Cara L. Lewis, PT, PhD
Boston University

Education:

Post-doctoral Fellowship
University of Michigan Ann Arbor, Michigan
Kinesiology
2006-2009

Doctor of Philosophy
Washington University in St. Louis St. Louis, Missouri
Movement Science
December/2005

Master of Science
Washington University in St. Louis, School of Medicine St. Louis, Missouri
Physical Therapy
December/1996

Bachelor of Science
University of Notre Dame Notre Dame, Indiana
Pre-professional Studies
May/1993

Licensure Information:

State and Registration Number:
Missouri State Board of Registration for the Healing Arts: 112159 (from 8/12/1997 to 1/31/2020)

Employment and Positions Held:

Associate Professor, Clinical Epidemiology Research and Training Unit
Department of Medicine
Boston University School of Medicine
(from 2017 to present)

Associate Professor, Department of Physical Therapy & Athletic Training
Associate Professor, Department of Health Sciences
Boston University College of Health & Rehabilitation Sciences: Sargent College
Boston, Massachusetts
(from 2016 to present)

Assistant Professor, Department of Health Sciences
Boston University College of Health & Rehabilitation Sciences: Sargent College
Boston, Massachusetts
(from 2015 to 2016)

Assistant Professor, Clinical Epidemiology Research and Training Unit
Boston University School of Medicine
Boston, Massachusetts
(from 2013 to 2017)

Assistant Professor, Department of Physical Therapy & Athletic Training
Boston University College of Health & Rehabilitation Sciences: Sargent College
Boston, Massachusetts
(from 2009 to 2016)

Physical Therapist

TheraPlus
Richmond Heights, MO
(from 2000 to 2005)

Staff Physical Therapist
BJC Rehabilitation and Fitness
St. Louis, MO
(from 1999 to 2000)

Staff Physical Therapist
Barnes-Jewish Hospital
St. Louis, MO
(from 1997 to 1999)

Peer Reviewed Publications:

Lewis CL, Khuu A,* Loverro KL.* Gait alterations in femoroacetabular impingement syndrome differ by sex. *Journal of Orthopaedic & Sports Physical Therapy,* accepted.

Lewis CL, Loverro KL,* Khuu A.* Kinematic differences during single leg stepdown between individuals with femoroacetabular impingement syndrome and individuals without hip pain. *Journal of Orthopaedic & Sports Physical Therapy*, 2018;48(4):270-279.

Lewis CL, Foley H,* Lee T,* Berry J. Effect of band position on muscle activity during resisted side-stepping. *Journal of Athletic Training,* accepted.

Bove AM, Clohisy J, DeWitt J, Di Stasi S, Enseki K, Harris-Hayes M, Lewis CL, Reiman MP, Ryan JM. Cost-effectiveness analysis of hip arthroscopy surgery and structured rehabilitation alone in individuals with hip labral tears: Letter to the editor. *Am J Sports Med*. 2017 Mar; 45(3):NP1-NP2. doi: 10.1177/0363546517691278

Li JS,* Tsai TY, Li G, Felson DT, Lewis CL. Six degree-of-freedom knee joint kinematics in obese individuals with knee pain during gait. *PLoS ONE,* 2017; 12(3):e0174663. doi: 10.1371/journal.pone.0174663

Lewis CL, Laudicina NM,* Khuu A,* Loverro KL.* The Human Pelvis: Variation in structure and function during gait. *The Anatomical Record.* 2017 Apr;300(4):633-642. doi: 10.1002/ar.23552.

Whittaker JL, Booysen N, de La Motte S, Dennett L, Lewis CL, Wilson D, McKay C, Warner M, Padua D, Emery CA, Stokes M. Predicting sport and occupation lower extremity injury risk through movement quality screening: A systematic review. *British Journal of Sports Medicine.* 2016 Dec 1. doi: 10.1136/bjsports-2016-096760.

Felson DT, Niu J, Quinn EK, Neogi T, Lewis CL, Lewis CE, Frey Law L, McCulloch C, Nevitt M, LaValley M. Multiple nonspecific sites of joint pain outside the knees develop in persons with knee pain. *Arthritis & Rheumatology*. 2016 Sep 2. doi: 10.1002/art.39848

Straccolini A, Yen YM, d'Hemecourt PA, Lewis CL, Sugimoto D. Sex and growth effect on pediatric hip injuries presenting to sports medicine clinic. Journal of Pediatric Orthopaedics B. 2016 Jul; 25(4):315-21. doi: 10.1097/BPB.0000000000000315

Gill SV, Ogamba M,* Lewis CL. Effects of additional anterior body mass on gait. *BMC Pregnancy and Childbirth*. 2016 May 16;16:109. doi: 10.1186/s12884-016-0893-0

Dwyer MK, Lewis CL, Hanmer AW, McCarthy JC. Do neuromuscular alterations exist for patients with acetabular labral tears during function? *Arthroscopy: The Journal of Arthroscopic & Related Surgery.* 2016 Jun 30;32(6):1045-52. doi: 10.1016/j.arthro.2016.03.016.

