CURRICULUM VITAE

Joseph Thachil Francis

Assistant Professor
State University Of New York Downstate Medical Center

Mailing Address

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Education

Bachelor of Science in Biology, State University of New York at Buffalo, May 1994.

Doctorate of Neuroscience, Ph.D, The George Washington University May 2001

Research Experience:

Assistant Professor, Department of Physiology and Pharmacology, State University of New York Downstate Medical Center July 2006 – present.

Research Assistant Professor, Department of Physiology and Pharmacology, State University of New York Downstate Medical Center 2004 – July,2006.

Post-Doctoral Fellow, Department of Physiology and Pharmacology, State University of New York at Downstate Medical Center 2002-2004

Post-Doctoral Fellow, Department of Biomedical Engineering, Johns Hopkins University. 2001-2002

Research Assistant, Neuroscience Program, The George Washington University, and The Krasnow Institute for Advanced Study at George Mason University. 1998-2001

Graduate Research Assistant, Mathematics Department, George Mason University. 1999

Graduate Research Assistant, Neuroscience Program, The George Washington University, and Children's Research Institute of the Children's National

Medical Center. 1995-1998.

Undergraduate Research Assistant, The Honors Program in Biological Sciences, State University of New York Buffalo. 1992-1994.

Teaching Experience:

Microvasculature Lectures I-IV in the medical school at SUNY Downstate. To start in Jan 2009.

Microvasculature Lectures I-II in the school of public health at SUNY Downstate. To start in Oct 2008.

Course director and sole lecturer for Computational Motor Control and Neuro-Robotics, SUNY Downstate Medical Center Spring 2007.

Lecturer, Basic Mechanisms of Clinical Neuroscience, SUNY Downstate Medical Center Fall 2006.

Co-Course director for Biomedical instrumentation, Department of Physiology and Pharmacology SUNY Downstate Medical Center 2006-present.

Guest Lecturer, Department of Physiology and Pharmacology SUNY Downstate Medical Center.2003-2005

Graduate Teaching Assistant, Department of Biological Sciences, George Mason University, Fairfax, VA, 1998-2000.

Graduate Teaching Assistant for Neuroanatomy, Department of Anatomy, The George Washington Medical School. Washington DC. 1997.

Fellowships:

The George Washington Medical School Graduate Fellowship 1996-1998.Program in Neuroscience Fellowship at The George Washington University, 1995.
Mathematics Department at George Mason University Graduate Research Fellowship 1999.
Department in Biological Sciences SUNY at Buffalo Undergraduate Training Fellowship, summer of 1992 and 1993.

Honors and Awards:

2nd Place in the Poster Competition at The George Washington Medical Center Research Day. 1999.
Graduated With Honors in Biological Sciences SUNY Buffalo, 1994
Golden Key National Honor Society, 1993.

Professional Memberships:

Society for Neuroscience
American Association for the Advancement of Science (AAAS)
The American Physiological Society
New York Academy of Science

Funding Awards:

NYS Department of Health SCRIBs (Co-Principal Investigator) Amount of award: $359,383. (2008-2010).

NYS Department of Health SCIRBs # C022048 (Principal Investigator) Amount of award: $324,000. (April 2007 – May 2010).

National Academies Keck Futures Initiative NAKFI SP09. (Principal Investigator) Amount of award: $75,000. (May 2007 – April 2009).

Deans Initiative SUNY Downstate Medical School. (Principal Investigator) Amount of award: $19,000.

Publications:

Francis JT, Xu S and Chapin JK. Proprioceptive and Cutaneous Representations in the Rat Ventral Posterolateral (VPL) Thalamus. Ventral Posterolateral Thalamus. *J Neurophysiol* 99: 2291-2304, 2008 (Cover of May 2008 Journal)

Francis JT. Error Generalization as a Function of Velocity and Duration: Human Reaching Movements. Exp Brain Res. 2008 Mar;186(1):23-37. Epub 2007 Nov 20.

Francis JT and Chapin JK. Neural ensemble activity from multiple brain regions predicts kinematic and dynamic variables in a multiple force field reaching task. IEEE Transactions on neural systems and rehabilitation engineering. Vol. 14, NO. 2, June 2006.

Francis JT. The Influence of Inter-Reach-Interval on Motor Learning. Exp Brain Res Vol 167, Number 1, Nov 2005, 128-131.

Francis JT, Chapin JK. A Novel Torque Manipulandum for Small Animals. IEEE Transactions on Biomedical Engineering 2004 Jun; 51(6):963-965.

