

# Melissa M. (Morris) Sahl

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## Executive Summary:

Multidisciplinary educator and engineer who is passionate about making the world better through effective and meaningful education and health tools. Work in education focuses on personalized and accessible education for diverse populations and geographical areas, especially utilizing effective online strategies. Research interests focus on robotics and mechatronic systems for therapy, surgery, and nutrition. I strive to facilitate and maintaining ethics across all aspects of technology.

## Major Work Experience:

### Affiliated Faculty

University of Maryland Baltimore County, Baltimore, Maryland  
January 2023 – Present

- Cofounder of the Ethical Software Laboratory developing methods to impartially evaluate the ethics of software-intensive products
- Developed and taught graduate courses in Software Engineering both online and in-person/online hybrid formats
- Assisted the Software Engineering Graduate Program in outreach activities

### Assistant Professor

Embry-Riddle Aeronautical University – Worldwide Campus, Daytona Beach, Florida  
December 2019 – May 2024

- Associate Program Coordinator of the BS in Engineering
- Taught online asynchronous courses
- Redeveloped courses and online laboratories in robotics and mechatronics
- Assisted in successfully obtaining full initial ABET accreditation
- Consulted with AVRA Medical Robotics (unpaid) to modify and implement a robot for dermatology applications

### Assistant Professor

Florida Polytechnic University, Lakeland, FL 33805  
June 2017 – December 2019

- Developed ten new courses at a start-up university
- Helped develop the Mechanical Engineering project-based degree program
- Instructed several different in-person courses via active learning strategies
- Researched and implemented smart agriculture and robotics projects on campus and in the community

### **Adjunct Instructor**

Palm Beach State College, Palm Beach Gardens, Florida  
May 2017 – August 2017

- Taught a hands-on laboratory course in electronics

### **Graduate Research Assistant**

Florida International University, Miami, Florida  
August 2011 – May 2017

- Developed, built, and tested two prototypes of an ophthalmic robot for remote examinations and surgery. Two patents were issued for this work
- Taught four different robotics courses as instructor-of-record. Assisted in others
- Supervised 47 undergraduate students in twelve capstone projects
- Advised seven undergraduate independent study projects
- Maintained the Robotics Laboratory as needed for courses, research, and tours

### **Graduate Researcher**

Technion – Israel Institute of Technology, Haifa, Israel  
May 2008 – October 2010

- Conducted research on cable-driven robotics
- Mentored and advised undergraduate students in robotics

### **Teaching Assistant**

Florida Atlantic University, Boca Raton, Florida  
May 2003 - July 2005, January 2006 - May 2007

- Designed and prototyped a physical therapy robot. Received a provisional patent
- Conducted research retrofitting of industrial robots to perform biomedical tasks
- Assisted in the teaching of numerous courses in engineering for undergraduates and high school students
- Independently developed and conducted hands-on workshops for practical engineering design and construction

### **Engineering Intern**

Ford Motor Company of Europe, Cologne, Germany  
August 2005 – December 2005

- Improved the data management program for the Virtual Manufacturing division remotely verifying the physical implementation of spot weld points against the requested positions developed in virtual simulations

### **User Assistant**

University of Miami, Miami, Florida  
August 1998 – December 2000

- Improved cleanliness and usability of computing facilities in the Engineering Center
- Voted best user assistant for IT users by peers in 1999

## Education:

**Florida International University**, Miami, Florida  
PhD, Mechanical Engineering  
July 28, 2017  
GPA: 4.0 of a 4.0 grade scale, Summa cum laude

**Florida Atlantic University**, Boca Raton, Florida  
MS, Mechanical Engineering  
December 14, 2007  
GPA: 3.42 of a 4.0 grade scale

**Florida Atlantic University**, Boca Raton, Florida  
Graduate Certificate, Bioengineering  
May 5, 2006

**Florida Atlantic University**, Boca Raton, Florida  
BS, Electrical Engineering  
May 2, 2003  
GPA: 3.58 of a 4.0 scale, Cum laude

