IN THIS ISSUE

Message From The Chair

Physical therapy education must remain affordable; team based healthcare practice requires an inter-professional education (IPE) approach; and innovative research and education are hallmarks of Iowa's program. These three themes form the basis for several articles in this year's newsletter.

Promising events on the economic horizon invariably lead to concerns of a "bubble"; a period of unsustainable growth that can rapidly revert to a crisis situation. Such economic downturns are keenly felt by students and recent college graduates, many of whom incur educational debt in the pursuit of their chosen profession.

With this in mind, I am proud to relate that the faculty, staff and administrators in the Department of Physical Therapy and Rehabilitation Science are committed to contain the cost of physical therapy education at Iowa. Our nationally-ranked program prepares students for clinical careers at an affordable cost to students. The value of a physical therapy education at Iowa is second to none. We believe our profession must remain affordable in order to thrive in this new healthcare market.

I am proud to relate that we have achieved this outstanding educational value without compromising the personal touch for which Iowa is known. Our class size is small and every student receives instruction, advising, and mentoring directly from our talented faculty, all of whom are leaders in our profession. In addition to being accomplished clinicians and scientists, all of our faculty members are committed teachers who bring our students to the cutting edge of rehabilitation knowledge.

As we move into a new era of health care policy, we have renewed our commitment to prepare our students to play integral roles in team-based health care. We have developed new opportunities for our students to engage in inter-professional education (IPE) via novel collaborations with our colleagues in the College of Medicine. In this issue, we report on these

IPE initiatives as well as several innovative approaches our faculty use to maximize student learning throughout our "state of the art" curriculum.

Even in challenging economic times, we continue to advance the discovery of new knowledge through health care research. To commemorate the longevity and success of our Department's research mission, we will celebrate the 40th anniversary of our PhD program this fall at our 2014 Alumni Reunion.

We are grateful for the support of our alumni and friends in the past year and we are excited to meet the challenges and opportunities in the coming year. We hope you enjoy this edition of our Department's newsletter.

Richard K. Shields, PT, PhD, FAPTA

Save the Date!

All-Alumni Reunion
October 3-4, 2014

Help us commemorate the 40th Anniversary of Iowa's PhD program!

Spotlight: Meet Dean Debra Schwinn

Debra Schwinn, MD

2013 brought a change of leadership to our College: Debra Schwinn, MD succeeded Paul Rothman, MD as Dean of the Carver College of Medicine. Dean Schwinn oversees the clinical departments, the clinician-education departments (Physical Therapy, Medicine, and Physician Assistant), as well as the basic science departments within the College.

Dean Schwinn previously served as the Allan J. Treuer Endowed Professor of Anesthesiology, chair of anesthesiology and pain medicine, and adjunct professor of pharmacology and genome sciences at the University of Washington.

She is a clinical anesthesiologist and a nationally known investigator in molecular pharmacology. Dean Schwinn brings a keenunderstanding of health care reform and the necessity of training students to thrive in team-based care. She states, "I am committed to inter-professional learning. We can't educate people in silos and ask them to work in teams."

Dean Schwinn has fostered an environment that encourages the development of novel approaches to prepare students for the "real world" of health care delivery. Her support has been vital for the implementation of our Department's new inter-professional education curriculum.

2013 DPT Graduating Class

The Department conferred the DPT degree upon 36 students in the 2013 Commencement ceremony on December 20. Several members of each class were recognized for their excellence through scholarships and awards:

2013 Scholarship and Award Recipients:

- **Alumni Award:** John Sheldahl, Patrick McCue
- **Tracy Dahl Memorial Scholarships:** Ashleigh Miele, Kristin Iehl, Allison Shedek
- **Frank Hazelton Memorial Scholarship:** Patrick McCue, David Indovina
- **Mary Lou Fairchild Clinical Excellence Award:** Lacie Surratt
- **Judy Biderman Professionalism Award:** Kelsey Jo Williams
- **Collin's Pediatric Award:** Bryan Stein
- **ILEND Traineeships:** Bryan Stein, Patrick McCue
- **Mentor Scholarships:** Tyler Johnston, John Sheldahl, Kristina Timmer, Kelcie Wittman
- **Rock Valley Physical Therapy Scholarship:** Justin Nicol

Professor and Chair Dr. Richard Shields paid special tribute to Ken Leo PT, MA for his long-standing service to our Department and to the physical therapy profession. Ken recently retired as Director of Rehabilitation Therapies at the University of Iowa Hospitals and Clinics. Ken served as an adjunct professor in our Department for many years and was always a strong ally for PT education at Iowa. We wish him a joyful and productive retirement!

