

La Crosse Institute For Movement Science (LIMS)

Thomas Kernozek, PhD, FACSM, Director

The Institute was created in 2005 at the University of Wisconsin—La Crosse in the Department of Health Professions, Physical Therapy Program. LIMS brings together scientists and clinicians from various disciplines seeking applied knowledge related to human movement, factors related to injury, and in the foundations of therapeutic exercise used in the treatment and rehabilitation of injury.

Each year over 40 students from graduate and undergraduate programs from the UW-L campus are involved in laboratory research including Physical Therapy, Exercise and Sport Science, Physics, and Biology. High-technology funding from the State of Wisconsin supports 8 Physics Biomedical student internships in the laboratory.

Due to the many publications from the clinical biomechanics laboratory, LIMS has developed a national/international reputation.



Tom Kernozek, PhD, Drew Rutherford, MS, Naghmeh Gheidi, PhD, Becky Heinert, PT, MS, SCS and C. Nathan Vannatta DPT, SCS, represented LIMS at the 42nd Annual Meeting of the American Society of Biomechanics in August at the Mayo Clinic in Rochester, MN. Heinert and Vannatta are clinical collaborators from Gundersen Health System. Four papers were presented:

Effects of visual feedback on patellofemoral joint force during squatting in people with patellofemoral pain syndrome by Michael Schiller, Amanda Smith, Tom Kernozek, Drew Rutherford, and Chris Durall

Effect of Immediate Feedback during Drop Landings on Impact and Joint Positions in Young Healthy Female Athletes by Jessica Onsager, Jeremie Schiedermayer, Becky Heinert, Drew Rutherford, and Tom Kernozek

Sex Differences in Gluteal Muscle Forces During Running by C. Nathan Vannatta and Thomas Kernozek

Comparing Patellofemoral Joint Stress of Various Movements by Naghmeh Gheidi, Alexey Minaev, Sara Frank, Madeline Sandheinrich, Taviere Hawkins, and Thomas Kernozek

100 manuscripts!



Tom Kernozek, professor in the Physical Therapy program since 1996, published his 100th manuscript. He states "This was a tremendous accomplishment for the LIMS, the Physical Therapy Program, and myself. I could not have done it without the support of my colleagues, collaborators, and graduate/undergraduate students that have worked in my lab over the years. It has truly been incredible to get to this point in my career and that many other researchers have come to recognize our work here at UWL."

LIMS uses visual feedback in community screening to prevent ACL injury risk in female athletes

ACL injury risk is 2-8 times greater for female athletes. UWL and Gundersen Health System are partnering to reduce these numbers! Portable force plate and video feedback are being used to reduce the risk of ACL injury in female athletes. Immediate data is projected to a visual display to augment training to examine the effectiveness of immediate movement based feedback. If you would like your school to be involved in this project, please contact us! Grants from UWL and Gundersen Medical Foundation have supported these efforts.



Tom Kernozek, PhD, FACSM, Naghmeh Gheidi, PhD and Becky Heinert, PT, MS, SCS attended the American College of Sports Medicine Meeting in Minneapolis, MN in May/June. Heinert is a clinical collaborator with Gundersen Health System. Two papers were presented:

Symmetry loading after knee injury appear different during leg press and squat activities by Tom Kernozek, Becky Heinert, Drew Rutherford, Jeremie Schiedermayer, and Doug Baumann.

Patellofemoral joint loading during a variation in jump-landing movements by Naghmeh Gheidi, Tom Kernozek, Cheyenne Massie, and Katie Hansen

Student co-authors on these presentations: Schiller, Smith, Onsager, Schiedermayer, Minaev, Frank, Sandheinrich, Massie, Hansen. In bold are Doctoral Students in Physical Therapy.

LIMS Scientists

- Chris Durall, DPT, ATC, MSPT (UW-La Crosse Health Center)
- John Greany, PT, PhD, Exercise Physiologist, (Health Professions)
- Thomas Greiner, PhD, Biological Anthropologist, (Health Professions)
- Naghmeh Gheidi, PhD, Biomechanist, (Assistant Professor, Exercise & Sport Science)
- Becky Heinert, MSPT, SCS, (Gundersen Sports Medicine)
- Tom Kernozek, PhD, FACSM, Biomechanist, (Health Professions)
- Patrick Grabowski, PT, PhD, OCS, CSCS, Motor Control/Biomechanics, (Health Professions)
- Drew Rutherford, MS, Laboratory Manager/Engineer (Health Professions)
- Nate Vannatta, DPT, SCS, (Gundersen Sports Medicine)



Recently Published or In Press Research (2017-2018)

[INFLUENCE OF ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION ON DYNAMIC POSTURAL CONTROL.](#) Heinert B, Willett K, Kernozek TW. Int J Sports Phys. 2018 Jun;13(3):432-440.

[Achilles tendon loading during weight bearing exercises.](#) Gheidi N, Kernozek TW, Willson JD, Revak A, Diers K. Phys Ther Sport. 2018 Jul;32:260-268.

