

# Lynn Snyder-Mackler



Department of Physical Therapy  
University of Delaware  
309 McKinly Lab  
Newark, DE 19716

## PROFESSIONAL

Education  
Professional History  
Professional Organizations  
Honors & Awards  
Service

## RESEARCH

Current Research  
Current Grants  
Selected Publications  
Selected Presentations  
PT Research Labs  
Resources for Undergraduate Researchers

## ACADEMICS & OTHER

UD Courses Taught  
Doctoral Student Advising  
Service  
Clinical Practice  
Former PhD Students

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## EDUCATION

- Sc.D. in Applied Anatomy and Physiology from Boston University, Boston, MA 1990
- M.S. in Organizational Behavior from The University of Pennsylvania, Philadelphia, PA 1984
- P.G. Cert. in Physical Therapy from The University of Pennsylvania, Philadelphia, PA 1980
- B.A. in Quantitative Studies from The Johns Hopkins University, Baltimore, MD 1978

## PROFESSIONAL HISTORY

- *Professor*, Department of Physical Therapy and Interdisciplinary Graduate Program in Biomechanics and Movement Sciences, Center for Biomedical Engineering Research, University of Delaware, Newark, DE. 12/89-present
  - Academic Liaison Physical Therapy Clinic
  - Director, Sports Physical Therapy Residency
- *Assistant Professor*, Department of Physical Therapy, Boston University, Boston, MA 9/86-12/89
- *Assistant Professor*, Department of Physical Therapy, Temple University, Philadelphia, PA 9/83-6/89

## PROFESSIONAL ORGANIZATIONS/SOCIETIES

- American Physical Therapy Association
- International Society for Electrophysiology and Kinesiology
- Orthopedic Research Society
- American College of Sports Medicine

- National Athletic Trainers Association

## SELECTED PUBLICATIONS

### Articles in Peer-Reviewed Journals (selected 1991 to present):

Snyder-Mackler L, Ladin Z, Schepsis AA, Young JC: Electrical stimulation of thigh muscles after reconstruction of the anterior cruciate ligament. *J Bone Joint Surg* 73-A:1025-1036, 1991

Snyder-Mackler L, Binder-Macleod SA, Williams PR: Fatigueability of human quadriceps femoris muscle following anterior cruciate ligament reconstruction. *Med Sci Sports Exer* 25:783-789, 1993

Binder-Macleod SA, Snyder-Mackler L: Muscle fatigue: Clinical implications for fatigue assessment and neuromuscular electrical stimulation. *Phys Ther* 73:902-910, 1993

Snyder-Mackler L, De Luca PF, Williams PR, Eastlack ME, Bartolozzi AR: Reflex inhibition after injury or reconstruction of the anterior cruciate ligament. *J Bone Joint Surg* 76-A: 555-560, 1994

Snyder-Mackler L, Delitto A, Stralka SW, Bailey S: Use of Electrical Stimulation to Enhance Recovery of Quadriceps Femoris Muscle Force Production in Patients Following Anterior Cruciate Ligament Reconstruction. *Phys Ther* 74:901-907, 1994

Snyder-Mackler L, Delitto A, Bailey S, Stralka SW: Quadriceps Femoris Muscle Strength and Functional Recovery After Anterior Cruciate Ligament Reconstruction: A Prospective Randomized Clinical Trial of Electrical Stimulation. *J Bone Joint Surg* 77-A:1166-1173, 1995

Delitto A, Snyder-Mackler L: The Process of Clinical Classification in Physical Therapy. *Phys Ther* 75:203-211, 1995

Snyder-Mackler L, Fitzgerald GK, Bartolozzi AR, Ciccotti MG: Passive joint laxity and functional outcome after anterior cruciate ligament injury. *Am J Sports Med* 25:191-195, 1997.

