

# Joshua Peeples

PHD CANDIDATE · ELECTRICAL AND COMPUTER ENGINEERING

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## Education

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### University of Florida

Gainesville, FL

PHD ELECTRICAL AND COMPUTER ENGINEERING

June 2017 - Pres.

- Advisor: Dr. Alina Zare
- Thesis: "Connecting the Past and Present: Histogram Layers for Texture Analysis"
- Research Interest: Machine Learning, Deep Learning, Pattern Recognition, Computer Vision, Image Processing
- Expected Graduation Date: April 2022

### University of Florida

Gainesville, FL

MS ELECTRICAL AND COMPUTER ENGINEERING

June 2017 - Dec 2019

- Related Coursework: Fundamentals of Machine Intelligence, Math for Intelligent Systems, Machine Learning, Foundations of Digital Signal Processing, Image Processing and Computer Vision

### University of Alabama at Birmingham

Birmingham, AL

BS ELECTRICAL ENGINEERING (MINOR: MATHEMATICS)

Aug 2013 - April 2017

- Magna Cum Laude

## Publications

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### PUBLISHED

7. **J. Peeples**, C. McCurley, S. Walker, D. Stewart, and A. Zare, "Learnable Adaptive Cosine Estimator (LACE) for Image Classification," in *Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)*, 2022, In Press. doi: arXiv:2110.05324. 📄
6. R. Gloaguen, Z. Brym, **J. Peeples**, W. Xu, C. Hyen-Chung, and D. Rowland, "The Plasticity of Early Root Development in *Sesamum indicum* L. as Influenced by Genotype and Water Availability", *Rhizosphere*. Elsevier BV, 2021, In Press.
5. D. Prioleau, K. Alikhademi, A. Roberts, **J. Peeples**, A. Zare, and J.E. Gilbert, "Use of Divisive Clustering for Reducing Bias in Training Data," in *International Conference on Machine Learning and Data Mining (MLDM)*, 2021, pp. 115-131. P-ISSN 1864-9734, E-ISSN 2699-5220, ISBN 978-3-942952-81-1. 📄
4. S. Walker, **J. Peeples**, J. Dale, A. Zare, and J. Keller, "Explainable Systematic Analysis for Synthetic Aperture Sonar Imagery," in *IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, 2021, pp. 2835-2838. doi: 10.1109/igarss47720.2021.9554901. 📄
3. **J. Peeples**, M. Cook, D. Suen, A. Zare, and J. Keller, "Comparison of Possibilistic Fuzzy Local Information C-Means and Possibilistic K-Nearest Neighbors for Synthetic Aperture Sonar Segmentation," in *Detection and Sensing of Mines, Explosive Objects, and Obscured Targets XXIV*, vol. 11012. International Society for Optics and Photonics (SPIE), 2019, p. 110120T. doi: 10.1117/12.2519484. 📄
2. A. Starke, J. McNair, R. Trevizan, A. Bretas, **J. Peeples**, and A. Zare, "Toward Resilient Smart Grid Communications using Distributed SDN with ML-Based Anomaly Detection," in *International Conference on Wired & Wireless Internet Communications*. Springer, 2018, pp. 83-94. doi: 10.1007/978-3-030-02931-9\_7. 📄
1. **J. Peeples**, D. Suen, A. Zare, and J. Keller, "Possibilistic Fuzzy Local Information C-means with Automated Feature selection for Seafloor Segmentation," in *Detection and Sensing of Mines, Explosive Objects, and Obscured Targets XXIII*, vol. 10628. International Society for Optics and Photonics (SPIE), 2018, p. 1062812. doi: 10.1117/12.2305178. 📄

### IN REVIEW

3. **J. Peeples**, W. Xu, R. Gloaguen, D. Rowland, A. Zare, and Z. Brym, "Spatial and Texture Analysis of Root System Architecture with Earth Mover's Distance (STARSEED)," doi: 10.1101/2021.08.31.458446, submitted for review September 8, 2021. 📄

2. **J. Peeples**, S. Walker, C. McCurley, A. Zare, and J. Keller, "Divergence Regulated Encoder Network for Joint Dimensionality Reduction and Classification," submitted for review September 12, 2021. doi: arXiv:2012.15764. 📄
1. **J. Peeples**, W. Xu, and A. Zare, "Histogram Layers for Texture Analysis," submitted for review June 28, 2021. doi: arXiv:2001.00215. 📄

## Professional Experience

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### University of Florida Machine Learning and Sensing Laboratory

Gainesville, FL

#### GRADUATE RESEARCH ASSISTANT

June 2017 - Pres.

