

Jamie Ann Johnston, Ph.D.

(last update: February 11, 2008)

Address: Faculty of Kinesiology
KNB 222
University of Calgary
2500 University Dr. N.W.
Calgary, AB
T2N 1N4
CANADA

Telephone: +1-403-220-3649
Fax: +1-403-284-3553
E-mail: johnston@kin.ucalgary.ca

Education

Doctor of Philosophy: The Pennsylvania State University
August 2003
Specialization: Kinesiology
Focus: Motor Control and Behavioral Neuroscience

Master of Science: The Pennsylvania State University
May 2000
Specialization: Kinesiology
Focus: Motor Control and Behavioral Neuroscience

Bachelor of Arts: Amherst College
May 1993
Majors: Computer Science and Psychology

Research Experience

Research Focus: Neurophysiology of human movement. Specifically, understanding hand and finger control at multiple levels of analysis (i.e., cortex-to-muscle-to-behavior) in healthy and clinical populations (e.g., Carpal Tunnel Syndrome)

Assistant Professor
2008-present
University of Calgary
Faculty of Kinesiology

Adjunct Faculty: Arizona State University, Tempe, AZ
2005-2007
Kinesiology Department
Duties: Research in the Neural Control of Movement
Laboratory - Conduct research examining
compensatory force responses to perturbations
during grasping.
Supervisor: Dr. Marco Santello, Associate Professor of
Kinesiology.

Research Associate: The Mayo Clinic Arizona, Scottsdale, AZ

- 2005-2006
Duties: Research on the behavioral consequences of Carpal Tunnel Syndrome
Supervisors: Dr. Marco Santello, Associate Professor of Kinesiology
Dr. Scott F. M. Duncan, M.D., Hand Surgeon, Mayo Clinic Arizona
- Post-Doctoral Fellow:**
2003-2005, 2007-2008
Arizona State University, Tempe, AZ
Kinesiology Department
Duties: Research in the Neural Control of Movement Laboratory - Conduct research examining the neural control and coordination of multidigit grasping. Develop algorithms using *Matlab* and *Labview* programming languages to collect and analyze intramuscular electromyography (EMG), force and torque data in the time and frequency domains.
Supervisor: Dr. Marco Santello, Associate Professor of Kinesiology.
- Graduate Assistant:**
1998 - 2003
The Pennsylvania State University, University Park, PA
Kinesiology Department
Duties: Research in the Motor Control Laboratory - Conducted research examining cortical activity using electroencephalography (EEG) associated with motor control and coordination. Developed algorithms using *Matlab* and *Labview* programming languages to collect and analyze both EEG and behavioral data in the time, frequency, and time-frequency domains.
Supervisor: Dr. Semyon Slobounov, Associate Professor of Kinesiology
- Research Assistant:**
Summers, 1999-2001
The Pennsylvania State University, University Park, PA
Psychology Department
Duties: Research Assistant in the Psychophysiology Laboratory - Conducted research examining cortical activity using EEG associated with cognition, specifically memory. Developed algorithms using *Matlab* and *Labview* programming languages to collect and analyze EEG in the time, frequency, and time-frequency domains.
Supervisor: Dr. William Ray, Professor of Psychology

Teaching Experience

- Teaching Assistant:**
1998-2003
The Pennsylvania State University, University Park, PA
Kinesiology Department
Duties: Teaching Assistant for "Psychology of Movement"

course

- Lecture: Coaching Styles, Fall 1998
- Lecture: Control Theory, Spring 2000
- Lecture: Psychology of Sport Injury, Fall 2002
- Lecture: Psychology of Sport Injury and Burnout, Spring 2003
- Lecture: Biofeedback, Spring 2003

Supervisors: Dr. Semyon Slobounov, Associate Professor of Kinesiology (1998-2002)
Dr. Danielle Symons-Downs, Assistant Professor of Kinesiology (2002-2003)

Student Mentor:
2000-2003

The Pennsylvania State University, University Park, PA
Kinesiology and Psychology Departments

Duties: Devoted approximately 40 hours a semester mentoring 8 undergraduate students in library research, conceptualization of hypotheses, experimental design, and collection and analysis of data as part of the requirements for the NASA Space Grant Fellowship.