Francis JT, Gluckman BJ and Schiff SJ. Sensitivity of Neurons to Weak Electric Fields. *J Neuroscience* 2003, 23(19):7255-61.

Donchin O, **Francis JT**, Shadmehr R. Quantifying Generalization from Trial-by Trial behavior of Adaptive Systems that Learn with Basis Functions: Theory and Experiments in Human Motor Control. *J Neuroscience* 2003, 23(27):9032-45.

Francis JT, So P, Gluckman GJ, Schiff. Differentiability implies continuity in neuronal dynamics. Physica D, 2001 (148)175-181

Jerger KK, Netoff TI, **Francis JT**, Sauer T, Pecora L, Weinstein SL, Schiff SJ. Early seizure detection. *J Clin Neurophysiol*, 2001 May, 18(3):259-68,

So P, **Francis JT**, Netoff TI, Gluckman, BJ, and Schiff SJ. Periodic Orbits: A Novel Language for Neuronal Dynamics*, Biophysical Journal*, **74**, 2776-2785, 1998.

Francis J.T, Hennessey T.M, Chemorepellents in Paramecium and Tetrahymena *Journal of Eukaryotic Microbiology.* **42**: (1) 78-83 Jan-Feb 1995.

Hennessey T.M, Frego L.E, Francis J.T, Oxidants Act as Chemorepellents in Paramecium by Stimulating an Electrogenic Plasma-Membrane Reductase Activity. *Journal of Comparative Physiology A-Sensory Neural and Behavioral Physiology.* **175**: (5) 655-665 Nov 1994.

Book Chapters:

Francis JT. The neural representation of Kinematics and Dynamics in multiple brain regions: The use of force field reaching paradigms in the Primate and Rat. In: Mechaniosensitivity in Cells and Tissues: Nervous system. Springer, 2008.

Jerger KK, Netoff TI, **Francis JT**, Sauer T, Pecora LM, Weinstein SL, Schiff SJ. Comparison of Methods for Seizure Detection. In: Epilepsy as a Dynamic Disease eds. Milton J, Jung P Springer, New York, 2003

Papers in Preparation/Press:

Francis J.T, Xu S, vonKraus L ,Rozenboym A, and Chapin J.K. Microstimulation in somatosensory thalamus elicits naturalistic responses in cortical networks.

Francis J.T. Similarities between the neural representation of dynamics and kinematics in the sensory motor cortices of the rat and macaque.

Francis J.T. Differential activation of the sensory motor cortices induced via optimized spatiotemporal microstimulation of the cutaneous and proprioceptive thalamus in rat.

Meeting Abstracts:

Francis, J.T Error generalization as a function of velocity: human reaching movements. Society for Neuroscience annual meeting. Atlanta GA, 2006.

Rozenboym A, Xu S, vonKraus L, Semework M, **Francis, J.T**, Chapin J.K Micro-stimulation in somatosensory thalamus elicits naturalistic responses in cortical networks. Society for Neuroscience annual meeting. Atlanta GA, 2006.

Francis, J.T, Chapin JK, Neural ensemble activity from multiple brain regions predicts kinematic and dynamic variables in a multiple force field reaching task in the Rat. Society for Neuroscience annual meeting. Washington DC, 2005.

Rozenboym A, Xu S, vonKraus L, Semework M, Chapin J.K, **Francis, J.T**, Neuronal ensemble representation of cutaneous stimuli in the somatosensory cortex of awake and anaesthetized macaques. Society for Neuroscience annual meeting Washington DC, 2005.

Xu S, Li L, **Francis, J.T**, Talwar S.K, Chapin J.K. Spatiotemporal encoding in rat somatosensory cortex of electrical stimulation in sensory thalamus. Society for Neuroscience annual meeting. 2003.

Li L, Xu S, Hawley E. S, **Francis, J.T**, Talwar S.K, Chapin J.K. Spatiotemporal encoding in rat somatosensory cortex of electrical stimulation in sensory thalamus. Society for Neuroscience annual meeting. 2003.

Francis, J.T, Xu S, Rodriguez D, Chapin J.K. Mapping the Ventroposterior lateral thalamus: cutaneous and proprioceptive representations. Society for Neuroscience annual meeting, 2003.

Huang V, **Francis J.T**, Shadmehr R. Temporal Gain Field of Motor Memory. Society for Neuroscience annual meeting. 2003.

