

NATELA SHANIDZE

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PROFESSIONAL EXPERIENCE

The Smith-Kettlewell Eye Research Institute, San Francisco, CA

Scientist (Associate Professor Equivalent)

October 2022 – present

Examining effects of low vision and noise exposure on vestibular function

The Smith-Kettlewell Eye Research Institute, San Francisco, CA

Associate Scientist (Assistant Professor Equivalent)

September 2018 – September 2022

Examined visual/vestibular interactions in central visual field loss

The Smith-Kettlewell Eye Research Institute, San Francisco, CA

Postdoctoral Researcher

December 2016 – August 2018

Studied visual-vestibular interactions in patients with central visual field loss

Mentor: Preeti Verghese, Ph.D.

The Smith-Kettlewell Eye Research Institute, San Francisco, CA

Postdoctoral Fellow

April 2014 – December 2016

Studied pursuit and perception of moving objects in patients with central visual field loss

Mentors: Preeti Verghese, Ph.D. & Stephen J. Heinen, Ph.D.

Stanford University, Stanford, CA | Department of Neurology & Neurological Sciences

Postdoctoral Fellow

April 2012 – June 2013

Studied behavioral and neural correlates of Parkinson's Disease

Mentor: Helen M. Brontë-Stewart, M.D.

EDUCATION

University Michigan, Ann Arbor, MI

Doctor of Philosophy in Neuroscience

2011

Dissertation: "Coordination of Eye and Head Movements in *Cavia Porcellus*"

University of Michigan, Ann Arbor, MI

Master of Science in Neuroscience

2008

University of Chicago, Chicago, IL

Bachelor of Arts in Physics

2005

Honors Thesis: "Comparison of the Absorption Spectra of Strong Gravitational Lenses with Weak Absorbers"

University of Chicago, Chicago, IL

Bachelor of Arts in Psychology

2005

PEER REVIEWED PUBLICATIONS

Shanidze, N., Lively, Z., Lee, R., & Verghese, P. (2022). Saccadic Contributions to Smooth Pursuit in Macular Degeneration. *Vision Research*, 200.

Lotze, A., Love, K., Velisar, A., & **Shanidze, N.** (2022) A low-cost robotic oculomotor simulator for assessing eye tracking accuracy in health and disease. *Behavior Research Methods*, in Press.

Verghese, P., Vullings, C., & **Shanidze, N.** (2021). Eye Movements in Macular Degeneration. *Annual Reviews of Vision Science*, 7.

- Shanidze, N.** & Velisar A. (2020). Eye, Head & Gaze Contributions to Smooth Pursuit in Macular Degeneration. *Journal of Neurophysiology*, 124(1), 134.
- Shanidze, N.** & Verghese, P. (2019). Motion Perception in Central Field Loss. *Journal of Vision*, 19(14), 20.
- Shanidze, N.**, Heinen, S., & Verghese, P. (2017). Monocular and binocular smooth pursuit in central field loss. *Vision Research*, 141, 181.
- Shanidze, N.**, Ghahghaei, S., & Verghese, P. (2016). Accuracy of eye position for saccades and smooth pursuit. *Journal of Vision*, 16(15), 23.
- Shanidze, N.**, Fusco, G., Potapchuk, E., Heinen, S., & Verghese, P. (2016). Smooth pursuit eye movements in patients with macular degeneration. *Journal of Vision*, 16(3), 1–1. (Cover Article)
- Shanidze, N.**, Lim, K., Dye, J., & King, W. M. (2012). Galvanic stimulation of the vestibular periphery in guinea pigs during passive whole body rotation and self-generated head movement. *Journal of Neurophysiology*, 107(8), 2260–2270.
- King, W. M., & **Shanidze, N.** (2011). Anticipatory eye movements stabilize gaze during self-generated head movements. *Annals of the New York Academy of Sciences*, 1233(1), 219–225.
- Shanidze, N.**, Kim, A. H., Raphael, Y., & King, W. M. (2010). Eye-head coordination in the guinea pig I. Responses to passive whole-body rotations. *Experimental Brain Research*, 205(3), 395–404.
- Shanidze, N.**, Kim, A. H., Loewenstein, S., Raphael, Y., & King, W. M. (2010). Eye-head coordination in the guinea pig II. Responses to self-generated (voluntary) head movements. *Experimental Brain Research*, 205(4), 445–454.
- D. G. York, et al. (2006). “Average Extinction Curves and Relative Abundances for QSO Absorption Line Systems at $1 \leq z_{\text{abs}} < 2$ ”, *Monthly Notices of the Royal Astronomical Society*, 367: 945-978.

