

## **Michael A. Sikora**

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### **Research Fellow, 2009 to 2011**

**Department of Radiology**

**Center for Magnetic Resonance Research, University of Minnesota.**

*Functional MR imaging analysis using FSL and also AFNI, SPM and BrainVoyager.*

*Anatomical MR analysis using FreeSurfer and FSL*

### **Projects:**

- The neural correlates for self-other and inner-outer space confusion in hallucinating schizophrenia patients, PI: Massoud Stéphane M.D.
- Brain Structure with 7 Tesla MRI in Epilepsy - PI: Thomas R. Henry M.D.
- Neural Correlates of Food Reward in American Indian Women, PI: Tiffany Beckman M.D.
- An Animal Model of Huntington's Disease, PI: Jan Dubinsky, PhD
- Default Mode Resting State and Metabolism, PI: Silvia Mangia, PhD
- Compulsive Behavior in Patients with Parkinson's Disease: Functional MRI Correlates, PI: Aviva Abosch M.D.

### **Technical Consultant, 2006 to 2011**

*Mathematical Modeling and Computational Simulation of Neural Systems*

[www.CompNeuroSci.info](http://www.CompNeuroSci.info)

#### **Department of Radiology, Harvard University.**

- Mathematical modeling and computational simulation of cortical networks to replicate Magnetoencephalographic (MEG) data in the somatosensory cortex using Neuron, MatLab and C/C++.

#### **Department of Neuroscience, University of Minnesota.**

- Mathematical modeling and computational simulation of a GABAergic synapse using Neuron and C/C++.
- Curriculum and software development for a course in computational neuroscience (Nsci 5201).

### **Senior Systems Software Programmer, 1989 to 2005**

**Departments of Neuroscience, Physiology and Psychology, University of Minnesota.**

- Mathematical modeling and computer simulation of retinal ganglion and bipolar cells and networks of cells. Modeling and simulation of synaptic mechanisms using Neuron and C/C++.
- Instructor of a graduate course in Computational Neuroscience (Nsci 5201).
- Software development of real-time data acquisition and stimulus control systems for neurophysiological instrumentation in C/C++, Forth, and LabView.
- Software development for signal and image analysis in MatLab
- Unix System and Network Administration of Sun, DEC, SGI, Linux Intel, and Linux Alpha hosts.
- Taught annual course in “Fundamentals of the Unix Operating System” to incoming neuroscience graduate students

- Coordinator of the Department of Physiology Core Computational Laboratory.

### **Software Engineer, 1988 to 1989**

#### **Test Engineering, Medtronic, Inc. (on contract)**

- Functional and detailed design of a device-driver interface library using CASE tools.
- Implementation in C of a device-driver interface library and user-interface library.
- Design and implementation of module and system test plans.

### **Software Engineer, 1987 to 1988**

#### **Design Engineering, ETA Supercomputer Systems, Inc. (on contract)**

- Software development and test of an embedded control system for supercomputer power and cooling – Conversion of control code to new ETA10 series P – Design and develop programming and debugging tools.
- Design and development of a relational database for power and cooling system wirelist - Member of a corrective action team whose goal was to upgrade documentation for cost-efficient outside vending of cables and harnesses.

### **Assistant Scientist, 1978 to 1987**

#### **Otophysiology Laboratory, Department of Otolaryngology, University of Minnesota Medical School.**

- Design and implement electro physiological experiments.
- Design and develop data acquisition and stimulus control systems used for audiological and physiological.
- Perform statistical analysis of data.
- Write technical articles for refereed professional journals
- Write grant proposals to federal and private institutions.
- Supervise and train surgical residents and technical staff in experimental design, surgical techniques, data acquisition, analysis, and interpretation of experimental results.

## **Education**

### **University of Minnesota, B.S. 1987**

#### **Majors in Computer Science, Psychology and Philosophy**

In 1966, I entered the University of Illinois as a student of Philosophy with a keen interest in epistemology and the theory of Mind. This study has molded my professional pursuits in some manner ever since.

My entrée into Neuroscience was a course offered in 1972 by the, then new and now defunct, Department of Information Engineering at the University of Illinois at Chicago (then Chicago Circle.) This course in Neuroscience, taught by a research neurophysiologist opened my mind to a way to study the mind that has fascinated and motivated me ever since.

I graduated with a B.Science degree with a mixture of course work in cognitive and physiological psychology, biology, computer science and philosophy both at the University of Illinois and Minnesota. As a student I worked part or full time in a range of biological disciplines as a laboratory technician.

## Publications

**Hippocampal sclerosis in temporal lobe epilepsy: findings at 7 T.** Henry TR, Chupin M, Lehericy S, Strupp JP, Sikora MA, Sha ZY, Ugurbil K, Van deMoortele PF. *Radiology*. 2011 Oct;261(1):199-209.

