

RONALD FREDRICK ZERNICKE

**Faculties of Kinesiology, Medicine, and Engineering
Alberta Bone and Joint Health Institute
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PERSONAL

Birthdate: 18 January 1948, Shawano, Wisconsin, USA
Marital Status: Married (Kathleen), Twins (Kristin & Eric, 27 March 1983)
Citizenship: Dual Citizen – United States & Canada

EDUCATION

1970 B.A. (Liberal Arts) Concordia University Chicago
1972 M.Sc. (Biomechanics) University of Wisconsin, Madison, Wisconsin
1974 Ph.D. (Biomechanics & Anatomy) University of Wisconsin, Madison, Wisconsin

APPOINTMENTS

2005-date Executive Director, Alberta Bone and Joint Health Institute
2005-date Adjunct Professor, Dept Physical Therapy, Faculty of Rehabilitation Medicine,
University of Alberta
2002-date Director, Alberta Provincial CIHR Training Program in Bone and Joint Health
2001-date Professor, Dept Mechanical and Manufacturing Engineering, Univ Calgary
1999-date Professor, Dept Physiology & Biophysics, University of Calgary
1998-date Professor, Department of Surgery, University of Calgary
1997-date Wood Professor in Joint Injury Research, Faculty Medicine, University of Calgary
1992-2005 Adjunct Professor Department of Civil Engineering, University of Calgary
2004-2005 Special Advisor to the President (Health and Wellness) University of Calgary
1998-2005 Dean, Faculty of Kinesiology, University of Calgary
1993-2001 Adjunct Professor, Dept Mechanical and Manufacturing Eng, Univ Calgary
1992-1998 Adjunct Professor, Faculty of Kinesiology, University of Calgary
1996-1998 Professor and Heritage Medical Senior Scholar, Dept Surgery, Univ Calgary
1996-1998 Chair, Joint Injury and Arthritis Research Group, University of Calgary
1995-1998 Director, Office of Surgical Research, Department of Surgery, Univ of Calgary
1991-1996 Professor and Heritage Medical Scholar, Dept Surgery, Univ of Calgary
1989-1991 Chair, Department of Kinesiology, UCLA, Los Angeles, California
1986-1991 Professor, Department of Kinesiology, UCLA, Los Angeles, California
1985-1991 Director, Tissue Biomechanics Lab, UCLA Department of Kinesiology
1980-1986 Associate Professor, Dept. 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, Dept Kinesiology, UCLA, Los Angeles, California
1972-1974 Instructor, Department of Kinesiology, University of Wisconsin, Madison

HONOURS

- 2006 Fellow, Canadian Society of Biomechanics
- 2006 International Fellow, American Academy of Kinesiology and Physical Education
- 2005 Delsys Award for EMG Research Innovation, Joint Congress of International and American Societies of Biomechanics, Cleveland, Ohio (*Effect of dynamic ankle joint stiffness on joint mechanics and muscle activation patterns during locomotion*)
- 2005 Faculty of Kinesiology, Award of Excellence—Research, University of Calgary
- 2004 Kinesiology Research Centre, Research and Leadership Award, Univ of Calgary
- 2004 Founders Medal, Best Research Paper, Canadian Orthopaedics Society Conference (*Relation between loading rate, strain gradients, and bone adaptation*)
- 2004 City of Calgary, Community Achievement Award (Education)
- 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 universities of Canada)
- 2002 Preeminent Scholarly Publication Award, California State University Northridge (for Whiting and Zernicke, *Biomechanics of Musculoskeletal Injury*, 1998)
- 2001 Outstanding Research Paper, Merck-Frosst Canada Research Conference. Kirkland, Quebec (*Pharmacological mediation of periarticular bone remodeling and angiogenesis in osteoarthritis*)
- 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 (*Inter-related behaviours of subchondral bone and articular cartilage in the ovine knee*)
- 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 (*Knee joint dynamics predict patellar tendonitis in elite volleyball players*)
- 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
- 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

