Sidney Roy Lehky

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Cognitive Neuroscience Lab
The Salk Institute
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Research Area:
Systems neuroscience: computational/cognitive neuroscience
Visual perception/memory: awake monkey neurophysiology, human visual
Psychophysics, mathematical modeling of neural information processing.

Personal:
Born: October 6, 1954, Chicago, Illinois USA
Citizenship: US

Nine years in Jamaica, Thailand, Laos, Philippines, and Cambodia as a child,
due to father's job with US State Dept.

Education
Early years:
New York City public schools
British School   Kingston, Jamaica
British PNEU School   Bangkok, Thailand
American School   Vientiane, Laos

High School:
International School   Manila, Philippines
Montgomery Blair H.S. Maryland, USA

University:
1975 B.A. Biological Sciences, University of Chicago

1985 Ph. D. Dept. of Biophysics and Theoretical Biology,
University of Chicago School of Medicine
Thesis title: Temporal Properties of Human Vision
Thesis Supervisor: Dr. Hugh R. Wilson

1976-1979 National Science Foundation Graduate Fellow
1990-1992 McDonnell-Pew Foundation Fellow in Cognitive Neuroscience

1988 Carnegie-Mellon University Connectionist Summer School
1992 Santa Fe Institute Summer School
1996 fMRI Brain Imaging Course, Massachusetts General Hospital

Employment:
2003- Visiting Scientist, Sloan Center for Theoretical Neurobiology, Salk
     Institute, La Jolla, CA (Lab of Terry Sejnowski)

2002- Visiting Research Scientist, Cognitive Brain Mapping Lab, RIKEN Brain
     Science Institute, Wako, Japan (lab of Keiji Tanaka)

2000-2002 Research Fellow, Lab. of Brain and Cognition, NIMH, Bethesda, MD
     (lab of Leslie Ungerleider) Functional magnetic brain imaging in humans
     related to studies of visual attention and face perception.
     [June-August 2001- (part-time-one day/week) Acting scientific review
     administrator- NIH VISB study section: process grant applications
     incoming to NIH related to neurophysiology and psychology of visual
     perception.]

2000- Visiting scientist, Sloan Center for Theoretical Neurobiology, The Salk
     Institute, La Jolla, CA

1994-1999 Staff Scientist, Lab. of Cognitive Brain Mapping RIKEN Brain
     Science Institute, Wako, Japan (laboratory of Dr. Keiji Tanaka) Neural
     modeling, human visual psychophysics, and neurophysiological recording
     from monkey visual cortex, oriented to problems of object recognition and
     memory.

1992-1994 Research Fellow, Division of Neuroscience, Baylor College of
     Medicine, Houston TX (laboratory of Dr. John Maunsell) (lab moved from
     Rochester) Electrophysiological recording from money lateral geniculate
     nucleus, human psychophysics, oriented to problems in binocular vision.

1991-1992 Guest Researcher, Dept. of Physiology, University of Rochester
     Medical School, Rochester, NY (laboratory of Dr. John Maunsell).

1990-1992 Post-doctoral fellow, Computational Neuroscience Laboratory, Salk
     Institute, La Jolla CA (laboratory of Dr. Terrence Sejnowski, in residence at
     NIH and U. Rochester)

1988-1992   Guest Researcher, Lab. of Neuropsychology, National Institute of
     Mental Health, Bethesda, MD (laboratory of Dr. Robert Desimone)
     Electrophysiological recording from monkey primary visual cortex, neural
     modeling of nonlinear properties of neural responses.

1985-1990   Post-doctoral fellow/research scientist, Dept. of Biophysics, Johns
     Hopkins University, Baltimore, MD (laboratory of Dr. Terrence Sejnowski)
     Neural network modeling related to visual perception.

1980-1982 Graduate teaching assistant- Common laboratory section for all
     introductory undergraduate biology courses, University of Chicago.
     Created new labs and wrote extensive parts of course syllabus

1975-1976 Lab Assistant- Section on Neural Systems, Laboratory of Biophysics, National Institute of Neurological and Communicative Diseases and Stroke, NIH intramural lab located at Marine Biological Laboratory, Woods Hole, MA (laboratory of Daniel Alkon). Invertebrate neurobiology lab studying biophysical basis of learning.

1973-1974 (summers) Undergraduate research in Thyroid Study Unit, Dept. of Medicine, University of Chicago, Chicago, IL (laboratory of Samuel Refetoff). Isolation of thyroid hormone receptors from rat liver nuclei.