Khuu A,* Foch E, Lewis CL. Not all single leg squats are equal: A biomechanical comparison of three variations. *International Journal of Sports Physical Therapy,* 2016; 11(2):201-11.

Ogamba MI,* Loverro KL,* Laudicina NM,* Gill SV, Lewis CL. Changes in gait with anteriorly added mass: a pregnancy simulation study. *Journal of Applied Biomechanics*. 2016; 32(4):379-387. doi: 10.1123/jab.2015-0178

Stefanik JJ, Gross KD, Guermazi A, Felson DT, Roemer RW, Niu J, Lynch JA, Segal NA, Lewis CE, Lewis CL. Relation of step length to magnetic resonance imaging-detected structural damage in the patellofemoral joint: The multicenter osteoarthritis study. *Arthritis Care & Research*, 2016 Jun;68(6):776-83*.* doi: 10.1002/acr.22738

Yen YM, Lewis CL, Kim YJ. Understanding and treating snapping hip. *Sports Medicine and Arthroscopy Review*, 2015; 23(4):194-9. doi: 10.1097/JSA.0000000000000095

Berry JW, Lee TS,* Foley HD,* Lewis CL. Resisted side-stepping: the effect of posture on hip abductor muscle activation. *Journal of Orthopaedic and Sports Physical Therapy,* 2015; 45(9):675-82. doi:10.2519/jospt.2015.5888

Lewis CL, Foch E, Luko MM,* Loverro KL,* Khuu A.* Differences in lower extremity and trunk kinematics between single leg squat and step down tests. *PLoS ONE,* 2015; 10(5):e0126258. doi: 10.1371/journal.pone.012625

Marinko LN, Christie R, Lewis CL. Successful rehabilitation of a young adult with total hip arthroplasty a decade after a Girdlestone procedure: a case report. *PM&R,* 2015; 7(8):895-900. doi: 10.1016/j.pmrj.2015.04.002

Lewis CL, Khuu A,* Marinko LN. Postural correction reduces hip pain in adult with acetabular dysplasia: A case report. *Manual Therapy,* 2015; 20(3):508-12. doi: 10.1016/j.math.2015.01.014

Caron RR,* Lewis CL, Saltzman E, Wagenaar RC, Holt KG. Musculoskeletal stiffness changes linearly in response to increasing load during walking gait. *Journal of Biomechanics*, 2015; 48(6):1165-71. doi: 10.1016/j.jbiomech.2014.12.046

Lewis CL, Garibay E. Effect of increased pushoff on anterior hip joint forces during gait. *Journal of Biomechanics,* 2015; 48(1):181-5. doi: 10.1016/j.jbiomech.2014.10.033

Lewis CL, Sahrmann SA. Effect of posture on hip angles and moments during gait. *Manual Therapy,* 2015; 20(1):176-82. doi: 10.1016/j.math.2014.08.007

Gill SV, Lewis CL, DeSilva JM. Arch height mediation of obesity-related walking in adults: A cross-sectional examination of contributors to physical activity limitations. *Physiology Journal,* 2014; vol. 2014, Article ID 821482, 8 pages. doi:10.1155/2014/821482.

Monaghan GM,* Hsu WH,* Lewis CL, Saltzman E, Hamill J, Holt KG. Forefoot angle at initial contact determines the amplitude of forefoot and rearfoot eversion during running*. Clinical Biomechanics,* 2014; 29(8):936-42. doi: 10.1016/j.clinbiomech.2014.06.011.

Hsu WH,* Lewis CL, Monaghan GM,* Saltzman E, Hamill J, Holt KG. Orthoses posted in both the forefoot and rearfoot reduce moments and angular impulses on lower extremity joints during walking. *Journal of Biomechanics*. 2014; 47(11):2618-25. doi: 10.1016/j.jbiomech.2014.05.021.

Millis MB, Lewis CL, Schoenecker PL, Clohisy JC. Legg-Calvé-Perthes disease and slipped capital femoral epiphysis: major developmental causes of femoroacetabular impingement. *Journal of American Academy of Orthopaedic Surgeons*, 2013; 21(suppl 1):S59-S63.