Hazeltons Help Students Afford PT Education

The Frank Hazelton Annual Scholarship recognizes an outstanding student from the DPT2 and DPT1 classes each year. The Hazelton family hosts a luncheon and personally meets the award recipients and faculty. This has become a highlight for the students and faculty as they learn something new about Frank Hazelton each year.

Frank Hazelton (Certificate 1959; MA 1972) was a physical therapy leader who served as president of the Iowa Physical Therapy Association from 1966-1968. He was instrumental in organizing the successful effort to license physical therapists in Iowa (1965) and served on the first state licensure board. He was a "master clinician" who knew how to bring out the very best in his patients. His legacy as an educator, researcher, and clinician still resonates in the halls of the University of Iowa Physical Therapy Department.

In 2003, the Hazelton family supports the renovation of the Medical Education Building, commemorating Frank's memory with the "Frank Hazelton Laboratory Classroom". Each day our students use this space to develop hands-on clincial skills to improve the health and function of their patients. Frank did so much for physical therapy that it is gratifying to hear our students associate their learning of clinical skills with the "Hazelton" name each day.

The Frank Hazelton Scholarship has touched the lives of many students. We thank the Hazelton family for their continued support of physical therapy education at Iowa.

Hazelton Family with 2013 Award Recipients. First row: David Indovina, Marion Hazelton, and Jenna Sedlacek; Second row: Jim Hazelton, Tom Hazelton, and Deb Wretman).

Alumni Spotlight:
Helen Hislop PT, PhD, FAPTA

***"Physical therapy stands at what could be the beginning of a new era; an era in which science is our quest and humaneness our expression; an era in which physical therapy can constitute a bridge over which science and man's dignity maintain contact."* (Helen Hislop - 1975 Mary McMillan Lecture)**

In November our profession lost one of its greatest pioneers and thinkers: Helen Hislop PT, PhD, FAPTA passed away at the age of 84 at her home in North Carolina.

Dr. Hislop was beloved by clinicians, students, teachers, and scientists from one side of the country to the other - and abroad. She championed the maturation of our field into a profession; one with both unflinching scientific rigor and deep clinical understanding.

Her career began at the University of Iowa, where she received both her PT degree and her PhD. Dr. Hislop directed the Division of Biokinesiology and Physical Therapy at the University of Southern California for 23 years. Nationally and internationally, Dr. Hislop was known for her clearly-articulated vision for the future of physical therapy as a field unequalled in science and service.

Many moving tributes to Dr. Hislop can be found online, such as those at the APTA website. A full tribute will be forthcoming in a future issue of Physical Therapy. Several of our faculty knew Dr. Hislop and provided recollections of her energetic vision and her singular influence on our profession.

Two of our distinguished faculty knew Helen well. Professor Emeritus Gary Soderberg stated "*The opportunity to be a colleague of Helen's for many years was a tremendous experience. She had marvelous insights, was a superb pontificator and used a vocabulary that was second to none. Her wit and provocative dialog will be missed. Her influence on the profession was outstanding and should be remembered for years to come. I will always refer members and prospective students to her McMillan lecture "The Not So Impossible Dream" as many of her thoughts and ideas are still applicable today".*

David Nielsen, Professor emeritus remarked, *"She was known as a person with a vision, a goal seeker, a pace setter, and served as a role model for others to emulate.Of noteworthy mention, Dr Hislop was the first University of Iowa Physical Therapy Alumnus to receive the Carver College of Medicine Distinguished Alumni Award of Achievement (2000). Dr Hislop received standing applause for her acceptance speech (Historical Perspectives of the Evolution of Medicine and Physical Therapy). Dean Kelch of the College of Medicine was so impressed, that while still standing at the podium, asked Dr Hislop for her handheld copy of the speech. She served as a unique ambassador to our Program and the University of Iowa. We are saddened by her loss but celebrate her life and are honored to have had her as one of our alumni".*

The text of Dr. Hislop's landmark McMillan Lecture is available online at this link.