Axe MJ, Snyder-Mackler L, Konin J, Strube MJ: Development of a distance based interval throwing program for Little League™ age athletes. *Am J Sports Med* 24:594-602, 1996

Manal TJ, Snyder-Mackler L: Practice guidelines for anterior cruciate ligament rehabilitation: A criterion-based rehabilitation program. *Operative Techniques in Orthopaedics* 6:190-196, 1996

Rudolph, K.S.; Eastlack, M.E.; Axe, M.J.; Snyder-Mackler, L. 1998 Basmajian Student Award Paper: Movement patterns after anterior cruciate ligament injury: a comparison of patients who compensate well for the injury and those who require operative stabilization. *J Electromyogr Kinesiol*, 8(6): 349-362, 1998.

Irrgang JJ, Snyder-Mackler L, Wainner RS, Fu F, Harner C: Development of a patient-reported measure of function for the knee. *J Bone Joint Surg* 80-A:1132-1145, 1998

Fees M, Decker T, Snyder-Mackler L, Axe MJ. Upper Extremity Weight-Training Modifications for the Injured Athlete. *Am J Sports Med* 26:732-742, 1998.

Eastlack ME, Axe MJ, Snyder-Mackler L: Laxity, Instability and Functional Outcome After Anterior Cruciate Ligament Injury: Copers versus Non-copers. *Med Sci Sports Exer* 1999 Feb;31(2):210-5.

Schmitt L, Snyder-Mackler L: Role of scapular stabilizers in etiology and treatment of impingement syndrome. *J Orthop Sports Phys Ther.* 1999 Jan;29(1):31-8

Fitzgerald GK, Axe MJ, Snyder\_Mackler L. The efficacy of perturbation training in nonoperative anterior cruciate ligament rehabilitation programs for physical active individuals. *Phys Ther.* 2000 Feb;80(2):128\_40.

Fitzgerald GK, Axe MJ, Snyder\_Mackler L. Proposed practice guidelines for nonoperative anterior cruciate

ligament rehabilitation of physically active individuals. J Orthop Sports Phys Ther. 2000 Apr;30(4):194\_203

Fitzgerald GK, Axe MJ, Snyder\_Mackler L. A decision\_making scheme for returning patients to high\_level activity with nonoperative treatment after anterior cruciate ligament rupture.

Rudolph K.S., Axe, M.J., Snyder-Mackler, L. Dynamic Stability in the ACL deficient knee: Who can hop? Knee Surg Sports Traumatol Arthrosc. 2000;8(5):262-9

Manal TJ, Snyder-Mackler L. Failure of voluntary activation of the quadriceps femoris muscle after patellar contusion. J Orthop Sports Phys Ther. 2000 Nov;30(11):655-60; discussion 661-3.

Stackhouse SK, Stevens JE, Lee SC, Pearce KM, Snyder-Mackler L, Binder-Macleod SA. Maximum voluntary activation in nonfatigued and fatigued muscle of young and elderly individuals. Phys Ther. 2001 May;81(5):1102-9.

Axe MJ, Wickham R, Snyder-Mackler L. Data-based interval throwing programs for little league, high school, college, and professional baseball pitchers. Sports Medicine and Arthroscopy Review. 9:24-34, 2001.

Rudolph K.S., Axe, M.J., Buchanan, T.S., Scholz, J.P., Snyder-Mackler, L. Dynamic Stability in the ACL deficient knee. Knee Surg Sports Traumatol Arthrosc. 2001;9(2):62-71

Stevens JE, Binder-Macleod S, Snyder-Mackler L. Characterization of the human quadriceps muscle in active elders. Arch Phys Med Rehabil. 2001 Jul;82(7):973-8.

Chmielewski, T.L., Rudolph, K.S., Fitzgerald, G.K., Axe, M.J., Snyder-Mackler, L. Biomechanical Evidence Supporting a Differential Response to Acute ACL Injury. Clinical Biomechanics. 2001 Aug;16(7):586-91.

