Matthew S Creamer

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EDUCATION

PhD – Neuroscience
Yale University, 2012-2019
Thesis defense, October 5th, 2018

BS – Cellular and Molecular Biology, GPA 4.0
Minor – Mathematics
Northern Arizona University, 2008-2011
- Graduated in 3 years

RESEARCH EXPERIENCE

C. V. Starr Fellow – Princeton University
Princeton, NJ, 2019 - Present
Advisor: Andrew M. Leifer and Jonathan W. Pillow

PhD, NSF GRFP – Yale University
New Haven, CT, 2012-2018
Advisor: Damon A. Clark
- My PhD focused on algorithms for biological visual motion detection
- Discovered, characterized, and modeled new motion detection circuit in *Drosophila* [4]
- Measured fast timescale responses in direction selective neurons in the fly brain [8]
- Engineered a virtual reality fly-on-a-ball behavior rig to measure *Drosophila* walking and turning speeds while presenting visual stimuli [3]
- Programmed visual stimulus presentation system and suite of data analysis software for fly behavior (60k lines in Matlab)

Research Assistant – Ludwig Institute for Cancer Research
Melbourne, Australia, 2011-2012
Advisor: Antony W. Burgess
- Built mass action kinetics model of a cancer signalling pathway which allowed researchers to predict protein concentration and modification over time (Matlab)
- Parameterized the model by measuring protein concentration in tissue culture

Helios Scholar Internship – Translational Genomics Research Institute
Phoenix, Arizona, June-August 2011
Advisor: Richard G. Posner and Edward C. Stites
- Finalized work from undergraduate (see below) [9, 10]

Undergraduate Researcher – Northern Arizona University
Flagstaff, Arizona, 2008-2011
Advisor: Richard G. Posner
- Built mass action kinetic model of large cell signalling pathway to demonstrate that it is possible to create models with arbitrarily large numbers of complexes [10]

AWARDS

C. V. Starr Fellowship
Princeton University, 2019

Graduate Research Fellowship
National Science Foundation, 2014-2017

John Spangler Nicholas Symposium Poster prize
Yale University, 2015

Helios Scholars Symposium – 2nd place
TGen, 2011

Regents High Honors Endorsement
Northern Arizona University – 2008-2011
Full tuition scholarship to any Arizona university

PUBLICATIONS

[1] Mano, O., **Creamer, M.S.**, Matulis, C.A., Salazar-Gatzimas, E., Chen, J., Zavatone-Veth, J.A., and Clark, D.A. (2019). Using slow frame rate imaging to extract fast receptive fields. *Nature communications* 10 (1): 1-13. https://doi.org/10.1038/s41467-019-12974-0

[2] Badwan, B.A., **Creamer, M.S.**, Zavatone-Veth J.A., and Clark, D.A. (2019). Dynamic nonlinearities enable direction-opponency in *Drosophila* elementary motion detectors. *Nature Neuroscience*. https://doi.org/10.1038/s41593-019-0443-y

[3] **Creamer, M.S.**, Mano, O., Tanaka, R., and Clark, D.A. (2019). A flexible geometry for panoramic visual and optogenetic stimulation during behaviour and physiology. *J. Neurosci. Methods* 323: 48-55. https://doi.org/10.1016/j.jneumeth.2019.05.005

[4] **Creamer, M.S.**, Mano, O., and Clark, D.A. (2018). Visual Control of Walking Speed in *Drosophila*. *Neuron* 100: 1460–1473. https://doi.org/10.1016/j.neuron.2018.10.028
Video abstract: https://youtu.be/LdJRfc6PCi4

[5] Astigarraga, S., Douthit, J., Tarnogorska, D., **Creamer, M.S.**, Mano, O., Clark, D.A., Meinertzhagen, I.A., and Treisman, J.E. (2018). *Drosophila* Sidekick is required in developing photoreceptors to enable visual motion detection. *Development* 145: dev.158246. https://doi.org/10.1242/dev.158246

