

RONALD F. ZERNICKE, PhD, DSc

University of Michigan



Department of Orthopaedic Surgery
School of Kinesiology
Department of Biomedical Engineering
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Education and Training

07/1970 BA (Liberal Arts) Concordia University Chicago
09/1972 MSc (Biomechanics) University of Wisconsin, Madison, Wisconsin
09/1974 PhD (Biomechanics & Anatomy) University of Wisconsin, Madison, Wisconsin

Academic and Administrative Appointments

Academic Appointments

2008-date Professor, Department of Biomedical Engineering, University of Michigan
2007-date Professor, Department of Orthopaedic Surgery, University of Michigan
2007-date Professor, School of Kinesiology, University of Michigan
2007-date Adjunct Professor, Department of Surgery and Department of Physiology and Pharmacology, Cummins School of Medicine, University of Calgary
2007-date Adjunct Professor, Faculty of Kinesiology, University of Calgary
2007-2010 Adjunct Professor, Department of Mechanical and Manufacturing Engineering, University of Calgary
2005-2007 Adjunct Professor, Dept Physical Therapy, Faculty of Rehabilitation Medicine, University of Alberta
2001-2007 Professor, Dept Mechanical and Manufacturing Engineering, Univ Calgary
1999-2007 Professor, Department of Physiology & Biophysics, University of Calgary
1997-2007 Wood Professor in Joint Injury Research, Faculty Medicine, University of Calgary
1993-2001 Adjunct Professor, Dept Mechanical and Manufacturing Eng, Univ Calgary
1992-2007 Professor, Faculty of Kinesiology, University of Calgary
1991-2007 Professor, Department of Surgery, University of Calgary
1992-2005 Adjunct Professor Department of Civil Engineering, University of Calgary
1986-1991 Professor, Department of Kinesiology, UCLA, Los Angeles, California
1980-1986 Associate Professor, Department of Kinesiology, UCLA, Los Angeles, California
1981 Visiting Associate Professor, University of Cincinnati, Department of Orthopaedic Surgery, College of Medicine and Institute for Applied Interdisciplinary Research, School of Engineering, Cincinnati, Ohio
1974-1980 Assistant Professor, Department of Kinesiology, UCLA, Los Angeles, California
1972-1974 Instructor, Department of Kinesiology, University of Wisconsin, Madison

Administrative Appointments

2018-date Director, U-M Exercise & Sport Science Initiative (www.essi.umich.edu)
2017-2018 Co-Director, Michigan Performance Research Lab
2016-2018 Co-Director, U-M Exercise & Sport Science Initiative

2010-2016	Dean, School of Kinesiology, University of Michigan
2007-2009	Director, Bone & Joint Injury Prevention & Rehabilitation Center, University of Michigan
2005-2007	Executive Director, Alberta Bone and Joint Health Institute
2002-2007	Director, Alberta Provincial CIHR Training Program in Bone and Joint Health
2004-2005	Special Advisor to the President (Health and Wellness), University of Calgary
1998-2005	Dean, Faculty of Kinesiology, University of Calgary
1996-1998	AHFMR Senior Scholar, Department of Surgery, University of Calgary
1996-1999	Chair, Joint Injury and Arthritis Research Group, University of Calgary
1995-1998	Director, Office of Surgical Research, Department of Surgery, University of Calgary
1991-1996	AHFMR Scholar, Department of Surgery, University of Calgary
1989-1991	Chair, Department of Kinesiology, UCLA, Los Angeles, California
1985-1991	Director, Tissue Biomechanics Laboratory, UCLA Department of Kinesiology

Research Interests

- Functional adaptation of bone to physiological stimuli (exercise, disuse, and diet)
- Joint injury and post-traumatic osteoarthritis
- Biomechanical mechanisms underlying control of normal and pathological movements

Grants/Contracts

Present and Active

- National Basketball Association and National Basketball Players Association; *Partnership for Wearable Device Validation & Review*. Principal Investigator; 2018-2021; \$789,282
- Detroit Tigers; *Player Performance Assessments and Biomechanical Evaluations*. Co-Principal Investigator; 2018-2021; \$438,930
- National Institutes of Health (K08 AR07393301A1); *Personal Surgical Planning to Avoid Hip Dislocation after Total Hip Arthroplasty: Concept of Functional Safe Zone*; Co-Investigator (PI: Pour, AE); 2019-2024; \$827,495.
- University of Michigan Biosciences Initiative (Ideas Lab); Mechanisms of Human Resiliency; Co-Investigator (PI: Tewari); 2021-2023; \$666,900.

Summary of Major Previous Grants

- NIH; *Significance of Muscle Fiber Types*; Co-Investigator; 1977-1980; \$233,390 (PI: V. Reggie Edgerton)
- NIH NS16333; *Motor Capacity of the Chronic Spinal Cat*; Co-Investigator 1980-1983; \$162,401 (PI: Judith Smith)
- NIH NS19864; *Motor Capacity of the Chronic Spinal Cat*; Co-Investigator; 1983-1986; \$275,046 (PI: Judith Smith)
- NASA NCA-1R390-501; *Effects of Prolonged Suspension on Dense Fibrous Connective Tissue*; Co-Investigator; 1984-1987; \$140,000 (PI: Arthur Vailas)
- NASA NCA2-156; *Bone and Tendon Alterations with Prolonged Hindlimb Suspension*; Co-Investigator; 1984-1987; \$75,000 (PI: Arthur Vailas)
- Co-Principal Investigator (NASA NCA2-501), *Skeletal Effects of Seven Days of Space Flight in Space Lab 3 Rats*, 1986-1987, \$10,000 (Co-PI: Arthur Vailas)
- Department of the Navy N66001-87-C0285; *Etiology of Tibial Stress Fractures Associated with Strenuous Exercise*; Co-Investigator; 1987-1988, \$70,000 (PI: Arthur Vailas)

- NASA NAG2-47; *Soft Dense Fibrous Connective Tissue Adaptation to Prolonged Suspension*; Co-Principal Investigator; 1987-1988; \$65,288 (Co-PI: Arthur Vailas)
- NASA A53749C; *COSMOS Pilot Studies on Ground-Based Control Animal*; Co-Principal Investigator; \$5000; 1987 (Co-PI: Arthur Vailas)
- NASA; *Connective Tissue Studies in Rats Exposed to 14 Days of Space Flight, COSMOS Mission 1887*; Co-Principal Investigator; 1987-1988; \$35,000 (Co-PI: Arthur Vailas)
- NIH NS19864; *Control of Stereotypic Limb Movements*; Co-Principal Investigator; 1986-1990; \$470,708 (PI: Judith Smith)
- American Diabetes Association J890725; *Diabetic Effects on Bone and Ligament*; Principal Investigator; 1989-1990; \$27,316
- Shriners Hospitals for Crippled Children; *Below-Knee Child Amputee Gait: Dynamics of an Energy Storing Prosthesis*; Co-Principal Investigator; 1988-1991; \$122,767 (Co-PI: Yoshio Setoguchi)
- Weider Inc.; *Effects of Varied Protein Intake on Muscle and Bone Development during Exercise Training*; Principal Investigator; 1990-1991; \$24,704
- NIH HD22830-Subcontract; *Dynamical Factors in Development of Motor Skills*; Principal Investigator; 1987-1992; \$190,888
- National Collegiate Athletic Association; *Stress Fracture Risk Assessment among Elite Collegiate Women Runners*; Principal Investigator; 1990-1993; \$20,085
- Shriners Hospitals for Crippled Children; *Gait Mechanics and Energetics in Proximal Femoral Focal Deficiency*; Co-Principal Investigator; 1991-1993; \$104,052 (Co-PI: Yoshio Setoguchi)
- NIH NS19864; *Control of Stereotypic Limb Movements* Co-Principal Investigator (1990-1991) 1990-1997, \$575,055; funded with an extended budget as a *Javits Neuroscience Investigator Award* to J. L. Smith [PI]
- Alberta Heritage Foundation for Medical Research; *Functional Adaptation of Bone*; Principal Investigator; 1991-1994; \$220,000
- University of Calgary Research Grants; *Diet-Related Effects on Bone*, Principal Investigator; 1993-1995, \$8,926
- Medical Research Council of Canada; *Cryopreservation of Osteochondral Grafts for Joint Reconstruction and Repair*; Co-Principal Investigator; 1994-1997; \$420,060 (Co-PI: Norman Schachar)
- Alberta Heritage Foundation for Medical Research; *High Speed Camera System for Motion Analysis*; Principal Investigator; 1996-1997; \$100,000
- Canadian Orthopaedic Foundation; *Gait Analysis after Total Hip Arthroplasty*, Principal Investigator; 1993-1997; \$25,500
- TransCanada Pipeline Ltd.; *Children's Gait and Motion Analysis*; Principal Investigator; 1995-1998; \$15,000
- Alberta Children's Hospital Foundation; *Assessing Scoliosis with Laser Imaging and Neural Networks*; Principal Investigator; 1995-1998; \$45,000
- Alberta Children's Hospital Foundation; *Relation between Femoral Antetorsion and Patellofemoral Knee Pain*; Co-Principal Investigator; 1994-1998; \$34,000 (Co-PI: Janet Ronsky)
- National Institutes of Health; *Vasoregulation in Aged Bone*; Principal Investigator; 1997-1999; \$71,107 (US\$); [Subgrant to University of Calgary; \$16,863 (US\$)]
- Medical Research Council of Canada; *Vascular and Mechanical Responses to Joint Injury*; Co-Principal Investigator; 1994-2000; \$387,855 (Co-PI: Robert Bray)
- Whitaker Foundation; *Coordinated Graduate Programme in Biomedical Engineering for the Province of Alberta*; Principal Investigator; 1997-2000; University of Calgary; \$492,401 (US\$), (Total budget \$978,802 (US\$)); University of Alberta and University of Calgary)

- Hospital for Sick Children Foundation; *Predicting Scoliosis Progression with Laser Imaging and Neural Networks*; Principal Investigator; 1998-2000; \$129,282
- National Centres of Excellence—Canadian Arthritis Network; *Assessment of Meniscus Healing in Vivo*; Co-Investigator; 1999-2000; \$46,000 (PI: Cy Frank)
- National Centres of Excellence—Canadian Arthritis Network; *In Vivo Engineering of Ligament Scars*; Co-Investigator; 1999-2000; \$46,000 (PI: Nigel Shrive)
- Johann Jacob Foundation; *Adaptive Bone Remodelling in Young Females*; Co-Principal Investigator; 1996-2000; \$165,000 (Co-PI: Benno Nigg)
- Arthritis Society of Canada; *Predicting Scoliosis Progression with Laser Imaging and Neural Networks*; Principal Investigator; 2000-2001; \$64,641
- Medical Research Council of Canada; *Cryopreservation of Osteochondral Grafts for Joint Reconstruction and Repair*; Co-Principal Investigator; 1998-2001; \$211,383 (Co-PI: Norman Schachar)
- ATCO Ltd; *Children's Gait and Motion Analysis*; Principal Investigator; 1995-2001; \$100,000.
- National Centres of Excellence—Canadian Arthritis Network; *Gene Therapy Application to Ligament Healing*; Co-Investigator; 2000-2001; \$50,000 (PI: Cy Frank)
- Canadian Institutes for Health Research; *Vascular Adaptations in Post-Traumatic Osteoarthritis*; Co-Principal Investigator; 2000-2003; \$232,776 (Co-PI: Robert Bray)
- Canadian Natural Sciences and Engineering Research Council; Equipment Grant: *Kinetic and Kinematic Movement Analysis System*; Co-Principal Investigator; 2001-2002; \$67,340 (Co-PI: Janet Ronsky)
- Alberta Heritage Foundation for Medical Research; Equipment Grant: *Optical Surface Scanning System*; Co-Principal Investigator; 2002-2003; \$100,000 (Co-PI: Janet Ronsky)
- Alberta Children's Hospital Foundation; *Relations among Postural Control and Locomotion in Youngsters with Spastic Diplegia*; Co-Investigator; 2001-2003; \$39,751 (PI: Janet Ronsky)
- Proctor and Gamble, Inc.; *Risedronate Use in a Rabbit Model of Post-Traumatic Osteoarthritis*; Principal Investigator; 2003-2004; \$187,820
- Workmen's Compensation Board; *Quantitative Assessment of Prostheses with Traditional and CAD/CAM Sockets for Transtibial Amputees*; Co-Investigator; 1999-2004; \$109,000 (PI: Janet Ronsky)
- Canadian Institutes for Health Research; *Targeting bFGF to Bone for Systemic Stimulations of Bone Formation*; Co-Investigator; 2002-2005; \$270,000 (PI: Hasan Uludag)
- Canadian Institutes for Health Research; *Bone and Ligament Remodeling in Osteoarthritis*; Principal Investigator; 2003-2004; \$98,116
- Canadian Natural Sciences and Engineering Research Council; *Functional Adaptation of Bone*; Principal Investigator; 1994-2005; \$393,920
- Canadian Institutes for Health Research/Arthritis Society of Canada; *Predicting Scoliosis Progression with Laser Imaging and Neural Networks*; Principal Investigator; 2001-2005; \$207,900
- Canadian Institutes for Health Research; *Building a Multidisciplinary Team in Adolescent Sport Injury Prevention*; Co-Investigator; Pilot–New Emerging Team Grant; 2004-2005; \$98,805 (PI: Winne Meeuwisse)
- Canada Foundation for Innovation; *Nutrition, Genetics & Human Performance*; Co-Principal Investigator; 2001-2005; \$3,256,247 [Infrastructure] (Co-PI: Roy Gravel)
- Innovation & Science, Province of Alberta; *Nutrition, Genetics & Human Performance*; Co-Principal Investigator; 2001-2005; \$3,256,247 [Infrastructure] (Co-PI: Roy Gravel)

