



Exponent[®]
Engineering & Scientific Consulting

Abtine Tavassoli, Ph.D.

Managing Scientist | Human Factors
5401 McConnell Avenue | Los Angeles, CA 90066
(310) 754-2737 tel | atavassoli@exponent.com

Professional Profile

Dr. Tavassoli has expertise in human perception, attention, eye movements, sensory-motor integration, cognition, decision-making, visual search, signal processing and image/video processing. He has managed large user studies and data collection efforts (>\$1M) with Fortune 100 and Fortune 500 clients. He has led teams of up to thirty engineering/scientific consultants and research assistants on several projects. Dr. Tavassoli has been spearheading computational analysis work on data from motion tracking, eye tracking, and other systems with applications to virtual reality (VR) and vehicle driving/autonomous vehicles. He has been involved in product failure and vehicular accident analysis work. He has been leading research work examining driver behavior while simultaneously collecting eye-tracking data, head rotation kinematics, and vehicle dynamics during naturalistic driving. Dr. Tavassoli was a contributing author for the fourth edition of *Forensic Aspects of Driver Perception and Response*, a comprehensive reference book on driver behavior. In particular, he co-authored the chapter on driver eye movements and visual attention.

Dr. Tavassoli employs in his work a wide range of analysis tools including programming custom software: to model human performance and behavior in usability/user experience studies; to examine eye/head movement behavior of drivers; to automatically analyze and extract relevant features from various signals (e.g. from eye tracking, accelerometers, GPS, biosensors); to evaluate and accurately capture visibility and conspicuity (e.g. for low-visibility/nighttime accidents); to quantify the detection/distinguishability of sounds; and to study driver perception and behavior. Additionally, he routinely applies the human-factors and cognitive-psychology literature to address technical questions related to warnings compliance, visual perception and human behavior.

Prior to joining Exponent, Dr. Tavassoli was a postdoctoral scholar in the departments of Neurobiology and Psychology at the University of California, Los Angeles. He studied the characteristics of human eye movements used to track slowly moving objects and developed a model to accurately predict such eye movements. He has also conducted eye movement, performance monitoring and memory studies in epileptic patients in which he correlated neuronal activity with behavior. His doctoral work at the University of Texas at Austin centered on the study of human eye movement strategies during visual search, applying his findings to the development of automated fixation selection algorithms.

Academic Credentials & Professional Honors

Postdoctoral Scholar, Neurobiology and Psychology, University of California, Los Angeles (UCLA), 2012

Ph.D., Electrical and Computer Engineering, University of Texas, Austin, 2007

M.S., Electrical and Computer Engineering, University of Texas, Austin, 2002

Diplôme d'Ingénieur, Electrical Engineering, Polytech Lille, France, 2001

Editorial Board Member, Journal of Eye Movement Research, 2020-pres.

Elsevier Recognized Reviewer, 2016

UCLA Chancellor's Award for Postdoctoral Research, Neurobiology Nominee, 2012

AAAS/Science Program for Excellence in Science, 2010-2012

University of California, Los Angeles Brain Research Institute & Semel Institute Postdoctoral Travel Award for Excellence in Postdoctoral Research, 2009

Computational Neuroscience: Vision, Cold Spring Harbor Laboratory, Travel Scholarship, 2008

Center for Perceptual Systems Student Travel Grant, University of Texas at Austin, 2006

College of Engineering Scholarship, University of Texas at Austin, 2002-2004

Phi Kappa Phi, 2003

Ramshorn Award for Project in Digital Image Processing, University of Texas at Austin, 2001

IMCC Consortium Travel Scholarship, 2000

Prior Experience

Postdoctoral Researcher, Departments of Neurobiology and Psychology, University of California, Los Angeles, 2008-2012

Guest Lecturer, Behavioral Neuroscience Laboratory, University of California, Los Angeles, 2010

Professional Affiliations

Society for Automobile Engineers (member)

Institute of Electrical and Electronics Engineers (member)

Human Factors and Ergonomics Society (past conference session co-chair; member)

Publications

Tavassoli A, Cymbalist N, Dunning A, Krauss D. Learning from human naturalistic driving behavior at stop signs for autonomous vehicles. SAE Technical Paper, No. 2019-01-1021, 2019.

Todd J, Bui D, Tavassoli A, Krauss D. Quantitative method for estimating driver eye height. Proceedings of the Human Factors and Ergonomics Society Annual Meeting, vol. 61, no. 1, pp. 1443-1446. Sage CA: Los Angeles, CA: SAGE Publications, 2017.

Tavassoli A, Perlmutter S, Bui D, Todd J, Milan L, Krauss D. Development of a robust database for measuring human gaze behavior and performance during naturalistic driving. SAE Technical Paper, No. 2017-01-1369, 2017.

Lopour B*, Tavassoli A*, Fried I, Ringach DL. Coding of Information in the Phase of Local Field Potentials

within Human Medial Temporal Lobe, *Neuron* 2013; 79:3, 594-606.

Tavassoli A, Ringach DL. When your eyes see more than you do. *Current Biology* 2010; 20:3, R93-94.

Tavassoli A, Ringach DL. Dynamics of smooth pursuit maintenance. *Journal of Neurophysiology* 2009; 102:1, 110-118.

