

UNIVERSITY OF IOWA CARVER COLLEGE OF MEDICINE CURRICULUM VITAE

Susanne M Morton

Sept 2010

I. EDUCATIONAL AND PROFESSIONAL HISTORY

A. INSTITUTIONS ATTENDED

1994	BS	Biology	University of Illinois, Urbana IL
1998	MS	Physical Therapy	Washington University in St Louis, St Louis MO
2003	PhD	Movement Science	Washington University in St Louis, St Louis MO
2004	Posdoc	Neurology	Johns Hopkins University, Baltimore MD

POSTGRADUATE MEDICAL EDUCATION

2003 Society for Neuroscience Annual Meeting, New Orleans
2003 Combined Sections Meeting of the APTA
2004 Society for Neuroscience Annual Meeting, San Diego
2005 Society for Neuroscience Annual Meeting, Washington DC
2006 Society for the Neural Control of Movement Annual Meeting, Key Biscayne FL
2006 Society for Neuroscience Annual Meeting, Atlanta
2007 Am Congress of Rehab Medicine / Am Society of Neurorehab Annual Meeting
2007 Society for Neuroscience Annual Meeting, San Diego
2008 The Science of Balance Rehabilitation, Scottsdale AZ
2008 Society for Neuroscience Annual Meeting, Washington DC
2009 Combined Sections Meeting of the APTA, Las Vegas
2009 Society for Neuroscience Annual Meeting, Chicago
2010 Course: The Neural Control of Movement, Karolinska Institutet, Stockholm, Sweden

LICENSURES / CERTIFICATIONS

1998- Licensed Physical Therapist, Missouri (#117770)
2004-2009 Licensed Physical Therapist, Maryland (#21147)
2009- Licensed Physical Therapist, Iowa (#004351)
2004- American Heart Association, basic lifesaving CPR and AED program

B. PROFESSIONAL AND ACADEMIC POSITIONS HELD

1998-1999	Staff Physical Therapist, full-time	Barnes-Jewish Hosp, St Louis MO
1999-2001	Staff Physical Therapist, part-time	Barnes-Jewish Hosp, St Louis MO
2004-2008	Asst Professor, non-tenure track	Dept Physical Therapy & Rehab Science Univ of Maryland School of Medicine
2005-2008	Asst Professor, secondary appt	Dept Anatomy & Neurobiology Univ of Maryland School of Medicine
2008-	Asst Professor, tenure track	Prog Physical Therapy & Rehab Science Univ of Iowa Carver College of Medicine

- C. HONORS, AWARDS, RECOGNITIONS, OUTSTANDING ACHIEVEMENTS
 2001 Patricia Leahy Award for predoctoral research, Neurology section of the APTA
 2001 Fellowship Award for predoctoral research, Recent Develop Cerebellar Research
 2002 PODS-II Scholarship Award for predoctoral research, Foundation for PT

II. **TEACHING AT THE UNIVERSITY OF IOWA**

A. TEACHING ASSIGNMENTS ON A SEMESTER BY SEMESTER BASIS

<u>Date</u>	<u>Course</u>	<u>#Stu</u>	<u>%Resp</u>	<u>Cla Hrs</u>	<u>Form</u>	<u>Role</u>
Sp 09	101:225 Neuromusc Ther	33	5	72	Lect/lab	Coordinator
Fa 09	650:270 Prin Scholarly Integ	150	5	7	Small grp	Facilitator
Fa 09	101:248 Research in PT	6	5	10	Small grp	Facilitator
Sp 10	101:225 Neuromusc Ther	35	85	70	Lect/lab	Coordinator

B. PERSONNEL SUPERVISED

POSTDOCTORAL FELLOWS

2008- Shih-Chiao Tseng, PT, PhD

PHD STUDENTS

2005- Douglas N Savin, MPT
 PhD student in Physical Rehabilitation Science (UM, Baltimore)
 Currently enrolled

2006-2008 Shih-Chiao Tseng, PT, MS
 PhD student in Physical Rehabilitation Science
 Graduated; currently postdoctoral scholar at U Iowa

