
BIOGRAPHICAL SKETCH

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|--|--|---------|---------------------|
| NAME Kiemel, Tim | POSITION TITLE Research Assistant Professor | | |
| eRA COMMONS USER NAME (credential, e.g., agency login) KIEMEL | | | |
| EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.) | | | |
| INSTITUTION AND LOCATION | DEGREE (if applicable) | YEAR(s) | FIELD OF STUDY |
| University of Minnesota | B.Math. | 1984 | Mathematics |
| Cornell University | M.S. | 1987 | Applied Mathematics |
| Cornell University | Ph.D. | 1990 | Applied Mathematics |

A. Positions

- 1984-85 **Teaching Assistant**, Cornell University.
1985-88 **NSF Graduate Fellow**, Cornell University.
1988-89 **Mathematical Science Institute (MSI) Graduate Fellow**, Cornell University.
1989 **Research Assistant**, Cornell University.
1990 **Postdoctoral Fellow**, Florida Atlantic University.
1990-92 **NSF Mathematical Sciences Postdoctoral Research Fellow**, National Institutes of Health.
1992-2004 **Research Associate**, Department of Biology, University of Maryland.
2005-present **Research Assistant Professor**, Department of Kinesiology, University of Maryland.

B. Selected peer-reviewed publications (in chronological order)

- Tim Kiemel and Philip Holmes (1987) A model for the periodic synaptic inhibition of a neuronal oscillator, *IMA Journal of Mathematics Applied in Medicine & Biology*, 4:145–169.
- Avis H. Cohen, G. Bard Ermentrout, Tim Kiemel, Nancy Kopell, Karen A. Sigvardt and Thelma L. Williams (1992) Modelling of intersegmental coordination in the lamprey central pattern generator for locomotion, *Trends in Neurosciences*, 15:434–438.
- Avis H. Cohen and Tim Kiemel (1993) Intersegmental coordination: lessons from modeling systems of coupled non-linear oscillators, *American Zoologist*, 33:54–65.
- John J. Jeka, J.A.S. Kelso and Tim Kiemel (1993) Pattern switching in human multilimb coordination dynamics, *Bulletin of Mathematical Biology*, 55:829–845.
- John J. Jeka, J.A.S. Kelso and Tim Kiemel (1993) Spontaneous transitions and symmetry: pattern dynamics in human four-limb coordination, *Human Movement Science*, 12:627–651.
- Paul Frankel and Tim Kiemel (1993) Relative phase behavior of two slowly coupled oscillators, *SIAM Journal of Applied Mathematics*, 53:1436–1446.
- Nick Mellen, Tim Kiemel and Avis H. Cohen (1995) Correlational analysis of fictive swimming in the lamprey reveals strong intersegmental connectivity, *Journal of Neurophysiology*, 73:1020–1030.
- Richard Bertram, Manish J. Butte, Tim Kiemel and Arthur Sherman (1995) Topological and phenomenological classification of bursting oscillations, *Bulletin of Mathematical Biology*, 57:413–439.
- Ranu Jung, Tim Kiemel and Avis H. Cohen (1996) Dynamical behavior of a neural network model of locomotor control in the lamprey, *Journal of Neurophysiology*, 75:1074–1086.