HONORS (continued)

- 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 UCLA—University Distinguished Teaching Award
- 1978-date Fellow, American College of Sports Medicine
- 1970-1973 NDEA Doctoral Fellow, University of Wisconsin, Madison

PROFESSIONAL SOCIETIES

- American College of Sports Medicine (Fellow)
 American Society of Biomechanics (Member)
 American Society for Bone and Mineral Research (Member)
 Biomedical Engineering Society (USA, Member)
 Canadian Orthopaedic Research Society (Honourary Member 1998-date)
 Canadian Society of Biomechanics (Member)
 International Society of Biomechanics (Charter Member)
 Orthopaedic Research Society (USA, Member)

EDITORIAL SERVICE

- Reviewer: *American Journal of Sports Medicine*
Annals of Biomedical Engineering
Archives of Physical Medicine and Rehabilitation
British Journal of Sports Medicine
Calcified Tissue International
Canadian Journal of Physiology and Pharmacology
Canadian Journal on Aging
Clinical Journal of Sport Medicine
Clinical Orthopaedics and Related Research
Child Development
Developmental Psychology
Experimental Brain Research
Experimental Neurology
IEEE Transactions on Biomedical Engineering
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

EDITORIAL SERVICE (continued)

- Journal of Orthopaedic Research*
Journal of Rheumatology

Medical Engineering and Physics
Medical Science Monitor
Medicine and Science in Sports and Exercise
Physiology and Behavior
Research Quarterly of Sports and Exercise
Scandinavian Journal of Medicine and Science in Sports

OTHER PROFESSIONAL ACTIVITIES

- Editorial *Journal of Motor Behavior* (1984-1990)
- Boards: *Exercise and Sport Sciences Reviews* (Biomechanics Editor, 1984-1997)
Journal of Biomechanics (1988-1998)
Clinical Journal of Sport Medicine (1996-2004)
- Member: Research Grants Panel (Chair–Bone, Joint & Cartilage Panel, 1996-1997)
 The Arthritis Society of Canada (1992-1995; 1996-1997)
 Medical Planning Committee, The Arthritis Society of Canada (1996-1997)
 Research Advisory Committee, The Arthritis Society of Canada (1996-1999)
 Nominating Committee, The 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 (1994-1998)
 External Advisory Committee, Cleveland Clinic Foundation,
 Department of Biomedical Engineering (1996-2006)
 External Advisory Committee, State University of New York, Stony Brook,
 Biomedical Engineering Program (2001-2006)
 External Advisory Committee, Dept of Physical Medicine and Rehabilitation,
 University of Virginia (2002-2006)
 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 Research Foundation (1998-
 2004)
 Canadian Arthritis Network (National Centres of Excellence) (2000-2007)
 Board of Directors, Alberta Bone and Joint Health Program (2003-2005)
 Research Advisory Committee, Canadian Arthritis Alliance (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)
 Executive Committee, Alberta Bone and Joint Health Institute (2005-2007)
 Alberta Provincial Arthroplasty Working Committee (2005-2006)

OTHER PROFESSIONAL ACTIVITIES (continued)

- Member: Alberta Provincial Bone & Joint Steering Committee (2006-2007)
 Alberta Provincial Wait Times Steering Committee (2006-2007)
 Laboratory Alberta, Health Innovation Steering Committee (2006-2007)
- Chair: Canadian Institutes for Health Res, Movement & Exercise Committee (2002-2005)
- 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)
- Ad hoc*
 Reviewer: National Institutes of Health (1983-1985, 1987)
 NSERC of Canada (1984-1985, 1989-1991, 1994, 1998, 2000, 2001, 2004–2006)
 NSERC of Canada (2006, Idea-to-Innovation Research Partnership Program)
 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)
 Research Grants Council of Hong Kong (2005-2006)
 Czech Science Foundation—Research Grants (Czech Republic) (2005-2006)
 Whitaker Foundation, Biomedical Engineering Grants (2004-2006)
 Canadian Cystic Fibrosis Foundation, Research Grants (2005)
 Canadian Institutes for Health Research (Biomedical Engineering) (2005)
 Canadian Institutes for Health Research (Studentships in Musculoskeletal Research) (2006)
 WorkSafe British Columbia, Research Secretariat (2006)
- 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)

