

COLLEGE OF MEDICINE CURRICULUM VITAE

Richard K. Shields, PhD, PT

August 2011

I. EDUCATIONAL AND PROFESSIONAL HISTORY

A. List of institutions attended (least to most recent)

(Institution, dates attended, field of study, degree obtained, date degree received.) Include: Postgraduate Medical Education and Certification and Licensure

1981 Mayo Clinic School of Physical Therapy, Rochester, Minnesota
1985 M.A. University of Iowa, Iowa City, Iowa (Physical Therapy)
1992 Ph.D. University of Iowa, Iowa City, Iowa (Exercise Science)

Post Graduate Education

Date Title/Sponsor/Location

1980 Evaluation and Treatment of Low Back Pain: Robin MacKenzie, Mayo Clinic, Rochester, MN
1981 Management of the Post-neurosurgical Brain Tumor Patient, Emphasis-Physical Therapy: University of Iowa, Iowa City, IA
1981 Low Back Pain: University of Iowa College of Medicine, Department of Orthopaedic Surgery, Iowa City, IA
1981 Physical Therapy Seminar: University of Iowa Hospitals and Clinics, Iowa City, IA
1982 Care of the Stroke Patient: Karen Kirkman, LPT, MA, University of Iowa Department of Physical Therapy, Iowa City, IA
1983 Recent Advances in Clinical Orthotics: University of Iowa Physical Therapy Education, Iowa City, IA
1983 Orthopaedic Study Group: Southeast Iowa APTA
1984 Evaluation and Treatment of the Hand: University of Iowa Department of Physical Therapy, Iowa City, IA
1984 Wheelchair Mobility, Seating and Design: University of Virginia Department of Engineering, Charlottesville, VA
1984 Evaluation and Treatment of the Clinical Spine: Dave Johnson, Iowa City, IA
1984 APTA National Convention: Neural Plasticity, Rick Difabio, PhD, Las Vegas, NV
1984 The Shoulder, Evaluation and Treatment: George Davies, APTA National Convention, Las Vegas, NV
1985 MacKenzie and Maitland Integrated Clinical Workshop of the Lumbar Spine: University of Iowa Department of Physical Therapy, Iowa City, IA
1985 APTA National Convention: Neural Basis for Movement, New Orleans, LA
1986 Ergonomics: Evaluation of the Worker: Sally Rogers, Ph.D., University of Iowa Department of Physical Therapy, Iowa City, IA
1986 APTA National Convention: Adaptive Properties of Skeletal Muscle, Chicago, IL
1987 APTA National Convention: Principles of Motor Control, San Antonio, TX
1988 APTA National Convention: Length Induced Weakness in Skeletal Muscle, Las Vegas, NV
1989 Evaluation and Treatment of Muscle Imbalances: Shirley Sahrman, University of Iowa, Iowa City, IA
1989 APTA National Convention: Neurologic Basis for Physical Therapy, Nashville, TN
1990 First Annual Post-graduate Electromyography Review Course: Department of Neurology, University of Iowa College of Medicine, Iowa City, IA
1990 APTA National Convention: Basis for Neurophysiological Treatments, Anaheim, CA
1991 Second Annual Post-graduate Electromyography Review Course: Department of Neurology, University of Iowa College of Medicine, Iowa City, IA

- 1991 APTA National Convention: Managing the Adult with Hemiplegia, Orlando, FL
1991 APTA Combined Sections Meeting: Issues in Evaluating and Treatment of SCI Patients, Boston, MA
1991 Muscle Function in Normal and Pathological States: A Research Retreat Sponsored by the APTA Section on Research, New Hampton, NH
1992 RASCH Analysis in the Development of Measurements, presented by Ben Wright, Ph.D., University of Chicago, Chicago, IL
1992 APTA National Convention: Scientific Basis of Motor Learning, Denver, CO
1992 Current Issues in Neuromuscular Therapeutics, IPTA Fall Conference, by Carl Kukulka, Ph.D., PT
1992 Society for Neuroscience International Conference: Neuroanatomical Differences Based on Gender, Anaheim, CA
1992 Outcomes, Effectiveness Research in Physical Therapy, sponsored by the APTA, Alexandria, Virginia, Oct 23-24, 1992
1993 APTA National Convention: Mechanisms of Neural Mediated Balance Disorders, Cincinnati, OH
1993 Society for Neuroscience International Conference: Decade of the Brain, Washington, DC
1994 University of Missouri, Columbia: Contemporary Issues in Motor Control.
1994 APTA National Convention: Outcomes Research for the Neurologically Impaired. Toronto, Canada
1994 Gordon Conference, Skeletal Muscle Physiology. Fatigability, Relaxation Properties, and Electromyographic Responses of the Human Paralyzed Soleus Muscle, New Hampton, NH
1994 Outcome Effectiveness Research: Development of a Database for Outcomes Research. Scottsdale, AZ.
1994 Effects of Double Pulse Activation on Torque Output in the Human Paralyzed Soleus Muscle. Society for Neuroscience, Miami, FL.
1994 Project Focus '94: White House Conference on Aging
1995 42nd Annual Meeting, American College of Sports Medicine (ACSM), Minneapolis, MN.
1995 World Congress in Physical Therapy Meeting, Washington, DC, June
1995 Multi Segmental Motor Control and Biomechanics: Research Section Retreat, New Hampton, NH
1995 Society for Neuroscience, San Diego, CA
1996 APTA National Conference, Minneapolis, MN
1996 American Physiological Society Meeting, Vancouver
1996 Society for Neuroscience, Washington, DC
1997 Society for Neuroscience, New Orleans, LA
1998 Society for Neuroscience, Los Angeles, California
1998 APTA Task Force, Alexandria, VA, "Practice Guidelines," May 11, 12, 13
1998 Neuromuscular Plasticity: APTA Research Section Retreat, Newport, RI
1999 Society for Neuroscience, Miami, FL, October 23-27
1999 Implementing the *Guide to Physical Therapist Practice* in PT Education using APTA Documentation Software, November 13, 1999, Iowa City, IA
2001 Society for Neuroscience, San Diego, CA, November 10-15, 2001
2001 APTA Combined Sections Meeting, San Antonio, TX, February 14-18, 2001
2003 APTA Combined Sections Meeting, Tampa, FL, February 12-15, 2003
2003 APTA National Conference, Washington, DC
2003- All APTA Annual Conferences, CSM, Neuroscience, and ACSM annual meetings

** Over 500 presentations since 2003 are available upon request**

Certification & Licensure

1981-pres. Iowa, Physical Therapy License #991, Annual Renewal

B. Professional and academic positions held (least to most recent) (title of position, dates of service, location or institution)

1977-79 Biology Teacher and Coach, Holy Cross High School, Riverside, NJ
1981-82 Staff Physical Therapist, Neuromuscular Division, University of Iowa Hospitals and Clinics, Iowa City, IA
1982-86 Senior Physical Therapist, Neuromuscular Division, University of Iowa Hospitals and Clinics, Iowa City, IA
1984-92 Adjunct Associate, The University of Iowa Physical Therapy Graduate Program
1986-pres Clinical Specialist and Research Coordinator, Neuromuscular Division, University of Iowa Hospitals and Clinics, Iowa City, IA
1991-pres. Director -- Clinical Measurement Laboratory, Department of Physical Therapy, University of Iowa Hospitals and Clinics, Iowa City, IA
1993-97 Assistant Professor, The University of Iowa, College of Medicine, Physical Therapy Graduate Program and University of Iowa Hospital and Clinics
1998-03 Associate Professor (Director of Graduate Studies) Graduate Program in Physical Therapy and Rehabilitation Science, Director, Motor Control and Human Performance Laboratory, Medical Education Building
2004-06 Professor Graduate Program in Physical Therapy and Rehabilitation Science; Director, Motor Control and Human Performance Laboratory, Medical Education Building
2006- Professor and Chair, Physical Therapy and Rehabilitation Science, Director, Motor Control and Human Performance Laboratory, Medical Education Building

C. Honors, Awards, Recognitions, Outstanding Achievements (least to most recent)

1989 Clinical Research Award, Iowa Chapter
1991 Clinical Research Award, Iowa Chapter
1993 Mayo Clinic Outstanding Alumnus Award
1993 Clinical Research Award, Iowa Chapter
1995 Distinguished Master's Thesis Award, Advisor
1998-02 Chair, Scientific Advisory Committee for the Foundation for Physical Therapy
2000 College of Medicine Collegiate Teaching Award
2000 Clinical Research Award, Iowa Chapter
2002 National Research Excellence Award, APTA Neurology Section
2003 Board of Trustees, 3-year appointment, Foundation for Physical Therapy Inc.
2004 NIH, Musculoskeletal Rehabilitation Panel, NICHD
2004 NIH, Expert Panel, Strategic Rehabilitation Research Plan
2004 Associate Editor, Physical Therapy
2005 Rehabilitation Research Panel, NIH Meeting (Dr.Zerhouni)
2005 Distinguished Mentor Award, Graduate College, The University of Iowa
2006 President, Foundation for Physical Therapy Inc.
2006 Senior Editor, Physical Therapy
2006 Service Award, Board of Trustees, Foundation for Physical Therapy Inc.
2006 Catherine Worthingham Fellow Award (FAPTA), APTA
2006 Patent #21087.0022uia. Neuromusculoskeletal Training System.
2009 Williams Research Award, APTA
2010 Magistro Award for Service to Research Foundation (FPT), APTA
2011 Olive Farr Distinguished Service Award, IPTA

II. TEACHING AT THE UNIVERSITY OF IOWA

A. Teaching Reviews: Overall Average: 5.94 (6 point scale); COM Teacher of the Year Award (2000); Outstanding Mentor Award (2005)

B. Teaching assignments on semester by semester basis (least to most recent) (classroom, seminar, teaching lab)

		s.h.	#	% resp.
1981-85	101:095 Rehabilitation	3	30	5
1986	101:225 Neuromuscular Therapeutics	4	30	15
1987	101:225 Neuromuscular Therapeutics	4	30	15
1988	101:225 Neuromuscular Therapeutics	4	30	15
1989	101:225 Neuromuscular Therapeutics	4	30	15
1990	101:225 Neuromuscular Therapeutics	4	30	20
1991	101:225 Neuromuscular Therapeutics	4	36	20
1992	101:225 Neuromuscular Therapeutics	4	36	20
1993	101:225 Neuromuscular Therapeutics II	4	36	100
1993	101:224 Principles of Motor Control/ Applied Neuroscience	3	36	100
1993	101:275 Sensorimotor Analysis in Pathological and Non Pathological State	3	1	100
1993	101:284 Research Practicum	1	1	100
1994	101:280 Teaching Practicum	3	1	100
1994	101:225 Neuromuscular Therapeutics II	3	36	100
1994	101:224 Principles of Motor Control/ Applied Neuroscience	3	42	100
1994	101:275 Sensorimotor Analysis in Pathological and Non Pathological State	3	3	100
1994	101:284 Research Practicum	3	2	100
1994	101:301 Thesis	2	1	100
1995	101:284 Research Practicum	3	3	100
1995	101:280 Teaching Practicum	3	3	100
1995	101:325 Independent Study	4	3	100
1995	101:224 Prin Motor Control/Appl Neurosci	3	38	100
1995	101:275 Sensorimotor Analysis in Pathological and Non Pathological States	3	3	100
1995	101:225 Neuromuscular Therapeutics	3	36	100
1995	101:301 Thesis	8	4	100
1996	101:284 Research Practicum	3	3	100
1996	101:280 Teaching Practicum	3	3	100
1996	101:325 Independent Study	4	3	100
1996	101:224 Prin Motor Control/Appl Neurosci	3	38	100
1996	101:275 Sensorimotor Analysis in Pathological and Non Pathological State	3	3	100
1997	101:225 Neuromuscular Therapeutics	3	36	100
1997	101:301 Thesis	8	4	100
1997	101:275 Sensorimotor Analysis in Pathological and Non Pathological States	3	4	100
1997	101:224 Prin Motor Control/Appl Neurosci	3	36	100
1998	101:225 Neuromuscular Therapeutics	3	36	100
1998	101:301 Thesis	8	2	100
1998	101:224 Prin Motor Control/Appl Neurosci	3	36	100
1998	101:275 Sensorimotor Analysis in Pathological and Non Pathological States	3	4	100
1999	101:225 Neuromuscular Therapeutics	3	36	100