DPT STUDENT RESEARCH PROJECTS SUPERVISED

2009-10 F Cummins, J Ferris, B Goos, E Muff, R Plunkett, J Stagg

UNDERGRADUATE STUDENT RESEARCH PROJECTS SUPERVISED

2009 W Williams (SROP / McNair Scholars Program)

PERSONNEL SUPERVISED

2008- A Couch, Undergraduate work-study student

2010- T Hackney, Undergraduate student, part-time research assistant

GRADUATE STUDENT COMMITTEES

2009 M Iguchi, PhD dissertation defense committee, Phys Rehab Sci, member

2009 A Littman, PhD comprehensive exam committee, Phys Rehab Sci, member

2009 P Parikh, PhD comprehensive exam committee, Integ Physiol, member

2010 K Avin, PhD comprehensive exam committee, Phys Rehab Sci, member

C. OTHER CONTRIBUTIONS TO INSTITUTIONAL PROGRAMS

DEPARTMENTAL COMMITTEES

2008- Curriculum & Instruction Committee

2008- Faculty, Staff & Student Affairs Committee

2008- Research & Development Committee

TEACHING COMMITTEES

2008 SROP / McNair's Scholars Program, summer research mentor
2009- Graduate College Scholarly Integrity Task Force II

III. SCHOLARSHIP / PROFESSIONAL PRODUCTIVITY

A. PUBLICATIONS

PEER-REVIEWED PAPERS

1. **Morton SM**, Lang CE, Bastian AJ. Inter- and intra-limb generalization of adaptation during catching. *Exp Brain Res* 141(4): 438-445, 2001.
2. **Morton SM**, Bastian AJ. Relative contributions of balance and voluntary leg coordination deficits to cerebellar gait ataxia. *J Neurophysiol* 89(4): 1844-1856, 2003.
3. **Morton SM**, Dordevic GS, Bastian AJ. Cerebellar damage produces context-dependent deficits in control of leg dynamics during obstacle avoidance. *Exp Brain Res* 156(2): 149-163, 2004.
4. **Morton SM**, Bastian AJ. Prism adaptation during walking generalizes to reaching and requires the cerebellum. *J Neurophysiol* 92(4): 2497-2509, 2004.
5. **Morton SM**, Bastian AJ. Cerebellar control of balance and locomotion. *Neuroscientist* 10(3): 247-259, 2004.
6. Mostofsky SH, Bunoski R, **Morton SM**, Goldberg M, Bastian AJ. Children with autism adapt normally during a catching task implicating the cerebellum. *Neurocase* 10(1): 60-64, 2004.
7. **Morton SM**, Bastian AJ. Cerebellar contributions to locomotor adaptations during splitbelt treadmill walking. *J Neurosci* 26(36): 9107-9116, 2006.
8. **Morton SM**, Bastian AJ. Mechanisms of cerebellar gait ataxia. *Cerebellum* 6(1): 79-86, 2007.
9. Savin DN, **Morton SM**. Asymmetric generalization between the arm and leg following prism-induced visuomotor adaptation. *Exp Brain Res* 186(1): 175-182, 2008.
10. Tseng S, Stanhope SJ, **Morton SM**. Impaired reactive stepping adjustments in older adults. *J Gerontol A Biol Sci Med Sci* 64(7): 807-815, 2009. [PMCID: PMC2691798]
11. **Morton SM**, Bastian AJ. Can rehabilitation help ataxia? *Neurol* 73(22): 1818-1819, 2009.
12. Tseng S, Stanhope SJ, **Morton SM**. Visuomotor adaptation of voluntary step initiation in older adults. *Gait Posture* 31(2): 180-184, 2010. [PMCID: PMC2818275]
13. Reisman DS, Bastian AJ, **Morton SM**. Neurophysiologic and rehabilitation insights from the split-belt and other locomotor adaptation paradigms. *Phys Ther* 90(2): 187-195, 2010. [PMCID: PMC2816031]
14. Tseng S, **Morton SM**. Impaired interlimb coordination of voluntary leg movements in post-stroke hemiparesis. *J Neurophysiol* 2010 July, 104 (1) 248-57; 2010 May 12 [Epub ahead of print]. PMCID: 2904219.
15. **Morton SM**, Tseng Y, Zackowski KM, Daline JR, Bastian AJ. Longitudinal tracking of gait and balance impairments in cerebellar disease. *Mov Disord* 2010 June 11; (in press). [Epub ahead of print] PMCID: PMC2939173
16. Harris-Love ML, **Morton SM**, Perez MA, Cohen LG. Mechanisms of training-induced reaching improvement in severely hemiparetic stroke patients. *Neurorehabil & Neural Repair* 2010 (in review).