- Geomatics for Informed Decisions (GEOIDE) Network of Centre of Excellence; *Biometrology for Informed Decisions in Medical Diagnoses, Procedures and Treatment Evaluations*; Co-Investigator; 2002-2005; \$272,000 (PI: Janet Ronsky)
- Canada Foundation for Innovation; *Integrating Research in Osteoarthritis: From the Bedside to the Bench and Back Again*; Co-Principal Investigator; 2002-2005; \$4,303,000 [Infrastructure] (PI: David Hart)
- Canadian Institutes for Health Research; *Establishing the Foundation for a Methodology Aimed at Delivering Peptides and Proteins to Skeletal Tissues*; Co-Investigator; 2003-2005; \$100,000 (PI: Hasan Uludag)
- Canadian Institutes for Health Research; *Bone and Ligament Remodeling in Osteoarthritis*; Principal Investigator; 2003-2006; \$311,676
- Canadian Space Life Sciences Concept and Ground Studies; *Loss of Biomechanical Stimulation Leads to Alterations in Gene Expression by Cells and Tissues of the Musculoskeletal System: Implication for Atrophy Induced by Space Flight*; Co-Investigator; 2002-2006; \$150,000 (PI: David Hart)
- Hospital for Sick Children Foundation; *Reliability Study of the Non-invasive Assessment of the 3-D External Asymmetry of Patients with Idiopathic Scoliosis*; Co-Investigator; 2004-2006; \$129,680 (PI: Farida Chariet)
- Canadian Natural Sciences and Engineering Council; *Functional Adaptation of Bone*; Principal Investigator; 2005-2007; \$92,318
- Alberta Heritage Foundation for Medical Research; *Scanco MicroCT*; Co-Investigator; 2006-2007; \$100,000 [Equipment] (PI: Steven Boyd)
- Health Quality Council of Alberta; *Alberta Hip and Knee Replacement Project*; Co-Principal Investigator; 2006-2007; \$100,000 (Co-PI: Cy Frank)
- Alberta Innovation and Science; *Integrating Research in Osteoarthritis: From the Bedside to the Bench and Back Again* [Infrastructure]; Co-Principal Investigator; 2003-2008; \$4,054,176 (Co-PI: David Hart)
- Canadian Institutes for Health Research; *Predicting Scoliosis Progression with Surface Imaging and Neural Networks*; Co-Principal Investigator; 2005-2008; \$240,939 (Co-PI: Janet Ronsky)
- Canadian Institutes for Health Research; *An International Collaboration in Bone Health: A Hierarchical Analysis of Bone Architecture Across the Lifespan*; Co-Investigator; 2007-2008; \$25,000
- Canadian Natural Sciences and Engineering Research Council; *High Resolution In Vitro Micro-Computed Tomography Scanner*; Co-Investigator; 2007-2008; \$148,750 [Equipment] (PI: Steve Boyd)
- Alberta Ministry of Health & Wellness; *Alberta Provincial Bone & Joint Health*; Executive Director; 2007-2008; \$6,300,000.
- Canadian Institutes for Health Research/Alberta Heritage Foundation for Medical Research/Arthritis Society; *Alberta Provincial Training Program for Bone and Joint Health*; Program Director; 2002-2007; \$2,100,000
- Canadian Institutes for Health Research; *Targeting bFGF to Bone for Systemic Stimulation of Bone Formation*; Co-Investigator; 2005-2009; \$553,444 (PI: Hasan Uludag)
- Canadian Institutes for Health Research—Partnerships for Health System Improvement Competition; *Improving Access of Standard Care for Knee Injuries*; Co-Principal Investigator; 2006-2009, \$150,000 (Co-PI: Nicholas Mohtadi)
- The Arthritis Society of Canada; *Bone and Ligament Remodeling in Osteoarthritis*; Principal Investigator; 2006-2010, \$288,960
- Canadian Institutes for Health Research; *Stem Cells as Promoters of Skeletal Repair*; Co-Investigator; 2006-2011; \$1,485,000 (PI: Derrick Rancourt)

- Fraternal Order of Eagles, Alberta & Saskatchewan; *Scoliosis Research*; Principal Investigator; 1994-2013; \$501,000 (Co-PIs: Janet Ronsky & James Harder)
- Grand Aerie, Fraternal Order of Eagles, Lew Reed Spinal Cord Research Fund; *Scoliosis and Spinal Column Deformity Research*; Principal Investigator; 2005-2013; \$480,000
- Alberta Heritage Foundation for Medical Research; *Creating Bone and Joint Health from the Bedside to the Bench and Back Again—“Designer Therapies” to Reduce the Burden of Osteoarthritis (OA) – from Mechanisms to Prevention*; Collaborator; 2008-2013; \$5,067,103; (PI: Cy Frank)
- Small Company Innovation Program (Michigan Statagic Fund/Michigan Economic Development Corporation); *Validation and Application of Novel Wireless In-Sole Foot Force and Movement Device*. Co-Investigator; 2016-2018; \$21,730.
- adidas™; *Human Performance and Musculoskeletal Injury Prevention*; Co-Principal Investigator; 2010-2019; \$1,826,532
- Michigan Exercise & Sport Science Initiative; *Development of a Multilevel System-Based Model for Injury Resiliency at the Individual and Team Level in Collegiate Running Sports*; Co-Investigator (PI: Gonzalez, R); 2017-2019; \$198,149

Honors and Awards

2020-2021	President, National Academy of Kinesiology (USA)
2019-2020	President-Elect, National Academy of Kinesiology (USA)
2017-2022	Executive Board, National Academy of Kinesiology (USA)
2015	Fellow, International Society of Biomechanics
2011	Fellow (#503), National Academy of Kinesiology (USA)
2011	Fellow, American Society of Biomechanics
2008	Doctor of Science (Honorary), University of Waterloo, Ontario, Canada
2008	Pease Family Scholar Award, Iowa State University
2008	Career Award, Canadian Society for Biomechanics/Société Canadienne de Biomécanique (North American Congress of Biomechanics)
2008	Outstanding Achievement in Graduate Supervision, University of Calgary
2007	Canadian Institutes for Health Research, CIHR Partnership Award [\$25,000] Executive Director, Alberta Bone and Joint Health Institute
2006	Fellow, Canadian Society for Biomechanics/Société Canadienne de Biomécanique
2006-2011	International Fellow, National Academy of Kinesiology (USA)
2005	Delsys Award for EMG Research Innovation, Joint Congress of International and American Societies of Biomechanics, Cleveland, Ohio
2005	Award of Excellence—Research, Faculty of Kinesiology, University of Calgary
2004	Research and Leadership Award, University of Calgary
2004	Founder’s Medal, Best Research Paper, Canadian Orthopaedics Society
2004	Community Achievement Award (Education), City of Calgary
2004-2005	President, Sigma Xi, University of Calgary
2002-2006	President/Past President, Canadian Society of Biomechanics
2002-2004	President/Past-President, Canadian Council of Physical Education and Kinesiology Administrators (38 Canadian universities)
2002	Preeminent Scholarly Publication Award, California State University Northridge (for Whiting and Zernicke, <i>Biomechanics of Musculoskeletal Injury</i> , 1998)
2001	Outstanding Research Paper, Merck-Frosst Canada Research Conference, Quebec
2000-2002	Vice President, Canadian Council of Phys Educ and Kinesiology Administrators
2000-2004	Member, Executive Board, Canadian Society of Biomechanics

1997-2002 Co-Chair, 4th World Congress on Biomechanics
1998-date Honourary Member, Canadian Orthopaedic Research Society
1997-1999 Co-Organizer, XVIIth Congress of the International Society of Biomechanics
1997 Yasuda Award for Outstanding Research Paper,
Society for Physical Regulation in Biology and Medicine
1997 Visiting Professor, Dept Biomedical Engineering, Cleveland Clinic Foundation
1995-1997 Member, Scientific Advisory Committee,
XVIth Congress of International Society of Biomechanics, Tokyo, Japan
1995 R. Tait MacKenzie Award for Best Research (1st Runner up)
Canadian Academy of Sports Medicine
1994-1998 Elected Member, World Council on Biomechanics
1993-1995 President, International Society of Biomechanics
1992-1993 President, American Society of Biomechanics
1991 Alumnus of the Year, Concordia University Chicago
1987 NASA Cosmos Achievement Award, USA Nat'l Aeronautics and Space Admin
1987-1999 Member, Executive Council, International Society of Biomechanics
1987-1989 Co-Chair, XIIth Congress of the International Society of Biomechanics
1983-1988 Member, U.S. National Committee on Biomechanics
1985, 1988 Biomechanics Area Representative, Annual Meeting ACSM
1985-1987 Chair, Education Committee, American Society of Biomechanics
1984 Program Chair, Annual Meeting of the American Society of Biomechanics
1983-87, 91-94 Executive Board, American Society of Biomechanics
1980-1983 Member, Research and Education Committee (Biomechanics
Subcommittee) of American Society for Orthopaedic Sports Medicine
1980 University Distinguished Teaching Award, UCLA
1978-date Fellow, American College of Sports Medicine
1970-1973 NDEA Doctoral Fellow, University of Wisconsin, Madison

Memberships in Scholarly or Professional Societies

2006-date National Academy of Kinesiology (Fellow)
2004-date American Society of Biomechanics (Member & Fellow)
2004-date American Society for Bone and Mineral Research (Member)
2004-date Biomedical Engineering Society (USA, Member)
1998-date Canadian Orthopaedic Research Society (Honourary Member 1998–date)
1991-date Canadian Society of Biomechanics (Member & Fellow)
1987-date American College of Sports Medicine (Member & Fellow)
1980-date International Society of Biomechanics (Charter Member)
1980-date Orthopaedic Research Society (USA, Member)

Editorial Positions, Boards, and Peer-Review Service

Reviewer: American Journal of Sports Medicine
Annals of Biomedical Engineering
Archives of Physical Medicine and Rehabilitation
Bone
British Journal of Sports Medicine

Calcified Tissue International
Canadian Journal of Physiology and Pharmacology
Canadian Journal on Aging
Clinical Journal of Sport Medicine
Clinical Biomechanics
Clinical Orthopaedics and Related Research
Child Development
Developmental Psychology
Experimental Brain Research
Experimental Neurology
FASEB Journal
Frontiers in Physiology
IEEE Transactions on Biomedical Engineering
International Journal of Medical Research
International Journal of Sport Biomechanics
Journal of Applied Biomechanics
Journal of Applied Physiology
Journal of Biomechanics
Journal of Biomechanical Engineering
Journal of Bone and Mineral Research
Journal of Bone and Joint Surgery (American)
Journal of Experimental Biology
Journal of Gerontology: Medical Sciences
Journal of Gerontology: Biological Sciences
Journal of Motor Behavior
Journal of Neurophysiology
Journal of Orthopaedic Research
Journal of Rheumatology
Journal of Sport & Health Sciences
Kinesiology Review
Medical Engineering and Physics
Medical Science Monitor
Medicine and Science in Sports and Exercise
Muscle & Nerve
NPJ Microgravity
Physiology and Behavior
PLOS One
Research Quarterly of Sports and Exercise
Scandinavian Journal of Medicine and Science in Sports

Ad hoc
Reviewer:

National Institutes of Health (1983-1985, 1987, 2008, 2009)
American Osteopathic Association Research Bureau (1986)
National Science Foundation (Integrative Neural Systems) (1988, 1990, 1993)
National Science Foundation (Advanced Computational Dynamics) (2000)
The Arthritis Society of Canada (1989)
Medical Research Council, Canada (1989-90, 1993-95, 1997)
Alberta Children's Hospital Foundation (1990)
Christopher Reeve's Paralysis Foundation (2001-2002)
Arthritis Research Campaign (United Kingdom) (2003)
Canadian Cystic Fibrosis Foundation, Research Grants (2005)

