

# Paul Amoruso, M.S.

## UCF Ph.D. Candidate

### UCF ECE Future Faculty Laureate (FFL) 2024-2026

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## I. Objectives

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To pursue an *Assistant Professor position at a high Research Activity (R1) institution* upon attaining my doctorate in computer engineering.

To do so, I am conducting an academic program spanning:

- *ECE technical topics* (artificial intelligence and it’s computational acceleration with FPGAs),
- *integrative cross-disciplinary research* (novel application of AI to autonomously adaptive micro-credentialing and learner remediation), and
- *acquisition of instructional abilities* (teaching assistant, formal educational coursework, and authoring/reviewing STEM publications).

## II. Education

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**Ph.D., Computer Engineering** **Fall 2023-Present**  
*ECE Department, University of Central Florida, Orlando, FL, GPA: 4.0/4.0 Advisor: Dr. Ronald F. DeMara*

**M.S., Computer Engineering** **Spring 2022- Spring 2023**  
*ECE Department, University of Central Florida, Orlando, FL, Advisor: Dr. Ronald F. DeMara Thesis Title: “Micro-Credentialing with Fuzzy Content Matching: An Educational Data-Mining Approach”*

**B.S., Computer Engineering** **2017-2021**  
*ECE Department, University of Central Florida, Orlando*

## III. Professional Experience

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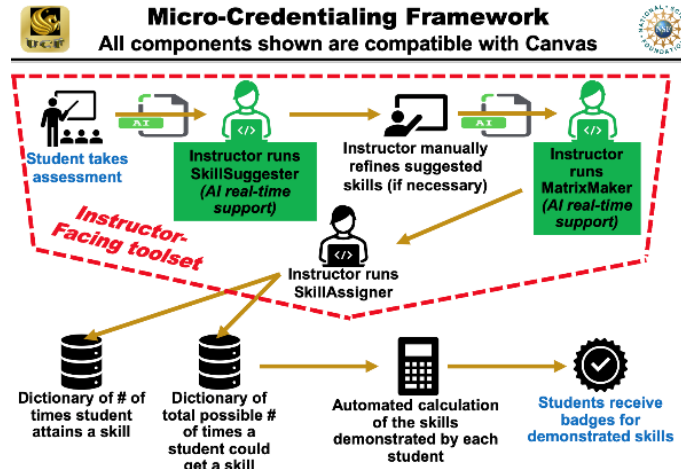
### **A. Research Experience**.....

**Computer Architecture Laboratory** **Multiple semesters since 2022**  
*Graduate Research Assistant, NSF Large-scale Research Grant ECE Dept., University of Central Florida*

- As lead technical GRA on a 5-year NSF grant, I researched novel applications of *Assistive AI* to automate student micro-credentialing, as well as the novel application of *Generative AI* for post-assessment remediation. My research and publications spanned both AI/processing aspects in the ECE domain and instructional delivery topics in the STEM educational domain.
- Innovated an *instructor-facing toolset* for identifying each student’s competencies within STEM courses and researched a design that can facilitate acquisition of employer-focused skills for students to achieve incrementally throughout a course. Resulted in an ASEE publication as lead author.
- Developed an *agent-based-model* for identifying the Optimal Remedial Staffing to Achieve Learning Outcomes within Cost Constraints. This spanned objective metrics such as learning outcomes, processing load, predictor for GTA staffing, and correlation with results in-practice when applied to an ECE course at UCF. Resulted in a Computation Society publication as lead author.
- Researched a *feature-oriented cellular automata-based learning mechanism* for convolution-free image classification. Resulted in an IEEE publication as co-author.
- Mentored senior design team of CS undergraduates. Proposed the project topic and advised the students bi-weekly to

develop Python and Rest-API technologies to create a novel student dashboard regarding learners' post-assessment remediation

- Currently prototyping a Python-based framework to utilize Generative AI to prime and level out each learner's knowledge gaps prior to meeting with human tutors to review their handwritten scratch sheets. Investigating campus-wide Canvas integration with collaborator/mentor from UCF CDL. Will analyze processing throughput at institutional-scale and acceleration methods including FPGA, parallel CPU/GPU cores, and others.