Caron RR,* Wagenaar RC, Lewis CL, Saltzman E, Holt KG. Center of mass trajectory and orientation to ankle and knee in sagittal plane is maintained with forward lean when backpack load changes during treadmill walking. *Journal of Biomechanics*, 2013; 46(1):70-76. doi: 10.1016/j.jbiomech.2012.10.004

Monaghan GM,* Lewis CL, Hsu WH,* Saltzman E, Hamill J, Holt KG. Forefoot angle determines duration and amplitude of pronation during walking. *Gait and Posture,* 2013; 38(1):8-13. doi: 10.1016/j.gaitpost.2012.10.003

Lewis CL, Ferris DP. Invariant hip moment pattern while walking with a robotic hip exoskeleton. *Journal of Biomechanics,* 2011; 44(5):789-793. doi: 10.1016/j.jbiomech.2011.01.030

Lewis CL, Sahrmann SA, Moran DW. Effect of hip angle on anterior hip joint force during gait. *Gait & Posture,* 2010; 32(4):603-607. doi: 10.1016/j.gaitpost.2010.09.001

Kao PC,* Lewis CL, Ferris DP. Short-term locomotor adaptation to a robotic ankle exoskeleton does not alter soleus Hoffmann reflex amplitude. *Journal of NeuroEngineering and Rehabilitation*, 2010; 7:33. doi: 10.1186/1743-0003-7-33

Kao PC,* Lewis CL, Ferris DP. Joint kinetic response during unexpectedly reduced plantar flexor torque provided by a robotic ankle exoskeleton during walking. *Journal of Biomechanics,* 2010; 43(7):1401-1407. doi: 10.1016/j.jbiomech.2009.12.024

Lewis CL. Extra-articular snapping hip: a literature review. *Sports Health: A Multidisciplinary Approach,* 2010; 2(3):186-190.

Kao PC,* Lewis CL, Ferris DP. Invariant ankle moment patterns when walking with and without a robotic ankle exoskeleton. *Journal of Biomechanics,* 2010; 43(2):203-9. doi: 10.1016/j.jbiomech.2009.09.030

Charnock BL, Lewis CL, Garrett WE, Queen RM. Adductor longus mechanics during the maximal effort soccer kick. *Sports Biomechanics,* 2009; 8(3):223-34. doi: 10.1080/14763140903229500

Ferris DP, Lewis CL. Robotic lower limb exoskeletons using proportional myoelectric control. *Conference Proceedings IEEE Engineering in Medicine and Biology Society,* 2009; 2119-24. doi: 10.1109/IEMBS.2009.5333984

Sawicki GS, Lewis CL, Ferris DP. It pays to have a spring in your step. *Exercise and Sport Sciences Reviews,* 2009; 37(3):130-8. doi: 10.1097/JES.0b013e31819c2df6

Lewis CL, Sahrmann SA. Muscle activation and movement patterns during prone hip extension exercise in females. *Journal of Athletic Training,* 2009; 44(3):238-48. doi: 10.4085/1062-6050-44.3.238

Lewis CL, Sahrmann SA, Moran DW. Effect of position and alteration in synergist muscle force contribution on hip forces when performing hip strengthening exercises. *Clinical Biomechanics,* 2009; 24(1):35-42. doi: 10.1016/j.clinbiomech.2008.09.006

Lewis CL, Ferris DP. Walking with increased pushoff decreases hip muscle moments. *Journal of Biomechanics,* 2008; 41:2082-2089. doi: 10.1016/j.jbiomech.2008.05.013

Lewis CL, Sahrmann SA, Moran DW. Anterior hip joint force increases with hip extension, decreased gluteal force, or decreased iliopsoas force. *Journal of Biomechanics,* 2007; 40(16):3725-3731.

Lewis CL, Sahrmann SA. Acetabular labral tears. *Physical Therap*y, 2006; 86(1):110-121.

Klaesner JW, Hastings MK, Zou D, Lewis C, Mueller MJ. Plantar tissue stiffness in patients with diabetes mellitus and peripheral neuropathy. *Archives of Physical Medicine and Rehabilitation,* 2002; 83(12):1796-801.

Peer Reviewed Scientific and Professional Presentations:

Hip biomechanics
6th Annual New England Sports & Orthopedic Rehabilitation Summit: Hip Management, Preservation, Rehabilitation, and Surgery Throughout the Lifespan, Providence, RI
April 2018

Reinterpreting the role of strength in movement in individuals with hip pain
Combined Sections Meeting of the American Physical Therapy Association, New Orleans, LA
February 2018

Gait and motion: interaction of structure and movement
Hip and Pelvis Structure: A Cross-Pollination Collaborative, Seattle, WA
October 2017

Movement analysis and gait retraining.
Part of: Osteoarthritis examined from full human to cellular perspectives: ASB-OARSI symposium sympatico.
Annual Conference of the American Society of Biomechanics*,* Boulder, CO
August 2017

Neuromuscular control of the hip
2017 Northern New England Athletic Training Conference, Manchester, NH
June 2017

Biomechanical evaluation and treatment of the young athlete's hip
American College of Sports Medicine's 64th Annual Meeting, 8th World Congress of Exercise is Medicine® and World Congress on the Basic Science of Exercise and the Brain, Denver, CO
May 2017