1999	101:301 Thesis	4	2	100
1999	101:224 Prin Motor Control/Appl Neurosci	3	36	100
1999	101:275 Sensorimotor Analysis in Pathological	3	5	100
2000	101:225 Neuromuscular Therapeutics	3	36	100
2001	101:225 Neuromuscular Therapeutics	3	36	
2001	101 280 Teaching Practicum	3	1	
2001	101:325 Independent Study	3	2	
2001	101:327 Res In Phys Therapy	3	1	
2002 sp	101:214 Adv Sem Phys Therapy	3	1	100
2002 sp	101:301 Thesis	6	1	100
2002 sp	101:325 Independent Study	3	2	100
2002 su	101:301 Thesis Physical Therapy	1	1	100
2002 su	101:325 Independent Study	1	2	100
2002 f	101:224 Motor Control	3	35	100
2002 f	101:275 Sensorimotor Analysis	3	1	100
2002 f	101:301 Thesis Physical Therapy	4/3/2	3	100
2002 f	101:284 Practicum Research	3	1	100
2002 f	101:325 Independent Study	2	1	100
2002 f	101:326 Analysis of Sci Lit	3	1	100
2003 sp	101:214 Adv Sem Phys Therapy	3	1	100
2003 sp	101:301 Thesis	6	1	100
2003 sp	101:325 Independent Study	3	2	100
2003 su	101:301 Thesis Physical Therapy	1	1	100
2003 su	101:325 Independent Study	1	2	100
2003 f	101:224 Motor Control	3	35	100
2003 f	101:275 Sensorimotor Analysis	3	1	100
2003 f	101:301 Thesis Physical Therapy	4/3/2	3	100
2003 f	101:284 Practicum Research	3	1	100
2003 f	101:325 Independent Study	2	1	100
2003 f	101:326 Analysis of Sci Lit	3	1	100
2004 sp	101:325 Independent Study	1	1	100
2004 sp	101:301 Thesis Rehab Sci	2/3	4	100
2004 sp	101:284 Practicum Research	3	2	100
2004 sp	101:214 Adv Sem Phys Therapy	1	1	100
2004 sp	101:327 Res in Rehab Science	2/4	2	
2004 su	101:301 Thesis Rehab Sci	2	1	100
2004 su	101:284 Practicum Research	3	1	100
2004 fa	101:224 Prin of Mtr Control & App Neurosci	4	33	100
2004 fa	101:275 Analysis Sensori-Mtr Sys in Hlth Dis	1/4/3	4	
2004 fa	101:284 Practicum in Research	3	2	
2004 fa	101:301 Thesis Rehab Science	2/1/4	4	
2004 fa	101:325 Independent Study	2/3	3	
2004 fa	101:280 Teaching Practicum	2	1	
2005 sp	101:301 Thesis Rehab Science	3	2	100
2005 sp	101:327 Research in Rehab Science	2	1	100
2005 sp	101:325 Independent Study	2	1	100
2005 sp	101:214 Advanced Seminar in Rehab	3	3	100
2005 su	101:301 Thesis Rehabilitation Science	2	3	100
2005 su	101:325 Independent Study	2	1	100
2005 fa	101:224 Prin of Mtr Control & Appl Neurosci	4	60	100
2005 fa	101:275 Analysis Sensori-Mtr Sys in Hlth Dis	4	60	100
2005 fa	101:301 Thesis Rehabilitation Science	1/3/9	4	100

2005 fa	101:325	Independent Study	3	1	100	
2005 fa	101:326	Scientific Writing in Rehab Science		3	1	100
2005 fa	101:280	Teaching Practicum	3	1	100	
2006 sp	101:214	Advanced Seminar in Rehab Science	3	2	100	
2006 sp	101:284	Practicum in Research	1-3	2	100	
2006 sp	101:301	Thesis Rehabilitation Science	3	1	100	
2006 sp	101:325	Independent Study	3-4	2	100	
2006 sp	101:327	Research in Rehab Science	1	1	100	
2006 fa	101:224	Prin Mtr Control & Appl Neuroscience	4	60	100	
2007 sp	101:280	Teaching Practicum	3	1	100	
2007 sp	101:301	Thesis Rehabilitation Science	2/4/2	3	100	
2007 sp	101:327	Research in Rehabilitation Science	3	1	100	
2007 su	101:280	Teaching Practicum	3	1	100	
2007 fa	101:214	Advanced Seminar in Rehabilitation Sci	3	1	100	
2007 fa	101:224	Principles of Motor Control	4	60	100	
2007 fa	101:301	Thesis Rehab Science	4/3	2	100	
2007 fa	101:275	Analysis Sensori-Mtr Sys in Hlth Dis	3	60	100	
2007 fa	101:325	Independent Study	2	1	100	
2007 fa	101:248	Research Physical Therapy	2	36	3%	
2008 sp	101:284	Practicum in Research	3	1	100	
2008 sp	101:301	Thesis Rehabilitation Science	1/2	2	100	
2008 sp	101:325	Independent Study	1	1	100	
2008 fa	101:224	Principles of Motor Control	4	60	100	
2008 fa	101:275	Analysis Sensori-Motor Sys in Hlth Dis	3	60	100	
2009 sp	101:301	Thesis Rehab Science	1-2	3	100	
2009 sp	101:284	Practicum in Research	2-3	2	100	
2009 su	101:176	Pharmacology for PT	3	36	50%	
2009 fa	101:224	Prin Motor Control & Appl Neuroscience	4	60	100%	
2009 fa	101:275	Analysis Sensori-Motor Sys in Hlth Dis	3	60	100%	
2009 fa	101:301	Thesis Rehab Science	4	1	100%	
2009 fa	101:248	Research in PT	2	36	3%	
2010 sp	101:301	Thesis Rehabilitation Science	4	1	100%	
2010 fa	101:224	Principles of Motor Control	4	60	100%	
2010 fa	101:275	Analysis Sensori-Mtr Sys in Hlth Dis	3	60	100%	
2010 fa	101:301	Thesis Rehab Science	1	1	100%	
2010 fa	101:325	Independent Study	3	2	100%	
2010 fa	101:248	Research in PT	2	36	3%	
2011 sp	101:284	Practicum in Research	4	1	100%	
2011 sp	101:301	Thesis Rehab Science	4	1	100%	

2011 fa	101:224 Principles of Motor Control	4	37	100%
2011 fa	101:275 Analysis Sensori-Mtr Sys in Hlth Dis	3	4	100%
2011 fa	101:280 Teaching Practicum	1	1	100%
2011 fa	101:301 Thesis Rehab Science	1	1	100%
2011 fa	101:327 Research in Rehab Science	2/4	2	100%

(clinical teaching year, weeks/year or hours/week)

<i>Year</i>	<i>Where Teaching Occurred</i>	<i>Wks/Yr</i>	<i>Hrs/Wk</i>
1982-84	Physical Therapy Seminar, University of Iowa Hospitals, Iowa City, IA	1	1
1982-pres	UIHC Neurosurgeons' Conference, University of Iowa Hospitals, Iowa City, IA	1	2
1982-pres	Lecture Series for Physical Therapist Interns, University of Iowa Hospitals, Iowa City, IA	5	1
1982-pres	Neurosurgery Nursing Clinical Education, University of Iowa Hospitals, Iowa City, IA	4	2
1985	Physical Therapy Graduate School Seminar, University of Iowa, Iowa City, IA	1	1
1986	Physical Therapy Seminar, UIHC	1	1
1987	Physical Therapy Seminar, UIHC	1	1
1988	Physical Therapy Seminar, UIHC	1	1
1989	Physical Therapy Seminar, UIHC	1	1
1990	Neurosurgical Nursing, UIHC	1	1
1991	Neurobiology of Paralyzed Muscle, UIHC	2	2
1992	Histochemical/Ultrastructural Properties of Paralyzed Muscle, UIHC	1	2
1992	Reliability, Validity, and Responsiveness of Functional Tests for Individuals with Total Joint Replacement, UIHC	1	1
1993	Fatigue Properties of the Human Paralyzed Soleus Muscle, UIHC	1	1
1993	Plasticity of Human Paralyzed Muscle, St. Luke's Hospital	1	1
1994	Effects of Reduced Activity on Human Skeletal Muscle, UIHC	1	1
1995	Pressure Sore Prevention in Acute SCI, Grand Rounds, Department of Neurosurgery	1	1
1996	Physiological Properties of Paralyzed Muscle, Department of Neurosurgery	1	1
1996	Plasticity of Skeletal Muscle, Department of Neurology	1	1
1996	Bone Demineralization Following Paralysis in Humans, Multipurpose Arthritis Center	1	1
1997	CRC Noon Seminar — Health Related Quality Of Life	1	1
1998	CRC Noon Seminar — Physiological Properties of Paralyzed Muscle	1	1
1999	Neuromusculoskeletal Changes after Paralysis UIHC Noon Seminar	1	1
2000	Neuromusculoskeletal Changes after Paralysis UIHC Noon Seminar	1	1
2001	Neurosurgery Conference-Neuroplasticity after SCI	1	1
2002	Adaptive Changes After SCI, UIHC noon seminar	1	1
2003	Innovative Method to Tx Individuals with SCI UIHC Noon Seminar	1	1
2004	Outcomes Research in Rehabilitation	1	1
2005	Motor Control Principles: Responses Before Reaction Time		
2005	Past, Present, Future of SCI Management	1	1

- 2007 UIHC Noon Seminar
2008 UIHC NOON SEMINAR
2009 UIHC noon seminar
2010 UIHC Noon Seminar
C. **Advanced Graduate students supervised (not entry level DPT students)
(name, degree objective, outcome)**