- Avis H. Cohen, Li Guan, Jennifer Harris, Ranu Jung and Tim Kiemel (1996) Interaction between the caudal brainstem and the lamprey central pattern generator for locomotion, *Neuroscience*, 74:1161–1173.
- Tim Kiemel, and Avis H. Cohen (1998) Estimation of Coupling Strength in Regenerated Lamprey Spinal Cords Based on a Stochastic Phase Model. *Journal of Computational Neuroscience*, 5:267–284.
- A. H. Cohen, T. Kiemel, V. Pate, J. Blinder and L. Guan (1999) Temperature can alter the functional outcome of spinal cord regeneration in larval lampreys. *Neuroscience*, 90:957–965.
- John Jeka, Kelvin Oie and Tim Kiemel (2000) Multisensory information for human postural control: Integrating touch and vision. *Experimental Brain Research*, 134:107–125.
- Li Guan, Tim Kiemel and Avis H. Cohen (2001) Impact of movement-related feedback on the lamprey central pattern for locomotion. *Journal of Experimental Biology*, 204:2361–2370.
- Tim Kiemel and Avis H. Cohen (2001) Bending the lamprey spinal cord causes a slowly-decaying increase in the frequency of fictive swimming. *Brain Research*, 900:57–64.
- Kelvin S. Oie, Tim Kiemel and John J. Jeka (2001) Human multisensory fusion: detecting nonlinearity with small changes in the sensory environment. *Neuroscience Letters*, 315:113–116.
- Kelvin S. Oie, Tim Kiemel and John J. Jeka (2002) Multisensory fusion: simultaneous re-weighting of vision and touch for the control of human posture. *Cognitive Brain Research*, 14:164–176.
- Rob Creath, Tim Kiemel, Fay Horak and John J. Jeka (2002) Limited control strategies with the loss of vestibular function. *Experimental Brain Research*, 145:323–333.
- Tim Kiemel, Kelvin S. Oie and John J. Jeka (2002) Multisensory fusion and the stochastic structure of postural sway. *Biological Cybernetics*, 87:262–277.
- Tim Kiemel, Kevin M. Gormley, Li Guan, Thelma L. Williams and Avis H. Cohen (2003) Estimating the strength and direction of functional coupling in the lamprey spinal cord. *Journal of Computational Neuroscience*, 15:233–245.
- John Jeka, Tim Kiemel, Robert Creath, Fay Horak and Robert Peterka (2004) Controlling human upright posture: velocity information is more accurate than position or acceleration. *Journal of Neurophysiology*, 92:2368–2379.
- Sean Carver, Tim Kiemel, Herman van der Kooij and John J. Jeka (2005) Comparing internal models of the dynamics of the visual environment. *Biological Cybernetics*, 92:147–163.
- Robert Creath, Tim Kiemel, Fay Horak, Robert Peterka and John Jeka (2005) A unified view of quiet and perturbed stance: simultaneous co-existing excitable modes. *Neuroscience Letters*, 377:75–80.
- Elena Ravaioli, Kelvin S. Oie, Tim Kiemel, Lorenzo Chiari and John J. Jeka (2005) Nonlinear postural control in response to visual translation. *Experimental Brain Research*, 160:450–459.
- Leslie K. Allison, Tim Kiemel and John J. Jeka (2006) Multisensory reweighting of vision and touch is intact in healthy and fall-prone older adults. *Experimental Brain Research*, 175:342–352.
- Sean Carver, Tim Kiemel and John J. Jeka (2006) Modeling the dynamics of sensory reweighting. *Biological Cybernetics*, 95:123–134.
- John Jeka, Leslie Allison, Mark Saffer, Yuanfen Zhang, Sean Carver and Tim Kiemel (2006) Sensory reweighting with translational visual stimuli in young and elderly adults: the role of state-dependent noise. *Experimental Brain Research*, 174:517–527.
- Tim Kiemel, Kelvin S. Oie and John J. Jeka (2006) The slow dynamics of postural sway are in the feedback loop. *Journal of Neurophysiology*, 95:1410–1418.
- Yuanfen Zhang, Tim Kiemel and John Jeka (2007) The influence of sensory information on two-component coordination during quiet stance. *Gait & Posture*, 26:263–271.
- Wei-Li Hsu, John P. Scholz, Gregor Schöner, John J. Jeka and Tim Kiemel (2007) Control and estimation of posture during quiet stance depends on multijoint coordination. *Journal of Neurophysiology*, 97:3024–3035.

- Bair WN, Kiemel T, Jeka JJ, Clark JE. Development of multisensory reweighting for posture control in children. *Exp Brain Res* 183:435–446, 2007.
- Saffer M, Kiemel T, Jeka J. Coherence analysis of muscle activity during quiet stance. *Exp Brain Res* 185:215–226, 2008.
- Várkonyi PL, Kiemel T, Hoffman K, Cohen AH, Holmes P. On the derivation and tuning of phase oscillator models for lamprey central pattern generators. *J Comput Neurosci* 25:245-61, 2008.
- Creath R, Kiemel T, Horak F, Jeka JJ. The role of vestibular and somatosensory systems in intersegmental control of upright stance, *J Vestib Res* 18:39-49, 2008.
- Gelman S, Ayali A, Kiemel T, Sanovich E, Cohen AH. Metamorphosis-related changes in the lateral line system of lampreys, *Petromyzon marinus*. *J Comp Physiol A* 194:945-956, 2008.
- Jeka JJ, Oie KS, Kiemel T. Asymmetric adaptation with functional advantage in human sensorimotor control. *Exp Brain Res* 191:453-463, 2008.
- Kiemel T, Elahi AJ, Jeka JJ. Identification of the plant for upright stance in humans: multiple movement patterns from a single neural strategy. *J Neurophysiol* 100:3394-3406, 2008.

C. Research Support

Ongoing Research Support

R01 NS035070 PI: John J. Jeka 7/1/1997 to 6/30/2011
NIH/NINDS

Multisensory Integration and Human Postural Control

This project is using closed-loop system identification techniques from control theory to separately identify the plant and feedback for postural control of upright stance in humans. Multiple sensory perturbations are used to identify the multi-joint plant (muscle and body); multiple mechanical perturbations are used to identify feedback (sensory feedback and the neural control strategy).

Role: Co-Investigator

R01 NS054271-01 PI: Avis H. Cohen 9/15/2005 to 5/31/2010
NIH/NINDS

An Integrated Locomotion Model for Lamprey Swimming

This project is developing an integrated model of lamprey swimming that includes the neural central pattern generator (CPG), muscle dynamics, body dynamics, fluid dynamics, and sensory feedback. The goal is to understand how the complex interactions between the body and the surrounding water are reflected in the function of the CPG, and the role that sensory feedback plays in the generation of swimming.

Role: Co-Investigator

Completed Research Support

R01 NS46065 PI: John J. Jeka 10/1/2002 to 9/31/2006
NIH/NINDS

Development of a Mechanistic Model of Multisensory Integration and Human Postural Control

We developed descriptive and mechanistic models of human postural control and multisensory integration by studying how multisensory reweighting is achieved.

Role: Co-Investigator

R01 HD42527 PI: Jane Clark

7/1/2002 to 6/31/2008

NIH

Adaptive sensorimotor control in children with DCD

This project examined the hypothesis that children with DCD have problems with the relationship between perception and action and more specifically with the ability to adapt this relationship to new environments and tasks referred to as adaptive sensorimotor control. The project combines behavioral and computational approaches to investigate this relationship in 7-year-old children with and without DCD in stable and changing sensorimotor environments.

Role: Mathematician