PEER REVIEWED CONFERENCE PUBLICATIONS

- Love, K., Velisar, A., & **Shanidze, N.** (2021). Eye, Robot: Calibration Challenges and Potential Solutions for Wearable Eye Tracking in Individuals with Eccentric Fixation. In *ACM Symposium on Eye Tracking Research and Applications (Adjunct)*. Association for Computing Machinery: New York, NY, USA.
 --- Best Paper Award at ActivEye ETRA '21 Workshop awarded to K. Love
- Velisar, A., & **Shanidze, N.** (2021). Noise in the Machine: Sources of Physical and Computation Error in Eye Tracking with Pupil Core Wearable Eye Tracker. In *ACM Symposium on Eye Tracking Research and Applications (Adjunct)*. Association for Computing Machinery: New York, NY, USA.
- D. E. Vanden Berk, et al. (2005). “Average Extinction Curves and Abundances at $1 < z < 2$ from MgII Absorption Systems” *Bulletin of the American Astronomical Society*, 37: 1360.
- P. Khare, et al. (2005). “Evidence for the presence of dust in intervening QSO absorbers from the Sloan Digital Sky Survey” *Proceedings of the International Astronomical Union*, 1: 427-429.
- D. G. York, et al. (2005). “The Sloan Digital Sky Survey QSO absorption line catalogue” *Proceedings of the International Astronomical Union*, 1: 58-64.

INVITED TALKS & PRESENTATIONS

Beyond Sensory Loss in Macular Degeneration: Smooth Pursuit without Central Vision
 Ocular Motor & Vestibular Lecture Series, Johns Hopkins University School of Medicine

- The effects of noise exposure on vestibular function*
Hearing, Balance and Chemical Senses Seminar Series, University of Michigan, Ann Arbor. 2022
- The effects of noise exposure on vestibular function*
Satellite of the Society for Neural Control of Movement Annual Meeting, Dublin, Ireland 2022
- Head-Unrestrained Eye Movements in Macular Degeneration: a Story in 3 Parts*
UC Berkeley Vision Science Oxyopia Seminar, Berkeley, CA 2021
- Smooth Pursuit without Foveal Vision*
Minisymposium: The Dynamic Interaction of Vision and Eye Movements, moderator: J.P. Mayo
Session 096.03, Society for Neuroscience Annual Meeting, San Diego, CA 2018
- Interacting with the world without a fovea: eye, head, and body movements in AMD*
Invited Seminar at Smith-Kettlewell Eye Research Institute, San Francisco, CA 2018
- Interaction of Eye and Head Movements during Smooth Pursuit in Macular Degeneration*
Association for Research in Vision and Ophthalmology Annual Meeting, Honolulu, HI. 2018
Abstract: **N. Shanidze**, E. Ullman, J. Badler, P. Verghese. (2018) *Investigative Ophthalmology & Visual Science*, 59(9): 4412
- Use and Placement of Fovea in Smooth Pursuit*
Invited brown bag speaker at NASA Ames Research Center, Moffett Field, CA 2017
- Relative eye position during monocular and binocular pursuit in central field loss*
The Optical Society Fall Vision Meeting, San Jose, CA. 2015
Abstract: **N. Shanidze**, S. Heinen, P. Verghese. (2016) *Journal of Vision*, 16(4): 20.
- Coordination of Eye and Head Movements in the Guinea Pig*
Hearing, Balance and Chemical Senses Seminar Series, University of Michigan, Ann Arbor. 2011
- POSTERS (LAST 10 YEARS)
- Agathos, C.P., Velisar, A., **Shanidze, N.** "Assessing head stabilization during the instrumented Timed Up and Go test: Comparison to level walking." Annual Meeting of the Society for Neuroscience. 2022
- Velisar, A., Agathos, C.P., **Shanidze, N.** "Effects of Noise Exposure on Verticality Perception with and without Head Tilt." Annual Meeting of the Society for Neuroscience. 2022
- Agathos, C.P., Velisar, A., **Shanidze, N.** "Ocular Eccentricity Affects Subjective Visual Vertical Perception in Health and Disease." Society for the Neural Control of Movement 2022
- Agathos, C.P., Velisar, A., **Shanidze, N.** "Eccentric Viewing Shifts Subjective Visual Vertical Perception." International Society for Posture & Gait Research World Congress (Postdoc Award to C. Agathos) 2022
- N. Shanidze**, T. Ellmers, W. Young. "Links Between Central Visual Field Loss and Movement Processing During Locomotion." International Society for Posture & Gait Research World Congress 2022
- Agathos, C.P., Velisar, A., **Shanidze, N.** "Eccentric Viewing Alters Subjective Visual Vertical Perception." Association for Research in Otolaryngology. 2022
- N. Shanidze** & A. Velisar. "Translational Vestibulo-Ocular Reflex in Adults With Central Visual Field Loss." Association for Research in Otolaryngology Midwinter Meeting. 2022

