Lane McIntosh

CONTACT INFORMATION

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RESEARCH INTERESTS

Theoretical Neuroscience. Searching for general principles that underlie neural organization and encoding. Information processing in single neurons and neural circuits, information theory and far-from-equilibrium statistical mechanics

EDUCATION

Stanford University, Stanford, California

Ph.D. Student, Neurosciences (September 2012 - present)

Lab Rotation: Surya Ganguli (Department of Applied Physics)

University of Hawaii, Honolulu, Hawaii

M.A., Mathematics (May 2012)

Thesis: Information Processing and Energy Dissipation in Neurons
Committee: Susanne Still, George Wilkens, JB Nation, Robert Little; GPA 3.7/4.0

University of Chicago, Chicago, Illinois

B.A., Biological Sciences (Neurobiology), Computational Neuroscience (June 2010)

General Honors; Dean's List 2006-2010, GPA 3.53/4.00

HONORS AND AWARDS

Departmental Merit Scholarship (University of Hawaii, 2012)

National Science Foundation SUPER-M Graduate Fellowship (NSF, 2011-12)

Kotaro Kodama Scholarship (University of Hawaii, 2011-12)

Graduate Teaching Fellowship (University of Hawaii, 2010-11)

2008-2009 Innovative Funding Strategy Award (University of Chicago, 2009)

Lerman-Neubauer Junior Teaching Fellowship (University of Chicago, 2008)

NIH Neuroscience and Neuroengineering Fellowship (National Institutes of Health, 2008)

Bank of America Mathematics Award (Bank of America in Southern California, 2006)

President's Gold Educational Excellence Award (White House, 2006)

California Scholarship Federation Gold Seal Bearer (CSF, 2006)

Advanced Placement Scholar with Distinction (College Board, 2006)

Valedictorian (Santa Fe Christian High School, 2006)

ACADEMIC EXPERIENCE

UH Department of Mathematics — Honolulu, HI
Machine Learning Group — *August, 2010 - May, 2012*
Includes graduate level coursework in mathematics and thesis research. Coursework has focused on information theory, stochastic processes, graph theory, and traditional graduate algebra and analysis.

University of Chicago — Chicago, IL
MacLean Computational Neuroscience Lab — *March, 2010 - August, 2010*

Research on neural circuits in Jason MacLean's 2-photon lab; developed an optogenetics software platform and electrophysiological cell classifier.

Institute for Advanced Study Princeton, NJ
Simons Center for Systems Biology *June, 2009 - September, 2009*
Research in bioinformatics looking at SNP-linkages in populations of sub-Saharan Africa; developed data mining software for gene copy number variation.

National Institutes of Health Chicago, IL
Neuroscience and Neuroengineering Summer Fellowship *June, 2008 - August, 2008*
Research in David Gallo's memory lab; analyzed fMRI data collected at Harvard and found cerebellar involvement in and coordination of episodic memory tasks.

Biotechnology Experience

Prometheus Technologies San Diego, CA
Co-founder *December, 2010 - January, 2012*
Developed new ways of delivering personal genomic information to the non-sequenced public via linkages in SNPs underlying unambiguous phenotypes.

Archinoetics Honolulu, HI
Internship *September, 2010 - September, 2012*
Provide neurobiology expertise for federal DoD- and Navy-funded contracts related to brain-computer interfaces and monitoring mental states. Past and current projects include writing a review on the physiological dynamics of stress, creating better diagnostic tools for Post Traumatic Stress Disorder, and developing vestibular and optical frameworks that inhibit motion sickness.

Cytori Therapeutics San Diego, CA
Regenerative Cell Technology Internship *June, 2006 - August, 2007*
Research in adult stem cell differentiation; experimented with RNAi and super-cooling techniques.

Submitted Papers

Greenbaum B, Chan C, Naqvi A, McIntosh L, Levine A. A Novel Directional Method to Assess Selection in Copy Number Variants.

Alexe G, Reddy A, Seiler M, Michael T, Cronk L, Shraiman B, Neher R, McIntosh L, Levine A, Bhanot G. The Maasai are Genetically Protected against Hypercholesterolemia.

Papers in Preparation

McIntosh L, Matthews R. Dynamics of Stress: Review.

Presentations

McIntosh L, Brown J. Graph Theory and the Art of Searching. HCTM Conference. (Scheduled for February, 2012)

McIntosh L, Gallo D. Memory Retrieval and Monitoring in the Cerebellum. NIH Research Brief and Presentation. (August, 2008)

Testing

GRE	Quantitative	800/800	94^{th} percentile
	Verbal	700/800	97^{th} percentile
	Analytical	6.0/6.0	99^{th} percentile

Professional Memberships

American Mathematical Society

Teaching

MATH 135: Precalculus, University of Hawaii **July, 2012 - August, 2012**
Instructor
Taught a precalculus class of 35 students.

MATH 140: Precalculus, University of Hawaii **August, 2010 - May, 2011**
Teaching Assistant
Involved lecturing about 60 undergrads twice a week in precalculus.

BIOS 20244: Biophysics and Chemical Biology, UChicago **March, 2008 - June, 2008**
Lerman-Neubauer Junior Teaching Fellow
Involved some lecturing; last class in the advanced AP5 undergraduate biology sequence.

Other Experience

Graduate Student Organization, Honolulu, HI **September, 2010 - present**
Representative - Mathematics Department
Reviewing research, conference, and travel grant applications from departments in the physical sciences division and making funding decisions.

Department of Economics, Chicago, IL **April, 2009 - June, 2009**
Research Assistant
Providing neurobiology expertise to economics professors John List and Ali Hortasu as a member of the neuroeconomics research initiative at UChicago.

Chicago Society, Chicago, IL **September, 2006 - June, 2009**
Finance Director
Developed and managed one of the largest budgets of any student organization on campus and created the reputation of C.S. as the University's official event planning organization.

Men's Ice Hockey, Chicago, IL **September, 2008 - June, 2010**
Right Wing, Offense
Forward on University of Chicago's ice hockey team. Won 2009 IVEY Cup Championship (London, Ontario).

Technical and Language Skills

- Programming/Scripting Languages: Python, Perl/BioPerl, Ruby, Java
- Web Development: Ruby on Rails
- Statistical Packages: R, Stata
- Applications: extensive use of MATLAB, PyLab, Mathematica, LabView, Plink, SPM5
- Spoken Languages: intermediate Chinese and French
- Other interests: surfing, snowboarding, sailing, and writing