MAX H. TURNER

(319) 430-5531 ⋄ mhturner@stanford.edu ⋄ mhturner.github.io
Department of Neurobiology
299 W. Campus Drive ⋄ Stanford, CA. 94305.

EDUCATION

University of Washington *2011 - 2017*
Ph.D., Neuroscience
Advisor: Fred Rieke, Ph.D.
Dissertation: *Circuit mechanisms underlying the encoding of ethologically relevant visual stimuli in the retina*

University of Iowa *2007 - 2011*
B.S., Biology
Honors thesis: *Developing a model for cerebral ventricle research in the zebrafish Danio rerio.*

B.S., Mathematics

RESEARCH EXPERIENCE

Postdoctoral Fellow 2018 - Present
Stanford University *Department of Neurobiology*

- Advisor: Tom Clandinin, Ph.D.
- Selected projects: Receptive field structure in *Drosophila* visual projection neurons.
- Techniques: Scientific programming for image analysis; software design for data acquisition and visual stimulation; *in vivo* two-photon imaging of fluorescent indicators of neural activity; histology and confocal imaging; *Drosophila* husbandry and genetics; Molecular biology and molecular genetics techniques. Programming languages: Python, OpenGL.

Predoctoral Research Associate 2012 - 2018
University of Washington *Department of Physiology and Biophysics*

- Advisor: Fred Rieke, Ph.D.
- Selected projects: Noise correlations and population encoding by mouse directionally-selective retinal ganglion cells; Spatial integration of natural visual inputs by primate retinal ganglion cells; Center-surround interactions in the retinal ganglion cell receptive field.
- Techniques: Patch clamp electrophysiology; visual stimulus design; two-photon targeted recording; computational modeling of visual neurons; Programming for data analysis. Programming languages: Matlab, OpenGL

Undergraduate Research Associate 2007 - 2011
University of Iowa *Department of Biology*

- Advisor: Alan Kay, Ph.D.
- Project: Developing a model for cerebral ventricle research in the zebrafish *Danio rerio.*
- Techniques: *in vivo* time-series imaging of larval zebrafish; image analysis; 3D volumetric rendering.

Summer Undergraduate Research Fellow 2010
University of Pittsburg *Department of Mathematics*

- Advisor: Bard Ermentrout, Ph.D.

- Project: Oscillations and phasic activity in inhibitory neural networks.
- Techniques: Mathematical modeling of neurons and neural populations using XPP [software for numerically evaluating dynamical systems]

TEACHING EXPERIENCE

DataLucence: Images 2019
Teaching Assistant *Stanford University*

- Responsibilities: Developed teaching materials including Python code to demonstrate coding for image analysis in the biosciences, presented a lesson in a live-coding format, provided feedback and guidance in hands-on software workshops for graduate students and postdoctoral fellows.
- Syllabus & course evaluations available upon request

Readings in neurobiology - neural processing in sensory systems 2015
Instructor *University of Washington*

- Responsibilities: Designed course structure, syllabus, and reading list; guided weekly discussion of primary literature organized around themes in sensory neuroscience; provided feedback on written assignments.
- Syllabus & course evaluations available upon request

Introduction to cellular & molecular neurobiology 2013
Teaching Assistant *University of Washington*

- Responsibilities: Ran a weekly lab section which complemented lecture material; graded lab reports and tests; held office hours for students.
- Course evaluations available upon request

FUNDING

Ruth L. Kirschstein Postdoctoral NRSA Fellowship 2018-Present
F32-MH118707 *NIH - NINDS / BRAIN initiative*

- PI: M.H. Turner
- Project title: *Neural circuit mechanisms underlying hierarchical visual processing in Drosophila*

Ruth L. Kirschstein Predoctoral NRSA Fellowship 2015-2017
F31-EY026288 *NIH - Natl. Eye Inst.*

- PI: M.H. Turner
- Project title: *Retinal ganglion cell receptive field form and function during natural viewing*

Vision Training Grant, University of Washington 2012-2015
T32-EY07031 *NIH - Natl. Eye Inst.*

- PI: John Clark, Ph.D.

