Jessica McLaughlin

Assistant Teaching Professor
Biomedical Engineering Program
University of Colorado Boulder
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PERSONAL

Date of Birth: October 5, 1992 **Place of Birth**: Albany, NY, USA **Citizenship**: USA

EDUCATION

Northeastern University, Boston, MA
PhD in Bioengineering
May 2020
Dissertation Title: Optical Sensing Techniques for Detection of Rare Circulating Tumor Cells and Disease Metabolites
Brief Synopsis: Under Principal Investigators Professors Hicham Fenniri and Mark Niedre, developing optical sensors for both in vitro and in vivo disease detection and diagnosis.

Oral Roberts University, Tulsa, OK
BS in Engineering Physics
May 2014
Thesis: Synthesis of Silver Nanoparticles Toward Antimicrobial Medical Devices

EMPLOYMENT

Teaching Assistant Professor University of Colorado Boulder, Boulder, CO

Biomedical Engineering Program
Fall 2020 – *present*
Responsible for undergraduate and graduate course instruction, new course development, and cultivating a community of support, growth, and excellence in the new Biomedical Engineering program at CU. Courses to date include: Freshman Engineering Projects, Computer Aided Design and Fabrication, Anatomy and Physiology for Engineers, Biomaterials, and Bioinstrumentation.

Graduate Research Assistant Northeastern University, Boston, MA

Biomedical Optics Group
Summer 2018 – Summer 2020
Developing a mouse cancer model to evaluate the effects of radiation on metastasis via detection of circulating tumor cells with Diffuse In Vivo Flow Cytometry

Supramolecular Nanotechnology Lab
Fall 2014 – Spring 2018
Creating "barcoded polymer" biomimetic sensors for detection of clinically relevant liquid and vapor analytes using Raman spectroscopy and multivariate data analysis

Communications Laboratory Writing Fellow Northeastern University, Boston, MA
2017 – 2019
Consulting and partnering with bioengineering and chemical engineering graduate students and post-doctoral fellows to help develop and improve their technical writing skills for publications including journal articles, abstracts, theses, and others

Book Co-editor

2018-2019
Springer Series *Methods in Molecular Biology*: Special Edition in Biomimetic Sensing

Course Instructor Northeastern University, Boston, MA
Anatomy and Physiology I & II Lab (Spring 2016 – Fall 2017)

Graduate Teaching Assistant
Northeastern University, Boston, MA

Biomaterials (Spring 2018)
Bioengineering Research and Design (Fall 2015)

SERVICE, OUTREACH, AND PROFESSIONAL DEVELOPMENT

Grant Reviewer – NSF Graduate Research Fellowship Program
December 2023

ABET Coordinator – Biomedical Engineering Program
University of Colorado Boulder, Boulder, CO
Spring 2021 – present

Program Evaluation: Fall 2023, ABET accreditation earned

American Society for Engineering Education
National Society Member
2022 - *present*

BME Capstone Development Advisory Committee
University of Colorado Boulder, Boulder, CO
Summer 2021 – Summer 2022

Undergraduate Advising Committee – Biomedical Engineering Program
University of Colorado Boulder, Boulder, CO
Fall 2020 – present

Undergraduate Advising Committee – College of Applied Science and Engineering
University of Colorado Boulder, Boulder, CO
Fall 2020 - present

Industry Advisory Board – Biomedical Engineering Program
University of Colorado Boulder, Boulder, CO
Fall 2020 – present

Biomedical Engineering Society Local Chapter Advisor
University of Colorado Boulder, Boulder, CO
Fall 2020 - present

Biomedical Engineering Society
National Society Member
2019 - present

Lab Safety Officer
Northeastern University, Boston, MA
Biomedical Optics Group
2019

Undergraduate Research Mentor
Northeastern University, Boston, MA
2015-2019

Graduate Women in Science and Engineering (GWISE)
Northeastern University, Boston, MA
2015-2019
Operations and Community Chair (2018-2019) Secretary (2015-2017)
GWISE is a group of graduate students and postdocs designed to assist in the professional and personal advancement of women in science and engineering at Northeastern University. To achieve this, GWISE sponsors events covering a wide variety of topics including networking, career options, balancing work and personal life, and other issues affecting women in the sciences.

Student Research Engagement Committee (SREC)
Northeastern University, Boston, MA
2015-2016
Public Relations Director
SREC exists to support and promote undergraduate student involvement in research in a variety of different fields by hosting various poster sessions, networking events, and career development seminars and workshops.

PUBLICATIONS

Williams AL, Fitzgerald JE, Ivich F, Sontag ED, Niedre M. **Short-Term Circulating Tumor Cell Dynamics in Mouse Xenograft Models and Implications for Liquid Biopsy.** Oncol. 2020; 10: 601085. DOI: 10.3389/fonc.2020.601085

Fitzgerald JE, Byrd BK, Patil RA, Strawbridge RR, Davis SC, Bellini C, Niedre M. **Heterogeneity of Circulating Tumor Cell Dynamics and Lung Metastases in a Subcutaneous Lewis Lung Carcinoma Model**. Biomedical Optics Express. 2020 Jul; 11(7): 3633-2647. DOI: 10.1364/BOE.395289

Bartosik PB, Fitzgerald JE, El Khatib M, Yaseen MA, Vinogradov SA, Niedre M. **Prospects for the Use of Upconverting Nanoparticles as a Contrast Agent for Enumeration of Circulating Cells in vivo.** Int J Nanomedicine. 2020 Mar; 15: 1709-1719. DOI: 10.2147/IJN.S243157. PubMed PMID: 32210561

Fitzgerald JE, Shen J, Fenniri H. **A Barcoded Polymer-Based Cross-Reactive Spectroscopic Sensor Array for Organic Volatiles.** Sensors (Basel). 2019 Aug 24;19(17).