## Skills:

- Programming of Industrial Robots for Automation, including PLCs
- Computer Aided Drafting (CAD), Computer Aided Manufacturing (CAM), Computer Numerical Controlled Machining (CNC)
- Circuit and Electrical System Design, Analysis, Packaging, Construction, Implementation, and Evaluation
- Computer vision programming and implementation
- Programming and Application of Microcontrollers and Single-board PCs
- C++, Basic, Python, TCL/TK, Fortran, Web design, HTML, Javascript
- MATLAB, Simulink, GNU/Octave, Maple, Spice Programs, MultiSIM, AutoCAD, ProEngineer, SolidWorks, Autodesk, Inventor, CATIA, Office, MacOS, iOS, Android, Linux, Unix, Windows
- Machining, Additive Manufacturing, Composite Fabrication and Repair
- Photovoltaic Systems Design and Implementation
- Biotechnology Laboratory Techniques and Procedures, Bioinformatics
- Software ethics including use of Artificial Intelligence (AI)

## Professional Registration:

**Engineer-in-Training (EIT)** License 1100008851, State of Florida  
Granted February 14, 2004; Currently Active  
Planning to sit for the PE exam in 2025

### Patents:

- Remote Ophthalmic System and Related Methods; **US Patent 11,497,651** with Austin Bach; TYB, Inc., November 15, 2022
- Remote Ophthalmic System and Related Methods; **US Patent 10,751,216** with Austin Bach; TYB, Inc., August 25, 2020
- Safety Joystick for Rehabilitation Robot; **Provisional US Patent** with Oren Masory; Florida Atlantic University, 2007

### Major Honors:

- Service Award; Embry-Riddle Aeronautical University, August 2022
- Order of the Engineer; Florida International University, May 2017
- Outstanding Academic Achievement Award; Department of Mechanical and Materials Engineering, Florida International University, April 2017
- Technology Leaders of the Year Award Finalist; Miami Chamber of Commerce, Florida, April 2013
- Student Talon Award; Florida Atlantic University (Awarded to only one or two students a year for outstanding leadership), November 2004

### Major Leadership and Service Positions:

- Member of the Future of Mechatronics and Robotics Education committee, North America, 2021 – Present
- Associate Program Coordinator, B.S. in Engineering, Embry-Riddle Aeronautical University, 2020 – 2024
- Site Visit Reviewer, National Science Foundation (NSF), September 2023
- Robotics Consultant, AVRA Medical Robotics, Orlando, Florida, 2020 – 2022
- Workshop Co-organizer and co-presenter, *Curriculum and Course Design for Mechatronics and Robotics Engineering Education*, 2022 ASEE Annual Conference & Exposition, Minneapolis, MN, June 2022
- Conference Organizer, 35th Florida Conference on Recent Advances in Robotics, Daytona Beach, FL (Virtual), 2022
- Director of the Florida Polytechnic Intelligent Garden, June 2018 – December 2019
- Robotics Club Adviser, Florida Polytechnic University, 2018-2019
- Conference Co-organizer, 32nd Florida Conference on Recent Advances in Robotics, Lakeland, FL, 2019
- Conference Organizer, 27th Florida Conference on Recent Advances in Robotics, Miami, FL, 2014
- Project Adviser, Cable-driven RoboCup Soccer Goalie, Technion – Israel Institute of Technology, 2008-2009
- Assistant Organizer, 9th Biennial ASME Conference on Engineering Systems Design and Analysis, Haifa, Israel, 2008
- Member of Tau Beta Pi, Sigma Xi, American Society for Engineering Education, and the American Society of Mechanical Engineers

## Courses Taught:

**Modeling of Robots** – EML 4806, Florida International University  
Summer 2014; In-person

**Robot Design** – EML 4840, Florida International University  
Spring 2013; In-person  
Spring 2014; In-person

**Advanced Design of Robots** – EML 6805, Florida International University  
Spring 2014; In-person

**Intro to Electronics** – EET1215C, Palm Beach State College  
Summer 2017; In-person in lab setting

**Dynamics** – EGN 3321, Florida Polytechnic University  
Fall 2017; In-person  
Summer 2018; In-person

**Intro to STEM** – IDS 1002, Florida Polytechnic University  
Fall 2017; In-person

**Concepts and Methods for Engineering and Computer Science** – EGN 1007C,  
Florida Polytechnic University  
Spring 2018; In-person

**Skills & Design I** – EGN 2001C, Florida Polytechnic University  
Developed course  
Fall 2017; In-person  
Fall 2018; Course coordinator, In-person, three sections