**Computer Science
Instructor:**
1996-1998

Canterbury School, Ft. Myers, FL

Duties: **Teaching:** 6th grade Writing Lab; 7th grade Multimedia Course; 8th grade Programming; Upper School Computer Applications; Upper School Intermediate Programming
Advising: Co-advisor of 8th grade class
Coaching: Girl's Varsity Basketball (96-98); 6th grade soccer (98)
Committees: Technology Committee (96-98); Technology Integration Committee (96-98) - responsibilities included providing computer and technology instruction to teachers

Supervisor: Greg Ventre, Headmaster

**Computer Science
Instructor:**
1993-1996

Isidore Newman School, New Orleans, LA

Duties: **Teaching:** 8th grade Programming; Upper School Computer Applications; Upper School Intermediate Programming
Seminars: Abnormal Psychology (93-95); Personality Assessment (93-95)
Advising: Nine Middle School Students
Coaching: Girl's Middle School Basketball (93-96); Volleyball (94-96); Softball (94-96)
Committees: Social Committee (94-96); Middle School H.U.G. Committee (94-95, chair 95-96) - chair of the committee that chose students for character recognition
Club Sponsor: Middle School boy's computer club (93-96); girl's computer club (94-95); Upper School Community Service Activities (95-96)

Supervisor: Dale Smith, Computer Science Department Head

Scholarly Work

Manuscripts in preparation

- 1) Common input across intrinsic and extrinsic hand muscles during precision grip with changes in object's center of mass
- 2) Impairments in sensorimotor integration in patients with Carpal Tunnel Syndrome.
- 3) Coordinated activity among intrinsic and extrinsic hand muscles during precision grip with changes in extrinsic muscle length
- 4) Corrective force responses to individual digit perturbations during a three-digit grasp
- 5) Assessment of across-muscle coherence using multi-unit vs. single-unit recordings: A simulation study

Publications in refereed journals:

- Winges SA, **Johnston JA**, Santello M. Muscle-pair specific distribution and grip type modulation of neural common input to extrinsic digit flexors. *Journal of Neurophysiology*, 2006, 96(3):1258-66.
- Johnston JA**, Wings SA, Santello M. Periodic modulation of motor unit activity in extrinsic hand muscles during multidigit grasping, *Journal of Neurophysiology*, 2005, 94:206-218.
- Johnston JA**, Wings SA, Santello M. Neuromuscular determinants of force coordination during multidigit grasping. *Conf Proc IEEE Eng Med Biol Soc*, 2004, 4645-4648.
- Slobounov S., **Johnston J.**, Chiang H., Ray W. The role of sub-maximal force production in the enslaving phenomenon, *Brain Research*, 2002, 954:212-219.
- Slobounov S., **Johnston J.**, Chiang H., Rearick M., Ray W. Movement-related EEG potentials are force or end-effector dependent: evidence from a multifinger experiment, *Clinical Neurophysiology*, 2002, 113(7):1125-1135.
- Slobounov S., **Johnston J.**, Chiang H., Ray W. Motor-related cortical potentials accompanying enslaving effect in single versus combination of fingers force production tasks, *Clinical Neurophysiology*, 2002, 113(9): 1444-1453.
- Slobounov S., Chiang H., **Johnston J.**, Ray W. Modulated cortical control of individual fingers in experienced musicians: an EEG study, *Clinical Neurophysiology*, 2002, 113:2013-2024.
- Johnston J**, Rearick M, Slobounov S. Movement-related cortical potentials associated with progressive muscle fatigue in a grasping task. *Clinical Neurophysiology*, 2001,112:68-77.
- Rearick MP, **Johnston JA**, Slobounov SM. Feedback-dependent modulation of isometric force control: an EEG study in visuomotor integration, *Brain Research: Cognitive Brain Research*, 2001, 12: 117-130.
- Ray WJ, Slobounov S, Mordkoff JT, **Johnston J**, Simon RF. Rate of force development and the lateralized readiness potential. *Psychophysiology*, 2000, 37: 757-765.
- Slobounov SM, Rearick MP, Simon RF, **Johnston JA**. Movement-related potentials are task or end-effector dependent: evidence from a multifinger experiment. *Experimental Brain Research*, 2000, 135:106-116.

Book Chapters:

Johnston JA, Santello M. Multi-digit grasping and manipulation: Effect of Carpal Tunnel Syndrome on force coordination. *Sensorimotor Control of Grasping: Physiology and Pathophysiology* (Nowak DA, Hermsdorfer J, eds.; in press).

Johnston JA, Wings SA, Santello M. Neural control of hand muscles during prehension. *Progress in Motor Control* (Sternad D, ed; in press).