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 (U Calgary & U Alberta)
Transdisciplinary Bone and Joint Health (U Calgary & U Alberta)
Seminar in Bone and Joint Health (U Calgary & U Alberta)

TRAINING OF HIGHLY QUALIFIED PERSONNEL

Name	University/Dept	Degree	Date	Project Area	Position
*Manske, S.	Calgary/Kines	PhD	2010	Bone Adapataion	PhD student (supervisor)
Guang, L.	U Alberta/Pharm	MSc	2008	Bone Microstructure	MSc student (co-supervisor)
Doherty, C.	Calgary/Kines	MD/PhD	2011	Scoliosis	PhD student (supervisor)
*Fried, A.	Calgary/ Mech Eng	MSc	2007	Bone Modeling	MSc student (supervisor)
*Goulet, G.	Calgary/ Mech Eng	MSc	2007	Bone Fluid Modeling	MSc student (supervisor)
*Lorincz, C.	Calgary/Kines	PhD	2007	Bone Adaptation	PhD student (supervisor)
*Schneider, P.	Calgary/Kines	MD/PhD	2007	Gait/Motor Control	PhD student (supervisor)
*LaMothe, J.	Calgary/Kines	MD/PhD	2007	Bone Adaptation	PhD student (supervisor)
*Tapper, J.	Calgary/Mech Eng	MD/PhD	2007	Joint Mechanics	PhD student (co-supervisor)
*MacKay, C.	Calgary/Med Sci	PhD	2007	Bone Adaptation	PhD student (supervisor)
*Monteleone, B.	Calgary/Kines	MD/PhD	2006	Joint Injury	PhD student (supervisor)
Croft, J.	Calgary/Med Sci	PhD	2006	Gait Biomechanics	PhD student (supervisor)
Robu, D.	Calgary/Mech Eng	MSc	2005	Scoliosis	MSc student (co-supervisor)
*Grant, J.	Calgary/Kines	MD/PhD	2005	Rehab Biomechanics	MD Resident Orthop, U of C
*Sran, M.	UBC/Rehab Sci	PhD	2005	Bone Microarchitecture	PDF, Univ British Columbia
*Hamilton, N.	Calgary/Mech Eng	MSc	2004	Bone Fluid Modeling	Med Student, Univ of Laval
*Doschak, M	Calgary/Med Sci	PhD	2004	Bone/Osteoarthritis	Assistant Prof, Univ of Alberta
Alvarez, M.	Calgary/Kines	MSc	2003	Prosthetics/Gait	Grad Student, BC Inst Tech
*Gildenhuis, A.	Calgary/Mech Eng	MSc	2003	Balance/Posture	Bioengineer, DynaSystems
Pardy, C.	Calgary/Kines	MSc	2003	Bone Adaptation	Grad Student, BC Inst Tech
Wohl, G	Calgary/Mech Eng	PhD	2002	Bone Adaptation	PDF, Washington U, St Louis
McGuinness, B.	Calgary/Med Sci	MSc	2002	Bone/Osteoporosis	HS Science Teacher, Ontario
*Jaremko, J.	Calgary/Med Sci	MD/PhD	2002	Scoliosis/Neural Nets	MD Resident Radiology, U of A