**Skills & Design II** – EGN 2002C, Florida Polytechnic University,  
Developed course  
Spring 2018: In-person  
Spring 2019: Course coordinator, In-person, two sections

**Mechatronics** – EML 3811C, Florida Polytechnic University  
Created and developed course  
Spring 2018: Course Coordinator, In-person  
Fall 2018: In-person; Course Coordinator  
Spring 2019: In-person; Course Coordinator  
Fall 2019: Course Coordinator

**Compliant Mechanisms** – EGS 5903, Florida Polytechnic University  
Created and developed course  
Fall 2019: In-person

**Mechatronics** – ENGR 404, Embry-Riddle Aeronautical University  
Course Developer 2023

February 2020: Asynchronous online  
August 2020: Asynchronous online  
October 2020: Asynchronous online  
October 2021: Asynchronous online  
January 2022: Asynchronous online  
August 2022: Asynchronous online  
January 2023: Asynchronous online

**Mechatronics Lab** – ENGR 404, Embry-Riddle Aeronautical University  
Course Developer 2023

February 2020: Asynchronous online  
August 2020: Asynchronous online  
October 2020: Asynchronous online  
October 2021: Asynchronous online  
January 2022: Asynchronous online  
August 2022: Asynchronous online  
January 2023: Asynchronous online

**Introduction to Robotics** – MECH 302, Embry-Riddle Aeronautical University  
Course Developer 2023

January 2021: Asynchronous online  
August 2021: Asynchronous online  
October 2022: Asynchronous online

**Introduction to Robotics Lab** – MECH 303, Embry-Riddle Aeronautical University  
Course Developer 2023

January 2021: Asynchronous online  
August 2021: Asynchronous online  
October 2022: Asynchronous online

**Signals and Systems** – ENGR 330, Embry-Riddle Aeronautical University  
January 2021: Asynchronous online

**Signals and Systems Lab** – ENGR 331, Embry-Riddle Aeronautical University  
January 2021: Asynchronous online

**Graphical Communications** – ENGR 120, Embry-Riddle Aeronautical University  
August 2023: Asynchronous online

**Fundamentals of Energy Systems** – ENGR 400, Embry-Riddle Aeronautical University  
October 2023: Asynchronous online

**Capstone Design Project I** – ENGR 490, Embry-Riddle Aeronautical University  
August 2023: Asynchronous & Synchronous online

**Capstone Design Project II** – ENGR 491, Embry-Riddle Aeronautical University  
October 2023: Asynchronous & Synchronous online

**Ethics in Software Engineering** – SENG 601, University of Maryland Baltimore County

Spring 2023: Hybrid  
Summer 2023: Asynchronous online  
Fall 2023: Hybrid  
Spring 2024: Hybrid  
Summer 2024: Asynchronous online

**Reading to Write Code** – SENG 691 Special Topics in Software Engineering, University of Maryland, Baltimore County  
Spring 2024: Synchronous/Asynchronous online

**Software Engineering Capstone** – SENG 701, University of Maryland Baltimore County

Spring 2024: Synchronous online assistant

### Major Projects:

- Ethical Software Laboratory; UMBC, 2023 – Present
- SPARK 2.0 Educational Robot; personal collaboration, 2020 - Present
- Robotic Skin Treatments; AVRA Medical Robotics, 2020-2022
- Intelligent Garden; Florida Polytechnic University, 2017-2019
- Remote Ophthalmology Robot (I & II); FIU/TYB Inc., 2014-2017
- Robot for Pediatric Rehabilitation; FIU, 2013-2017
- Robot for Rehabilitation Assistance; FAU, 2006-2007
- Monitoring Program for Spot Welds in an Assembly Plant; Ford, 2005
- Cable-Driven Force-Feedback Manipulator; FAU, 2005
- Pipetting & Visual Analysis Robot; FAU, 2005
- Portable Braille Computer Interface; 2004
- Walking Robot II “Son of Fledgling,” SAE Walking Machine Challenge; FAU, 2003
- Walking Robot I “Fledgling,” SAE Walking Machine Challenge; FAU/SAE, 2002

## Grants:

\$10,000; Co-PI with Dr. Mohammad Samarah; ACM Summer School Grant “UMBC Ethical Software Lab Workshop” from the Association for Computing Machinery; Funded June 2024 – August 2025.