Dissertation:

Jamie A. Johnston. Cortical Activity Associated with Finger Tremor. Dissertation, 2003.

Abstracts:

Lisa Raleigh, **Jamie Johnston**, Marianne Merritt, Scott Duncan, Anthony Smith, Mark Ross, Marco Santello. Sensorimotor integration during multi-digit grasping in patients with Carpal Tunnel Syndrome. *Soc Neurosci Abstr* 167.15, 2007.

Jamie A. Johnston, Sara A. Wings, Marco Santello. Muscle-pair specificity of periodic common neural input to hand muscles during precision grip. *Soc Neurosci Abstr* 408.8, 2007.

Jamie A. Johnston, Sara A. Wings, Marco Santello. Modulation of the strength of periodic common neural input to hand muscles during precision grip is muscle-pair specific. *Progress in Motor Control*, 2007.

Jamie A. Johnston, Marianne Merritt, Anthony Smith, Scott Duncan, Mark Ross, Marco Santello. Impaired sensorimotor integration for multi-digit grasping in patients with Carpal Tunnel Syndrome. *Orthopaedic Research Society*, submitted, 2007.

Jamie A. Johnston, Marco Santello. Corrective force responses to perturbations to a three-digit grasp. *Soc Neurosci Abstr* 147.3, 2006.

Lisa M. Raleigh, **Jamie A. Johnston**, Marco Santello. Relations between EMG activity of intrinsic and extrinsic hand muscles as a function of wrist posture during two-digit grasping. *Soc Neurosci Abstr* 147.2, 2006.

Jamie A. Johnston, Marco Santello. Corrective responses to perturbations of force sharing patterns. *Neural Control of Movement*, Key Biscayne, FLA 2006.

J.A. Johnston, S.A. Wings, M. Santello. Periodic common input to extrinsic flexors in 2- and 5-digit grasping. *Soc Neurosci Abstr* 399.2, 2005.

Formicone G, **Johnston JA**, Hamm T, Santello M. Assessment of across-muscle coherence using multi-unit vs. single unit signals. *Soc Neurosci Abstr* 399.3, 2005.

Johnston JA, Wings SA, Santello M. Coherence of motor unit activity from hand muscles during multi-digit grasping. *Soc Neurosci Abstr* 188.13, 2004.

S.A. Wings, **J.A. Johnston**, M. Santello. Effect of grip type on the strength of common input to extrinsic finger flexors. *Soc Neurosci Abstr* 188.15, 2004.

Jamie A. Johnston, Sara A. Wings, Marco Santello. Oscillatory modulation of motor unit activity of extrinsic hand muscles during multi-digit grasping. *Neural Control of Movement*, Sitges, Spain, 2004.

Johnston J., Rearick M., Slobounov S. Movement-related cortical potentials associated with progressive muscle fatigue in a grasping task. *Society for Psychophysiological Research*, 2000.

M. Rearick, R. Simon, **J. Johnston**. Brain electrical activity associated with coordination and control during grasping. XIV Annual Graduate Research Exhibition, The Pennsylvania State University, 1999.

Poster Presentations:

- Lisa Raleigh, **Jamie Johnston**, Marianne Merritt, Scott Duncan, Anthony Smith, Mark Ross, Marco Santello. Sensorimotor integration during multi-digit grasping in patients with Carpal Tunnel Syndrome. Soc Neurosci Abstr 167.15, 2007.
- Jamie A. Johnston**, Sara A. Wings, Marco Santello. Muscle-pair specificity of periodic common neural input to hand muscles during precision grip. Soc Neurosci Abstr 408.8, 2007.
- Jamie A. Johnston**, Marco Santello. Corrective force responses to perturbations to a 3-digit grasp. Soc Neurosci Abstr 147.3, 2006.
- Jamie A. Johnston**, Marco Santello. Corrective responses to perturbations of force sharing patterns. Neural Control of Movement, Key Biscayne, FLA 2006.
- J.A. Johnston**, S.A. Wings, M. Santello. Periodic common input to extrinsic flexors in 2- and 5-digit grasping. Soc Neurosci Abstr 399.2, 2005.
- Formicone G, **Johnston JA**, Hamm T, Santello M. Assessment of across-muscle coherence using multi-unit vs. single unit signals. Soc Neurosci Abstr 399.3, 2005.
- Johnston JA**, Wings SA, Santello M. Coherence of motor unit activity from hand muscles during multi-digit grasping. Soc Neurosci Abstr 188.13, 2004.
- Jamie A. Johnston**, Sara A. Wings, Marco Santello. Oscillatory modulation of motor unit activity of extrinsic hand muscles during multi-digit grasping. The Society for the Neural Control of Movement, Sitges, Spain, 2004.
- Johnston J.**, Rearick M., Slobounov S. Movement-related cortical potentials associated with progressive muscle fatigue in a grasping task. The Pennsylvania State University Graduate Exhibition, 2001.
- Johnston J.**, Rearick M., Slobounov S. Movement-related cortical potentials associated with progressive muscle fatigue in a grasping task. Fortieth Annual Meeting of the Society of Psychophysiological Research, San Diego, 2000.
- M. Rearick, R. Simon, **J. Johnston**. Brain electrical activity associated with coordination and control during grasping. XIV Annual Graduate Research Exhibition, The Pennsylvania State University, 1999.