[Impact kinetics associated with four common bilateral plyometric exercises.](#) Stewart E, Kernozek T, Peng HT, Wallace B. J Sports Med Phys Fitness. 2018 Apr 20

[Cognitive Demands Influence Lower Extremity Mechanics During a Drop Vertical Jump Task in Female Athletes.](#) Almonroeder TG, Kernozek T, Cobb S, Slavens B, Wang J, Huddleston W. J Orthop Sports Phys Ther. 2018 May;48(5):381-387.

[EFFECT OF HEEL LIFTS ON PATELLOFEMORAL JOINT STRESS DURING RUNNING.](#) Mestelle Z, Kernozek T, Adkins KS, Miller J, Gheidi N. Int J Sports Phys Ther. 2017 Oct;12(5):711-717.

[Divided attention during cutting influences lower extremity mechanics in female athletes.](#) Almonroeder TG, Kernozek T, Cobb S, Slavens B, Wang J, Huddleston W. Sports Biomech. 2017 Nov 13:1-13

[Effect of Posttrial Visual Feedback and Fatigue During Drop Landings on Patellofemoral Joint Stress in Healthy Female Adults.](#) Olbrantz C, Bergelin J, Asmus J, Kernozek T, Rutherford D, Gheidi N. J Appl Biomech. 2018 Feb 1;34(1):82-87.

[Optimum Drop Jump Height in Division III Athletes: Under 75% of Vertical Jump Height.](#) Peng HT, Khuat CT, Kernozek TW, Wallace BJ, Lo SL, Song CY. Int J Sports Med. 2017

[Changes in gluteal muscle forces with alteration of footstrike pattern during running.](#) Vannatta CN, Kernozek TW, Gheidi N. Gait Posture. 2017 Oct;58:240-245.

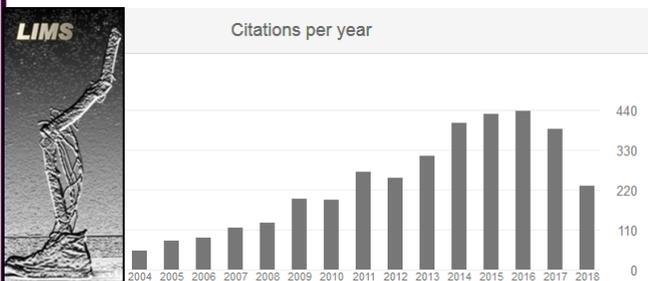
[Effects of Anterior Knee Displacement During Squatting on Patellofemoral Joint Stress.](#) Kernozek TW, Gheidi N, Zellmer M, Hove J, Heinert BL, Torry MR. J Sport Rehabil. 2018 May 1;27(3):237-243.

[Achilles Tendon Loading During Heel-Raising and -Lowering Exercises.](#) Revak A, Diers K, Kernozek TW, Gheidi N, Olbrantz C. J Athl Train. 2017 Feb;52(2):89-96.

[Comparison of estimates of Achilles tendon loading from inverse dynamics and inverse dynamics-based static optimisation during running.](#) Kernozek T, Gheidi N, Ragan R. J Sports Sci. 2017 Nov;35(21):2073-2079.



LIMS research continues to have national and international impact. The figure below shows the growth in the number of citations from other authors in acknowledging our work in their research.



Department of Health Professions, Physical Therapy Program

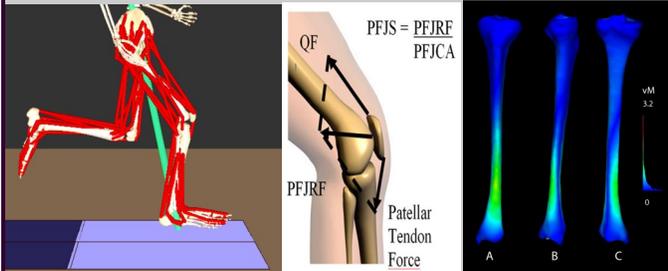


We measure movement performance!

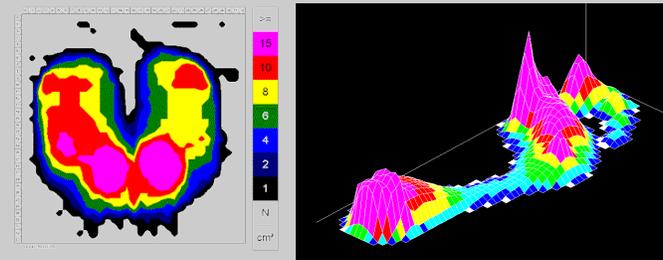
Our laboratories have sophisticated equipment that measure motion, impact forces, pressures on the feet or in seating, muscle activation, energy cost and heart rate, or for the imaging of tendons or soft tissue.

These data can be used to determine the loading on joints and muscles to give insight to how and why injuries may occur or for the improvement of performance to keep you active.

Musculoskeletal models are used to determine loading on bone, joints, ligaments, and tendons.



Pressure distribution measures show us the pressure points in seating or on your foot during walking or running.



For more information contact:

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Check out our lab on your smartphone!