

SHAY OHAYON

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Research Interests

The neural basis of mid/high level vision (object detection/recognition, categorization, feature representation) and biologically motivated computer vision;

Education

California Institute of Technology – **Caltech** (PhD, 2008 - 2014)

Computation and Neural Systems; Doris Tsao's lab.

Thesis "Dissecting neural circuits for vision in non-human primates using fMRI-guided electrophysiology and optogenetics"

Master of Science, Israel Institute of Technology – **Technion**, 2007

Computer Science, *summa cum laude*, Ehud Rivlin's lab.

Thesis "*interactions of gaze control and visual attention in the Barn Owl*"

Bachelor of Science, Israel Institute of Technology – **Technion**, 2003

Computer Science, *cum laude*

Major in Computer Vision, Digital Image Processing and Computer Graphics

Publications

Ohayon, S., Grimaldi, P., Schweers, N., Tsao, D., *Saccade modulation evoked by optical and electrical stimulation in the macaque frontal eye field*. **Journal of Neuroscience** Oct 16, 2013.

Ohayon, S. Avni, O. Egnor, R., Perona, P. *Automated multi-day tracking of marked mice for the analysis of social behavior*. **Journal of Neuroscience Methods**. Vol 219, Issue 1, 2013.

Kornblith, S., Cheng, X., Ohayon, S., Tsao, D. *A network for scene processing in the macaque temporal lobe*. **Neuron**. Vol. 79, Issue 21, 2013.

Ohayon, S., Freiwald, W., Tsao, D., What makes a cell face-selective: The importance of contrast. **Neuron**. Vol. 74, Issue 3, 2012.

Ohayon, S. Tsao, D. *MR-Guided stereotactic navigation*. **Journal of Neuroscience Methods**. Vol. 204, Issue 2, 2011.

Netser S, Ohayon S, Gutfreund, Multiple *manifestations of micro stimulation in the optic tectum: eye movements, pupil dilations and sensory priming*. **J. Neurophysiology**. Vol 104, Issue 1, 2010.

Ohayon, S., Harmening, W., Wagner, H., Rivlin, E., *Through a barn owl's eyes: interactions between scene content and visual attention*. **Biological Cybernetics**, Vol. 98, Issue 2, 2008.

Ohayon, S., Rivlin, E. *Robust 3D head tracking using camera pose estimation*. **International Conference on Image Processing**; Hong Kong, China, 2006.

Ohayon, S., van der Willigen, R., Wagner, H., Katsman, I., Rivlin, E. *On the Barn Owl's visual pre-attack behavior*. **Journal of Comparative Physiology A** Vol. 192, Issue 9, 2006.

Oral presentations

SFN 2012, COSYNE 2011, SFN 2010, VISIONTRAIN 2007

Previous collaborations

HHMI Janelia Farm; Computational Vision Lab, Caltech; 2009 - 2012

Developing new software for fully automated mice tracking and behavior analysis. Collaboration with Roian Egnor and Pietro Perona

Institute fur Biology II, RWTH Aachen, Germany, 2004, 2005

Visual attention and gaze control in barn owls. Developed 6DOF head

tracking system. Collaboration with Hermann Wagner and Robert van-der-Willigen

Intelligent Systems Lab, Israel Institute of Technology – Technion, 2002

Robot navigation research, under the supervision of Ilan Shimshoni

Professional Experience

RCADIA Medical Imaging Ltd (Startup). Haifa, Israel, 2005 – 2008

Principal algorithm developer and system architect; automated analysis pipeline of coronary blood vessels in CT images

Philips Medical Systems. Haifa Research & Development Center, Israel, 2004

Programmer and algorithm developer; Developed an automated analysis pipeline for heart segmentation in CT images

Patents

CIT-5890-P - A novel method to target brain structures using MRI and a stereotactic manipulator

US 7940977 - Method and system for automatic analysis of blood vessel structures to identify calcium or soft plaque pathologies

US 7873194 - Method and system for automatic analysis of blood vessel structures and pathologies in support of a triple rule-out procedure

US 7860283 - Method and system for the presentation of blood vessel structures and identified pathologies

US 7983459 – Creating a blood vessel tree from imaging data

US 8103074 – Identifying aorta exit points from imaging data

Software Development

Open Ephys – Open source electrophysiology recording system (<http://open-ephys.org/>)

Planner – Pre-surgery planning tool that assists in MR-guided electrophysiology (<http://tsaolab.caltech.edu/?q=Planner>)

Kofiko – A complete electrophysiology software package including distributed real-time experimental control software for precise stimuli presentation, real time multiple channel data acquisition with spike detection and sorting.

MoTR – Mice tracking software that can track multiple mice in a single arena and maintain correct individual identities over long periods of time (<http://motr.janelia.org/>).

Teaching Experience

California Institute of Technology, 2010-2013

The Primate Visual System, Teaching Assistant

fMRI Laboratory class

Israel Institute of Technology – Technion, 2003 - 2006

Introduction to Computer Science, Teaching Assistant in Charge;

Skills

Algorithm development, programming (C,C++, C#, Matlab,...), computer vision, digital image processing (2D & 3D), computer graphics, DAQ and real time programming (Arduino, etc), cluster/cloud computing, rapid prototyping (SolidWorks). NHP and rodent surgical experience. Optogenetics and Electrophysiology (rodents, macaques), MRI, fMRI, confocal imaging, histology and immunohistochemistry, basic molecular techniques.