RIMKUS CONSULTING GROUP, INC.
FORENSIC ENGINEERS AND CONSULTANTS

Leroy (Lee) R. Waite, Ph.D., P.E., CXLT

Principal Consultant
Biomechanical

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Background

Dr. Waite received his Ph.D. in Biomedical Engineering from Iowa State University, where he also studied Mechanical Engineering. His upper-level coursework focused on biomechanics, ultrasound, medical instrumentation, and biomedical fluid mechanics. He is now a registered professional engineer in more than a dozen states and speaks fluent German, in addition to his native English language. His primary areas of consulting expertise include injury consistency biomechanics, vehicle accident reconstruction, medical device failures, and fluid and biofluid mechanics.

As a forensics consultant, Dr. Waite performs biomechanical analysis on cases involving low-speed vehicle accidents, occupational injuries, driver determination, falling objects, helmet and seat belt usage, sports-related injuries, and slip/trip/fall incidents. He also performs occupant motion studies to determine injury potential/consistency, vehicle occupant positions, and seatbelt/helmet use. He uses both computer and physical models to reconstruct those accidents and to measure the load and injury levels. His expertise has been beneficial to insurance carriers, law firms, risk managers, and corporate clients.

Prior to joining Rimkus, Dr. Waite was a Professor of Mechanical and Biomedical Engineering professor at the Rose-Hulman Institute of Technology, and also the founding department head of the first ABET-accredited biomedical engineering program in the state of Indiana. His prior teaching and research

experience includes multiple aspects of orthopedics, knee joint biomechanics, and cardiovascular fluid mechanics. His key achievements include performing biomechanical motion analysis using infrared motion-analysis systems and mathematical modeling of blood flow through the mitral valve. Dr. Waite also possesses an extensive publication record and has performed collaborative research in interdisciplinary and international groups.

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Professional Engagements

- Bioengineering
  - Axiomed Spine Corporation (2003 to 2010), Served on the Axiomed technical advisory panel for the Freedom TM Lumbar Replacement Disc Device Design.
  - Rocky Mountain Bioengineering Symposium (2004–2008), President of the oldest continually running bioengineering symposium in the U.S.
  - DAAD Selection Panel – New York, NY (2005-present), Invited member of the 2004-2019 Natural Sciences selection cycles of the German Academic Exchange Service scholarships for study and research in Germany.
  - Fulbright Senior Scholar – Heidelberg, Germany (2008-2009), Experimental Heart Surgery Laboratory.

- Expert Witness
  - Wooden & McLaughlin – (2010-2014), Offered expert witness opinions in a case involving a balloon-expandable arterial stent.

Forensic Engagements

- Biomechanical Investigations
  - Philadelphia, PA (2017), Analysis of plaintiff's description of a fall in relation to injuries sustained and more specifically whether injuries were consistent with a slip event.
  - Wallkill, NY (2017), Reconstruction of the dynamics of a two-car accident and determination of the motions and mechanisms to which the plaintiff would have been subjected in relation to the injuries claimed. This case included in-court trial testimony.
  - Stony Brook, NY (2017), Analysis of the plaintiff's description of the fall in relation to the injuries sustained, and most specifically to determine whether memory and testimony describing the event are consistent with the mechanics that are in play in this type of fall event.
  - Woburn, MA (2018), Reconstruction of the dynamics of a two-vehicle accident and determination of the motions and mechanisms to which the plaintiff would have been subjected in relation to the injuries claimed. This case included Affidavit preparation and in-court trial testimony.
  - Washington, D.C. (2018), Reconstruction of the dynamics of a two-car accident and determination of the motions and mechanisms to which the plaintiff would have been subjected in relation to the injuries claimed. This case included computer modeling validated by Event Data Recorder data and deposition testimony.
  - Lancaster, PA (2018), Use of an English XL variable incidence tribometer to evaluate the slip resistance index at a painted stop bar in a parking lot, where a plaintiff reportedly slipped and fell.

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Professional Experience

- Rimkus Consulting Group, Inc. 2016 – Present
  - Principal Consultant – Biomechanics

    Provides consulting services to insurance carriers, law firms, risk managers, and corporate clients. Evaluates and analyzes biomechanical systems, including voluntary and involuntary human motions. Provides human-injury impact analysis in vehicular accidents, medical device failures, and cases involving falling objects. Performs occupant motion studies to determine injury potential/consistency, vehicle occupant positions, and seatbelt/helmet use. Uses both computer and physical models to reconstruct those accidents and to measure the load and injury levels. Evaluates medical device failures and malfunctions.

- Rose-Hulman Institute of Technology 1987 – 2016
  - Professor of Mechanical and Biomedical Engineering (2011-2016)
    Responsible for teaching undergraduate courses in engineering mechanics, and graduate and undergraduate courses in biomedical engineering. Primary areas of teaching included statics, dynamics, mechanics of materials, sports biomechanics, and biofluid mechanics. Primary areas of research included modeling of biofluid mechanics and orthopedic biomechanics research. Served as primary thesis advisor for over 20 M.S. students.
  - Professor and Department Head, Applied Biology and Biomedical Engineering (1998-2011)

    Founding department head of the first ABET-accredited biomedical engineering program in the state of Indiana. Responsible for curriculum development, teaching graduate and undergraduate courses, hiring faculty and staff members, and an annual departmental budget of approximately $1 million.
  - Assistant and Associate Professor, Applied Biology and Biomedical Engineering (1987-1998)
    Responsible for teaching graduate and undergraduate courses, as well as research and service to the institute through academic committees.