- N. Shanidze**, Z. Lively, R. Lee, A. Velisar, & P. Verghese. "Saccades during smooth pursuit in macular degeneration." *Investigative Ophthalmology & Visual Science*.
Abstract: *Investigative Ophthalmology & Visual Science*, 62(8): 3547. 2021
- A. Velisar, & **N. Shanidze**. "Effects of eccentric viewing in orientation discrimination." Society for Neuroscience Global Connectome: Virtual. 2021
- N. Shanidze**, R. Lee, & W. R. Young. (2021). "Evaluating Associations Between Central Visual Field Loss and Conscious Movement Processing." Society for Neuroscience Global Connectome: Virtual. 2021
- C. E. Stewart, D. S. Bauer, A. Velisar, & **N. Shanidze**. (2021). "Functional Correlates of Noise-Induced Damage to the Vestibular Periphery." Society for Neuroscience Global Connectome: Virtual. 2021
- A. Velisar & **N. Shanidze**. "Effect of Viewing Distance on the Vestibuloocular Reflex in Central Field Loss." Association for Research in Otolaryngology Midwinter Meeting. San Jose, CA. 2020
- M. Safi, P. Verghese & **N. Shanidze**. "Effects of task demands on smooth pursuit gain in macular degeneration." Association for Research in Vision and Ophthalmology Annual Meeting.
Abstract: *Investigative Ophthalmology & Visual Science*, 61(7): 1045. 2020
- N. Shanidze** & P. Verghese. "Motion Perception in Central Field Loss." Association for Research in Vision and Ophthalmology Annual Meeting.
Abstract: *Investigative Ophthalmology & Visual Science*, 60(9): 1823. 2019
- A. Velisar, P. Verghese & **N. Shanidze**. "Does eccentric fixation alter head movement strategy for smooth pursuit?" Society for the Neural Control of Movement. 2019
- N. Shanidze** & P. Verghese. "Motion Perception in Central Field Loss." Optical Society Fall Vision Meeting.
Abstract: (2019) *Journal of Vision*, 19(8): 122-122. 2018
- N. Shanidze**, S. Heinen, P. Verghese. "Do we foveate targets during smooth pursuit?" Vision Sciences Society Annual Meeting.
Abstract: *Journal of Vision*, 16(12): 1347. 2016
- N. Shanidze**, S. Heinen, P. Verghese. "Gaze Changes from Binocular to Monocular Viewing during Smooth Pursuit in Macular Degeneration." Association for Research in Vision and Ophthalmology Annual Meeting.
Abstract: *Investigative Ophthalmology & Visual Science*, 57(12): 4590. 2016
- G. Fusco, **N. Shanidze**, P. Verghese. "Assessing Patients with Central Field Loss Using a Low-Cost Virtual Reality System with Head Tracking". Optical Society Fall Vision Meeting.
Abstract: (2016) *Journal of Vision*, 16(4): 40. 2015
- N. Shanidze**, E. Potapchuk, S. Heinen, P. Verghese. "Evaluation of Smooth Pursuit in Individuals with Central Field Loss". European Conference on Eye Movements.
Abstract: *Journal of Eye Movement Research*, 8(4): 183. 2015
- N. Shanidze**, E. Potapchuk, G. Fusco, S. Heinen, P. Verghese. "Characteristics of Monocular Smooth Pursuit in Central Field Loss". Association for Research in Vision and Ophthalmology Annual Meeting (MIT Award).
Abstract: *Investigative Ophthalmology & Visual Science*, 56(7): 2903. 2015
- L.A. Shreve, A. Velisar, **N. M. Shanidze**, B. C. Hill, C. Kilbane, J. M. Henderson, H. Yu, H. Brontë-Stewart. "Incidence and modulation of resting state subthalamic nucleus beta rhythm in Parkinson's Disease". Annual Meeting of the Society for Neuroscience. 2013