\$20,000; Co-PI with Drs. Mohammad Samarah, Abhijit Dutt, and Charissa Cheah; COEIT Interdisciplinary Grant “The Ethical Software Lab at UMBC” from the College of Engineering and Information Technology at the University of Maryland Baltimore County; Funded August 2024 – July 2025.

\$25,000; Co-PI with Dr. Mohammad Samarah; Cybersecurity Leadership Exploratory Project Grant “The UMBC Ethical Software Lab” from the University of Maryland Baltimore County (UMBC); Funded May 2023 – January 2024.

\$10,000; Co-PI with Dr. Mohammad Samarah; CENTRE (Commercialization & ENTr REsearch) Grant “The UMBC Center for Software Ethics Certification” from the University of Maryland Baltimore County (UMBC); Funded April 2023, *declined to be ethical since two awards were received for the same project.*

\$25,000; Co-PI with Dr. Nicoleta Hickman; Internal Grant AW-1800023 “Back to Nature Intelligent Gardening Center, Phase II” from Florida Polytechnic University; Funded July 2018 – June 2019.

\$51,000; Assisted in obtaining with Dr. Sabri Tosunoglu; “Remote Ophthalmology Robotic Device Prototype” from TYB, Inc., Miami, FL; Funded May 2015 – April 2016.

## Publications:

### Book Chapter

S. Nguyen, A. Lens, M. Sahl, and M. Samarah, “A Comparison of Axon Regeneration in *Xenopus* and *Danio rerio*,” *Proteomics MultiOmics and Systems Biology in Optic Nerve Regeneration*, editors: E. Neag and S. Bhattacharya, Elsevier; September 2024.

### Dissertation

“Robot Control for Remote Ophthalmology and Pediatric Physical Rehabilitation,” under the supervision of Professors Sabri Tosunoglu and Ibrahim Tansel, July 2017.

### Thesis

“Cable-Driven Robot for Physical Therapy Assistance,” under the supervision of Professor Oren Masory, November 2007.



### Professional Workshop Presentations

- M. Samarah, M. Morris, and K. Kephart, "An Open-Source and AI Kit to Co-Create Hardware and Software Engineering Skills and Explore Ethical Implications of Its Use for Diverse Communities," *2023 Maryland Open Education Resource Summit*, Workshop, December 1, 2023, Salisbury, MD.
- C. Berry, G. Lewin, M. Morris, J. Mynderse, "Curriculum and Course Design for Mechatronics and Robotics Engineering Education," *American Society of Engineering Education Annual Conference*, June 26, 2022, Minneapolis, MN.