Canadian Institutes for Health Research (Biomedical Engineering) (2005)
Research Grants Council of Hong Kong (2005-2010)
Czech Science Foundation—Research Grants (Czech Republic) (2005-2006)
Whitaker Foundation, Biomedical Engineering Grants (2004-2006)
Canadian Institutes for Health Research (Studentships in Musculoskeletal Research)
(2006 & 2007)
WorkSafe British Columbia, Research Secretariat (2006)
NSERC of Canada (1984-1985, 1989-1991, 1994, 1998, 2000, 2001, 2004–2011)
NSERC of Canada (2006, Idea-to-Innovation Research Partnership Program)
NSERC of Canada (2006, Collaborative Health Research Project)
Canada Foundation for Innovation (2007 & 2011, Leaders Opportunity Fund)
Canadian Institutes for Health Research (Catalyst Grants—Muscle & Rehab) (2008)
European Union Research Young Investigator Award (2007)
Canadian Society of Biomechanics (Abstract Reviewer) (2008)
American Society of Biomechanics (Abstract Reviewer) (2009, 2015)
International Society of Biomechanics (Abstract Reviewer) (2009)
Canadian Institutes of Health Research, Partnership Award Committee (2009)
Orthopaedic Research Society (Abstract Reviewer) (2011, 2016-2017)
W. M. Keck Foundation (Grant Reviewer) (2015)

External
Reviewer

College of Kinesiology, University of Saskatchewan (2004)
School of Physical and Health Education, Queen’s University (2005)
Department of Kinesiology, McMaster University (2005)
School of Kinesiology, University of Western Ontario (2005)
Faculty of Kinesiology and Health Studies, University of Regina (2007)
Human Health & Nutritional Sciences, University of Guelph (2007)
Department of Kinesiology, School of Public Health, University of Maryland (2012)
Exercise Biology, College of Biological Sciences, Univ. California, Davis (2013)

Associate
Editor:

Frontiers in Physiology — Integrative Physiology, *Optimal Mobility and
Function across the Lifespan* (2019-2021, Special Issue)

Boards

Editorial:

Journal of Motor Behavior (1984-1990)
Exercise and Sport Sciences Reviews (Biomechanics Editor, 1984-1997)
Journal of Biomechanics (1988-1998)
Clinical Journal of Sport Medicine (1996-2004)
Bulletin of Applied Mechanics (2010-2013)
British Journal of Sports Medicine (2008-2021)
Kinesiology Review (2011-2021)
Frontiers in Physiology (2019-2021)

Member:

Research Grants Panel (Chair—Bone, Joint & Cartilage Panel, 1996-1997)
The Arthritis Society of Canada (1992-1995; 1996-1997)
Medical Planning Committee, Arthritis Society of Canada (1996-1997)
Research Advisory Committee, Arthritis Society of Canada (1996-1999)
Nominating Committee, Arthritis Society of Canada (1996-1997)
Scientific Advisory Committee, Whitaker Foundation (1994-2003)

Post-Doctoral Fellowship Advisory Committee (Chair, 1995-1998), Alberta Heritage Foundation for Medical Research
 Medical Research Council, Biomedical Engineering Committee (1999-2000)
 Canadian Institutes for Health Research, Biomedical Eng Comm (2000-2002)
 Alberta Heritage Fdn for Med Res, Program Advisory Committee (2002-2004)
 Board of Directors, Western Orthopaedic and Arthritis Res Foundation (1998-2004)
 Canadian Arthritis Network (National Centres of Excellence) (2000-2009)
 Board of Directors, Alberta Bone and Joint Health Program (2003-2005)
 Research Advisory Committee, Alliance for Canadian Arthritis Program (2003-2007)
 Scientific Advisory Board, Singapore Fitness Professionals Fed (2003-2007)
 International Scientific Advisory Committee, 6th International Workshop on Fluid Flow in Bone, Seattle, WA (2004)
 Research Advisory Committee, Alberta Centre for Active Living (2000-2005)
 International Reviewer Panel, *Medical Science Monitor* (2005-2007)
 Provincial Board of Directors (Ex Officio), Alberta Bone and Joint Health Institute (2005-2007)
 Data & Safety Monitoring Board, Harvard University and University of Maryland, NIH Project on Osteoporosis (2006-2013)
 Executive Committee, Alberta Bone and Joint Health Institute (2005-2007)
 Management Committee, Alberta Bone and Joint Health Institute (2005-2007)
 Alberta Provincial Arthroplasty Working Committee (2005-2006)
 Alberta Provincial Wait Times Management Steering Committee (2006-2007)
 Alberta Provincial Bone and Joint Advisory Committee (2006-2007)
 Steering Committee, Centre for Innovation in Health Technology (2006-2007)
 Laboratory Alberta, Health Innovation Steering Committee (2006-2007)
 International Program Committee, IASTED International Conference on Biomechanics, BioMech 2007 (2006-2007)
 Alberta Bone & Joint Physician Advisory Committee (Ex Officio) (2006-2007)
 American Society of Biomechanics, Borelli Award Committee (2008)
 American Society of Biomechanics, James Hay Award Committee (2009)
 International Advisory Board, Alberta Bone and Joint Health Institute (2007-2010)
 NASA Human Research Program's Bone & Muscle Risk Standing Review Panel (2009-2013)
 External Advisory Committee, Cleveland Clinic Foundation, Department of Biomedical Engineering (1996-2010)
 External Advisory Committee, State University of New York, Stony Brook, Department of Biomedical Engineering (2001-2010)
 External Advisory Committee, Dept of Physical Medicine and Rehabilitation, University of Virginia (2002-2009)
 External Advisory Committee, School of Applied Physiology, Georgia Institute of Technology (2008-2018)
 Programme Committee NSERC CREATE Training Programme (University of Calgary, 2009-2013)
 External Advisory Board, Centre for Mobility and Health (University of British Columbia 2009-2017)
 Program Advisory Committee, Joint Motion Training Program (University of Western Ontario, 2010-2018)
 College of Reviewers for the Canada Research Chairs Program (2010-2017)

American Society of Biomechanics, Borelli Award Committee (2012); Clinical Biomechanics Award Committee (2013); Fellowship Committee & Abstract Reviewer (2015-2020)
 International Society of Biomechanics, Fellowship Review Committee (2015-2020)
 International Advisory Board, Alberta Osteoarthritis Program (2012-2017)
 National Academy of Kinesiology, Committee on Membership (2012-2017); Executive Board (2017-2023)
 National Academy of Kinesiology, Presidential Committee on International Fellows (2018-2020)
 Orthopaedic Research Society, Abstract Reviewer (2015-2020)
 Research and Business Advisory Committee, Western's Bone & Joint Institute (Western University, London, ON) (2017-2018)
 Member, Organizing Committee, 2018 World Congress of Rheumatology and Orthopaedics, Madrid, Spain (2017-2018)
 Member, Scientific Advisory Committee, International Society of Biomechanics, 2019 ISB Congress, Calgary, Alberta, Canada (2018-2019)
 Member Advisory Board, University of Michigan Concussion Center, Ann Arbor, MI, 2019-2021
 Member, Selection Committee, Clinical Biomechanics Award, ISB-ASB Combined Congress, Calgary, Alberta, 2019
 Member, Launch Committee (new faculty—Alex Shorter), Department of Mechanical Engineering, University of Michigan, Ann Arbor, MI, 2018-2020
 Member, Launch Committee (new faculty—Tristan Maerz), Department of Orthopaedic Surgery, University of Michigan, Ann Arbor, MI, 2019-2020
 Member, Launch Committee (new faculty—Aidin Pour), Department of Orthopaedic Surgery, University of Michigan, Ann Arbor, MI, 2019-2022
 Member, Faculty Reappointment Committee (Alex Shorter), Department of Mechanical Engineering, University of Michigan, Ann Arbor, MI, 2019-2020
 Member, Faculty Mentor Committee (Joel Gagnier), Department of Orthopaedic Surgery, University of Michigan, Ann Arbor, MI, 2019-2022

- Chair: National Academy of Kinesiology, Presidential Committee on NAK 90th Anniversary and Fund Development (NAK@90 — 2019-2020)
- Chair: National Academy of Kinesiology, Committee on Nominations and Election of Officers (2019-2020)
- Chair: Canadian Institutes for Health Research, Movement & Exercise Committee (2002-2005, 2007)
- Chair: CIHR and Canadian Space Agency, Microgravity & Bone Cells Committee (2005)
- Chair: International Scientific Committee, International Space Life Sciences Working Group & International Osteoporosis Federation Congress, Space-Bone Workshop & Symposium (2005-2006)

Teaching/Mentoring—Graduate Trainees

Name	University/Dept	Degree	Date	Position
Stoneman, B	U-Michigan/Kines	MSc	2021	Current MSc student
Mamon, M	U-Michigan/Kines	MSc	2021	Current MSc student
**Teal, B.	U-Michigan/Kines	PhD	2023	Current MSc/PhD student
Mori, S.	U-Michigan/Kines	MSc	2020	Current MSc student
Martin, J.	U-Michigan/Kines	MSc	2020	Current MSc student
Aube, M.	U-Michigan/Kines	MSc	2020	Current MSc student
Ofir, C.	U-Michigan/Kines	MSc	2020	Physical Therapist/Trainer, Baltimore, MD
**Burns, G.	U-Michigan/Kines	PhD	2020-	Post-Doctoral Fellow, U Michigan
Gayfield, T.	U-Michigan/Kines	MSc	2017	Strength & Conditioning, Mich Athletics
*Lorincz, C.	Calgary/Kines	MD/PhD	2012	Physician, Emerg Med, Univ Calgary
*Manske, S.	Calgary/Kines	PhD	2010	Asst Professor, Univ Calgary, Dept Radiology
*MacKay, C.	Calgary/Med Sci	PhD	2010	Bioengineer, Medtronics, Edmonton, Alberta
Gooch, K.	Curtin/Public Health,	PhD	2010	Health Services Res; Baxter Pharmaceuticals
*Goulet, G.	Calgary/ Mech Eng	PhD	2009	Research Director, Xenith Tech, Detroit, MI
*Tapper, J.	Calgary/Mech Eng	MD/PhD	2009	Physician, Univ Calgary
*Fried, A.	Calgary/ Mech Eng	MSc	2008	Business owner & entrepreneur, Calgary
*Schneider, P.	Calgary/Kines	MD/PhD	2008	Asst Prof, Dept Surgery, Univ Calgary
Steiner, D.	Calgary/Medicine,	MBT	2007	Physician, Univ British Columbia
*LaMothe, J.	Calgary/Kines	MD/PhD	2007	Assistant Professor, Univ Calgary, Dept Surgery
*Monteleone, B.	Calgary/Kines	MD/PhD	2006	Sport Med Physician, Kelowna BC
Croft, J.	Calgary/Med Sci	PhD	2006	Assistant Professor, New Zealand
Robu, D.	Calgary/Mech Eng	MSc	2006	Researcher, Calgary Health Region
*Grant, J.	Calgary/Kines	MD/PhD	2005	Asst Professor, Dept Orthop Surg, U Michigan
*Sran, M.	UBC/Rehab Sci	PhD	2005	Post-Doctoral Fellow, Simon Fraser University
*Hamilton, N.	Calgary/Mech Eng	MSc	2004	MD, University of Laval
*Doschak, M	Calgary/Med Sci	PhD	2004	Associate Professor, University of Alberta
Alvarez, M.	Calgary/Kines	MSc	2003	Graduate Student, BC Institute of Technology
*Gildenhuis, A.	Calgary/Mech Eng	MSc	2003	Bioengineer, DynaSystems, Alberta
Pardy, C.	Calgary/Kines	MSc	2003	Prosthetist-Orthotist, Calgary, Alberta
Wohl, G	Calgary/Mech Eng	PhD	2002	Associate Professor, Mech Eng, McMaster Univ
McGuinness, B.	Calgary/Med Sci	MSc	2002	HS Science Teacher, Ontario
*Jaremko, J.	Calgary/Med Sci	MD/PhD	2002	Assoc Professor, Radiology, Univ of Alberta
*Boyd, S.	Calgary/Mech Eng	PhD	2001	Endowed Prof, Medicine/Mech Eng, U Calgary
Chan, R.	Calgary/Mech Eng	MSc	2000	PhD, University of London, UK
Davies, C.	Calgary/Mech Eng	MSc	2000	PhD/University of Waterloo
*Judex, S.	Calgary/Mech Eng	PhD	1999	Professor, SUNY Stony Brook
Ajemian, S.	Calgary/Med Sci	MSc	1998	Biomedical Engineer, California
Wohl, G.	Calgary/Mech Eng	MSc	1996	Associate Professor, McMaster University
Ferguson, K.	Calgary/Comp Sci	PhD	1996	Software Engineer, California
Kerrigan, D. C.	UCLA/Kines	MD/MSc	1992	Professor & Chief Rehab Med, Univ of Virginia
Li, K-C.	UCLA/Kines	MD/PhD	1991	Orthop Surgeon-Scientist, Taiwan, ROC
Hou, J.	UCLA/Kines	MD/PhD	1990	Orthop Surgeon-Scientist, Taiwan, ROC
Loitz, B.	UCLA/Kines	PhD	1990	Asst Research Professor, University of Calgary
Salem, G.	UCLA/Kines	PhD	1989	Professor, Univ Southern California
Wisleder, D.	UCLA/Kines	MSc	1989	PhD, Penn State University
Hart, T.	UCLA/Kines	PhD	1988	Vice President, Mattel Corp, Los Angeles
Shaw, S.	UCLA/Kines	MD/PhD	1987	Orthopaedic Surgeon, New York