NON-PEER-REVIEWED PAPERS

BOOKS

CHAPTERS

1. **Morton SM**, Bastian Cerebellar lesions and effects on posture, locomotion and limb movement. In: *Encyclopedia of Neuroscience*, edited by Squire LR. Elsevier Ltd. 2009, p 717-722.

ELECTRONIC PUBLICATIONS

ABSTRACTS

1. Sahrman S, Scheets P, **Morton S** Norton B. Reliability, correlation, and relationship to function of measures of "tone" in patients with hemiparesis. *CSM Phys Ther Abst* 255, 1999.
2. Scheets P, **Morton S**, Sahrman S, Norton B. Reliability, correlation, and relationship to function of measures of active motion in patients with hemiparesis. *CSM Phys Ther Abst* 256, 1999.
3. **Morton SM**, Lang CE, Bastian AJ. Intra- and inter-limb generalization of adaptation during catching. *Soc Neurosci Abst* 63.2, 2000.
4. **Morton SM**, Bastian AJ. Contributions of limb incoordination and postural control deficits to cerebellar gait ataxia. *Soc Neurosci Abst* 293.9, 2001.
5. **Morton SM**, Bastian AJ. Contributions of limb incoordination and postural control deficits to cerebellar gait ataxia. *Recent Developments in Cerebellar Research Meeting*, St. Louis MO, 2001.
6. **Morton SM**, Bastian AJ. Does cerebellar damage impair control of interaction torques during walking over obstacles? *Soc Neurosci Abst* 666.1, 2002.
7. **Morton SM**, Bastian AJ. Does cerebellar damage impair control of interaction torques during walking over obstacles? *CSM Phys Ther Abst* 2003.
8. **Morton SM**, Bastian AJ. Prism adaptation during walking generalizes to pointing and requires the cerebellum. *Soc Neurosci Abst* 822.7, 2003.
9. Kingsbury DJ, **Morton SM**, Bastian AJ. Visuomotor adaptation to prisms: features of walking that contribute to its generalization to reaching. *Soc Neurosci Abst* 415.15, 2004.
10. **Morton SM**, Bastian AJ. Cerebellar adaptation of locomotion: impaired adaptation during split-belt but not coupled treadmill locomotion. *Soc Neurosci Abst* 415.13, 2004.
11. Savin DN, **Morton SM**. Visuomotor adaptation: does the extent of generalization depend on the body part adapted? *Soc Neurosci Abst* 742, 2006.
12. **Morton SM**. Unilateral versus bilateral reciprocal ankle movements in individuals with post-stroke hemiparesis. *Soc Neurosci Abst* 557.7, 2006.
13. Tseng S-C, **Morton SM**, Stanhope SJ. Impaired reactive postural adjustments in the elderly during a visually-guided voluntary stepping task. *Soc Neurosci Abst* 81.15, 2007.
14. Harris-Love ML, Perez M, **Morton S**, Kapteyn R, Cohen L. Neural mechanisms of practice-induced improvement in functional reaching after moderate severity stroke. *ASNR/ACRM Abst*, 2008.
15. Harris-Love ML, Perez M, **Morton S**, Kapteyn R, Cohen L. Neural mechanisms of practice-induced improvements in functional reaching after moderate severity stroke. *Soc Neurosci Abst* 380.4, 2008.
16. Savin DN, Tseng S, **Morton SM**. Interlimb coupling during adaptation to a unilateral perturbation while walking: results in healthy adults and individuals with post-stroke hemiparesis. *Soc Neurosci Abst* 272.11, 2008.
17. Tseng SC, Stanhope SJ, **Morton SM**. Impaired postural adjustments to a predictable perturbation during step initiation in the elderly. *Soc Neurosci Abst* 275.17, 2008.
18. Williams WA, Tseng SC, **Morton SM**. Retention of a newly learned visuomotor adaptation. *Committee on Institutional Cooperation SROP / U Iowa McNair's Scholar's Program Conference*, 2009.
19. Tseng S, **Morton SM**. Adaptation and savings of a leg reaching visuomotor rotation task. *Soc Neurosci Abst* 369.23, 2009.