### Papers (presenter is underlined, if applicable)

- C. Pannier, C. Berry, M. Morris, and X. Zhao, "Diversity and Inclusion in Mechatronics and Robotics Engineering Education," *Proceedings of the 127th American Society of Engineering Education Annual Conference*, June 21-27, 2020, Montreal, Canada (online).
- M. Morris, "Engagement in Practice: A Second Year Project-Based Learning Sequence," *Proceedings of the 127th American Society of Engineering Education Annual Conference*, June 21-27, 2020, Montreal, Canada (online).
- M. Ayer, M. Morris, "Compliant Joints Actuated Via Cables," *Proceedings of the 33rd Florida Conference on Recent Advances in Robotics*, May 15, 2020, Melbourne, Florida (online).
- M. Morris, N. Hickman, B. Butler, and G. Percy, "Florida Polytechnic University's Intelligent Garden," *2019 ASABE Annual Meeting*, Advances in Instrumentation and Control Systems, July 2-10, 2019, Boston, MA.
- E. Williams, M. Swindon, J. Johnson, M. Acvecedo, E. Araiza, B. Garcia, K. Ricketts, B. Chandrasekaran, E. Elibol, M. Morris, and R. Integlia, "Progress in Upcycled and Sustainable Robotics: Developing an Accessible, Flexible, and Environmentally Friendly Robotics Platform," *Proceedings of the 32nd Florida Conference on Recent Advances in Robotics*, May 9-10, 2019, Lakeland, Florida.
- E. Williams, M. Acvecedo, M. A. Bharmal, V. Fomitchev, L. Nichols, K. Ricketts, B. Chandrasekaran, E. Elibol, M. Morris, and R. Integlia, "Towards the Development of Junkyard Hacks: Networked Robotics Applications," *Proceedings of the 31st Florida Conference on Recent Advances in Robotics*, May 10-11, 2018, Orlando, Florida.
- D. Larsson, D. Irving, S. Effendi, J. Dubin, A. Bach, M. Morris, and S. Tosunoglu, "Ophthalmic Robot," *Proceedings of the 30th Florida Conference on Recent Advances in Robotics*, May 11-12, 2017, Boca Raton, Florida.
- K. Kaba, F. Baksh, Y. Almashan, B. Alsubaei, A. Bach, M. Morris, and S. Tosunoglu, "Miniature Robotic Arm to Manipulate Ophthalmic Lenses," *Proceedings of the 30th Florida Conference on Recent Advances in Robotics*, May 11-12, 2017, Boca Raton, Florida.
- L. Ramos, S. Valencia, S. Verma, K. Zornoza, M. Morris, and S. Tosunoglu, "Robotic Face to Simulate Humans Undergoing Eye Surgery," *Proceedings of the 30th Florida Conference on Recent Advances in Robotics*, May 11-12, 2017, Boca Raton, Florida.
- R. Maliki, D. Alhaidar, K. Attallah, S. Alsalem, M. Morris, and S. Tosunoglu, "Robotic Hand that Teaches Sign Language," *Proceedings of the 30th Florida Conference on Recent Advances in Robotics*, May 11-12, 2017, Boca Raton, Florida.

- R. Olazo, G. Soles, A. Mendoza, J-C. Drada, S. Tosunoglu, and M. Morris, "The Humanoid Rehabilitation Project," *Proceedings of the 30th Florida Conference on Recent Advances in Robotics*, May 11-12, 2017, Boca Raton, Florida.
- E. Bu Pons, M. Aranega, M. Morris, and S. Tosunoglu, "BudE: Assistant to Parent of a Child," *Proceedings of the 30th Florida Conference on Recent Advances in Robotics*, May 11-12, 2017, Boca Raton, Florida.
- F. Lopez, C. Reano, A. Rosenqvist, M. Morris, S. Tosunoglu, "FARA: Framing Assembly Robotic Arm System for Construction Sites," *Proceedings of the 30th Florida Conference on Recent Advances in Robotics*, May 11-12, 2017, Boca Raton, Florida.
- S. Varadaramanujan, S. Sreenivasa, P. Pasupathy, S. Calastawad, M. Morris, S. Tosunoglu, "Design of a Drone with a Robotic End-Effector," *Proceedings of the 30th Florida Conference on Recent Advances in Robotics*, May 11-12, 2017, Boca Raton, Florida.
- M. Morris and S. Tosunoglu, "Teleoperated Ophthalmic Examination Robot," *Proceedings of the 29th Florida Conference on Recent Advances in Robotics*, May 12-13, 2016, Miami, Florida.
- M. Morris and S. Tosunoglu, "Robotic Ocular Surgery," *Proceedings of the 28th Florida Conference on Recent Advances in Robotics*, May 14-15, 2015, Melbourne, Florida.
- A. Garo, L. Melara, R. Scott, M. Morris and S. Tosunoglu, "Natural Gain Inducing Transtibial Prosthetic," *Proceedings of the 28th Florida Conference on Recent Advances in Robotics*, May 14-15, 2015, Melbourne, Florida.
- J. Higgs, A. Osorio, G. Pisani, S. Rojas, M. Morris and S. Tosunoglu, "Laser Eye Surgery Robot," *Proceedings of the 28th Florida Conference on Recent Advances in Robotics*, May 14-15, 2015, Melbourne, Florida.
- R. Gonzalez, J. Hernandez, A. Muller-Poitevien, M. Montan, M. Morris and S. Tosunoglu, "Terramartian Mining Robot," *Proceedings of the 28th Florida Conference on Recent Advances in Robotics*, May 14-15, 2015, Melbourne, Florida.
- D. Delgado, M. Fisher, L. Melara, M. Morris, and S. Tosunoglu, "SWAT Bot and Its Future Uses as a Strategic Response Robot," *Proceedings of the 28th Florida Conference on Recent Advances in Robotics*, May 14-15, 2015, Melbourne, Florida.
- R. Portorreal, M. Koza, S. Di Pasquale, A. Rodriguez, and M. Morris, "MEC Panther," *Proceedings of the 27th Florida Conference on Recent Advances in Robotics*, May 8-9, 2014, Miami, Florida.
- M. Morris, "Flexible Robotic Technology for Human-Robot Interaction," *Proceedings of the 26th Florida Conference on Recent Advances in Robotics*, May 16-17, 2013, Tallahassee, Florida.
- O. Masory, M. Morris, Y. Tobie, "Upper-Limbs Rehabilitation Devices: Part I – Active Devices," *Rehabilitation Engineering and Assistive Technology Society of North America (RESNA) Annual Conference*, June 22-24, 2013, Bellevue, Washington.
- M. Morris and S. Tosunoglu, "Comparison of Rechargeable Battery Technologies," *American Society of Mechanical Engineers Early Career Technical Conference and Journal*, November 2-3, 2012, Atlanta, Georgia.
- D. Garcia, V. Soto, Y. Lurbe, M. Morris, and S. Tosunoglu, "Development of a Rehabilitative Exoskeletal Arm," *American Society of Mechanical Engineers Early Career Technical Conference and Journal*, November 2-3, 2012, Atlanta, Georgia.
- D. Garcia, R. Arredondo, M. Morris, and S. Tosunoglu, "A Review of Rehabilitation Strategies for Stroke Recovery," *American Society of Mechanical Engineers Early Career Technical Conference and Journal*, November 2-3, 2012, Atlanta, Georgia.

