James Regis Eles, Ph. D.

Post-doctoral associate
Department of Bioengineering
University of Pittsburgh
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EDUCATION

University of Pittsburgh — Pittsburgh, PA
Doctor of Philosophy in Bioengineering — 2012 – 2018
Advisor: Tracy Cui, Ph.D.

University of Rochester — Rochester, NY
Bachelor of Science in Neuroscience, *cum laude* — 2007 – 2012
Dean's Scholarship, Dean's List: 2007-2012
Phi Beta Kappa

RESEARCH AND DATA EXPERIENCE

University of Pittsburgh, Department of Bioengineering — Pittsburgh, PA
Kozai Laboratory, Post-Doctoral Associate — September 2018 – Present

- **Developing image processing pipelines in Matlab to extract biological signals from 25-50GB of 5D images**
- Designing studies to understand and improve electrical stimulation therapies **resulting in 2 publications**
- Mentoring 5 graduate students and laboratory technicians and teaching imaging and programming techniques

Cui Laboratory, Graduate Student — August 2012 – September 2018

- **Innovated signal processing techniques to combine neural data and imaging data in 100GB data sets with principle component analysis, k-means clustering, and linear algebra based image processing**
- Contributed to work that resulted in **4 first-author publications** in *Biomaterials* and *Journal of Neural Engineering* in addition to **6 other co-author papers and 12 poster or podium presentations**
- Awarded Department of Bioengineering Bevier Award, Teaching assistant for 3 courses for a combined 80 students, guest lecturer for "Intro to Neural Engineering" (2016-2018)

University of Rochester Medical Center — Rochester, NY
Majewska Laboratory, Undergraduate Research Assistant — August 2009 – May 2012

- Conducted synaptic plasticity and astrocytic expression in sensory cortices *in vivo*
- Awarded the University of Rochester Center for Visual Sciences Summer Fellowship, 2011 (*$3,530 in stipend*)
- Awarded the Walt and Bobbi Makous Prize for undergraduate research in the visual sciences, May 2012
- Teaching assistant; Neurochemical Foundations of Behavior, led workshops for 50 students across 2 years

University of Rochester Medical Center — Rochester, NY
Zlokovic Laboratory, Summer Undergraduate Research Assistant — May-August 2010

- Co-established a protocol for extracting blood vessel mRNA from human brain tissue alongside clinicians and researchers, resulting in a novel method for quantifying vascular changes in Alzheimer's disease

PROJECT MANAGEMENT AND COMMERCIALIZATION EXPERIENCE

InterPhase Materials January 2015 – February 2018
Collaborating Project Manager

- **Led a multidisciplinary team of bioengineers and dental clinicians to launch OXI-Dent: A dental implant that prevents inflammation-related complications**
- Brought together collaborations with dental implant industry leaders to direct pre-clinical experimental design
- Designed and managed pre-clinical testing on OXI-Dent; co-inventor on US Patent App. 2017/0050996 A1
- Generated grant applications and pitches resulting in > $160,000 of non-dilutive funding from the University of Pittsburgh sponsored commercialization grants and industry sponsored research support

sciVelo October 2016 – November 2018
Jr. Commercial Translation Associate

- **Developed commercialization strategies for bioinformatics technologies created by university researchers**
- Led >12 teams of scientists and MBAs to develop business models, competitive analyses, IP landscapes, regulatory assessments, reimbursement assessments, and customer analyses for university researchers
- Generated grants and pitches to secure >$325,000 in support for teams and resulting in two spin-out companies

SELECTED HONORS AND AWARDS

1. Part of grand prize winning team of Randall Family Big Idea Competition, Pittsburgh Innovation Challenge, and the Wells Student Healthcare Entrepreneurship Competition, **2015, $160,000 total**
2. 1st Place team "DNA" in the Pittsburgh Health Innovation Case Competition, **2017, $4,000**
3. University of Rochester Center for Visual Sciences Summer Fellow Summer**, 2011, $3,530 in stipend**
4. University of Rochester Center for Visual Sciences Walt and Bobbi Makous Prize Award, **2012**
5. Iota chapter of Phi Beta Kappa Society, Phi Beta Kappa O'Hern European Travel Scholarship, **2012, $5,000**
6. University of Rochester Dean's Scholarship, **$4,000/year, 2007-2011**
7. University of Rochester Dean's List, **all semesters, 2007-2012**
8. Take Five Scholar; 2012, awarded ***tuition-free 5th year*** to study history and psychology of warrior codes