Theses mentored since 1994 appointment

Advanced Master's Degrees

- Chang Ya Ju: Effect of Variable Frequency Train versus Constant Frequency Train Electrical Stimulation on Torque Produced by the Human Paralyzed Soleus Muscle, July 1995. (MA)
Casey K: Effect of Double Pulse Stimulation on Torque Before and After Fatigue of the Human Paralyzed Soleus Muscle, May 1995. (MA)
Enloe, Lori: Relationship Between the Dizziness Handicap Inventory and the Short Form Health Survey in Patients with Vestibular Dysfunction, May 1996. (MA)
Ruhland, Janet: Efficacy of Physical Therapy on Health-Related Quality of Life in Patients with Chronic Demyelinating Polyneuropathy, May 1996. (MA)
Littmann, Andrew: Tetanic Potentiation During Fatigue and Recovery In The Paralyzed Soleus Muscle in Humans, May 1998. (MA)
Madhavan, Sangeetha: Influence of Age on Dynamic Position Sense: Evidence using a Sequential Movement Task., 2003 (MA)
McHenry, Colleen: Biomechanical Analysis of SLR and STANCE in SCI, 2010. (MA)

Doctoral Degrees

- Heiss, Deborah: Effects of Expected versus Unexpected Loads during Lifting, July 1997. (PhD)
Messaros, Andrew: Concentric versus Eccentric Contractions: Effect on Central and Peripheral Mechanisms of Muscle Fatigue, February 1998. (PhD)
Chang, Ya-Ju: Neuromuscular Propagation during Fatigue and Recovery of Paralyzed Muscle, June 1999. (PhD)
Schindler-Ivens, Sheila: H-Reflex Changes After SCI, December 2001. (PhD)
Frey-Law, Laura: Comparison of three mathematical models of trained and untrained paralyzed muscle 2004. (PhD)
Ballantyne, Bryon: Neuromuscular Control of Knee 2005 (PhD)
Deshpande, Preeti: Spinal Cord Physiology 2007 (PhD)
Madhavan, Sangeetha: Neuromuscular Control 2007 (PhD)
Eppen, Kim: Pulmonary Rehab (PhD)
Riley, Nora: Vestibular Physiology (PhD)
Iguchi, Masaki: Muscle Fatigue and Heat Stress (PhD)
Dudley-Javoroski: Bone, SCI, muscle physiology (PhD)
Littmann, AE: Motor Learning (PhD post comps)
Shaffer, Mike: Neuromuscular Control (ACL) (PhD pre comps)
McHenry, Colleen: Musculoskeletal Plasticity (PhD pre comps)

MA Thesis Committees (Member-in addition to advisees)

- Quaney, Barbara: The Effect of Callus Removal on Plantar Pressure Distribution in the Forefoot, December 1993 (MA)
Ludewig, Paula: The Effect of Head Position on Scapular Rotation and Muscle Activity during Shoulder Elevation, June 20, 1994 (MA)
Werremeyer, Mary: The Control of Hand Grip following Perturbation, May 1994 (MA)

Houck, Jeff: Three-Dimensional Analysis of Head Position on Elderly and Young Adults with and without a History of Neck Pain, May 1996 (MA)
Elokda, Ahmed: Effects of E-Stim on Blood Pressure in Patients with Spinal Cord Injury, November 1997 (MA)
Riley, Nora: Neuromuscular Mechanisms of Fatigue After CVA, August 1998 (MA)
Gaitonde, Shreela: Neuromuscular Fatigue Mechanisms in the Elderly, May 1999 (MA)
Chandran, Prasant: Pain Mechanisms with TENS, 2002 (MA)
Bartelt, Robert: Changes in Illusory Background Display At Movement Initiation Affect Prehension Kinematics And Grasp Dynamics, 2003 (MA)
Iguchi, Masaki: The Effect of Central Drive on Fatigue-Induced Unsteadiness, 2004 (MA)

Ph.D. Thesis Committees (Member-in addition to advisees)

Charmornnarumit, Chitanongk: Cutaneous Effects on Reciprocal Inhibition of the Soleus Muscle, May 1993 (PhD)
Rosecrance, John: The Use of Provocation for the Detection of Abnormal Nerve Conduction in Carpal Tunnel Syndrome, May 1993 (PhD)
Wei, Shun-Hwa: Biomechanical Comparison of Dynamically Resisted Knee Extension, Resisted Knee Flexion, and the Leg Press, April 1994 (PhD)
McQuade, Kevin: Three-Dimensional Analysis of Shoulder Elevation During Fatigue, May 1994 (PhD)
Kelly, Mitch: Effects of Visual and Auditory Disturbance on Learning: A spatial Task, August 1995 (PhD)
Butler, Andy: Sensory Motor Transformations in Patients with Cerebellar Lesions During a Reaching Task, September 1995 (PhD)
Johnson, David: Effects of Disability as a Risk for Secondary Injury in Farmers, November, 1996 (PhD)
Pizzimenti, Mark: Control of Serial Pointing Movements, July 1998 (PhD)
Chang, Ann: Effects of Fatigue on Speech, July 1998 (PhD)
Ogard, Bill: Effects of Proprioception on Knee Kinematics. May 2000 (PhD)
Cuddeford, Tyler: Effects of Patello-femoral pain on Knee Kinematics in Runners. July 2000 (PhD)
Quaney, Barb: The characteristics of memory for anticipatory control of precision grip. July 2002 (PhD)
Elokda, Ahmed: Effects of Exercise on Anti-Oxidants, December 2003 (PhD)
Eichelberger, Tammy: Effect of age on muscle fatigue, August 2005 (PhD)
Rao, Smita: Ankle stiffness and diabetes, Feb 2005 (PhD)
Hung, You-jou: Shoulder position sense and kinesthetically guided reaching accuracy in individuals with anterior shoulder instability, December 2008 (PhD)
Chandran, Mouli: 2009(PhD)
Peterson, Clay: 2009(PhD)
Avin, Keith: (PhD)
Joanna Clair (University of Alberta, Edmonton, Canada: August 2010 (PhD)

Ph.D. Comprehensive Exam Committees

Heiss, Deborah: Motor Control Issues with Lifting (Chair), 1997
Messaros, Andrew: Effects of Lengthening Versus Shortening Contractions on Fatigue (Chair), 1996
Chang, Ya-Ju: Neuromuscular Propagation during Fatigue of Paralyzed Muscle (Chair), 1998
Schindler-Ivens: H-Reflex Properties during acute and chronic spinal cord injury (Chair), 1999

Ogard, Bill: Proprioception in ACL Deficient Knees, 1997
Quaney Barb: Procedural and Declarative Learning, 2000
Frey-Law, Laura: Bone density and vibration in SCI August, 2002
Elokda, Ahmed: Effects of Exercise on Anti-Oxidants in Individuals with Heart Disease
2002
Nielsen, Kim: Effects of PR on COPD, 2002
Yo Jo Hung: Effects of Proprioception on Unstable Shoulders, 2002
Rao, Smita: Diabetes and Gait, 2003
Tammy Eichelberger: Fatigue Mechanisms 2004
Ballantyne, Bryon: Motor Control of Lumbar Movements, (Chair) 2004
Madhavan, Sangeetha: Central Set and Neuromuscular Control (Chair) 2005
Riley, Nora: Neuromuscular Control and Vestibular Loss (Chair) 2005
Deshpande, Preeti: Fatigue and Pre-synaptic Inhibitory Mechanisms (Chair) 2005
Peterson, Clay: Rate of force development and motor cortex plasticity 2006
Iguchi, Masaki: Effects of active-resistive training on spasticity after SCI 2006
Krishnan, Chandramouli: ACL 2007
Avin, Keith: 2010
Littman, Andy: 2010

Graduate Student Support (Other than Block Allocation from Graduate College)

Messaros, AJ: NIDRR \$100,000 (PhD)
Heiss, D: NIDRR \$60,000 (PhD)
Ruhland, J: NIH – Geriatric Nursing Award \$5,000 (MA)
Enloe, L: Foundation CRC Grant \$20,000 (MA)
Schindler-Ivens, S: Foundation for Physical Therapy – PODS I Award \$7,500, PODS II
Award \$15,000, PODS II Award \$15,000, NIH Spinal Cord Research
Foundation \$10,000 (PhD)
Frey Law, L: Presidential Scholarship \$60,000, Foundation for Physical Therapy
McMillan Award \$5,000, PODS I Award \$7,500, PODS II Award \$15,000,
Carver Foundation \$5,000
Dudley-Javoroski, S: Foundation for Physical Therapy McMillan Award \$5,000, NIH
support \$80,000, Reeve Foundation Support \$50,000
Littmann AL: McMillan \$5000, PODS I \$7,500

Total: \$470,000 independent graduate student support

C. (Institutional/Departmental conferences, Committees, grand rounds, journal clubs)

- 1981 "Thoracic Outlet Syndrome: Evaluation and Treatment," University of Iowa, Iowa City, IA
- 1981 "Management of the Postneurosurgical Brain Tumor Patient," University of Iowa Hospitals, Department of Physical Therapy, Iowa City, IA
- 1982 "Acute Care of the Quadriplegic," University of Iowa College of Nursing, Iowa City, IA
- 1982 "Spinal Cord Injury: Effect of Acute Care in Rehabilitation," Neurosurgery/Neurology Conference, University of Iowa, Department of Neurosurgery, Iowa City, IA
- 1983 "Care of the Stroke Patient," University of Iowa Hospitals, Department of Physical Therapy, Iowa City, IA
- 1983 "Disability and the Spinal Cord Injured," Pilot Parents of Southeast Iowa, Burlington, IA
- 1983 "Continuous Rotation in the Management of Acute Cervical Spine Fracture," APTA National Convention, Las Vegas, NV
- 1983 "Rehabilitation of the Quadriplegic Patient," Iowa, Department of Neurosurgery, Iowa City, IA
- 1984 "Mechanisms of Injury and Acute Management of Spinal Cord Injuries," Iowa Chapter APTA, Cedar Rapids, IA

