Max H. Turner
(319) 430-5531 mhturner@stanford.edu Department of Neurobiology, Stanford University

Education

UNIVERSITY OF WASHINGTON, SEATTLE, WA — PH.D. (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, IOWA CITY, IA — B.S. (2011)

B.S., Biology, with honors

B.S., Mathematics

Research Experience

POSTDOCTORAL FELLOW (2018-PRESENT)
STANFORD UNIVERSITY DEPARTMENT OF NEUROBIOLOGY, STANFORD, CA

Advisor: Tom Clandinin, Ph.D.

POSTDOCTORAL FELLOW (2017-2018)
UNIVERSITY OF WASHINGTON PHYSIOLOGY & BIOPHYSICS DEPARTMENT, SEATTLE, WA

Advisor: Fred Rieke, Ph.D.

PREDOCTORAL RESEARCH ASSOCIATE (2012-2017)
UNIVERSITY OF WASHINGTON PHYSIOLOGY & BIOPHYSICS DEPARTMENT, SEATTLE, WA

Advisor: Fred Rieke, Ph.D.

Techniques: Patch clamp electrophysiology, *in vitro* mammalian retinal preparation, visual stimulus design, two-photon targeted recording, computational modeling of visual neurons, programming for data analysis (MATLAB)

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

UNDERGRADUATE RESEARCH ASSISTANT (2007-2011)
UNIVERSITY OF IOWA, DEPARTMENT OF BIOLOGY, IOWA CITY, IA

Advisor: Alan Kay, Ph.D.

Techniques: *in vivo* imaging of larval zebrafish, image analysis, 3D volumetric rendering

Project: Developing a model for cerebral ventricle research in the zebrafish *Danio rerio*

SUMMER RESEARCH FELLOW (2010)
UNIVERSITY OF PITTSBURGH, CENTER FOR THE NEURAL BASIS OF COGNITION, PITTSBURGH, PA

Advisor: G. Bard Ermentrout, Ph.D.

Techniques: Mathematical modeling of neurons and neural populations using XPP (software for numerically exploring dynamical systems)

Project: Oscillations and phasic activity in inhibitory neural networks

Teaching Experience

PREDOCTORAL TA, NEUROBIOLOGY 450 - UNIVERSITY OF WASHINGTON (FALL 2015)

- Course title: *Readings in neurobiology - neural processing in sensory systems*
- 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

PREDOCTORAL TA, NEUROBIOLOGY 301 - UNIVERSITY OF WASHINGTON (WINTER 2013)

- Course title: *Introduction to cellular & molecular neurobiology*
- 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

- F32-MH118707. Ruth L. Kirschstein Postdoctoral NRSA Fellowship. (2018-present)
  PI: M. H. Turner
  Project title: *Neural circuit mechanisms underlying hierarchical visual processing in Drosophila*
- F31-EY026288. Ruth L. Kirschstein Predoctoral NRSA Fellowship. (2015-2017)
  PI: M. H. Turner
  Project title: *Retinal ganglion cell receptive field form and function during natural viewing*
- T32-EY07031. Vision Training Grant, University of Washington. (2012-2015)
  PI: John Clark, Ph.D.

Honors & Other Activities

- Member, UW Postdocs United Organizing Committee (2017-2018)
- Volunteer tutor, MESA Seattle STEM education program (2016-2018)
- 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

*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*. In revision. *Co-first authors

*Turner, M.H., *Giraldo, L.G.S., Schwartz, O., and Rieke, F. (2018). Stimulus- and goal-oriented frameworks for understanding natural vision (Invited Review). *Nature Neuroscience*. In press. *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.

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

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.