 (Some dates may overlap because of overlapping appointments)

Publications:

Refereed Papers:

Lehky, S.R. (1983)   A model of binocular brightness and binaural loudness perception with general applications to nonlinear summation of sensory inputs. Biol. Cybernetics **49**, 89-97.

Lehky, S.R. (1985) Temporal properties of visual channels measured by masking. J. Opt. Soc. Am. A **2**, 1260-1272.

Lehky, S.R. (1988) An astable multivibrator model of binocular rivalry. Perception **17**, 215-228.

Lehky, S.R. and Sejnowski, T.J. (1988) Network model of shape-from-shading: Neural function arises from both receptive and projective fields. Nature **333**, 452-454.

Lehky, S.R. and Sejnowski, T.J. (1990) Neural model of stereoacuity and depth interpolation based on a distributed representation of stereo disparity. J. Neurosci. **10**, 2281-2299.

Lehky, S.R. and Sejnowski, T.J. (1990) Network model of visual cortex for determining surface curvature from images of shaded surfaces. Proc. R. Soc. Lond. B **240**, 251-278.

Lehky, S.R. and Blake, R. (1991) Organization of binocular pathways: Data and modeling related to rivalry. Neural Computation **3**, 44-53.

Lehky, S.R., Sejnowski, T.J., and Desimone, R. (1992) Predicting responses of nonlinear neurons in monkey primary visual cortex to complex spatial patterns. J. Neurosci. **12**, 3568-3581.

Lehky, S.R. (1995) Binocular rivalry is not chaotic. Proc. R. Soc. Lond. B **259**, 71-76.

Lehky, S.R. and Maunsell, J.H.R. (1996) No binocular rivalry in the LGN of alert

macaque. Vision Research **36**, 1225-1234.

Lehky, S.R. and Sejnowski, T.J. (1999) Seeing white: Qualia in the context of decoding population codes. Neural Computation **11**, 1262-1280.

Lehky, S.R. (2000) Deficits in feature binding under isoluminant conditions. J. Cognitive Neurosci. **12**, 383-392.

Lehky, S.R. (2000) Fine discrimination of faces can be performed rapidly. (J. Cognitive Neurosci., **12**, 848-855.

Lehky, S.R. (2003) Bayesian estimation of responses in Poisson spike trains. Neural Computation, in press.

Lehky, S.R., Sejnowski, T.J., and Desimone, R. Selectivity and ergodicity in monkey striate complex cells (submitted).

Lehky, S.R. and Tanaka, K. Comparison of responses in macaque monkey perirhinal and TE cortices during memory-intensive and passive viewing tasks. (in preparation).

Conference Absracts:
Lehky, S.R. and Wilson, H.R. (1983) Temporal transfer functions measured by masking experiments. Invest. Ophthal. & Vis. Sci. (supplement) **24**, 95. (ARVO annual meeting, Sarasota, FL)

Lehky, S.R. (1983) Model of binocular brightness perception. J. Opt. Soc. Am. **73**, 1873. (Opt. Soc. Am. annual meeting, San Diego)

Lehky, S.R. (1984) Simulation of reversal time distributions in binocular rivalry. J.Opt. Soc. Am. A **1**, 1260. (Opt. Soc. Am. annual meeting, New Orleans)

Lehky, S.R. (1984) Temporal characteristics of visual channels measured by masking. J. Opt. Soc. Am. A **1**, 1273. (Opt. Soc. Am. annual meeting, New Orleans)

Lehky, S.R. and Wilson, H.R. (1985) Non-monotonicity at high contrasts in the contrast increment threshold curve. Invest. Ophthal. & Vis. Sci. (supplement) **26**, 139. (ARVO annual meeting, Sarasota, FL)

Lehky, S.R. and Sejnowski, T.J. (1987) Extracting curvatures of 3-D objects using a neural network. Presented at AT&T Conference on Neural Networks for Computation, Snowbird, Utah.

Lehky, S.R., Jester, J.R., and Sejnowski, T.J. (1987) Line element model of disparity discrimination. Invest. Ophthal. & Vis. Sci. (supplement) **28**, 293. (ARVO annual meeting, Sarasota, FL)

Lehky, S.R. and Sejnowski, T.J. (1987) Extracting 3-D curvatures from images of surfaces using a neural model. Soc. Neurosci., 17th Annual Meeting, New Orleans.