Sluka Receives Kate Daum Professorship

The Carver College of Medicine has appointed Kathleen A. Sluka PT, PhD, FAPTA as the Kate Daum Professor for 2013-2017.

This professorship was established to recognize outstanding women scientists in the College of Medicine. It honors Kate Daum PhD, who directed the UI Nutrition Department from 1927-1955 and helped pave the way for female scientists at the UI.

Dr. Sluka has spent her career studying basic mechanisms of musculoskeletal pain and the neurobiological mechanisms of non-pharmacological pain therapies. She has been an advocate for improved guidelines and standards for pain education and was recently part of a group that developed competencies for entry-level PT pain education. Her textbook, "Pain Mechanisms and Management for the Physical Therapist," is an evidence-based compendium of basic science mechanisms, PT treatments, and inter-disciplinary approaches for the treatment of pain syndromes.

Innovative Teaching Approaches Enhance DPT Curriculum

In 2011, Dr. Richard Shields flipped his classroom. The uninitiated may wonder what feat of strength this entailed, or perhaps if Dr. Shields found the arrangement of lectern and desks to be disagreeable. But a "flipped classroom" is just one of many innovative teaching approaches being employed by the Physical Therapy Department to enhance learning in the DPT curriculum.

Flipped Classrooms

Dr. Shields' "Activity Based Neural and Musculoskeletal Plasticity in Healthcare" course undergoes continual refinement. Each fall he incorporates the latest findings from scientific fields as diverse as biochemistry, epigenetics, regenerative medicine and biopsychology. He found that student mastery of these cutting-edge concepts was optimized via classroom discussion and team-based problem-solving. He searched for educational approaches that fostered the development of high level critical thinking, a skill that typifies the "Master Clinician".

His solution was to "flip" the classroom experience: to provide traditional lecture content via online video and to use classroom time for dialogue and cooperative higher-end learning. In a flipped classroom, students take lectures at their own convenience during a time that suits their preferences and life obligations. Students can stop, pause, and review lecture material at their own pace, freeing them to listen carefully instead of merely transcribing the instructor's words.

During classroom sessions, Shields revisits the previously-learned concepts via interactive problem solving experiences, often consisting of an Oxford Debate about controversial treatments. Students arrive to class having already mastered the core content of the course, allowing them to use classroom time to explore more advanced concepts. Shields has adequate "face time" to challenge students to apply core motor control and neuroscience principles to clinical scenarios and advanced scientific questions. Importantly, students develop their ability to problem solve on the spot; an advanced skill that is necessary for successful clinical practice.

The flipped classroom has been well-received by students and has resulted in enhanced learning. In particular, Shields has observed that a greater proportion of the class is prepared to grapple with complex material at a high level. He believes that the flipped classroom approach assists many students who require greater time for reflection and synthesis of new material. The flexibility of the flipped classroom has enabled him to maintain high standards for core competencies while continuing to adapt the curriculum in response to new scientific discoveries.

Student-Centered Learning

Think of the phrase "college class" and what comes to mind? For many, a vast lecture hall with a solitary instructor's voice intoning facts and figures, PowerPoint slides blinking inexorably across a screen. Sounds great, doesn't it? This is known as the "didactic lecture" method of instruction, and it's an optimal learning format for only a small percentage of students, according to recent research.

A far greater proportion of students learn most effectively when they're actively engaged in the curriculum via discussion, investigation, synthesis, and peer-teaching. In our Department's "Kinesiology and Pathomechanics" course, Dr. John Yack employs an active-learning approach called "Student-Centered Learning" to enhance student acquisition of fundamental biomechanical principles.

Student-Centered Learning (SCL) is the inverse of the didactic lecture format, which could rightly be called "Instructor-Centered Learning." With SCL, students bear the responsibility for researching course content and for teaching it to their peers. While this may sound a bit anarchic, the instructor is integrally involved in setting the framework for the course and for intervening when learners misstep into unfruitful directions.