**Context Diagram of Micro-Credentialing Research** (lead GRA of the project)

**B. Teaching Experience**.....

**EEL3801 Computer Organization**

**Summer 2022- Spring 2023**

*Graduate Teaching Grader (GTG)*

*ECE Dept., University of Central Florida*

Received **Best Graduate Teaching Assistant Award in ECE Department at UCF of 2023** in consideration of:

- Tutoring students via post-test remediation sessions in EPC and/or ECE labs
- Spearheaded a technical initiative to investigate operational flow in migration from “Classic Quiz” Canvas LMS quizzes to the "New Quiz" format. This was provided to UCF Digital Learning and has been utilized by multiple UCF CECS faculty
- Substitute instructor for a session of the lab in EEL3801 to accommodate sudden unavailability of the lab GTA
- Directed and managed up to 4 UTAs performing post-assessment remediation four days per week

**EGS1006 Introduction to Engineering**

**Fall 2019**

*Undergraduate Teaching Assistant (UTA)*

*CECS, University of Central Florida*

- Lead laboratory session of up to 40 students for three days each week
- Responsible for managing and grading assignments for about 120 students during the semester.
- Consisted of teaching the steps to build and program the TI-RSLK Unit and then application testing where it navigates through a maze

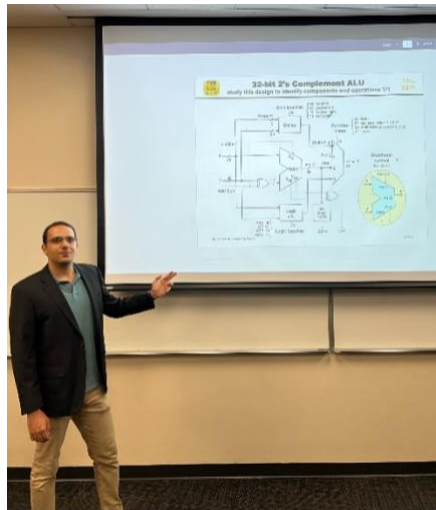
**High-School Honors Biology**

**2017**

*Student Assistant*

*Lake Brantley High-School*

- Responsible for grading student in class and homework assignments.
- Prepared and organized laboratory experiments for student's
- Supported biology teacher with audio/ visual technologies



**Course Delivery – STEM Undergraduate Courses**

(EEL3801 GTA / Guest Lecturer, EGN1006 Undergraduate Teaching Assistant, UCF Invited Seminar Speaker)

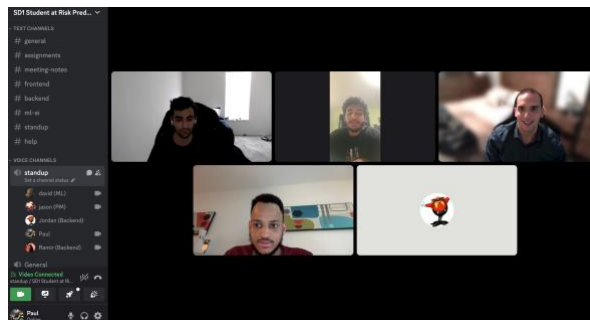
**C. Mentoring Experience**.....

**Advising and Mentoring of undergraduate Students**

*Computer Science Senior Design, University of Central Florida*

*Senior Design Project - Technical Advisor*

1. Jason Saini, BSCS student
2. Justin Gamboa, BSCS student
3. Jordan Morillo, BSCS student
4. Ramir Dalencour, BSCS student
5. David Santamaria, BSCS student



**Technical Mentoring – Aspiring Undergraduate and Graduate Students at UCF**

(COP4934 Senior Design I, COP4935 Senior Design II, approximately 10 GTAs/UTAs in UCF ECE Department)

## **IV. Professional Training and Course Design.**

### **A. Formal Coursework** .....

- Completed *EME6613: Instructional System Design*. This UCF Graduate course covered systematic analysis and design of instruction. Completed group project on developing a higher education course analysis and treatment plan for teaching Punctuality and Time Management skills.
- Completed *UCF's Preparing Tomorrow's Faculty* course. This UCF Graduate Studies development course covers a comprehensive approach to student learning and motivation involves integrating course design with effective teaching pedagogies, using ongoing assessment and feedback, and fostering a positive course climate that supports students' career development including the preparation of a teaching philosophy statement.
- Completed EEL 6938: *Special Topics in ECE: Professional Communications for Engineers*.

### **B. Course Enhancement and Development**

#### **Computer Organization and Design.**

**Summer 2022-Spring 2023**

#### *Course Content Development.*

*University of Central Florida*

- Supported implementation of using Canvas add-ons, including UCF Here for measuring student attendance
- Resolved technical complexities for course migration from Classic to New quiz format
- Utilized python scripts leveraging Canvas REST API for downloading student and validating student grades
- Developed scripts for automatically anonymizing student quiz submissions to adhere to FERPA cognizant approaches in remediation