Gourde, T.	UCLA/Kines	MSc	1987	MD/Medical Student
Peller, D.	UCLA/Kines	MSc	1986	Engineer, TRW, Redondo Beach
Matsuda, J.,	UCLA/Kines	MSc	1985	MD University of Iowa
Gross (Hoy), M.	UCLA/Kines	PhD	1984	Associate Professor, University of Michigan
Stewart, H.	UCLA/Kines	MSc	1983	Engineer, TRW, Redondo Beach
Roberts, D.	UCLA/Kines	MSc	1983	MD Harvard University
Keller-Brewer, D.	UCLA/Kines	MSc	1982	Teacher, Los Angeles
Jepsen, R.	UCLA/Kines	MSc	1982	Teacher, Los Angeles
Perry, J.	UCLA/Kines	MSc	1981	Teacher, Los Angeles
Garhammer, J.	UCLA/Kines	PhD	1980	Professor, California State Univ Long Beach
Hoy, M.	UCLA/Kines	MSc	1979	Associate Professor, University of Michigan
Whiting, W.	UCLA/Kines	MSc	1979	Professor, California State Univ Northridge
Clark, L.	UCLA/Kines	MSc	1978	Physical Therapist, Los Angeles
Sprong, S.	UCLA/Kines	MSc	1975	Teacher, Los Angeles
Verderber, J.	UCLA/Kines	MSc	1975	Teacher, Los Angeles
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**Burns, G.	U-Mich/ESSI	PDF	20-22-	Post-Doctoral Fellow, U Michigan
***Olthof, S.	U-Mich/ESSI	PDF	19-21	Post Doctoral Fellow, U Michigan
***Giblin, G.	U-Mich/ESSI	PDF	18-19	Sport Scientist/Biomechanist, Detroit Tigers
**Hafer, J.	U-Mich/Kines	PDF	17-19	Asst Professor, Univ Delaware
**Agresta, C.	U-Mich/Kines	PDF	15-18	Asst Professor, University of Washington
Denoweth, J.	U-Mich/Kines	PDF	13-15	Principal, Zandler Scientific, Tacoma, WA
Whiteside, D.	U-Mich/Kines	PDF	13-15	Chief Sport Scientist, New York Yankees
**Cole, J.	U-Mich/Orthop Surg	PDF	10-13	Assistant Professor, Mech Eng, NCSU-UNC
Goulet, G.	U-Mich/Kines	PDF	09-12	VP/Director of Research, Xenith Tech, Detroit
Brown, T	U-Mich/Kines	PDF	11-12	Res Scientist, US Army Med Res Center, Mass.
**Kipp, K.	U-Mich/PM&R	PDF	09-11	Assistant Professor, Marquette University
*Cooper, D.	Calgary/Med	PDF	05-06	Professor, University of Saskatchewan
Doschak, M.	Calgary/Med Sci	PDF	2005	Associate Professor, University of Alberta
Poncet, P.	Calgary/Surgery	PDF	01-05	Bioengineer, Calgary, Alberta
*Judex, S.	Calgary/Surgery	PDF	1999	Professor, SUNY Stony Brook
*Muldrew, K.	Calgary/Surgery	PDF	96-98	Assistant Professor, University of Calgary
Ogawa, T.	Calgary/Surgery	PDF	96-97	Assistant Professor, South Korea
*Gross, T.	Calgary/Surgery	PDF	93-95	Professor, Dept Orthopaedics & Sports Med, University of Washington

*At the *University of Calgary* – Recipient of national (NSERC or CIHR), provincial (AHFMR), or U of Calgary scholarship funding.

**At the *University of Michigan* – Recipient of national (e.g., NIH or DoD) or University scholarship.

***At the *University of Michigan* – Recipient of research/scholarship funding.

Each year, at the University of Calgary, I served on other supervisory committees for 8-10 MSc and PhD students in the Departments of Mechanical & Manufacturing Engineering, Kinesiology, and Medical Sciences, and supervised 2-3 undergraduate summer research students and 1–2 orthopaedic residents.

Trainee Awards for Excellence (Selected):

PhD student Stefan Judex—Young Investigator Award, Canadian Society of Biomechanics; Young Investigator Award, International Society of Biomechanics (1993)

PDF Ted Gross—Young Investigator Award, American Society of Biomechanics (1993)

PhD student Steve Boyd—International Society of Biomechanics Dissertation/Research Award (1999) and International Society of Biomechanics Young Investigator Award (2001); Canadian Biomedical Engineering Society Best Student Research Paper (1998)

Preceptor for U of C Medical Students (Maya Spaeth and Nili Katz)—Peter Cruse Award for Best Surgery-Related Research Paper, Faculty of Medicine (1999)

PhD student Greg Wohl—Outstanding Research Paper Award at the 2000 Alberta Biomedical Engineering Conference

PhD student Michael Doschak—Outstanding Research Award at the 2001 Merck-Frosst Research Conference, Kirkland, Quebec; World Congress on Osteoarthritis Travel Award, Germany (2003)

MD/PhD student Jacob Jaremko (2001) Dr. Lionel McLeod Health Research Scholar (AHFMR)

MSc student Prism Schneider—International Society of Biomechanics Congress Travel Award (2003)

PhD student Jeremy LaMothe—International Society of Biomechanics Congress Travel Award (2003), 5th International Bone Fluid Flow Conference Travel Award (2003); Canadian Connective Tissue Conference Travel Award (2003); Nickle Foundation Prize (Top entering medical student, Univ. Calgary, 2003)

PDF Philippe Poncet—Canadian GEOIDE National Centre of Excellence, Annual Meeting, 1st Prize for Research (2003)

MD/PhD student Jeremy LaMothe—International Society of Biomechanics, Young Investigator Award (2003)

MD/PhD student Janet Tapper—ASME Summer Bioengineering Conference (USA), Young Investigator Award (2003); Orthopaedic Research Society, New Investigator Recognition Award (2004)

MD/PhD student John Grant—Peter Cruse Award for Best Surgery-Related Research Paper, Faculty of Medicine (2004) and Young Investigator Award, Canadian Society for Clinical Investigation (2004)

PhD student Caeley Lorincz—Gold Medal (Faculty of Kinesiology) and Undergraduate Canadian Society of Exercise Physiology Award (2004)

MSc student Nicolas Hamilton—Finalist, New Investigator Award (MSc), Canadian Society of Biomech (2004); 6th International Bone Fluid Flow Conference Travel Award (2004)

MSc student Christopher MacKay—Finalist, New Investigator Award (MSc), Canadian Society of Biomech (2004)

PhD/MD student Jeremy LaMothe—Founder's Medal (Best Research Paper), Canadian Orthopaedic Research Society Meeting (2004); New Investigator Research Award, Combined Conference of the Orthopaedic Research Societies (USA, Canada, Japan, and Europe) (2004); J. B. Hyne Research Innovation Award (University of Calgary, 2004)

PhD/MD student Prism Schneider—Delsys Award for EMG Research Innovation, Joint Congress of International and American Societies of Biomechanics, Cleveland, Ohio (2005); Best Research (Poster) Canadian Society for Clinical Investigation, Vancouver, British Columbia (2005)

PhD/MD student Jeremy LaMothe—Best Research Award (Poster), Alberta Provincial Training Program in Bone & Joint Health Annual Conference, Banff, Alberta (2005); Lydia Sikora Medical Research Award; University of Calgary Faculty of Medicine (2005 & 2006)

PhD student Grant Goulet—Best Presentation Award, University of Calgary, Schulich School of Engineering, Graduate Student Research Symposium (2006); NDI New Investigator Award, Canadian Society of Biomechanics (2006)

PhD student Sarah Manske—Ralph Steinhauer Award of Distinction, Province of Alberta (2007); Killam Honourary Scholarship (2007); University of Calgary Faculty of Graduate Studies Dean's Research Excellence Award (2007)

MSc student Aviv Fried—International Society of Biomechanics Congress Travel Award (2007)

PhD/MD student Prism Schneider—Peter Cruse Award for Best Surgery-Related Research Paper (Honorable Mention), Faculty of Medicine, University of Calgary (2007)
PhD/MD student Caeley Lorincz—Markin Graduate Scholar; University of Calgary (2009), Finalist Young Investigator Award, International Society of Biomechanics, Capetown, South Africa (2009)
PhD student Sarah Manske—Natural Sciences and Engineering Research Council of Canada, Research Achievement Award (2009)
PhD student Sarah Manske—NDI New Investigator Award (PhD), Canadian Society of Biomechanics (2010)
PhD student Sarah Manske—Harold Frost Young Investigator Award, Sun Valley Bone Conference (2011)
PhD student Geoff Burns—American Society of Biomechanics, Conference Travel Award (2017 & 2018)
PhD student Geoff Burns—European College of Sport Science, Rackham Travel Award (2019)
PhD student Geoff Burns—American Kinesiology Association Doctoral Scholar of the Year Award Nominee (University of Michigan, 2020) (2020)
MS student Carmel Ofir—American Kinesiology Association Masters Scholar Nominee (University of Michigan, 2020)

TEACHING (*UCLA*)

Human Neuromuscular Anatomy
Human Dissection Anatomy
Biomechanics of Human Movement
Biomechanics of Musculoskeletal Injury
Electromyographic Assessment of Movement
Musculoskeletal Mechanics
Physiology and Mechanics of Connective Tissues

TEACHING (*University of Calgary and University of Alberta*)

Biomechanics of Bone (Mechanical Engineering)
Topics in Joint Injury & Arthritis—Biology & Biomechanics (Medical Science)
Control of Posture and Movement (Medical Science)
Normal and Pathological Gait (Medical Science)
Seminars in Biomedical Engineering (University of Calgary & University of Alberta)
Transdisciplinary Bone and Joint Health (Univ Calgary & Univ Alberta)
Seminar in Bone and Joint Health (University of Calgary & University of Alberta)

Committee, Organizational, and Volunteer Service

Institutional

UCLA

Life Sciences Advisory Committee, USPHS Biomed Res Grant (1981-83 & 1985-89)
Academic Senate Legislative Assembly (1981-1982)
University Committee on Undergraduate Courses and Curricula (1982-1985)
University Committee on Teaching (1985-1988)
University Graduate Council—Review of Department of Pathology (1988)
Chancellor's Committee to Evaluate the Dean of Life Sciences (1985-1986)

Academic Advisory Committee, Chemistry/Biological Sciences Renovation (1987-1989)
Advisory Committee, Dental Research Institute (1987-1991)
Advisory Committee, Sports Med and Dept of Intercollegiate Athletics (1989-91)
Executive Committee, Southern California Injury Prev and Res Center (1989-92)
Selection Committee, Alumni Assoc, UCLA Outstanding Senior (1981)
Selection Committee, Alumni Association, Community Service Awards (1982)

