UNIVERSITY OF WISCONSIN LA CROSSE UWL

La Crosse Institute For Movement Science (LIMS)

Thomas Kernozek, PhD, FACSM, Director

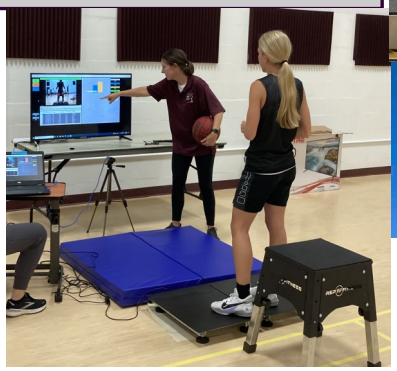
The Institute was created in 2005 at the University of Wisconsin—La Crosse in the Department of Health Professions, Physical Therapy Program. LIMS brings together scientists and clinicians from various disciplines seeking applied knowledge related to human movement, factors related to injury, and in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

Each year generally 40 students from graduate and undergraduate programs from the UW-L campus are involved in laboratory research from Physical Therapy, Physics, Exercise and Sport Science, and Biology. High-technology funding from the State of Wisconsin supports Physics Biomedical student internships in the laboratory. Gundersen Medical Foundation has annually supported a Sports Medicine researcher for collaborative research with us.

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

The Health Science Center is home to the La Crosse Medical Health Science Consortium, a unique partnership between Gundersen Health System, Mayo Clinic Healthcare La Crosse, Western Technical College and Viterbo University. The building serves as the core of many community partnerships/programs, educational programs and research activities. LIMS and the Physical Therapy program has grown along with the HSC into one of central research hubs at UW-La Crosse. Faculty and student research outcomes have distinguished UWL and the doctoral program in Physical Therapy Program.

Pandemic and research



Many campus and community based research projects have been slowly coming back to life this spring and summer. We partnered with Viterbo Women's Athletics to re-engage our knee injury prevention efforts where we tested and trained the Women's basketball and volleyball team using our portable force platform and video system. Our system uses two portable force plates to provide post-trial feedback of impact forces and high speed video to foster safer landing mechanics in athletes involved in jumping and landing sports. In addition, we performed similar testing at Onalaska High School and with regional schools participating in the UWL Women's basketball summer league. Doctoral of physical therapy students, Gundersen Sports Physical Therapy residents have completed several projects involving UWL and community members this year. Three physical therapy students participated in the 3-minute Graduate Project event (one earned 2nd place honors) and 18 participated in the UWL Research and Creativity Celebration this Spring. We had several presentations by faculty, students and residents at professional meetings such as the Combined Sections meeting of the American Physical Therapy Association and the World Congress on Biomechanics.

We look forward to working with our students, campus and community participants and partners in a more typical manner this year!

LIMS Scientists

Hanni Cowley, DPT, Clinical Partner (Health Professions)

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, (Winona State University),

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),

Robert Ragan, PhD, Computational Physicist (Physics),

Kanikkai "Steni" Sakiriyas, PT, DSc, Clinical Biomechanics (Health Professions)

La Crosse Institute for Movement Science LIMS UW-LA CROSSE Physical Therapy

Recently Published or In Press Research (2021-2022)

Kiminski, R., Williams, C., Mills, O., Cluppert, K., Heinert, B., Rutherford, D., Kernozek, T.W. Heinert, B., Rutherford, D. N., Kernozek, T. W. Transfer of post-trial feedback on impacts during drop landings in female athletes. *To appear in Sports Biomechanics* (Accepted: August 2022).

Heinert, B., Rutherford, D. N., Kernozek, T. W. Effectiveness of augmented feedback on drop landing using baseline vertical ground reaction in female athletes. *To appear in International Journal of Athletic Therapy and Training*. (Accepted: May 2022).

Jacobson, L., Vannatta, C.N., Schuman, C.,Kernozek, T.W. An updated model does not reveal sex differences in patellofemoral joint stress in running. *To appear in International Journal of Sports Physical Therapy.* (Accepted: July, 2022).

Waite, L., Stewart, M., Sackiriyas, K. S. B., Jayawickrema, J., Almonroeder, T. G. (2022). Female athletes exhibit greater trial-to-trial coordination variability when provided with instructions promoting an external focus. *Journal of Motor Behavior*. (Published: April (2ndQuarter/Spring) 27, 2022).

Ertman, B., Dade, R., Vannatta, C.N., Kernozek, T. W. (2022). Offloading fffects on impact forces and patellofemoral joint loading during running in females. *Gait and Posture, 93*, 212-217.

VanZile, A. W., Snyder, M. J., Watkins, E. A., Jayawickrema, J., Widenhoefer, T. L., Almonroeder, T. (2021). Kinetic asymmetry during a repetitive tuck jump task in athletes with a history of anterior cruciate ligament reconstruction. *International Journal of Sports Physical Therapy, 16*(5), 1278-1285.

