

# Emily Cooper

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## CONTACT

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## POSITIONS

<b>University of California, Berkeley</b> <i>Assistant Professor, School of Optometry &amp; Vision Science Program</i>	<b>2018 – present</b>
<b>Dartmouth College</b> <i>Assistant Research Professor, Psychological and Brain Sciences</i> <i>Adjunct Assistant Professor, Computer Science</i>	<b>2015 – 2018</b> <i>2015 – 2018</i> <i>2016 – 2018</i>
<b>Stanford University</b> <i>Postdoctoral Research Scholar, Psychology</i> (Advisor: Anthony Norcia)	<b>2013 – 2015</b>

## EDUCATION

<b>University of California, Berkeley</b> <i>Ph.D., Neuroscience</i> Dissertation: Perception of Depth in Real and Pictured Environments (Advisor: Martin Banks)	<b>2007 – 2012</b>
<b>University of Chicago</b> <i>B.A., Psychology and English Language &amp; Literature (Phi Beta Kappa)</i>	<b>2003 – 2007</b>

## RESEARCH FUNDING

Human Frontier Science Program, 2018  
*Visual circuit adaptations to natural environments & behaviors in zebrafish and cichlids (co-I)*

Neukom Institute, Dartmouth College, 2017 [Internal]  
*Biologically-plausible model of associative learning (co-PI)*

Intel, 2017  
*Light Field Display ISRA Program, Unrestricted Gift*

Oculus, 2017  
*Unrestricted Gift*

Samsung, 2016  
*Global Research Outreach, Monovision and Focus-tunable Near-eye Displays (co-I)*

Microsoft, 2015  
*Augmenting Reality for the Visually Impaired, Unrestricted Gift*

National Science Foundation, 2011  
*Graduate Research Fellowship*

Department of Defense, 2009  
*National Defense Science & Engineering Graduate Fellowship*

## AWARDS

NVIDIA, Academic GPU Award, 2016  
Stanford University, Henzl-Gabor Young Women in Science Travel Award, 2013  
ARVO, Vision Sciences Society Student Travel Award, 2012  
UC Berkeley, Outstanding Graduate Student Teaching Award, 2009  
HHMI, Undergraduate Research Fellowship, 2006

## ARTICLES

- Z. Bağöze, A.P. Mackey and E.A. Cooper. Plasticity and Adaptation in Adult Binocular Vision. [Review Article] *Current Biology*, in press
- M. Kinateder, J. Gualtieri, M.J. Dunn, W. Jarosz, X. Yang and E.A. Cooper. Using an Augmented Reality Device as a Distance-Based Vision Aid – Promise and Limitations. *Optometry & Vision Science*, 95(9), 727-737, 2018
- B. Rokers, J.M. Fulvio, J. Pillow, and E.A. Cooper. Systematic Misperceptions of 3D Motion Explained by Bayesian Inference. *Journal of Vision*, 18(3):23, 2018
- E.A. Cooper and M.S. Banks. Perceived Facial Distortions in Selfies are Explained by Viewing Habits. [Commentary] *JAMA Facial Plastic Surgery*, 20(5), 431, 2018
- R. Konrad, N. Padmanaban, K. Molner, E.A. Cooper, and G. Wetzstein. Accommodation-invariant Computational Near-eye Displays. *ACM Transactions on Graphics (SIGGRAPH Conference Proceedings)*, 36(4):88, 2017
- N. Padmanaban, R. Konrad, T. Stramer, E.A. Cooper, and G. Wetzstein. Optimizing Virtual Reality for All Users Through Gaze Contingent and Adaptive Focus Displays. *Proceedings of the National Academy of Sciences*, 114(9), 2183-2188, 2017
- E.A. Cooper, M. van Ginkel, and B. Rokers. Sensitivity and Bias in the Discrimination of 2D and 3D Motion Direction. *Journal of Vision*, 16(10):5, 2016
- W.W. Sprague, E.A. Cooper, S. Reissier, B. Yellapragada, and M.S. Banks. The Natural Statistics of Blur. *Journal of Vision*, 16(10):23, 2016
- E.A. Cooper and A.P. Mackey. Sensory and Cognitive Plasticity: Implications for Academic Interventions. [Review Article] *Current Opinion in Behavioral Sciences*, 10, 21-27, 2016
- E.A. Cooper. A Normalized Contrast-encoding Model Exhibits Bright/dark Asymmetries Similar to Early Visual Neurons. *Physiological Reports*, 4(7):e12746, 2016
- R. Konrad, E.A. Cooper, and G. Wetzstein. Novel Optical Configurations for Virtual Reality: Evaluating User Preference and Performance with Focus-tunable and Monovision Near-eye Displays. *Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI)*, 2016
- E.A. Cooper and A. Radonjic. Gender Representation in the Vision Sciences: a Longitudinal Study. *Journal of Vision*, 16(1):17, 2016
- E.A. Cooper and H. Farid. Does the Sun Revolve Around the Earth? A Comparison between the General Public and On-line Survey Respondents in Basic Scientific Knowledge. *Public Understanding of Science*, 25(2), 146-153, 2016
- W.W. Sprague\*, E.A. Cooper\*, I. Tomic and M.S. Banks. Stereopsis is Adaptive for the Natural Environment. *Science Advances*, 1(4):e1400254, 2015 \*Author order determined by coin toss