Femoroacetabular impingement syndrome: alterations in movement
Movement System Impairment (MSI) Retreat, Columbia, IL
March 2017

Biomechanics and neuromuscular control of the hip
The Ohio State University Wexner Medical Center 6th Annual Hip Symposium, Columbus, OH
December 2016

Why task matters: How small movement modifications make big differences
International Society for Hip Arthroplasty (ISHA) 2016 Annual Scientific Meeting, San Francisco, CA
September 2016

Functional outcomes assessment in patients with femoroacetabular impingement
Gait & Clinical Movement Analysis Society 2016 Annual Conference, Memphis, TN
May 2016

What kind of year has it been? Updates on hip muscle activation during movement
Movement System Impairment (MSI) Retreat, Columbia, IL

March 2016

Rethinking femoroacetabular impingement: Is it really abnormal? Is surgery really necessary?
Combined Sections Meeting of the American Physical Therapy Association, Anaheim, CA, February 2016

What can be achieved with physiotherapy / physical therapy?
Annual Scientific Meeting of the International Society for Hip Arthroscopy, Cambridge, England
September 2015

Neuromuscular rehabilitation of FAI
Annual Scientific Meeting of the International
Society for Hip Arthroscopy, Cambridge, England
September 2015

Normal neuromuscular function of the hip
Annual Scientific Meeting of the International Society for Hip Arthroscopy, Cambridge, England
September 2015

Hip evo devo: adaptation of the hip in phylogeny and ontogeny
Orthopaedic Research Society 2015 Annual Meeting, Las Vegas, NV
March 2015

Hip research update: new publications
Movement System Impairment (MSI) Retreat, Columbia, IL
March 2015

Acetabular labral tears revisited: understanding the current evidence and how it shapes our interventions
Combined Sections Meeting of the American Physical Therapy Association, Indianapolis, IN
February 2015

Hip structure and implications for rehabilitation
The New England Sports and Orthopedic Rehabilitation Summit 2014, Advances in Rehabilitation of the Lower Extremity, Providence, RI
April 2014

Hip research update: initial findings
Movement System Impairment (MSI) Retreat, Columbia, IL
March 2014

Diary of a joint: adaptation of hip structure over time
Physios in Sport (UK) Biennial Conference. Glasgow, Scotland, UK
October 2013

Biomechanical and anatomical considerations in evaluation and treatment of the adult hip
APTA of MA's 2013 Annual Conference and Exposition. Boston, MA
October 2013

Biomechanical analysis of young adults with hip pain
Movement System Impairment (MSI) Retreat, Columbia, IL
March 2013

Rehab of young adults with intra-articular hip disorders
Combined Sections Meeting of the American Physical Therapy Association, San Diego, CA
January 2013

Hip pain in young adults
Movement System Impairment (MSI) Retreat, Innsbrook, MO
March 2012

Changing your gait to save your hip
Spaulding Hospital Research Seminar, Boston, MA
May 2011

Hip joint forces with exercise and gait
Movement System Impairment (MSI) Retreat, Innsbrook, MO
March 2011

Movement pattern differences in young adults with and without hip pain
Presented at CREST Seminar, Boston University, Boston, MA
February 2011

Robotic lower limb exoskeletons for human locomotion
The 2010 joint meeting of the Gait and Clinical Movement Analysis Society and the European Society of Movement Analysis in Adults and Children (JEGM 2010), Miami, FL
May 2010

Building a robotic lower limb exoskeleton
American Society of Biomechanics Annual Meeting Tutorial, State College, PA
August 2009

Anterior hip forces: effect of movement and muscle recruitment patterns
PT 2005: Annual Conference & Exposition of the American Physical Therapy Association, Boston, MA
June 2005

Theory on etiology and management of anterior hip pain
The Marilyn Gossman Graduate Student Seminar, APTA Combined Sections Meeting, Tampa, FL
February 2003

Invited Speaker Presentations:

Neuromuscular rehabilitation of FAI. From FAI to OA: Updates on the changing landscape of the conservative management of hip pain,
Shirley Ryan AbilityLab, Chicago, IL
April 2017

Assessing neuromuscular control of the hip. From FAI to OA: Updates on the changing landscape of the conservative management of hip pain
Shirley Ryan AbilityLab, Chicago, IL
April 2017

Hip pain in the runner
The 2016 Micheli Lecture: The Science of Running: Injury and Prevention, Boston, MA
September 2016

Neuromuscular control of the hip: implications throughout the lower extremity
Biomechanical Approaches to Treating the Lower Extremity & Their Clinical Implications, Boston, MA
February 2015

Biomechanical considerations of the hip.
Pediatric and Young Adult Hip Conference Boston Children's Hospital, Boston, MA
May 2014

Hip Structure and Sport: what we can and cannot change
The International Festival of Athletics Coaching, Glasgow, Scotland, UK
October 2013