- 1984 "Evaluation of the Thoracic Outlet Syndrome," Southeast Iowa Musculoskeletal Study Group, Iowa City, IA
- 1984 "Care of the Quadriplegic Hand," University of Iowa, Iowa City, IA
- 1985 "Evaluation and Treatment of the Spinal Cord Injured: Acute Care and Long-term Rehab," Iowa Chapter APTA, Iowa City, IA
- 1985 "Sitting Postures and the Disabled," Neurosurgery/Neurology Conference, University of Iowa, Iowa City, IA
- 1985 "Ischiobarograph: Clinical Device to Prevent Pressure Sores," APTA National Convention, New Orleans, LA
- 1986 "Effect of a Lumbar Support on Seated Buttock Pressure," APTA National Convention, Chicago, IL
- 1986 "Effect of Sitting Posture on Pressure Distribution," Rehab Engineering Society of North America, Minneapolis, MN
- 1986 "Research on Pressure Distribution in Spinal Cord Injured Patients," Hospital School Seating and Mobility Conference, Iowa City, IA
- 1986 "Wheelchair Posture and Its Effects on Pressure," Philadelphia College of Pharmacy and Science, Philadelphia, PA
- 1987 "Seating Systems for the Disabled," Visiting Nurses' Association, Iowa City, IA
- 1987 "Effect of Lumbar Support and Seat Angle on Ischial Tuberosity Pressure," APTA National Convention, San Antonio, TX
- 1987 "Seat Angle and Lumbar Support - Effect on Seated Pressure," Rehab Engineering Society National Meeting, San Jose, CA
- 1988 "Pressure Sore Prevention Program," Robert Wood Johnson Foundation, San Antonio, TX
- 1988 "Effect of Lumbar Support Size on Pelvic Tilt and Seated Pressure," APTA National Convention, Las Vegas, NV
- 1988 "Reducing Work Injury and Illness Through Ergonomics," University of Iowa College of Medicine, Iowa City, IA
- 1989 "EMG Analysis of Abdominal Muscles During SLR and Curl Exercise," APTA National Convention, Nashville, TN
- 1990 "Reducing Work Injury and Illness Through Ergonomics," University of Iowa College of Medicine, Iowa City, IA
- 1990 "Inter-rater Reliability of the Standing Test in Neurologically Impaired Patients," APTA National Convention, Anaheim, CA
- 1991 "Lumbar Support Thickness: Effect on Seated Buttock Pressure in Individuals with and without Spinal Cord Injury," APTA Combined Sections Meeting, Orlando, FL
- 1991 "Electromechanical Properties of the Human Paralyzed Triceps Surae," APTA National Convention, Boston, MA
- 1992 "Reliability/Validity of Functional Tests for the Assessment of Individuals with Total Joint Replacement. APTA National Convention, Denver, CO, June 1992
- 1992 "Fatigability, Relaxation Properties, and Electromyographic Response of the Human Paralyzed Soleus Muscle", Society for Neuroscience, Anaheim, CA
- 1992 "Development of Functional Measures for Patients with Total Hip Arthroplasty," Evaluating and Treating the Arthritic Hip, December 12-13, 1992, The University of Iowa, Iowa City, IA
- 1992 "Outcome Assessment Research for Physical and Occupational Therapists," American Society for Hand Therapists/Surgeons, Phoenix, AZ
- 1993 "Histochemical Properties of Human Paralyzed Muscle," APTA National Convention, Cincinnati, OH
- 1993 "Effects of Electrically Induced Fatigue on the Twitch and Tetanic Contractile Properties of the Human Paralyzed Soleus Muscle," Society for Neuroscience, Washington, D.C.
- 1993 "Development of Quality Outcome Measures for Clinical Research," American Society of Hand Therapy, Kansas City, MO
- 1994 "Clinical Research Center Annual Report," Foundation Board of Trustees, Combined Sections Meeting, New Orleans, LA

- 1994 "Reliability of the Quality of Well Being Test in Patients with Total Hip Replacement," APTA National Convention, Toronto, Canada, June 4-9, 1994.
- 1994 "Effect of Double Pulse Activations on Human Paralyzed Muscle after Fatigue." Society for Neuroscience, Miami, FL
- 1994 "Plasticity of Human Paralyzed Muscle." Gordon Conference on Muscle Physiology, Sponsored by Research Section of the APTA, New Hampton, NH
- 1994 "Project Focus: Prioritizing Funding for Rehabilitation of the Elderly." P.T. Foundation, Alexandria, VA
- 1994 "Outcomes Oriented Approach to Managing your Physical Therapy Practice," Scottsdale, AZ (Oct 21-22, 1994)
- 1995 "Effect of a Variable Frequency Train versus Constant Frequency Train on Torque of the Human Paralyzed Soleus Muscle," Society for Neuroscience, San Diego, CA (Nov)
- 1995 "Low Frequency Fatigue in Human Paralyzed Muscle." World Confederation of Physical Therapy, Washington, DC (July)
- 1995 "An Outcomes Oriented Approach to Physical Therapy Practice," Boston, MA (July)
- 1995 "Developing a Clinical Practice Database for Outcomes Research," University of Alabama (March)
- 1995 "Selected Neuromuscular and Musculoskeletal Principles of Clinical Practice: Helping to Establish a Scientific Foundation for Physical Therapy." Wisconsin Physical Therapy Association, Fall Conference, October 19-21
- 1996 "Physiological Properties of Human Paralyzed Muscle: Case Western Reserve Research Symposium," Invited Speaker, May 13-15.
- 1996 "Effects of Concentric and Eccentric Exercise on Low Frequency Fatigue, Peak Torque, and Muscle Soreness." Integrative Muscle Biology Meeting sponsored by the American Physiological Society, Vancouver, October 14-17.
- 1996 "Optimizing Paralyzed Muscle Force through Adaptive Control." Society for Neuroscience, Washington, DC, November 17-20.
- 1997 "Management of Osteoarthritic Hip." APTA National Meeting, San Diego, CA, June 14-18.
- 1997 "Physiological Properties of Human Paralyzed Muscle." Boston University (June) and University of Alabama, Birmingham (July)
- 1997 "Kinesiologic and Clinical Issues Pertaining to the Patient with a Prosthetic Hip," Alumni Continuing Education Course, Iowa City, IA (September)
- 1997 "Torque Potentiation After Fatigue of the Human Paralyzed Soleus Muscle," Society for Neuroscience, New Orleans, Nov 18-22.
- 1997 "Effects of Concentric/Eccentric Exercise of the Elbow Flexors on Low Frequency and Central Fatigue. International Society of Electromyography and Kinesiology, Montreal, Canada, June 25-28.
- 1998 "H-reflex suppression after spinal cord injury," Society for Neuroscience, Los Angeles, Calif.
- 1999 "Effects of Training of H-reflexes, muscle torque and endurance," Society for Neuroscience, Miami, Florida.
- 2000 "Effects of Variable Frequency Trains on Torque in Individuals with Paralysis," Society for Neuroscience, New Orleans.
- 2001 "Effects of Fatigue on H-Reflex Suppression in Individuals Without Paralysis," APTA National Conference, Anaheim, CA, June
- 2001 "Mathematical Model of Stance in Individuals with Spinal Cord Injury," American Society for Biomechanics, San Diego, CA, Aug.
- 2001 "Training Paralyzed Muscle" Society for Neuroscience, San Diego, CA, November.
- 2001 Paired Pulse Activation of Human Paralyzed Muscle, Society for Neuroscience, San Diego, CA, November
- 2001 "Musculoskeletal Plasticity After SCI," Neurosurgery Research Conference, The University of Iowa, Dec. 17.
- 2005 Paradigm Shift in Treatment of Individuals with Complete SCI, 3rd Annual Physical Medicine & Rehabilitation Conference: Spine Injury, Pain, & Rehabilitation, Dept. of

Orthopaedic & Rehabilitation, Iowa Spine Research and Rehabilitation Center, The University of Iowa, Iowa City, IA, April, 2005.

2005- (Over 500 presentations are available upon request)

(Departmental and College Committees)

<i>Year</i>	<i>Committee</i>	<i>Hrs/Year</i>
1986	MPT Admissions Committee	75 hrs/year
1987	MPT Admissions Committee	75 hrs/year
1988	MPT Admissions Committee	75 hrs/year
1991	Standards of Practice Committee, UIHC	25 hrs/year
1993	CRC committee, UIHC	25 hrs/year
1994	Chair, Search Committee (Dr. Sluka)	75 hrs/year
1994-	Chair, PhD Program Committee	75 hrs/year
1994-	Faculty Committee	150 hrs/year
1999	Chair, Promotion and Tenure Committee (Dr. Yack – Associate Professor)	
2000	Chair, Promotion and Tenure Committee (Dr. Sluka – Associate Professor)	
2001	Chair, Promotion and Tenure Committee (Dr. Bilodeau – Associate Professor)	
2002	Chair, Promotion and Tenure Committee (Dr. Hartsell – Associate Professor)	
2002	Chair, Search Committee (Dr. Williams)	75 hrs/year
2004	Chair, Search Committee – (Dr. Maluf)	75 hrs/year
2005	Chair, Promotion and Tenure Committee (Dr. Sluka – Professor)	
2005	Chair, Departmental Review Committee (PA Program)	50 hrs/year

(Student Advising)

<i>Year</i>	<i>#</i>	<i>MPT Students</i>	<i>MA & PhD Students</i>	<i># Exercise Science - Honor Students</i>
1992	5	50 hrs/year--	--	--
1993	5	50 hrs/year3	100 hrs/year	--
1994	6	100 hrs/year	6 PhD	200 hrs/year
1995	6	100 hrs/year	6 PhD	200 hrs/year
1996	5	100 hrs/year	5 PhD	300 hrs/year
1997	5	100 hrs/year	1 MA 4 PhD	250 hrs/year
1998	5	100 hrs/year	1 MA 4 PhD	300 hrs/year
1999	5	100 hrs/year	3 PhD	300 hrs/year
2000	5	100 hrs/year	3 PhD	300 hrs/year
2001	5	100 hrs/year	1 MA 3 PhD	300 hrs/year
2002	5	100 hrs/year	1 MA 3 PhD	300 hrs/year
2003	5	100 hrs/year	1 MA 5 PhD	500 hrs/year
2004	10	100 hrs/year	7 PhD	500 hrs/year
2005	5	100 hrs/year	7 PhD	500 hrs/year
2006	5	100 hrs/year	7 PhD	500 hrs/year
2007	5	100 hrs/year	7 PhD	500 hrs/year
2008	5	100 hrs/year	7 PhD	500 hrs/year
2009	5	100 hrs/year	7 PhD	500 hrs/year
2010	5	100 hrs/year	7 PhD	500 hrs/year
2011	5	100 hrs/year	7 PhD	500 hrs/year

D. Course materials (syllabi, instructional web pages, computer lab materials)

- 1987 Developed VHS tape demonstrating to patients and students the effect of posture on sitting pressure.
- 1993 Developed clinical educational tapes depicting selected gait problems in patients with neurological impairment.
- 1996 Developed a teaching videotape entitled "Motor Control Principles: From Muscle to Brain."
- 2001 PowerPoint and Web Based Program, "Sensorimotor Analysis in Health and Disease.
- 2001 Syllabi, lectures, course readings are all web based.
- 2005 CD and Web Based lecture/lab on movement after brain tumor.
- 2010 Web Based Course in Movement Control and Human Performance

III. SCHOLARSHIP

A. Patents, Publications, or creative works (least to most recent)

(Inventions and patents)

Neuromusculoskeletal Wheelchair Training System for paralyzed individuals. (Patent # 21087.0022UIA).

Neuromuscular Control System to train volitional resistive and perturbation control strategies after various knee or limb pathologies (Patent # 21087.0022UIB).

