

VASHA DUTELL

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Education

- PhD, Vision Science** August 2015 - December 2021
University of California, Berkeley
- MS, Biology (Bioinformatics)** June 2013 - September 2014
University of Oregon
- BS, Computer and Information Science** September 2007 - June 2012
BS, Physics
University of Oregon

Research Experience

- Postdoctoral Fellow, MIT Computer Science & AI Lab (CSAIL)** January 2022 - Present
Developing models of human peripheral vision, adapting optimization and deep learning methods to improve models of static and dynamic texture perception and peripheral visual processing. Advisor: Dr. Ruth Rosenholtz
- PhD Student, University of California Berkeley** August 2015 - December 2021
Investigated the spatiotemporal statistics of dynamic natural visual signals, and their relationship to the human visual and motor systems, focusing on low-level statistics such as the Power Spectrum. Device design, programming, and data collection for mobile eye-tracking with human subjects. Advisors: Drs. Bruno Olshausen & Martin S. Banks
- Research Intern, Nvidia** May 2018 - August 2018
Designed and trained a self-supervised generative neural network for image and video metamers, to improve computation speed in a model based on human peripheral vision.
- Data Science Consultant, C. Light Technologies** May 2018 - Feb 2019
Applied deep neural network models and machine learning to detect biomarkers for neurological diseases based on patient's drift and microsaccade eye motion.
- PhD Rotation Student, University of California Berkeley** January 2016 - May 2016
Studied the response of retinal amacrine cells to ChR2 stimulation using patch-clamp recordings. Performed simultaneous electrophysiology and calcium imaging, measuring velocity tuning of these cells. Advisor: Dr. Marla Feller
- Bioinformatician, Stowers Institute for Medical Research** January 2014 - August 2015
Studied the mouse olfactory receptor repertoire and its variability and expression among sex and strains using RNA-seq, differential expression, time course, coexpression, cluster, pathway, and single cell analyses. Advisor: Dr. Ron Yu

Research Assistant, University of Oregon Neuroscience Institute June 2012 - September 2012
Investigated auditory processing in rodents, spatially mapping frequency response in auditory cortex with temporally-encoded intrinsic imaging. Improved accuracy and increased processing speed over 3 fold. Advisor: Dr. Mike Wehr

Teaching Experience & Qualifications

Certificate of Teaching and Learning in Higher Education July 2019
GSI Teaching & Resource Center, UC Berkeley

Binocular Vision & Oculomotor Function, Graduate Student Instructor Spring 2016, 2017
School of Optometry & Vision Science, UC Berkeley

Introductory General Biology, Graduate Student Instructor Fall 2013
Department of Biology, University of Oregon

Physics Laboratory Courses, Teaching Lab Assistant Spring 2009 - Summer 2012
Department of Physics, University of Oregon

Peer-Reviewed Publications

Brown, R., **DuTell, V.**, Walter, B., Rosenholtz, R., Shirley, P., McGuire, M., and Luebke, D. *Efficient Dataflow Modeling of Peripheral Encoding in the Human Visual System* (Transactions on Perception, Under Review)

Hsu, A., Syme, M., **DuTell, V.**, and Marzen, S. *Optimal Reservoir Recipes in Continuous-Time* (Under Revision)

Dutell, V., Gibaldi, A., Focarelli, G., Olshausen, B., and Banks, M. *Integrating High Fidelity Eye, Head and World Tracking in a Wearable Device*. (Behavioral Research Methods, In Press)

Dutell, V., Gibaldi, A., Focarelli, G., Olshausen, B., and Banks, M. *Integrating High Fidelity Eye, Head and World Tracking in a Wearable Device. ETRA '21 Adjunct: Symposium on Eye Tracking Research and Applications (2021)*

Gibaldi, A., **Dutell, V.**, and Banks, M. *Solving Parallax Error for 3D Eye Tracking. ETRA '21 Adjunct: Symposium on Eye Tracking Research and Applications (2021)*

Duyck, K*, **Dutell, V***, Ma, L., Paulson, A., and Yu, C.R. *Strain specific gene expression in the mouse vomeronasal organ. BMC genomics 18.1 (2017): 965. *(Equal Contribution)*

Koonce, P., **Dutell, V**, Farrington, J., Sukhoy, V., and Stoytchev, A. *Toward learning to solve insertion tasks: A developmental approach using exploratory behaviors and proprioception. Proceedings of AAAI (2011)*