Interaction of the athlete with the environment: Lower limb mechanics and injury
Profile of a Modern Day Athlete, Glasgow, Scotland, UK
October 2013

The controversial role of structure in hip pain
MGH Sports Medicine Seminar, Boston, MA
April 2012

Reducing joint forces at the hip
Kinesiology Department Seminar, University of Massachusetts, Amherst, MA
February 2011

Altering Hip Mechanics during Ambulation
The Boston Action Club, Northeastern University, Boston, MA
January 2010

Practical applications of biomechanics
Guest Lecturer for Biological and Behavioral Bases of Human Movement, University of Michigan, Ann Arbor, MI
April 2009

Anterior Hip Pain: Ankle, Angles and Ambulation
Grand Rounds, the Cleveland Clinic, Cleveland, OH
January 2009

Altering Hip Mechanics during Ambulation
PT Research Seminar, Washington University, School of Medicine, St. Louis, MO
January 2009

Powered Orthoses for Gait Rehabilitation
Michigan Orthotics & Prosthetics Association 2008 O & P Educational Seminar, Kalamazoo, MI
June 2008

Modification of hip moments during gait
PT Research Seminar, Washington University, School of Medicine, St. Louis, MO
May 2007

Application of musculoskeletal modeling: effect of movement and muscle activation patterns on anterior hip joint forces
Guest Lecturer for Quantitative Physiology, Washington University in St. Louis, Department of Biomedical Engineering, St. Louis, MO
November 2005

Using a musculoskeletal model to test the effect of movement and muscle recruitment on anterior hip forces
Muscle Physiology Laboratory, University of California, San Diego, CA
August 2005

Effect of movement and muscle recruitment on anterior hip joint forces
Sensory Motor Performance Program Laboratory, Rehabilitation Institute of Chicago, Chicago, IL

July 2005

Anterior hip forces: effect of movement and muscle recruitment patterns
Kinesiology Seminar, University of Michigan, Ann Arbor, MI
June 2005

Motor contributions to musculoskeletal pain syndromes
Guest Lecturer for Motor Control and Motor Learning, Washington University, Program in Physical Therapy, St. Louis, MO
June 2005

Timing of muscle recruitment during prone hip extension in people with and without anterior hip pain
PT Research Seminar, Washington University, School of Medicine, St. Louis, MO
March 2005

Using research (methods) to augment physical therapy evaluation
Guest Lecturer for Case Integration, Washington University, Program in Physical Therapy, St. Louis, MO
January 2005

Altered gait and muscle recruitment leads to increased anterior forces on the acetabulum and anterior hip pain
PT Research Seminar, Washington University, School of Medicine, St. Louis, MO
March 2004

Anterior hip pain: etiology and physical therapy management
Physical Therapy Seminar, Saint Louis University, School of Allied Health Professions, St. Louis, MO
March 2003

Biomechanical modeling of indentation testing and application in nonlinear FEA of the diabetic foot
PT Research Seminar, Washington University, School of Medicine, St. Louis, MO
March 2002

Funded/In Review Grant Activity:

Role: Co-mentor
Award Amount: $375,000
Identifying cases of patellofemoral joint osteoarthritis and their hip impairments
It well accepted that hip impairments contribute to the development of patellofemoral pain syndrome. However, it is not known if these same impairments are involved in the development of patellofemoral osteoarthritis. The goal of this project is better understand the role of hip dysfunction in patellofemoral osteoarthritis.
7/1/2014 – 6/30/2017, American College of Rheumatology, Investigator Award (PI: Joshua Stefanik)

Role: Fellow
Award Amount: £4,390
Harmonising hip-specific motion analysis and screening protocols
The overall objective of this fellowship is to harmonise motion capture and hip screening test protocols to facilitate multi-center investigation of hip disease in adolescents and young adults. Multi-center collaboration is essential to advancing the understanding of pre-arthritic hip disease and to develop evaluation and intervention strategies to slow or prevent the progression to hip osteoarthritis.
01/01/2016 – 02/28/2017, Arthritis Research UK Centre For Sport, Exercise and Osteoarthritis (PI: Cara L. Lewis)

Role: PI

Award Amount: $275,000
Sex-specific movement differences in young adults with and without hip pain
This study aims to determine sex-specific differences in movement patterns in adults with hip pain in order to develop sex-specific rehabilitation and prevention programs. This study is an extension of the internally funded project with the same name.
8/1/2012 – 7/31/2014, NIH R21 AR061690 (PI: Cara L. Lewis)

Role: Co-Investigator
Award Amount: $25,480
Clinical Planning Grant on Motion Analysis in Femoroacetabular Impingement
The goal of this clinical trials planning grant is to develop a multi-center clinical trial to assess the biomechanics of patients with femoroacetabular impingement during functional and activity specific task.
6/1/2014 – 5/31/2015, Pediatric Orthopaedic Society of North America (POSNA), Clinical Trials Planning Grant (PI: David Podeszwa)