- M. Morris and S. Tosunoglu, "Survey of Rechargeable Batteries for Robotic Applications," *Proceedings of the 25th Florida Conference on Recent Advances in Robotics*, May 10-11, 2012, Boca Raton, Florida.
- M. Morris and D. Raviv, "A Methodical Method for Determining Research Areas in Heart Disease Based on the Eight-Dimensional Methodology for Innovative Problem Solving," *Proceedings of the 2009 American Society for Engineering Education Annual Conference & Exposition*, June 14-17, 2009, Austin, Texas.
- M. Morris and M. Shoham, "Applications and Theoretical Issues of Cable-Driven Robots," *Proceedings of the 22nd Florida Conference on Recent Advances in Robotics*, May 21-22, 2009, Jupiter, Florida.
- M. Morris and O. Masory, "A Novel Cable-Driven Robot for Rehabilitation," *Second Israeli Conference on Robotics*, November 19-20, 2008, Herzliya, Israel.
- M. Morris and O. Masory, "Planar Cable-Driven Rehabilitation Robot," *Proceedings of the 21st Florida Conference on Recent Advances in Robotics*, May 8-9, 2008, Melbourne, Florida.
- D. Raviv, M. Morris, K. Ginsberg, "On Teaching and Assessing Engineering Innovation," *Proceedings of the 2005 American Society for Engineering Education Annual Conference & Exposition*, June 14, 2005, Portland, Oregon.
- T. Kelly, P. Baillargeon, M. Morris, J. Morris, "Pipetting Application of a Pick and Place Robot," *18th Florida Conference on Recent Advances in Robotics*, May 5-6, 2005, Gainesville, Florida.
- M. Morris, "A Study of Bilateral Force Reflection Manipulators," *17th Florida Conference on the Recent Advances in Robotics*, May 6, 2004, Orlando, Florida.
- M. Morris, "Portable Braille Computer Interface," *Proceedings of the ASME Southeastern Region XI 2004 Regional Technical Conference and Journal*, April 2-3, 2004, Mobile, Alabama.
- B. Landon, D. Martin, J. Morris, M. Morris, J. Railsback, M. Spies, "Walking Robot," *Proceedings of the 16th Florida Conference on Recent Advances in Robotics*, May 8-9, 2003, Dania Beach, Florida.
- M. Morris, J. Morris, B. Landon, D. Martin, L. Rainard, W. Krug, and T. Kelly, "Fledgling: Florida Atlantic University's First Walking Robot," *2002 Society of Automotive Engineers Walking Machine Challenge*, May 2-4, 2002, Golden, Colorado.