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University of California
Department of Medicine

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EDUCATION:

Sept. 2004 - June 2010 — **Ph.D. in Computational and Applied Mathematics**
University of California, Irvine
Thesis Topic: *A Mathematical Approach to Signaling, Specificity and Growth in Yeast Cell Mating.*
Advisor: Qing Nie

Sept. 2000 - June 2004 — **B.A. in Mathematics and Integrated Science**
Northwestern University

ACADEMIC POSITIONS:

Apr. 2016 - Present — **University of California, San Diego**
Postdoctoral Scholar; Advisor: Maxim Bazhenov

Jan. 2014 - March 2016 — **University of California, Riverside**
Postdoctoral Scholar; Advisor: Maxim Bazhenov

Sept. 2011 - Dec. 2013 — **University of San Diego**
Visiting Professor

May 2012 - Aug. 2012, Jan. - May 2011 — **San Diego State University**
Part-time Faculty, Instructor

Jan. - May 2011 — **Miramar Community College**
Part-time Faculty, Instructor

PUBLICATIONS:

Cancer

1. **Haney S**, Bardwell L, Nie Q (2010) Ultrasensitive responses and specificity in cell signaling. *BMC Sys Biol.* 4:119.
2. **Haney S**, Reya T, Bazhenov M (2016) Delayed Onset of Symptoms Through Feedback Interference in Chronic Cancers. *Convergent Science Physical Oncology.* 2:4; 045002.
3. **Haney S**, Konen J, Marcus AI, Bazhenov M. (2018) The Complex Ecosystem in Non-Small Cell Lung Cancer. *accepted at PLoS Comput Biol.* Preprint published on *BioRxiv.* doi: https://doi.org/10.1101/176446

Neuroscience

1. Finelli LA, **Haney S**, Bazhenov M, Stopfer M, Sejnowski TJ (2008) Synaptic learning rules and sparse coding in a model sensory system. *PLoS Comput Biol.* 4:4.
2. **Haney S**, Saha D, Raman B, Bazhenov M (2018) Differential Effects of Adaptation on Odor Discrimination *accepted at Journal of Neurophysiology.*
3. Lei H, **Haney S**, Guo XJ, Jernigan C, Cook C, Bazhenov M, Smith BS (2018) Novelty detection in early olfactory processing of the honeybee, *Apis melifera. in prep.*

Ecology

1. **Haney S**, Cattivera M, Siepielski A (2015) Temporal variation in niches and the ecological equivalence of species. *Theo. Ecol.* DOI: 10.1007/s12080-015-0267-7.
2. **Haney S**, Siepielski A (2018) Resource scarcity and surplus have long-lasting effects on community structure. *American Naturalist* vol. 191, no. 5. DOI: 10.1086/697045.

RESEARCH INTERESTS:

I use computational modeling to explore questions in systems biology: cancer, neuroscience, and community ecology. Specifically, my work has explored with how stochastic dynamics influences tumor progression, how ecological interactions with the local micro-environment contribute to invasion and metastasis. In neuroscience, I use biophysically accurate models to study how various forms of neuroplasticity impacts sensory coding.

GRANTS:

2017 Postdoctoral Kirschstein-NRSA fellow supported by training award (T32HL134632). Sallary support for 12 months.

This research is focused on investigating the connection between sleep apnea and cancer risk. I approach this problem with models operating at multiple scales, from cancer cell population dynamics to brainstem networks controlling immune system response and respiratory activity to brain circuits responsible for sleep pattern generation.

2013 NIMBioS Undergraduate Conference at the Interface Between Biology and Mathematics. Travel award for myself, Matt Cattivera, Ryan DeMuse. ($1500).

We presented work on the effect of jet-lag on circadian oscillator synchrony (*A Modified Goodwin Model of Biological Oscillators*) and work showing exact solutions to ecological competition dynamics when competition is nearly neutral (*A Perturbation Approach to Approximate Extinction Time in Ecological Systems Due to Harsh Conditions*).

2009 UCI CCBS(Center for Complex Biological Studies) Opportunity Award ($500)

This supported a collaborative project investigating the impact of membrane heterogeneity and receptor mobility on sensing and signaling. This was presented at the Center for Computational Biological Systems Annual Retreat (*Noise Attenuation in Yeast Mating via Lipid Rafts*).

HONORS AND AWARDS:

Best Poster. $100 prize. Resource scarcity and surplus have long-lasting effects on community structure. UCSD Postdoctoral Association Research Symposium. 2016.

INVITED TALKS:

- **Moore T, Haney S**, Yi TM, Nie Q. *Noise Attenuation in Yeast Mating via Lipid Rafts.* Center for Computational Biological Systems Annual Retreat, University of California, Irvine. 2010.
- **Haney S**, Bardwell L, Nie Q. *Specificity, Ultrasensitivity and Polarization in Yeast: A Mathematical Approach.* University of San Diego. 2011.
- **Haney S**. Cattivera M., Siepielski S.*Stochastic Models in Ecology.* Bazhenov Lab. UC Riverside. 2013.
- **Haney S**. Cattivera M., Siepielski S.*Stochastic Models in Ecology and Protein Network Evolution.* Gutenkunst Lab. Univ. of Arizona. 2013.