*Boyd, S.	Calgary/Mech Eng	PhD	2001	Bone Adaptation	Asst Prof, Mech Eng, U of C
Chan, R.	Calgary/Mech Eng	MSc	2000	Bone Blood Flow	PhD student, London, UK
Davies, C.	Calgary/Mech Eng	MSc	2000	Pathological Gait	PhD student/Univ Waterloo
*Judex, S.	Calgary/Mech Eng	PhD	1999	Exercise & Bone	Asst Prof SUNY Stony Brook
Ajemian, S.	Calgary/Med Sci	MSc	1998	Pathological Gait	Biomedical Engineer, California
Wohl, G.	Calgary/Mech Eng	MSc	1996	Fatty Acids & Bone	[see Wohl, G., above]
Ferguson, K.	Calgary/Comp Sci	PhD	1996	Computer Modeling	Software Engineer, California
Kerrigan, D. C.	UCLA/Kines	MD/MSc	1992	Gait/Rehabilitation	Prof/Chief Rehab Med, U Virginia
Li, K-C.	UCLA/Kines	MD/PhD	1991	Osteopenia/Diabetes	Orthop Surgeon, Taiwan, ROC
Hou, J.	UCLA/Kines	MD/PhD	1990	Osteopenia/Diabetes	Orthop Surgeon, Taiwan, ROC
Loitz, B.	UCLA/Kines	PhD	1990	Exercise/Bone	Asst Prof, Univ Calgary
Salem, G.	UCLA/Kines	PhD	1989	Bone Adaptation	Assoc Prof, Univ Southern Cal
Wisleder, D.	UCLA/Kines	MSc	1989	Gait Dynamics	PhD student, Penn State Univ
Hart, T.	UCLA/Kines	PhD	1988	Limb Dynamics	Vice Pres, Info Syst, Los Angeles
Shaw, S.	UCLA/Kines	MD/PhD	1987	Bone Adaptation	Orthop Surgeon, New York City
Gourde, T.	UCLA/Kines	MSc	1987	Gait/Motor Control	MD/Medical Student
Peller, D.	UCLA/Kines	MSc	1986	Meniscus Biomechanics	Engineer, TRW, Redondo Beach
Matsuda, J.,	UCLA/Kines	MSc	1985	Bone/Exercise	MD University of Iowa
Gross (Hoy), M.	UCLA/Kines	PhD	1984	Limb Dynamics	Assoc Prof, Univ Michigan
Stewart, H.	UCLA/Kines	MSc	1983	Segmental Dynamics	Engineer, TRW, Redondo Beach
Roberts, D.	UCLA/Kines	MSc	1983	Limb Dynamics	MD Harvard Med School
Keller-Brewer, D.	UCLA/Kines	MSc	1982	Posture and Gait	Teaching, Los Angeles
Jepsen, R.	UCLA/Kines	MSc	1982	Limb Dynamics	Teaching, Los Angeles
Perry, J.	UCLA/Kines	MSc	1981	Limb Dynamics	Teaching, Los Angeles
Garhammer, J.	UCLA/Kines	PhD	1980	Joint Dynamics/Lifting	Prof Cal State Univ Long Beach
Hoy, M.	UCLA/Kines	MSc	1979	Amputee Gait	[see Hoy, M., above]
Whiting, W.	UCLA/Kines	MSc	1979	Amputee Gait	Prof, Calgary St Univ Northridge
Clark, L.	UCLA/Kines	MSc	1978	Posture in Children	Physical Therapist, Los Angeles