Donchin, O, **Francis, J.T**, Shadmehr, R. Explaining motor learning using a simple dynamical system. Society for Neuroscience annual meeting. 2002.

Francis, J.T, So.P, Gluckman, B. J, Netoff, T.I, Schiff, S.J, Synchronization Between a Neuronal Ensemble and a "Natural" Electric Field at Physiologically Relevant Strengths. Society for Neuroscience annual meeting. Miami, 1999.

Francis, J.T, So, P, Gluckman, B. J, Netoff, T.I, Schiff, S.J, Differentiability Implies Continuity in Neuronal Dynamics. Annual Computational Neuroscience Meeting. Pittsburgh, 1999.

Francis, J.T, So, P, Gluckman, B. J, Netoff, T.I, Schiff, S.J, Differentiability Implies Continuity in Neuronal Dynamics. Fifth SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah, May 1999.

Francis, J.T, So, P, Gluckman, B. J, Netoff, T.I, Schiff, S.J, Differentiability Implies Continuity in Neuronal Dynamics. Research Day at The George Washington Medical Center, 1999.

Francis, J.T, So, P., Gluckman, B., Netoff, T.I., Schiff, S.J., Deterministic structure in data from a free running neuronal ensemble: a comparison of three non-linear tests for determinism. *Society for Neuroscience Abstracts*, vol 24, pg. 1214,1998.

Francis, J. T, So, P, and Schiff, S. J, Description of Cyclic patterns in Neuronal ensemble Activity. *Society for Neuroscience Abstracts*, vol 23, pg 380, 1997

Francis, J. T., So, P., and Schiff, S. J., Periodic Orbits in Neuronal Ensemble Activity. *Society for Neuroscience Abstracts* 22: 2085, 1996.

Presentations By My Colleagues on Our Work:

Schiff, S. J, So, P, **Francis, J.T**, Gluckman, B. J, Nonlinear time series analysis of physiological and pathological brain dynamics, Bonn, Germany, 1999

Schiff, S. J, **Francis, J. T**, So, P, Gluckman, B. J, Smithsonian Associates Seminar Series, Campus on the Mall, Dynamical Neuroscience: From Top-Down to Bottom-Up and Beyond, The Smithsonian Institution, 1999.

So, P., **Francis, J.T**, Gluckman, B.J, Netoff, T.I, Schiff, S.J, "Nonlinear Dynamics in Neuronal Ensembles", Dynamics Days 1999 Como Italy, Villa Olmo, Como, Italy, June 1999.

So, P., Gluckman, B. J., **Francis, J.T**, Netoff, T., and Schiff, S. J., Characterization of Complex Neuronal Dynamics using Unstable Periodic Orbits. Presented at the American Physical Society, Los Angeles, 1998.

Gluckman BJ, So P, **Francis JT**, Netoff T, and Schiff S J. Prediction and Tracking of Complex Neuronal Dynamics using Unstable Periodic Orbits. Presented at the American Physical Society, Los Angeles, 1998.

Netoff TI, So P, Gluckman BJ, **Francis JT**, Schiff SJ. Understanding Interspike Interval Variability. Society for Industrial and Applied Mathematics, Snow Bird Utah, (1999)

Netoff TI, Gluckman BJ, So P, **Francis JT**, Schiff SJ. Searching for nonlinear interactions between cells in neuronal networks. *Society for Neuroscience Abstracts*, vol 24, pg 1160, 1998

Netoff, T.I; So, P, Gluckman, B.J, **Francis J.T**, SJ Schiff, Detecting Patterns of Activity in Single Cell Recording. *Society for Neuroscience Abstracts* vol23,pg 482

So, P., **Francis, J.T**, Gluckman, B.J, Netoff, T.I, Schiff, S.J, "Characterization of Complex Neuronal Dynamics by Unstable Periodic Orbits", Gordon Research Conference on Bio- electrochemistry, New England College, NH, July 1998.
So, P., **Francis, J.T**, Gluckman, B.J, Netoff, T.I, Schiff, S.J, "Periodic Orbits: A New Language for Neuronal Dynamics", George Mason University, Fairfax, Virginia, November 1997.

Invited Talks:

2008 KECK Mid Grant Meeting. Cleveland OH.

2005 International Conference on Brain Controlled Interfacing. Rensselaervill NY.

2002 University of Alabama Birmingham Department of biomedical engineering.

2000 Mount Sinai Department of Physiology.

2000 Johns Hopkins Department of biomedical engineering.