Elaina Atherton, Sc.M.

Providence, RI | elaina_atherton@brown.edu

EDUCATION

Brown University, Providence RI, *Doctor of Philosophy - Biotechnology* **2015 - Present**
PhD Candidate, Thesis: "Engineering the Device-Tissue Interface: Toward Long-term Mitigation of the Neural Response to a Foreign Body"
Relevant Coursework: ENGN 1230, Neural Dynamics, Implantable Devices

Brown University, Providence RI, *Master of Science – Biotechnology* **2014**
Master's Thesis: "Morphological Changes in Polycaprolactone/Oil Systems"
Relevant Coursework: Experimental Surgery, Drug and Gene Delivery, Pharmacokinetics, Polymer Science

Brown University, Providence RI, *Bachelor of Science - Neuroscience* **2012**
Relevant Coursework: Neuropharmacology, Physiological Pharmacology, Neurochemistry and Behavior, The Diseased Brain, Experimental Neurobiology, Synaptic Transmission and Plasticity

TEACHING EXPERIENCE

UTRA Mentor, Principles of Surgery for Graduate Research, Brown University	**Jun 2019 – Aug 2019**
Mentor, gBMES Mentoring Program, Brown University	**Sept 2018 – Present**
Instructor, Principles of Surgery for Graduate Research, Brown University	**Jun 2017 – Aug 2017**
STEM II Instructor, Introduction to Biomedical Engineering and Device Design, Brown University	**Jun 2017 - Jul 2017**
Course Assistant, Implantable Devices, Brown University	**Jan 2017 – May 2017**
Graduate Teaching Assistant, Genetics, Brown University	**Sep 2016 - Dec 2016**
UTRA Mentor, Summer UTRA Program, Brown University	**Jun 2016 - Aug 2016**
Middle School Teacher, 8th Grade Precalculus, 7th Grade Algebra	**Sep 2012 - Dec 2013**
Substitute Teacher, 4th Grade Remedial Math, 11th Grade Statistics	**Sep 2012 - May 2013**

PUBLICATIONS

Borton D, **Atherton EH**, Colvin V (2018). Drug-polymer film for controlled local delivery at tissue-device interface. US Patent. US2018/0272042A1.

ABSTRACTS AND PRESENTATIONS

Vafaee V, **Atherton EH**, Hu Y, Friedberg A, Borton DA, Colvin V (2019). Antioxidant Nanoparticle Films for Improving Deep Brain Recording. Conference Abstract. North East Bioengineering Conference, New Brunswick, NJ.

Hu Y, **Atherton EH**, Ling V, Borton DA, Colvin V (2019). A Method of Making Biocompatible Antioxidant Ceria Nanoparticles Loaded in Multi-layer Polymer Films on Device. Conference Abstract. North East Bioengineering Conference, New Brunswick, NJ.

Atherton EH, Allawala AB, Powell M, Hoffman-Kim D, Borton DA (2018). An engineered in vitro model of foreign-body response to chronic neural implants. Conference Abstract. Society for Neuroscience, San Diego, CA.

Atherton EH, Powell M, Hoffman-Kim D, Borton DA (2018). Self-assembled neural microtissue as an in vitro model for the device-tissue interface. Conference Poster. Neuroscience, Neuroengineering, and Biomedical Engineering Workshop, Newport, RI.

Atherton EH, Sevetson J, Hoffman-Kim D, Borton DA (2017). Self-assembled neural microtissue as a relevant, reliable, and high throughput in vitro model of the device-tissue interface. Conference Abstract. *Society for Neuroscience*, Washington, DC.

Atherton EH, Borton DA (2016). Conjugation of Antioxidants for Integration of Neural Device-Tissue Interfaces. Conference Abstract. *Materials Research Society*, Boston, MA.

Atherton EH, Baker CM, Lee R, Austin D, Mathiowitz E (2015). Morphological Changes in Polycaprolactone/Oil Systems. Conference Abstract. *Controlled Release Society*, Edinburgh, Scotland.

Léandre V, **Atherton EH**, Rajpara S, Furtado S, Weston P, Guennoun A, Bauer H, Shin S, Chang J, Choo S, Kurial S, Lee R, Makani R, Bakhru S, Darling E, Chouchane L, Mathiowitz E (2015). Polymeric, Cytokine-Aided Cell Recruitment & Histological Analysis. *Controlled Release Society*, Edinburgh, Scotland.

Baker CM, Jain N, **Atherton EH**, Mathiowitz E (2015). Controlled Release of Menthol from Polycaprolactone. *Controlled Release Society*, Edinburgh, Scotland.

Azagury A, Hojsak S, Rege S, **Atherton EH**, Mathiowitz E (2015). Controlling Polymeric Particle Size and Distribution by Adjusting the Applied Mechanical Force. *Controlled Release Society*, Edinburgh, Scotland.

Baker CM, **Atherton EH**, Mathiowitz E (2013). Release of Volatile Perfumes Utilizing Enhanced Polymer Films. Poster session. Rhode Island Healthcare Showcase.

Volatile Oil in Polycaprolactone: A Study of Release and Absorption for Industrial Application. Master's Thesis Presentation, 2013.

RESEARCH EXPERIENCE

Student Researcher **Sep 2016 - Present**

Borton Lab: Brown Neuromotion Lab, School of Engineering, Brown University, Providence, RI

Project 1: Development of a local extended release delivery system for drug treatment of long-term inflammation at the tissue-device interface. Design, fabrication, and characterization of layer-by-layer thin films loaded with antioxidant nanoparticles. Development of a custom dipping machine for fabrication of films.