- Developed automated machine learning approaches for seafloor segmentation and scene understanding
- Designed and implemented novel deep learning layers focused on texture analysis
- Supervised undergraduate students on research projects
- Disseminated results of research through publications, presentations, and reports to funding agencies

### Naval Research Enterprise Internship Program

Panama City, FL

#### GRADUATE SUMMER RESEARCH INTERN (VIRTUAL)

May 2021 - Aug 2021

- Project: "Deep, Regularized Histogram-based Features for Seafloor Segmentation and Classification"
- Assisted in curation of ground truth labels for semantic segmentation of circular synthetic aperture sonar (CSAS) imagery
- Develop algorithms to identify various environments in synthetic aperture sonar (SAS) imagery

### Michigan State University Summer Research Opportunities Program

East Lansing, MI

#### UNDERGRADUATE SUMMER RESEARCH INTERN

May 2016 - July 2016

- Participated in a 10-wk residential program for students interested in graduate study
- Attended a week-long short course in statistics and R Studio software
- Utilized multiple datasets to develop an improved algorithm for lane detection
- Selected for travel award to present research at Emerging Researchers National Conference in STEM

### University of Alabama at Birmingham Signal Processing and Embedded Systems Laboratory

Birmingham, AL

#### UNDERGRADUATE RESEARCH ASSISTANT

Jan 2014 - Dec 2016

- Performed image processing techniques for a project that involved topics such as facial detection and recognition
- Worked with Arduino software that was implemented to various technologies such as a robotic arm, sensors, and Bluetooth
- Designed and interpreted circuit diagrams to properly implement hardware designs

## Awards, Fellowships, & Grants

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**GRAND TOTAL:** \$525,910 **UNDERGRADUATE TOTAL:** \$30,000 **GRADUATE TOTAL:** \$495,910

University of Alabama at Birmingham (UAB); University of Florida (UF)


2021	<b>Inductee</b> , Edward Alexander Bouchet Graduate Honor Society	
2020-21	<b>Dr. Joseph S. Rosko Award</b> , UF Department of Electrical and Computer Engineering	\$ 3,750
2018-Pres.	<b>Graduate Research Fellowship (NSFGRFP)</b> , National Science Foundation	\$ 144,000
2018-Pres.	<b>NSF External Top-up Award</b> , UF Graduate School	\$ 26,250
2018-Pres.	<b>Southern Regional Education Board Institute Travel Award</b> , UF Graduate School	\$ 6,000
2017-Pres.	<b>McKnight Doctoral Fellowship</b> , Florida Education Fund	\$ 85,000
2017-Pres.	<b>Preeminence Award</b> , UF Graduate School	\$ 218,130
2017	<b>Iva and Norman Tucker Fellowship</b> , UF Transportation Institute	\$ 4,000
2017	<b>Board of Education Summer Fellowship</b> , UF Office of Graduate Diversity Initiatives	\$ 8,780
2017	<b>Green Blazer of Excellence</b> , UAB Blazer Male Excellence Network	
2017	<b>President's List (Spring)</b> , UAB	

