KATE D. FISCHL

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EDUCATION

Johns Hopkins University, Baltimore MD
Ph.D. Candidate in Electrical and Computer Engineering   Expected June 2019
M.S.E. in Electrical and Computer Engineering, 3.8 GPA   May 2016
Princeton University, Princeton NJ
B.S.E. in Electrical Engineering, 3.3 GPA   June 2011
Concentration in Computer Design;
Minors in Bio-Engineering and Robotics & Intelligent Systems

RESEARCH AND DEVELOPMENT EXPERIENCE

PhD Candidate, Johns Hopkins University, Baltimore, MD   August 2014 – Present

- Neural Modeling: Creating neural characterizations and computational models of the social brain in Rhesus macaque monkeys to better understand the breakdown of social behavior during mental illness.
  - Determined role of eyeblinks as a socio-emotional factor, not simply a physiological imperative to protect the eyes through a film of tears.
  - Implemented Bayesian change point detection to determine neuron firing rate changes in response to eyeblinks and saccades.
  - Implementing point process modeling to predict neuron spiking as a function of covariates.
- Neuromorphic Hardware: Implementing spike based algorithms and deep neural networks on the IBM TrueNorth neurosynaptic system for lower power solutions.
  - Implemented a spike wave propagation path-planning algorithm on TrueNorth to find solutions for maps two orders of magnitude larger than existing solutions.
  - Working to realize a real-time neuromorphic self-driving robot platform, which navigates itself using a trained neural network on TrueNorth.
  - Created a real-time system to recognize handwritten digits using the Asynchronous Time-based Image Sensor (ATIS) and the TrueNorth chip.
- Bat Location Identification: Developed an algorithm and associated user GUI to separate bat echolocation pings for data analysis facilitation as part of an effort to understand bat communication within a multi-bat group.
- VLSI Design: Created circuitry and layout for input/output pads with associated ESD circuitry as part of a lab-wide fabrication effort.

Assistant Staff, MIT Lincoln Laboratory, Bioengineering Systems and Technologies Group, Lexington, MA   September 2011 – July 2014

- Physiological Monitoring: Project goals included building systems and software to measure, categorize, and predict human fatigue to subsequently prevent injury.
  - Designed, assembled, and tested wearable embedded electronic systems and their associated software to record impact forces, acceleration, and gyration using instrumented boots.
  - Designed, assembled, and tested a low-power wearable system to monitor and record heart rate, skin temperature, and acceleration continuously over multiple days.
  - Created MATLAB algorithms to analyze and visualize data from heart rate monitors, accelerometers, and instrumented boots.
  - Aided in field test collections and the subsequent organization and analysis of physiological data.

- Noise Dosimetry: Project goals included building wearable high-decibel noise recorders to collect data for use in modeling solider hearing loss.
    - Designed, assembled, and tested embedded wearable electronic systems to record high-decibel noise. (Patented)
    - Co-architected, implemented, and tested the associated embedded C++ code.
- Cognitive Robotics: Project goals included implementing a biomimetic MATLAB simulation of a simplified brain for situational awareness applications.
    - Designed, implemented, and tested MATLAB simulation.

NSF Summer Intern, University of Maryland, College Park, MD   Summer 2010
- Analyzed ChIP-Seq (chromatin immunoprecipitation and high-throughput sequencing) peak detection algorithms for improved location of histone proteins.
- Studied epigenetic correlation between histone location and gene expression or malfunction.

Undergraduate Researcher, Princeton University, Princeton, NJ   Summer 2009
- Fabricated stretchable micro-electric arrays (SMEAs) inside a clean room laboratory.
- Tested SMEAs for biological compatibility with neuron cells.
- **Equipment**: 3" Mask Aligner, Reactive Ion Etch and Plasma Enhanced Chemical Vapor Depositor, Optical Microscope, Electron Beam Evaporator, Vacuum Hot Plate, Spinners

Lab Assistant, PortaScience Inc., Moorestown, NJ   Summer 2007
- Developed, tested, and manufactured test strips and dye indicators for point-of-care testing devices.