In the context of Kinesiology and Pathomechanics, Dr. Yack has designed a framework in which student peer-groups sequentially study regional kinesiology of individual body segments. Using this scaffolding, students gather background material and develop study aids for the benefit of themselves and their peers. Throughout this investigational phase, the instructor injects expert-level perspective from clinical practice and from contemporary scientific literature.

At the conclusion of each SCL regional kinesiology module, a selected student group presents a fully-developed summary to the entire class. Discussion, demonstration, and peer-critique are all important components of this session.

In the SCL approach, pedagogical "endpoints" may not differ from those of a traditional lecture course; core competencies must be met, no matter the instructional model. But with SCL, every student has the liberty to arrive at these endpoints via his or her own process of discovery.

Case-Based Learning

"Thinking like a clinician" is a professional behavior that must be practiced and refined, just like any other skill in our DPT curriculum. Students need exposure to situations that require them to think on their feet and to communicate clearly and effectively. The cognitive and affective components of physical therapy practice are as integral to patient outcomes as evaluation and treatment techniques.

Kelly Sass directs a two-semester "Case-Based Learning" course designed to bridge the gap between PT education and the fast-paced, complicated world of patient care. In these courses, the students work in small groups to analyze patient cases that compliment the content they are currently studying in their traditional courses. Expert clinicians from the community serve as facilitators who interact with the student groups to provide feedback and mentoring. These facilitators share their own perspectives on efficient and effective clinical interactions in the "real world" of clinical practice.

In addition, these courses work with Simulated Patient Instructors" (SPIs) who provide realistic portrayals of patients with a variety of problems, ranging from straightforward to complex. DPT students work individually or in partners to interview and evaluate the SPIs in a way that demonstrates clinical problem-solving skills, appropriate communication (verbal and nonverbal) and professionalism.

Students are challenged to conduct the interviews and evaluations in an orderly manner, adapting their approach as needed in response to information gleaned from the SPIs. An emphasis is placed on building rapport with the SPI and in engaging them with open-ended questions.

As the course instructor, Kelly Sass draws upon her own unique educational background: she is completing her PhD dissertation in Educational Psychology and has an interest in nontraditional approaches to teaching and learning. Under her direction, Case Based Learning has become a critical stepping stone between the classroom and the clinic for our DPT students.

Physical Therapy Students Provide Education for Medical Students

The highly integrative, collaborative nature of modern health care demands that providers cross professional lines to deliver streamlined, high-quality care. The University of Iowa has instituted broad inter-professional education (IPE) initiatives designed to promote teamwork and collegiality among its future health science graduates. During their first two years of study, students in the Colleges of Medicine (Physical Therapy, Medical, Physician Assistant), Nursing, Dentistry, Pharmacy, and Public Health work in integrated teams to process clinical and health-policy problems that they will encounter in their future careers. This new course is entitled: *Interprofessional Education I: Team Based Approach to Healthcare.*

In addition to these broad-ranging IPE initiatives, we have identified smaller, more tightly-focused opportunities to facilitate collaboration among students in different professions. Our faculty developed a second IPE course (*Inter-professional Education II: Teaching Neural and Musculoskeletal Anatomy*) to foster students' communication, collegiality, teamwork, and teaching skills.

Within that course second-year DPT students work in peer-groups to provide teaching/demonstrations of neural and musculoskeletal evaluation to first semester medical students enrolled in Gross Human Anatomy. The objective of the session was to provide the medical students with an opportunity to integrate their new anatomical knowledge into a basic framework for clinical neural and musculoskeletal application. In addition, the session offered DPT students a unique opportunity to develop their professional skills as "near-peer teachers" for the first semester medical students.

The near-peer IPE format offered unique advantages for both groups of students. The chief benefit for the medical students, per their report, was having an early opportunity to integrate basic knowledge of anatomy into a framework for future clinical skills acquisition. We anticipate that exposure to this IPE session early in their training might serve as a primer to help them rapidly integrate more advanced musculoskeletal learning and appreciate the important role physical therapists play in healthcare.

Advantages for the physical therapy students included a deep review and re-synthesis of previously learned material. They gained an opportunity to refine several key professional behaviors: they worked in teams with their peers, they internalized and adapted to constructive feedback, and they sought common ground and understanding with members of another profession. These professional behaviors will equip them to function at a high level in the intensely collaborative environment of modern health care delivery.

