzio '10, '14, VP Business Development, Made In Space. The day included presentations by UCF alumni, faculty and students who highlighted their innovative ideas and companies. Capped with a startup pitch competition for students and emerging, early-career alumni vying for a \$10,000 prize, the day concluded with a highly-anticipated announcement of the winner, FLUIX, LLC, presented by Abhi Sastri '20.

#### **College of Engineering** 66 and Computer Science UCF UNIVERSITY OF CENTRAL FLORIDA

UTVS Contact: Francesca.Botteri@ucf.edu L3Harris Engineering Center #114 P.O. Box 162993

Orlando, FL 32816-2993 Connect with us on social media





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17

2022

# Special Initiatives CECS Virtual Seminar Series



# varies from 50-100 attendees

G5: Become Nation's Technology Partner Leader

 Seminar series highlights faculty research, programs and industry

Friday Lunch-time (12:00-1:00PM)

<u>Video archive</u> searchable by topic,

 Series started May 2020; entertained 300+ presentations; 25+ were from

industry speakers; audience typically

 Research summaries w/Q&A, opportunity for follow-ups

author and department

collaborations

**Zoom** presentations

You're Invited! - Meet us online, learn more about UCF research

# **CECS Virtual Seminar Series**







Special Initiatives North America Competition (NAC) ICPC NA Virtual Career Fairs (VCFs)



### **Special Initiatives** NAC (North America Competition) ICPC NA VCFs (Virtual Career Fairs)



- ICPC and UCF have collaborated to organize NAC in 2021 and 2022 at UCF; 50 of the best programming teams in North America come to NAC to compete for one of the 125 spots in the World Finals (0.1% of teams globally make it)
- NAC 2022 was supported by NSA, DoD STEM, NSIN, UCF President's Office
- The ICPC NA (North America) Virtual Career Fairs (Fall 2022, Spring 2023) bring to one place (virtual fair) students from up to 400 ICPC universities to connect (internships, jobs) with sponsor organizations
- NAC 2023 will occur at UCF in May 2023; current sponsors include Lockheed Martin, L3Harris, NSIN; expected sponsors are NSA, DoD STEM, maybe others
- The ICPC NA VCF of October 27, 2022, had 100+ schools participating, approximately 400 students, more than 350+ meetings booked with 5 sponsors (NSA, LM, L3Harris, Accenture, Two Sigma)

G5: Become Nation's Technology Partner Leader



### **Special Initiatives** NAC (North America Competition) ICPC NA VCFs (Virtual Career Fairs)



- UCF Return on Investment (ROI)
  - NAC brings (to UCF) 50 student teams (150 students) and their coaches; students and coaches learn more about UCF (some of these teams come from the best institutions in North America)
  - UCF connects with DoD (NSA, DoD STEM, NSIN, other DoD entities) thus increasing UCF's visibility within DoD
  - **NSA and DoD STEM sponsored NAC 2022**. The plan is for NSA, DoD STEM to become perennial sponsors of NACs to occur, in perpetuity, at UCF, co-organized with ICPC
  - The ICPC NA Virtual Career Fairs provide an opportunity to connect with many organizations (industry, government) to advocate for the value of this Virtual Career Fair. VCFs sponsoring orgs will have the opportunity to see the quality of students coming out of UCF and will become frequent recruiters of UCF talent
  - The NAC provides an opportunity for the UCF President and the CECS dean to connect with Presidents and deans of the 50 institutions that participate in the NAC every year (e.g., MIT, Carnegie Melon, Berkeley, Purdue, UIUC, U. of Maryland, Michigan, others). This will provide consistent good visibility for UCF



# Special Initiatives

Academy of Science, Engineering and Medicine of Florida (ASEMFL)



# Special Initiatives

### Academy of Science, Engineering and Medicine of Florida (ASEMFL)

- In Fall 2017 the Provosts from the SUS (State University System) discussed, per recommendation of the UCF Provost, the creation of an Academy in Florida, the Academy of Science, Engineering and Medicine of Florida (ASEMFL). All Provosts agreed that the creation of such an Academy will be beneficial for the state, all its higher-ed institutions and Florida's technology workforce
- *The Academy was established in October 2018* as a non-for-profit organization in the State of Florida. National Academy members that reside or work in Florida are automatically members of the Academy. Other members are inducted into the Academy following a selection process that resembles that National Academy selection process
- The Academy has two primary goals:
  - (A) *Induct into the Academy new members* that have made significant contributions in science, engineering, or medicine
  - (B) **Conduct studies** that are of interest to the *State of Florida* and its citizens.
- Since its inception, the Academy has *approved a constitution and bylaws*, has held *three annual meetings* (two virtual, 1 hybrid) and has *inducted 51 new members* to the academy (22 in 2020, 15 in 2021, 14 in 2022)