Invited Speaker:

- Impaired sensorimotor integration for multi-digit grasping in patients with Carpal Tunnel Syndrome. Orthopaedic Research Society Conference, Hawaii, Fall 2007.
- Neural control of the hand: Complementary approaches to understanding grip force control and coordination. Faculty of Kinesiology, University of Calgary, Spring 2007.
- Sensorimotor integration underlying hand control in patients with Carpal Tunnel Syndrome. Department of Kinesiology, Arizona State University, Spring 2007.
- Neural control of the hand: The distribution of periodic common input to motor units of hand muscles. Biomedical Engineering Department, University of Minnesota, Spring 2007.
- Neural control of the hand: Complementary research approaches to understanding a complex system. Center for Neuroscience and Neurological Recovery, Methodist Rehabilitation Center, Jackson MS, Spring 2007.
- Correlated input to hand muscle motor units during grasping. Neuroscience Symposium, Arizona State University/Barrow Neurological Institute, Fall 2006.
- Assessment of across-muscle coherence using multi-unit vs. single-unit signals. Kinesiology Department Seminar, Arizona State University, Spring 2006.
- Cortical activity associated with postural finger tremor. Kinesiology Department, Arizona State University, Spring 2003.

Cortical activity associated with postural finger tremor. National Institute of Neurological Disease and Stroke, NINDS, National Institutes of Health, Spring 2003.

Movement-related cortical potentials associated with progressive muscle fatigue in a grasping task. Psychophysiology of Movement Class, The Pennsylvania State University, Spring 2002.

Movement-related cortical potentials associated with progressive muscle fatigue in a grasping task. Action Club, The Pennsylvania State University, Spring 2002.

Signal Processing: Filter Design. Motor Control Seminar, The Pennsylvania State University, Fall 1999.

Funding

NIH RO1 (Pending):	12/1/2007 - Amount: ? Title: Sensorimotor integration underlying grasp control in Carpal Tunnel Syndrome Sponsor: ? Being reviewed by Musculoskeletal Rehabilitation Sciences Study Section [MRS] Co-PI
NRSA Fellowship:	8/1/2005-7/31/2007 Amount: \$79,272 Title: Perturbation to force sharing patterns in 5-digit grasps Sponsor: NIAMDS, NIH Individual
NASA Space Grant Fellowship:	9/1/2000-5/31/2002 Amount: \$5,000 (Stipend)
Graham Endowed Fellowship:	9/1/1998-5/31/1999 Awarded by: The Pennsylvania State University Amount: \$4,000 (Stipend)

Professional Memberships

The Society for the Neural Control of Movement, (2004, 2006)

The Society for Neuroscience, (2004 – present)

Professional Service and Volunteer Work

Ad Hoc Reviewer	Journal of Neurophysiology, 2006
Research in Engineering and Applied Science Symposium:	ASU, Tempe, AZ, 2006 Judged scientific papers.
Graduates in Earth, Life and Social Sciences Symposium:	ASU, Tempe, AZ, 2004 Judged scientific presentations.

- Pennsylvania Interscholastic Athletic Association:** State College, PA 1998-1999
Officiated girl's high school basketball games.
- AAU Club Basketball:** Ft. Myers, FL 1997-1998
Initiated the formation of new club basketball organization in Ft. Myers area as well as coached a 10-under and 12-under team.
- Vice-President: Florida High School Athletic Association:** Ft. Myers, FL 1997-1998
Responsibilities included helping to organize meetings and making award nominations to the state.
- Associated Catholic Charities of New Orleans, Inc.:** New Orleans, LA 1995
Volunteered as a Child Care Assistant at a women's shelter.