2016-17	<b>Dupuis Leadership Scholarship</b> , UAB School of Engineering	\$ 1,500
2016-17	<b>Cleo and Clara Thomas Academic Scholarship for Excellence</b> , UAB	\$ 1,000
2016	<b>Commitment to Excellence in Tutoring</b> , UAB Vulcan Material Academic Success Center	
2016	<b>Dean's List (Spring)</b> , UAB	
2016	<b>President's List (Fall)</b> , UAB	
2016	<b>Honor Scholar</b> , UAB Multicultural Scholars Program	
2015	<b>Dean's List (Spring and Fall)</b> , UAB	
2015	<b>Scholar of the Year</b> , UAB Multicultural Scholars Program	
2014	<b>Dean's List (Spring)</b> , UAB	
2013-17	<b>Vulcan Materials Scholarship</b> , UAB	\$ 4,000
2013-17	<b>Comprehensive Minority Faculty and Student Development Program Scholarship</b> , UAB	\$ 4,000
2013-17	<b>Collegiate Honors Scholarship</b> , UAB	\$ 16,000
2013-14	<b>Scholarship</b> , The Birmingham Chapter of the American Association of Blacks in Energy	\$ 3,500

## Presentations

\* *presenting author*

### INVITED TALKS

3. **\*J. Peeples**, "Connecting the Past and Present: Histogram Layers for Texture Analysis," in *Boston University Electrical and Computer Engineering Seminar Series*, Boston, MA, Virtual, April 2021. 
2. **\*J. Peeples**, "Artificial Intelligence for Texture Analysis," in *University of Florida Thompson Earth Systems Institute Scientist in Every Florida School*, Gainesville, FL, Virtual, May 2021.
1. **\*J. Peeples**, "Design Your Engineering Career," in *University of Alabama at Birmingham Engineering Young Alumni Series*, Birmingham, AL, Virtual, July 2020.

### ORAL PRESENTATIONS

8. D. Prioleau\*, K. Alikhademi\*, A. Roberts, **J. Peeples**, A. Zare, and J.E. Gilbert, "Use of Divisive Clustering for Reducing Bias in Training Data," in *International Conference on Machine Learning and Data Mining (MLDM)*, New York, Virtual, July 2021.
7. S. Walker, **\*J. Peeples**, J. Dale, A. Zare, and J. Keller, "Explainable Systematic Analysis for Synthetic Aperture Sonar Imagery," in *IEEE International Geoscience and Remote Sensing Symposium*, Brussels, Belgium, Virtual, July 2021.
6. **\*J. Peeples**, \*J. Jameson, N. Kotta, W. Stoppel, and A. Zare, "Jointly Optimized Spatial Histogram U-NET Architecture (JOSHUA) for Adipose Tissue Identification in Histological Images of Lyophilized Silk Sponge Implants," in *University of Florida Biomaterials Day*, Gainesville, FL, Virtual, March 2021.
5. \*R. Gloaguen, **J. Peeples**, W. Xu, Z. Brym, D. Rowland, A. Zare, and H. Chun, "New Approaches to Characterize the Root System Architecture Response of a Drought Tolerant Crop to Varying Soil Moisture Levels," in *ASA-CSSA-SSSA Annual Meeting, C02 Crop Physiology and Metabolism Section, C-2 Graduate Student Oral*, Phoenix, AZ, Virtual, November 2020.
4. **\*J. Peeples**, M. Cook, D. Suen, A. Zare, and J. Keller, "Comparison of Possibilistic Fuzzy Local Information C-Means and Possibilistic K-Nearest Neighbors for Synthetic Aperture Sonar Segmentation," in *Detection and Sensing of Mines, Explosive Objects, and Obscured Targets XXIV*, International Society for Optics and Photonics (SPIE), Baltimore, MD, May 2019.
3. **\*J. Peeples**, "Histogram Layer: A Novel Approach to Feature Engineering," in *McKnight Doctoral Mid-Year Research and Writing Conference*, Tampa, FL, February 2019.
2. **\*J. Peeples**, D. Suen, A. Zare, and J. Keller, "Possibilistic Fuzzy Local Information C-means with Automated Feature selection for Seafloor Segmentation," in *Detection and Sensing of Mines, Explosive Objects, and Obscured Targets XXIII*, International Society for Optics and Photonics (SPIE), Orlando, FL, April 2018.
1. **\*J. Peeples** and A. Zare, "Synthetic Aperture SONAR Soft Segmentation using Possibilistic Fuzzy Local Information C-Means" in *University of Florida Water Institute Symposium*, Gainesville, FL, February 2018.