LEADERSHIP

1. Co-founded team of biomedical and chemical engineers to learn Python and Machine Learning skills, **2018-2019**
2. STEM outreach to **120** rising high school sophomores in summer course, **2013-2017**
3. Mentor for graduate students as part of the Peer Networking and Professional Development Program **2016-2017**
4. Biomedical Engineering Society, Peer-elected Chapter Leadership Board, **2013**
5. Resident advisor and community assistant for **120** students **2010-2011**

PUBLICATIONS

Eles JR, Vazquez AL, Kozai TDY, Cui XT. Meningeal inflammatory response and fibrous tissue remodeling around intracortical implants: an in vivo two-photon imaging study. *Biomaterials*. 2019. *In press*.

Michelson NJ, **Eles JR**, Vazquez AL, Ludwig KA, Kozai TDY. Calcium activation of cortical neurons by continuous electrical stimulation: Frequency-dependence, temporal fidelity and activation density. *Journal of Neuroscience Research*. 2019. *In press.*

Patel A, Xue Y, Hartley R, Sant V, **Eles JR**, Cui XT, Stolz DB, Sant S. Hierarchically aligned fibrous hydrogel films through microfluidic self-assembly of graphene and polysaccharides, *Bioengineering and Biotechnology*. 2018. 115(10): 2654-2667.

Eles JR, Vazquez AL, Kozai TDY, Cui XT. *In vivo* imaging of neuronal calcium during electrode implantation: Spatial and temporal mapping of damage and recovery, *Biomaterials*. 2018. 174: 79-94.

Shen Y, Cao B, Snyder N, Woeppel K, **Eles JR**, Cui XT. ROS Responsive Resveratrol Delivery from LDLR Peptide Conjugated PLA-coated Mesoporous Silica Nanoparticles Across the Blood-Brain Barrier, *J. Nanobiotechnology*. 2018. 16:13

Cody PA, **Eles JR**, Lagenaur CF, Kozai TDY, Cui XT. Unique electrophysiological and impedance signatures between encapsulation types: An analysis of biological Utah array failure and benefit of a biomimetic coating in a rat model. Biomaterials. 2018. 161: 117-128.

Michelson NJ, Vazquez AL, **Eles JR**, Salatino JW, Purcell EK, Williams JJ, Cui XT, Kozai TDY. Multi-scale, multi-modal analysis uncovers complex relationship at the brain tissue-implant neural interface: New Emphasis on the Biological Interface. J Neural Engineering. 2018. doi: 10.1088

Wellman SM, **Eles JR**, Ludwig KA, Seymour JP, Michelson NJ, McFadden WE, Vazquez AL, Kozai TDY. A materials roadmap to functional neural interface design. *Adv. Funct. Mater.* 2017. 1701269.

Taylor IM, Du Z, Bigelow E, **Eles JR**, Horner AR, Catt K, Webser S, Jamieson B, Cui XT. Aptamer-functionalized neural recording electrodes for the direct measurement of cocaine in vivo. Journal of Materials Chemistry B. 2017. 5: 2445-2458.

Eles JR, Vazquez AL, Snyder NR, Lagenaur C, Murphy MC, Kozai TDY, Cui XT. Neuroadhesive L1 coating attenuates acute microglial attachment to neural electrodes as revealed by live two-photon microscopy. *Biomaterials*. 2017, 113: 279-92.