RELATED PROJECTS
Architected and Implemented an Operating System, Harvard University   Fall 2012
- Designed and implemented a functional operating system that performs memory management, spawns and kills processes, separates user and supervisor space, and employs interrupt priorities.
- View final presentation at: https://community.freescale.com/videos/1340

Created Smart Health News Update Application, Princeton University   Spring 2011
- Programmed an application that provides a user with the most relevant and current health news updates based upon the interests indicated in a user profile.

Designed/Created Autonomous Camera-Driven Model Car, Princeton University, Spring 2010
- Integrated microprocessors, communications, control and circuitry to create a model car, which followed a black line around a course at a constant speed.

TEACHING EXPERIENCE
Course Instructor, Johns Hopkins University, Baltimore, MD   Fall 2017
- Co-Course instructor for graduate course entitled "Sensory Information Processing".

STEM Mentor, Western High School, Baltimore, MD   Spring 2017
- Designed and orchestrated a wearable electronics after-school workshop to teach students the skills needed to solder, program, and assemble an Arduino-based light-up necklace.

Teaching Assistant, Johns Hopkins University, Baltimore, MD   Fall 2015
- Facilitated laboratory section for a course on VHSIC Hardware Description Language (VHDL) in which students are required to complete ten different projects, including implementing a finite state machine, frequency-shift keying, phase locked loop, and tone detection, among others.

Undergraduate Teaching Assistant, Princeton University, Princeton, NJ   Spring 2011
- Facilitated laboratory section of the electrical engineering design course in which students designed and built an autonomous camera-driven model car.

RELATED SKILLS
Programming: MATLAB, Java, BASIC, C, C++, Eclipse, Assembly Language, VHDL, Verilog, Python
- **Other:** Mentor Graphics, Adobe Photoshop, Visio, Cadence

STEM LEADERSHIP EXPERIENCE
Graduate Association of Women in CS & ECE President   Fall 2015-present
- Founded organization. Organized weekly lunches and other networking and social events.

JHU ECE Graduate Student Assoc. Officer   Fall 2015-present
- Organized department social and educational events for graduate students.

Lincoln Laboratory Recent Graduate Employee Resource Group Co-Chair and Co-Founder   Fall 2011 – Spring 2014
- Organized lectures, lunches, and email listserv, and provided resources for participants.

Princeton Biomedical Engineering Society President and Co-Founder
- Planned events, found speakers, and provided resources.   Summer 2010 – June 2011

OTHER LEADERSHIP EXPERIENCE
JHU Jewish Graduate Student Association Co-Chair, Baltimore, MD   Fall 2015 - present
- Planned and orchestrate social and holiday events.

2011 Princeton Commencement Committee Member, Princeton, NJ   Fall 2010 – Spring 2011
- Designed and ordered class jackets. Helped plan and organize commencement activities.

Center for Jewish Life Vice President, Princeton, NJ   January 2009 – June 2011
- Oversaw planning and execution of all events. Led and managed the student board.

Club Swimming Officer, Princeton, NJ   Fall 2008 – Spring 2011
- Helped run practices, organize meets, and plan social events.

Outdoor Action Leader, Princeton NJ   September 2010, 2011
- Led freshman pre-orientation wilderness backpacking trip.

PRESENTATIONS
- "Path Planning on the TrueNorth Neurosynaptic System". **Kate Fischl**, Kaitlin Fair, Wei-Yu Tsai, Jack Sampson, Andreas G. Andreou. Conference talk presented at: IEEE International Symposium on Circuits & Systems, Baltimore, MD, May 31, 2017.
- "Neuromorphic Self-Driving Robot Platform". **Kate Fischl**. Presented as a subsection of "Cognitive Computing Architecture for Machine Learning, Data Center Processing and Internet of Things". Conference tutorial presented at: IEEE International Symposium on Circuits & Systems, Baltimore, MD, May 28, 2017.
- "Women in ECE & CS Mentoring Dinner". Moderated panel discussion on personal experiences as women within ECE & CS at varying career stages. Attended by 90+ faculty and students. Johns Hopkins University, December 5, 2016.
- "Open Body Area Network (OBAN): An Open Architecture Prototype for a tactical body sensor network". Anthony L, Lacirignola J, Aguilar C, Aubin D, Biddle J, Brigada D, Merfeld M, **Fischl K**, Maurer D, Telfer B, Palmer J, Buller M, Mullen S, Tharion W, Hoyt R. Poster Presented at: Body Sensor Networks (BSN) 2013 IEEE International Conference, Cambridge, MA, May 6-9, 2013.
- "Individualized Detection of Ambulatory Distress in the Field using Wearable Sensors". Williamson J, **Fischl K,** Dumas A, Hess A, Hughes T, Buller M. Poster Session Presented at: Body Sensor Networks (BSN) 2013 IEEE International Conference, Cambridge, MA, May 6-9, 2013.
- "Comparison of Histone Protein Locating Algorithms". Fischl, K. Poster presented at: MERIT-BIEN NSF Fair, University of Maryland, College Park, MD, August 6, 2010.

