Monica Liu

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EDUCATION

University of Pittsburgh, Pittsburgh, Pennsylvania, USA — Aug 2016 – Present
PhD Candidate in Bioengineering, Neural Engineering
- Examining how populations of neurons encode sensory and motor information
- Advisors: Dr. Douglas Weber and Dr. Aaron Batista

University of Virginia, Charlottesville, Virginia, USA — Aug 2011 – May 2015
Bachelor of Science (B.S.) in Biology
Bachelor of Arts (B.A.) in Computer Science

WORK EXPERIENCE

Novartis Institute for Biomedical Research, NX Informatics — Sep 2015 – Sep 2016
Data Engineer
- Develop software to support genomic research
- Supervisor: Dr. Nabil Hachem

University of Virginia, Center for Diabetes Technology — May 2014 – Jun 2015
Undergraduate Research Assistant, Breton Lab
- Assist in clinical trials and take the data collected to estimate insulin sensitivity
- Supervisor: Dr. Marc Breton

University of Virginia, Biology — Jun 2014 – May 2015
Undergraduate Research Assistant, Siller Lab
- Developed a MATLAB script to quantify axonal blebbing in fluorescent microscopy images
- Supervisor: Dr. Karsten Siller

University of Virginia, Biochemistry and Molecular Genetics — Mar 2011 – May 2014
Undergraduate Research Assistant, Taylor Lab
- Research into developing immunotherapies of cancer using flow cytometry to study mechanisms of action of monoclonal antibodies
- Supervisor: Dr. Ronald Taylor

PUBLICATIONS

- **Liu, M.**, Batista, A. P., Bensmaia, S. J., Weber, D. J. (2020). Information about contact force and surface texture is mixed in the firing rates of cutaneous afferent neurons. *Journal of Neurophysiology*. https://doi.org/10.1152/jn.00725.2019.
- Urbin, M. A., **Liu, M.**, Bottorff, E. C., Gaunt, R. A., Fisher, L. E., Weber, D. J. (2019). Hindlimb motor responses evoked by microstimulation of the lumbar dorsal root ganglia during quiet standing. *Journal of Neural Engineering*, 17(1), 016019. https://doi.org/10.1088/1741-2552/ab4c6c.
- M.J. Pokrass, **M.F. Liu**, M.A. Lindorfer, and R.P. Taylor, "Monoclonal Antibodies that Target Cell-associated HLA or β2- microglobulin Exhibit Differential Complement Activity: Implications for Cancer Immunotherapy," *Molecular Immunology*, vol. 56, no. 4, pp. 549–560, Dec 2013.

POSTERS

- **MF Liu**, B Dekleva, R Chowdhury, A Batista, M Boninger, J Collinger, R Gaunt, D Weber. "The effect of visual and proprioceptive feedback on brain-computer interface control of a robotic arm".*Neural Control of Movement, 2020.* (Cancelled due to Covid-19)
- **MF Liu**, JE Winberry, C Versteeg, Simpson, ER Oby, AD Degenhart, MA Urbin, AP Batista, RA Gaunt, LE Miller, SJ Bensmaia, DJ Weber. "Effect of surface texture on the encoding of touch, pressure, and shear in the glabrous skin of a rhesus macaque". *Society for Neuroscience 2018*.
- **MF Liu**, SA Arbuckle, E Okorokova, AJ Herrera, A Kaiser. "How S1 spiking activity encodes sensory feedback for goal-directed movements in a grasping task". *Motor Learning and Motor Control, 2017*
- **MF Liu**, JE Winberry, TW Simpson, BP Delhaye, ER Oby, AD Degenhart, MA Urbin, AP Batista, RA Gaunt, LE Fisher, SJ Bensmaia, DJ Weber. "Dorsal root ganglion neuronal population responses to tactile stimuli in rhesus monkey hand". *Society for Neuroscience 2017*.

ACTIVITIES AND AWARDS

National Science Foundation, Graduate Research Fellowship Award — Apr 2018

Computational Sensory-Motor Neuroscience Course, Student Winner — Aug 2017

Carnegie SciTech Days, University of Pittsburgh — Nov 2016

- Helped organize and teach bioengineering activities for middle and high school students at Carnegie Science Center's SciTech days.

Bevier Award, University of Pittsburgh — Oct 2016

Apache Spark 1.6.0, Open Source Contributor — Jan 2016

Madison House, University of Virginia

Medical Services – Acute Pediatrics and Surgical Supply — Aug 2012 – May 2015

Youth Mentoring - Museum Gallery Volunteer and Music Resource Center — Aug 2012 – May 2014

International Collegiate Programming Competition — Aug 2014 – Dec 2014

- Participated as a competitor on a team of three to solve algorithmically challenging problems in a time-constrained environment
- Helped organize high school programming contest for Charlottesville-area high schools

TEACHING

Introduction to Neural Engineering, Graduate Course — Oct 2018

One lecture summary of PCA and K-Means

Quantitative Systems Neuroscience, Undergraduate Course — Mar 2018

Three lectures on PCA and EM Algorithm via K-Means and Gaussian Mixture Models

Signals and Systems, Teaching Assistant — Aug 2017– Dec 2017

- Grade homeworks, quizzes, and exams
- Assist with lab component, which primarily involved MATLAB simulations
- Tutored students individually.

Quantitative Systems Neuroscience, Teaching Assistant — Jan 2017– May 2017

- Grade homeworks, quizzes, and exams
- Gave lectures on PCA, K-Means, and spinal cord physiology

PROJECTS AND RELEVANT COURSEWORK

Machine Learning: Implemented decision trees, hidden Markov models, binomial and multinomial logistic regression classifiers, neural networks, and other algorithms from scratch in Python.

Neural Signal Processing: Used principal components analysis and K-means clustering for spike sorting and decoding reach directions from neural signals; fit Poisson models of neuronal spiking activity.

Programming Languages: Implemented lexer in Javascript, parser in Ruby, type-checker in Haskell, and interpreter in OCaml for a subset of Java.