We anticipate that the future will hold opportunities for reciprocal exchange among various student groups within our academic healthcare center. Our experience with near-peer IPE interactions shows that they can provide education-rich opportunities for students who are committed to developing the hallmarks of professionalism, particularly within the context of team-based care.

Healing of Magic Seminar and Residency

(Photo credit: Carlow University)

We are excited to announce an upcoming collaboration with Iowa's Hancher Auditorium, welcoming Kevin Spencer, artist-in-residence, in February 2014. Mr. Spencer is an internationally-known illusionist who will be performing at Hancher on February 16. Tickets are available at the Hancher web site.

In addition to a career as a performer, Mr. Spencer is an adjunct faculty member with the Occupational Therapy Department at the University of Alabama in Birmingham. His clinical and academic work focuses on using simple magic tricks as unique tools to foster motor, cognitive, and psychosocial development in people with disabilities. The intrinsic reward in mastering these tasks helps his clients, particularly children and the elderly, to approach long-term therapy with greater motivation.

Mr. Spencer will be conducting workshops for our students, faculty, and clinicians during his residency at Iowa. For more information about his continuing education programs for rehabilitation specialists, visit www.magictherapy.com. Also visit his educational foundation, Hocus Focus, to learn about his educational curriculum for children with developmental and intellectual disabilities.

Faculty Recognitions

DeJong Joins Faculty

The faculty and staff are pleased to welcome Stacey DeJong PT, PhD, PCS as Assistant Professor of Physical Therapy and Rehabilitation Science. Starting in spring 2014 she will co-direct the Neuroscience course and direct the Neuromuscular Therapeutics course within the DPT curriculum.

Dr. DeJong received her PhD in movement science at Washington University in St. Louis. She completed postdoctoral training and was a Research Assistant Professor at the University of Kansas Medical Center.

Her clinical research background includes upper extremity motor recovery in adults post-stroke and studies of gait training, flexibility exercise, and postural control in children with cerebral palsy. Dr. DeJong has fifteen years of experience as a clinician, primarily serving children with developmental disabilities.

Dr. DeJong's research will focus on the neural basis of abnormal movement patterns that persist after neural injury. Her work is funded by the Foundation for Physical Therapy.

Cook Becomes Professor Emeritus

Thomas Cook PT, PhD has been appointed Professor Emeritus, an honor recognizing his many contributions over the last 27 years in our Department.

Dr. Cook received his physical therapy degree from Duke University in 1973 and his PhD from Iowa in 1987. He has directed Iowa's Occupational Ergonomics laboratory since that time.

Through a dual appointment with the College of Public Health, Dr. Cook has investigated work-related musculoskeletal disorders in industrial and agricultural workers. His interest in global environmental health has taken him around the world, with significant time spent conducting research in Slovakia and Hungary.

During the course of his career at Iowa, Dr. Cook mentored numerous physical therapist scientists and made key contributions to our understanding of risk factors for occupational injury. We look forward to his continued engagement with our Department in his new role as Professor Emeritus.

Tom Cook PT, PhD

Four Students Receive PhD Degrees

We are proud to announce that four of our students received their PhD degrees at the Graduate College spring convocation.

Dana Dailey, PT, MS, PhD was mentored by Kathleen Sluka, PT, PhD, FAPTA. Her dissertation was entitled "Fibromyalgia: Pain, Fatigue and Function: Predictors, Dual Task Fatigue and Transcutaneous Electrical Nerve Stimulation."

Bhupinder Singh, PT, PhD was mentored by H. John Yack, PT, PhD. His dissertation was entitled "The Interplay between Obesity, Biomechanics and Fitness within the Reverse Causation Hypothesis."

Patricia Teran-Yengle, PT, MA, PhD was likewise mentored by H. John Yack, PT, PhD. Her dissertation was entitled "Training Strategies to Reduce Knee Hyperextension Gait Patterns in Healthy Women."

And finally, Carol G. Vance, PT, MA, PhD was mentored by Kathleen Sluka, PT, PhD, FAPTA. Her dissertation was entitled "Examination of Parameters in Transcutaneous Electrical Nerve Stimulation Effectiveness."

Congratulations to our graduates and our best wishes for your academic careers!