Fitzgerald JE, Shokat Fadaee S, Sundaram R, Fenniri H. **Sensor arrays from spectroscopically-encoded polymers: Towards an affordable diagnostic device for biomolecules.** Sensors and actuators. B, Chemical. 2019 June; 288:332-336.

Sharafeldin IM, Fitzgerald JE, Fenniri H, Allam NK. **Computational Modeling for Biomimetic Sensors. Methods Mol Biol.** 2019;2027:195-210. doi: 10.1007/978-1-4939-9616-2_16. PubMed PMID: 31309483

Fitzgerald JE, Fenniri H. Cross-Reactive, **Self-Encoded Polymer Film Arrays for Sensor Applications.** Methods Mol Biol. 2019;2027:1-13. doi: 10.1007/978-1-4939-9616-2_1. PubMed PMID: 31309468.

Biomimetic Sensing. 1 ed. Fitzgerald JE, Fenniri H, editors. New York, NY: Humana (Springer); 2019. 213p.

Fitzgerald, J.E., Bui, E.T., Simon, N.M. and Fenniri, H., 2017. **Artificial Nose Technology: Status and Prospects in Diagnostics.** Trends in Biotechnology, 35(1), pp.33-42.

Fitzgerald, J.E. and Fenniri, H., 2016. **Biomimetic cross-reactive sensor arrays: prospects in biodiagnostics.** RSC Advances, 6(84), pp.80468-80484.

Fitzgerald, J.E., Zhu, J., Bravo-Vasquez, J.P. and Fenniri, H., 2016. **Cross-reactive, self-encoded polymer film arrays for sensor applications.** RSC Advances, 6(86), pp.82616-82624.

Odom, P.W., Fitzgerald, J., Tryon T.G., Halsmer, D. 2013. **Implementation and Assessment of a Curricular Module on the History and Philosophy of Reverse Engineering in Biological Systems.** ASEE Annual Conference, Atlanta, GA, United States

Fitzgerald J., Halsmer, D., 2012. **The Problem of Evil and Suffering from an Engineering Perspective.** Engineering and Metaphysics Conference, Tulsa, OK, United States.

Fitzgerald, J., Halsmer, D., 2011**. Metaphysical Considerations Enhance Reverse Engineering Studies.** ASA Annual Meeting, Naperville, IL, United States.

PRESENTATIONS

Speaker

2019 Northeastern University Bioengineering Research Symposium: Boston, MA
In vivo Optical Measurement of Circulating Tumor Cell Count in Response to Radiation Therapy in Mice

2018 Northeastern University Bioengineering Research Symposium: Boston, MA
Fabrication and Optical Properties of Dye Labeled SERRS-Encoded Au/Ag Alloy Nanoshells

2017 Northeastern University Biomaterials Day: Boston, MA
A Cross–Reactive Array Based on Spectroscopically Encoded Polymers for the Classification of Biomolecules

2016 American Institute of Chemical Engineering (AIChE) Annual Meeting: San Francisco, CA
An "Artificial Nose" for Disease Diagnosis Through Exhaled Breath Analysis

Poster

2019 Biomedical Engineering Society Annual Meeting: Philadelphia, PA
In vivo Optical Measurement of Circulating Tumor Cell Count in Response to Radiation Therapy in Mice

2017 Northeastern University Research, Innovation, and Scholarship Expo (RISE): Boston, MA
An "Electronic Nose" for the Non-invasive Analysis of Volatiles in Alveolar Breath

2016 World Biomaterials Congress: Montreal, Quebec, Canada
An 'Artificial Nose' for the Non-Invasive Diagnosis of Anxiety in Alveolar Breath

2015 Materials Research Society (MRS) Meeting: Boston, MA
An 'Artificial Nose' for the Non-Invasive Diagnosis of Anxiety in Alveolar Breath

2015 Northeastern University RISE: Boston, MA
An "Artificial Nose" for the Non-invasive Diagnosis of Anxiety in Alveolar Breath

2014 AIAA/ASME Symposium: Oklahoma City, OK
Undergraduate Senior Project: "Synthesis and Utilization of Silver Nanoparticles for Use in the Medical Field"

SKILLS

Science writing
Publishing
Interdisciplinary Research
Science Communication
Peer mentorship
STEM education
Experimental Design
Biomedical Optics
Data Analysis
Flow Cytometry
Cell Culture
Raman Microspectroscopy
Unscrambler
Origin
Multivariate data analysis
Spectral Signal Processing
Proficient in Microsoft Office Suite Scanning Tunneling Microscopy Atomic Force Microscopy
AutoCAD
SolidWorks
Some experience with Matlab and other programming languages

AWARDS

Northeastern Distinguished Deans' Fellow (2014)