FUNDING

HHS ACL NIDILRR: Rehabilitation Engineering Research Center PI: <i>J. Coughlan</i>	2022
NIH NIA: Research Project Grant (R01 AG073157) PI: <i>C. Stewart, N. Shanidze</i> Title: "Effects of Noise Exposure Across the Lifespan on Balance and Stability in Older Adults"	2021
NIH NEI: Equipment Supplement Award (3R00 EY026994-03S1) PI: N. Shanidze	2019
NIH NEI: Pathway to Independence Award (K99/R00 EY026994) PI: N. Shanidze Title: "Coordination of Eye and Head Movements in Central Field Loss"	2016
NIH NEI: Ruth L. Kirschstein National Research Service Award (F32 EY025151) PI: N. Shanidze Title: "Oculomotor Strategies in Central Field Loss"	2015
The Smith-Kettlewell Eye Research Institute, San Francisco, CA: Rachel C. Atkinson & C.V. Starr Postdoctoral Fellowship	2014
Stanford University, Stanford, CA: Dean's Postdoctoral Fellowship Title: "Neural Correlates of Freezing in Parkinson's Disease"	2012
NIH NIDCD: Ruth L. Kirschstein National Research Service Award (F31 DC010947) PI: N. Shanidze Title: "Vestibular Control of Head Movements"	2010
NIH NIDCD: Hearing, Balance & Chemical Senses Training Fellowship (T32 DC000011) <i>Awarded by Kresge Hearing Research Institute, University of Michigan, Ann Arbor, MI</i>	2007 – 2010
American College of Neuropsychopharmacology: Educational Outreach Grant <i>Awarded for Brains Rule! Faculty Sponsor: Huda Akil</i>	2008
NIH NEI: Early-Stage Training in Neurosciences Training Fellowship (T32 EY17878) <i>Awarded by the Neuroscience Graduate Program, University of Michigan, Ann Arbor, MI</i>	2006 – 2007

AWARDS/HONORS

MIT Outstanding Poster Award, <i>Association for Research in Vision and Ophthalmology</i> Title: "Characteristics of Monocular Smooth Pursuit in Central Field Loss"	2015
Travel Grant, <i>Association for Research in Vision and Ophthalmology</i>	2015
Trainee Scholarship, <i>Society for the Neural Control of Movement</i>	2011
Rackham Graduate Student Research Grant (Doctoral Candidate), <i>University of Michigan, Ann Arbor, MI</i>	2009
Rackham Graduate Student Research Grant (Doctoral Pre-Candidate), <i>University of Michigan, Ann Arbor, MI</i>	2008
Graduate Research Fellowship <u>Honorable Mention</u> , <i>National Science Foundation</i> Title: "Vestibular Processing of Gravity Versus Linear Acceleration in the Guinea Pig"	2007, 2008
Dean's List, <i>University of Chicago, Chicago, IL</i>	2004-2005

ADVISING ACTIVITIES

Postdoctoral Fellow: Catherine P. Agathos, Ph.D. (current)
Clinical Research Fellow: Mustafa Safi, M.D. (co-adviser, 2019-2020)
Interns: Ryan Bixler (2018); Sai Muktevi (co-adviser, 2018); Rachel Lee, B.A. (2020-2021); Kassia Love (2020-2021); Kyra Deams (co-adviser 2021); Ebenezer Nyanwe (2022)

SERVICE

- Federal Advisory Committee Member** Scientific Merit Review Board Subcommittee on Sensory Systems & Communication Disorders, Rehabilitation Research and Development Service | VA 2023 - Present
- Ad hoc Reviewer** Communication Disorders Review Committee, NIDCD | NIH 2022
- Ad hoc Reviewer** ZRG1 EMNR-B (02) Special Emphasis Panel, NIH 2021 – Present
- Organizer** *A fine balance: the neural control of eye and head movements in health versus disease*. Satellite of the Meeting of Society for Neural Control of Movement. Organizers: **N. Shanidze** & N. Gandhi 2022
- Guest Editor** Special Issue: “Practical Issues in Eye Tracking for Naturalistic Behaviors” 2022
Behavioral Research Methods, Springer
- Ad hoc Reviewer** RR&D Subcommittee on Small Projects in Rehabilitation Research (SPiRE), VA 2021
- Organizer** *ActivEye: Challenges in large scale eye-tracking for active participants*. Workshop of Symposium on Eye Tracking Research and Applications (ETRA '21). Organizers: K. Binaee, A. Gibaldi, **N. Shanidze** 2021
- Member**, Fellowship Committee (nominated) 2020-Present
The Smith-Kettlewell Eye Research Institute
- Chair**, Website Committee (nominated) 2019 - Present
- Member**, Website Committee (volunteer) 2016-2019
The Smith-Kettlewell Eye Research Institute
- Co-Chair**, Outreach Committee, **Lead** Social Media Team (volunteer) 2019 – Present
The Smith-Kettlewell Eye Research Institute
- Graduate Student Forum Representative** (nominated) 2007-2008 & 2009-2010
Rackham Graduate School, University of Michigan, Ann Arbor, MI

