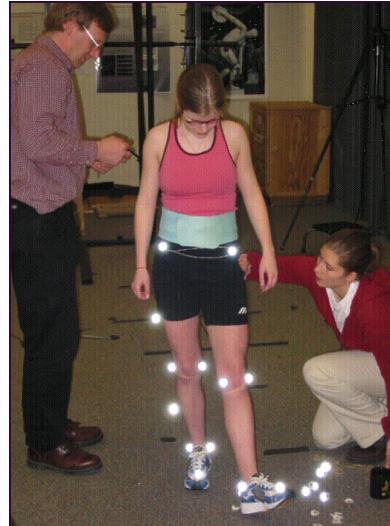


La Crosse Institute For Movement Science (LIMS)

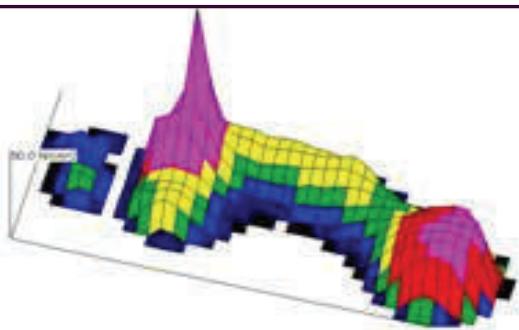
Thomas Kerozek, PhD, Director

The Institute was created in the Fall of 2005 in the Health Science Center at the University of Wisconsin-La Crosse in the Department of Health Professions. The Institute brings together scientists and clinicians of various disciplines in the quest for new knowledge related to human movement, the identification of factors related to injury, the foundations of therapeutic exercise and injury prevention. Each year over 40 students from graduate and undergraduate programs across 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 undergraduate student internships in the lab. A graduate assistant from Exercise and Sport Science is also assigned to the lab. Many undergraduate students have presented at the National Conference on Undergraduate Research and at professional meetings in biomechanics and sports medicine. Graduate students have presented with faculty mentors at professional meetings in physical therapy, biomechanics and sports medicine.



Current Projects in the Lab...

- Evaluating changes in select biomechanical and physiological parameters of adolescents. The study is comparing the effectiveness of Nike IPOD devices and standard pedometers on monitoring activity level in 7th graders from Longfellow Middle School in La Crosse.
- Evaluating Ho Chunk native Americans without diabetes, pre-diabetes and diabetes on clinical and biomechanical factors. The goal is to contribute to a better understanding of the impact of diabetes in this population.
- Modeling the knee to better understand mechanisms of non-contact ACL injuries in females.
- Examining the factors which promote abnormal lower extremity alignment in runners.
- Establishing the reliability and validity of a clinical measure of gluteal muscle endurance.



3-D Representation of Plantar Loading Data during Walking

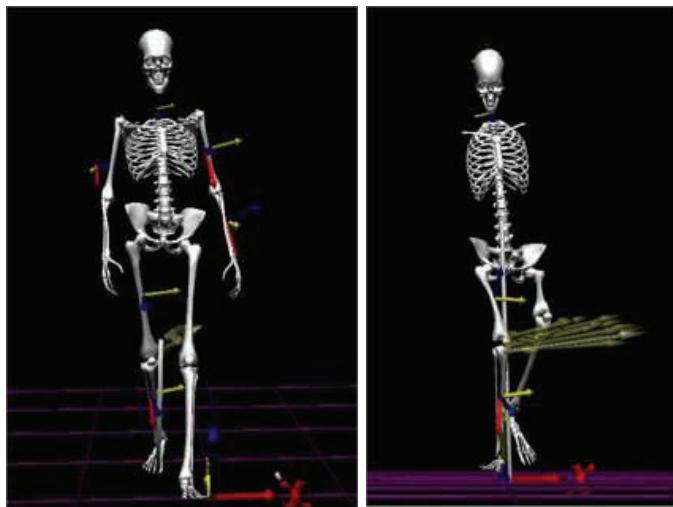
LIMS Facilities

LIMS labs in the Health Science Center include a 1,500 square foot biomechanics and 1,700 square foot exercise physiology laboratory. The biomechanics laboratory includes an 8 camera motion analysis system and two force platforms, electromyography, seating, barefoot and in-shoe pressure measurement technology, and an electromagnetic tracking system. The exercise physiology laboratory includes a metabolic and gas analysis system for bike or treadmill use.



