

Gregory Murad Reis

Assistant Teaching Professor
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RESEARCH INTERESTS

My research interests intersect the areas of Localization and Navigation of Aquatic Robots, Persistent Ocean Monitoring, Artificial Intelligence, and STEM Education. Key problems I have addressed so far include: localization and navigation of underwater robots in GPS-denied environments [C2, C4, C7, J4, J5], analysis of the spatio-temporal dynamics of the ocean [C3, C5, C6], data analysis of water profiles [C11], persistent monitoring of the ocean using under-actuated robots [C5, J4], and artificial intelligence models applied to agriculture and welfare of poultry [J1, J2, J3, J4, C1]. Recently, I have been conducting marine robotics research to monitor and preserve Biscayne Bay, FL, and developing a software pipeline to create missions to aquatic robots; analyze, visualize and provide water quality data to local authorities and researchers in Florida, USA. So far, I have published sixteen articles and I have ninety-two citations.

EDUCATION

Doctor of Philosophy in Computer Science Knight Foundation School of Computing and Information Sciences, FIU	Aug-2014 - Jul-2018 Miami, FL
Master of Science in Systems Engineering Engineering Department, Federal University of Lavras	Jan-2012 - Jul-2014 Lavras, Brazil
Bachelor of Science in Computer Science Computer Science Department, Federal University of Lavras	Mar-2008 - Jan-2012 Lavras, Brazil

WORK EXPERIENCE

Assistant Teaching Professor Knight Foundation School of Computing and Information Sciences, FIU <i>Responsibilities:</i> Teach upper division undergraduate courses, such as COP4555 - Principles of Programming Languages, COP4814 - Component-Based Software Development, COP4813 - Web Application Programming and CAP4104 - Human-Computer Interaction, and conduct research projects in the fields of Education, Oceanography, Engineering and Mathematics. On average, I teach 185 full time students per semester.	Jan-2021 - Present Miami, FL
Affiliated Faculty/Researcher NSF Center of Research Excellence in Science and Technology, FIU <i>Responsibilities:</i> Conduct research at the NSF's Center for Aquatic Chemistry and Environment (CREST) focusing on development of (i) algorithms for localization of underwater vehicles; (ii) low-cost and robust surface aquatic robots for marine monitoring; (iii) a water quality device for citizens of Miami-Dade.	May 2019 – Present Miami, FL
Lecturer/Robotics Supervisor Ultimate Software Academy for Computer Science Education, FIU	Aug 2016 – Present Miami, FL

Responsibilities: Develop and teach professional development workshops in Robotics for K-12 teachers; organize robotics competitions designed for middle school and elementary school students in Florida; and design modules of a robotics curriculum for the K-12 system in the U.S.

Lecturer/Research Supervisor

May 2016 – Present

NSF Research Experiences for Teachers (RET) and for Undergraduates (REU)

Miami, FL

Responsibilities: Research supervision and instructional guidance to high school teachers and undergraduate students. I have actively participated in two different sites: Advanced Secured Sensor Enabling Technologies (ASSET) and Coastal Ecosystems.

Visiting Instructor

Aug-2018 - Dec-2020

Knight Foundation School of Computing and Information Sciences, FIU

Miami, FL

Responsibilities: Teach upper division undergraduate courses, such as COP4555 - Principles of Programming Languages, COP4814 - Component-Based Software Development, COP4813 - Web Application Programming and CAP4104 - Human-Computer Interaction, and conduct research projects in the fields of Education, Oceanography, Engineering and Mathematics.

Professor

Jan 2014 – Jul 2014

Exact Sciences Department, Federal University of Lavras

Lavras, Brazil

Responsibilities: Teaching undergraduate level courses: Calculus I, Calculus II, Numerical Calculus, Analytic Geometry and Linear Algebra and Laboratory of Mathematics.

RESEARCH GRANTS

- Co-PI - DoD (US Department of Defense) Acquisition of a Combined Aerial and Underwater Motion Capture System - \$600,000.00 - July 2021 - Future
- Co-I/Senior Investigator - NSF (National Science Foundation) - RET in Engineering and Computer Science SITE: Research Experience for Teachers on Cyber-Enabled Technologies - \$600,000.00 - March 2021 - Present
- Co-PI - Microsoft Philanthropies - Development of Teacher Trainings and Professional Workshops in Robotics partnered with nonprofit Miami EdTech, local chapter of CS Teacher's Association, and Miami-Dade County Public Schools - \$195,000.00 - May 2020 - Present

FELLOWSHIPS AND AWARDS

- Best Student Award, Gammon Presbyterian Institute, Year: 2019.
- Science without Borders Fellowship, Laspau Affiliated with Harvard University University, Award: US\$146,004.10. 2014-2018.
- 3 times Student Poster Competition Finalist at Oceans Conference in Aberdeen, Scotland (2017), in Charleston, USA (2018), and in Marseille, France (2019).
- Graduate Fellowship from CAPES for the master's program in Systems Engineering at Federal University of Lavras, 2012-2013.

