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Siobhan Rigby Oca
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EDUCATION

Duke University   **Durham, NC**
PhD in the Department of Mechanical Engineering and Materials Science   August 2018- May 2022
Relevant Courses: Robot System Design, Human Robot Interaction, Introduction to Robotics, Linear Systems, Intermediate Dynamics, Model Predictive Control, Data Driven Dynamical Systems and Control

UC Berkeley and UC San Francisco (joint program)   **Berkeley and San Francisco, CA**
Masters in Translational Medicine   June 2017
Relevant Courses: Bringing Biomedical Device to Market (Regulatory focus: PMA, 510k, Design Review)
Advanced Orthopedic Biomechanics, Marketing and Product Management, Clinical Need Based Therapy Solns

Massachusetts Institute of Technology (MIT)   **Cambridge, MA**
Bachelors in Mechanical Engineering   June 2016
Minors in Biomedical Engineering and Literature
Relevant Courses**:** Tissue Mechanics; Prosthetics for Dev World; Micro/Nano Eng Lab; Medical Device Design

TEACHING

Duke University Mechanical Engineering and Materials Science (MEMS) Department   **Durham, NC**
Instructor of Record for Introduction to Robotics   Fall 2021
- Designed a new course for MEMS and ECE including building simulation environments for students
- Became an American Society of Mechanical Engineers Graduate Teaching Fellow and supported by Bass Instructor of Record Fellowship based on course plan
- Bass Connections Collaborative Project Expedition Proposal Selected to develop ROS based team project in the summer with two Professors in MEMS and further the Robotics curricula for future semesters

Duke University Mechanical Engineering and Materials Science (MEMS) Department   **Durham, NC**
Teaching Assistant (TA) for required undergraduate course: Control Systems   Fall 2019 and 2020
- Designed and led recitations and led labs to review concepts and prepare students for exams
- Held office hours, created grading rubrics and graded homework and exams
- Participate in Certificate for College Teaching (CCT) Program and have completed Teaching Triangles

MIT Global Teaching Labs   **Crema and Milan, Italy**
Visiting Teacher and Representative (160 students)   January 2014 and January 2015
- Taught mechanics, electricity and magnetism, calculus, biology and statistics to high school students
- Chosen as representative to present at teaching conference for the Italian Minister of Education

RESEARCH/INDUSTRY EXPERIENCE

Duke Acute Care Technology Lab   **Durham, NC**
PhD Researcher   August 2018-May 2022
- As first PhD student of the lab, helped select lab equipment, train and mentor undergraduate and masters students (10) in research activities in robotics such as prototype development (of end effectors, arm restraints, human phantom tissue) and data analysis
- Developed robotic arm, ultrasound, RGB-D camera testbed and core visualization (using Klampt) and testing scripts for development of medical procedure and controller testing for PhD research
- Generated and granted IRB of human testing for vein localization with autonomous ultrasound and RGB-D camera guided robotic arm

Graduate Robot System Design   **Durham, NC**
Project Lead: Team Baymax   January-June 2019
- Defined key assumptions and goals, specifically relevant to previous Nursebot system
- Developed system parameters and wrote custom ROS nodes for our integrated ROS system

- Led team meetings in defining core goals and tasks for each week and outlined, created communication deliverables of midterm and final document and class presentations

UC San Francisco Medical School   **San Francisco, CA**
Graduate Researcher in Hypoxia Research Laboratory and Pulse Oximeter Test Facility   January 2017-July 2018
- Designed automated electric and mechanical system with simulated blood to develop pulsatile measures for low blood volume
- Working with cross functional team of engineers and doctors to develop design and test procedures

UC Berkeley Department of Electrical Engineering   **Berkeley, CA**
Graduate Researcher in Arias Biosensor Fabrication Lab   January - June 2017
- Developed and designed circuit in EAGLE for pulse oximetry to reduce motion artifact
- Provided leadership to team project with regulatory and business experience

LivaFortis   **San Francisco, CA/Austin, TX**
Manager of Product Development   October 2017- August 2018
- Developed working medical device prototype with electromechanical sensors for those with scoliosis

Bioxytech Retina   **Richmond, CA**
Research Associate   June- September 2017
- Designed/Conducted market research study (40 Ophthalmologists) to develop reimbursement strategy key to future STTR Phase 2 Grant submission and acceptance
- Developed and executed prototype verification setup with fixture design and stabilizing blood saturation

Boston Scientific   **Cambridge, MA**
Engineering Intern, R&D of Orion Catheter in Rythmia Mapping System   June – August 2016
- Toleranced shaft referencing manufacturing systems & quality standards with various analytical methods
- Test protocol origination, execution and reporting for shaft interaction in vulnerabilities analysis of shaft