Lewek M, Stevens JE, Snyder-Mackler L. Use of electrical stimulation to increase quadriceps femoris muscle force in an elderly patient following a total knee arthroplasty. Phys Ther 81:1565-1571, 2001

Williams, G.N., Chmielewski, T.L., Rudolph, K.S., Buchanan, T.S., Snyder-Mackler, L. Dynamic knee stability: Current theory and implications for clinicians and scientists. J Orthop Sports Phys Ther, 2001 Oct;31(10):546-66).

Axe MJ, Windley TC, Snyder-Mackler L. Data-Based Interval Throwing Programs for Baseball Position Players from Age 13 to College Levels. J Sports Rehabil. 10:255-274, 2001

Lewek, M., Rudolph, K.S., Axe, M.J., Snyder-Mackler, L. The effect of insufficient quad strength on gait after anterior cruciate ligament reconstruction. Clin Biomech 2002 Jan, 17(1):56-63

## **CURRENT GRANTS**

Grant Number:5R01AR046386-03NIAMS. Project Title:ACL Deficient Knee-MRI and Biomechanical Modeling (PI Buchanan, Thomas S.) 01-JUN-1999 - 31-MAY-2004

Grant Number:5R01HD037985-02NICHD Project Title:Dynamic Stability In The ACL Injured Knee (PI Snyder-Mackler, Lynn) 08-FEB-2001 - 30-NOV-2004

Grant Number:1R21HD040956-01NICHD Project Title:Smart Fluid Devices for Physical Rehabilitation (PI Katherine Rudolph) 17-SEP-2001 to 30-JUN-2004

Grant Number:1P20RR016458-00003 NCRR Project Title:Osteoarthritis: prevention and treatment (PI Katherine Rudolph, co-PI Lynn Snyder-Mackler) 23-FEB-2002 - 31-JAN-2007

- Grant Number: 1R01HD041055-01A1 NICHD Project Title: NMES for Older Individuals After Total Knee Arthroplasty (PI Snyder-Mackler, Lynn) 15-Mar-2002 - 28-FEB-2007

## **SELECTED PROFESSIONAL PRESENTATIONS**

### **Invited Scientific and Research Presentations (1999-present):**

Regaining range of motion after sports injury. Invited Speaker. Second International Congress on Sports Rehabilitation and Sports Biomechanical Investigation. Perugia, Italy. January 1999.

Return to sports after injury. Second International Congress on Sports Rehabilitation and Sports by Mechanical Investigation. Perugia, Italy. January 1999.

The use of modalities: an American perspective. Invited Speaker. Second International Congress on Sports Rehabilitation and Sports Biomechanical Investigation. Perugia, Italy. January 1999.

Rehabilitation of the throwing athlete. Invited Speaker. Second International Congress on Sports Rehabilitation and Sports Biomechanical Investigation. January 1999.

Rehabilitation after surgical treatment of PCL injuries. Invited Speaker. Second International Congress on Sports Rehabilitation and Sports Biomechanical Investigation. Perugia, Italy. January 1999.

Electrotherapy: pain control. Invited Speaker. XII Congreso Nacional de Kinesiología. Santiago, Chile. May 1999.

Electrotherapy: neuromuscular electrical stimulation. Invited Speaker. XII Congreso Nacional de Kinesiología. Santiago, Chile. May 1999.

Electrotherapy: tissue repair. Invited Speaker. XII Congreso Nacional de Kinesiología. Santiago, Chile. May 1999.

Return to the Weight Room After Injury. Invited Speaker. 22<sup>nd</sup> National Conference of the National Strength and Conditioning Association. Kansas City, MO, June 1999

Muscular and Mechanical Adaptations to ACL Injury. Invited Speaker and Symposium Organizer, International Society of Biomechanics XVIIth Congress. Calgary, Alberta Canada, August 1999

Motion analysis and prediction of ACL deficient patient outcome. Invited Speaker. Third International Congress on Sports Rehabilitation and Sports Biomechanical Investigation. Perugia, Italy. December 1999.

Rehabilitation after Bone-patellar-tendon bone ACL reconstruction. Third International Congress on Sports Rehabilitation and Sports by Mechanical Investigation. Perugia, Italy. December 1999.