## **V. Publications**

### **A. Conference Publications** .....

#### **i. Technical Manuscripts:**

5. **P. Amoruso**, R. Yarnell, and R. F. DeMara, "Leveraging Novel GZIP Compression for Hardware Accelerated Text Classification," in-preparation for submission to IEEE/ACM FPGA conference.
4. R. Yarnell, **P. Amoruso**, and R. F. DeMara, "Hardware Synthesis Techniques for Neuromorphic Acceleration on Fine-Grained Reconfigurable Fabrics," submitted to *International Symposium of Quality Electronic Design (ISQED)*, 2025.
3. **P. Amoruso**, I. Garibay, L. O. Campbell, J. A. Mejia, F. E. Hernandez, and R. F. DeMara, "A NetLogo-based Approach to Predictive Estimation of Student Performance and Corresponding Tutoring Demand within STEM Undergraduate Courses," abstract submission to *ASEE National Conference*.
2. **P. Amoruso**, A. Pindoria, and R. F. DeMara, "Feasibility and Scalability of Generative AI for Remediation of STEM Assessments," in-preparation for submission to ACM/IEEE AI Acceleration conference.
1. N. Ari, R. Yarnell, **P. Amoruso**, J. Mell, and R. DeMara, A. Wu, "FOCAL: Feature-Oriented Cellular Automata Learning for Convolution-Free Image Classification," in *Proceedings of 12th IEEE International Conference on Intelligent Systems (IEEE-IS)*, Varna, Bulgaria, August 29-31, 2024.

#### **ii. STEM Educational Manuscripts:**

5. **P. Amoruso**, and R. F. DeMara, “Progressing from Micro-Credentialing to Micro-Matching: Connecting Employers to Ideally-Badged Learners,” in-preparation for submission to 2025 Frontiers in Education Conference.
4. **P. Amoruso**, B. Chen, R. F. DeMara, “KnowGap: Personalized Self-Paced Multi-Media Remediation via Data-Driven Learning Objectives,” in-preparation for submission to ASEE or other STEM education conference.
3. **P. Amoruso**, I. Garibay, R. F. DeMara, “Agent-Based Model for Optimal Remedial Staffing to Achieve Learning Outcomes within Cost Constraints,” Poster presentation at *Computational Social Science Society of the Americas (CSSSA) Annual Conference*, Santa Fe, NM, USA, October 24-27, 2024. **Recognition: Best Poster Award of Conference**
2. **P. Amoruso**, O. Garibay, L. O. Campbell, and R. F. DeMara, “Instructor-Facing Graphical User Interface for Micro-Credential Designation and Refinement in STEM Curricula, in *Proceedings of 2024 ASEE Southeast Section Annual Meeting*, Marietta, Georgia, March 10 – 12, 2024. 10.18260/1-2—45539.
1. **P. Amoruso**, R. F. DeMara, L. O. Campbell, F. Hernandez, and A. Mejia, “Personalizing Digitized Assessments and Remediation using an Automated Micro-Credentialing Framework,” *Online Learning Consortium (OLC) 2022 Conference on Accelerating Online Learning Worldwide*, Orlando, FL, Nov. 15, 2022.

**B. Journal Publications** .....

1. **P. Amoruso**, R. DeMara, and L. O. Campbell, “AchieveUP: Personalizing Digitized Assessments and Remediation using an Automated Micro-Credentialing Framework for Canvas LMS,” in-preparation for submission *ASEE Computers in Education (COED) Journal*.

**VI. Honors and Awards**

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**A. Scholarships and Fellowships** .....

- **Future Faculty Laureate**, Electrical and Computer Engineering Dept., 2024-2026.  
*Monetary Amount: \$12,000 discretionary budget*

**Description:** Provides bright and promising ECE graduate students having aptitude for academic employment with opportunities to learn how to conduct various faculty activities including teaching a class as an instructor of record, grant proposal writing, course materials development, instructional technologies, undergraduate/graduate technical mentoring, NSF programs solicitations/processes including meeting with CAREER awardees, and attendance at STEM Educational Conferences, and the academic hiring process.

A budget \$12K over two years is provided to support progression through eight key milestones: obtaining teaching assistant experience, completing formal training in educational skills, implementing course enhancements, authoring STEM publications, participating in professional events, mentoring undergraduate learning assistants, delivering a UCF ECE course as instructor of record, and gaining immersion in funding proposal processes.

**B. Awards** .....

- **Best Graduate Teaching Assistant Award**, UCF Electrical and Computer Engineering Dept., 2023.

*Monetary Amount: \$500*

Graduate Teaching Assistants (GTAs) from the Electrical and computer engineering department were auto selected to compete in the award. Excellence in serving as a Graduate Teaching Assistant is demonstrated by evidence from student survey responses.

- *UCF Three Minute Thesis (3MT) Competition*, university-level finalist: Nov. 14, 2022
- *UCF CECS Senior Design Day Showcase*, First Place Award for ECE Projects: Fall 2021
- *Dean's List*, University of Central Florida: 2018, 2019, 2020, 2021
- *ACM Complimentary Membership*, bestowed for reviewer service: May 2024
- *President's Honor Roll*, University of Central Florida: Spring 2020 - Fall 2020

## **VII. Professional Service**

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### **A. Technical Paper Reviewer/Referee** .....