20. Cummins F, Ferris J, Goos B, Muff E, Plunkett R, Stagg J, **Morton SM**. Effects of stroke on adaptation and retention of a novel reaching task. *U Iowa Grad Program in PT & Rehab Sci Research Day*, 2010.
21. Savin DN, Tseng S, **Morton SM**. Bilateral motor adaptations in response to a unilateral leg perturbation during walking. *CSM Phys Ther Abst* 2011.

REVIEWS

OTHER

B. AREAS OF RESEARCH INTEREST AND CURRENT PROJECTS

1. Interlimb Coordination and Locomotor Impairments Following Stroke, including (a) effects of corticospinal tract lesions on human lower extremity coordination and (b) spinal versus supraspinal contributions to interlimb coordination during locomotion.
2. Mechanisms of Motor Adaptation and Motor Learning, including: (a) motor cortical versus cerebellar contributions to motor learning, (b) mechanisms of cerebellar motor adaptations and (c) using motor adaptation to enhance long-term recovery of walking post-stroke.
3. Motor Cortical Interhemiperic Effects in Health and Disease, including: the role of transcortical connections and ipsilateral motor cortical structures in bilateral leg movements in individuals with post-stroke hemiparesis.

C. PUBLISHED REVIEWS OF SCHOLARSHIP

D. GRANTS RECEIVED

1. Title *Cerebellar Control and Adaptation of Human Locomotion*
 Description This project investigates the relative roles of balance and leg coordination in gait ataxia in individuals with cerebellar dysfunction.
 Source Patricia Leahy Award for Predoctoral Research (a PODS I Award); American Physical Therapy Association, Neurology section
 Amount (dir) \$7,500
 Period 09/01/2001 – 08/31/2002
 PI Susanne M Morton, PT
 Effort 100%
 Sal Support N / A
2. Title *Cerebellar Control and Adaptation of Human Locomotion*
 Description This project investigates mechanisms of impaired locomotor adaptability in individuals with cerebellar dysfunction and gait ataxia.
 Source PODS II Award for Predoctoral Research; APTA's Foundation for Physical Therapy
 Amount (dir) \$15,000
 Period 09/01/2002 – 08/31/2003
 PI Susanne M Morton, PT
 Effort 100%
 Sal Support N / A
3. Title *Interlimb Coupling of Kinematic & Muscle Activation Patterns Poststroke*

- Description This project investigates interlimb coupling during bilateral leg movements and specifically how a unilateral perturbation drives motor behavioral changes bilaterally in persons with and without stroke and hemiparesis.
- Source Clinical Research Feasibility Funds; U Maryland School of Med GCRC
- Amount (dir) \$20,000
- Period 03/01/2005 – 02/28/2006
- PI Susanne M Morton, PT, PhD
- Effort 15%
- Sal Support 0%
4. Title *Mechanisms of Impaired Interlimb Coupling Post-stroke*
- Description This project investigates motor cortical control and interlimb coupling during bilateral leg movements following stroke. We compare coordination of bilateral vs. unilateral leg muscle activation patterns during passive, active, and isometric conditions to determine the effect of the sensorimotor state of a limb on the motor output of the opposite limb.
- Source New Investigator Intramural Award; U Maryland School of Med ORAGS
- Amount (dir) \$15,000
- Period 07/01/2005 – 06/30/2006
- PI Susanne M Morton, PT, PhD
- Effort 12.5%
- Sal Support 0%
5. Title *Task-Oriented Exercise and Robotics in Neurological Disease*
- Description The focus of the Center is to optimize functional recovery in individuals with mobility impairment due to stroke using a multi-systems approach. Studies determine, among other things, novel protocols integrating modular robotics with exercise to enhance motor learning.
- Source Center of Excellence Grant; Veterans Affairs
- Amount (dir) \$4,153,100
- Period 07/01/2005 – 06/30/2010
- PI Richard F Macko, MD and Christopher Bever, MD
- Effort 5%
- Sal Support N / A
- Role Co-investigator, Neuroplasticity Core, 07/01/2005 – 08/15/2008
6. Title *Effect of Contralateral Leg on Motor Output Post Stroke*
- Description The purpose is to determine mechanisms of bilateral leg control in individuals with post-stroke hemiparesis; specifically, to determine the effects of the sensorimotor state of one leg on the motor behavior of the opposite leg.
- Source Mentored Career Development Award (K01); NIH/NICHHD (HD-050369)
- Amount (dir) \$506,832
- Period 04/01/2006 – 03/31/2011
- PI Susanne M Morton, PT, PhD
- Effort 75%
- Sal Support 75%
7. Title *Motor adaptation: a novel method for retraining locomotion following stroke*
- Description This project examines whether individuals with stroke and hemiparesis can utilize a motor adaptation strategy to improve their gait, specifically to improve step length symmetry.