Measurement of strength after ACL reconstruction. Invited Speaker. Third International Congress on Sports Rehabilitation and Sports Biomechanical Investigation. Perugia, Italy. December 1999.

Rehabilitation after open Bankart repair. Invited Speaker. Third International Congress on Sports Rehabilitation and Sports Biomechanical Investigation. December 1999.

Proprioception and Neuromuscular Control of the Lower Extremity. Invited Speaker. Injuries in Baseball Conference, Tampa, FL, January 2000

Conditioning Program for the Softball Player. Invited Speaker. Injuries in Baseball Conference, Tampa, FL, January 2000.

Restoring Lower Extremity Proprioception and Neuromuscular control. Invited Speaker. Injuries in Baseball Conference, Tampa, FL, January 2000.

Rehabilitation of the Unstable shoulder. Invited Speaker. Norwegian Society of Physical Medicine, Sandefjord, Norway, March 2000.

Dynamic Knee Stability. Invited Speaker. Norwegian Society of Physical Medicine, Sandefjord,

Norway, March 2000

Return to play following ACL reconstruction Invited Speaker. The Panther Sports Medicine Symposium. The Knee: A New Millennium from Robotics to Gene Therapy. May 2000. Pittsburgh PA.

Dynamic Stability in the ACL Deficient and Reconstructed Knee. Invited Speaker. The Panther Sports Medicine Symposium. The Knee: A New Millennium from Robotics to Gene Therapy. May 2000. Pittsburgh PA.

Shoulder Rehabilitation in Sport. Invited Speaker. Swedish Society for Sports Medicine Annual Meeting. Stockholm, Sweden, May 2000

Screening test and rehabilitation guidelines for completing an athletic season after ACL rupture. Invited Speaker. Swedish Society for Sports Medicine Annual Meeting. Stockholm, Sweden, May 2000

Rehabilitation for patellofemoral pain. Invited Speaker. Swedish Society for Sports Medicine Annual Meeting. Stockholm, Sweden, May 2000

Rehabilitation after thermal capsulorrhaphy. Current Concepts in the Treatment and Rehabilitation of Sports Injuries 2000 University of Vermont Sports Medicine Conference, Burlington, VT September 2000

Principles for Non-surgical Treatment of Shoulder Injuries. Current Concepts in the Treatment and Rehabilitation of Sports Injuries 2000 University of Vermont Sports Medicine Conference, Burlington, VT September 2000

Rehabilitation of Muscle Injuries. Current Concepts in the Treatment and Rehabilitation of Sports Injuries 2000 University of Vermont Sports Medicine Conference, Burlington, VT September 2000

Screening Test and Rehab guidelines for Completing a Season after Early Season ACL Rupture. Current Concepts in the Treatment and Rehabilitation of Sports Injuries 2000 University of Vermont Sports Medicine Conference, Burlington, VT September 2000

Rehabilitation After ACL Surgery. How Aggressive Can We Be? ISAKOS Congress, Montreaux Switzerland, May 2001

Outcomes Measures in Clinical Research ISAKOS Congress, Montreaux Switzerland, May 2001

Optimal Loading of the ACL graft During Rehabilitation ACSM Baltimore, MD May 30-June 2, 2001

Dynamic Stability in the ACL Deficient Knee. Norwegian Sports Physical Therapy Congress, Tonsberg, Norway, June 2001

Neuromuscular Control and Dynamic Stability of the Shoulder Norwegian Sports Physical Therapy Congress, Tonsberg, Norway, June 2001

CNS Control of the ACL Deficient Knee. *The Many Faces of Osteoarthritis. Tahoe City, CA June 2001*

Electrical Stimulation for Tendinitis. Fifth International Congress on Sports Rehabilitation and Sports Biomechanical Investigation. Perugia, Italy. December 2001.

Iliotibial Band Friction Syndrome. Fifth International Congress on Sports Rehabilitation and Sports Biomechanical Investigation. Perugia, Italy. December 2001.