OTHER ACADEMIC ACHIEVEMENTS

- **Invention Disclosure** Approved under track code D2019-0025. Description: The "FIU Water Wand" uses simple environmental sensors to measure depth and salinity of urban floodwaters during king tide and other flooding events.
- Recommended for **Graduate Faculty Status** in January 2020 at Florida International University.

SERVICE

Present

- Ad-Hoc Reviewer for Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs at NSF (National Science Foundation), which are highly competitive programs that encourage domestic small businesses to engage in Federal Research/Research and Development (R/R&D) with the potential for commercialization. (2020-**Present**)
- Mentor and Instructor in the NSF's Research Experience for Undergraduates (REU) SITE: "Advanced Secured Sensor Enabling Technologies (ASSET)" and the NSF's Research Experience for Teachers (RET) SITE: "Cyber-enabled technologies", FIU, Miami, FL. (2017-**Present**)
- Doctoral Dissertation Committee Member of the PhD Student Luana Okino Sawada at FIU KFSCIS
- Chair of the FIU KFSCIS Undergraduate CO-OP Committee. (2020-**Present**)
- Coordinator of the FIU KFSCIS Graduate Program in Data Science. (2020-**Present**)
- Technical Program Committee at the International Workshop on Security, Privacy, and Trust for Emergency Events (EmergencyComm 2020).
- Member of the FIU Knight Foundation School of Computing and Information Sciences (KFSCIS) Infrastructure Committee. (2018-**Present**)
- Development and execution of the Professional Development Training in Robotics offered by the Academy for Computer Science Education to teachers from Miami Dade County Public Schools, Broward and privates schools around South Florida. (2016-**Present**)
- Advising four Computer Science undergraduate students in their research project: reinforcement learning applied to localization and navigation of aquatic robots to assess water quality and nutrient cycling impacts caused by climate and human-induced impacts in the Florida Keys National Marine Sanctuary, Biscayne Bay, Florida Bay, Southwest Florida Shelf, and the Whitewater Bay/Ten Thousand Islands area of Everglades National Park. (2020-**Present**)
- Member of KFSCIS Programming Team Advisors and coordinators for the Ultimate Software Academy for Computer Science Education. (2016-**Present**)
- FIU KFSCIS ACM Student Chapter Faculty Advisor. (2020-**Present**)
- Founding faculty for the Panther Robotics Club at Florida International University. (2018-**Present**)

Past

- Actively participated in the research agreement between Florida International University and Fort Lewis College, Colorado, almost US\$300,000 in aquatic robotics equipment promoting cooperation in academic education and research. (2020)

- Mentor in the National Science Foundation's Research Experience for Undergraduates (NSF REU) SITE: "Coastal Ecosystems", Florida International University, Miami, FL. (2019)
- Advising two Computer Science undergraduate students in their Senior Project entitled: "MathBotics Learning Management System". This software application is intended for teachers, guardians and students from the K-12 system in the United States of America. (2020)
- Vice-President and Co-Founder of the Computer Science Graduate Student Association, Florida International University, Miami, FL. (2017-2018)
- Academic Mentor, Peer Coach and Resident Assistant at PantherLIFE Program for students with intellectual disabilities. School of Education and Human Development, Florida International University, Miami, FL. (2015-2016)
- Organizer of the "First Annual Florida International University Robotics Open (VEX-IQ Challenge)", an event with a total of 300 K-12 students from twenty schools across Florida and co-sponsored by Miami-Dade County School District. (2018)

SKILLS AND CERTIFICATIONS

- Full-Stack Software Development and Microcontrollers (Arduino, Raspberry Pi).
- Python, Flask, F#, R, Java, Matlab, MySQL, HTML, CSS, PHP, C, C++ and others.
- Certified in Arduino Electronics and Physical Computing.
- Experience with the YSI Ecomapper autonomous underwater robot used for high-resolution maps of water quality, water currents, bathymetry, and sonar imagery.