- E.A. Cooper and A.M. Norcia. Predicting Cortical Dark/Bright Asymmetries from Natural Image Statistics and Early Visual Transforms. *PLOS Computational Biology*, 11(5):e1004268, 2015
- D.E. Jacobs, O. Gallo, E.A. Cooper, K. Pulli, and M. Levoy. Simulating the Visual Experience of Very Bright and Very Dark Scenes. *ACM Transactions on Graphics*, 34(3):25, 2015
- E.A. Cooper and A.M. Norcia. Perceived Depth in Natural Images Reflects Encoding of Low-level Luminance Statistics. *Journal of Neuroscience*, 34(35), 11761-8, 2014
- M.S. Banks, E.A. Cooper, and E.A. Piazza. Camera Focal Length and the Perception of Pictures. *Ecological Psychology*, 26(1-2), 30-46, 2014
- E.A. Cooper, H. Jiang, V. Vildavski, J.E. Farrell, and A.M. Norcia. Assessment of OLED Displays for Vision Research. *Journal of Vision*, 13(12):16, 2013
- P. Vangorp, C. Richardt, E.A. Cooper, G. Chaurasia, M.S. Banks, and G. Drettakis. Perception of Perspective Distortions in Image-Based Rendering. *ACM Transactions on Graphics (SIGGRAPH Conference Proceedings)*, 32(4):58, 2013
- E.A. Cooper, E.A. Piazza, and M.S. Banks. The Perceptual Basis of Common Photographic Practice. *Journal of Vision*, 12(5):8, 2012
- R.T. Held, E.A. Cooper, and M.S. Banks. Blur and Disparity are Complementary Cues to Depth. *Current Biology*, 22(5), 426-31, 2012
- E.A. Cooper, J. Burge, and M.S. Banks. The Vertical Horopter is not Adaptable, but It may be Adaptive. *Journal of Vision*, 11(3):20, 2011
- E.A. Cooper, U. Hasson, and S.L. Small. Interpretation-Mediated Changes in Neural Activity During Language Comprehension. *NeuroImage*, 55(3), 1314-23, 2011
- R.T. Held, E.A. Cooper, J. O'Brien, and M.S. Banks. Using Blur to Affect Perceived Distance and Size. *ACM Transactions on Graphics*, 29(2):19, 2010

#### ABSTRACTS

- M. Kinader and E.A. Cooper. Using Visual Snapshots to Estimate Egocentric Orientation in Natural Environments. *Journal of Vision*, 18:513, 2018
- M. Kinader, T. Pfaff, and E.A. Cooper. The Visual Features of Smoke. *Journal of Vision*, 17(10):415, 2017
- S. Finocchetti, E.A. Cooper, and M. Gori. Visual Experience and Spatial Reference Frames for Sound Localization. *International Multisensory Research Forum*, 2017
- N. Padmanaban, R. Konrad, E.A. Cooper, and G. Wetzstein. Optimizing Virtual Reality for All Users Through Adaptive Focus Displays. *SIGGRAPH*, 2017
- R. Konrad, N. Padmanaban, E.A. Cooper, and G. Wetzstein. Computational Focus-Tunable Near-Eye Displays. *SIGGRAPH Emerging Technologies*, 3, 2016
- M.S. Banks, W.W. Sprague, E.A. Cooper, and S. Reissier. How Natural Distributions of Blur Affect 3D Percepts. *Journal of Vision*, 16(12):195, 2016
- E.A. Cooper and A.M. Norcia. What are the Natural Scene Statistics of Cortical Input? *Journal of Vision*, 15(12):1287, 2015