LIMS Distinguished Lecturer

In the Fall of 2006, LIMS hosted their first distinguished lecturer Tim Hewett, PhD from Cincinnati Children's Hospital. Dr. Hewett presented his research about anterior cruciate ligament injuries to faculty, students, clinicians, and the public during a very well-attended two day event.



Visual representation obtained via Motion Capture

LIMS Scientists

Hanni Cowley, MSPT (Gundersen Lutheran Sports Medicine)

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)

Di-An Hong, PhD, Biomechanist, (Laboratory Manager, Health Professions)

Tom Kernozeck, PhD, Biomechanist, (Health Professions)

Robert Ragan, PhD, Computational Physicist (Physics)

John Willson, MSPT, PhD, Biomechanist, (Health Professions)

New Scientists Join LIMS in 2007

Di-An Hong, PhD comes to UW-L from Motorola Labs in Schaumburg, IL. He initiated and managed the biomechatronics research program at Motorola for a number of years. He has experience in many advanced motion analysis technologies, motor control and biomechanics.

John Willson, PhD is a former UW-L physical therapy graduate student who completed his PhD in Movement Science at the University of Delaware in 2007. He is now an assistant professor in the Physical Therapy Program.

Both Dr. Willson and Dr. Hong enhance the research experience and capabilities of the LIMS Institute.

Dr. Tom Kerozek was a Keynote Speaker in Taipei, Taiwan



Tom Kerozek (second from the right in the front row) at the conference banquet with two other international speakers and graduate students from Exercise and Sports Science and Rehabilitation at the National Taiwan Normal University in Taipei.

Tom Kerozek was a keynote speaker at the Taiwan Society of Biomechanics Meeting in Taipei on November 10-11, 2007. His paper, "In Search of Neuromuscular Anterior Cruciate Ligament Injury Mechanisms in Female Athletes in Landing", was published in the conference proceedings. Dr. Kerozek was invited to lecture about his biomechanics research at the National Taiwan Normal University, National Taiwan University Medical School, the Chinese Cultural University and the National College of Physical Education during his stay in Taiwan.

Recent Publications and Publications in Review

Wallace, B.J., **Kerozek, T.W.**, Mikat, R.P., Wright, G.A., Simons, S.Z., Wallace, K.L. (in press). A comparison between back squat exercise and vertical jump kinematics: Implications for assessing ACL injury risk. *Journal of Strength and Conditioning Research*

Kerozek, T.W., Durall, C., Friske, A., Mussallem, M. (in press). Ankle bracing and plantar flexion angle does not influence ankle muscle latencies during inversion stress in healthy subjects. *Journal of Athletic Training*.

Kerozek, T.W., Greany, J.F., Anderson, D., Van Heel, D., Youngdahl, R.L., Benesh, B.G. Durall, C. (in press). The effect of immersion cryotherapy on medial-lateral postural sway in individuals with a lateral ankle sprain.

Heinert, B., **Kerozek, T.W.**, Greany, J.F., Fater, D.C.W. (in press) The effect of hip abductor weakness on lower extremity kinematics during the stance phase of running in healthy females. *Journal of Sport Rehabilitation*.

Willson JD, Davis IS, Binder-Macleod S. (in press) Lower Extremity Jumping Mechanics of Females with and without Patellofemoral Pain Before and After Exertion. *American Journal of Sports Medicine*.

Willson JD, Davis IS. (in review) Core Strength and Lower Extremity Mechanics During Jumping in Females with Patellofemoral Pain. *Archives of Physical Medicine and Rehabilitation*.

Recent Publications and Publications in Review (Continued)

Willson JD, Davis IS. (in review) Utility of the frontal plane projection angle in females with patellofemoral pain. Journal of Orthopaedic and Sports Physical Therapy.

Butler RJ, **Willson JD**, Van Doren A, Distefano M, Blackburn JT, Padua DA. (in review) Interaction of gender and type of landing on landing mechanics. British Journal of Sports Medicine.

Kernozeck, T.W., Ragan, R. (in review) Estimation of anterior cruciate tension during landing from inverse dynamics and electromyography data. Clinical Biomechanics.