University of Calgary

Chair, Coordinating Committee on Biomedical Engineering (1997-1998)
Chair, Joint Injury and Arthritis Research Group (1996-1998)
Member, Joint Injury and Arthritis Research Group (1991-date)
Member, Julia McFarlane Diabetes Research Centre (1992-1995)
Chair, Department of Surgery Research Committee (1992-1997)
Member, Pediatric Orthopaedic Research Group (2000-date)
Director, Office of Surgical Research, Department of Surgery (1995-1998)
Member, Division Heads/Division Chiefs, Department of Surgery (1995-1998)
Member, Division of Orthopaedic Surgery, Research Committee (1993-1998)
Member, Division of Orthopaedic Surgery, Finance Committee (1993-1998)
Member, General Faculties Council (1993-1997, 1998-2003)
Member, University Admissions, Promotions & Dismissal Committee (1993-1996)
Member, Animal Care Policy Committee—Health Sciences (1993-1996)
Member, University Dismissal Hearing Panel (1994-1998)
Member, Search Committee for Assoc Vice-Pres (Research)/Dean, Faculty of Graduate Studies (1996)
Member, Search Committee, Division of Orthopaedics, Department of Surgery (1996)
Chair, Search Committee for Connective Tissue Histomorphometrist, Dept of Anatomy (1994)
Chair, Search Committee, Department of Biochemistry and Molecular Biology (1998)
Member, Review/Search Committee for Carma Chair, Faculty of Management, Univ of Calgary (1996)
Member, Search Committee for Department of Community Health Sciences (1996)
Member, Search Committee, Department of Civil Engineering, University of Calgary (1996)
Member, Search Committee, Department of Electrical and Computer Engineering (1997)
Member, Search Committee, Department of Clinical Neurosciences (1997)
Member, Search Committee, Department of Mechanical and Manufacturing Engineering (1998)
Member, UC Strategic Transformation Team for Research and Graduate Studies (1997-1998)
Member, Faculty of Medicine, Recruitment Priorities Committee (1997-1998)
Member, Surgical Executive Committee, Department of Surgery and Calgary Regional Health Authority (1996-1998)
Member, Executive Board, Calgary Olympic Development Association (1998-2003)
Chair, Health and Education Deans' Cluster (Education, Medicine, Nursing, Kinesiology) (1999-2000)
Member, Deans' Council Executive Committee (2000-2003)
Chair, Deans' Council Executive Committee (2001-2002)
Member, Deans' Council Alcohol Advisory Committee (2000-2002)
Member, University Task Force on the Changing Nature of Academic Work (2000)
Member, University Task Force on Faculty Recruitment and Retention (2000)
Member, University Task Force on Trust Employees (2001-2002)
Member, University InfoStructure Advisory Group (2001-2002)
Member, University Committee for Alberta Ingenuity Foundation Centres of Excellence (2001)
Member, University Revenue Generation Action Group (2002-2003)
Member, Killam Memorial Chair Review Committee (2003)

Member, Communications Committee (*Advances in Motion*), Joint Injury and Arthritis Research Group (2000-2005)
Member, Advisory/Scholarship Committee, Undergraduate Student Research Program (2004-2006)
Member, Bioengineering Advisory Committee (2004-2006)
Chair, Advisory Board, Markin Institute for Public Health (2004-2005)
Member, University of Calgary West Campus Development Task Force (2005)
Member, Fundraising Vetting Committee, REACH Fundraising Initiative of the University of Calgary and Calgary Health Region (2005)
Advisory Selection Committee (Designate of Vice President Research and International), Alvin Libin Chair in Biomedical Engineering, Schulich School of Engineering (2005-2006)
Chair, Academic Search and Selection Committee, Canada Research Chair (Tier II) in Health Systems and Services Research, Faculty of Medicine (2006)
Member, Faculty of Kinesiology, Research Policy Committee (2006-2008)
Member, Academic Search and Selection Committee, Biomechanics/Bioengineering Position, Faculty of Kinesiology & Schulich School of Engineering (2007)

University of Michigan

Member, Research Advisory Committee, Department of Orthopaedic Surgery (2007-2012)
Member, Search Committee, Bone & Joint Injury Prevention & Rehabilitation Center, Director (2009-2010)
Member, Search Committee, Department of Orthopaedic Surgery, Musculoskeletal Epidemiologist (2009-2010)
Member, Academic Programs Group, Development Subcommittee (2010-2011, 2012-2014)
Member, Academic Programs Group, Operations Subcommittee (2010-2012)
Member, Academic Programs Group, Diversity Subcommittee (2014-2015)
Member, Academic Programs Group, Budget Subcommittee (2012-2016)
Member, Academic Programs Group, School for Deans Committee (2013-2014)
Co-Chair, Executive Committee, Bone & Joint Injury Prevention & Rehabilitation Center (2010-2015)
Member, Internal Advisory Board, Michigan Institute for Clinical and Health Research (2011-2016)
Member, University Advisory Board, MHealthy Program (2012-2016)
Chair, Search Committee (Biomechanics), School of Kinesiology (2017-2018)
Member, Scientific Review Committee, Michigan Medicine–Peking University Health Science Center (2019-2020)
Member, Launch Committee (New Faculty, Dept Mechanical Engineering—2018-2020)
Member, Launch Committee (New Faculty, Dept Orthopaedic Surgery—2019-2021)

Volunteer Service (Community)

Chair, United Way of Calgary & Area Campaign Cabinet, Education Division (2001 and 2002)
Member, Community and Partners Advisory Committee, Libin Cardiovascular Institute of Alberta (2003-2007)

Consulting Positions

AAU Sports Medicine Committee (1977-1979);
US Olympic Committee (1975-1976)
Spain, Ministry of Culture–Sports Medicine (1980)
Failure Analysis Associates, Inc., Los Angeles (1975-1982)
Forensic Science Associates, Los Angeles (1981-1983)

Association of Scientific Advisors, Los Angeles (1979-1982)
UCLA Child Amputee Prosthetics Project (1978-1994)
BIOMLIB Software (Austria 1982-1987)
Meduski Research Corporation, Los Angeles (1991-1992)
Canadian National Sports Development Centre, Calgary (1994-1995)
Fraser, Milner & Casgrain, Calgary, Alberta, (2000)

Visiting Professorships, Seminars, and Extramural Invited Presentations (Selected)

NASA/Ames & UC Davis Symposium on the Physiological and Mechanical Responses of Bone to Weightlessness, NASA/Ames, Moffett Field, CA, October 1986: *Biomechanical and morphological response of Spacelab-3 tibiae and humeri to weightlessness.*

Engineering Foundation—Conference on Biomechanics and Control, Henniker, New Hampshire, July 1987: *Role of intersegmental dynamics in the control of rapid limb oscillations.*

Alberta Heritage Foundation for Medical Research Visiting Lecturer, Faculty of Physical Education, Human Performance Laboratory, University of Calgary, Calgary, Alberta, Canada, October 1987: *The control of rapid limb movements & The response of fibrocartilage and bone to altered mechanical stress.*

Department of Biomedical Engineering, University of Southern California, Los Angeles, California, February 1988: *Dynamical control of limb trajectories.*

Department of Aerospace Engineering and Engineering Mechanics, Department of Mechanical Engineering, and the Institute for Applied Interdisciplinary Research, University of Cincinnati, Cincinnati, Ohio, April 1988: *The role of intersegmental dynamics in the control of limb trajectories.*

North American Society for Psychology of Sport and Physical Activity Annual Meeting, Knoxville, Tennessee, June 1988: *Intersegmental dynamics: New dimensions in motor development.*

Center for Locomotion Studies, The Pennsylvania State University, State College, Pennsylvania, September 1988: *The role of intersegmental dynamics in the control of limb trajectories.*

Department of Exercise and Sport Sciences, Arizona State University, Tempe, Arizona, November 1988: *Control of inertial and muscular torques during coordinated limb movements.*

Department of Exercise and Sport Sciences, The Pennsylvania State University, State College, Pennsylvania, February 1989: *The dynamics of motor control and connective tissue adaptation.*

Department of Neurosurgery, UCLA School of Medicine Symposium on Acquired Lumbar Spinal Stenosis, Los Angeles, California, March 1989: *Ligament properties and relation to lumbar spinal stenosis.*

American Orthopaedic Society for Sports Medicine and National Institutes of Health, Bethesda, Maryland, May 1989: *Mechanisms of overload injuries: Dynamical loading of the musculoskeletal system in training and conditioning.*

Department of Surgery, University of Calgary, Alberta, Canada, March 1990: *Osteoregulatory function of bone strain.*

Department of Surgery, Joint Injury and Diseases Research Group, University of Calgary, Alberta, Canada, June 1990: *Adaptive responses of bone and ligament to diet, exercise, and diabetes.*

American College of Sports Medicine, Southwest Chapter Annual Meeting, San Diego, California, November 1990: *Adaptation of immature and mature bone to strenuous exercise.*

Julia McFarlane Diabetes Research Centre and Endocrine Research Group, University of Calgary, Faculty of Medicine, April 1992: *The effects of diabetes and exercise on bone and ligament.*

Engineering Foundation Conference on Biomechanics and Neuroscience, Ventura, CA, July 1992: *Intersegmental dynamics and motor control of human limb movements.*

Western Canadian Prosthetics Symposium, Alberta Children's Hospital, Calgary, Alberta, October, 1992: *Static and dynamic alignment of the prosthesis and the effect on gait.*

Department of Medicine, Grand Rounds, University of Calgary, Calgary, Alberta, November 1992: *Connective tissue physiology, mechanics, and injuries.*

Alberta Neuroscience Association, Kananaskis Centre, Kananaskis, Alberta, November 1992: *Changes in limb dynamics in the first year of life.*

Visiting Professor, Republic of China, Sports Medicine Society, Taipei, Taiwan, December 1992: Four invited lectures— (1) *The response of bone to exercise*, (2) *locomotion and sports for amputees*, (3) *Overtraining injuries and stress fractures*, (4) *role of dynamics in the learning of motor skills.*

University of Alberta, Department of Physical Therapy and Neuroscience Program, March 1993 (Two Lectures): (1) *Role of intersegmental dynamics in adult and infant motor skill acquisition*, and (2) *Locomotion and prosthesis ergonomics in lower extremity amputees.*

Columbia University, New York, Keynote Lecture, Conference on Skill Acquisition: Implications of Research and Theory in Motor Learning: April 1993: *The role of intersegmental dynamics in adult and infant motor skill acquisition.*

Université du Québec à Montréal, Montréal, Québec, Département de kinanthropologie, February 1994: *Intersegmental dynamics and motor skill acquisition.*

Canadian Society of Biomechanics, 8th Biennial Conference, Calgary, Alberta, Invited lecture, August 1994: *Assessing outcome efficacy in child amputee locomotion.*

Annual Meeting of the Southeast American College of Sports Medicine, Lexington, Kentucky, Keynote Lecture, February 1995: *The response of bone to exercise and diet.*

XVth Congress of the International Society of Biomechanics, Jyväskylä, Finland, Presidential Keynote Lecture, July 1995: *Functional adaptation of bone to physiological and mechanical stimuli.*

American Physical Therapy Association Research Symposium, Multisegmental Motor Control: Interface of Biomechanical, Neural and Behavioral Approaches. Invited Lecture, New Hampton, New Hampshire, August 1995: *Biomechanics and motor control in orthopaedic related pathologies.*

American Physical Therapy Association Scientific Meeting and Exposition, Minneapolis, Minnesota, Invited Lecture, June 1996: *Biomechanics and motor control in orthopaedic related pathologies.*

Cleveland Clinic Foundation, Department of Biomedical Engineering, Cleveland, Ohio, Invited Lecture, May 1997: *Response of bone to physiological stimuli.*

Canadian Orthopaedic Association Annual Meeting, Invited Lecture, Hamilton, Ontario, June, 1997: *Biomechanics and osteoporosis.*

Whitaker Foundation Research Conference, Keynote Lecture, Snowbird, Utah, July 1997: *Biomedical engineering and orthopaedic clinical care.*

Southwest Chapter of the American College of Sports Medicine, Invited Lecture, Las Vegas, Nevada, November, 1997: *Musculoskeletal injuries to the knee and leg.*

Department of Kinesiology, University of Waterloo, Waterloo, Ontario, Invited Lecture, February, 1998: *Orthopaedic biomechanics: Function, diagnosis, and mechanisms.*

CORS Presidential Guest Lecture, Canadian Orthopaedic Research Society, Ottawa, Ontario, June 1998: *Functional adaptation of bone.*

Canadian Medical and Biological Engineering Society, Invited Lecture, Edmonton, Alberta, June, 1998: *Cryopreservation of osteochondral tissues for joint replacement and repair.*

Alberta Society for Motor Control, Keynote Lecture, Jasper, Alberta, October, 1998: *Biomechanics and motor control.*

Marquette University, Visiting Professor Lecture, Department of Biomedical Engineering, Milwaukee, WI, February, 1999: *Functional adaptation of bone.*

University of California, Davis. Departments of Orthopaedics and Exercise Science and Biomedical Engineering Program, Invited Lecture, Davis, CA, February, 1999: *Functional adaptation of bone*.

Canadian Orthopaedic Nursing Association Annual Meeting, Keynote Lecture, Calgary, AB, October 1999: *Functional adaptation of bone*.

The Arthritis Society, Keynote Lecture, Research and Public Symposium, October, 1999: *Osteoarthritis—treatments and new directions*.

McMurtry Lecturer (Invited Keynote Lecture), Surgeons' Day, University of Calgary, Calgary, AB, June 2000: *Orthopaedic surgery research*.

Canadian Society of Biomechanics, Keynote Lecture, Montreal, PQ, August 2000: *Factors in skeletal adaptation*.

IOC Pre-Olympic Scientific Congress, Keynote Lecture, Brisbane, Australia, September 2000: *Functional adaptation of bone*.

Sigma Xi Research Society, University of Calgary, Invited Lecture, November 2000: *Osteoarthritis and joint mechanics and physiology*.

Biomedical Engineering Society—Republic of China, Keynote Lecture, Taipei, Taiwan, December 2000: *Responses of bone to exercise and injury*.