## POSTER PRESENTATIONS

3. **\*J. Peeples**, \*J. Jameson, N. Kotta, W. Stoppel, and A. Zare, "Spatial Histogram Layers in Convolutional Neural Network Models for Adipose Segmentation in Histological Silk Implant Images," in *Biomedical Engineering Society Annual Meeting*, Orlando, FL, October 2021.
2. **\*J. Peeples**, B. Driggers, G. Contreras, N. Tracht, S. Chen, and M. Bedwell, "Using the Engineering Force: BHAMSolo Senior Design Project," in *University of Alabama at Birmingham Spring Expo*, Birmingham, AL, April 2017.
1. **\*J. Peeples**, M. Al-Qizwini, and H. Radha, "LIVE ON: Lane, Sign, and Vehicle Detection in Various Environments," in *Emerging Researchers National (ERN) Conference in STEM*, Washington, D.C., March 2017.

## Teaching Experience

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### University of Florida Electrical and Computer Engineering Department

Gainesville, FL

#### SUPERVISED TEACHER, EEL 5840/4930 FUNDAMENTALS OF MACHINE LEARNING

Aug 2019 - Dec 2019

- Updated lecture notes and held weekly office hours
- Assisted in the preparation and grading of assignments and exams
- Participated in weekly meetings with instructor team

### Successful Transition and Enhanced Preparation for Undergraduates Program (Year II)

Gainesville, FL

#### COURSE CO-INSTRUCTOR, INTRODUCTION TO CODING AND PROGRAMMING

July 2019 - Aug 2019

- Led lectures to introduce core concepts for programming and Python to incoming engineering students
- Developed course syllabus, assignments, and project

### Successful Transition and Enhanced Preparation for Undergraduates Program (Year I)

Gainesville, FL

#### COURSE CO-INSTRUCTOR, MACHINE LEARNING

July 2018 - Aug 2018

- Led lectures to introduce machine learning and remote sensing to incoming engineering students
- Coordinated activities of class with program director and trained teaching assistants in preparation of course

### University of Alabama at Birmingham Vulcan Material Academic Success Center

Birmingham, AL

#### SUPPLEMENTAL INSTRUCTION LEADER, CALCULUS BASED PHYSICS II

Jan 2015 - April 2015

- Created an intensive learning environment for undergraduate students by hosting two weekly SI sessions (75 minutes per session)
- Constructed weekly worksheets and mock exams to prepare students for class
- Maintained a constant interaction with the professor to properly align supplemental materials with course information and requirements

### University of Alabama at Birmingham Vulcan Material Academic Success Center

Birmingham, AL

#### TUTOR, ELECTRICAL CIRCUITS, MATHEMATICS, AND PHYSICS

Aug 2014 - April 2017

- Assisted students in difficult subjects by working through conceptual and quantitative problems
- Led approximately 10 one-hour sessions per week with undergraduates
- Participated in training sessions to become an Associate in the Tutoring Profession (ATP) certified Associate Tutor

## Mentoring

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- 2020-21 **Wilkerson, P.**, UAB Young Alumni Mentee, University of Alabama Birmingham,  
*Achievements*: internship for Spring 2021 with TriAltus Bioscience, graduated Spring 2021,  
hired as Suture Manufacturing Engineer at Arthrex
- 2019-21 **Walker, S.**, Undergraduate Research Assistant, University of Florida,  
*Achievements*: Selected for University Research Scholar Program, published two  
manuscripts, graduated Spring 2021, accepted into UC San Diego as a Master's student  
studying Computer Science with a focus in AI
- 2019-20 **Zhao, H.**, Undergraduate Research Assistant, University of Florida,  
*Achievements*: Graduated Fall 2020, hired as Software Engineer at Capital One
- 2019 **Tran, T.**, Graduate Research Assistant (Master's student), University of Florida,  
*Achievements*: Graduated Fall 2020, hired as Program Manager at Microsoft

2019 **Kim, T.**, Student Science Training Program (High School student), University of Florida,  
*Achievements: won Best Paper Award, accepted into Columbia University*