Kernozeck, T.W., Torry, M.R., Iwasaki M. (2007). Effects of gender and neuromuscular fatigue on landing mechanics. The American Journal of Sports Medicine. Nov 15; E-pub ahead of print.

Ball, KA and **Greiner, TM** On the Problems of Describing Joint Axis Alignment. Journal of Biomechanics. In revision.

Greiner, TM and Ball, KA. Statistical Analysis of the Three Dimensional Joint Complex. Computer Methods in Biomechanics and Biomedical Engineering in revision.

Wallace, B.J., **Kernozeck, T.W.**, Bothwell, E.C. (2007). Lower extremity kinematics and kinetics of division three collegiate baseball and softball players while performing a modified pro-agility task. Journal of Sports Medicine and Physical Fitness. 47:377-384.

Willson JD, Davis IS. (2007) Lower Extremity Mechanics of Females with and without Patellofemoral Pain Across Activities with Progressively Greater Task Demands. Clinical Biomechanics; doi:10.1016/j.clinbiomech.2007.08.025

Willson JD, Ireland ML, Davis IS. (2006) Core strength and lower extremity alignment during single leg squats. Medicine and Science in Sports and Exercise; 38(5):945-52.

Kernozeck, T.W., Langenhorst, B., Iwasaki, M, Fater, D. **Durall, C.** (2006). Movement-based feedback may reduce spinal moments during lifting and lowering tasks in male workers. Physiotherapy Research International. 11, 140-147.

Cowley, H.R., Ford, K.R., Myer, G.D., **Kernozeck, T.W.**, Hewitt, T.E. (2006). Differences in neuromuscular strategies between landing and cutting tasks in female basketball and soccer athletes. Journal of Athletic Training. 41:67-73.

Denton J, **Willson JD**, Ballantyne BT, McClay Davis I. (2005) The addition of the Protonics brace system to a rehabilitation protocol to address patellofemoral joint syndrome. Journal of Orthopaedic and Sports Physical Therapy; 35(4): 210-19.

Willson JD, Dougherty CP, Ireland ML, McClay Davis I. (2005) Core stability and its relationship to lower extremity function and injury. Journal of the American Academy of Orthopaedic Surgeons; 13(5): 316-25.

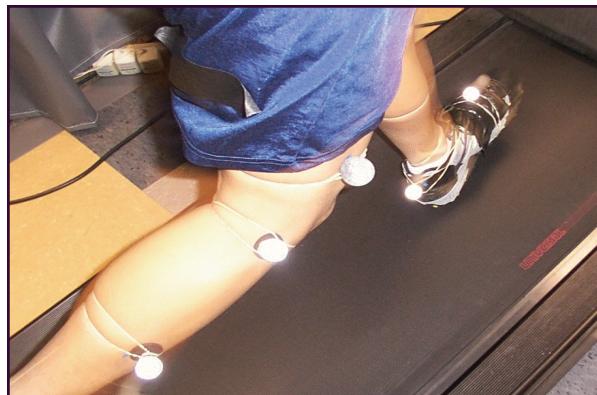
Hagoglou, A., Foster, C, deKoning, J.J., Lucia, A., **Kernozeck, T.W.**, Porcari, J. (2005). Effect of warm up on cycle time trial performance. Medicine and Science in Sports and Exercise. 37:1608-14.

Kernozeck, T.W., Torry, M.R., Van Hoof, H., **Cowley, H.**, Tanner, S. (2005). Gender differences in frontal and sagittal plane biomechanics during drop landings. Medicine and Science in Sports and Exercise. 37: 1003-12.

Greiner, TM The Jargon of Pedal Movement. Foot and Ankle International 28:109-125

Porcari, J.P., Miller, J., Cornwell, K., Foster, C., Gibson, M., McLean, K., **Kernozeck, T.W.** (2005). The effects of neuromuscular stimulation training on abdominal strength, endurance, and selected anthropometric measures. Journal of Sports Science and Medicine. 4: 66-75.

Schulte-Edelmann, J.A., Davies, G.J., **Kernozeck, T.W.**, Gerberding, E. (2005). The effects of plyometric training of the posterior shoulder and elbow. Journal of Strength and Conditioning Research. 19:129-134.



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