Stanford

Andrew D. Huberman, Ph.D.

Associate Professor of Neurobiology and of Ophthalmology

Bio

ACADEMIC APPOINTMENTS

- Associate Professor, Neurobiology
- Associate Professor, Ophthalmology
- Member, Bio-X
- Member, Stanford Neurosciences Institute

HONORS AND AWARDS

- Cogan Award for Research in Vision and Ophthalmology, ARVO (2017)
- Pew Biomedical Scholar, Pew Charitable Trusts (2013-2017)
- McKnight Scholar, McKnight Endowment Fund (2013-2016)
- Catalyst for a Cure Investigator, Glaucoma Research Foundation (2012- present)
- Helen Hay Whitney Postdoctoral Fellow, HHWF Foundation (2006-2009)

LINKS

- Huberman Lab Website: http://www.hubermanlab.com

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

My lab is focused on brain function, development and repair with emphasis on regeneration to prevent and cure blindness.

We also study the neural circuits that merge perceptions with internal states, in particular, visual fear.

The specific conditions we aim to understand and develop therapeutic strategies for include: retinal and optic nerve damage in glaucoma, and disorders of sensory-limbic integration, such as chronic anxiety, phobias and PTSD.

Teaching

STANFORD ADVISEES

Postdoctoral Faculty Sponsor

Heekyung Jung, Tania Seabrook, Supraja Varadarajan, Melis Yilmaz Balban

Publications

PUBLICATIONS

- **Signal Integration in Thalamus: Labeled Lines Go Cross-Eyed and Blurry.** *Neuron*
  Stafford, B. K., Huberman, A. D.
  2017; 93 (4): 717-720

- **Regenerating optic pathways from the eye to the brain.** *Science (New York, N.Y.)*
  Laha, B., Stafford, B. K., Huberman, A. D.
  2017; 356 (6342): 1031–34

- **Cortico-fugal output from visual cortex promotes plasticity of innate motor behaviour.** *Nature*
  Liu, B., Huberman, A. D., Scanziani, M.
  2016; 538 (7625): 383-387

- **Neural activity promotes long-distance, target-specific regeneration of adult retinal axons.** *Nature neuroscience*
  Lim, J. A., Stafford, B. K., Nguyen, P. L., Lien, B. V., Wang, C., Zukor, K., He, Z., Huberman, A. D.
  2016; 19 (8): 1073-1084

- **Life goes by: a visual circuit signals perceptual-motor mismatch** *NATURE NEUROSCIENCE*
  Ishiko, N., Huberman, A. D.
  2016; 19 (2): 177-179

- **BLINDNESS Assassins of eyesight** *NATURE*
  Huberman, A. D., El-Danaf, R. N.
  2015; 527 (7579): 456-457

- **Cell type-specific manipulation with GFP-dependent Cre recombinase** *NATURE NEUROSCIENCE*
  Tang, J. C., Rudolph, S., Dhande, O. S., Abraira, V. E., Choi, S., Lapan, S. W., Drew, I. R., Drokhlyansky, E., Huberman, A. D., Regehr, W. G., Cepko, C. L.
  2015; 18 (9): 1334-?

- **When Visual Circuits Collide: Motion Processing in the Brain.** *Cell*
  Salay, L. D., Huberman, A. D.
  2015; 162 (2): 241-243

- **Cortical Cliques: A Few Plastic Neurons Get All the Action** *NEURON*
  Seabrook, T. A., Huberman, A. D.
  2015; 86 (5): 1113-1116

- **Contactin-4 Mediates Axon-Target Specificity and Functional Development of the Accessory Optic System** *NEURON*
  Osterhout, J. A., Stafford, B. K., Nguyen, P. L., Yoshihara, Y., Huberman, A. D.
  2015; 86 (4): 985-999

- **Characteristic Patterns of Dendritic Remodeling in Early-Stage Glaucoma: Evidence from Genetically Identified Retinal Ganglion Cell Types** *JOURNAL OF NEUROSCIENCE*
  El-Danaf, R. N., Huberman, A. D.
  2015; 35 (6): 2329-2343

- **Functional Assembly of Accessory Optic System Circuitry Critical for Compensatory Eye Movements.** *Neuron*
  2015

- **So many pieces, one puzzle: cell type specification and visual circuitry in flies and mice** *GENES & DEVELOPMENT*
  Wernet, M. F., Huberman, A. D., Desplan, C.
  2014; 28 (23): 2565-2584