B. (peer-reviewed scientific papers)

1. **Shields RK**, Cook T. Effect of lumbar support and seat angle on seated buttock pressure. *Phys Ther* 1988 Nov; 68 (11):1682-1686 PMID: 3186795.
2. Somers V, Leo K, **Shields RK**, Clay M, Mark A. Forearm endurance training attenuates the sympathetic nerve response to isometric handgrip in humans. *J Appl Physiol* 1992; 72(3):1039-43
3. Yuh W, Fisher D, **Shields RK**, Ehrhardt J, Shellock F. Phantom limb pain induced in an amputee by strong magnetic fields. *J Magn Reson Imaging* 1992 Mar-Apr; 2 (2): 221-223 PMID: 1562774.
4. **Shields RK**, Cook T. Lumbar support thickness: effect on seated buttock pressure in individuals with and without spinal cord injury. *Phys Ther* 1992 Mar; 72 (3), 218-226 PMID: 1584855.
5. **Shields RK**, Leo K, Dostal W, Miller B, Barr R. An acute care physical therapy clinical practice data base for outcomes research. *Phys Ther* 1994 May; 74 (5): 463-470 PMID: 8171108.
6. **Shields RK**, Invited Commentary: Pain and stiffness reliability in clinical manual lumbar spine examination. *Phys Ther* 1994; 74:809-810
7. **Shields RK**, Enloe LJ, Evans RE, Smith KB, Steckel SD. Reliability, validity, and responsiveness of functional tests in patients with total joint replacement. *Phys Ther* 1995 Mar; 75 (3):169-179; discussion 176-9 PMID: 7870749.
8. **Shields RK**, Invited Commentary: Reliability, validity, and responsiveness of functional tests in patients with total joint replacement. *Phys Ther* 1995; 75(3):178-179

9. **Shields RK.** Fatigability, relaxation properties, and electromyographic responses of the human paralyzed soleus muscle. *J Neurophysiol* 1995 June; 73(6):2195-2206 PMID: 7666132.
10. Enloe L, **Shields RK**, Leo KC, Miller B, Smith K. Total hip and knee replacement treatment programs: A report using consensus of experts. *J Orthop Sports Phys Ther* 1996; 23 (1): 3-11 PMID: 8749744.
11. **Shields RK**, Chang YJ. Effects of fatigue on the torque frequency curve in the human paralyzed soleus muscle. *J Electromyogr Kinesiol* 1997 Mar; 7 (1): 3-13 PMID: 20719687.
12. **Shields RK**, Law LF, Reiling B, Sass K, Wilwert J. Effects of electrically induced fatigue on the twitch and tetanus of paralyzed soleus muscle in humans. *J Appl Physiol*, 1997 May; 82 (5): 1499-507 PMID: 9134899.
13. **Shields RK**, Heiss DG. An electromyographic comparison of abdominal muscle synergies during curl and double straight leg lowering exercise with control of the pelvic position. *Spine* 1997; 22 (16):1873-1879 PMID: 9280023.
14. Enloe LJ, **Shields RK**. Evaluation of health related quality of life in individuals with vestibular dysfunction using disease-specific and general outcome measures. *Phys Ther*, 1997 Sept; 77(9):890-903 PMID: 9291947.
15. Ruhland JL, **Shields RK**. The effects of a home exercise program on impairment and health-related quality of life in persons with chronic peripheral neuropathies. *Phys Ther* 1997 Oct; 77(10):1026-1039 PMID: 9327818.
16. **Shields RK**, Ruhland JL, Ross M, Saehler MM, Smith KB, Heffner ML. Analysis of health-related quality of life and muscle impairment in individuals with amyotrophic lateral sclerosis using the medical outcome survey and the tufts quantitative neuromuscular exam. *Arch Phys Med Rehab* 1998 July; 79 (7): 855-62 PMID: 9685105.
17. **Shields RK**, Chang YJ, Ross M. Neuromuscular propagation after fatiguing contractions of the paralyzed soleus muscle in humans. *Muscle Nerve* 1998 June; 21 (6): 776-787 PMID: 9585332.
18. **Shields RK**, Enloe LJ, Leo KC. Health-related quality of life in patients with total hip or knee replacement. *Arch Phys Med Rehabil* 1999 May; 80 (5): 572-579 PMID: 10326924.
19. **Shields RK**, Leo KC, Messaros AJ, Somers VK, Mark AM. Effects of repetitive handgrip training on endurance, specificity, and cross education. *Phys Ther* 1999 May; 79(5):467-475 PMID: 10331750.
20. Schindler-Ivens S, **Shields RK**. Low frequency depression of H-reflexes in humans with acute and chronic spinal cord injury. *Exp Brain Res* 2000 July; 133 (2): 233-241 PMID: 10968224.
21. Elokda A, Nielsen DH, **Shields RK**. Effect of functional neuromuscular stimulation on postural related orthostatic stress in individuals with acute spinal cord injury. *J Rehabil Res Dev* 2000; 37(5):535-542 PMID: 11322152.
22. Heiss DG, **Shields RK**, Yack HJ. Anticipatory control of vertical lifting force and momentum during the squat lift with expected and unexpected loads. *J Orthop Sports Phys Ther* 2001; 31(12):708-723 PMID: 11767247.

23. Heiss DG, **Shields RK**, Yack HJ. Anticipatory control of vertical lifting force and momentum during the squat lift with expected and unexpected loads. Invited commentary. *J Orthop Sports Phys Ther* 2001 Dec; 31(12): 708-723; discussion 724-9 PMID: 11767247.
24. Heiss DG, **Shields RK**, Yack HJ. Balance loss when lifting a heavier-than-expected load: effects of lifting technique. *Arch Phys Med Rehabil* 2002; 83(1):48-59 PMID: 11782833.
25. **Shields RK**. Muscular, skeletal, and neural adaptations following spinal cord injury. *J Orthop Sports Phys Ther* 2002 Feb; 32 (2):65-74 Review PMID: 11838582.
26. Ludewig P, Cook TM, **Shields RK**. Comparison of surface sensor and bone-fixed measurement of humeral motion. *J Appl Biomech* 2002; 18:163-170
27. Chang YJ, **Shields RK**. Within-train neuromuscular propagation varies with torque in paralyzed human muscle. *Muscle Nerve* 2002; 26:673-680 PMID: 12402290.
28. **Shields RK**, Dudley-Javoroski S. Musculoskeletal deterioration and hemicorporectomy after spinal cord injury: A case report. *Phys Ther* 2003; 83(3):263-275 PMID: 12620090.
29. Frey Law L, **Shields RK**. Femoral loads during passive, active and active-resistive stance after spinal cord injury. *Clin Biomech* 2004; 19:313-321 PMID: 15003348.
30. Schindler-Ivens SM, **Shields RK**. Soleus H-reflex recruitment is not altered in persons with chronic spinal cord injury. *Arch Phys Med Rehab* 2004 May; 85(5): 840-7 PMID: 15129411.
31. Schindler-Ivens SM, **Shields RK**. Comparison of linear regression and probit analysis for detecting H-reflex threshold in individuals with and without spinal cord injury. *Electromyogr Clin Neurophysiol* 2004; 44(3):153-163 PMID: 15125055.
32. Deshpande PJ, **Shields RK**. Soleus motor neuron excitability before and after standing: *Electromyogr Clin Neurophysiol* 2004; 44(5):259-264
33. **Shields RK**, Dudley-Javoroski S. Monitoring standing wheelchair use after spinal cord injury: A case report. *Disabil Rehabil* 2005; 27 (3): 142-146 PMID: 15823996.
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36. Frey Law LA, **Shields RK**. Mathematical models using varying parameter strategies to represent paralyzed muscle force properties: a sensitivity analysis. *J Neuroengineering Rehabil* 2005; 31:2-12. PMID: 15927064 PMCID: PMC1175855.
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52. **Shields RK**, Dudley-Javoroski S. Musculoskeletal adaptations in chronic spinal cord injury: Effects of long-term soleus electrical stimulation training. *Neurorehabil Neural Repair* 2007; 21(2):169-79 PMID: 17312092.

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(books)

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Shields RK: Rehabilitation after Spinal Cord Injury: Chapter 30 Musculoskeletal Plasticity after Spinal Cord Injury. FA Davis, 2007.

(abstracts)

Shields RK, "Continuous Rotation in the Management of Acute Cervical Spine Injuries," Physical Therapy, Vol 64, No 5, 1984 (National Conference).

Shields RK, Cook TM, "Ischiobarograph: Clinical Device for Preventing Pressure Sores" Physical Therapy, Vol 65, No 5, 1985 (National Conference).

Shields RK, Cook TM, "Effect of Lumbar Support on Seated Buttock Pressure," Physical Therapy National Conference, May 1986.

Shields RK, Cook TM, "The Effect of Seat Angle and Lumbar Support on Ischial Tuberosity Pressure," Rehab Engineering Society of North America-National Meeting, May 1986.

Shields RK, Cook TM, "Effect of Lumbar Support and Seat Angle on Seated Buttock Pressure," Physical Therapy National Conference, May 1987.

Shields RK, Cook TM, "Effect of Lumbar Support Size on Pelvic Angle and Sitting Pressure," Physical Therapy National Conference, May 1988.

Shields RK, "EMG Analysis of Abdominal Muscles during SLR and Curl Exercises," Physical Therapy National Conference, May 1989.

Leo K, Shields RK, "Specificity of Forearm Musculature to Endurance Training," Abstract for APTA National Conference, June 1989.

Shields KC, Shields RK, "Inter-rater Reliability of Tibial Displacement in ACL Deficient Individuals," Physical Therapy National Conference, June 1989.

Shields RK, Dostal WF, "Inter-rater Reliability of the Standing Test in Neurologically Impaired Patients," Physical Therapy National Conference, June 1990.

Shields RK, "Fatigability of Human Paralyzed Muscle," Abstract for APTA National Conference, Boston, MA, June 1991.

Shields RK, Enloe L, Evans D, Smith K, "Analysis of the Reliability of Clinical Functional Tests in Total Hip Replacement Patients," APTA National Conference, Denver, Colorado, June 1992.

Shields RK, "Fatigue and Contractile Properties of the Human Acutely and Chronically Paralyzed Soleus Muscle," Society for Neuroscience Abstracts, Anaheim, California, 1992.

Shields RK, "Histochemical and Physiological Properties of the Acute and Chronic Human Paralyzed Soleus Muscle," APTA National Conference, Cincinnati, Ohio, June 1993.

Shields RK, "The Effects of Electrically Induced Fatigue on the Twitch and Tetanic Contractile Properties of the Paralyzed Soleus Muscle in Humans," Society for Neuroscience, Washington, D.C., 1994.

Shields RK, Enloe L, Smith K, "Reliability of the QWB Test in Patients with Total Hip Replacement," APTA National Conference, June 1994, Toronto, CA.

Shields RK, Messaros A, "An Ultrastructural Analysis of Human Paralyzed Muscle," Gordon Conference, New Hampton, NH, August 1994.

Shields RK, Shields KC, "Effect of Double Pulse Activation on Torque After Fatigue of Human Paralyzed Muscle," Society for Neuroscience, Miami, FL, November 1994.

Shields RK, Enloe L, "Efficacy Versus Effectiveness in the Rehabilitation of Patients Following Total Knee or Total Hip Replacement," World Congress in Physical Therapy, Washington DC, June 1995.