Role: PI
Award Amount: $7,000
Compliant Nonlinear Quasi-Passive Knee Orthotic
The goal of this project was to develop a novel non-linear torsion orthotic knee brace.
3/1/2012 – 02/28/2014, NSF SBIR IIP-1152605 (PI: John Rokosz)

Role: PI
Award Amount: $7,000
Limb-specific differences in movement patterns in people with hip pain
The aim of this study was to evaluate side-to-side differences in movement patterns in people with hip pain and compare these differences to people without hip pain.
7/1/2012 – 12/31/2013, Boston University Dudley Allen Sargent Research Fund (PI: Cara L. Lewis)

Role: Professor
Award Amount: $120,000
Peter Paul Career Development Professorship
The purpose of this funding was to provide salary and research support for three years to promising new faculty who have been at Boston University for less than two years. Only three of these prestigious professorships are awarded each year.
7/1/2010 – 6/30/2013, Boston University

Role: Scholar
Award Amount: $92,000
Sex-specific movement differences in young adults with and without hip pain
The goal of this internal mentored career development award was to determine if there are sex-specific differences in movement patterns in young adults with and without hip pain.
1/1/2011 – 12/31/2012, Boston University Clinical and Translational Science Award (CTSA) Program KL2, NIH KL2 TR00158 (PI: David Center)

Role: PI
Award Amount: $23,000
Orthopedic Gait Rehabilitation with a Robotic Hip Exoskeleton
This funding was for pilot work related to a robotic hip exoskeleton which can provide assistance or resistance to hip flexion or extension. The long term aim is to use this device as a rehabilitation tool.
9/1/2012 – 4/30/2013, NIH UL TR00157 (PI: David Center)

Role: Trainee
Award Amount: $96,472
Upper limb control of robotic lower limb assistance during walking

The original aims of this project were to determine 1) if humans modify upper limb muscle activity and/or movement during treadmill walking to control plantar flexion assistance from a robotic ankle-foot orthosis (AFO), and 2) if one controller allowed the user to adapt faster or gain more assistance from the AFO than the other controllers. This project was later modified to include the development of a pneumatically powered hip orthosis to test motor adaptation and the interplay between ankle and hip during gait.
7/10/2007 – 7/9/2009, NIH/NICHD F32 HD055010-02 (PI: Cara L. Lewis)

Current/Active Research Activity:

Role: PI
Effect of femoroacetabular impingement (FAI) on hip motion in young adults
This mentored patient-oriented research career development award focuses specifically on movement patterns which may contribute to pain in young adults with FAI in order to develop effective non-surgical treatment options.
Award Amount: $605,000, 9/1/2013 – 8/31/2018, NIH K23 AR063235 (grant)

Role: Co-I
Multicenter Osteoarthritis Study (MOST) Second Renewal – Boston University
This renewal of the multicenter research study focuses on new prevention opportunities and also on novel ways to understand and ultimately limit the impact of knee arthritis on the daily lives of those affected.
Award Amount: $4,686,647, 07/01/2015 – 05/31/2020, NIH U01 AG018820 (PI: David T. Felson) (grant)

Role: PI
Movement patterns in individuals with femoroacetabular impingement syndrome
This funding supports collaborative work at the University of Utah using high-speed dual fluoroscopy to investigate hip joint arthrokinematics simultaneously with whole body osteokinematics.
Award Amount: $6,000, 05/01/2017 – 03/31/2018, Mini-sabbatical: Boston University Clinical and Translational Science (BU-CTSI) (grant)

Role: PI
Lower extremity movement screening in individuals with musculoskeletal hip pain
This pilot award is to establish the reliability and validity of a video-based assessment of a movement screen in individual with hip pain and individuals without hip pain.
Award Amount: $19,820, 01/01/2018 – 12/31/2018, Integrated Pilot Grant Program: Boston University Clinical and Translational Science Institute (BU-CTSI) (grant)

Role: PI
Movement screening and modification in individuals with femoroacetabular impingement syndrome
The purpose of this study is to test typical movement patterns in individuals with FAIS and determine if these patterns can be easily modified when given simple cues. Additionally, this study aims to shift the work from the 3D motion capture to the clinic setting.
Award Amount: $164,625, 03/01/2018 – 02/29/2020, NIH R03 AR072808 (grant)

Membership in Scientific/Professional Organizations:

American Physical Therapy Association (APTA)
(from 1996 to present)

American Society of Biomechanics (ASB)
(from 2002 to present)

Federation of State Boards of Physical Therapy (FSBPT)
(from 1999 to present)

Gait and Clinical Movement Analysis Society (GCMAS)

(from 2011 to 2015)