# Special Initiatives

### Academy of Science, Engineering and Medicine of Florida (ASEMFL)

- In the *Inaugural Board* of the Academy the President, Treasurer, Executive Director were UCF faculty. In the *current board* of the Academy the Treasurer and Executive Director are UCF faculty members
- *CECS' future goal is to support ASEMFL in its future pursuits* (goals A and B) thus increasing UCF's Brand and National Reputation
- UCF ROI:
  - (A) *Connecting with National Academy members in the State of Florida* (automatic members of ASEMFL),
  - (B) *Connecting with new inductees* who have made significant contributions in science, engineering, or medicine (some of these inductees could eventually be successfully nominated for the national academies),
  - (C) *Connecting with Florida institutions and other orgs* that are actively involved with ASEMFL (e.g., UF, FSU, USF, FIU, Miami, other orgs),
  - (D) *Play a pivotal role in enhancing the visibility of ASEMFL* within the state and outside the state once the academy pursues and completes studies that are of interest to the state and its citizens.







## Resources (Past, Near Future)



## Resources (Past, Near Future)

**Funds Source:** Central Administration Funds some of them because of the **old UCF Budget Model** (rewarded increased SCHs; CECS did well there) **Funds Usage:** Faculty Hires in CECS

**Funds Source:** Central Administration Funds related to the **BOG grant** (2014-2018). BOG grant provided funds to CS, IT, CpE programs to increase degrees; CECS increased degrees from 288 (12-13) to 561 (17-18); 21-22 degrees awarded in CS, IT, CpE were 959 (CECS did very well in this effort) **Funds Usage:** The BOG funds were used to support faculty hires, GTAs and advisors in CS, IT, CpE

Funds Source: Central Administration Funds related to the FCI (Faculty Cluster Initiative). In two FCI cycles 90 proposals were submitted, Central funded 9 of them: <u>Biionix; Security</u> and Privacy; Disability, Aging and Technology; Renewable Energy and Chemical Transformation (REACT), Resilient, Intelligent and Sustainable Energy Systems (RISES); Sustainable Coastal Systems; Violence Against Women. CECS has strong participation in 8 of the 9 FCIs (underlined ones; CECS did very well in the FCI initiative) Funds Usage: The FCI funds were used to support faculty hires and to provide some administrative support **Funds Source:** Central Administration Funds related to SIP (Strategic Initiative Program). In the Academic Excellence pot 60 proposals were submitted, Central funded 6 of them: Infectious Disease and Travel Health, Knight's Digital Twin, Space Education and Industrialization, Zero-Carbon Energy Economy and Society, Artificial Intelligence, Next Generation Computing Hardware. CECS has strong participation in all 6 of the SIP efforts (leads 2, co-leads 2 others). **Funds Usage:** The SIP funds are allocated to support faculty hires and start-ups

**Funds Source:** Central Administration Funds related to the *SIP (Strategic Initiative Program)*. In the Jump Start and Student Success pots, CECS competed with several proposals. SIP (Student Success) funded two CECS proposals. SIP (Student Success) funded an EXCEL Transfers program (impacts CECS). SIP (Student Success) funded Undergraduate College proposals to increase lecturers and advisors (CECS benefited from these funds). CECS had 6 Jump Start proposals funded **Funds Usage:** The SIP funds were allocated to support infrastructure, advisors, lecturers, EXCEL and a Student Success effort

*Funds Source:* Central Administration Funds, referred to as *Operational Excellence (OE) Funds*. These funds were provided by the State as a result of an LBR proposal that CECS spearheaded with the support of Central Administration and other units. OE supported seven initiatives for faculty hires: <u>Semiconductor; Space Engineering, Science, Aerospace, Hypersonics;</u> <u>AI, Machine Learning; Energy;</u> Optics and Photonics; <u>Cybersecurity; Digital Twin.</u> The ones underlined have strong CECS participation (CECS leads four). OE funds were also allocated for other purposes. *Funds Usage:* The OE funds are allocated to support faculty hires and other efforts, such as EXCEL expansion, GTA increased stipends, UTA-ULA programs, new GTAs, new post-docs, research staff.



