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

September 2009 to present
Associate Professor
University of Minnesota, School of Mathematics

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

July 2003 to August 2009
Assistant Professor
University of Minnesota, School of Mathematics

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:
Dynamical Systems and Chaos, Introduction to Numerical Methods I and II, Mathematical Neuroscience, 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)

PUBLICATIONS

L. Zhao, B. Beverlin II, T Netoff, and D. Q. Nykamp. Synchronization from second order network connectivity statistics. *Frontiers in Computational Neurosciemce*, 5:28, 2011.

C.-Y. Liu and D. Q. Nykamp. A kinetic theory approach to capturing interneuronal correlation: The feed-forward case. *Journal of Computational Neuroscience,* 26: 339-368, 2009.

D. Q. Nykamp. A stimulus-dependent connectivity analysis of stimulus-driven networks. *Journal of Mathematical Biology*, 59: 147-173, 2009.

M. E. Koelling and D. Q. Nykamp. Computing linear approximations to nonlinear neuronal response. *Network: Computation in Neural Systems,* 19: 286-313, 2008.

D. Q. Nykamp. Pinpointing connectivity despite hidden nodes within stimulus-driven networks. *Physical Review E,* 78:021902, 2008.

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 S. 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.

PUBLICATIONS IN PROGRESS

M. E. Koelling and D. Q. Nykamp. Searching for optimal stimuli: ascending a neuron's response function. *Submitted to Journal of Computational Neuroscience.*

L. Zhao, D. J. Nichols, D. R. Sandler, M. J. Schlatter, M. Buice, and D. Q. Nykamp. A simple framework for complex networks. *In preparation.*

GRANTS AND FELLOWSHIPS

2011	Estancias de profesores e investigadores extranjeros en centros españoles (Grant for stays of foreign professors and researchers in Spanish centers)
2010-2011	Beques de recerca per a professors/es i investigadors/es visitants a Catalunya 2010 (PIV-DGR) (Research scholarship for visiting professors and researchers in Catalonia 2010)
2009–2014	NSF DMS 0847749, *CAREER: Toward a second order description of neuronal networks*
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., July 2009
Liqiong Zhao, Ph. D. expected 2011
Patrick Campbell, 2011–

POSTDOCTORAL ASSOCIATES ADVISED

Alexander Yong. 2006–2007

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

UNDERGRADUATES ADVISED

Danielle R Sandler, Research Project, Fall 2009, Senior Honors Thesis, Spring 2010
David J Nichols, Research Project, Fall 2009
Joseph Nguyen, Senior project, Writing Intensive, Fall 2009
Max Schlatter, Senior project, Writing Intensive, Fall 2009
Trevor Bain, Directed Study, Summer 2009
Charles Liebling, Senior project, Writing Intensive, Spring 2009
Vallie Tracy, Senior project, Writing Intensive, Fall 2008
Justin Hausauer, REU, Summer 2008
David Barta, Senior Honors Thesis, Spring 2008
Zi Guan, Directed Study, Spring 2005

SELECTED INVITED LECTURES

Gatsby Computational Neuroscience Unit, University College London, London, England, December 2010
BIRS Workshop, Linking neural dynamics and coding: correlations, synchrony, and information, Banff, AB, Canada, October 2010
SIAM Conference on Life Sciences Minisymposium, Pittsburgh, PA, July 2010
SAMSI Workshop on Molecular Motors, Neuron Models, and Epidemics on Networks, Research Triangle Park, NC, April 2010
Neural Information Processing Group, Berlin University of Technology, Berlin, Germany, July 2009
Conference on Frontiers in Applied and Computational Mathematics, Newark, NJ, June 2009
SIAM Conference on Applications of Dynamical Systems Minisymposium, Snowbird, UT, May 2009
The Biocomplexity Institute, Indiana University, February 2009
Mathematical Neuroscience Short Course, Institute for Mathematics and its Applications, June 2008
School of Mathematics, University of Minnesota, April 2008
Organization of Biological Networks, Institute for Mathematics and its Applications Workshop, March 2008
Department of Mathematics and Statistics, Boston University, December 2007
Department of Brain and Cognitive Sciences, The Massachusetts Institute of Technology, December 2007
SIAM Conference on Applications of Dynamical Systems Minisymposium, Snowbird, UT, May 2007
Center for Theoretical Neuroscience, Columbia University, May 2006
Center for Neural Science, New York University, May 2006
Center for Molecular and Behavioral Neuroscience, Rutgers University, Newark, May 2006

SELECTED CONFERENCE PRESENTATIONS

Society for Neuroscience Annual Meeting, San Diego, CA, November 2010
OCCAM Computational Neuroscience Workshop, Oxford, England, September 2010
Computational Neuroscience Meeting, San Antonio, TX, July 2010
Society for Neuroscience Annual Meeting, Chicago, IL, October 2009
Computational Neuroscience Meeting, Berlin, Germany, July 2009
Computational Neuroscience Meeting, Portland, OR, July 2008
Society for Neuroscience Annual Meeting, San Diego, CA, November 2007
Computational Neuroscience Meeting, Toronto, Ontario, Canada, July 2007
Society for Neuroscience Annual Meeting, Atlanta, GA, October 2006
Conference on Mathematical Neurocience, Sant Julià de Lòria, Andorra, August 2006
Gordon Research Conference on Theoretical Biology and Biomathematics, Tilton, NH, June 2006

OTHER PROFESSIONAL ACTIVITIES

Member, Program Committee, Organization for Computational Neurosciences, 2011–2013
Organizer, Inferring Connectivity from Neural Network Data Minisymposium, SIAM Conference on the Life Sciences, Montreal, Quebec, Canada, August, 2008
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

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

PROFESSIONAL AFFILIATIONS

Society for Industrial and Applied Mathematics, Society for Neuroscience