Why ACL deficient athletes respond differently in biomechanical. Fifth International Congress on Sports Rehabilitation and Sports Biomechanical Investigation. Perugia, Italy. December 2001.

**Slide and Poster Presentations (1999-present):**

- Fitzgerald GK, Axe MJ, Snyder-Mackler L: A comparison of two non-operative rehabilitation programs

for early return to high-level activity after ACL injury. Slide Presentation at 1999 APTA Combined Sections Meeting Seattle, WA. J Orthop Sports Phys Ther 29:A-23, 1999

Rudolph KS, Axe MJ, Snyder-Mackler L: Dynamic stability after ACL injury: Who can hop and who cannot? Slide Presentation at 1999 APTA Combined Sections Meeting Seattle, WA. J Orthop Sports Phys Ther 29:A-45, 1999

Stevens J, Binder-Macleod SA, Snyder-Mackler L: Characterization of the Quadriceps Muscle in Active Elders. Slide Presentation at 1999 APTA Combined Sections Meeting Seattle, WA. J Orthop Sports Phys Ther 29:A-45, 1999

Manal TJ, Snyder-Mackler L: Slide Presentation at 1999 APTA Combined Sections Meeting Seattle, WA. J Orthop Sports Phys Ther 29:A-45, 1999

Lee SA, Pearce K, Snyder-Mackler L, Binder-Macleod: Maximum Voluntary Recruitment in Fresh and Fatigued Muscle of Young and Elder Individuals FASEB Journal Vol 13(5), p. A690, #514.10. Experimental Biology '99, Washington, D. C., April 17-21, 1999

Snyder-Mackler L, Fitzgerald GK, Rudolph KR, Axe M Dynamic Stability after ACL Injury, Slide presentation at the Annual Meeting of the National Athletic Trainers Association, Kansas City, MO, June 1999.

Chmielewski T, Manal T, Rudolph KS, Snyder-Mackler L, The Effects of Perturbation Training on Walking and Jogging Performance of Patients with Acute ACL Injury International Society of Biomechanics XVIIth Congress. Calgary, Alberta Canada, August 1999

Chmielewski T, Wilk K, Snyder-Mackler L. Assessment of Weight-Bearing Patterns in Anterior Cruciate Ligament Deficient and Surgically Reconstructed Patients Using the NeuroCom Balance Master. APTA Combined Sections Meeting, New Orleans, LA Feb 2000.

Chmielewski T, Stackhouse S, Binder-Macleod S, Snyder-Mackler L. Predicting Maximal Voluntary Isometric Contraction (MVIC) of the Quadriceps from Submaximal Contraction After ACL Injury. American College of Sports Medicine 47th Annual Meeting, Indianapolis. 6/2000

Lewek M, Stevens J, Snyder-Mackler L: NMES for quadriceps femoris muscle strengthening after a total knee arthroplasty: a case study. APTA Combined Sections Meeting, New Orleans, LA Feb 2000.

Dougherty S, Manal T, Snyder-Mackler L High Intensity Electrical Stimulation for Pain Management APTA Annual Meeting, Indianapolis, IN June 2000

Lewek M, Rudolph K, Axe MJ, Snyder-Mackler, L. The Effect of Quadriceps Weakness on Gait after ACL Reconstruction. ACSM, Baltimore, MD, May 30 -June 2, 2001.

Chmielewski T, Rudolph KS, Snyder-Mackler L. The Effect of Perturbation Training on Lower Extremity Muscle Activation During Walking and Jogging in Patients with Acute ACL Injury. American Physical Therapy Association Combined Sections Meeting, San Antonio, TX. 2/01.

Stackhouse SK, Johnson CD, Stevens JE, Snyder-Mackler L, Binder-Macleod S. Predictability of maximum voluntary quadriceps force from submaximal contractions in the elderly. APTA Combined Sections Meeting, San Antonio, TX. February 2001.

