

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.
Follow this format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME Tsao, Doris Ying		POSITION TITLE Assistant Professor of Biology	
eRA COMMONS USER NAME (credential, e.g., agency login) TSAODY			
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	MM/YY	FIELD OF STUDY
Harvard University	PhD	2002	Neuroscience (Advisor: Margaret Livingstone)
California Institute of Technology	BS	1996	Biology and Math

A. Biography

I am a systems neuroscientist interested in the neural mechanisms underlying primate vision. The central problem I want to understand is how visual objects are represented in the brain, and how these representations are used to guide behavior. To address this, my lab is investigating mechanisms at multiple stages in the visual hierarchy, from early processes for segmenting visual input into discrete objects, to mid- and high-level perceptual processes for assigning meaningful identity to specific objects, to processes by which these perceptual representations govern behavior. Techniques we use include: electrophysiology, fMRI, electrical microstimulation, anatomical tracing, psychophysics, and mathematical modeling.

B. Positions and Honors**Professional Experience**

June 2002-Sept. 2003	Postdoctoral Scientist in the laboratory of Margaret Livingstone and David Hubel
Nov. 2003 – Nov. 2004	Postdoctoral Scientist in the laboratory of Roger Tootell
Dec 2004 – Dec 2008	Visiting Scientist, Dept. Neurobiology, Harvard Medical School
Dec 2004 – Dec 2008	Head of Young Research Group, Institute for Brain Research, University of Bremen
January 2009 – present	Assistant Professor of Biology, California Institute of Technology

Honors, Awards, and Service

1993	National Merit Scholar
2004	Sofia Kovalevskaya Prize, Alexander von Humboldt Foundation
2006	Eppendorf and Science International Prize in Neurobiology
2007	Technology Review TR35, World's Top 35 Innovators under Age 35
2008	Reviewing Editor, Frontiers in Systems Neuroscience
2009	Elected Member, International Neuropsychological Symposium
2009	Alfred Sloan Research Fellowship
2009	NARSAD Young Investigator
2009	John Merck Scholar
2009	Searle Scholar

2009	Klingenstein Scholar
2009	NSF CAREER Award
2009	DARPA Young Faculty Award
2009	Associate Editor, Journal of Neuroscience
2010	Presidential Early Career Award for Scientists and Engineers
2011	4 th Distinguished Kavli Lecture
2012	Mcknight Technological Innovations in Neuroscience Award (joint with Dr. William J. Tyler)
2012	NIH Pioneer Award
2013	Allen Brain Institute, Member of Advisory Panel on Human Neuroscience
2013	Invited to give Presidential Lecture, Society for Neuroscience Conference

C. Selected peer-reviewed publications most relevant to this grant application.

- Ohayon S, Grimaldi P, Schweers N, Tsao DY. 2013. Saccade modulation by optical and electrical stimulation in the macaque frontal eye field . J Neurosci, in press.
- Kornblith, S, Cheng, X, Ohayon, S, Tsao, DY. 2013. A Network for Scene Processing in the Macaque Temporal Lobe. Neuron 25, Advanced Online Publication.
- Ohayon, S, Freiwald, WA, Tsao, DY. 2012. What makes a cell face selective: the importance of contrast. Neuron, 74 (3), 567-581.
- Ohayon, S, Tsao, DY. 2011. MR-Guided stereotactic navigation. *Journal of Neuroscience Methods* 204 (2), 389-39.
- Freiwald, WA*, Tsao DY*. 2010. Functional compartmentalization and viewpoint generalization within the macaque face processing system. Science, 330: 845-851. *co-first author.
- Conway, BR, Tsao DY. 2009. Color-tuned neurons are spatially clustered according to color preference within alert macaque posterior inferior temporal cortex. PNAS, 106 (42): 18034-18039.
- Freiwald WA*, Tsao DY*, Livingstone MS. 2009. A face feature space in the macaque temporal lobe. Nature Neuroscience, 12: 1187 – 1196. *co-first author.
- Moeller S*, Nallasamy N*, Tsao DY*, Freiwald W. 2009. Functional connectivity of the macaque brain across stimulus and arousal states. *Journal of Neuroscience*, 29: 5897-5909. *co-first author.
- Tsao DY, Moeller S, Freiwald W. 2008. Comparing face patch systems in macaques and humans. PNAS, Advance Online Publication.
- Op de Beeck H, DiCarlo J, Goense J, Grill-Spector K, Papanastassiou A, Tanifuji M, Tsao DY. 2008. Fine-scale spatial organization of face and object selectivity in the temporal lobe: Do fMRI, optical imaging, and electrophysiology agree? *Journal of Neuroscience*, in press.
- Tsao DY, Cadieu C, Livingstone MS. 2008. Object recognition: physiological and computational insights. In *Primate Neuroethology*, Oxford University Press, ed. Platt ML, Gazanfar AA.
- Tsao DY, Schweers N, Moeller S, Freiwald WA. 2008. Patches of face-selective cortex in the macaque frontal lobe. *Nature Neuroscience*, 11: 877-879.
- Moeller S, Freiwald WA, Tsao DY. 2008. Patches with links: a unified system for processing faces in the macaque temporal lobe. *Science*, 320: 1355-1359.
- Tsao DY, Livingstone, MS. 2008. Neural mechanisms for face perception. *Annual Review of Neuroscience*, 31: 411-438.
- Conway BR, Moeller S, Tsao DY. 2007. Specialized color modules in macaque extrastriate cortex. *Neuron*, 56: 560-573.
- Tsao DY. 2006. A dedicated system for processing faces. *Science*, 314: 72-73.
- Tsao DY, Freiwald WA, Tootell RBH, Livingstone MSL. 2006. A cortical region consisting entirely of face cells. *Science*, 311: 670-674.
- Tsao DY, Freiwald WA. 2006. What's so special about the average face? *Trends in Cognitive Science*, 10: 391-393.
- Conway, BR and Tsao*, DY. 2005. Color architecture in alert macaque cortex revealed by fMRI. *Cerebral Cortex*, 16: 1604-1613. *co-first author
- Tsao DY, Tootell RBH. 2004. Response to Tyler: Representation of stereoscopic structure in human and monkey cortex. *Trends in Neurosciences* 27: 118-20
- Tsao DY, Freiwald WA, Knutsen TA, Mandeville JB, Tootell RBH. 2003. The representation of faces and objects in Macaque Cerebral Cortex. *Nature Neuroscience*, 6: 989-95.
- Tsao DY, Vanduffel W, Sasaki Y, Fize D, Knutsen TA, et al. 2003. Stereopsis activates V3A and caudal intraparietal areas in macaques and humans. *Neuron* 39: 555-68

23. Tsao DY, Conway BR, Livingstone MS. 2003. Receptive fields of disparity-tuned simple cells in macaque V1. *Neuron* 38: 103-14
24. Tootell RBH, Tsao DY, Vanduffel W. 2003. Neuroimaging weighs in: humans meet macaques in 'primate' visual cortex. *Journal of Neuroscience* 23: 3981-9
25. Leite FP, Tsao DY, Vanduffel W, Fize D, Sasaki Y, et al. 2002. Repeated fMRI using iron oxide contrast agent in awake, behaving macaques at 3 Tesla. *Neuroimage* 16: 283-94.
26. Livingstone MS, Tsao DY. 1999. Receptive fields of disparity-selective neurons in macaque striate cortex. [erratum appears in *Nat Neurosci* 2000 Apr;3(4):409]. *Nature Neuroscience* 2: 825-32