Shields KC, Shields RK, "Torque Enhancement with Double Pulse Stimulation of Human Paralyzed Muscle," World Congress in Physical Therapy, Washington DC, June 1995.

Chang YJ, Shields RK: "Effects of Variable Frequency versus Constant Frequency Electrical Stimulation in the Human Paralyzed Soleus Muscle," Society for Neuroscience, San Diego, CA, November 11-15, 1995.

Shields RK, Messaros A, Buresh T, Lozoya E, Pittman D, Pranger B: "Effect of Concentric and Eccentric Exercise on Low Frequency Fatigue, Peak Torque, and Muscle Soreness," APTA National Conference, Minneapolis, MN, June 1996.

Shields RK, Miller BM, Leo KC, Smith K, Enloe LJ: "The Effects of Ultrasound with and Without Hydrocortisone on Musculoskeletal Pain," APTA National Conference, Minneapolis, MN, June 1996.

Shields RK, Enloe L: "Relationship Between the Quality of Well Being (QWB) Index and the Medical Outcomes Survey (SSF-36) in Patients with Total Hip and Knee Replacement (THKR)," APTA National Conference, Minneapolis, MN, June 1996.

Shields RK, House M, Fogarty D, Ketelsen D, Moore R: "Strength Changes from Neural Adaptation: A Comparison of Training with Maximal Voluntary and Imagined Isometric Muscle Contraction," APTA National Conference, Minneapolis, MN, June 1996.

Shields RK, Ruhland J, Ross M, Saehler P, Smith K, Hartsock L, Messaros A: "A Descriptive Study of Patients with Amyotrophic Lateral Sclerosis (ALS) Using the Tufts Quantitative Neuromuscular Exam (TQNE), and the Medical Outcomes Study Short Form Health Survey (SF-36)," APTA National Conference, Minneapolis, MN, June 1996.

Shields RK, Chang YJ, Messaros AJ: "The Relationship Between EMG and Torque During Fatigue and Recovery of the Human Paralyzed Soleus Muscle," APTA National Conference, Minneapolis, MN, June 1996.

Shields RK, Chang YJ: "The Effect of Variable Frequency Train Versus Constant Frequency Train Stimulation on Torque Production of the Human Paralyzed Soleus Muscle," APTA National Conference, Minneapolis, MN, June 1996.

Shields RK, Messaros AJ, Reifenrath G, Schroeder C, Stodden M, Wieskamp S: "Recovery from Eccentric and Concentric Exercise: Effects on Low Frequency Fatigue, Maximal Torque, EMG, and Delayed Onset Muscle Soreness," Integrative Biology Symposium, Vancouver, 1996.

Shields RK, Chang YJ: "Optimizing Paralyzed Muscle Force Through Adaptive Control," Society for Neuroscience, Washington, DC, 1996.

Shields RK, Messaros AJ. Recovery from eccentric and concentric exercise on low frequency fatigue, maximal torque, EMG, and delayed onset muscle soreness. *The Physiologist*, 39(5):A-93, 1996.

Enloe LJ, Shields RK: "Evaluation of Health Related Quality of Life in Individuals with Vestibular Dysfunction using a Disease Specific (DHI) and Generic (SF-36) Outcome Tool," APTA National Conference, San Diego, June 1997.

Ruhland JL, Shields RK: "The Efficacy of a Home Exercise Program on Impairment and Health Related Quality of Life in Persons with Chronic Peripheral Neuropathy," APTA National Conference, San Diego, June 1997.

Shields RK, Chang YJ, Littmann A: "The Effects of Potentiation and Fatigue on the Electromyographic Properties of Paralyzed Muscle," Society for Neuroscience, New Orleans, October 1997.

Heiss D, Shields RK, Yack JH: "Expected versus Unexpected Load Perturbations During the Squat Lift," Society for Neuroscience, New Orleans, October 1997.

Heiss D, Yack JH, Shields RK: "Effects of Unexpected Loads on Body Center of Mass," APTA National Conference, Orlando, FL, June 1998.

Chang YJ, Shields RK: "Neuromuscular Propagation Following Fatigue of Paralyzed Muscle," Society for Neuroscience, Los Angeles, November 1998.

Schindler-Ivens S, Shields RK: "Effects of Spinal Cord Injury on H-Reflex Suppression," Society for Neuroscience, Los Angeles, November 1998.

Shields RK: Physiological Properties of Paralyzed Muscle, APTA National Meeting, Washington, DC 1998.

Shields RK, Chang YJ, Littmann, Schindler-Ivens S: "Effects of Electrically Induced Training on Muscle Fatigue and H-reflex Suppression in Individuals with Paralysis," Society for Neuroscience, Miami, October 1999.

Shields RK, Baldwin K, Messaros A: "Task Dependency versus Fatigue Dependency of the Quadriceps Femoris Muscle," APTA National Meeting, Indianapolis, 2000.

Shields RK, Zwart B: "Analysis of Bone Mineral Density in Individuals with Spinal Cord Injury" APTA National Meeting, Indianapolis 2000.

Schindler-Ivens S, Shields RK: H-Reflex Torque Relationship in Humans With and Without Spinal Cord Injury. Society for Neuroscience, New Orleans, LA, November 2000.

Shields RK, Cole K, Herbst M, Fessler A, Hanson D, Spieler K: Torque-Frequency Relationship during Variable and Constant Frequency Stimulation of the Soleus Muscle in Humans with Spinal Cord Injury. Society for Neuroscience, New Orleans, LA, November 2000.

Shields RK: Effects of Fatigue on H-reflex Suppression, APTA National Meeting, Anaheim, CA, June 2001.

Frey-Law L, Shields RK: Mathematical Model of Stance in Individuals with Spinal Cord Injury, American Society for Biomechanics, San Diego, CA, August 2001

Shields RK, Cole K, Schindler-Ivens S: Training Paralyzed Muscle. Society for Neuroscience, San Diego, CA, Nov 2001.

Shields RK, Deshpande P, Cole K: Paired Pulse Activation of Human Paralyzed Muscle, Society for Neuroscience, San Diego, CA. Nov 2001

Shields RK, DeWall M, Grafft C, Peterson A, Willits C, Deshpande P, Cole K: Effects of Paired Pulse Activation Before and After Fatigue, Boston. APTA Combined Sections Meeting, Boston, Mass. Feb 2002

Deshpande PJ, Shields RK: Effects of Fatigue on H-Reflex Suppression in Able-Bodied and Spinal Cord Injured Subjects. Society for Neuroscience 32nd Annual Meeting, Orlando, FL, Nov, 2002

Shields, RK, Cole KR: Predictive Mathematical Muscle Model Tested on Trained and Untrained Paralyzed Muscle. Society for Neuroscience 32nd Annual Meeting, Orlando, FL, Nov, 2002

Madhavan S, Cole K, Shields RK: Proprioceptive Coordination-Triggered Movement Sequences and Simple Reaction Time, Society for Neuroscience, 32nd Annual Meeting, Orlando, FL, Nov, 2002.

Deshpande PJ, Shields RK: Effects of Fatigue on H-Reflex Suppression in Able-Bodied and Spinal Cord Injured Subjects. Society for Neuroscience 32nd Annual Meeting, Orlando, FL, Nov 2002.

Frey Law LA, Madhavan S, Shields RK: Proprioceptive Coordination – Triggered Movement Sequences and Simple Reaction Time. Society for Neuroscience 32nd Annual Meeting, Orlando, FL, Nov 2002.

Shields RK, Cole KR: Predictive Mathematical Muscle Model Tested on Trained and Untrained Paralyzed Muscle. Society for Neuroscience 32nd Annual Meeting, Orlando, FL, Nov, 2002.

Madhavan S, Cole K, Shields RK: Proprioceptive Coordination-Triggered Movement Sequences and Simple Reaction Time, Society for Neuroscience, 32nd Annual Meeting, Orlando, FL, Nov, 2002.

Brostad J, DeMeulenaere J, Eggers C, Otten P, Shields RK: Effect of Velocity and Exercise of the Lower Extremity on Coordination of an Upper Extremity Movement Sequence. APTA Combined Sections Meeting, Tampa, FL, February 2003.

Camacho MA, House MJ, Shields RK: Progression of Ambulation in a Person with Incomplete Paraplegia Using an Overground Harness Support Frame. APTA Combined Sections Meeting, Tampa, FL, February 2003.

Dudley-Javoroski S, Deshpande PJ, Shields RK: Long-term Electrical Stimulation Influences H-Reflex Suppression after Spinal Cord Injury. Society for Neuroscience, New Orleans, LA, November 2003.

Madhavan S, Shields RK: Influence of Age on Dynamic Position Sense. Society for Neuroscience, New Orleans, LA, November 2003.

Shields RK: Long-term Electrical Stimulation Training Prevents Soleus Muscle Adaptation After Spinal Cord Injury. Society for Neuroscience, New Orleans, LA, November 2003.

Chang Y, Liu CC, Tsaih PL, Shields RK: The Influence Of Stepping Induced Fatigue On Various Fatigue Indexes. APTA Annual Meeting, Chicago, IL, June 2004.

Madhavan S, Shields RK: Neuromuscular Control of the Knee during a Novel single Limb Squat Exercise. Society for Neuroscience, San Diego, CA, October 2004.

Deshpande P, Shields RK: Pre-synaptic inhibition in able-bodied and SCI. Society for Neuroscience, San Diego, CA, October 2004.

Shields RK: A Meeting of the Minds: Research Funding Priorities for the Foundation for Physical Therapy. Combined Sections Meeting of the American Physical Therapy Association, New Orleans, LA, February 2005.

Dudley-Javoroski S, Shields RK: Peripheral quantitative computed tomography (pQCT): Measurement sensitivity in individuals with and without spinal cord injury. Platform Presentation, Combined Sections Meeting of the American Physical Therapy Association, San Diego, CA, February 2006.

Iguchi M, Ganju A, Ballantyne B, Shields RK: Influence of Hamstring Low Frequency Fatigue on Neuromuscular Control of the Knee during Weight Bearing Exercise. Combined Sections Meeting of the American Physical Therapy Association, San Diego, CA, February 2006.

Madhavan S, Burkart S, Carpenter G, Read K, Teckenburg T, Zwanziger M, Shields R: Influence of age on neuromuscular control of the knee. Combined Sections Meeting of the American Physical Therapy Association, San Diego, CA, February 2006.

Madhavan S, Dye L, Humbert SB, Muckler BA, Rodemeyer T, Rubner J, Littmann A, Shields RK: Practice improves accuracy and alters neuromuscular activation patterns during a single leg weight bearing task in females. Combined Sections Meeting of the American Physical Therapy Association, Boston, MA, February 2007.

Madhavan S, Iguchi M, Littmann AE, Shields RK: Expected knee perturbations alter neuromuscular control during a single leg weight bearing exercise. Combined Sections Meeting of the American Physical Therapy Association, Boston, MA, February 2007.

Dudley-Javoroski S, Shields RK: Long-term plantar flexor stimulation after spinal cord injury preferentially preserves bone mineral density in the posterior distal tibia. Combined Sections Meeting of the American Physical Therapy Association, Boston, MA, February 2007.