- W.W. Sprague, E.A. Cooper and M.S. Banks. Statistics of Retinal Image Blur During Natural Viewing. *Journal of Vision*, 15(12):766, 2015
- E.A. Cooper and A.M. Norcia. Perceived Depth in Natural Images Reflects Encoding of Low-Level Luminance Statistics. *Journal of Vision*, 14(10):1112, 2014
- W.W. Sprague, E.A. Cooper, J.-B. Durand, and M.S. Banks. Disparity Preferences in V1 Reflect the Statistics of Disparity in Natural Viewing. *Journal of Vision*, 14(10):1111, 2014
- A.M. Norcia, J.M. Ales, E.A. Cooper, and T. Weigand. Measuring Perceptual Differences between Compressed and Uncompressed Video Sequences using the Swept-Parameter Visual Evoked Potential. *Journal of Vision*, 14(10):649, 2014
- J. Yang, M. Andric, S. Duncan, A. Holt, U. Hasson, E.A. Cooper, and S.L. Small. Top-Down Modulation of Brain Networks During Discourse Comprehension. *Society for the Neurobiology of Language*, San Diego, CA, 2013
- E.A. Cooper, W.W. Sprague, I. Tomic, and M.S. Banks. Is Stereopsis Optimized for the Natural Environment? *Journal of Vision*, 13(9):612, 2013
- J. Yang, U. Hasson, E.A. Cooper, and S.L. Small. Influence of Selective Attention on Story Comprehension. *Cognitive Neuroscience Society Annual Meeting*, San Francisco, CA, 2013
- E.A. Cooper and M.S. Banks. Perception of Depth in Pictures when Viewing from the Wrong Distance. *Journal of Vision*, 12(9):896, 2012
- E.A. Cooper, E.A. Piazza, and M.S. Banks. Depth Compression and Expansion in Photographs. *Journal of Vision*, 11(11):65, 2011
- E.A. Cooper, J. Burge, and M.S. Banks. Do People of Different Heights Have Different Horopters? *Journal of Vision*, 10(7):372, 2010
- R.T. Held, E.A. Cooper, and M.S. Banks. Blur and Disparity Provide Complementary Distance Information for Human Vision. *Journal of Vision*, 10(7):57, 2010
- R.T. Held, E.A. Cooper, J. O'Brien, and M.S. Banks. Making Big Things Look Small: Blur Combined With Other Depth Cues Affects Perceived Size and Distance. *Journal of Vision*, 9(8):959, 2009
- E.A. Cooper, U. Hasson, and S.L. Small. Dimensions of Discourse: Brain Activation During the Processing of Temporal, Spatial, and Actional Information in Narrative. *Cognitive Neuroscience Society Annual Meeting*, New York, NY, 2007

#### INVITED TALKS

- 3D Vision in Natural Environments  
*Bay Area Vision Research Day, 2018*
- Maximizing Insights Gained About Vision Across Animal Models, Computational Models, and Humans  
*Computational Cognitive Neuroscience, 2018*
- Using AR/VR to Better Understand Individual Differences in Vision and Visually-guided Behavior  
*Oculus, 2018*
- The Potential for Improving Impaired Vision with Augmented Reality  
*OSA Frontiers in Optics, 2017*

What 3D Scene Statistics Tell Us About 3D Vision  
*Harvard Medical School, 2017*

Designing and Assessing VR/AR Displays to Increase User Inclusivity  
*VSS Symposia, 2017*

What More can Natural Images Tell Us About ON and OFF Pathways?  
*Cosyne Workshop, 2017*

Designing and Assessing VR/AR Displays to Increase User Inclusivity  
*Google, 2017*

Designing and Assessing VR/AR Displays to Increase User Inclusivity  
*Stanford SCIEN, 2017*

What 3D Scene Statistics Tell Us About 3D Vision  
*University of Pennsylvania, 2016*

What 3D Scene Statistics Tell Us About 3D Vision  
*Rochester Institute of Technology, 2016*

What 3D Scene Statistics Tell Us About 3D Vision  
*UW Madison, 2016*

What 3D Scene Statistics Tell Us About 3D Vision  
*UT Austin NETI Workshop, 2016*

The Computational Demands of Biological Stereovision  
*Massachusetts Institute of Technology, 2015*

The Visual Representation of Brights and Darks  
*Italian Institute of Technology, 2015*

The Computational Demands of Biological Stereovision  
*Middlebury College, 2015*

Creating Illusions of Depth  
*Google, 2014*

Is Stereopsis Optimized for Our Natural Environment?  
*Bay Area Vision Research Day, 2013*

Is 3D Vision Optimized for Our Natural Environment?  
*Dartmouth College, 2013*

Is Stereopsis Optimized for Our Natural Environment?  
*Bay Area Society for Information Display, 2012*

The Perceptual Basis of Common Photographic Techniques  
*Stanford University, 2012*

## TEACHING

Dartmouth College, Functional Neuroanatomy	2018
Dartmouth College, Technology, Psychology & Neuroscience	2017
Dartmouth College, Functional Neuroanatomy	2016
UC Berkeley, Graduate Student Instructor, Brain, Mind & Behavior	2010
UC Berkeley, Graduate Student Instructor, Mammalian Neuroanatomy	2008

FORMER ADVISEES

Jonathan Huang (2017), Computer Science Senior Thesis Student  
Tim Tadros (2017), Computer Science Senior Thesis Student  
Irene Feng (2017), Computer Science Senior Thesis Student  
Max Kinatder (2018), Postdoctoral Researcher

OTHER ACTIVITIES

Center for Innovation in Vision and Optics, Member	2018 –
Females of Vision et al., Advisory Board Member	2018 –
Helen Wills Neuroscience Institute, Graduate Admissions Committee	2010 – 2010
Mind & Brain Night, After School Activity Nights	2008 – 2012
Community Resources for Science, Middle School Classroom Lessons	2008 – 2012
Helen Wills Neuroscience Institute, Speaker Series Committee	2008 – 2010