Faculty Publications for 2013

Addison O, Whetten B, Hayes H, DeJong SL. Reviews of wellness and physical activity web sites for persons with neurological disability. J Neurol Phys Ther. 2013 Jun;37(2):91-3.

Ambrosio F, Boninger ML, Brubaker CE, Delitto A, Wagner WR, Shields RK, Wolf SL, Rando TA. Guest editorial: emergent themes from second annual symposium on regenerative rehabilitation, Pittsburgh, Pennsylvania. J Rehabil Res Dev. 2013 Jun;50(3):vii-xiv.

Beck DT, Casey DP, Martin JS, Emerson BD, Braith RW. Exercise training improves endothelial function in young prehypertensives. Exp Biol Med (Maywood). 2013 Apr;238(4):433-41.

Beck DT, Martin JS, Casey DP, Braith RW. Exercise training reduces peripheral arterial stiffness and myocardial oxygen demand in young prehypertensive subjects. Am J Hypertens. 2013 Sep;26(9):1093-102.

Boyan BD, Tosi LL, Coutts RD, Enoka RM, Hart DA, Nicolella DP, Berkley KJ, Sluka KA, Kwoh CK, O'Connor MI, Kohrt WM, Resnick E. Addressing the gaps: sex differences in osteoarthritis of the knee. Biol Sex Differ. 2013 Feb 4;4(1):4.

Casey DP, Joyner MJ, Claus PL, Curry TB. Vasoconstrictor responsiveness during hyperbaric hyperoxia in contracting human muscle. J Appl Physiol (1985). 2013 Jan 15;114(2):217-24.

Casey DP, Mohamed EA, Joyner MJ. Role of nitric oxide and adenosine in the onset of vasodilation during dynamic forearm exercise. Eur J Appl Physiol. 2013 Feb;113(2):295-303.

Casey DP, Curry TB, Charkoudian N, Joyner MJ, Hart EC. The effects of acute beta-adrenergic blockade on aortic wave reflection in postmenopausal women. Am J Hypertens. 2013 Apr;26(4):503-10.

Casey DP, Shepherd JR, Joyner MJ. Sex and Vasodilator Responses to Hypoxia at Rest and During Exercise. J Appl Physiol (1985). 2013 Jul 3. [Epub ahead of print]

Casey DP, Walker BG, Ranadive SM, Taylor JL, Joyner MJ. Contribution of nitric oxide in the contraction-induced rapid vasodilation in young and older adults. J Appl Physiol (1985). 2013 Aug 15;115(4):446-55.

Corrêa JB, Costa LO, de Oliveira NT, Sluka KA, Liebano RE. Effects of the carrier frequency of interferential current on pain modulation in patients with chronic nonspecific low back pain: a protocol of a randomised controlled trial. BMC Musculoskelet Disord. 2013 Jun 27;14:195.

Dailey DL, Rakel BA, Vance CG, Liebano RE, Amrit AS, Bush HM, Lee KS, Lee JE, Sluka KA. Transcutaneous electrical nerve stimulation reduces pain, fatigue and hyperalgesia while restoring central inhibition in primary fibromyalgia. Pain. 2013 Nov;154(11):2554-62.

Darter BJ, Nielsen DH, Yack HJ, Janz KF. Home-based treadmill training to improve gait performance in persons with a chronic transfemoral amputation. Arch Phys Med Rehabil. 2013 Dec;94(12):2440-7.

Desantana JM, da Cruz KM, Sluka KA. Animal models of fibromyalgia. Arthritis Res Ther. 2013 Dec 5;15(6):222.

Dudley-Javoroski S, Shields RK. Active-resisted stance modulates regional bone mineral density in humans with spinal cord injury. J Spinal Cord Med. 2013 May;36(3):191-9.

Dudley-Javoroski S, Shields RK. Regional cortical and trabecular bone loss after spinal cord injury. J Rehabil Res Dev. 2013 Dec;49(9):1365-76.

Dudley-Javoroski S, Amelon R, Liu Y, Saha PK, Shields RK.High bone density masks architectural deficiencies in an individual with spinal cord injury . J Spinal Cord Med. 2013.

Elkins JM, Daniel M, Pedersen DR, Singh B, Yack HJ, Callaghan JJ, Brown TD. Morbid obesity may increase dislocation in total hip patients: a biomechanical analysis. Clin Orthop Relat Res. 2013 Mar;471(3):971-80.