Madhavan S, Shields RK: Anterior cruciate ligament reconstruction alters quadriceps hamstrings long latency responses during knee perturbations in weight bearing. Combined Sections Meeting of the American Physical Therapy Association, Nashville, TN, February 2008.

Madhavan S, Shields RK: Anterior cruciate ligament reconstruction influences performance accuracy and muscle coactivation patterns during a single limb weight bearing task. Combined Sections Meeting of the American Physical Therapy Association, Nashville, TN, February 2008.

Dudley-Javoroski S, Shields RK: Three-dimensional bone densitometry after spinal cord injury: measurement sensitivity at the distal femur, a common fracture site. Combined Sections Meeting of the American Physical Therapy Association, Nashville, TN, February 2008.

Deshpande PJ, Shields RK: Effects of dynamic exercise on reflex excitability of soleus motor neurons. Combined Sections Meeting of the American Physical Therapy Association, Nashville, TN, February 2008.

Littmann AE, Iguchi M, Shields RK: Influence of knee ACL reconstruction on dynamic position sense: Evidence using a sequential movement task. Combined Sections Meeting of the American Physical Therapy Association, Nashville, TN, February 2008.

Iguchi M, Dudley-Javoroski S, Littmann AE, Shields RK: Doublet stimulation: a safer technique for testing paralyzed quadriceps force and contractile speed. Combined Sections Meeting of the American Physical Therapy Association, Nashville, TN, February 2008.

Shields R, Iguchi M, Littmann AE, Wester L: Influence of Whole Body Heat Stress on Muscle Fatigue in Humans. Combined Sections Meeting of the American Physical Therapy Association, Las Vegas, NV, February 2009.

Shields RK, Dudley-Javoroski S, Littmann AE: Active Standing Under Electrical Stimulation Control Influences Muscle Adaptations after Spinal Cord Injury. Combined Sections Meeting of the American Physical Therapy Association, Las Vegas NV, February 2009.

B. Areas of Research Interest and Current Projects

Neuromuscular Control of Movement (age, fatigue, pathology)
Neuromuscular Strategies to control unstable joints to external perturbations (knee and shoulder)
Neurobiology of Muscle Fatigue (paralyzed and volitional)
Molecular and functional plasticity of neural, muscular, and skeletal tissues
Closed loop and open loop control of active stand neuroprosthesis
Rehabilitation Technology Transfer in Iowa
Adaptive influence of Heat Shock Proteins on Muscle and Health
Quality of Life

C. Published reviews of scholarship

D. Grants received (title) (source of grant) (amount of direct funds) (period of funding – starting and stopping date) (principle investigator) (percent of effort on grant) (percent of salary support obtained) (if you are not the PI, state your role or contributions – in a few sentences)

1985-87 Title: Effects of Seat Angle and Lumbar Support on Seated Pressure Distribution
Description: This project established the ideal way for individuals with paralysis to sit in an effort to prevent pressure sores.
Agency: Robert Wood Johnson Foundation
Co-Principal Investigator: R. Shields, 25% Effort
Amount: \$35,000
Salary Support: 20%

1986-87 Title: Effects of the ATS Lightweight Wheelchair Seat Angle on Seated Pressure Distribution in Individuals with Paralysis
Description: This project established if the angles in the ATS wheelchair were contributing to pressure sores.
Agency: Invacare Corporation, Elyria, Ohio

- Principal Investigator: R. Shields, 5% effort
Amount: \$5,000
Salary Support: none
- 1989-90 Title: Effect of Lumbar Support Size on Pelvic Tilt and Seated Pressure Distribution in Individuals with Spinal Cord Injury.
Description: The ideal pelvic position caused by different sized lumbar supports and the effect on seated buttock pressures were established for individuals with spinal cord injury.
Agency: Foundation for Physical Therapy, Inc.
Principal Investigator: R. Shields, 20% effort
Amount: \$16,780
Salary Support: 20%
- 1990-91 Title: Histochemical Properties of Human Paralyzed Muscle
Description: We determined that human paralyzed muscle becomes very fast and fatigable consistent with a conversion of fibers from slow to fast. This occurs within 1 year after spinal cord injury.
Agency: Foundation for Physical Therapy, Inc.
Principal Investigator: R. Shields, 20% effort
Amount: \$7,500
Salary Support: none
- 1993 Title: Characterization of the Fatigue Properties of Human Paralyzed Muscle
Description: The physiological properties of paralyzed muscle was determined for individuals with chronic and acute paralysis.
Agency: CIFRE Grant, College of Medicine
Principal Investigator: R. Shields, 20% effort
Amount: \$5,000
Salary Support: none
- 1993-95 Title: Health Related Quality of Life in Individuals with ALS
Description: We established the Health-Related Quality of Life of individuals every month for one year after the diagnosis of amyotrophic lateral sclerosis.
Agency: Synergen Corporation, Boulder, CO
Investigator: R. Shields, 6%
Amount: \$19,000
Salary Support: none
- 1995 Title: Relationship Between Health-Related Quality of Life and Tufts Quantitative Neuromuscular Exam in ALS
Description: We correlated measurements of strength with the individual's perception of their Health Related Quality of Life after diagnosis of ALS.
Agency: NIH - Gerontological Nursing Intervention Research Center
Principal Investigator: R. Shields, 15% effort
Amount: \$5,000
Salary Support: none
- 1992-95 Title: Physical Therapy Clinical Research Center: Database Core, Biostatistics Core, Clinical Measurement Core
Description: This project established the first rehabilitation computerized medical record and database at the University of Iowa and established cores to facilitate clinical outcomes research within UIHC.
Agency: Foundation for Physical Therapy, Inc.
Principal Investigator of Clinical Measurement Core: R. Shields, 60% effort

- Amount: \$600,000
Salary Support:40%
- 1993-96 Title: Educational Doctoral Traineeship for Rehabilitation Specialists
Description: This project was to support physical therapists pursuing doctoral training within our program.
Agency: National Institute of Disability Related Research (NIDRR)
Co-Investigator: R. Shields, 15% effort
Amount: \$293,988
Salary Support:\$5%
- 1996 Title: Effect of Upright Standing on Osteoporosis in Individuals with Acute and Chronic Spinal Cord Injury
Description: This was seed money to assist in developing a method for individuals with paralysis to stand to prevent osteoporosis.
Agency: CIFRE Grant, College of Medicine
Principal Investigator: R. Shields, 20% effort
Amount: \$6,450
Salary Support:none
- 1998-00 Title: Effects of Optimizing Muscle Force to Prevent Osteoporosis After Spinal Cord Injury
Description: Bone loss causes hypercalciuria which leads to renal stones after paralysis as well as pathological fractures. Optimizing muscle forces loads the skeletal system to maintain bone density.
Agency: Spinal Cord Research Foundation, Inc.
Principal Investigator: R. Shields, 25% effort
Amount: \$98,000 (Funded)
Salary Support: 20%
- 2000-01 Title: Active Standing to Prevent Musculoskeletal Changes After SCI
Description: Advance the development of active standing system for paralyzed individuals.
Agency: Carver Trust
Investigator: R. Shields, 10% effort
Amount: \$30,000
Status: Completed
- 2001-04 Title: Effects of Standing on Neuromusculoskeletal Plasticity After Spinal Cord Injury.
Agency: Levo Corporation
Description: To establish the effects of early loading after SCI on humeral factors and bone markers.
Principal Investigator: R. Shields
Amount: \$93,000
Status: Completed
- 2000-05 Title: Neuromusculoskeletal Plasticity Following Spinal Cord Injury.
Description: Advance the knowledge of changes after SCI and the extent to which they can be influenced by early intervention.
Agency: NIH – R01-HD54798 National Center for Medical Rehabilitation Research
Principal Investigator: R. Shields, 40% effort
Amount: \$530,000
Status: Completed

- 2004 Title: Innovative Method to Prevent Musculoskeletal Changes After SCI
Description: Randomized controlled trial examining the effect of a standing wheelchair on muscle, bone, and perception of health quality
Agency: Carver Foundation
Principal Investigator: R. Shields, 10% effort
Amount: \$30,000
Status: Completed
- 2005-08 Title: Effect of Early Standing on Musculoskeletal Properties Following SCI
Description: Using PQCT, bone and muscle properties will be assessed in those receiving an active standing protocol.
Agency: Christopher Reeve Foundation
Principal Investigator: R. Shields, 25% effort
Amount: \$150,000
Status: Completed
- 2006-12 Title: Neuro Musculoskeletal Plasticity Following SCI. (competitive renewal)
Description: Assessing dose of load on musculoskeletal properties after SCI.
Agency: NIH (NINR)
Principal Investigator: R. Shields, 50% effort
Amount: \$1,800,000
Salary Support: 40%
Status: Funded
- 2007-09 Title: Neuro Musculoskeletal Therapeutic System.
Description: Developing exercise system for injury prevention.
Agency: Battelle Enterprise Award
Principal Investigator: R. Shields
Amount: \$130,000
Salary Support: 20%
Status: Completed
- 2008-10 Title: Multicenter Career Development Program for Physical and Occupational Therapy
Description: Providing new investigators with skills needed to lead research programs
Agency: Washington University in St. Louis / NIH
Principal Investigator: M Mueller (Washington University):
Amount: \$127,440
Salary Support: 0%
Status: Funded
- 2010-15 Title: Mechanical Stress and Skeletal Plasticity after Spinal Cord Injury
Description: Prevention of deleterious skeletal secondary complications that follow complete spinal cord injury.
Agency: NIH R01 (NICHD)
Principal Investigator: R. Shields
Amount: \$1,500,000
Status: Funded (2 percentile priority score) (March 2010)
- 2011-14 Title: Novel Intervention to Influence Muscle Plasticity in Veterans with SCI
Description: The long-term goal is to develop a rehabilitation strategy to prevent the deleterious muscular and metabolic complications (diabetes) that follow individuals with complete spinal cord injury
Agency: Veterans Affairs Merit Award
Principal Investigator: R. Shields

Amount: \$750,000
Status: Funded

- 2010-12 Title: Electrical and Mechanical Stress on Post-SCI Muscle and Bone
Agency: Craig H. Neilsen Foundation
Description: To determine whether mechanical loads induced via electrical stimulation, mechanical oscillation, or the combination thereof can trigger anabolism of muscle and bone after SCI.
Principal Investigator: R. Shields
Amount: \$248,992
Status: Funded
- 2011-12 Title: Molecular, Cellular, and Cognitive Effects of Heat Stress in Humans.
Agency: Carver Foundation, Muscatine, IA
Description: To determine if heat stress can change insulin receptor sensitivity and cognitive function in humans.
Principal Investigator: R. Shields
Amount: \$25,000
Status: Funded

E. Invited lectures

"Fatigue Properties of the Human Paralyzed Soleus Muscle," The University of Iowa, College of Medicine, April 9, 1993.

Keynote Address, "Preparing for Tomorrow," Physical Therapy Graduate Program Graduation Ceremony, Iowa City, Iowa, October 29, 1994.