Lehky, S.R. and Sejnowski, T.J. (1988) Model of depth interpolation using a distributed representation of disparity. Invest. Ophthal. & Vis. Sci. (supplement) **29**, 398. (ARVO annual meeting, Sarasota, FL)

Lehky, S.R. and Blake, R. (1989) Binocular rivalry affects strength of contrast adaptation. Invest. Ophthal. & Vis. Sci. (supplement) **30**,253. (ARVO annual meeting, Sarasota, FL)

Lehky, S.R., Desimone, R., Sejnowski, T.J. (1990) Modeling macaque V1 neurons with a back-propagation neural network. Perception **19**, 403. (European Conference on Visual Perception, Paris).

Desimone, R., Li, L., Lehky, S.R., Ungerleider, L.G., Mishkin, M. (1990) Effects of V4 lesions on visual discrimination performance and on responses of neurons in inferior temporal cortex. Soc. Neurosci., 20th Annual Meeting, St. Louis.

Lehky, S.R., Desimone, R., Sejnowski, T.J. (1990) Network modeling of spatial properties of units in striate cortex. Soc. Neurosci., 20th Annual Meeting, St. Louis.

Lehky, S.R. and Maunsell, J. (1993) No binocular rivalry in LGN of alert macaque. Soc. Neurosci., 23th Annual Meeting, Washington, D.C.

Lehky, S.R. (1994) Binocular rivalry is not chaotic. Invest. Ophthal. &Vis. Sci. (supplement) **35**, 1917. (ARVO annual meeting, Sarasota, FL)

Lehky, S.R. (1997) Feature binding under isoluminance conditions. Soc. Neurosci, 27th Annual Meeting, New Orleans.

Lehky, S.R. (1998) Feature binding is not enhanced by synchronous feature presentation. Invest. Ophthal. & Vis. Sci. (supplement) **39**, 849.(ARVO annual meeting, Ft Lauderdale, FL)

Lehky, S.R. and Sejnowski, T.J. (1998) Network model of color representation in Extrastriate cortex. Perception (supplement) **27** 43. (European Conference on Visual Perception, Oxford)

Lehky, S.R., Sejnowski, T.J., and Desimone, R. (1998) Coding in macaque V1 complex cells is moderately sparse. Soc. Neurosci. 28th Annual Meeting, Los Angeles

Lehky, S.R. (1999) Discriminating faces. Annual meeting, Cognitive Neuroscience Society, Washington, D.C.

Lehky S.R. (1999) Measuring face discrimination thresholds. Invest Ophthal. &

Vis. Sci. (supplement) **40** 1840. (ARVO annual meeting, Ft. Lauderdale, FL)

Lehky, S.R., Sejnowski, T.J., and Desimone, R. (1999) Sparseness of coding in monkey striate complex cells: data and modeling. (Third International Conference on Cognitive and Neural Systems, Boston)

Lehky, S.R. and Tanaka, K. (2001) Visual selectivity of perirhinal and Teav units in macaque monkey. Soc. Neurosci. 31st Annual Meeting, San Diego

Lehky, S.R. (2002) Visual selectivity in striate and inferotemporal cortices in macaque monkey. Invited speaker, Computational Neuroscience Conference at the Telluride Workshop on Neuromorphic Engineering.

Lehky, S.R. and Tanaka, K. (2002) Macaque inferotemporal responses during memory-intensive and passive viewing tasks. Soc. Neurosci 31st Annual Meeting, Orlando, Florida

Other:
 Sejnowski, T.J. and Lehky, S.R. (1987) Neural network models of visual processing. Portion of syllabus for Society for Neuroscience ShortCourse on Computational Neuroscience.

Lehky, S.R. and Sejnowski, T.J. (1988) Neural network model for the cortical representation of surface curvature from images of shaded surfaces. In: Sensory Processing, J.S. Lund (Ed.) Oxford:Oxford University Press.

Lehky, S.R. and Sejnowski, T.J. (1989) Simplifying models of visual processing. In: Methods in Neural Modeling (1st Edition) , C. Koch and I Segev (Eds.) MIT Press:Cambridge.

Lehky, S.R. and Sejnowski, T.J. (1990) Neural model of stereoacuity using a Distributed representation of binocular disparity. In: Vision and visual dysfunction, Vol. 5, Limits of Visual Perception. J.J Kulikowski (Ed.) MacMillan Press: London

Lehky, S.R., Pouget, A., Sejnowski, T.J. (1990) Neural models of binocular depth perception In: The Brain Cold Spring Harbor Symposia on Quantitative Biology Vol. LV. Cold Spring Harbor Laboratory Press: Skyline, NY.

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References

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