

# MARK A. KRAMER

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## CONTACT INFORMATION

Please visit <http://MAKramer.info>

## EDUCATION & EMPLOYMENT

Postdoctoral associate (with N. Kopell)	Boston University	01/2006 — present
Methods in Computational Neuroscience	Marine Biological Laboratories	08/2006
PhD (Applied Physics)	University of California, Berkeley	08/2001 — 12/2005
BA (Physics, with highest honors)	Oberlin College	08/1997 — 05/2001

## HONORS AND AWARDS

First place (shared) in the 2008 Quantitative Single Neuron Modeling Competition: Challenge B  
National Science Foundation (NSF) Graduate Research Fellowship  
Berkeley Fellowship (Berkeley's most prestigious graduate fellowship)  
Barry M. Goldwater Scholarship

## ARCHIVAL JOURNAL PUBLICATIONS (*15 published in peer-reviewed journals*)

- M. A. Kramer**, A. K. ROOPUN, L. M. CARRACEDO, M. KAISER, C. H. DAVIES, R. D. TRAUB, M. A. WHITTINGTON, N. J. KOPELL, Rhythm generation through period concatenation in rat somatosensory cortex, *PLoS Computational Biology*, accepted, 07/2008.
- M. A. Kramer**, R. D. TRAUB, N. J. KOPELL, New dynamics in cerebellar Purkinje cells: torus canards, *Physical Review Letters*, accepted, 07/2008.
- M. A. Kramer**, E. D. KOLACZYK, AND H. E. KIRSCH, Emergent network topology at seizure onset in humans, *Epilepsy Research*, 79:2-3, 173-186, 2008.
- A. K. ROOPUN, **M. A. Kramer**, L. M. CARRACEDO, M. KAISER, C. H. DAVIES, R. D. TRAUB, N. J. KOPELL, M. A. WHITTINGTON, Period concatenation underlies interactions between gamma and beta rhythms in neocortex, *Frontiers in Cellular Neuroscience*, 2:1, 2008.
- M. A. Kramer**, A. B. L. TORT, N. J. KOPELL, Sharp edge artifacts and spurious coupling in EEG frequency comodulation measures, *Journal of Neuroscience Methods*, 170(2): 352-357, 2008.
- M. A. Kramer**, F. L. CHANG, M. E. COHEN, D. HUDSON, A. J. SZERI, Synchronization measures of the scalp electroencephalogram can discriminate healthy from Alzheimer's subjects, *International Journal of Neural Systems*, 17(2): 1-9, 2007.
- M. A. Kramer**, A. J. SZERI, J. W. SLEIGH, AND H. E. KIRSCH, Mechanisms of seizure propagation in a cortical model, *Journal of Computational Neuroscience*, 22(1): 63-80, 2007.
- M. A. Kramer**, B. A. LOPOUR, H. E. KIRSCH AND A. J. SZERI, Bifurcation control of a seizing human cortex, *Physical Review E*, 73: 041928, 2006.
- M. A. Kramer**, H. E. KIRSCH AND A. J. SZERI, Pathological pattern formation and cortical propagation of epileptic seizures, *Journal of the Royal Society Interface*, 2, (4): 113-127, 2005.
- M. A. Kramer**, E. EDWARDS, M. SOLTANI, M. S. BERGER, R. T. KNIGHT AND A. J. SZERI, Synchronization measures of bursting data: Application to the electrocorticogram of an auditory event-related

experiment, *Physical Review E*, 70: 011914, 2004.

**M. A. Kramer** AND A. J. SZERI, Quantitative approximation of the cortical surface potential from EEG measurements, *IEEE Transactions on Biomedical Engineering*, 51, (8): 1358-1365, 2004.

G. LODGE, **M. A. Kramer** AND J. A. WALSH, A trilinear three-body problem, *International Journal of Bifurcation and Chaos*, 13, (8): 2141-2155, 2003.

D. F. STYER, M. S. BALKIN, K. M. BECKER, M. R. BURNS, C. E. DUDLEY, S. T. FORTH, J. S. GAUMER, **M. A. Kramer**, D. C. OERTEL, L. H. PARK, M. T. RINKOSKI, C. T. SMITH AND T. D. WOTHERSPOON, Nine formulations of quantum mechanics, *American Journal of Physics*, 70, (3): 288-297, 2002.

Q. Z. ZHANG, T. R. HUNTER, J. BRAND, T. K. SRIDHARAN, S. MOLINARI, **M. A. Kramer** AND R. CESARONI, Search for CO outflows toward a sample of 69 high-mass protostellar candidates: Frequency of occurrence, *Astrophysical Journal*, 552, (2): L167-L170, 2001.

