

DUANE QUINN NYKAMP

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EDUCATION

New York University, Courant Institute of Mathematical Sciences, Department of Mathematics
Ph.D., Mathematics, May 2000

The University of Michigan
B.S., Honors Mathematics and General Physics, December 1994

APPOINTMENTS

July 2003 to present
Assistant Professor
University of Minnesota, School of Mathematics

April 2005 to present
Senior Member
University of Minnesota, Graduate Program in Neuroscience

August 2000 to June 2003
NSF Mathematical Sciences Postdoctoral Research Fellow and CAM Assistant Professor
University of California, Los Angeles, Department of Mathematics

TEACHING EXPERIENCE

Courses taught at the University of Minnesota:
Calculus with Biological Emphasis I and II, IT Multivariable Calculus and Vector Analysis, Mathematical Modeling of Neurons and Neural Networks (Topics in Mathematical Biology), Hearing and Vision (Topics in Mathematical Biology), Directed Study

Courses taught at the University of California, Los Angeles:
Graduate Seminar in Applied Mathematics, Applied Partial Differential Equations

Courses taught at New York University:
Elementary Statistics, Mathematical Thinking

PUBLICATIONS

- D. Q. Nykamp. Exploiting history-dependent effects to infer network connectivity. *SIAM Journal on Applied Mathematics*, 68:354–391, 2007.
- D. Q. Nykamp. A mathematical framework for inferring connectivity in probabilistic neuronal networks. *Mathematical Biosciences*, 205: 204–251, 2007.
- D. Q. Nykamp. Revealing pairwise coupling in linear-nonlinear networks. *SIAM Journal on Applied Mathematics*, 65:2005–2032, 2005.
- N. Wu, A. Enomoto, S. Tanaka, C.-F. Hsiao, D. Q. Nykamp, E. Izhikevich, and Scott H. Chandler. Persistent sodium currents in Mesencephalic V Neurons participate in burst generation and control of membrane excitability. *Journal of Neurophysiology*, 93:2710–2722, 2005.
- D. Q. Nykamp. Measuring linear and quadratic contributions to neuronal response. *Network: Computation in Neural Systems*, 14:673–702, 2003.
- D. Q. Nykamp. Reconstructing stimulus-driven neural networks from spike times. In S. Becker, S. Thrun, and K. Obermayer, editors, *Advances in Neural Information Processing Systems 15*, pages 309-316. MIT Press, Cambridge, MA, 2003.
- D. Q. Nykamp. White noise analysis of coupled linear-nonlinear systems. *SIAM Journal on Applied Mathematics*, 63:1208–1230, 2003.
- D. Q. Nykamp. Spike correlation measures that eliminate stimulus effects in response to white noise. *Journal of Computational Neuroscience*, 14:193–209, 2003.
- D. Q. Nykamp and D. L. Ringach. Full identification of a linear-nonlinear system via cross-correlation analysis. *Journal of Vision*, 2:1–11, 2002.
- E. Haskell, D. Q. Nykamp, and D. Tranchina. Population density methods for large-scale modeling of neuronal networks with realistic synaptic kinetics: Cutting the dimension down to size. *Network: Computation in Neural Systems*, 12:141–174, 2001.
- D. Q. Nykamp and D. Tranchina. A population density approach that facilitates large-scale modeling of neural networks: Extension to slow inhibitory synapses. *Neural Computation*, 3:511–546, 2001.
- D. Q. Nykamp and D. Tranchina. Fast neural network simulations with population density methods. *Neurocomputing*, 32:487–492, 2000.
- D. Q. Nykamp and D. Tranchina. A population density approach that facilitates large-scale modeling of neural networks: Analysis and an application to orientation tuning. *Journal of Computational Neuroscience*, 8:19–50, 2000.

GRANTS AND FELLOWSHIPS

- 2007–2010 NSF DMS 0719724, *Analyzing correlations in neuronal networks*
2006–2007 University of Minnesota DTC's Digital Technology Initiative Program
Discrete, statistical and computational methods in rat neural spike train decoding
2004–2007 NSF DMS 0415409, *Model-based reconstruction of neural networks*
2004–2005 MN Higher Education Services Office
Reaching and Exceeding the Mathematics Standards in Grades 2–5
2000–2003 NSF DMS 0071533, *Development of Mathematical Tools to Study Early Visual Processing*
NSF Mathematical Sciences Postdoctoral Research Fellowship
2001–2002 Margaret and Herman Sokol Postdoctoral Research Fellowship
1999–2000 Dean's Dissertation Fellowship
1995–2000 NSF Graduate Research Fellowship