AD-HOC PEER REVIEWER

Behavior Research Methods, Springer | *Peer J* | *Scientific Reports*, Nature | *Vision Research*, Elsevier | *Journal of the American Academy of Audiology* | *Behavioural Brain Research*, Elsevier | *Frontiers* | *Journal of the American Academy of Audiology* | *Current Eye Research*, Taylor & Francis | *Psychology and Neuroscience*, American Psychological Association | *Journal of International Medical Research*, SAGE

OUTREACH

- N. Shanidze** (July 2, 2020). After Parenthood, Sexism in Science Takes On New Meaning [Editorial]. *The Chicago Maroon*. Retrieved from www.chicagomaroon.com/article/2020/7/2/parenthood-sexism-science-takes-new-meaning/
- Advisory Board Member** (invited) 2019 - 2020
IGNITE Worldwide
- Low Vision Support Group Member/Speaker** (volunteer) 2015 - 2020
The Smith-Kettlewell Eye Research Institute
- P. Verghese, L. A. Lott & **N. Shanidze** (February 8, 2017). Federal Funding and Research are Key to Addressing Age-Related Macular Degeneration. *Research America! Blog*. Retrieved from www.researchamerica.org/blog/federal-funding-and-research-are-key-addressing-age-related-macular-degeneration
- Brains Rule! Lead Coordinator/Exhibitor** (volunteer) 2009/2006 – 2008
University of Michigan/Ann Arbor Hands-On Museum, Ann Arbor, MI

TEACHING EXPERIENCE

- The Smith-Kettlewell Eye Research Institute, San Francisco, CA
Content Coordinator – “Ethics in Academia” Seminar Series 2014 – Present
- California State University – East Bay, Hayward, CA
Lecturer/Instructor of Record – Psyc 4800 (Human Learning & Cognition Lab) 2016
 Enrollment: 14 (in-person)
- Stanford University, Stanford, CA
Small Group Facilitator – “Management Matters” 2013
 Organizers: John C. Boothroyd, Ph.D. & Helen J. Doyle, Ph.D.
- University of Michigan, Ann Arbor, MI
Graduate Student Instructor – Bio 222 (Neurobiology) 2008
 Instructors: Richard Hume, Ph.D. & Jonathan Demb, Ph.D.
- University of Chicago, Chicago, IL
Teaching Assistant – Math 131/132/133 (Elementary Functions & Calculus) 2004-2005
- University of Chicago, Chicago, IL (Neighborhood Schools Program)
Classroom Assistant for grades 3-5 in English and Mathematics 2001

RESEARCH EXPERIENCE

- Stanford University, Stanford, CA | Department of Otolaryngology
Contractor **October 2013 – January 2014**
 Assisted with data preparation and analysis, investigating deafness in transgenic mouse models
Investigator: Mirna Mustapha, Ph.D.
- University of Michigan, Ann Arbor, MI | Kresge Hearing Research Institute
Graduate Student Research Assistant **January 2007 – June 2011**
 Examined coordination of eye and head movement responses in guinea pig to vestibular stimulation
Mentor: W. Michael King, Ph.D.
- University of Michigan, Ann Arbor, MI | Department of Psychology, Biopsychology Program
Graduate Student Research Rotation **August – December 2006**
 Looked at β and θ rhythms in mouse hippocampus during navigation of novel environments
Mentor: Joshua Berke, Ph.D.
- University of Michigan, Ann Arbor, MI | Kresge Hearing Research Institute
Research Assistant **October 2005 – August 2006**
 Examined eye movements in humans and guinea pigs during vestibular and visual stimulation
Investigator: W. Michael King, Ph.D.
- University of Texas, Austin, TX | Center for Perceptual Systems
Research Associate **June – August 2005**
 Collected behavioral data and worked on mathematical models of monkey V1 responses to contrast stimuli
Investigator: Eyal Seidemann, Ph.D.
- University of Chicago, Chicago, IL | Department of Astronomy & Astrophysics
Student Research Assistant & Senior Research Thesis ('04-'05) **February 2002 – August 2005**
 Worked with quasar absorption spectra data from the Sloan Digital Sky Survey
Mentor: Donald G. York, Ph.D.

MEMBERSHIPS

Society for Neuroscience | Association for Research in Otolaryngology | Association for Research in Vision and Ophthalmology | Vision Sciences Society | Sigma Xi, the Scientific Research Society | Society for the Neural Control of Movement | International Society of Posture & Gait Research