Tavassoli A, van der Linde I, Bovik AC, Cormack LK. Eye movements selective for spatial frequency and orientation during active visual search. *Vision Research* 2009; 49:2, 173-181. (Science Direct Top 25 Hottest Articles, Jan.-Mar. 2009)

Tavassoli A. Discovery and representation of human strategies for visual search. Doctoral Dissertation, Department of Electrical & Computer Engineering, University of Texas, Austin, December 2007.

Tavassoli A, van der Linde I, Bovik AC, Cormack LK. Orientation anisotropies in visual search revealed by noise. *Journal of Vision* 2007; 7(12):11, 1-8.

Tavassoli A, van der Linde I, Bovik AC, Cormack LK. An efficient technique for revealing visual search strategies with classification images. *Perception & Psychophysics* 2007; 69:1, 103-112.

Tavassoli A, Becker MF. Optical correlation of frequency-shifted images in a photorefractive BSO correlator. *Applied Optics* 2004; 43:8, 1695-1702.

Tavassoli A. Photorefractive optical correlators: application to frequency-shifted signal detection. Master's Thesis, Department of Electrical & Computer Engineering, University of Texas, Austin, May 2002.

* contributed equally

Books

Tavassoli A, Krauss D, Meyer A. Private eyes: Where you look while you're driving is of immense concern for safety, roadway design, and the confluence of different forms of transportation. Exponent's 50th Anniversary Book, 2017.

Forensic Aspects of Driver Perception and Response. 4th Edition, Krauss D (ed), Tucson, AZ: Lawyers and Judges Publishing Company, Inc., 2015 (contributing author).

Presentations / Chairing Role

Tavassoli A, Cymbalist N, Dunning A, Krauss D. Learning from human naturalistic driving behavior at stop signs for autonomous vehicles. SAE WCX Conference, Detroit, MI, 2019.

Co-chair, Extreme and Dangerous Environments, Human Factors and Ergonomics Society Conference, 2015.

Frey JR, Tavassoli A, Ringach DL. Relative contributions of stimulus motion and VOR to eye movement during gaze pursuit. Vision Sciences Society, Naples, FL, 2012.

Lopour B, Tavassoli A, Fried I, Ringach DL. Phase coherence of field potentials facilitates prediction of single-trial outcome in a memory task. Computational and Systems Neuroscience, Salt Lake City, UT, 2012.

Tavassoli A, Lopour B, Suthana N, Fried I, Ringach DL. Performance-related signals in the human brain. Human Single Unit, New York, NY, 2011.

Lopour B, Tavassoli A, Fried I, Ringach DL. Low frequency phase of the local field potential predicts single-trial outcome in the human brain. Society for Neuroscience, Washington, DC, 2011.

Tavassoli A, Ringach DL. Your eyes see more than you in a velocity discrimination task. Workshop on Natural Environments Tasks and Intelligence, Austin, TX, 2010.

Tavassoli A, Ringach DL. Smooth pursuit eye movements: dynamics and relation with perception. Computational Neuroscience Affinity Group, University of California, Los Angeles, CA, 2010.

Tavassoli A, Lopour B, Fried I, Ringach DL. Single-trial feedback signals in the human brain. Society for Neuroscience, San Diego, CA, 2010.

Frey JR, Tavassoli A, Fried I, Ringach DL. Dynamics of coordinated head and eye visual tracking. Society for Neuroscience, San Diego, CA, 2010.

Tavassoli A, Ringach DL. Your eyes know more than you: higher oculometric than psychometric performance in a velocity discrimination task. Society for Neuroscience, San Diego, CA, 2009.

Tavassoli A, Ringach DL. White noise analysis of smooth pursuit eye movements. Society for Neuroscience, Washington, D.C., 2008.

Tavassoli A, van der Linde I, Bovik AC, Cormack LK. Selectivity for multiple orientations in visual search. Vision Sciences Society, Naples, FL 2008.

Sapkota R, Pardhan S, Tavassoli A, van der Linde I. Visual short-term memory for unfamiliar visual stimuli. British Congress of Optometry and Vision Sciences, United Kingdom, 2008.

Tavassoli A, van der Linde I, Bovik AC, Cormack LK. Noise unveils spatial frequency and orientation selectivity during visual search. Vision Sciences Society, Sarasota, FL, 2006.

van der Linde I, Tavassoli A, Bovik AC, Cormack LK. Classification images reveal observer templates underlying the direct tilt illusion", Vision Sciences Society, Sarasota, FL, 2006.

Tavassoli A, van der Linde I, Bovik AC, Cormack LK. The efficient use of classification images for the psychophysical investigation of visual search. AVA Xmas Meeting, United Kingdom, 2004.

Tavassoli A, Cormack LK, Bovik AC. Classification images for motion perception. Houston Society for Engineering in Medicine and Biology, Houston, TX, 2004.

Tavassoli A, Palmer CR, Cormack LK. Frequency and space domain classification images for motion detection. Vision Sciences Society, Sarasota, FL, 2003.

Peer Reviewer

Accident Analysis & Prevention

Attention Perception & Psychophysics

IEEE Industrial Electronics Society

IEEE Transactions on Biomedical Engineering

IEEE Transactions on Image Processing

Journal of Vision

Journal of Eye Movement Research (editorial board member)

Nature Scientific Reports

Pattern Recognition

SAE International

Vision Research