- Technical Paper Reviewer for *ACM Winter Simulation Conference 2024 Education Track*.
- Technical Abstract Reviewer for *ASEE National Conference 2024 NSF Grantees Poster Session*.

### **B. Membership and Leadership of Student Organizations** .....

*Student Laureates of STEM Teaching and Learning (SLSTL)*, President of Registered Student Organization at the University of Central Florida, Summer 2016-Summer 2024.

*Computer Hardware Innovation and Design Association (CHIDA)*, Treasurer of Registered Student Organization at the University of Central Florida, Spring 2019-Spring 2024.

### **C. Professional Society Memberships** .....

- *Institute of Electrical and Electronics Engineers (IEEE)* Student Member, Fall 2024 - present
- *American Society of Engineering Education (ASEE)* Student Member, Fall 2024 – present
- *Computational Social Science Society of the Americas (CSSSA)* Student Member, Fall 2024 - present

## **VIII. Presentation/Participation in Conferences/Seminars**

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- Poster presentation at *CSSSA*, Santa Fe, New Mexico, October 24-27, 2024.
- PowerPoint presentation at *ASEE-SE*, Marietta, Georgia, March 10-12, 2024.
- PowerPoint presentation at UCF Computer Science Senior Design course: Sponsorship Pitches 1/17/2024
- Online Learning Consortium (OLC) Accelerate Symposium, Technical Submission PowerPoint presentation, Orlando, Florida, November 1-3, 2022.

## **IX. Seminars and Invited Talks**

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- Perspectives on Graduate Teaching Assistantships spanning challenges and successes, August 23, 2024, ECE GTA Orientation, UCF, Orlando, Florida
- Engineering Initiative Meeting on Integrated Course Search and Credentialing for Higher-Education,

November 5, 2024, Center for Distributed Learning (CDL) meeting, UCF, Orlando, Florida

## **X. Certificates**

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- IDS 6513 *Preparing Tomorrow's Faculty*- Higher Education Teaching Program, Fall 2024

## **XI. Technical and Language Skills**

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SonicWall accredited sales engineer and support engineer ▪ Desktop support in PC & Mac computers  
▪ Familiar with programming the TI-RSLK ▪ Work well in groups & related projects ▪ Wireshark (Static / Live Analysis) ▪ Constructing Websites and Software Applications ▪ Proficient with teaching students how to program a TI-RSLK ▪ MacOS ▪ Machine Learning applications ▪ Microsoft Office ▪ Microsoft Project ▪ SQL Server ▪ Linux Ubuntu/Kali ▪ CVAT ▪ PyTorch ▪ NVIDIA Jetson Nano image classification toolsets ▪ REST API ▪ Vitis-HLS

### **Programming Language:**

C, C++, Verilog, Assembly, Python, MATLAB, HTML, XML, Java, MIPS Assembly language, Swift

### **Language:**

English (Native), Italian (Fluent), Spanish (Familiarized)

## **XII. Internships and Industry Experience**

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### **Junior Consultant**

*EMA Computers, Inc.*

- Computer setup and deployment
- Computer patch management
- Malware Mitigation: Effective Strategies for Eliminating Cyber Threats
- Designing and maintaining websites
- SEO (Search engine optimization)

**Dec 2015 - present**

*Altamonte Springs, FL*

## **XIII. Graduate Courses Completed**

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### **CDA5106: Advanced Computer Architecture**

*University of Central Florida*

**Spring 2021**

### **COP5611: Operating Design Principles**

*University of Central Florida*

**Spring 2021**

### **COT5405: Design & Analysis Algorithms**

*University of Central Florida*

**Spring 2022**

### **EEL6812: Intro To Neural Networks**

*University of Central Florida*

**Spring 2022**

### **CAP5610: Machine Learning**

*University of Florida (as a Traveling Scholar)*

**Summer 2022**

### **EIN6258: Human Computer Interaction**

*University of Central Florida*

**Fall 2022**

### **EEL5862: Real-Time Systems**

*University of Central Florida*

**Fall 2022**

### **EEL6762: Perf Analy Comp & Com Systems**

*University of Central Florida*

**Spring 2023**

### **CAP6675: Complex Adaptive Systems**

*University of Central Florida*

**Fall 2023**

<b>EEL5722: Field Program Gate Array FPGA</b> <i>University of Central Florida</i>	<b>Fall 2023</b>
<b>EEL5706: Resilient Computer System Design</b> <i>University of Central Florida</i>	<b>Spring 2024</b>
<b>ESI6535: Advanced Agent-Based Modeling</b> <i>University of Central Florida</i>	<b>Spring 2024</b>
<b>EME6613: Instructional System Design</b> <i>University of Central Florida</i>	<b>Summer 2024</b>
<b>EEL 6938: Professional Communications for Engineers</b> <i>University of Central Florida</i>	<b>Fall 2024</b>