Orthopaedic Research Society (ORS)
(from 2015 to present)

Consultative and Advisory Positions Held:

Invited participant, NIH 8th Annual Symposium on Advances in Pain Research
National Institutes of Health
2013

Member, Item Writing Task Force
Federation of State Boards of Physical Therapy
2011

Advanced Item Writer, National Physical Therapy Examination
Federation of State Boards of Physical Therapy
2004-present

Community Service:

Advanced Item Writer
Federation of State Boards of Physical Therapy
(from 2004 to present)

Chair, multiple sessions of APTA Annual Conference
American Physical Therapy Association (APTA)
(2010)

Session Moderator, GCMAS Conference
Gait and Clinical Movement Analysis Society (GCMAS)
(2011)

Member, Eugene Michel's Forum Committee Member, Section on Research
APTA
(from 2011 to 2015)

Item Writing Task Force
Federation of State Boards of Physical Therapy
(from 2011 to 2014)

Session Moderator, ASB Annual Conference
American Society of Biomechanics (ASB)
(2012)

Abstract Reviewer, GCMAS Annual Conference
GCMAS
(from 2012 to present)

Editorial Assistant, ASB Newsletter
ASB
(from 2013 to present)

Chair, Eugene Michel's Forum Committee Member, Section on Research
APTA
(from 2014 to 2015)

Member, ASB Program Committee

ASB
(2014)

Chair, Women in Science event
7th World Congress of Biomechanics
(2014)

Abstract Reviewer, ASB Annual Conference
ASB
(from 2015 to 2018)

Nominating Committee Member, ASB
ASB
(from 2015 to 2016)

Session Moderator, ASB Annual Conference
ASB
(from 2016 to 2017)

Abstract Reviewer, ORS Annual Conference
Orthopaedic Research Society (ORS)
(from 2017 to 2018)

Session Moderator, Combined Sections Meeting of the APTA
APTA
(2017)

International Editorial Review Board (IERB)
Journal of Orthopaedic & Sports Physical Therapy
(from 2018 to present)

Services to the University/College/School on Committees/Councils/Commissions:

Sargent College
September 2009 to May 2018
Advisor for PhD students in Rehabilitation Sciences Program

Sargent College
2009 to present
Member, Admissions Committee

Sargent College
2013 to present
Chair, Human Movement and Adaptation Curriculum Committee

Sargent College
2016 to present
Member, Steering Committee

Department of Physical Therapy & Athletic Training
2009-present
Advisor for DPT students (16 students/year)

Department of Physical Therapy & Athletic Training
2010-present
Advisor for Academic Practicum(12 students)

Department of Physical Therapy & Athletic Training
2009-2010
Member, Biomechanics Task Force

Department of Physical Therapy & Athletic Training
2010-2013
Member, Curriculum Committee

Department of Physical Therapy & Athletic Training
2009-2011
Member, Chair Search Committee

Department of Physical Therapy & Athletic Training
2010-2013
Chair, Visibility Task Force

Department of Physical Therapy & Athletic Training
2011-2013
Member, Sports Medicine Search Committee

Department of Physical Therapy & Athletic Training
2015-2016
Chair, Junior Tenure Track Faculty Search Committee

Honors and Awards:

Recipient, Early Career Investigator Award in Biomechanics Research, Biomechanics Special Interest Group of the Section on Research
American Physical Therapy Association
2017

Recipient, Eugene Michels New Investigator Award
American Physical Therapy Association
2016

Recipient, Arthritis Research Fellowship (£4,390)
UK Centre for Sport, Exercise and Osteoarthritis
2015

Invited Participant, Early Career Women Faculty Professional Development Seminar
Association of American Medical Colleges
2014

Recipient, UROP Outstanding Mentor Award
Boston University
2014

Recipient, Outstanding Service Award
Federation of State Boards of Physical Therapy
2011

Recipient, NIH Clinical and Translational Science Institute KL2 Scholar
National Institutes of Health
2011

Peter Paul Career Development Professorship ($120,000 total award)
Boston University

2010

Inductee, Academy of Advanced Item Writers
Federation of State Boards of Physical Therapy
2010

Invited Participant, ERRIS Intensive Workshop on Grant Writing, Preparation, and Submission in Rehabilitation Research
University of Virginia, Charlottesville, Virginia
2009

Recipient, NIH Kirschstein-NRSA Individual Post-Doctoral Research Fellowship
National Institutes of Health
2007-2009

Recipient, NIH Kirschstein-NRSA Institutional Post-Doctoral Research Fellowship
National Institutes of Health
2006

Recipient, Kirschstein-NRSA Institutional Pre-Doctoral Research Fellowship
National Institutes of Health
2000-03

Member, Examination Construction and Review Committee for the National Physical Therapy Examination
Federation of State Boards of Physical Therapy
1999-04

Continuing Education Attended:

Sports Medicine Association Annual Conference, Perth, Australia, October, 2018.