## Outreach & Professional Development

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### PROFESSIONAL SERVICE AND OUTREACH

#### **University of Florida Aspire STEM Equity Achievement Change Executive Committee**

*Gainesville, FL*

##### GRADUATE STUDENT REPRESENTATIVE

*July 2021 - Present*

- Assist with American Association for the Advancement of Science (AAAS) and the Association of Public and Land-grant Universities (APLU) effort to effect sustainable change to promote diversity, equity, and inclusion in science, technology, engineering, mathematics, and medicine (STEMM)
- Review project outputs such as surveys, audacious goals, and action plan
- Meet monthly to give feedback and perspective on ongoing work within the larger institutional context

#### **IEEE Geoscience and Remote Sensing Society (GRSS) Boston Hackathon (Virtual)**

*Boston, MA*

##### JUDGE

*July 2021 - August 2021*

- Documented scores and maintained communication with the IEEE GRSS Boston Chair
- Used expertise to provide constructive feedback and assessment of contest entries

#### **University of Florida Bouchet Spring Symposium**

*Gainesville, FL*

##### CO-ORGANIZER

*March 2021 - April 2021*

- Coordinated with team to organize theme and events for symposium
- Served on "Beyond a Scholar" panel to share research experience and journey
- Co-hosted research presentation session (Lightning Talks)

#### **University of Alabama at Birmingham School of Engineering Young Alumni Mentorship Program**

*Birmingham, AL*

##### MENTOR

*July 2020 - Present*

- Provided academic guidance, career advice and personal development to current UAB student(s)
- Maintained regular contact with mentee through two monthly, virtual meetings
- Documented interactions with mentee and provide feedback to Program Manager and Alumni Advisory Board

#### **University of Florida Board of Education Summer Fellowship Program**

*Gainesville, FL*

##### PEER ADVISOR

*July 2020 - Aug 2020*

- Served as mentor for incoming underrepresented graduate students
- Assisted in planning and leading program events with other Peer Advisors and Program Coordinator
- Led group of seven engineering students and documented their progress through weekly reports

#### **University of Florida Student Science Training Program (SSTP)**

*Gainesville, FL*

##### MENTOR

*June 2019 - July 2019*

- Developed research project for high school student participant
- Assisted and provided feedback for program deliverables (paper, poster, and presentation)
- Served as primary mentor for the participant which culminated in the student earning the SSTP Best Paper Award

#### **McKnight Doctoral Mid-Year Research and Writing Conference**

*Tampa, FL*

##### COMPUTER SCIENCE PANEL CHAIR

*June 2018 - Feb 2019*

- Recruited panelists to present their research during discipline-specific session
- Moderated discussion and feedback on presentations from expert discussants
- Collected and documented feedback on the session from panelists and audience to share with conference team

### LEADERSHIP EXPERIENCE

#### **African/African American/African Diaspora in Electrical and Computer Engineering**

*Gainesville, FL*

##### PRESIDENT

*Aug 2020 - Pres.*

- Led organization that provides community and support for Black undergraduate and graduate students in the department
- Facilitated monthly executive board meetings and allocate duties among officers

**Machine Learning and Sensing Laboratory***Gainesville, FL***SOCIAL MEDIA MANAGER***Aug 2020 - Aug 2021*

- Maintained and created content for the lab's Twitter and Facebook accounts to raise awareness of research and outreach activities

**Machine Learning and Sensing Laboratory***Gainesville, FL***OUTREACH COORDINATOR***Aug 2019 - July 2020*

- Created and organized opportunities to share the lab's research with others in the community (i.e., laboratory tours)

**Electrical and Computer Engineering Graduate Student Organization***Gainesville, FL***SECRETARY***April 2019 - April 2020*

- Recorded meeting notes and oversaw calendar of events
- Maintained listserv and reserved spaces for all activities of the organization

**Gator McKnights Unite***Gainesville, FL***PRESIDENT***April 2018 - April 2019*

- Led graduate student organization responsible for providing personal and professional development opportunities for African American and Latinx graduate students
- Organized monthly executive board meetings and regulate the general functioning of the executive board and organization