## **Path Forward** Research, Education Enterprise



#### Path Forward G1-G5 **Research, Education Enterprise** Path Forward IDTH (Infectious SPICE (Space Energy (Zero Next Generation AI (Artificial SIP **DT** (Digital Twin) Carbon Energy Diseases and Education and Computing Intelligence) and Economy) Travel Health) Industrialization) Hardware Space Al and Machine OE **Cyber Security Digital Twin** Aerospace, Energy Semiconductor Learning Initiative Initiative **Hypersonics** Initiative Initiative Initiative Initiative **Pegasus Partners** Education (UG, G) **Research (Big Grants)** Examples of Partners: Lockheed ٠ Examples: MS Smart City, **Examples: NSF ERC Smart** Martin, Northrop Grumman, MS CV, MS Cyber Streetscapes, NASA ULI, DoE Mitsubishi Power, Siemens, SIP-OE Strengths can lead grants others into new UG degrees, MS SIP-OE Strengths can lead into ٠ SIP-OE Strengths will accelerate degrees, Certificates big grant efforts Pegasus partnerships



Note: Impacts all CECS Goals,

# Path Forward Education Enterprise



## **Path Forward** Education Enterprise

Note 1: Supports CECS Vision Note 2: Supports Goal G2 (G Enterprise), Goal G4 (UG Experience)



# Path Forward Special Initiatives



## **Path Forward** Special Initiatives

#### Philanthropy

- Status: CECS exceeded the goal of \$85M for the IGNITE campaign (ended 2019)
- Progress: UCF Foundation and CECS Foundation leadership changes, CECS pockets of excellence, SIP-OE funds will provide opportunities for enhanced philanthropic support

### **CECS Virtual Seminar Series**

Path Forward

- Status: Started in May 2020 to showcase UCF research in 10minute segments; hosted 300+ presentations, some industry
- Progress: Continue with the seminar series, invite more outside speakers to enhance collaborations

#### UCF Technology Venture Symposium (UTVS)

- Status: Organized and executed UTVS 2021, 2022, showcased UCF entrepreneurial talent, attracted entrepreneurial, investor audience
- Progress: Continue with annual UTVS events, connect with entrepreneurial, investor communities

#### ASEMFL

#### (Academy of Science, Engineering and Medicine)

- Status: Founded in 2018 by UCF; brings together national academy members who reside or work in FL; inducts in the academy outstanding professionals
- Progress: Expand its visibility around the state to conduct studies for the state of interest to FL citizens; connects UCF with all higher ed institutions in the state, other state orgs



- Status: Organized at UCF (with ICPC) NAC 2021, 2022, brought 50 of best programming teams from NA to compete for a spot in World Finals; brought in \$600k support from NSA, DoD STEM
- Progress: Continue with organization of future NACs, stabilize sponsor support, provide UCF visibility to many schools in NA (Presidents, deans)



# Path Forward Collaborations



## Path Forward **Collaborations**

### Supports Goal G5: Become Nation's **Technology Partner Leader**



#### CECS+CBA

- **Existing Collaborations:** MS in FinTech, UTVS, Blackstone Launchpad, Data Analytics Board
- Enhanced/New Collaborations: MS in Fintech, AI Initiative (SIP-OE), Space Initiative (SIP-OE)

#### CECS+RCHM

- Existing Collaborations: MS in Travel **Technology and Analytics**
- Enhanced/New Collaborations: MS in Travel Technology and Analytics, IDTH Initiative (SIP), interest in out of state student recruits

### CECS+SMST

- Existing Collaborations: CyberSP FCI, collaborative grants
- Enhanced/New Collaborations: Digital Twin ٠ Initiative (SIP-OE), Energy Initiative (SIP-OE), UCF-Microelectronics Digital Twin (part of Build Back Better)

### CECS + Others

 CECS collaborated/will continue collaborating with many other units on campus (e.g., UG Admissions, G College) on topics of common interest (e.g., recruit students)


## **Path Forward** State, National Visibility



## Note: Impacts all CECS Goals, G1-G5

## **Path Forward** State, National Visibility



(1) State Preeminence and USNews and Word Report Rankings Metrics are highly correlated; (2) CECS affects positively all state preeminence metrics (met or not-met) and will impact them even further with the SIP, OE investments; (3) CECS affects positively all USNews and World Report Rankings metrics (CECS ranking moved from 85 in 2016 to 73 in 2023) and will impact them even further with the SIP, OE investments

## Thank you



