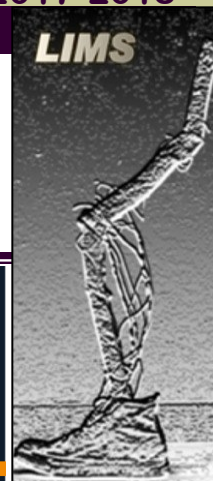


La Crosse Institute For Movement Science (LIMS)

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.

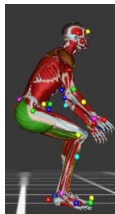
Due to the many publications from the clinical biomechanics laboratory, LIMS has developed a national/international reputation.

LIMS uses performance based feedback in the community in screening for ACL injury risk



Motion capture and force platform data are being used on a visual display to examine the effectiveness of movement based training. Currently, the laboratory has several projects where the performer uses these data to alter their movement performance.

Musculoskeletal modeling efforts continue



Laboratory data are being used to estimate patellofemoral joint, anterior cruciate ligament, and Achilles tendon loads during various activities. These methods allow us to measure performance differences to minimize injury risk as well as further guide rehabilitation efforts.



Tom Kernozek, PhD, Drew Rutherford, MS, and Naghmeh Gheidi, PhD represented LIMS at the 41st Annual Meeting of the American Society of Biomechanics in August at UC-Boulder. Three papers were presented:

"Differential effectiveness of visual feedback on drop landing performance" by Drew Rutherford, Abigail Anderson, Alyssa Kompelien, Elizabeth Skaer, Thomas Kernozek, Naghmeh Gheidi.

"Effect of fatigue and real-time visual feedback during drop landings on patellofemoral joint stress in healthy female adults" by Christina Olbrantz, Jamie Bergelin, Jill Asmus, Thomas Kernozek, Drew Rutherford, Naghmeh Gheidi.

"A stress progression sequence of exercises during Achilles tendon rehabilitation" by Naghmeh Gheidi, Thomas Kernozek, Andrew Revak, Keith Diers, John Willson.



Left to right, Naghmeh Gheidi, PhD, Tom Kernozek, PhD, Drew Rutherford, MS.



Graduate student co-authors on Am Soc Biomech papers included: Abigail Anderson, Alyssa Kompelien, Elizabeth Skaer, Christina Olbrantz, Jamie Bergelin, Jill Asmus, Andrew Revak, Keith Diers. All are Doctoral Students in Physical Therapy.



Interested in being a participant in a LIMS study?

Current research projects

Effects of Added Weight on Patellofemoral Joint Stress During Running

Running Mechanics and Articular Cartilage Response to Continuous Loading After Anterior Cruciate Ligament Reconstruction

Patellofemoral Joint Stress Differences Between a Front Squat and a Back Squat

Please contact Drew Rutherford, MS, drutherford@uwlax.edu or Tom Kernozek, PhD tkernozek@uwlax.edu for details

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 (2016-2017)

Changes in gluteal muscle forces with alteration of footstrike pattern during running. Vannatta, CN, Kernozek, TW, Gheidi, N. (in press). Gait Posture.

Optimum drop jump height in division III athletes: Under 75% of vertical jump height. Peng, HT, Khat, CT, Kernozek, TW, Wallace, B, Lo, SL, Song, CY. (in press). Int J Sports Med.

Effect of heel lifts on patellofemoral joint stress in running. Mestelle, Z, Kernozek, TW, Adkins, KS, Miller, J, Gheidi, N. (in press). Int J Sports Phys Ther.

Effects of anterior knee displacement during squatting on patellofemoral joint stress. Kernozek, TW, Gheidi, N, Zellmer, M, Hove, J, Heinert, BL, Torry MR. (in press). J Sport Rehab.

Comparison of estimates of achilles tendon loading from inverse dynamics and inverse dynamics-based static optimization during running. Kernozek, TW, Gheidi, N, Ragan, R. (in press). J Sport Sci.

Patellar tendon stress between two variations of the forward step lunge. Zellmer, M., Kernozek, TW, Gheidi, N, Hove, J, Torry, M. (in press). J Sport Health Sci.

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. 2017 Apr 19:1-26.

Muscle fiber excitation system. Ezenwa BN, Kernozek T. Conf Proc IEEE Eng Med Biol Soc. 2016 Aug;2016:5233-5236.

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.

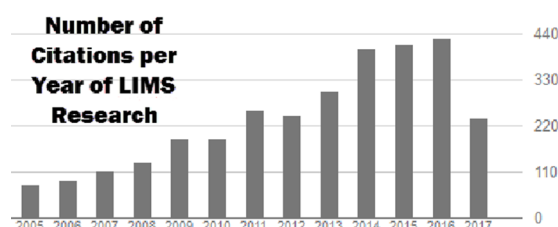
Comparison of estimates of achilles tendon loading from inverse dynamics and inverse dynamics-based static optimisation during running. Kernozek T, Gheidi N, Ragan R. J Sports Sci. 2017 Nov;35(21):2073-2079.

Utilization of impact testing to measure injury risk in alpine ski and snowboard athletes. Faltus J, Huntimer B, Kernozek T, Cole J. Int J Sports Phys Ther. 2016 Aug;11(4):498-506.

Influence of injury on dynamic postural control in runners. Meardon S, Klusendorf A, Kernozek T. Int J Sports Phys Ther. 2016 Jun;11(3):366-77.

Effects of foot strike and step frequency on achilles tendon stress during running. Lyght M, Nockerts M, Kernozek TW, Ragan R. J Appl Biomech. 2016 Aug;32(4):365-72.

LIMS research has a national/international impact. The figure below shows the growth in our research being cited by other researchers.



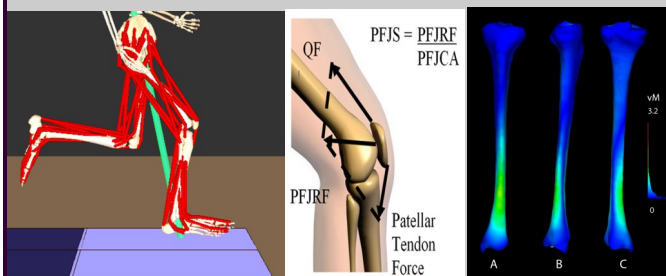
UNIVERSITY of WISCONSIN
LA CROSSE

We measure movement performance!

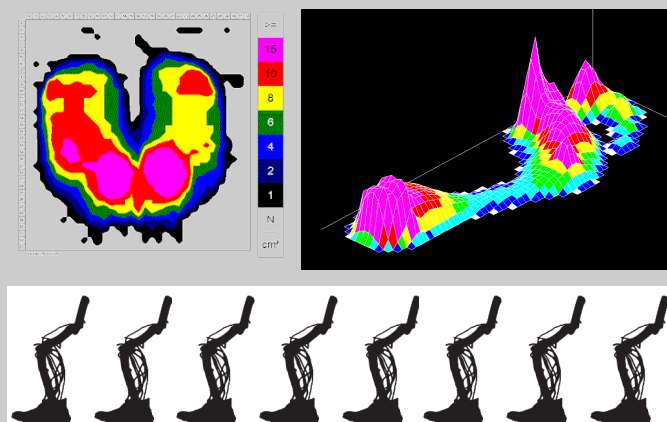
Our laboratories have sophisticated equipment that measure motion, impact forces, pressures on the feet or in seating, muscle activation, energy cost and heart rate, or for the imaging of tendons or soft tissue.

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!