Chmielewski T, Rudolph KS, Snyder-Mackler L. Movement Patterns of Individuals with Good Potential to Dynamically Stabilize their Knee After ACL Rupture. "The Many Faces of Osteoarthritis", Lake Tahoe, CA, 6/01

Stevens JE, Snyder-Mackler L. Quadriceps Inhibition and Weakness after Total Knee Arthroplasty; Association of Rheumatology Health Professionals, San Francisco November 2001.

Stevens JE, Mizner RL, Hingston S, Nardone M, Snyder-Mackler L. Quadriceps Weakness and Inhibition

Before and After Total Knee Arthroplasty. NIH Training Workshop, National Center for Medical Rehabilitation Research, December 2001.

Lewek M, Rudolph KS, Snyder-Mackler L. Lower Extremity Neuromuscular Response to a Rapid Valgus Movement at the Knee During Standing. NIH Training Workshop, National Center for Medical Rehabilitation Research, December 2001.

## HONORS & AWARDS

American Physical Therapy Association's Eugene Michels New Investigator Award for the outstanding new investigator who has demonstrated a commitment to a defined research theme - 1994

American Physical Therapy Association's Golden Pen Award for Scientific Writing - 1995

Awards for individual publications:

- Steven J. Rose Award for Excellence in Orthopedic Research - 1996
- 1998 John Basmajian Student Award. to Katherine Rudolph, awarded by ISEK
- 2000 Dorothy Briggs Memorial Scientific Inquiry Award. Doctoral level to G. Kelley Fitzgerald, awarded by the American Physical Therapy Association.
- 2001 Chattanooga Award, awarded by the APTA

## SERVICE

- Editorial Boards
  - Journal of Orthopedic and Sports Physical Therapy
  - Journal of Sports Rehabilitation
  - Physical Therapy in Sport
- Manuscript Reviewer
  - Journal of Bone and Joint Surgery
  - Physical Therapy
  - Medicine and Science in Sports and Exercise
  - Knee Surgery Sports Traumatology and Arthroscopy
  - Archives of Physical Medicine and Rehabilitation

Study Sections and Grant Review Panels:

NIDRR - Grant Review Panel, March 1995

NIH Clinical Sciences Special Emphasis Panel July 1996- 1999

NIH Geriatric and Rehabilitation Medicine Study Section Oct 2000

- Research Advisory Committee - Foundation for Physical Therapy (1997-1999)
- 100th Olympiad, Atlanta GA 1996, Chief Athletic Trainer, Beach Volleyball Venue
- Governors Council on Lifestyles and Fitness

Positions Held in Scientific/Professional/Honorary Societies:

*American Physical Therapy Association*

Advisory Panel on Research, from 1997 to 2000

*American Physical Therapy Association Section on Research*

Chairperson, Nominating Committee, from 1987 to 1989

Treasurer, from 1989 to 1993

Executive Committee, from 1991 to 1993 and 1995 to present

Strategic Planning Committee, from 1991 to present

President Elect, from 1995 to 1996

President, from 1996-1999

Past President 1999-present

*American Physical Therapy Association Sports Physical Therapy Section*

President, Knee Special Interest Group, from 1994 to 1997

*American Board of Physical Therapy Specialties*

Specialty Council for Clinical Electrophysiology

Chairperson, from 1987 to June 1991

*American Physical Therapy Association Section on Clinical Electrophysiology*

- Task force on Electrotherapy Standards, from 1986 to 1991, 1996-1999

## **CURRENT COURSES TAUGHT**

- PHYT 624 Basic Evaluation Techniques
- PHYT 608 Musculoskeletal Evaluation and Treatment
- PHY 641 - 642 Clinical Rounds I

## **CURRENT RESEARCH**

### ***ACL Deficient Knee: MRI and Biomechanical Modeling***

*Funding: National Institutes of Health R01- AR46386 (PI T. Buchanan) - commenced 6/99*

This project examines the ACL deficient knee via cine-phase contrast MRI and biomechanical modeling. Cine-phase contrast MRI allows us to examine the kinematics of the knee and the lengths of the tendons dynamically. Patient-specific biomechanical models allow us to estimate the forces in the ligaments and muscles. Combining these two powerful novel techniques will allow us to investigate why some ACL deficient patients (copers) are able to adjust well, returning to active sports with any surgical intervention, while other patients (non-copers) do poorly and require surgery.