[6] Collins, K.M., Bode, A., Fernandez, R.W., Tanis, J.E., Brewer, J.C., **Creamer, M.S.**, and Koelle, M.R. (2016). Activity of the C. elegans egg-laying behavior circuit is controlled by competing activation and feedback inhibition. *Elife* 5: 21126. https://doi.org/10.7554/eLife.21126

[7] Buck, K.B., Schaefer, A.W., Schoonderwoert, V.T., **Creamer, M.S.**, Dufresne, E.R., and Forscher, P. (2016). Local Arp2/3-dependent actin assembly modulates applied traction force during apCAM adhesion site maturation. *Mol. Biol. Cell* 28: 98–110. https://doi.org/10.1091/mbc.e16-04-0228

[8] Salazar-Gatzimas, E.*, Chen, J.*, **Creamer, M.S.***, Mano, O., Mandel, H.B., Matulis, C.A., Pottackal, J., and Clark, D.A. (2016). Direct Measurement of Correlation Responses in *Drosophila* Elementary Motion Detectors Reveals Fast Timescale Tuning. *Neuron* 92: 227–239. https://doi.org/10.1016/j.neuron.2016.09.017
(* Co-first authors)

[9] Stites, E.C., Aziz, M., **Creamer, M.S.**, Von Hoff, D.D., Posner, R.G., and Hlavacek, W.S. (2015). Use of mechanistic models to integrate and analyze multiple proteomic datasets. *Biophys. J.* 108. https://doi.org/10.1016/j.bpj.2015.02.030

[10] **Creamer, M.S.**, Stites, E.C., Aziz, M., Cahill, J.A., Tan, C., Berens, M.E., Han, H., Bussey, K.J., Von Hoff, D.D., Hlavacek, W.S., et al. (2012). Specification, annotation, visualization and simulation of a large rule-based model for ERBB receptor signaling. *BMC Syst. Biol.* 6: 107. https://doi.org/10.1186/1752-0509-6-107

CONFERENCE POSTERS

Creamer, M.S., Mano, O., and Clark, D.A. (2018). Overlapping circuitry implements two distinct algorithms to regulate orientation and walking speed in *Drosophila*. Neuronal Circuits in Cold Spring Harbor.

Salazar, E., Chen, J., **Creamer, M.S.**, Mano, O., Matulis, C., Pottackal, J., Fitzgerald, J.E., and Clark, D.A. (2017). Direct measurement of correlation responses in *Drosophila* direction-selective. COSYNE in Salt Lake City, UT.

Creamer, M.S., Mano, O., and Clark, D.A. (2017). Two distinct motion detection algorithms regulate turning and walking in *Drosophila*. COSYNE in Salt Lake City, UT.

TEACHING & SERVICE

Mentored undergraduates
Yale University
- Mentored 3 different undergraduates, one project was published [7]

Departmental Search Committee, graduate student committee
Yale University – January 2016 as committee chair and January 2018
- Interviewed candidates and assessed their qualifications for the position

Neurobiology TA
Yale University – 2016 fall semester
- Led subject review sessions for 10-20 students from the class

Bioethics in Neuroscience
Yale University – 2014 and 2015 spring semesters
- Created a syllabus and organized weekly guest speakers in an open discussion format

Science Mentor
Metropolitan Business Academy, New Haven, CT – January-May 2013
- Mentored high school students on their projects for the local science fair

TECHNICAL SKILLS

Matlab
Python/Tensorflow
Machine learning
Dynamical systems
Digital signal processing
Differential equations
Linear algebra
Statistics and probability
Systems, behavioral, and computational neuroscience

CERTIFICATIONS

Machine Learning
https://www.coursera.org/account/accomplishments/verify/3Q2GDG4AFWRR

Deep Learning Specialization
https://www.coursera.org/account/accomplishments/specialization/SBZPPH4DQBDN