Presentation "Outcome Research: Future of Physical Therapy Practice," Boston, Massachusetts, July 20-21, 1995.

Invited Speaker: Wisconsin State Meeting, "Neuromuscular Principles of Clinical Practice: Establishing the Scientific Basis for Physical Therapy," October 19-21, 1995.

Shields RK: "Natural History of Amyotrophic Lateral Sclerosis" NIH funded Aging Center, College of Nursing, March 14, 1997.

Shields RK: "Physiological Properties of Human Paralyzed Muscle" Boston University, Boston, MA, May 23, 1997.

"Establishing Efficacy of Physical Therapy in Patients with THR" APTA Annual Conference, San Diego, CA, May 30, 1997.

Shields RK: Mechanical Properties of the Paralyzed Soleus Muscle in Humans. UCLA Neuromuscular Plasticity Research Symposium, UCLA, Los Angeles, CA, December 18, 1997.

Shields RK: Musculoskeletal Plasticity Following Paralysis in Humans. Invited Speaker, University of Pennsylvania, Philadelphia, October 1998.

Shields RK: Osteoporosis: Silent Epidemic in Individuals with Paralysis. Atlanta, November 1998.

Shields RK: Neuromuscular Plasticity Following Spinal Cord Injury, Invited Research Speaker, University of Pennsylvania and Beaver College, October 21, 1998.

Shields RK: Clinical Outcome Research, Invited Research Speaker, Univ. of Pennsylvania Hospital/Clinic, October, 1998.

Shields RK: Plasticity of the Skeletal System Following Spinal Cord Injury. Invited Speaker. Levo Corporation, Atlanta, GA, November 18, 1998.

Shields RK: Outcomes Research in Rehabilitation. Presentation to Multidisciplinary Rehabilitation Center, December 1998.

Shields RK: "Recovery of Locomotion after SCI" invited speaker APTA national meeting - Washington DC, June 5, 1999.

Shields RK: Where do Foundation for Physical Therapy Research Dollars Go, APTA National Meeting - Washington DC, June 5 - 8, 1999.

Shields RK: What are the Physiological Properties of Human Paralyzed Muscle and Implications for Therapeutic Exercise? Skeletal Muscle Adaptations and Rehabilitation symposium invited speaker, APTA Annual Conference, June 2000.

Shields RK: Healthcare: An Unfinished Symphony. Keynote speaker, MPT Graduation Ceremony, The University of Iowa, Iowa City, IA, November 20, 1999.

Shields RK: "Neuromuscular Plasticity following SCI" (invited speaker) University of Delaware-Biomed Graduate Program, May 11-12, 2000.

Shields RK, "Muscle Adaptations: Impact on Rehabilitation," APTA National Meeting (Invited Speaker), Indianapolis, June 2000.

Shields RK, "Funding Tips Through the Foundation for Physical Therapy," (Invited Speaker), APTA National Meeting, Indianapolis, IN, June 2000.

Shields RK, "Neuromuscular Plasticity Following Spinal Cord Injury," (Invited Speaker), University of Florida, December 2000.

Shields RK, Foundation Funding Tips, (Invited Speaker), APTA Annual Conference, Anaheim, CA, June 2001.

Shields RK, Laura Frey Law: Presentation "Biomechanical Analysis of Stance in individuals with Spinal Cord Injury," American Society of Biomechanics, San Diego California, August 8 - 14, 2001.

Shields RK, Keynote Address, "The Writing on the Wall," Graduate Program in Physical Therapy & Rehabilitation Science Graduation Ceremony, The University of Iowa, Iowa City, Iowa, December 5, 2001.

Shields RK, Presentation "Impact of Federal Funds on Physical Therapy as a Profession" APTA CSM, Boston, MA, 2002

Shields RK, "Outcomes Research in Rehabilitation: Emphasis on Outpatient Orthopedics," sponsored by Iowa Chapter, Washington, IA April 11, 2002

Shields RK; "Physiological Benefits of Upright Stance after Spinal Cord Injury", Engberg, Switzerland, June 2002.

Shields RK. Funding Tips for Writing Grants to the Foundation for Physical Therapy. APTA Combined Sections Meeting, Tampa, FL, February 2003

Shields RK. A Paradigm Shift in the Treatment of Individuals with Spinal Cord Injury, APTA Combined Sections Meeting, Tampa, FL, February 2003

Shields RK. Preserving Neuromusculoskeletal Status After Spinal Cord Injury: Where are We Going? Mayo Clinic, Rochester, Minnesota April 4, 2003

Shields RK. Paradigm Shift in Management of SCI. Shepherds Center, Atlanta, GA, January, 2003.

Shields RK. Innovative Use of Rehabilitation Technology. Rehabilitation Technology Symposium, Oslo, Norway, April 2004.

Shields RK: "New Rehabilitation Strategies for SCI" Hamburg, Germany, 2002.

Shields RK. Outcomes research in rehabilitation. Department of Rehabilitation Therapies, University of Iowa Hospitals and Clinics, March 2004.

Shields RK. Dose-response in the presentation of osteoporosis after spinal cord injury. Sunaas Rehabilitation Center, Sunaas, Norway, May 2004.

Shields RK. Functional load through active resistive stance: Influence on musculoskeletal tissues after SCI. Swiss Paraplegia Center, Notwille, Switzerland, May 2004.

Shields RK. Management of the individual with spinal cord injury: A paradigm shift. Scandinavian Rehabilitation Symposium, Oslo, Norway, May 2004.

Shields RK. Contemporary Rehabilitation After SCI. Shepherd Center, Atlanta, 2004.

Shields RK. Neuromuscular plasticity after spinal cord injury. Hamburg Spinal Cord Injury Center, Hamburg, Germany, May 2004.

Shields RK. Physiological Adaptations After SCI. XVth Congress of the International Society of Electrophysiology & Kinesiology Annual Meeting, Boston, MA, June 2004.

Shields RK. Outcomes Research in Rehabilitation. Iowa Hospital Association, Des Moines, October 2004

Shields RK. Paradigm Shift in Treatment of Individuals with Complete SCI, 3rd Annual Physical Medicine & Rehabilitation Conference: Spine Injury, Pain, & Rehabilitation, Dept. of Orthopaedic & Rehabilitation, Iowa Spine Research and Rehabilitation Center, The University of Iowa, Iowa City, IA, April, 2005.

Shields RK. Neuromusculoskeletal Plasticity after SCI: Past, Present, and Future. University of Florida, Gainesville, FL, November 2005.

Shields RK. Adaptations following SCI: Implications for acute care management. Annual Research Day, University of Maryland, College Park, MD, April 2006.

Shields RK. From Bench to Bedside: Neuromuscular Plasticity after SCI. The Ohio State University, Columbus, OH, May 2006.

Shields RK. Physiological Adaptations after SCI: What can we control and when should we intervene? National Rehabilitation Hospital, Washington DC, April 27, 2006

Shields RK. Frontiers in Rehabilitation Research - NIH R0-1 funding. APTA National Meeting. Orlando Florida, June 2006.

Shields RK. Use of Innovative Seating Technology to Adapt Tissue Following SCI. Scandinavian Rehabilitation Symposium, October 2006.

Creighton, Hines VA, APTA, Pittsburgh, Advocacy Meeting, Alumni Reunion

Shields RK. Scott Azuma Memorial Lecture, "Health and Human Performance: Principles Underlying Exercise Prescription." St. Catherine University, Minneapolis Campus, December 10, 2010.

IV. SERVICE

A. Professional organizations (offices held) (least to most recent)

1986- pres.	American Physical Therapy Association
1983-1989	Southeast Iowa Musculoskeletal Society
1986-1989	Rehab Engineering Society of North America
1988-pres.	Iowa Chapter, American Physical Therapy Association
1988-pres.	Research Section, American Physical Therapy Association
1992-pres.	Neurology Section, American Physical Therapy Association
1993-pres.	Society for Neuroscience
1994-pres.	American College of Sports Medicine
1996-pres.	American Physiological Society

(Editorships)

2004-	Associate Editor, Physical Therapy
2005-	Senior Editor, Physical Therapy

(Review panels)

1990-Pres.	Reviewer, Journal of Orthopaedic and Sports Physical Therapy (Journal)
1992-Pres.	Reviewer, Muscle and Nerve
1994-Pres.	Reviewer, Journal of Neurophysiology
1994-Pres.	Reviewer, Medicine and Science in Sports and Exercise
1994-Pres.	Advisory Board member and Reviewer, Spine
1996-Pres.	Reviewer, Journal of Applied Physiology
1996-Pres.	Reviewer, Physical Therapy
1997-Pres.	Reviewer, American Journal of Physiology
1983-Pres.	Reviewer, Archives of Physical Medicine and Rehabilitation
1997-Pres.	Spine
1997-Pres.	NIH Study Section: 2RG4-SS5(16) Clinical Sciences Special Emphasis
1998	Doctoral Research Grant Reviews, APTA, Alexandria, VA, July 1-2.
1998	APTA Task Force: Establishing the Guidelines to Physical Therapy Practice
1999-Pres.	NIH Study Section, Special Emphasis Panel - Rehabilitation - Clinical Sciences, Bethesda, MD
1999-2001	Member, Scientific Advisory Committee, Fellowship, Doctoral Scholarship, and Grant Review for the Foundation for Physical Therapy, Alexandria, VA (2 review meetings/year)

2000 External Reviewer, Promotion and Tenure Committee, University of Florida, Gainesville (Dr. Mark Trimble)

2001-03 Chair, Scientific Advisory Committee to review grants/scholarships for the Foundation for Physical Therapy, Alexandria, VA, September 15-16, 2001, March 21-22, 2002, September 26-27, 2002, March 15-18, 2003.

2003-Pres. Appointment: Board of Trustees, Foundation for Physical Therapy Inc, Tampa, FL, February 17, 2003, Washington, DC, June 16, 2003, Alexandria, VA, August 22-25, 2003.

2003 External Reviewer, Promotion and Tenure Committee, University of Southern California, Los Angeles (Dr. Blanco)

2004 External Reviewer, Promotion and Tenure Committee, University of Georgia, Atlanta (Dr. G. Warren)

2004 NIH Musculoskeletal Rehabilitation Study Section, Washington DC, Nov 10-12.

2005 External Reviewer, Promotion and Tenure Committee, The Ohio State University, Columbus (Dr. Buford)

2005 Expert Panel: NIH Strategic Rehabilitation Research Plan, February 2005.

2005 The ALS Association's Clinical Management Research Grant Review Committee

2005 Future Rehabilitation Research Funding: Meeting with Dr. Zerhouni, Director NIH, Bethesda, Maryland

2007- President, Foundation for Physical Therapy, Alexandria, VA

(Relevant community involvement)

1984- Big Brothers of Johnson County, Iowa City, IA

1996- Developed the Johnson County Jaguars Youth Softball Program for young Girls

1996- Coach, Girls Softball Team (10 years)

B. Clinical assignments since last promotion (if applicable)

1981-pres Consultation at UIHC regarding the evaluation and treatment of selected neurological and orthopedic conditions (100% time)
Consultation for clinical outcome research initiatives.