Frey-Law LA, Avin KG. Muscle coactivation: a generalized or localized motor control strategy? Muscle Nerve. 2013 Oct;48 (4):578-85.

Frey-Law LA, Lee JE, Wittry AM, Melyon M. Pain rating schema: three distinct subgroups of individuals emerge when rating mild, moderate, and severe pain. J Pain Res. 2013 Dec 23;7:13-23.

Gardner SE, Blodgett NP, Hillis SL, Borhart E, Malloy L, Abbott L, Pezzella P, Jensen M, Sommer T, Sluka KA, Rakel BA. HI-TENS Reduces Moderate-to-Severe Pain Associated With Most Wound Care Procedures: A Pilot Study. Biol Res Nurs. 2013 Aug 15. [Epub ahead of print]

Gregory NS, Harris AL, Robinson CR, Dougherty PM, Fuchs PN, Sluka KA. An overview of animal models of pain: disease models and outcome measures. J Pain. 2013 Nov;14(11):1255-69.

Gregory NS, Gibson-Corley K, Frey-Law L, Sluka KA. Fatigue-enhanced hyperalgesia in response to muscle insult: Induction and development occur in a sex-dependent manner. Pain. 2013 Dec;154(12):2668-76.

Hart EC, Charkoudian N, Joyner MJ, Barnes JN, Curry TB, Casey DP. Relationship between sympathetic nerve activity and aortic wave reflection characteristics in postmenopausal women. Menopause. 2013 Sep;20(9):967-72.

Hoeger Bement MK, St Marie BJ, Nordstrom TM, Christensen N, Mongoven JM, Koebner IJ, Fishman SM, Sluka KA. An Interprofessional Consensus of Core Competencies for Prelicensure Education in Pain Management: Curriculum Application for Physical Therapy. Phys Ther. 2013 Dec 5. [Epub ahead of print]

Joyner MJ, Casey DP. Muscle Blood Flow, Hypoxia and Hypoperfusion. J Appl Physiol (1985). 2013 Jul 25. [Epub ahead of print]

Klocke NF, Amendola A, Thedens DR, Williams GN, Luty CM, Martin JA, Pedersen DR Comparison of T1ρ, dGEMRIC, and quantitative T2 MRI in preoperative ACL rupture patients. Acad Radiol. 2013 Jan;20(1):99-107.

Kurz MJ, Stuberg W, Dejong S, Arpin DJ Overground body-weight-supported gait training for children and youth with neuromuscular impairments. Phys Occup Ther Pediatr. 2013 Aug;33(3):353-65.

Littmann AE, McHenry CL, Shields RK. Variability of motor cortical excitability using a novel mapping procedure. J Neurosci Methods. 2013 Apr 15;214(2):137-43.

Lopez MG, Silva BM, Joyner MJ, Casey DP. Roles of nitric oxide and prostaglandins in the hyperemic response to a maximal metabolic stimulus: redundancy prevails. Eur J Appl Physiol. 2013 Jun;113(6):1449-56.

Lu Y, Whiteis CA, Sluka KA, Chapleau MW, Abboud FM. Responses of glomus cells to hypoxia and acidosis are uncoupled, reciprocal and linked to ASIC3 expression: selectivity of chemosensory transduction. J Physiol. 2013 Feb 15;591(Pt 4):919- 32.

Maxwell JL, Felson DT, Niu J, Wise B, Nevitt MC, Singh JA, Frey-Law L, Neogi T. Does clinically important change in function after knee replacement guarantee good absolute function? The multicenter osteoarthritis study. J Rheumatol. 2014 Jan;41(1):60-4.

Maxwell JL, Keysor JJ, Niu J, Singh JA, Wise BL, Frey-Law L, Nevitt MC, Felson DT. Participation following knee replacement: the MOST cohort study. Phys Ther. 2013 Nov;93(11):1467-74.