- **Birthdate and Outgrowth Timing Predict Cellular Mechanisms of Axon Target Matching in the Developing Visual Pathway** *CELL REPORTS*
  Osterhout, J. A., El-Danaf, R. N., Nguyen, P. L., Huberman, A. D.
  2014; 8 (4): 1006-1017

- **A dedicated circuit links direction-selective retinal ganglion cells to the primary visual cortex** *NATURE*
  Cruz-Martin, A., El-Danaf, R. N., Osakada, F., Sriram, B., Dhande, O. S., Nguyen, P. L., Callaway, E. M., Ghosh, A., Huberman, A. D.
  2014; 507 (7492): 358-?

- **Visual Circuits: Mouse Retina No Longer a Level Playing Field** *CURRENT BIOLOGY*
  Dhande, O. S., Huberman, A. D.
  2014; 24 (4): R155-R156

- **Retinal ganglion cell maps in the brain: implications for visual processing** *CURRENT OPINION IN NEUROBIOLOGY*
  Dhande, O. S., Huberman, A. D.
  2014; 24: 133-142

- **Genetic Dissection of Retinal Inputs to Brainstem Nuclei Controlling Image Stabilization** *JOURNAL OF NEUROSCIENCE*
  Dhande, O. S., Estevez, M. E., Quattrochi, L. E., El-Danaf, R. N., Nguyen, P. L., Berson, D. M., Huberman, A. D.
  2013; 33 (45): 17797-17813

- **Diverse Visual Features Encoded in Mouse Lateral Geniculate Nucleus** *JOURNAL OF NEUROSCIENCE*
  Piscopo, D. M., El-Danaf, R. N., Huberman, A. D., Niell, C. M.
  2013; 33 (11): 4642-4656

- **Transsynaptic Tracing with Vesicular Stomatitis Virus Reveals Novel Retinal Circuitry** *JOURNAL OF NEUROSCIENCE*
  Beier, K. T., Borghuis, B. G., El-Danaf, R. N., Huberman, A. D., Demb, J. B., Cepko, C. L.
  2013; 33 (1): 35-51

- **Wiring visual circuits, one eye at a time** *NATURE NEUROSCIENCE*
  El Danaf, R. N., Huberman, A. D.
  2012; 15 (2): 172-174

- **Visual Cognition: Rats Compare Shapes Among the Crowd** *CURRENT BIOLOGY*
  Cruz-Martin, A., Huberman, A. D.
  2012; 22 (1): R18-R20

- **What can mice tell us about how vision works?** *TRENDS IN NEUROSCIENCES*
  Huberman, A. D., Niell, C. M.
  2011; 34 (9): 464-473

- **Cadherin-6 Mediates Axon-Target Matching in a Non-Image-Forming Visual Circuit** *NEURON*
  Osterhout, J. A., Josten, N., Yamada, J., Pan, F., Wu, S., Nguyen, P. L., Panagiotakos, G., Inoue, Y. U., Egusa, S. F., Volgyi, B., Inoue, T., Bloomfield, S. A., Barres, et al
  2011; 71 (4): 632-639

- **Pathway-Specific Genetic Attenuation of Glutamate Release Alters Select Features of Competition-Based Visual Circuit Refinement** *NEURON*
  Koch, S. M., Dela Cruz, C. G., Hnasko, T. S., Edwards, R. H., Huberman, A. D., Ullian, E. M.
  2011; 71 (2): 235-242

- **Transgenic Mice Reveal Unexpected Diversity of On-Off Direction-Selective Retinal Ganglion Cell Subtypes and Brain Structures Involved in Motion Processing** *JOURNAL OF NEUROSCIENCE*
  Rivlin-Etzion, M., Zhou, K., Wei, W., Elstrott, J., Nguyen, P. L., Barres, B. A., Huberman, A. D., Feller, M. B.
  2011; 31 (24): 8760-8769

- **The Down Syndrome Critical Region Regulates Retinogeniculate Refinement** *JOURNAL OF NEUROSCIENCE*
  Blank, M., Fuerst, P. G., Stevens, B., Nouri, N., Kirkby, L., Warrier, D., Barres, B. A., Feller, M. B., Huberman, A. D., Burgess, R. W., Garner, C. C.
  2011; 31 (15): 5764-5776

- **Emergence of Lamina-Specific Retinal Ganglion Cell Connectivity by Axon Arbor Retraction and Synapse Elimination** *JOURNAL OF NEUROSCIENCE*
  Cheng, T., Liu, X., Faulkner, R. L., Stephan, A. H., Barres, B. A., Huberman, A. D., Cheng, H.
  2010; 30 (48): 16376-16382

- **Molecular and Cellular Mechanisms of Lamina-specific Axon Targeting** *COLD SPRING HARBOR PERSPECTIVES IN BIOLOGY*
  Huberman, A. D., Clandinin, T. R., Baier, H.