Peer-Reviewed Posters and Talks

Vision Science Society (May 2022)
Poster: Brown, R., DuTell, V., Walter, B., Rosenholtz, R., Shirley, P., McGuire, M., and Luebke, D. Efficient Dataflow Modeling of Peripheral Encoding in the Human Visual System

Eye Tracking Research and Applications ActivEye Workshop (May 2021)

Talk: DuTell, V., Gibaldi, A., Focarelli, G., Olshausen, B., and Banks, M. *Integrating High Fidelity Eye, Head and World Tracking in a Wearable Device*

Vision Science Society (June 2020)

Talk: DuTell, V., Gibaldi, A., Focarelli, G., Olshausen, B., and Banks, M. *The Spatiotemporal Power Spectrum of Natural Human Vision*

Society for Neuroscience (2016)

Talk & Poster: Vlasits, A., Morrie, R.D., Tran-Van-Minh, A., Bleckert, A., Gainer, C., **Dutell, V.**, DiGregorio D.A., Feller, M. *Synaptic input distribution plays a role in the dendritic computation of motion direction in the retina.*

Invited Posters and Talks

University of Nevada, Reno: Early Career Seminar Speaker (October 2021)

Talk: *A Day in the Life of the Human Retina: Hardware Design, Data Collection, and Spatiotemporal Frequency Properties of the Dynamic Visual Input*

Computational Vision Summer School (July 2019)

Poster: Dutell, V., Gibaldi, A., Banks, M., Olshausen, B. *Spatiotemporal Statistics of Retinal Time-Varying Signals*

European Summer School on Visual Neuroscience (September 2018)

Poster: Dutell, V., Olshausen, B. *Efficient Coding of Natural Visual Signals*

Okinawa Computational Neuroscience Course (July 2017)

Poster: Dutell, V., Tomani, C., Olshausen, B. *Population Heterogeneity in Efficient Coding of Natural Visual Signals*

Stowers Institute Scientific Advisory Board Symposium (May 2014, 2015)

Poster: Dutell, V., Paulson, A., Ma, L., Yu, R. *Differential Gene Expression in Varied Sex and Strain of Mouse*

MSI Bioinformatics Masters Research Symposium (June 2014)

Talk: Avishan, K., Dutell, V., Leggett, N. *Differential mRNA expression in Mbnl Knockout Mice.*

University of Oregon Undergraduate Research Symposium (2012)

Talk: Dutell, V., Freeman, P., Luiten, D. *Measuring Chaos in a Double Pendulum.*

NASA Oregon Space Grant Student Symposium (2011)

White Paper, Talk, Poster: Dutell, V., *Simulating Ionizing Radiation in a Lunar Micro Rover.*

Reviewer Activity

Behavioral Research and Methods, International Journal of Human-Computer Interaction, PLOS Computational Biology

Selected Awards

Postdoctoral Fellow - MIT CSAIL METEOR Fellowship (2022-Present)

Best Paper Honorable Mention - ETRA ActivEye Workshop (2021)

Graduate Fellow - National Defense Science & Engineering Graduate Fellowship (2017-2022)

Outstanding Talk Award - UC Berkeley Vision Science Retreat (2017, 2019, 2020)

Student Technology Fund Award - UC Berkeley (2017)

Academic Service

Postdoc Representative - MIT CSAIL Postdoc & Graduate Student Council (2022-Present)
Student Invited Speaker Series Committee Member - UC Berkeley Vision Science (2017-2021)
Admissions Committee Student Member - UC Berkeley Vision Science (2018)
Outstanding Graduate Student Instructor Award - UC Berkeley Vision Science (2017)
Bay Area Vision Research Day Committee Chair - UC Berkeley Vision Science (2016)

Volunteer & Science Outreach

Science Fair Judge May 2022
Massachusetts State Fair
Volunteer Judge for Massachusetts High School Science Fair

Outreach Volunteer June 2018 - June 2020
Bay Area Scientists in Schools (BASIS), UC Berkeley
Leading interactive lessons for elementary school children on human and animal vision.

Project Leader May 2018 - August 2018
Summer Math and Science Honors (SMASH) Academy, UC Berkeley
Led a group of 6 high school students in a scientific research project exploring trichromacy in human vision.

NightLife Presenter November 2016
Noise Pop NightLife, California Academy of Sciences
Interactive presentation to the public on research applying sparse coding to natural sounds.