Neogi T, Frey-Law L, Scholz J, Niu J, Arendt-Nielsen L, Woolf C, Nevitt M, Bradley L, Felson DT; for the Multicenter Osteoarthritis (MOST) Study. Sensitivity and sensitisation in relation to pain severity in knee osteoarthritis: trait or state? Ann Rheum Dis. 2013 Dec 18. [Epub ahead of print]

Pierce GL, Casey DP, Fiedorowicz JG, Seals DR, Curry TB, Barnes JN, Wilson DR, Stauss HM. Aortic pulse wave velocity and reflecting distance estimation from peripheral waveforms in humans: detection of age- and exercise training-related differences. Am J Physiol Heart Circ Physiol. 2013 Jul 1;305(1):H135-42.

Rao S, Dietz F, Yack HJ. Estimates of gastrocnemius muscle length during simulated pathological gait. J Appl Biomech. 2013 Apr;29(2):127-34.

Santos CM, Francischi JN, Lima-Paiva P, Sluka KA, Resende MA. Effect of transcutaneous electrical stimulation on nociception and edema induced by peripheral serotonin. Int J Neurosci. 2013 Jul;123(7):507-15.

Sato KL, Johanek LM, Sanada LS, Sluka KA. Spinal Cord Stimulation Reduces Mechanical Hyperalgesia and Glial Cell Activation in Animals with Neuropathic Pain. Anesth Analg. 2013 Dec 19. [Epub ahead of print]

Segal NA, Boyer ER, Wallace R, Torner JC, Yack HJ. Association between chair stand strategy and mobility limitations in older adults with symptomatic knee osteoarthritis. Arch Phys Med Rehabil. 2013 Feb;94(2):375-83.

Segal NA, Boyer ER, Teran-Yengle P, Glass NA, Hillstrom HJ, Yack HJ. Pregnancy leads to lasting changes in foot structure. Am J Phys Med Rehabil. 2013 Mar;92(3):232-40.

Shields RK, Dudley-Javoroski S. Fatigue modulates synchronous but not asynchronous soleus activation during stimulation of paralyzed muscle. Clin Neurophysiol. 2013 Sep;124(9):1853-60.

Singh B, Brown TD, Callaghan JJ, Yack HJ. Abdomen-thigh contact during forward reaching tasks in obese individuals. J Appl Biomech. 2013 Oct;29(5):517-24.

Sluka KA, O'Donnell JM, Danielson J, Rasmussen LA. Rphysical activity prevents development of chronic pain and activation of central neurons. J Appl Physiol (1985). 2013 Mar 15;114(6):725-33.

Sluka KA, Rasmussen LA, Edgar MM, O'Donnell JM, Walder RY, Kolker SJ, Boyle DL, Firestein GS. Acid-sensing ion channel 3 deficiency increases inflammation but decreases pain behavior in murine arthritis. Arthritis Rheum. 2013 May;65 (5):1194-202.

Sluka KA, Bjordal JM, Marchand S, Rakel BA. What makes transcutaneous electrical nerve stimulation work? Making sense of the mixed results in the clinical literature. Phys Ther. 2013 Oct;93(10):1397-402.

Taylor JL, Curry TB, Matzek LJ, Joyner MJ, Casey DP. Acute Effects of a Mixed Meal on Arterial Stiffness and Central Hemodynamics in Healthy Adults. Am J Hypertens. 2013 Nov 16. [Epub ahead of print]

Tseng SC, Shields RK. Limb compressive load does not inhibit post activation depression of soleus H-reflex in individuals with chronic spinal cord injury. Clin Neurophysiol. 2013 May;124(5):982-90.

Research Grant Support (Principal Investigators)

Darren Casey, PhD
Assistant Professor

NIH-K00, $503,129
Impact of Aging on Skeletal Muscle Blood Flow Kinetics During Exercise

American Heart Association, $71,500
Dietary Nitrates and Vascular Function in Patients with Peripheral Artery Disease

Stacey DeJong, PT, PhD
Assistant Professor

Foundation for Physical Therapy New Investigator Fellowship Training Initiative, $78,000
Changes in Corticomotor Divergence and Upper Limb Synergies after Neural Injury.

Kathleen Sluka, PhD, PT
Professor

Medtronic, Inc., $555,913
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CFD Research Corporation, $123,991
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NIH-U01, $3,218,011
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DJO, Inc., $136,381
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US Department of Veterans Affairs, $739,200
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Craig H. Neilsen Foundation, $248,992
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