Project 2: Development of a 3D, physiologically relevant in vitro model of foreign body response to implanted neural devices. Design of custom culturing molds, electrode inserter, and imaging apparatus. Development and characterization of a live cell imaging platform for 3D neural cultures. Novel analysis of morphological response to implanted devices.

Senior Research Assistant **Jul 2014 - Jul 2015**

Mathiowitz Lab; Oral Protein Delivery Group, Brown University, Providence, RI

Project 1: Developed polymer microencapsulation methods for oral protein delivery using phase inversion nanoencapsulation techniques. Characterized the morphology of the polymer/drug system by SEM and dynamic light scattering particle sizing to optimize drug loading and release properties, which were verified by HPLC release and extraction techniques.

Project 2: Developed and performed in vivo methods, including isolated loop intestinal surgeries in rats and blood serum collection, for evaluating the intestinal uptake of the optimized formulations, as well as ex vivo methods and novel tissue preparation for TEM and 3D SEM analysis of intestinal uptake.

Student Researcher **Jan 2013 - Dec 2013**

Mathiowitz Lab; Polymer Characterization Group, Biotechnology Department, Brown University, Providence, RI

Project 1: Studied the release of volatile oil from thin polymer films, developed film manufacturing methods, and analyzed the absorption of oil with thin films by Fourier Transform Infrared Spectroscopy

Project 2: Characterized the structure of and molecular interactions between oil and polycaprolactone in the oil loaded polymer films by x-ray diffraction and optical birefringence

RESEARCH SKILLS

Laboratory: Animal Surgery and Surgical Design, Primary Neural Cell Culture, 3D self-assembled cell culture, HPLC, ELISA, SEM, TEM and 3D SEM sample embedding, Ultramicrotomy, Heavy metal staining (OTO and Waltons Lead Nitrate), Organic Chemistry, FTIR, Powder X-ray Diffraction, Differential Scanning Calorimetry, Heated Hydraulic Film Pressing, Phase Inversion Nanoencapsulation, Polarized Light Microscopy, Epifluorescence Microscopy, Confocal Microscopy, Labview, Arduino, Soldering, Basic Circuit Design, Fusion 360 CAD, 3D Printing, DLS particle sizing. Profilometry, Focused Ion Beam SEM, Layer-by-layer film deposition, Adobe Illustrator and Photoshop, Eagle PCB design, implantable device design, Electrophysiology, Calcium imaging, Viral transfection, Matlab

EXTRACURRICULAR ACTIVITIES AND VOLUNTEER EXPERIENCE

Featured Artist, Carney Institute for Brain Science, Providence, RI **September 2019**
Designed and installed a custom, large format wall decal design for the Carney Innovation Space at Brown University.

Presenter, *Brown Brain Fair,* Providence, RI **Mar 2018**
Interactive presentation about Neuroengineering and Borton Lab Research for kids and families interested in the brain. Helped developed "EMG Ping Pong" game.

Presenter, *Brown Brain Fair,* Providence, RI **Mar 2017**
Interactive presentation about Neuroengineering and Borton Lab Research for kids and families interested in the brain. Helped developed "EMG Ping Pong" game.

Presenter, Brown University 25th Reunion Teen Program , Providence, RI **May 2016**
Interactive presentation about Neuroengineering and Borton Lab Research for Middle School Students.
Helped developed "EMG Mario Cart" game.

Presenter, *Brown Brain Fair,* Providence, RI **Mar 2016**
Interactive presentation about Neuroengineering and Borton Lab Research for kids and families interested in the brain. Helped developed "EMG Tug-of-war" game.

Guest Speaker, *Summer at Brown Intro to Physics Course,* Providence, RI **Jul 2015**
Presentation and discussion about women in science and career paths with a Bachelor's of Science.

Guest Presenter, *Promise Hill Elementary School,* Barrington, RI **Feb 2015**
Poster presentation and hands on demonstrations for elementary and middle school students about polymer chemistry, the human vascular system, and the mechanisms of neurological reflexes.

Musician and Songwriter, *Big Jim and the Sister Wives Band,* Providence RI **Aug 2014 - Present**
Winners of the 2015 Folk Yeah! Battle of the Bands, opened for the annual Brown University Folk Festival, Local shows at AS220 and The Met, currently recording the first album.

Softball Coach, *Portland/Powell Little League,* Portland, OR **Mar 2014 - Jun 2014**
Designed and ran practices, training clinics, and games. Presented curricula about health and wellness to inner-city kids.

Copy Editor, Brown Noser, Brown University's Comedy Newspaper, Providence RI **Aug 2013 - Dec 2013**

Medical Scribe, *University Emergency Medical Foundation,* Providence RI **Feb 2013 - Present**
Interviewing patients and documenting medical histories and patient-physician encounters in the Emergency Departments of Lifespan Hospitals in RI.

Assistant Javelin Coach, *TurboJav Training Clinics,* Providence RI **Oct 2012 - Nov 2013**

Softball and Soccer Coach, *Wheeler school,* Providence RI **Mar 2012 - Dec 2012**
Designed and ran practices, training clinics, and games.

Member, *Brown Music Collective* **Sep 2013 - Present**
Performed at open mic's and university sponsored shows. Participated in music collaborations between students.

Member, *Graduate Biomedical Engineering Society at Brown* **Feb 2013 - Present**