CONTRIBUTED TALKS AND POSTER SESSIONS:

- **Haney S**, Bardwell L, Nie Q. *Ultrasensitive responses and specificity in cell signaling.* International Conference on Systems Biology Poster Session. 2010.
- **Haney S**, Cattivera M, Siepielski A. *Mean Exit Time as a Metric of Ecological Stability in Stochastic Lotka-Volterra Models.* Joint Math Meetings. 2012.
- **Haney S**. *Mean Exit Time in Ecological Models of Competition.* Society of Mathematical Biology annual meeting. 2013
- **Cattivera M**, Haney S, and Siepielski A. *A Perturbation Approach to Approximate Extinction Time in Ecological Systems Due to Harsh Conditions.* NIMBioS Research Conference at the Interface of Biology and Mathematics. 2013.

- **DeMuse R** and Haney S. *A Modified Goodwin Model of Biological Oscillators.* NIMBioS Research Conference at the Interface of Biology and Mathematics. 2013.
- **Haney S**, Cattivera M, and Siepielski, A . *Effects of Stochastic Variation in Resource Availability in Ecological Community Structure.* Joint Math Meetings. 2014.
- **Haney S**, Saha D, Raman B, Bazhenov M. *A Model of Background invariant odor recognition.* Society For Neuroscience annual meetings. Poster Session. 2014.
- Haney S, Reya T, **Bazhenov M**. *Delayed Onset of Symptoms Through Feedback Interference in Chronic Cancers.* Q-Bio Winter Conference. 2015.
- **Haney S**, Saha D, Raman B, Bazhenov M. *A Model of Background invariant odor recognition.* 22nd Annual Joint Symposium on Neural Computation. Poster Session. 2015.
- **Haney S**, Saha D, Raman B, Bazhenov M. *Differential effects of adaptation on odor discrimination.* Collaborative Research in Computational Neuroscience. Poster Session. 2015.
- **Haney S**, Reya T, Bazhenov M. *Model of Enhanced Self Renwal in Chronic Myeloid Leukemia.* Q-Bio Winter Conference. Poster Session. 2016.
- **Haney S**, Reya T, Bazhenov M. *Model of Enhanced Self Renwal in Chronic Myeloid Leukemia.* Workshop on Mathematical Oncology VI. 2016.
- **Haney S**, Siepielski A. *Resource scarcity and surplus have long-lasting effects on community structure.* UCSD Postdoctoral Association Research Symposium. 2016. **Awarded Best Poster SLAM Presentation**
- **Haney S**, Saha D, Raman B, Bazhenov M. *Mechanisms and functions of the off-set response in insect olfaction.* Society For Neuroscience annual meeting. Poster Session. 2016
- **Haney S**, Konen J, Marcus AI, Bazhenov M. *Exploiting the Tumor Ecosystem.* Q-Bio Winter Conference. Poster Session. 2017.
- **Haney S**, Konen J, Marcus AI, Bazhenov M. *Exploiting the Tumor Ecosystem.* Mechanisms and Models of Cancer. Poster Session. 2017.

TECHNICAL SKILLS: Progamming and Software skills:

- FORTRAN, C/C++, Python, MATLAB
- GPGPU computing with CUDA and OpenCL
- Machine Learning: classification and regression learning in Python with scikit learn

REVIEWED FOR:

The Journal of Neuroscience, Neuron, Nature Communications, Journal of Physiology, PLoS Computational Biology, Journal of Neurophysiology

TEACHING EXPERIENCE:

University of San Diego

Calculus I	Fall 2011, Spring 2012, Fall 2012
Calculus II	Spring 2012, Fall 2012
Applied Mathematics for Science and Engineering	Spring 2013
College Algebra	Spring 2013, Fall 2013

San Diego State University

Applied Mathematics for Science and Engineering	Spring 2011, Summer 2012

Miramar Community College

Intermediate Algebra	Spring 2011

SERVICE:

Goldwater Scholarship Committee Member USD Fall 2012	Participated in campus-wide selection for candidates and shepherded individual applications for the scholarship.
Math Modeling Club Advisor USD Fall 2012	Organized meetings to prepare students for COMAP international contest in mathematical modeling.

MENTORING:

1. **Erica Nederend**. Senior honors thesis advisor. *Model of Serotonin Production and Regulation.* 2012 - 2013. Current position: Technology account manager at Oracle.
2. **Matt Cattivera**. Advisor for undergraduate research project: *A Perturbation Approach to Calculating Extinction Time of Ecologically Equivalent Species.* 2012 - 2014. Current position: FC Lending Consultant at Bank of America.
3. **Ryan DeMuse**. Advisor for undergraduate research project: *An Inducible Switch in Coupled Biological Oscillators.* 2012 - 2013. Current position: Graduate student in the Department of Mathematics at University of Denver.
4. **Jacob Garrett**. Advisor for graduate rotation project: *Heterogeneity in ORN Dynamics Affects Offset Response in Insect Olfaction.* 2016. Current position: Graduate student in Department of Neuroscience at UCSD.

REFERENCES:

Maxim Bazhenov
Postdoctoral Advisor
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Division of Pulmonary, Critical Care & Sleep Medicine
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Adam Siepielski
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Building 35A, Room 3E-623
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