3rd Annual Orthopaedic Research Symposium, Invited Lecture, University of Calgary, Department of Surgery (Division of Orthopaedics), February 2001, *Periarticular bone adaptations in post-traumatic osteoarthritis*.

4th Combined Meeting of the Orthopaedic Research Societies of USA, Canada, Japan, Europe, Keynote Lecture, Rhodes, Greece, June 2001: *Adaptation of bone to exercise and injury*.

International Conference on Biomechanics and Annual Meeting of the Taiwan Society of Biomechanics, Keynote Lecture, Taipei, Taiwan—Republic of China, November 2001: *Bone responses to exercise and injury*.

40th Anniversary Research Symposium, National Cheng-Kung University, Institute for Biomedical Engineering, Keynote Lecture, Tainan, Taiwan—Republic of China, November 2001: *Bioengineering advances in orthopaedics*.

Shanghai Second Medical School, The Ninth People's Hospital, Department of Orthopaedics, Invited Lecture, Shanghai, China, November 2001: *Bioengineering advances in orthopaedics*.

American Society for Nutrition Sciences Symposium, Experimental Biology 2002 Conference, Symposium Invited Keynote Lecture, New Orleans, Louisiana, April 2002: *Effects of dietary fat in bone adaptation*.

Alberta Health Industry Alliance, Invited Lecture, Calgary, Alberta, June 2002: *Health and wellness — Vision for southern Alberta*.

Center for Complex Systems and Brain Science, Florida Atlantic University, Boca Raton, Florida, August 2002: *Bioengineering systems and orthopaedic biomechanics*.

International Biomechanics Congress—Biomechanics of Man, Invited Keynote Lecture, Prague, Czech Republic, November 2002: *Response of bone to exercise and injury*.

Canadian Institutes for Health Research—Institute for Musculoskeletal Health and Arthritis National Symposium, Invited Lecture, January 2003: *Integrating bone and joint health research and training*.

Lawson Health Research Institute, University of Western Ontario, Sister Mary Doyle Research Symposium, Invited Keynote Lecture, March 2003: *Bone adaptation and orthopaedic biomechanics*.

CCAT/BioAlberta—Opportunities in Bioinformatics: Technology, Partnerships and Commercialization, Invited Lecture, March 2003: *Innovations in bone modelling*.

Alberta Provincial CIHR Bone and Joint Training Program (University of Calgary and University of Alberta), Seminar, March 2003: *Adaptation of bone to exercise and injury*.

American College of Sports Medicine, Annual Meeting, Symposium Invited Lecture, San Francisco, California, June 2003: *The bone-injury connection*.

Congress of the European College of Sport Sciences, Symposium on Neuromuscular & Skeletal Adaptation, Invited Lecture, Salzburg, Austria, July 2003: *Adaptation of bone to exercise and injury*.

Whitaker Conference on Biomedical Engineering, La Jolla, California, Workshop Invited Speaker, August 2003: *Strategies for Research: Individual vs. Team—How best to succeed*.

Department of Biomedical Engineering, State University of New York, Stony Brook, Invited Lecture, September 2003: *Adaptation of bone to exercise and injury*.

Departments of Orthopaedics and Anatomy & Cell Biology, Indiana University-Purdue University, Indianapolis, Invited Lecture, September 2003: *Adaptation of bone to exercise and injury*.

Departments of Pathokinesiology & Physical Therapy and Biomedical Engineering, University of Southern California, Los Angeles, Invited Lecture, February 2004: *Adaptation of the musculoskeletal system to exercise and injury*.

Department of Kinesiology and Leisure Studies, University of Hawaii, Honolulu, Hawaii, Invited Lecture, March, 2004: *Adaptation of the musculoskeletal system to exercise and injury*.

Bone Health Research Symposium, University of British Columbia, Vancouver, Invited Keynote Lecture, May 2004: *Adaptation of the musculoskeletal system to exercise and injury*.

Rodeo Research & Clinical Care—1st International Conference, Calgary, Alberta, Invited Lecture, July 2004: *Biomechanics, sport medicine & rodeo research*.

Canadian Society of Biomechanics, Annual Meeting, Halifax, Nova Scotia, Invited Lecture, August 2004: *Successful strategies for crafting grants for CIHR*.

Whitaker Conference on Biomedical Engineering, La Jolla, California, Workshop Invited Speaker, August 2004: *Strategies for research: individual vs. team—How best to succeed*.

6th International Bone Fluid Flow Workshop, Seattle, Washington, Invited Lecture, September 2004: *Functional adaptation of bone*.

Canadian Society of Exercise Physiology, Annual Meeting, Winnipeg, Manitoba, Invited Lecture, October 2004: *Formulating successful applications for NSERC/CIHR*.

Canadian Society of Exercise Physiology, Annual Meeting, Winnipeg, Manitoba, Invited Lecture, October 2004, Symposium on Adaptation of Bone to Physical Activity—*How does bone receive and act upon the loading message?*

Departments of Orthopaedics/Sport Medicine and Biomedical Engineering. Stanford University, Palo Alto, California, February, 2005: *Adaptation of the musculoskeletal system to exercise and injury*.

Exercise Biology Program and Department of Biomedical Engineering, University of California, Davis, California, February, 2005: *Adaptation of the musculoskeletal system to exercise and injury*.

School of Health, Physical Education, and Recreation and Department of Kinesiology, Indiana University, Bloomington, Indiana, April, 2005: *Adaptation of the musculoskeletal system to exercise and injury*.

Kerby Centre of Excellence and Network in Applied Gerontology, Calgary, Alberta, Invited Lecture, April 2005: *Healthy and successful aging*.

Canadian Athletic Therapy Association, Annual Meeting, Calgary, Alberta, Invited Lecture, May 2005: *Bone-injury connection*.

Canadian Institutes for Health Research, Institute for Musculoskeletal Health and Arthritis, Symposium for Strategic Training Programs in Health Research, Montreal, Quebec, May 2005: *Alberta Provincial Bone and Joint Health Training Program*.

Department of Physical Medicine and Rehabilitation, University of Virginia, Charlottesville, Virginia, Invited Lecture, August, 2005: *Adaptation of the musculoskeletal system to exercise and injury*.

School of Human Kinetics, University of British Columbia, Vancouver, British Columbia, Invited Lecture, November, 2005: *Adaptation of the musculoskeletal system to exercise and injury.*

IT for Healthcare Wait Times, The Canadian Institute, Invited Lecture, Toronto, Ontario, May 2006: *Redesign of bone & joint health care.*

International Space Life Sciences Working Group and International Osteoporosis Foundation Congress, Invited Lecture, Toronto, Ontario, June 2006: *Space bone research—key questions and directions.*

British Columbia Surgical Access Wait Times Conference, Invited Lecture, Kelowna, British Columbia, June 2006: *Hip and knee replacement wait times and access — The Alberta model.*

The Arthritis Society of Alberta and Northwest Territories, Research Day, Invited Keynote Lecture, Calgary, Alberta, June 2006: *Redesigning bone & joint health services.*

Canadian Society of Biomechanics, Biennial Conference, Invited Keynote Lecture, Waterloo, Ontario, August 2006: *Bone: Cellular mechanisms to functional adaptation.*

Alberta Orthopaedic Society, Annual Conference, Invited Presentation, Kananaskis, Alberta, September 2006: *Alberta Bone and Joint Health Institute.*

Alberta Healthcare Auxillary Association, Annual Conference, Invited Keynote Lecture, Red Deer, Alberta, October 2006: *Redesigning bone & joint healthcare.*

XXI Congress of International Society of Biomechanics, Invited Keynote Lecture, Taipei, Taiwan, July, 2007: *Functional adaptation of bone.*

Department of Orthopaedic Surgery Research Symposium—Badgley Day, University of Michigan, Invited Lecture, Ann Arbor, Michigan, October 2007: *Adaptation of bone to exercise, diet, and injury*

MedSport, University of Michigan, Invited Lecture, Ann Arbor, Michigan, December 2007: *Adaptation of bone to diet, exercise, and injury & role of musculoskeletal and sport injury prevention.*

Division of Kinesiology, University of Michigan, Invited Lecture, Ann Arbor, Michigan, January 2008: *Adaptation of bone to diet, exercise, and injury.*

Southern California Conference on Biomechanics, American Society of Biomechanics, Invited Keynote Lecture, Thousand Oaks, California, April 2008: *Bone adaptation: Diet, exercise & injury.*

Department of Kinesiology, Pennsylvania University, Invited Lecture, College Park, Pennsylvania, April 2008: *Adaptation of bone to diet, exercise, and injury.*

Symposium on Bone, University of British Columbia, Invited Lecture, Vancouver, British Columbia, May 2008: *Functional imaging and bone adaptation.*

North American Congress of Biomechanics, Invited Tutorial Lecture, Ann Arbor, Michigan, August 2008: *Successful strategies for Canadian grants.*

North American Congress of Biomechanics, Invited Keynote Lecture (Canadian Society of Biomechanics Career Award), Ann Arbor, Michigan, August 2008: *Biomechanicz in Three Acts.*

Pease Family Scholar, Invited Keynote Lecture, Department of Kinesiology and College of Human Sciences, Iowa State University, Ames, Iowa, September 2008: *Adaptation of bone to diet, exercise, or injury.*

International Biomechanics Congress—Human Biomechanics, Czech Society of Biomechanics, Invited Keynote Lecture, Prague, Czech Republic, October 2008: *Mechanisms of Bone Adaptation.*

Department of Kinesiology, Invited Lecture, University of Waterloo, Waterloo, Ontario, Canada, October 2008: *Adaptation of bone to diet, exercise, or injury.*

Department of Mechanical Engineering, Invited Lecture, University of Michigan, Ann Arbor, Michigan, October 2008: *Adaptation of bone to diet, exercise, or injury.*

Grand Rounds, Department of Orthopaedic Surgery, University of Michigan, Ann Arbor, Michigan, October 2008: *Redesigning the continuum of care for hip and knee replacements: The Alberta Project.*

Department of Industrial and Operational Engineering, Invited Lecture, University of Michigan, Ann Arbor, Michigan, October 2008: *The Alberta Model: Redesign of the continuum of care for hip and knee replacements.*

NCAA Scholarly Colloquium, Invited Keynote Lecture, Washington, DC, January 2009: *Play at your own risk: Sport and the injury epidemic.*

CIHR Provincial Training Program in Bone and Joint Health, Invited Lecture, University of Calgary and University of Alberta, Calgary, Alberta, March 2009: *The Bone & Joint Injury Prevention & Rehabilitation Center at the University of Michigan — Mission & Research.*

Grand Rounds, Invited Lecture, Department of Medicine, Division of Endocrinology, Indiana University-Purdue University Medical School, Indianapolis, Indiana, April 2009: *Effects of dietary protein, fat, and sugar on bone integrity.*

Department of Anatomy and Cell Biology, Invited Lecture, Indiana University-Purdue University Medical School, Indianapolis, Indiana, April 2009: *Bone adaptation to injury, mechanical loading, and fluid flow.*

International Symposium on Sport Injury Prevention, Invited Keynote Lecture, Oslo Sports Trauma Research Center, Oslo, Norway, May 2009: *Bone health: Diet, exercise, and injury mechanisms.*

The Canadian Arthritis Society, Invited Keynote Lecture (National Research Knowledge Translation Lecture Series), Internet webinar coordinated through Toronto, Ontario, July 2009: *Role of Bone in Osteoarthritis.*

Canadian Institutes for Health Research/Institute for Musculoskeletal Health and Arthritis, Bone Health Consensus Conference, Invited Keynote Lecture, Toronto, Ontario, November 2009: *Optimizing Bone Health—Diet & Physical Activity.*

Symposium on Ergonomic Interventions and Research: Preventing Musculoskeletal Disorders, Invited Lecture, San Francisco, California, December 2009: *Can Sports Medicine Methods Reduce the Risk of Workplace Musculoskeletal Disorders?*

Henry Ford Hospital Distinguished Scientist Lecture, Detroit, Michigan, March 2010: *Adaptation of bone to diet, exercise, and injury.*

Symposium on Joint Motion Program, University of Western Ontario, Invited Lecture, London, Ontario, May 2010: *The Alberta and Michigan models for musculoskeletal training programs.*

International Bone Fluid Flow Conference, Invited Lecture, Toronto, Ontario, October 2010: *Bone fluid flow in idealized and geometrically accurate computational models.*

International Sport and Exercise Medicine Conference—Prevention of Osteoarthritis following Exercise or Sport [Arthritis Research Campaign (ARC) and Institute of Sports and Exercise Medicine (ISEM)], Invited Keynote Lecture, London, UK, October 2010: *Response of Bone to Exercise and Injury.*

Distinguished Scientist Series, Invited Lecturer, Department of Kinesiology, University of Windsor, Ontario, Canada, February 2011: *Adaptation of Bone to Diet, Exercise, and Injury.*