2010; 2 (3)

- **MILESTONES AND MECHANISMS FOR GENERATING SPECIFIC SYNAPTIC CONNECTIONS BETWEEN THE EYES AND THE BRAIN** *INVERTEBRATE AND VERTEBRATE EYE DEVELOPMENT*
  Josten, N. J., Huberman, A. D.
  2010; 93: 229-259
- **Genetic Identification of an On-Off Direction-Selective Retinal Ganglion Cell Subtype Reveals a Layer-Specific Subcortical Map of Posterior Motion** *NEURON*
  Huberman, A. D., Wei, W., Elstrott, J., Stafford, B. K., Feller, M. B., Barres, B. A.
  2009; 62 (3): 327-334
- **Architecture and activity-mediated refinement of axonal projections from a mosaic of genetically identified retinal ganglion cells** *NEURON*
  Huberman, A. D., Manu, M., Koch, S. M., Susman, M. W., Lutz, A. B., Ullian, E. M., Baccus, S. A., Barres, B. A.
  2008; 59 (3): 425-438
- **Mechanisms underlying development of visual maps and receptive fields** *ANNUAL REVIEW OF NEUROSCIENCE*
  Huberman, A. D., Feller, M. B., Chapman, B.
  2008; 31: 479-509
- **The classical complement cascade mediates CNS synapse elimination** *CELL*
  Stevens, B., Allen, N. J., Vazquez, L. E., Howell, G. R., Christopherson, K. S., Nouri, N., Micheva, K. D., Mehalow, A. K., Huberman, A. D., Stafford, B., Sher, A., Litke, A. M., Lambris, et al
  2007; 131 (6): 1164-1178
- **Mechanisms of eye-specific visual circuit development** *CURRENT OPINION IN NEUROBIOLOGY*
  Huberman, A. D.
  2007; 17 (1): 73-80
- **Spontaneous retinal activity mediates development of ocular dominance columns and binocular receptive fields in V1** *NEURON*
  Huberman, A. D., Speer, C. M., Chapman, B.
  2006; 52 (2): 247-254
- **Neuronal pentraxins mediate synaptic refinement in the developing visual system** *JOURNAL OF NEUROSCIENCE*
  Bjartmar, L., Huberman, A. D., Ullian, E. M., Renteria, R. C., Liu, X., Xu, W., Prezioso, J., Susman, M. W., Stellwagen, D., Stokes, C. C., Cho, R., Worley, P., Malenka, et al
  2006; 26 (23): 6269-6281
- **Dynamics of spontaneous activity in the fetal macaque retina during development of retinogeniculate pathways** *JOURNAL OF NEUROSCIENCE*
  Warland, D. K., Huberman, A. D., Chalupa, L. M.
  2006; 26 (19): 5190-5197
- **Nob mice wave goodbye to eye-specific segregation** *NEURON*
  Huberman, A. D.
  2006; 50 (2): 175-177
- **Target-derived cues instruct synaptic differentiation** *JOURNAL OF NEUROSCIENCE*
  Huberman, A. D.
  2006; 26 (4): 1063-1064
- **Ephrin-As mediate targeting of eye-specific projections to the lateral geniculate nucleus** *NATURE NEUROSCIENCE*
  Huberman, A. D., Murray, K. D., Warland, D. K., Feldheim, D. A., Chapman, B.
  2005; 8 (8): 1013-1021
- **Early and rapid targeting of eye-specific axonal projections to the dorsal lateral geniculate nucleus in the fetal macaque** *JOURNAL OF NEUROSCIENCE*
  Huberman, A. D., Dehay, C., Berland, M., Chalupa, L. M., Kennedy, H.
  2005; 25 (16): 4014-4023
- **Decoupling eye-specific segregation from lamination in the lateral geniculate nucleus** *JOURNAL OF NEUROSCIENCE*
  Huberman, A. D., Stellwagen, D., Chapman, B.
  2002; 22 (21): 9419-9429