

A N D R E W G R E G O R Y H A N S E N

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OBJECTIVE

My primary interest is to reverse-engineer cognitive processes in neuromimetic networks and to develop robust cognitive models using mathematically defined boundaries, empirically derived metrics, and statistical methodologies. Bilaterally, I am interested in exploring the computational dynamics native to neural circuitry to produce and implement novel, cognition-inspired machine learning algorithms. My inspiration lies in the profound philosophical conundrum of reconciling qualia with a scientifically coherent and functional theory of consciousness.

EDUCATION

UNIVERSITY OF CALIFORNIA - IRVINE Irvine, CA
Ph.D. Cognitive Science 2018-Present
Relevant coursework · Neuromorphic Engineering, Biology-Inspired Machine Learning, Neural Networks
M.S. Statistics 2018-Present
Relevant coursework · Bayesian Cognitive

BRANDEIS UNIVERSITY Waltham, MA
M.S. Neuroscience Graduated 2016
Relevant coursework · Computational Neuroscience, Systems Neuroscience, Data Analysis & Statistics; Human Neuropsychology; Principles of Neuroscience.

ST. MARY'S UNIVERSITY San Antonio, TX
B.S. Physics with Biophysics Option Graduated 2015
Relevant coursework · Neurophysiology; Biochemistry I,II; Biophysics; Programming I,II; Algorithms; Mechanics; Electricity & Magnetism; Quantum Mechanics; Complex Analysis.

- × NIH, R25-MARC U-STAR Undergraduate Research Fellowship
- × UTHSCSA, START-UP Undergraduate Neuroscience Fellowship
- × Presidential Scholarship
- × Dean's List

PUBLICATIONS

Hansen, Andrew (2017): Analysis of Periodic Forcing Across the Izhikevich Spiking Neuron Model Parameter Space via Arbitrary Waveform Generation in MATLAB. figshare. <https://doi.org/10.6084/m9.figshare.5655781.v1> <https://github.com/agh-nmi/Izhikevich-Arbitrary-Forcing>

Van Hooser, S. D., Hansen, A. (2016): A System for Running and Performing Analysis for Visual Physiology Experiments (Visual Stimulation, Electrophysiology, 2-Photon Imaging). https://github.com/VH-Lab/vhlab_mlapp_RunExperiment

RESEARCH EXPERIENCE

UNIVERSITY OF CALIFORNIA - IRVINE
Specialist · Neuromorphic Machine Intelligence Laboratory
Irvine, CA
2017-Present
Advisor · Emre Neftci, Ph.D.

- ✘ Developing a theoretical biochemical framework for unifying and expanding approaches to neuron and network level systems (Morphogenic Learning).
- ✘ Developing and implementing experimental, biomimetic spiking neural networks on analog Dynamic Neuromorphic Asynchronous Processors (DYNAPs).
- ✘ Developing a drag-and-drop graphical neural network builder for education and instruction (Mango).

BRANDEIS UNIVERSITY
Software Developer · Neural Circuits Laboratory
Waltham, MA
2015-2016
Advisor · Stephen Van Hooser, Ph.D.

- ✘ Overhauled an outdated group of independent, tailored MATLAB library functions responsible for running an array of experimental neuroscience protocols.

UT CENTER FOR ELECTROMECHANICS
Summer Research Intern · NASTF
Austin, TX
2015
Advisor · Rhykka Connelly, Ph.D.

- ✘ Engineered a scalable high throughput system for converting biological and civil waste into biofuel.

Summer Research Intern · Texas High Energy Materials, LLC
2014, 2015
Advisor · Rhykka Connelly, Ph.D.

- ✘ Collaborated in a team environment to develop a compressible, self-healing aircraft fuel bladder.
- ✘ Co-developed and engineered an experimental protocol to assess reliabilities and lifetimes of aerial refueling systems.
- ✘ Refurbished a Falex Multi-Specimen Test Machine for the analysis of proprietary dry film lubricants.
- ✘ Assessed physical and chemical properties of immiscible polymer-solvent suspensions for supercritical CO₂ fabrication of micelle-encapsulated self-healing materials.

ST. MARY'S UNIVERSITY
Undergraduate Researcher · Computer Science Department
San Antonio, TX
2013-2015
Advisor · Carol Luckhardt Redfield, Ph.D.

- ✘ Designed an algorithmic approach for the reconstitution of iterative function systems underlying images of natural fractals via a generalized series of equations.

UT SOUTHWESTERN
Summer Research Intern · Neuroscience & Psychiatry Department
Dallas, TX
2013
Advisors · Adrian Rothenfluh, Ph.D. & Dante Gonzalez, Ph.D.

- ✘ Assayed a spectrum of *D. melanogaster* mutants for a combinatorial analysis of the epigenetic effects of histone methylation on feeding preferences.
- ✘ Developed an automated data analysis system that greatly increased assay throughput.

UT HEALTH SCIENCE CENTER
Undergraduate Researcher · Biochemistry & Biophysics Department
San Antonio, TX
2012-2013
Advisor · Susan Colette Daubner, Ph.D.

- ✘ Awarded an AHA grant for the study of Tyrosine Hydroxylase mutants and the

- effects of regulatory domain structure on enzyme kinetics.
- × Self-taught to use FPLC, developed a protocol to increase protein purification throughput from two weeks to 4 days, and created procedural and repair diagrams for following peers.

TEACHING & LEADERSHIP EXPERIENCE

UNIVERSITY OF CALIFORNIA - IRVINE	Irvine, CA
× Developer & Programmer · Dr. Emre Neftci's Neuromorphic Engineering course	2017-Present
UC DAVIS	Davis, CA
× Auditor & lecturer · Dr. Mark Goldman's Computational Neuroscience & Machine Learning course	2016-2017
GRIFFIN COLLEGE PREPARATORY SCHOOL	Austin, TX
× Substitute Teacher · Univariate Calculus	2015
× Visiting Lecturer · Natural Fractal Systems	2015
ST. MARY'S UNIVERSITY	San Antonio, TX
× Diagnosed two university server vulnerabilities exposing personally identifiable information to security breaches	2015
× Founder & President · Student-Led Society for Neuroscience	2014
× Lecturer · Natural Fractal Systems, Artificial Neural Networks	2014
× SACNAS Conference Presentation · Iterated Function Systems	2014
× Research Symposium Presentation · Histone Methylation	2014
× Research Symposium Presentation · Iterated Function Systems	2014
× Research Symposium Presentation · Kinetics of Tyrosine Hydroxylase	2014
× Lecturer · Kinetics of Tyrosine Hydroxylase	2013
× Lecturer · Neuropsychology of Synesthesia	2013
× Research Symposium Presentation · Kinetics of Tyrosine Hydroxylase	2013
× Attended Society for Neuroscience Conference	2012
× Teaching Assistant · Neurophysiology	2012
UT SOUTHWESTERN	Dallas, TX
× Trained and supervised two high school summer research interns	2013
× Poster Presentation · Histone Methylation	2013
BOY SCOUTS OF AMERICA	2003-2008
× Awarded Rank of Eagle Scout	2007
× Order of the Arrow, Honor Society	2006
× Troop 17, Senior Patrol Leader	2006