Centennial Symposium, Invited Keynote Lecture, Department of Kinesiology, University of Wisconsin, Madison, Wisconsin, April 2011: *Biomechanics: Blending Movements and Tissue Adaptation.*

Congress of the International Society of Biomechanics, Invited Tutorial Lecture, Brussels, Belgium, July 2011: *Adaptation of Bone to Diet, Exercise, and Injury.*

National Academy of Kinesiology, Invited Keynote Lecture, Minneapolis, Minnesota, September 2011: *Impact of Biomechanics Research on Society.*

Alberta Osteoarthritis Conference, Invited Keynote Lecture, Canmore, Alberta, April 2012: *Team Science: Opportunities & Challenges*

Hope College, Invited Lecture, Holland, Michigan, February 2013: *Biomechanics: Blending Movement and Tissue Adaptation*

Concordia University, Invited Lecture, Ann Arbor, Michigan, April 2013: *Biomechanics: Blending Movement and Tissue Adaptation*

World Congress of Biomechanics, Invited Participant for the International Society of Biomechanics Panel Discussion, Boston, Massachusetts, July 2014: *PhD & Post-Doctoral Networking and Opportunities*

World Congress of Biomechanics, Invited Keynote Speaker for the International Society of Biomechanics Presidential Symposium, Boston, Massachusetts, July 2014: *Skeletal Adaptation: Mechanisms & Influences*

University of Calgary, Invited Keynote Speaker for the Research Symposium, 35th Anniversary of the Human Performance Laboratory, Calgary, Alberta, December 2016: *Skeletal Adaptation: Synthesis & Beyond*

Marquette University, Invited Lecture, Department of Physical Therapy/Graduate Program in Rehabilitation Science, Milwaukee, Wisconsin, February 2017: *Skeletal Adaptation*

University of Waterloo, Invited Lecture, Department of Kinesiology (Faculty of Applied Health Sciences), 50th Anniversary Symposium (Founding of Dept of Kinesiology), Waterloo, Ontario, Canada, April 2018: *Skeletal Adaptation: Synthesis & Beyond*.

Leadership Summit, Invited Keynote Lecture, Concordia University, Ann Arbor, Michigan, August 2018: *Achieving Personal and Career Goals via Sport, Exercise, and Optimizing Performance*.

World Congress of Rheumatology and Orthopaedics, Invited Plenary Lecture, Madrid, Spain, September 2018: *Skeletal Adaptation: Exercise, Injury & Osteoarthritis*.

American Kinesiology Association Annual Conference, Invited Workshop Co-Chair & Speaker, Phoenix, Arizona, January 2019: *Fundraising and Alumni Engagement*

Combined Congress of the International and American Societies of Biomechanics, Invited Keynote Speaker, CSB Symposium, Calgary, Alberta, Canada, August 2019: *Opportunities, Collaborations, and Impact: A Biomechanics Journey*.

National Academy of Kinesiology Annual Conference, Invited Lecture, Bellevue, Washington, August 2019: *Biomechanics of Elite Performers: Economy and Efficiency of Movement*.

Alberta Biomedical Engineering Conference, Invited Keynote Lecture, Banff, Alberta, Canada, October 2019: *Biomedical Engineering—Catalyzing Collaborations in Human Performance Biomechanics*.

Leadership Summit, Invited Keynote Lecture, Concordia University, Ann Arbor, Michigan, January 2020: *Achieving Personal and Career Goals via Sport & Exercise and Health & Wellness*.

Patent

Gu, P. and **Zernicke, R. F.** General isosurface equation for surface integration in reverse engineering. UTI REF 283.2, July 2001, Canada [A general implicit equation and an associated topology-based integration algorithm for range surface integration. Modeling, design, and manufacturing of free-form surfaces have applications ranging from automobile, aircraft, plastic manufacturing, and biomedical industries to entertainment and arts.]

Publications

Peer-Reviewed Journals (h Index=64; i10 index=181; Citations=16,669; Google Scholar JAN 2021)

1. **Zernicke, R. F.**, and Waterland, J. C. Single motor unit control in m. biceps brachii. *Electromyography and Clinical Neurophysiology* **12**: 225-241, 1972.
2. **Zernicke, R. F.**, Caldwell, G., and Roberts, E. M. Fitting biomechanical data with cubic spline functions. *Research Quarterly* **47**: 9-19, 1976.
3. **Zernicke, R. F.**, Garhammer, J. J., and Jobe, F. W. Human patellar tendon rupture: A kinetic analysis. *Journal of Bone and Joint Surgery* **59A**: 179-183, 1977.
4. **Zernicke, R. F.**, and Roberts, E. M. Lower extremity forces and torques during systematic variation of non-weightbearing motion. *Medicine and Science in Sports* **10**: 21-26, 1978.
5. Butler, D., Grood, E. S., Noyes, F. R., and **Zernicke, R. F.** Biomechanics of ligaments and tendons. *Exercise and Sport Sciences Reviews* **6**: 125-183, 1978.
6. Smith, J. L., Betts, B., Edgerton, V. R., and **Zernicke, R. F.** Rapid ankle extension during paw shakes: Selective recruitment of fast ankle extensors. *Journal of Neurophysiology* **43**: 612-620, 1980.
7. Spector, S. A., Gardiner, P. F., **Zernicke, R. F.**, Roy, R. R., and Edgerton, V. R. Muscle architecture and force-velocity characteristics of cat soleus and medial gastrocnemius: Implications for motor control. *Journal of Neurophysiology* **44**: 951-960, 1980.
8. Clark, L. A., and **Zernicke, R. F.** Balance in lower limb child amputees. *Prosthetics and Orthotics International* **5**: 11-18, 1981.
9. Shapiro, D. C., **Zernicke, R. F.**, Gregor, R. J., and Diestal, J. D. Evidence for generalized motor programs using gait pattern analysis. *Journal of Motor Behavior* **13**: 33-47, 1981.
10. **Zernicke, R. F.** Biomechanical evaluation of bilateral tibial spiral fractures during skiing. *Medicine and Science in Sports and Exercise* **13**: 243-245, 1981.
11. Huston, R. L., Harlow, M. W., and **Zernicke, R. F.** Effect of restraining belts in preventing vehicle-occupant/steering-system impact. In: *Occupant Crash Interaction with the Steering System (SP-507)* SAE Technical Paper No. 820471, 1982.
12. **Zernicke, R. F.**, Gregor, R. J., and Crary, B. J. Balance and visual proprioception in children. *Journal of Human Movement Studies* **8**: 1-13, 1982.
13. Hoy, M. G., Whiting, W. C., and **Zernicke, R. F.** Stride kinematics and knee joint kinetics of child amputee gait. *Archives of Physical Medicine and Rehabilitation* **63**: 74-82, 1982.
14. **Zernicke, R. F.**, and Gregor, R. J. The integrative role of cinematography in biomechanics research. *Proceedings of SPIE* **291**: 202-209, 1982.
15. Huston, R. L., and **Zernicke, R. F.** Computerized simulation of whole body dynamics: Aspects of human movement modeling. *Proceedings of SPIE* **291**: 180-186, 1982.
16. Smith, J. L., Smith, L. A., **Zernicke, R. F.**, and Hoy, M. G. Locomotion in exercised and non-exercised cats cordotomized at two or twelve weeks of age. *Experimental Neurology* **76**: 393-413, 1982.
17. Bodine, S. C., Roy, R. R., Meadow, D. A., **Zernicke, R. F.**, Sacks, R., and Edgerton, V. R. Architectural, histochemical, and contractile characteristics of a unique biarticular muscle: The cat semitendinosus. *Journal of Neurophysiology* **48**: 192-20, 1982.

18. Whiting, W. C., and **Zernicke, R. F.** Recognition and correlation of limb trajectory patterns. *Journal of Motor Behavior* **14**: 135-142, 1982.
19. **Zernicke, R. F.** Biomechanical and biochemical synthesis. *Medicine and Science in Sports and Exercise* **15**: 6-8, 1983.
20. Butler, D. L., Stouffer, D. C., Wukusick, P. M., and **Zernicke, R. F.** Analysis of non homogeneous strain response of human patellar tendon. *ASME AMD-56*: 109-112, 1983.
21. **Zernicke, R. F.**, Butler, D. L., Grood, E. S., and Hefzy, M. S. Strain topography of human tendon and fascia. *Journal of Biomechanical Engineering* **106**: 177-180, 1984.
22. Noyes, F. R., Butler, D. L., Grood, E. S., **Zernicke, R. F.**, and Hefzy, M. S. Biomechanical analysis of human ligament grafts used in knee-ligament repairs and reconstructions. *Journal of Bone and Joint Surgery* **66A**: 344-352, 1984.
23. Butler, D. L., Grood, E. S., Noyes, F. R., **Zernicke, R. F.**, and Brackett, K. Effects of structure and strain measurement technique on the material properties of young human tendons and fascia. *Journal of Biomechanics* **17**: 579- 596, 1984.
24. Hoy, M. G., and **Zernicke, R. F.** Modulation of limb dynamics in the swing phase of locomotion. *Journal of Biomechanics* **18**: 49-60, 1985.
25. Smith, J. L., Hoy, M. G., Koshland, G. F., Phillips, D. M., and **Zernicke, R. F.** Intralimb coordination of the paw shake response: A novel mixed synergy. *Journal of Neurophysiology* **54**: 1271-1281, 1985.
26. Hoy, M. G., **Zernicke, R. F.**, and Smith, J. L. Contrasting roles of knee and ankle muscle and inertial moments during paw shake response. *Journal of Neurophysiology* **54**: 1282-1294, 1985.
27. Vailas, A. C., **Zernicke, R. F.**, Matsuda, J., and Peller, D. Regional biochemical and morphological characteristics of rat knee meniscus. *Comparative Biochemistry and Physiology* **82B**: 283-285, 1985.
28. **Zernicke, R. F.**, Hoy, M. G., and Whiting, W. C. Ground reaction forces and center of pressure distribution in child amputee gait. *Archives of Physical Medicine and Rehabilitation* **66**: 736-741, 1985.
29. **Zernicke, R. F.**, Vailas, A. C., Shaw, S. R., Bogey, R. A., Hart, T., and Matsuda, J. Heterogeneous mechanical response of rat menisci to thermomechanical stress. *American Journal of Physiology: Regulatory, Integrative and Comparative Physiology* **250**: R65-R70, 1986.
30. Vailas, A. C., **Zernicke, R. F.**, Matsuda, J. J., Curwin, S., and Durivage, J. Adaptation of rat knee meniscus to prolonged exercise. *Journal of Applied Physiology: Respiratory, Environmental, and Exercise Physiology* **60**: 1031-1034, 1986.
31. Matsuda, J. J., **Zernicke, R. F.**, Vailas, A. C., Pedrini, V. A., Pedrini-Mille, A., and Maynard, J. A. Structural and mechanical adaptation of immature bone to strenuous exercise. *Journal of Applied Physiology: Respiratory, Environmental, and Exercise Physiology* **60**: 2028-2034, 1986.
32. Hoy, M. G., and **Zernicke, R. F.** The role of intersegmental dynamics during rapid limb oscillations. *Journal of Biomechanics* **19**: 867-877, 1986.
33. Smith, J. L., and **Zernicke, R. F.** Predictions for neural control based on limb dynamics. *Trends in NeuroScience* **10**: 123-128, 1987.

34. Shaw, S. R., **Zernicke, R. F.**, Vailas, A. C., deLuna, D., Thomason, D., and Baldwin, K. Mechanical, morphological, and biochemical adaptations of bone and muscle to hindlimb suspension and exercise. *Journal of Biomechanics* **20**: 225-234, 1987.
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37. Schneider, K., **Zernicke, R. F.**, Schmidt, R. A., and Hart, T. J. Changes in limb dynamics during the practice of rapid arm movements. *Journal of Biomechanics* **21**: 805-817, 1989.
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39. Schneider, K., and **Zernicke, R. F.** Tolerance limits of the human head with respect to impact acceleration. *Unfallchirurg* **92**: 49-53, 1989.
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41. Salem, G. J., **Zernicke, R. F.**, and Vailas, A. C. Biomechanical and biochemical changes in lumbar vertebrae of rapidly growing rats. *American Journal of Physiology: Regulatory, Integrative and Comparative Physiology* **256**: R259-R263, 1989.
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47. Vailas, A. C., **Zernicke, R. F.**, Grindeland, R. E., and Li, K-C. Suspension effects on morphological and mechanical properties of rat medial collateral ligament. *American Journal of Physiology: Regulatory, Integrative and Comparative Physiology* **258**: R704-R708, 1990.
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Administrative Portfolio (UCLA)

Leading Undergraduate/Graduate Programs

In the Department of Kinesiology, I led development of new undergraduate and graduate curricula in biomechanics—which contributed to my UCLA Distinguished Teaching Award—and I spearheaded the development and implementation of the PhD program in kinesiology at UCLA.