D. R. STINEBRING, M. A. McLAUGHLIN, J. M. CORDES, K. M. BECKER, J. E. E. GOODMAN, **M. A. Kramer**, J. L. SHECKARD AND C. T. SMITH, Faint scattering around pulsars: Probing the interstellar medium on solar system size scales, *Astrophysical Journal*, 549, (1): L97-L100, 2001.

#### PUBLICATIONS IN PREPARATION

A. B. L. TORT, **M. A. Kramer**, C. THORN, D. J. GIBSON, Y. KUBOTA, A. M. GRAYBIEL, N. J. KOPELL, Dynamic cross-frequency couplings of local field potential oscillations in rat striatum and hippocampus during performance of a T-maze task, (submitted).

J. L. BROOKS, **M. A. Kramer**, M. P. KURYLO, R. T. KNIGHT, AND L. C. ROBERTSON, Perceptual grouping and completion induce event-related coherence in extrastriate cortex, (submitted).

#### CONFERENCE PROCEEDINGS

**M. A. Kramer**, A. K. ROOPUN, R. D. TRAUB, N. KOPELL, M. A. WHITTINGTON, Gamma + beta2 = beta1: rhythm generation through period concatenation, *Society for Neuroscience Annual Meeting*, San Diego, CA, 11/2007.

**M. A. Kramer**, E. D. KOLACZYK, H. E. KIRSCH, Emergent network topology at seizure onset in humans, *132nd Annual Meeting of the American Neurological Association*, Washington, DC, 10/2007.

**M. A. Kramer**, N. KOPELL, R. D. TRAUB, M. A. WHITTINGTON, Coupled rhythms and transitions in rat auditory cortex, *SIAM Conference on Applications of Dynamical Systems*, Snowbird, UT, 05/2007.

**M. A. Kramer**, H. E. KIRSCH, A. J. SZERI, Using stochastic partial differential equations to model and treat the seizing human cortex, *SIAM Annual Meeting*, Boston, MA, 07/2006.

J. L. BROOKS, **M. A. Kramer**, M. P. KURYLO, J. ARITA, R. T. KNIGHT AND L. C. ROBERTSON, Perceptual grouping and completion induce event-related coherence in extrastriate cortex, *Annual Meeting of the Cognitive Neuroscience Society*, New York, NY, 04/2005.

**M. A. Kramer**, E. EDWARDS, M. SOLTANI, M. S. BERGER, R. T. KNIGHT AND A. J. SZERI, Measures of linear and nonlinear interdependence of electrocorticogram time series from evoked-response potential experiments, *International Conference of the IEEE Engineering in Medicine and Biology Society*, San Francisco, CA, 09/2004.

T. C. FERREE, **M. A. Kramer**, D. MCGONIGLE AND H. W. HWA, Quantifying scaling properties of neurophysiological time series. *Notre Dame Series on Quantitative Methodology Conference and Workshop*, South Bend, IN, 05/2004.

## TEACHING & MENTORING

### **Boston University:**

Mathematical Models in the Life Sciences (MA565)	Instructor	S2008
Quantitative Ecology (BI303)	Instructor	S2007, S2008
Senior Thesis Project	Research Mentor	F2008, S2009

### **University of California, Berkeley:**

Undergraduate Bioengineering Research	Research Mentor	2004-2005
Dynamical systems software	Graduate Student Assistant	F2004

## PROFESSIONAL ASSOCIATIONS

Society for Industrial and Applied Mathematics (member)

Society for Neuroscience (member)

## SERVICE

Referee: *Journal of Neural Transmission*, *Neurobiology of Aging*, *International Journal of Neural Systems*

Boston University Entrepreneur Design Contest (Judge)

## COLLABORATORS

Nancy J. Kopell (Mathematics, BU); Eric D. Kolaczyk (Statistics, BU); Miles A. Whittington (Neuroscience, Newcastle University); Roger D. Traub (Physiology and Pharmacology, SUNY); John A. White (Bioengineering, University of Utah); Ann M. Graybiel (Neuroscience, MIT); Donald B. Katz (Psychology, Brandeis); Andrew J. Szeri (Mechanical Engineering, UCB); Robert T. Knight (Psychology, UCB); Heidi E. Kirsch (Neurology, UCSF); Mitchel S. Berger (Neurosurgery, UCSF); Maurice E. Cohen (Bioengineering, UCSF-Fresno), Donna Hudson (Bioengineering, UCSF-Fresno); James W. Sleigh (Engineering, U. Waikato, New Zealand); Fen Lei Chang (Neurology, Fort Wayne Neurological Center).