DOCTORAL STUDENTS ADVISED

Chin-Yueh Liu, Ph. D. expected 2008

POSTDOCTORAL ASSOCIATES ADVISED

Alexander Yong

TRAINER ON TRAINING GRANTS

NIH 1 T90 DK070106-01 and 1 R90 DK71500-01. *Neuro-physical-computational Sciences Graduate Training*, PI: Timothy J. Ebner
Role: Co-advisor of graduate students Joshua G. Pohl, Audrey Royer, and Steve Kerrigan

SELECTED INVITED LECTURES

SIAM Conference on Applications of Dynamical Systems Minisymposium, Snowbird, UT, May 2007
Center for Theoretical Neuroscience, Columbia University, New York, NY, May 2006
Center for Neural Science, New York University, New York, NY, May 2006
Center for Molecular and Behavioral Neuroscience, Rutgers University, Newark, NJ, May 2006
SIAM Conference on Applications of Dynamical Systems Minisymposium, Snowbird, UT, May 2005
Department of Biomedical Engineering, University of Minnesota, May 2005
Neuroscience Graduate Program, University of Minnesota, March 2005
Digital Technology Center, University of Minnesota, February 2005
5th International Conference on Dynamical Systems and Differential Equations, Special Session, June 2004
Annual Meeting of the Sloan-Swartz Theoretical Neurobiology Centers, Del Mar, CA, July 2003
Department of Engineering Sciences and Applied Mathematics, Northwestern University, January 2003
Department of Mathematics, Notre Dame University, January 2003
School of Mathematics, University of Minnesota, December 2002

Department of Mathematics, University of Michigan, November 2002
Neural Dynamics Workshop, Mathematical Biosciences Institute, October 2002
4th International Conference on Dynamical Systems and Differential Equations, Special Session, May 2002
Society for Industrial and Applied Mathematics Annual Meeting Minisymposium, July 2001
Sloan Center for Theoretical Neurobiology, The Salk Institute for Biological Studies, March 2001

SELECTED CONFERENCE PRESENTATIONS

Society for Neuroscience Annual Meeting, San Diego, CA, November 2007
Computational Neuroscience Meeting, Toronto, Canada, July 2007
Society for Neuroscience Annual Meeting, Atlanta, GA, October 2006
Conference on Mathematical Neuroscience, Sant Julià de Lòria, Andorra, August 2006
Gordon Research Conference on Theoretical Biology and Biomathematics, Tilton, NH, June 2006
Society for Neuroscience Annual Meeting, Washington, DC, November 2005
Society for Neuroscience Annual Meeting, San Diego, CA, October 2004
SIAM Conference on the Life Sciences, Portland, OR, July 2004
Neural Information Processing Systems, Vancouver, BC, December 2002
Society for Neuroscience Annual Meeting, Orlando, FL, November 2002

OTHER PROFESSIONAL ACTIVITIES

Organizer, Analysis and Dynamics of Neuronal Networks Minisymposium, Joint SIAM-SMB Conference on the Life Sciences, Raleigh, NC, August 2006
Organizer, Mathematical Neuroscience Minisymposium, Society for Mathematical Biology Annual Meeting, Ann Arbor, MI, July 2004

CURRICULUM DEVELOPMENT

Development of a series of interactive concept-visualization tools (manipulable computer graphics), accompanying text, and online quizzes designed to help students understand the concepts underlying multivariable calculus. The concept-visualization tools with text can be viewed at the web address www.math.umn.edu/~nykamp/m2374/readings using any web browser with Java support.

OUTREACH ACTIVITIES

Participation in a summer 2004 workshop to train Saint Paul public school teachers to exceed mathematical standards. (Funded by the MN Higher Education Services Office grant: *Reaching and Exceeding the Mathematics Standards in Grades 2-5*).

TEACHING DEVELOPMENT

Early Career Teaching Program, September 2003 – May 2004

REFeree FOR JOURNALS

SIAM Journal on Applied Mathematics, Physica D, Physics Letters A, Network: Computation in Neural Systems, Applied Mathematics Letters, Mathematical Biosciences, Journal of Computational Neuroscience, Journal of Physics A, Proc. Natl. Acad. Sci. USA

PROFESSIONAL AFFILIATIONS

American Mathematical Society, Society for Industrial and Applied Mathematics, Society for Neuroscience