HONORS AND OTHER ACTIVITIES

- Member, UW Postdocs United Organizing Committee [2017-2018]
- Volunteer tutor, MESA Seattle STEM education program [2016]
- Member, faculty search committee, University of Washington Department of Physiology & Biophysics [Fall 2016]
- Steward in the University of Washington graduate student union, UAW local 4121 [2012-2017]

· Robbie Prize in Biology, University of Iowa. [2011]
· NSF VIGRE Undergraduate Research Assistantship in mathematics, University of Iowa. [2010-2011]
· Robert S. and Dorothy J. Lee Scholarship, University of Iowa. [2010]
· Clifford W. Hesseltine Award in Biology, University of Iowa. [2010]
· Old Gold Scholar, University of Iowa. [2007-2011]

PUBLICATIONS

***Turner, M.H.**, *Sanchez Giraldo, L.G., Schwartz, O., and Rieke, F. [2019]. Stimulus and goal oriented frameworks for understanding natural vision. *Nature Neuroscience*. 22, 15-24. *Co-first authors

*Bleckert, A., *Zhang, C., **Turner, M.H.**, Koren, D., Berson, D., Park, S.J.H., Demb, J.B., Rieke, F., Wei, W., Wong, R.O. [2018]. GABA release selectively regulates synapse development at distinct inputs on direction-selective retinal ganglion cells. *PNAS*. 115 (51), E12083-E12090. *Co-first authors

Turner, M.H., Schwartz, G.W., and Rieke, F. [2018]. Receptive field center-surround interactions mediate context-dependent spatial contrast encoding in the retina. *eLife*. 7:e38841.

Turner, M.H., and Rieke, F. [2016]. Synaptic rectification controls nonlinear spatial integration of natural visual inputs. *Neuron*. 90, 1257-1271.

*Zylberberg, *J., Cafaro, J., ***Turner, M.H.**, Shea-brown, E., and Rieke, F. [2016]. Direction-Selective Circuits Shape Noise to Ensure a Precise Population Code. *Neuron*. 89, 369-383. *Co-first authors

Sexton, T.J., Bleckert, A., **Turner, M.H.**, and Van Gelder, R.N. [2015]. Type I intrinsically photosensitive retinal ganglion cells of early post-natal development correspond to the M4 subtype. *Neural Development*. 10, 17.

Trenholm, S., Mclaughlin, A.J., Schwab, D.J., **Turner, M.H.**, Smith, R.G., Rieke, F., and Awatramani, G.B. [2014]. Nonlinear dendritic integration of electrical and chemical synaptic inputs drives fine-scale correlations. *Nature Neuroscience*. 17, 1759-1766.

Bleckert, A., Schwartz, G.W., **Turner, M.H.**, Rieke, F., and Wong, R.O.L. [2014]. Visual Space Is Represented by Nonmatching Topographies of Distinct Mouse Retinal Ganglion Cell Types. *Current Biology*. 24, 310-315.

Turner, M.H., Ullmann, J.F.P., and Kay, A.R. [2012]. A method for detecting molecular transport within the cerebral ventricles of live zebrafish (*Danio rerio*) larvae. *The Journal of Physiology*. 590, 2233-2240.

PRESENTATIONS & INVITED TALKS

Turner, M.H., Isaacman-Beck, J., and Clandinin, T. [2019]. Exploring higher-order sensory representation in visual projection neurons. Poster presentation at Neurobiology of Drosophila meeting. Cold Spring Harbor Laboratories, NY.

Turner, M.H. [2019]. Visual Encoding of Natural Scenes. Visiting scholar invited talk at the McPherson Eye Research Institute. University of Wisconsin, Madison.

Turner, M.H., Isaacman-Beck, J., and Clandinin, T. [2019]. Circuits underlying complex visual representation in the Drosophila visual system. Poster presentation at NIH BRAIN investigator's meeting. Washington, D.C.

Turner, M.H., and Rieke, F. [2016]. Nonlinear spatial integration in the receptive field surround and its impact on natural scene encoding. Data blitz talk & poster presentation at FASEB Retinal Neurobiology and Visual Processing meeting. Keystone, CO.

Turner, M.H., and Rieke, F. [2016]. Control of nonlinear spatial integration by rectified synaptic inputs. Poster presentation at ARVO meeting. Seattle, WA.

Turner, M.H., and Rieke, F. [2016]. Synaptic rectification controls nonlinear spatial integration of natural visual inputs. Poster presentation at COSYNE. Salt Lake City, UT.

Turner, M.H., and Rieke, F. [2014]. Spatial integration of natural stimuli by primate retinal ganglion cells. Poster presentation at Gained In Translation meeting. Seattle, WA.

Turner, M.H., and Rieke, F. [2014]. Characterizing parasol ganglion cell receptive field structure using natural retinal inputs. Poster presentation at FASEB retinal neurobiology and visual processing meeting. Saxton's River, VT.

Turner, M.H., Zylberberg, J., Cafaro, J., Schwartz, G., Shea-Brown, E., and Rieke, F. [2013]. Spike correlations and direction encoding in the the retina. Poster presentation at ARVO meeting. Seattle, WA.

Turner, M.H., and Kay, A.R. [2009]. The zebrafish as a model for studying cerebral ventricles. Poster presentation at the Iowa Center for Research by Undergraduates. Iowa City, IA.