Eles JR*, Degenhart AD*, Dum R, Mischel JL, Smalianchuk I, Endler B, Ashmore RC, Tyler-Kabara EC, Hatsopoulos NG, Wang W, Batista AP, Cui XT. Histological evaluation of a chronically-implanted electrocorticographic electrode grid in a non-human primate. *J Neural Eng.* 2016, 13(4): 046019 [*Authors contributed equally].

Kozai TDY, **Eles JR**, Vazquez AL, Cui XT. Two-photon imaging of chronically implanted neural electrodes: Sealant Methods and new insights. *J Neurosci. Meth.*. 2015, 258(30) 46-55.

INTELLECTUAL PROPERTY

Cui XT, Snyder NR, Catt K, and **Eles JR**, inventor; University of Pittsburgh, assignee. Antioxidant compounds and their use. US Patent Application US 2017/0050996 A1. February 23, 2017.

ORAL AND POSTER PRESENTATIONS

Eles JR. In vivo imaging to characterize dynamic tissue responses after neural electrode implantation. **Seminar**: Michigan State University, East Lansing, MI. 2018 Sept 10.

Eles JR. In vivo imaging to characterize dynamic tissue responses after neural electrode implantation. **Seminar**: University of Wisconsin, Madison, WI. 2018 Sept 5.

Eles JR, et al. In vivo imaging of acute and chronic neuronal calcium during electrode implantation: injury and recovery. Poster presented: Neural Interfaces Conference 2018; 2018. Jun 25-27; Minneapolis, MN.

Eles JR. Using in vivo imaging to understand and improve long-term neural electrode performance. **Seminar:** Translational Neuroengineering Group Seminar. University of Michigan, Ann Arbor, MI. 2018 Jun 14.

Eles JR. Neuronal Disruption During Electrode Implantation: In Vivo Imaging of Sub-Cellular Injury and Repair. **Invited seminar**: McGowan Institute for Regenerative Medicine Injury, Repair, and Regenerative Medicine Seminar Series.

University of Pittsburgh, Pittsburgh, PA. 2018 Jan 16.

Eles JR, et al. In vivo 2-photon microscopy mapping of acute mechanical damage due to neural electrode array implantation. Poster presented: Neuroscience 2017, Society for Neuroscience; 2017 Nov 11-16; Washington D.C.

Eles JR, et al. In vivo 2-photon imaging of neural implants: surface modification with L1CAM camouflages devices from microglial encapsulation. Poster presented: Neuroscience 2016, Society for Neuroscience; 2016 Nov 12-16; San Diego, CA

Eles JR, et al.. In vivo tracking of the meningeal response to chronically implanted neural electrode arrays. **Invited "Rapid-Fire Talk"**, McGowan Institute of Regenerative Medicine Annual Retreat 2016, Farmington, PA

Eles JR, Zheng X, Prabhu P, Cui XT. Carbon Nanotube/Conducting Polymer Coatings for Electrically Stimulated Drug Release from intramuscular electrodes Biomedical Engineering Society Annual Meeting; 2015 Oct 7-10; Tampa, FL

Eles JR, Kolarcik CL, Venpati SK, Cui XT. Combination electrical stimulation and pulsatile therapeutic-release strategies to preserve neuromuscular junction health in peripheral nerve injury. Poster presented: Neuroscience 2014, Society for Neuroscience; 2014 Nov 15-19; Washington D.C.

Eles JR, et al. Histological Evaluation of a Chronically-implanted Electrocorticographic Electrode Grid in a Non-Human Primate. Poster presented: BRAIN Grand Challenges Conference, IEEE EMBS; 2014 Nov 13-14; Washington D.C.

Eles JR, Weaver CL, Snyder NR, Cui XT. Ultrastructural characterization of tissue reaction to neural probe implantation. Poster presented at: Neuroscience 2013, Society for Neuroscience; 2013 Nov 9-13; San Diego, CA

Eles JR, Tremblay ME, Majewska AK. Visual Deprivation Regulates the GLT-1 Promoter in Cortical Astrocytes. Poster presented at: University of Rochester Center for Visual Sciences Summer Fellowship Poster Session; 2011 Aug; Rochester, NY