Source Research Grant; APTA Foundation for Physical Therapy
Amount (dir) \$40,000
Period 03/01/2009 – 02/28/2010
PI Susanne M Morton, PT, PhD
Effort 5%
Sal Support 5%

E. INVITED LECTURES

- 2002 “Relative contributions of leg ataxia and balance deficits to walking abnormalities in individuals with cerebellar damage”, Research Seminar, Washington University in St Louis Program in PT, St Louis MO.
- 2002 “Cerebellar ataxia: impairments of movement coordination and motor learning”, National Ataxia Foundation Maryland Chapter Meeting, Silver Spring MD.
- 2006 “Cerebellar contributions to locomotor adaptations during splitbelt treadmill walking”, Research Day Seminar, Univ of Maryland Dept PT & Rehab Science, Baltimore MD.
- 2007 “Motor adaptation, motor learning and the effects of stroke on motor learning”. Rehabilitation Service Seminar, Univ of Maryland Medical Center, Baltimore MD.
- 2007 “Cerebellar and corticospinal control of motor adaptations and interlimb coordination”, Movement Disorders Clinic Seminar, Univ of Maryland Medical Center, Baltimore MD.
- 2008 “Impaired reactive postural control in the healthy elderly”, The Science of Balance Rehabilitation: applications to prevent falls and improve postural stability in normal aging and neurologically impaired individuals, Scottsdale AZ.
- 2008 “Motor adaptation: what can short-term motor adaptations tell us about long-term motor learning?”, University of Iowa Hospitals & Clinics Rehabilitation Staff Monthly Seminar Series, Iowa City IA.
- 2010 “Cerebellar motor control”, The Neural Control of Movement Course, Karolinska Institutet, Stockholm, Sweden.

F. PENDING DECISIONS

1. Title *Acquisition and Retention of Locomotor Adaptations after Stroke*
Description The purpose is to determine mechanisms of impaired acquisition and retention of short-term locomotor adaptations in individuals with stroke and hemiparesis.
Source R21; NIH/NINDS
Amount (dir) \$275,000
Period 07/01/2010 – 06/30/2012
PI Susanne M Morton, PT, PhD
Effort 20%
Sal Support 20%

IV. **SERVICE**

A. MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS

MEMBERSHIPS, PROFESSIONAL ORGANIZATIONS OR COMMITTEES

1997- American Physical Therapy Association, Neurology & Research Sections
2000- Society for Neuroscience
2007- Foundation for Physical Therapy, Scientific Advisory Committee

MANUSCRIPT REVIEWER

2003- *Phys Ther*
2004- *IEEE Trans Neural Syst Rehabil Eng*
2004- *Exp Brain Res*
2005- *J Neurophysiol*
2005- *Arch Phys Med Rehabil*
2006- *Q J Exp Psych*
2006- *Somatosens Motor Res*
2006- *J Neurologic Phys Ther*
2007- *Percept Motor Skills Psych Res*
2008- *Exper Neurol*
2009- *Cerebellum*
2009- *J Applied Biomech*
2009- *Neurorehabil & Neural Rep*

GRANT REVIEWER

2008- Ataxia UK

B. CLINICAL ASSIGNMENTS

N / A