**Electrical and Computer Engineering Graduate Student Organization***Gainesville, FL***FACULTY AND STAFF LIASON***Jan 2018 - April 2018*

- Chaired social events to promote community in the ECE department (e.g., faculty/staff mixer)

**Machine Learning and Sensing Laboratory***Gainesville, FL***DEPARTMENTAL REPRESENTATIVE***Aug 2017 - June 2019*

- Served as liaison between the department and lab by actively participating in departmental events

**University of Alabama at Birmingham Institute of Electrical and Electronics Engineers***Birmingham, AL***VICE CHAIR***June 2016 - April 2017*

- Assisted the Chapter Chair in following up on assigned committee responsibilities
- Performed all functions of the Chapter Chair in their absence or upon request

**University of Alabama at Birmingham School of Engineering***Birmingham, AL***LEADERSHIP SCHOLAR***June 2016 - April 2017*

- Led tours of the engineering building for prospective students
- Actively participated in several events throughout the year such as recruitment, award ceremonies, and meetings

**University of Alabama at Birmingham Multicultural Scholars Program***Birmingham, AL***PRESIDENT***Aug 2014 - April 2017*

- Coordinated activities of the executive committee, which included oversight of the duties of executive committee members
- Served as the liaison between the executive body and program director
- Assisted students in identifying funding opportunities as co-Chair of the scholarship committee

**University of Alabama at Birmingham Blazer Male Excellence Network***Birmingham, AL***MENTOR***Aug 2014 - April 2017*

- Served as a role model, counselor, and motivator for incoming freshmen Black male students
- Collaborated with other mentors for social and volunteer activities of organization

**PROFESSIONAL DEVELOPMENT AND WORKSHOPS**

- 2021 **SEC Emerging Scholars Program**, selected for virtual workshop to provide professional development and networking opportunities for current doctoral students and a limited number of postdoctoral researchers considering careers in higher education.
- 2021 **Rochester Institute of Technology (RIT) Future Faculty Career Exploration Program**, selected to participate in rigorous three-day virtual program designed for African American, Latino American, and Native American scholars and artists to experience a “behind the scenes” glimpse into life as a faculty member at RIT.

- 2021 **Notre Dame Future Faculty Workshop**, invited to on-campus program to share research through poster presentation and engaged in panel discussions regarding academic hiring process.
- 2021 **Auburn University Preparing Future Faculty Workshop**, participated in interactive, virtual sessions to provided more insight into seeking academic positions.
- 2021 **EGS6056 Engineering Supervised Teaching**, supplemented graduate students teaching activities to learn practical skills to become effective instructors.
- 2021 **EGS6933 Engineering Faculty Development**, detailed preparation for careers in academia through exploration and experiential learning.
- 2020 **NextProf Nexus Workshop**, provided participants the opportunity to explore and prepare for a faculty position. The program is part of a nationwide effort to strengthen and diversify the next generation of academic leaders in engineering.
- 2020 **McKnight Webinar Series: Best Practices for Obtaining Faculty/Postdoc Positions**, presented comprehensive process of applying for faculty and postdoctoral vacancies as well as provide feedback on application materials.
- 2019-20 **Assistant Grant Writer**, responsible for editing, reviewing, and organizing documents for National Science Foundation AI Institute proposal (not awarded)

#### CONFERENCE AND JOURNAL PEER REVIEW

IEEE Geoscience and Remote Sensing Letters (Spring 2019, Spring 2020, Summer 2020)  
 IEEE Transactions on Artificial Intelligence (Fall 2021)  
 IEEE Journal of Oceanic Engineering (Fall 2021)  
 The Plant Phenome Journal (Fall 2021)

#### PROFESSIONAL MEMBERSHIPS

2018-Pres. Association for Computing Machinery (ACM)  
 2017-Pres. National Society of Black Engineers (NSBE)  
 2017-Pres. Order of the Engineer  
 2016-Pres. Institute of Electrical and Electronics Engineers (IEEE)  
 2015-Pres. National Society of Leadership and Success (NSLS)