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### ***Dynamic Stability in the ACL Injured Knee***

*Funding: National Institutes of Health R01-HD37985 - commenced 2/01*

The overall goal of this work is to develop more effective, physiologically based, non-operative rehabilitation programs to dynamically stabilize the knee after anterior cruciate ligament rupture. Some individuals can stabilize their knees following ACL rupture even during activities involving cutting and pivoting while others have instability with daily activities (non-copers). Physiological responses and motor control strategies for copers are different from non-copers. Rehab that includes purposeful perturbation of support surfaces results in superior return to activity in potential copers. The proposed experiments are designed to answer these questions: How does the training promote dynamic knee stability? Can adding perturbation training to a vigorous rehabilitation program improve function in non-copers who elect non-operative management?

### **Knee Alignment And The Progression Of Osteoarthritis**

*Funding: National Institutes of Health (P20 RR16458-01-00003) commenced 2/02*

This 5-year study will determine the effect of restoring normal anatomic realignment of the tibiofemoral joint on movement and muscle activity patterns in patients with osteoarthritis (OA) in the knee.

Patients who are undergoing opening wedge osteotomy to correct genuvarum will be tested in the Motion Analysis Laboratory (see left) to determine if their muscles are activated differently when the knee is subjected to a valgus stress or if their movement and muscle activity patterns change during walking, as a result of the reduction of the laxity and pseudolaxity associated with genuvarum. Testing will take place before surgery and after surgery at various intervals.

The intention is to determine if the restoration of normal anatomical alignment will result in normal function and whether changes in walking and muscle activation are consistent with conditions that reduce the progression of OA.

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### **NMES for Older Individuals After Total Knee Arthroplasty**

*Funding: National Institutes of Health (RO1HD041055) commenced 3/02*

Muscle weakness from illness or injuries often leads to loss of function and independence in the elderly. The recovery of muscle strength and function in disabled elderly individuals is a major challenge in rehabilitation. Training programs designed to maximize strength gains in young individuals may not be optimal in the elderly because the cause of the weakness and the morphology of the muscle is different for young vs. old people. The overall goal of this work is to determine if physiologically and morphologically based rehabilitation programs are more effective than traditional rehabilitation to counter changes in muscle strength and function in older individuals. We posit that using NMES to augment a traditional rehabilitation program for elderly patients with osteoarthritis following total knee arthroplasties (TKA) will result in greater strength and functional gains than using only traditional rehabilitation.

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### **CLINICAL PRACTICE**

Dr. Snyder-Mackler's clinical practice is concentrated in the areas of sports related knee and shoulder injury. She can be consulted by contacting the University of Delaware Physical Therapy Clinic.

### **DOCTORAL STUDENT ADVISING (Current)**

- Doctoral Advisor:
  - Michael Lewek
  - Glenn Williams
  - Ryan Mizner (precandidacy)
  - Tara Jo Manal (precandidacy)
  - Stephanie Petterson (precandidacy)
  - Wendy Hurd (precandidacy)
- PhD Dissertation Committee Member
  - Peter Barrance, Mechanical Engineering, (Advisor Thomas Buchanan)
  - Michael Higgins, Biomechanics and Movement Sciences, (Advisor David Barlow)
  - Scott Stackhouse, (Advisor Stuart Binder-Macleod)
  - Laura C. Schmitt, (precandidacy, Advisor Katy Rudolph)

### **FORMER PhD STUDENTS**

- Marty Eastlack, PT, PhD
- Katherine Rudolph, PT, PhD
- G. Kelley Fitzgerald, PT, PhD
- Jennifer Stevens, PT, PhD
- Terese Chmielewski, PT, PhD