PUBLICATIONS

Conference Papers

- [C11] Torres, A.; **Reis, G. M.**; Absten, J.; Briceno, H. O.; Bobadilla, L.; Smith, R. N. "Correlating Water Quality and Profile Data in the Florida Keys", Accepted in Proceedings of MTS/IEEE OCEANS, Seattle, Washington, USA, October 2019.
- [C10] Bayuelo, A.; Alam, T.; **Reis, G. M.**; Nino, L. F.; Bobadilla, L.; and Smith, R. N. "Toward Simultaneous Localization and Mapping in Aquatic Dynamic Environments", Accepted in Proceedings of MTS/IEEE OCEANS, Marseille, France, June 2019. (Best Student Paper Finalist)
- [C9] **Reis, G. M.**; Alam, T.; Bobadilla, L.; and Smith, R. N. "Feedback-Based Informative AUV Planning from Kriging Errors", Proceedings of IEEE/OES Autonomous Underwater Vehicle (AUV) Symposium, Porto, Portugal, November 2018.
- [C8] Alam, T.; **Reis, G. M.**; Bobadilla, L.; and Smith, R. N. "An Underactuated Vehicle Localization Method in Marine Environments", in Proceedings of MTS/IEEE OCEANS Conference, pp. 1-8, Charleston, SC, USA, October 2018. (Best Student Paper Finalist)
- [C7] Alam, T.; **Reis, G. M.**; Bobadilla, L.; Smith, R. N. "A Data-Driven Deployment Approach for Persistent Monitoring in Aquatic Environments", Accepted in *IEEE International Conference on Robotic Computing*, Laguna Hills, CA, USA, February 2018

- [C6] **Reis, G. M.**; Leon, H.; Alam, T.; Anderson, J.; Bobadilla, L.; Smith, R. N. "A Whitening-based Tracking Algorithm for Autonomous Underwater Vehicles", in *Marine Technology Society/IEEE Oceans*, Kobe, Japan, 2018.
- [C5] Alam, T.; **Reis, G. M.**; Bobadilla, L.; Smith, R. N. "A Data-Driven Planning with the Persistent Behavior Analysis of a Marine Environment", in *Marine Technology Society/IEEE Oceans*, Kobe, Japan, 2018 (TOP 20).
- [C4] **Reis, G. M.**; Fitzpatrick, M.; Bobadilla, L.; Anderson, J.; Smith, R.N., "Increasing Persistent Navigation Capabilities for Underwater Vehicles with Augmented Terrain-Based Navigation", in *Marine Technology Society/IEEE Oceans*, Aberdeen, Scotland, 2017 (Best Student Paper Finalist)
- [C3] **Reis, G. M.**; Fitzpatrick, M.; Bobadilla, L.; Anderson, J.; Smith, R.N., "Augmented Terrain-Based Navigation to Enable Persistent Autonomy for Underwater Vehicle", in *IEEE International Conference on Robotic Computing*, Taichung, Taiwan, pp. 1 - 7, 2017
- [C2] Mileyko, Y.; **Reis, G. M.**; Chyba, M.; Smith, R.N., "Energy-Efficient Control Strategies for Updating an Augmented Terrain-Based Navigation Map for Autonomous Underwater Navigation", in *IEEE Conference on Control Technology and Applications*, Kohala Coast, Hawaii, 2017.
- [C1] Ponciano, P. F.; Yanagi Junior, T.; Alvarenga, T. A. C.; **Reis, G. M.**; Campos, A. T. "Behavior of Chicks Subjected to Heat Stress", in *XLII Brazilian Conference of Agricultural Engineering*, Fortaleza, 2013.

Journal Articles

- [J5] Fitzpatrick, M., **Reis, G. M.**, Anderson, J., Bobadilla, L., Alsabban, W., Smith, R. Development of Environmental Niche Models for Use in Underwater Vehicle Navigation. *IET Cyber-Systems and Robotics*, 2020.
- [J4] Alam, T.; **Reis, G. M.**; Bobadilla, L.; and Smith, R. N. "A Data-Driven Deployment and Planning Approach for Underactuated Vehicles in Marine Environments", in *IEEE Journal of Oceanic Engineering*, 2020.
- [J3] Schiassi, L.; Junior, T. Y.; **Reis, G. M.**; Abreu, L. H. P.; Campos, A. T.; Castro, J. O. "Fuzzy modeling applied in the evaluation of broiler performance", in *Revista Brasileira de Engenharia Agrícola e Ambiental*, Campina Grande, PB, BR, February 2015.
- [J2] Ferraz, P. F. P.; Junior, T. Y.; Julio, Y. F. H.; Castro, J. O.; Gates, R. S.; **Reis, G. M.**; Campos, A. T., "Predicting Chick Body Mass by Artificial Intelligence-Based Models", in *Brazilian Journal of Agricultural Research*, v. 49. n. 7, p. 559-568, July 2014.
- [J1] Schiassi, L.; Junior, T. Y.; Abreu, L. H. P.; **Reis, G. M.**, Damasceno, F. A.; Silva, G. C. A.; Campos, A. T. "Laboratory Proposal for Studies on Poultry Environment", in *International Journal of Engineering Research and Applications*, 2014.