Demers, T., Bednarz, N., Mitchell, K., Gerstle, E., Almonroeder, T. The influence of step-down technique on lower extremity mechanics during curb descent. *To appear in Journal of Electromyography and Kinesiology*. (Accepted: September 2021).

Stewart, M., Waite, L., Jayawickrema, J., Almonroeder, T. (2021). Neuromuscular training programs predominantly include instructions that promote an internal focus. *The Journal of Sports Medicine and Physical Fitness, 67*(7), 1020-1026.

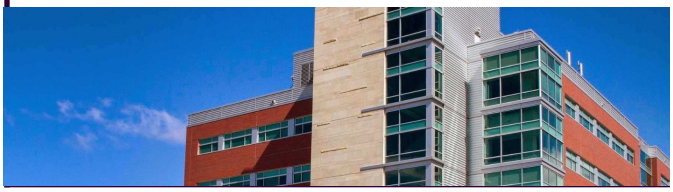
Larson, D., Vannatta, C. N., Rutherford, D. N., Kernozek, T. W. (2021). Kinetic changes associated with extended knee landings following anterior cruciate ligament reconstruction in females. *Physical Therapy in Sport, 52*, 180-188.

Heinert, B., Rutherford, D. N., ***Cleereman, J., Lee, M.,*** Kernozek, T. W. (2021). Changes in landing mechanics using augmented feedback: 4 week training and retention study. *Physical Therapy in Sport, 52*, 97-102.

Zheng, Q., Kernozek, T. W., Daoud-Gray, A., Borer, K. (2021). Anabolic bone stimulus requires a preexercise meal and 45-minute walking impulse of suprathreshold speed-enhanced load and momentum to prevent or mitigate postmenopausal osteoporosis within circadian constraints. *Nutrients, 13*, 3727.

Musgjerd, T., Anason, J., Rutherford, D. N., Kernozek, T. W. (2021). Effect of Increasing Running Cadence on Peak Impact Force in an Outdoor Environment. *International Journal of Sport Physical Therapy*. (Published: August 1, 2021).

****UWL student or resident contributors are in *italics*****

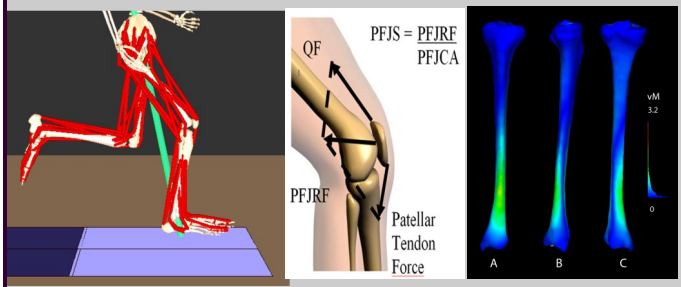


We measure movement performance!

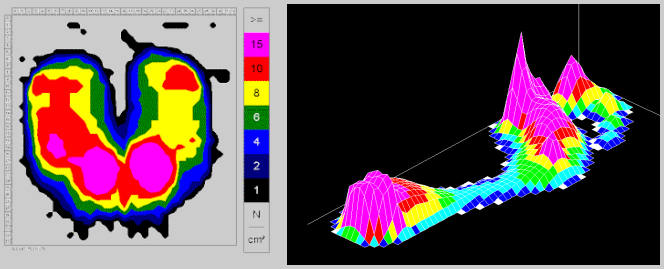
Our laboratories have sophisticated equipment that measure motion, impact forces, pressures on the feet or in seating, muscle activation, energy cost, respiration and heart rate, or for the imaging of tendons or other soft tissue.

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 examine loading on bone, joints, ligaments, and tendons.



Loading in seating or during walking or running. Hotter colors depict higher loading in those areas.



For more information contact:

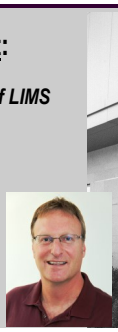
Tom Kernozek, PhD, FACSM, Director of LIMS

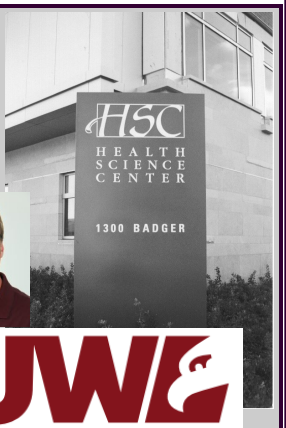
4071 Health Science Center

University of Wisconsin—La Crosse

1300 Badger Street

La Crosse, WI 54601





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Check out LIMS on your smartphone!