**Quantitative Analysis and Biophysically Realistic Neural Modeling of the MEG Mu Rhythm: Rhythmogenesis and Modulation of Sensory-Evoked Responses** Stephanie R. Jones, Dominique L. Pritchett, Michael A. Sikora, Steven M. Stufflebeam,1 Matti Hamalainen and Christopher I. Moore *J Neurophysiol* 102: 3554–3572, 2009.

**Retinal bipolar cells: Temporal filtering of signals from cone photoreceptors** Burkhardt DA, Fahey PK, Sikora MA *Vis Neurosci*. 2007 Nov-Dec;24(6):765-74.

**Natural images and contrast encoding in bipolar cells in the retina of the land- and aquatic-phase tiger salamander** Burkhardt DA, Fahey PK, Sikora MA *Visual Neuroscience* 2006 Jan-Feb;23(1):35-47

**A Computational Model of the Ribbon Synapse.** Sikora MA, Gottesman J, Miller RF. *J.Neuroscience Methods*. 2005 Vol 145/1-2 pp 47-61

**Retinal bipolar cells: Contrast encoding for sinusoidal modulation and steps of luminance contrast.** D.A. Burkhardt, P.K. Fahey, M.A. Sikora *Vis Neurosci*. 2004 Nov-Dec; 21(6):883-93

**How voltage-gated ion channels alter the functional properties of ganglion and amacrine cell dendrites.** Miller RF, Stenback K, Henderson D, Sikora M (2002). *Arch Ital Biol* 140: 347-359 2002

**Structure and functional connections of presynaptic terminals in the vertebrate retina revealed by activity-dependent dyes and confocal microscopy.** Miller RF, Fagerson MH, Staff NP, Wolfe R, Doerr T, Gottesman J, Sikora MA, Schuneman R *J Comp Neurol* 437: 129-155. 2001

**Pre- and post-synaptic mechanisms of spontaneous, excitatory postsynaptic currents in the salamander retina.** Miller RF, Gottesman J, Henderson D, Sikora M, Kolb H (2001). *Prog Brain Res* 131: 241-253. 2001

**Responses of ganglion cells to contrast steps in the light-adapted retina of the tiger salamander.** D.A. Burkhardt, P.K. Fahey, M.A. Sikora *Visual Neuroscience* 15, 219-229 1998

**Experimental hyperlipidemia and auditory dysfunction.** M. A. Sikora, T. Morizono, W. D. Ward, M. M. Paparella, K. Leslie *Acta Otolaryngol* 102, 372-381 1986

**Sensorineural hearing loss in experimental purulent otitis media due to S. Pneumoniae.** T. Morizono, G. S. Giebink, M. M. Paparella, M. A. Sikora, D. Shea *Arch Otolaryngol* 111, 794-798 1985

**Hyperlipidemia and noise in the chinchilla.** T. Morizono, M. A. Sikora, W. D. Ward, M. M. Paparella, J. Jorgenson *Acta Otolaryngol* 99, 516-524 1985

**Measurement of action potential thresholds in experimental endolymphatic hydrops.** T. Morizono, J. Cohen, M. A. Sikora *Ann Otol Rhino Laryngol* 94:2, 191-195 1985

**Sensorineural hearing loss in an animal model of purulent otitis media.** T. Morizono, G. S. Giebink, M. A. Sikora, M. M. Paparella Recent Advances in Otitis Media with Effusion, Decker and Decker, 1984

**Tympanostomy tubes and otic drops.** W. L. Meyerhoff, T. Morizono, C. G. Wright, L. S. Shaddock, D. Shea, M. A. Sikora Laryngoscope 93:8, 1022-1027 1983

**N1 latency following acute pure-tone trauma.** M. A. Sikora, T. Morizono Hearing Research 11, 93-101 1983

**Compound action potential input-output decrement.** M. A. Sikora, T. Morizono Arch Otolaryngol 109, 677-681 1983

**Ototoxicity of ear drops.** T. Morizono, L. Rybak, M. A. Sikora Ear Clinics International, Vol II, Williams and Wilkins 1982

**Experimental hypercholesteremia and auditory function in the chinchilla.** T. Morizono, M. A. Sikora Otol Head Neck Surg 90, 814-818 1982

**The ototoxicity of topically applied povidone-iodine preparations.** T. Morizono, M. A. Sikora Arch Otolaryngol 108, 210-213 1982

**Ototoxicity of ethanol in the tympanic cleft in animals.** T. Morizono, M. A. Sikora Acta Otolaryngol 92, 33-40 1981