Department Chair

During my last years at UCLA, I was Chair of the Department of Kinesiology, a department that was ranked as the #1 Kinesiology Program in the United States (Gourman Report).

Administrative Portfolio (University of Calgary)

Leading Undergraduate and Graduate Research/Training Programs

I led several U of C and interuniversity initiatives to enhance integrated, interdisciplinary undergraduate and graduate research and education. At the undergraduate level (U of C), I structured and secured funding (university and private donor) for the *Undergraduate Student Research Program*, which is now a university-wide undergraduate student research program in “health and wellness”. At the interuniversity graduate level, I led the development of and secured seed funding (Whitaker Foundation, \$1.1 million) for the Alberta Provincial Graduate Program in Biomedical Engineering between the University of Calgary (Faculties of Medicine, Kinesiology, and Engineering) and University of Alberta (Faculties of Engineering, Medicine and Dentistry, and Rehabilitation Medicine). Also at the interuniversity graduate education level, I secured CIHR and AHFMR (Alberta Heritage Foundation for Medical Research) funding for the Alberta Provincial CIHR Training Program in Bone and Joint Health (\$2.1 million). This was a joint University of Calgary and University of Alberta PhD program that trained highly qualified basic scientists and clinician scientists in transdisciplinary bone and joint research. In 2007, the provincial CIHR Training Program in Bone and Joint Health had 37 PhD trainees and more than 40 faculty mentors at the two universities.

Dean

Administratively, as Dean of the Faculty of Kinesiology at the University of Calgary, I led the rapid maturation and expansion of the Faculty’s integrated research, teaching, and university/community programs. Between 1995 and 2004, scholarships for Kinesiology undergraduates increased by 375%, and graduate student funding increased by 475%. During that same time, Kinesiology external research support increased by more than 800%, and we completed construction of a \$14 million expansion (30,000 sq ft) that doubled our multidisciplinary research space, with funds secured from a competitive Canada Foundation for Innovation grant and provincial sources and donor fundraising. The Roger Jackson Centre for Health and Wellness Research (opened in 2005), comprising the Human Performance Laboratory and Sport Medicine Centre, provides an outstanding environment for research in basic and applied research related to human performance, biomechanics, and musculoskeletal health and well-being. The Centre, arguably, has risen to the highest echelon of research in the field. In a program review, internationally renowned biomechanists (Dr. Stuart McGill–University of Waterloo and Dr. Günter Rau–Helmholtz Institute for Biomedical Engineering, Germany) acclaimed the Centre to be the “best in the world” and the “gold standard” in clinical biomechanics and sport medicine research.

Special Advisor to the President

While serving as the Special Advisor to the President for Health and Wellness at the University of Calgary, I led an extensive and comprehensive consultation with all 15 faculties at the U of C, other Alberta universities and post-secondary institutions, the provincial government, industry, and health regions to develop the foundation for a interdisciplinary platform for research and education in health and wellness. As part of that consultation, I organized a successful international symposium, held in Calgary, which brought outstanding Canadian (e.g., the Alberta Premier and Minister of Health & Wellness, Chief Public Health Officer of Canada, and Scientific Director, CIHR Institute of Population and Public Health) and international (e.g., USA and Australia) speakers to inform and shape the focus of public health for the 21st century.

Institute Executive Director

The Alberta Bone and Joint Health Institute (www.albertaboneandjoint.com) was founded in 2004 as a not-for-profit centre of excellence for the advancement of Alberta-wide bone and joint patient treatment, research, and education. The Institute's goal was to create an innovative and sustainable system of patient-centered health care that efficiently provides the best quality of bone and joint health. The difference is being seen in significantly faster access and world-class service, safety and quality, regardless of location, and at a cost taxpayers can afford. In accomplishing its goal, the Institute—with its partners—created a health care model that can be applied to other medical procedures and in other parts of Canada for the benefit of patients and the public. The provincial Institute had more than 25 staff and active partnerships with all nine health regions in Alberta; Alberta's bone and joint physicians, surgeons, and health care providers; Alberta Ministry of Health & Wellness; the Universities of Calgary and Alberta; Alberta Orthopaedic Society; Alberta Medical Association; and the Alberta College of Physicians and Surgeons. One example of the Institute's new health services model and provincial approach was tested in a randomized controlled trial, Alberta Hip and Knee Replacement Project, simultaneously launched in Edmonton, Red Deer and Calgary (accounting for more than 80% of provincial hip and knee joint replacements). Interim results with more than 3400 patients—reported nationally—showed: (1) significant improvement in patient and health care provider satisfaction (driven by declines of almost 85% in specialist consultation waiting time, declines of 90% in surgery waiting time, and declines of 30% in hospital stay), (2) faster recovery and enhanced patient engagement and education, (3) increased efficiency, including major gains in the number of surgeries per day per operating room, and (4) at significantly less cost.

This project received the 2007 Canadian Institutes of Health Research Partnership Award (\$25,000).

Administrative Portfolio (University of Michigan)

Director

My initial administrative role at the University of Michigan was to lead the development of an interdisciplinary center, the Bone & Joint Injury Prevention & Rehabilitation Center (the Center), which is supported by researchers and senior leaders from the University of Michigan Medical School (especially the Departments of Orthopaedic Surgery and Physical Medicine & Rehabilitation), School of Kinesiology, College of Engineering, and School of Public Health, University of Michigan Health System, and by the generous contribution and support of the Judy and Fred Wilpon Family Foundation.

Selected initiatives for the Center for November 2007 through December 2009 included:

- Developing the Center's Strategic Plan (2008-2012) emphasizing initiatives in musculoskeletal injury prevention, treatment and rehabilitation—with a primary emphasis on injury prevention.
- Establishing vision, mission, guiding principles, objectives, and proposed actions of the Center.
- Elevating profile of the Center, through presentations to community, alumni, donor groups, and researchers (e.g., Michigan Seminar for Major Donors; Ann Arbor Kiwanis; Public Forum—*Knees: The Weak Link! What can I do to prevent knee injury and stay active despite a painful knee?*; Traverse City, Medical School alumni and potential donors; U-M Development Office, 4th Thursday Up North, Petoskey; North American Symposium at University of Michigan—*Head Injury & Concussion: Prevention, Treatment & Rehabilitation*; NCAA Scholarly Colloquium, Invited Keynote Lecture, Washington, DC—*Play at your own risk: Sport and the injury epidemic*).
- Organizing and coordinating a university-wide pilot grant program through the Center.

- Developing and sustaining the Center website (www.bjiprc.umich.edu).
- Establishing Center committee structure, including: Operations, Communications, Finance, Outreach & Symposia, Injury Registries, Pilot Research, Networks/Affiliations, and Planning; and hired full-time Center staff (i.e., Clinical Research Coordinator, Marketing and Communications Director).
- Implementing a marketing and communications plan to increase public awareness about injury prevention and to foster a positive image of the Center with academic and research leaders, with public opinion leaders, and with media and potential donors. Tactics include: bylined, opinion-editorials; Web-based and print materials; broadcast, print, and radio interviews; meetings and presentations; press releases; social networking sites; the Bone & Joint Center's Website; U-M internally published electronic and print publications; and research articles in peer-reviewed, scholarly journals.
- Initiating partnership with Safe Kids Worldwide (SKW) to focus on a grass roots campaign to reduce and prevent youth sport injury. SKW consists of a global network of coalitions and chapters (>600) whose mission is to prevent accidental childhood injury. They have a successful track record reducing many types of childhood injuries. The Center, along with SKW, hosted leading experts to collaborate on youth sport injury prevention research and education at a workshop at the University of Michigan (2009). Attendees for the workshop included experts from U-M (Orthopaedic Surgery, Kinesiology, Public Health and Engineering), Safe Kids, American Orthopaedic Society for Sports Medicine, American Pediatric Association, International Olympic Committee, FIFA/F-MARC, Santa Monica Orthopaedics Group, Athletic Trainers Association, Physical Therapists Association, American Academy of Neurology, and corporate supporters.
- May 2009, held a public forum at the Center that attracted more than 350 people who wanted to learn more about back pain. Center clinician-scientists in physical medicine, orthopaedic surgery and neurosurgery participated.

Dean

January 1, 2010, appointed Dean of the School of Kinesiology at the University of Michigan (www.kines.umich.edu). Decanal appointment completed, June 30, 2016.

Multiple points of progress were achieved for the School, including:

- Re-organized administrative structure of School: Three Associate Deans [Research, Undergraduate Affairs, and Graduate and Faculty Affairs; Director of Teaching and Learning Innovation; and senior staff administrative organization and reporting structure)
- Increased the number of tenure and tenure-track faculty by 35% (over 2009)
- Developed balanced budget plans each year 2010–2017
- Research revenues increased each year from 2010–2016 (cumulative increase > 28%)
- Grant and contract success rate (2014–2016) averaged 47% for School
- Doubled (over 2009) the number of applicants to PhD program
- Masters program enrollment was highest in history

- UM Kinesiology doctoral program ranked 3rd in the United States (National Academy of Kinesiology)
- Exceeded undergraduate enrolment targets (each year) for fall 2010–2016 (with excellent quality of students; applications for Fall 2016 were highest in history; less than 22% of applicants were admitted)
- Developed and implemented School strategic plan
- Strengthened research and curricular links between Kinesiology and University of Michigan schools and colleges (e.g., College of Engineering, Ross School of Business, School of Public Health, Medical School, Taubman College of Architecture and Urban Planning, and School of Social Work)
- Initiated and led comprehensive undergraduate curriculum revision (e.g., including adding a new major in Health & Fitness (<http://www.kines.umich.edu/programs/health-and-fitness>) — launched Fall 2014 and ranked #1 in United States by *USA Today*, October 2014)
- Established a new track in the Movement Science program—IntraOperative NeuroMonitoring (IONM). Rapidly growing in student interest. Michigan’s IONM program was the first university in the nation to be accredited (September 2015), establishing Michigan as the national leader in this area of scientific and medical innovation (<http://kines.umich.edu/programs/movement-science/ionm>)
- Enhanced digital and experiential learning for students
- Expanded the number and scope of internships (>200) for both undergraduates and masters students
- International experiences for undergraduates were established, with programs for students in Europe, Australia, China, Israel, and Brazil
- Revitalized the Kinesiology Seminar Series for 2010-2016
- Reorganized School communications & development: Director of Communications was hired; new Alumni and Annual Fund Director was hired; new Director of Advancement was hired; new major gifts officer was hired; redesigned School Website and launched social media ventures
- School was selected by the Provost and UM Planning Committee as a “highest priority” status for new facilities on UM campus (with \$105 million committed funding from the UM Regents, September 2016)
- Developed key fundraising initiatives for the University of Michigan campaign (i.e., undergraduate and graduate student support, faculty endowments and chairs, and new learning and research facilities)

Director, Exercise & Sport Science Initiative — University of Michigan

The University of Michigan academic programs and Athletics are partnering in the Exercise and Sport Science Initiative (ESSI: www.essi.umich.edu), which integrates the resources of an elite research university and one of the nation’s top collegiate athletic programs to optimize physical performance of student-athletes and health for people of all ages and abilities. ESSI facilitates responding to research-related questions presented to Athletics; faculty interface, prioritize, and conduct sport and exercise-related research and innovation. Collaborative solutions, such as research studies, prototypes, data

analytics, and performance assessments and monitoring, are developed and communicated to campus and the general public.

Through the experience and expertise of U-M's schools and colleges and athletic program, ESSI is performing cutting-edge interdisciplinary research, and translating findings to the marketplace and general public, related to:

- Performance optimization in exercise and sports for individuals and teams
 - Strength, training, conditioning, psychology, nutrition, rest, recovery, regeneration, and injury prevention
 - Understanding the role of physical activity in improved physical and mental performance, overall health, and quality of life at all ages
- Data science and analytics
 - Apps, big data, individual and team analytics, data underlying urban planning, business development, marketing, and entrepreneurship
- Sport technology & innovation
 - Sensors, helmets, intelligent apparel, equipment design, and rapid prototyping

ESSI draws on exceptional resources to address the challenges in exercise and sports by engaging:

- Faculty and student researchers across campus in such key fields as kinesiology, psychology, biology, public health, medicine, nutrition, engineering, sensor design, and data science and analytics
- Student-athletes, coaches, and trainers from U-M's varsity, club, and intramural sports
- Partnerships with industry, government, and foundations

ESSI promotes the fitness, health, and well-being of students, of athletes at all levels, and of society by encouraging the transfer of emerging insights and innovations into practice in the classroom, on the playing fields, and in communities, as well as through apps, sport analytics, proactive communication and outreach, and commercial applications.

Funding for ESSI is provided by the Office of the Provost, Office of the Vice President for Research, and U-M Athletics, as well as external contracts and grants.