PATENTS

- Lacirignola, Joseph J.; Vian, Trina Rae; Aubin Jr., David F.; Quatieri, Thomas F.; **Fischl, Kate D.**; Collins, Paula P.; Smalt, Christopher J.; Gatewood, Paul D.; Malyska, Nicolas; Maurer, David C., Methods and Apparatus For Recording Impulsive Sounds. Patent Application No. 20150162047. June 2015.

PUBLICATIONS

- **Fischl, K. D.**, K. Fair, Wei-Tsai, J. Sampson and A. G. Andreou. "Spike propgation path planning on the IBM TrueNorth Neurosynaptic System." *Electronics Letters* (2017).
- **Fischl, Kate D.**, et al. "Neuromorphic self-driving robot with retinomorphic vision and spike-based processing/closed-loop control." *Information Sciences and Systems (CISS), 2017 51st Annual Conference on.* IEEE, 2017.
- Ballesta, Sébastien, Clayton P. Mosher, Jeno Szep, **Kate D. Fischl**, and Katalin M. Gothard. "Social determinants of eyeblinks in adult male macaques." *Scientific Reports* 6 (2016).
- Andreou, Andreas G., Andrew A. Dykman, **Kate D. Fischl**, Guillaume Garreau, Daniel R. Mendat, Garrick Orchard, Andrew S. Cassidy et al. "Real-time sensory information processing using the TrueNorth neurosynaptic system." In *Circuits and Systems (ISCAS), 2016 IEEE International Symposium on*, pp. 2911-2911. IEEE, 2016.
- Williamson, J R ; Dumas, A ; Hess, A R ; Patel, T ; Telfer, B A ; **Fischl, K** ; Butler, M J, "Detecting Gait Asymmetry with Wearable Accelerometers", MIT Lincoln Laboratory, Lexington, MA, Rep. PSM-3, 18 Mar 2015.
- Jerome J. Braun ; Marianne A. DeAngelus ; **Kate D. Fischl** ; Austin R. Hess ; Danelle C. Shah; Building animats: neurobiomimetic approach for cognitive systems. Proc. SPIE 9121, Multisensor, Multisource Information Fusion: Architectures, Algorithms, and Applications 2014, 91210M (May 22, 2014).
- Hughes, T.B., Willimason, J.R., Hess, A.R., Young, W.T., Dumas, A., **Fischl, K. D.**, and B.D. Telfer. *Solider Projection Benchmark Evaluation (SPBE) Physiological Data Collection and Analysis.* Rep. no. 1174. Lexington: MIT Lincoln Laboratory, 2013. Print.
- Williamson, James R.; **Fischl, Kate**; Dumas, Andrew; Hess, Austin; Hughes, Tadd; Buller, Mark J., "Individualized detection of ambulatory distress in the field using wearable sensors," Body Sensor Networks (BSN), 2013 IEEE International Conference on, 6-9 May 2013.
- **Fischl K**. "A Smart Health News Update Application." Princeton University Senior Independent Project. January 2011.

AWARDS

Baltimore Women in Tech Micro-Grant Recipient	May 2017
NSF Graduate Research Fellowship	April 2016
Dean's Fellowship, Johns Hopkins University	September 2014
NSF Graduate Research Fellowship Honorable Mention	April 2014
Best Oral Presentation, University of Maryland NSF Fair	August 2010
Second Best Overall Project, University of Maryland NSF Fair	August 2010

PROFESSIONAL MEMBERSHIP

- IEEE, IEEE Women in Engineering (WIE)

OTHER INTERESTS

- Swimming, bicycling, photography, cooking, traveling