Department of Biological Engineering and Koch Institute at MIT   **Cambridge, MA**
Undergraduate Researcher in Fraenkel and Houseman Lab   January 2013 – June 2015
- Preformed brain surgery for injection of virus, brain dissection and FAACs on striatum and cortex of mice
- Studied Huntington's disease through R61 and CHL2 mice animal models and cell/neuron culture

Technische Universiteit Delft (T.U. Delft)   **Delft, The Netherlands**
Visiting Research Fellow, Biomechanics Department   June – August 2015

LEADERSHIP

Mechanical Engineering and Materials Science (MEMS) Graduate Committee   **Durham, NC**
Vice President/President/ Recruitment Chair   Fall 2018- Spring 2022
- Revamped recruitment and orientation to encourage increased interactions, even in the pandemic
- Co-led, analyzed and presented climate survey for graduate student body of MEMS

Duke Club Field Hockey   **Durham, NC**
Head Coach (40 players)   Fall 2018-Spring 2022
- Lead 2-3 weekly practices with games in spring in fall with games/tournaments on select weekends

Berkeley High Field Hockey   **Berkeley, CA**
Head Coach to Varsity and JV (75 players)   Fall 2016- Fall 2017
- Organized schedule, practice for both teams, and rides; selected teams rosters
- Led daily practice and tutoring, which led to first winning season for team

HONORS/AWARDS

Duke University

NSF NRT TAST Fellow (first for Surgical Robotics program at Duke)	Nov 2021
ASME Graduate Teaching Fellow	May 2021
Bass Connections Collaborative Project Expedition Proposal Selected	May 2021
Bass Instructional Fellowship	December 2020

KNO2 *Startup Technical Lead*   December 2016-June 2017

Finalist at BASES Challenge, Stanford

Finalist Global Health in Big Ideas Competition, UC Berkeley ($5,000 award)

Invited presenters/Finalists Global Health Innovation Conference, Yale

MIT Varsity Field Hockey   September 2012-May 2016

NFHCA National Academic Squad	2013, 2014, 2015
NEWMAC Academic All-Conference	2014, 2015

PRESENTATIONS/PUBLICATIONS

Siobhan R. Oca, Jiselle Havas, Leila Bridgeman, Daniel M Buckland, Durable Breast Phantom with Geometric and Mechanical Properties approximating Human Tissue for Ultrasound Image and Robotic System Testing, Paper presented at IEEE International Symposium on Medical Robotics (ISMR) in Atlanta, GA, 2022

Siobhan R. Oca, Leila Bridgeman, Daniel M Buckland, A Robotic System for Ultrasound Guided Peripheral Vascular Localization for Human Spaceflight, [Conference Presentation] NASA Human Research Program Investigators' Workshop. Virtual, 2022

Oca, SR, Navas, A, Leiman, E, Buckland, DM. Effect of language interpretation modality on throughput and mortality for critical care patients: A retrospective observational study. *JACEP Open.* 2021 2:e12477. https://doi.org/10.1002/emp2.12477

Guangshen Ma*, **Siobhan R. Oca*,** Yifan Zhu, Patrick Codd, Daniel M Buckland, A Novel Robotic System for Ultrasound-Guided Peripheral Vascular Localization, Proc. IEEE International Conference on Robotics and Automation (ICRA 2021) Xian, China, 2021

Siobhan R. Oca, Guangshen Ma, Leila Bridgeman, Daniel M Buckland, A Robotic System for Ultrasound Guided Peripheral Vascular Localization for Human Spaceflight, [Conference Presentation] NASA Human Research Program Investigators' Workshop. Virtual, 2021

Yildirim, F., Ng, C., Kappes, K., Ehrenberger, T, **Rigby, S**., Stivanello, V., Gipson, T., Soltis, A., Vanhoutte, P., Caboche, J, Housman, D & Fraenkel, E. (2019, November) Early epigenomic and transcriptional changes reveal Elk-1 transcription factor as a new therapeutic target in Huntington's disease. *Proceedings of the National Academy of Sciences of the United States of America*

Oca, S. R. & Buckland, P. (2019, April) *Challenges in Autonomous Intravenous Therapy (IV) Insertion* Poster presented at International Symposium on Medical Robotics (ISMR) in Atlanta, GA

Rigby, S., Lipnick, M., Bernstein, M., Law, T., & Bickler, P. (2017, November) *Novel method for measuring blood oxygen saturation in patients with severe anemia* Poster presented at Anesthesia Research Day at University of California San Francisco

SKILLS

Research: AFM, Nanoindentor, micro fluidics, electron microscopy, micro contact printing, photolithography

Computer: MATLAB, Python, EAGLE, ROS, C++, Solid Works/Fusion

Prototyping: welding, woodwork, brush on silicone, sewing, basic electronics (wiring, soldering), 3D Printing