- Iowa State University 1983 – 1987
  - Graduate Teaching Assistant and Graduate Research Assistant
    Responsibilities included teaching undergraduate courses on statics and mechanics of materials, and performing biomedical engineering research using Doppler ultrasound to measure and analyze blood velocity waveforms in bovine uterine arteries.

- Fisher-Controls International, Inc. 1980 – 1983
  - Nuclear Qualification Engineer/Design Engineer

As a Nuclear Qualification Engineer, his responsibilities included writing test and qualification procedures for large orders of nuclear control valves. His role involved interface with customers, contractors, and the Nuclear Regulatory Commission. As a Design Engineer, his responsibilities included technical design, project management, and interface with drafting, marketing, manufacturing, sales, and purchasing personnel.

Education, Certifications, and Professional Organizations

- Biomedical Engineering, Ph.D.: Iowa State University (1987)
- Biomedical Engineering, M.S.: Iowa State University (1985)
- Mechanical Engineering, B.S.M.E.: Iowa State University (1980)
- Registered Professional Engineer: Connecticut, Delaware, District of Columbia, Indiana, Iowa, Maryland, Massachusetts, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Virginia, and Kentucky
- Certified XL Tribometrist Certification Program: EXCEL Tribometers, LLC
- Rocky Mountain Bioengineering Symposium (RMBS)
- American Society of Mechanical Engineering (ASME)
- SAE International (formerly the Society of Automotive Engineering)

Continuing Education

- Successful completion of the requirements of the EXCEL Tribometers, LLC Certified XL Tribometrist Certification Program (CXLT 1811736)
- Northwestern University Center for Public Safety, Traffic Crash Investigation I Northwestern University Center for Public Safety, Traffic Crash Investigation II
- Northwestern University Center for Public Safety, Traffic Crash Reconstruction II
- Institute of Police Technology and Management, Bosch Full CDR technician.

Publications

- Dr. Waite is the co-editor, author, or co-author of 48 scientific publications in various books, book chapters, proceedings, and transactions, as well as paper or poster presentations at local, national, and international meetings. A representative list of these publications includes:
- "Applied Biofluid Mechanics, 2nd Edition." 2017
- "Using a mathematical model for diastolic filling through the mitral valve

to determine cardiac properties." Biomedical Sciences Instrumentation, 2012

- "Measurements of Low oxygen tension in vitro and response of macrophages to levels applicable to peri-and post-operative treatment of traumatic brain injury." Biomedical Sciences Instrumentation, 2012
- "A computer model of early diastolic filling through the mitral valve." Journal of Engineering in Medicine: Proceedings of the Institution of Mechanical Engineers, 2011
- "Novel enzymatic method to study the impact of hypoxia and hydrogen peroxide on cells." Free Radical Biomedicine, 2010
- "A lumped-parameter model of mitral valve Blood flow: left ventricular, Diastolic, e-wave filling." Biomedical Sciences Instrumentation, 2009
- "Applied Biofluid Mechanics." 2007
- "Applied Cell and Molecular Biology for Engineers." 2007
- "Quantitative Studies on Biological Water Oxidation: A Novel Mechanism of T Cells and Antibodies." Biomedical Sciences Instrumentation, 2006
- "Biofluid Mechanics in Cardiovascular Systems." 2005
- "A new computer model of mitral valve hemodynamics during ventricular filling." European Journal of Cardiothoracic Surgery, 2004
- "Human embryonic stem cell research: an ethical controversy in the US & Germany." Biomedical Sciences Instrumentation, 2003
- "A variable valve area, lumped-parameter model of left ventricular filling." Biomedical Sciences Instrumentation, 2002
- "Investigation of the relationship between arch height and rear foot motion during running." Biomedical Sciences Instrumentation, 2002
- "Mathematical Model of a variable aperture mitral valve." Biomedical Sciences Instrumentation, 2002
- "A lumped parameter model of left ventricular filling - pressure waveforms." Biomedical Sciences Instrumentation, 2000
- "Automatic determination of patellofemoral kinematic parameters through x-ray image processing." Biomedical Sciences Instrumentation, 1998
- "Patellofemoral Joint Study via Image Processing." Biomedical Sciences Instrumentation, 1996
- "An enzyme-coupled electrode for measurement of lactate and lactic acid." Biomedical Instrumentation and Technology, 1991
- "Mechanical characteristics and active tension generation in rat intestinal arterioles." American Journal of Physiology, 1991
- "Use of ultrasonic Doppler waveforms to estimate changes in uterine artery blood flow and vessel compliance." Journal of Animal Science, 1990
- "Use of Doppler ultrasound for early pregnancy diagnosis in dairy cattle." Proceedings of the 7th meeting of the European Society of Biomechanics, 1990
- "Microcomputer based analyzer for the assessment of Doppler ultrasound blood velocity waveforms." Biomedical Sciences Instrumentation, 1989