International Society for Hip Arthroplasty (ISHA) 2018 Annual Scientific Meeting, Melbourne, Australia, October, 2018.

Hospital for Special Surgery: Advances in Hip Preservation: Surgery, Rehabilitation and Sports Performance. New York, NY, August, 2018.

Annual Conference of the American Society of Biomechanics, Rochester, MN, August 2018. Included the Teaching Symposium on integrating lab type experiences in lecture format classes.

6th Annual New England Sports & Orthopedic Rehabilitation Summit: Hip Management, Preservation, Rehabilitation, and Surgery Throughout the Lifespan, Providence, RI, April, 2018.
Movement System Impairment (MSI) Retreat, Columbia, IL, March, 2018

Combined Sections Meeting of the American Physical Therapy Association, New Orleans, LA, February, 2018.

Hip and Pelvis Structure: A Cross-Pollination Collaborative, Seattle, WA, October, 2017.

Pain – Biology to Behavioural Change, Boston University, Boston MA Oct 2017

APTA of MA Annual Conference, Norwood, MA, October 2017.

Annual Conference of the American Society of Biomechanics, Boulder, CO, August, 2017.

Northern New England Athletic Training Conference, Manchester, NH, June, 2017.

American College of Sports Medicine's 64th Annual Meeting, 8th World Congress of Exercise is Medicine® and World Congress on the Basic Science of Exercise and the Brain, Denver, CO, May, 2017.

From FAI to OA: Updates on the changing landscape of the conservative management of hip pain, Shirley Ryan AbilityLab, Chicago, IL, April, 2017.

Annual Meeting of the Orthopaedic Research Society, San Diego, CA, March, 2017.

Movement System Impairment (MSI) Retreat, Columbia, IL, March, 2017 including the pre-retreat meeting focusing on integrating the movement system into teaching and curriculum.

Combined Sections Meeting of the American Physical Therapy Association, San Antonio, TX, February, 2017.

The Ohio State University Wexner Medical Center 6th Annual Hip Symposium, Columbus, OH, December, 2016.

The 2016 Micheli Lecture: The Science of Running: Injury and Prevention, Boston, MA, September, 2016.

International Society for Hip Arthroplasty (ISHA) 2016 Annual Scientific Meeting, San Francisco, CA. September, 2016.

40th Annual Meeting of the American Society of Biomechanics, Raleigh, NC, August, 2016.

Biomechanics and Neural Control of Movement, Mt. Sterling, OH, June, 2016.

Gait & Clinical Movement Analysis Society 2016 Annual Conference, Memphis, TN, May, 2016.

Movement System Impairment (MSI) Retreat, Columbia, IL, March, 2016.

Orthopaedic Research Society, Orlando, FL, March, 2016.

Combined Sections Meeting of the American Physical Therapy Association, Anaheim, CA, February, 2016.

Annual Scientific Meeting of the International Society for Hip Arthroscopy, Cambridge, England, September, 2015.

39th Annual Meeting of the American Society of Biomechanics, Columbus, OH, August, 2015.

Orthopaedic Research Society 2015 Annual Meeting, Las Vegas, NV, March, 2015.

Movement System Impairment (MSI) Retreat, Columbia, IL, March, 2015.

Biomechanical Approaches to Treating the Lower Extremity & Their Clinical Implications, Boston, MA, February, 2015

Combined Sections Meeting of the American Physical Therapy Association, Indianapolis, IN, February, 2015.

Gait and Clinical Movement Analysis Society (GCMAS), Newark, DE, June, 2014.

Pediatric and Young Adult Hip Conference, Boston Children's Hospital, Boston, MA, May, 2014.

The New England Sports and Orthopedic Rehabilitation Summit 2014, Advances in Rehabilitation of the Lower Extremity, Providence, RI, April, 2014.

Movement System Impairment (MSI) Retreat, Columbia, IL, March, 2014.

Combined Sections Meeting of the American Physical Therapy Association, Las Vegas, NV, February, 2014.

Physios in Sport (UK) Biennial Conference. Glasgow, Scotland, UK, October, 2013.

The International Festival of Athletics Coaching, Glasgow, Scotland, UK, October, 2013.

Profile of a Modern Day Athlete, Glasgow, Scotland, UK, October, 2013.

APTA of MA's 2013 Annual Conference and Exposition. Boston, MA, October, 2013.

Movement System Impairment (MSI) Retreat, Columbia, IL, March, 2013.

Combined Sections Meeting of the American Physical Therapy Association, San Diego, CA, January, 2013.

Current Teaching Responsibilities in the Entry-Level for the Academic Year of Site Visit:

Summer 2018:
None (sabbatical)

Fall 2018:
None (sabbatical)

Spring 2019:
None (sabbatical)