Sprong, S.	UCLA/Kines	MSc	1975	Children Locomotion	Teacher, Los Angeles
Verderber, J.	UCLA/Kines	MSc	1975	Children Locomotion	Teacher, Los Angeles
*Cooper, D.	Calgary/Med	PDF	05-06	Bone Imaging/ μ CT	PDF Univ British Columbia
Doschak, M.	Calgary/Med Sci	PDF	2005	Bone/Osteoarthritis	Assistant Prof, Univ Alberta
Poncet, P.	Calgary/Surgery	PDF	01-05	Scoliosis	Bioengineer, Calgary, AB
*Judex, S.	Calgary/Surgery	PDF	1999	Bone Adaptation	Asst Prof SUNY Stony Brook
*Muldrew, K.	Calgary/Surgery	PDF	96-98	Bone & Cryobiology	Assistant Prof, Univ Calgary
*Ogawa, T.	Calgary/Surgery	PDF	96-97	Bone Cellular Biol	Assistant Prof, South Korea
*Gross, T.	Calgary/Surgery	PDF	93-95	Bone Adaptation	Associate Prof, Univ Washington

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

Each year, since at the University of Calgary, I serve on supervisory committees for 12-14 MSc and PhD students in the Departments of Mechanical & Manufacturing Engineering, Kinesiology, and Medical Sciences, and supervise 2–5 undergraduate summer research students and 1–3 orthopaedic residents.

At the University of Calgary — *Recent trainee awards for excellence include:*

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)

MSc 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 (2006)

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

RESEARCH INTERESTS

- Functional adaptation of bone to physiological stimuli (exercise, disuse, diet, and disease)
- Bone-cartilage interactions in post-traumatic osteoarthritis
- Biomechanical mechanisms underlying control of normal and pathological movements

RESEARCH SUPPORT (Past)

Co-Investigator (NIH), *Significance of Muscle Fiber Types*, 1977-80, \$233,390

Co-Investigator (NIH NS16333), *Motor Capacity of the Chronic Spinal Cat*, 1980-1983, \$162,401

Co-Investigator (NIH NS19864), *Motor Capacity of the Chronic Spinal Cat*, 1983-1986, \$275,046

Co-Investigator (NASA NCA-1R390-501), *Effects of Prolonged Suspension on Dense Fibrous Connective Tissues*, 1984-1987, \$140,000

Co-Investigator (NASA NCA2-156), *Bone and Tendon Alterations with Prolonged Hindlimb Suspension*, 1984-1987, \$75,000

Co-Principal Investigator (NASA NCA2-501), *Skeletal Effects of Seven Days of Space Flight in Space Lab 3 Rats*, 1986-1987, \$10,000

Co-Investigator (Department of the Navy N66001-87-C0285), *Etiology of Tibial Stress Fractures Associated with Strenuous Exercise*, 1987-1988, \$70,000

Co-Principal Investigator (NASA NAG2-479), *Soft Dense Fibrous Connective Tissue Adaptation to Prolonged Suspension*, 1987-1988, \$65,288

Co-Principal Investigator (NASA A53749C), *COSMOS Pilot Studies on Ground-Based Control Animals*, \$5000, 1987

Co-Principal Investigator (NASA), *Connective Tissue Studies in Rats Exposed to 14 Days of Space Flight, COSMOS Mission 1887*, 1987-1988, \$35,000

Co-Principal Investigator (NIH NS19864), *Control of Stereotypic Limb Movements* 1986-1990, \$470,708

Principal Investigator (American Diabetes Association J890725), *Diabetic Effects on Bone and Ligament*, 1989-1990, \$27,316

Co-Principal Investigator (Shriners Hospitals for Crippled Children), *Below-Knee Child Amputee Gait: Dynamics of an Energy Storing Prosthesis*, 1988-1991, \$122,767

RESEARCH SUPPORT (Past)

- Principal Investigator (Weider Inc.) *Effects of Varied Protein Intake on Muscle and Bone Development during Exercise Training*, 1990-1991, \$24,704
- Principal Investigator (NIH HD22830-Subcontract), *Dynamical Factors in Development of Motor Skills*, 1987-1992, \$190,888
- Principal Investigator (National Collegiate Athletic Association), *Stress Fracture Risk Assessment among Elite Collegiate Women Runners*, 1990-1993, \$20,085
- Co-Principal Investigator (Shriners Hospitals for Crippled Children), *Gait Mechanics and Energetics in Proximal Femoral Focal Deficiency*, 1991-1993, \$104,052
- Co-Principal Investigator (1990-1991) (NIH NS19864), *Control of Stereotypic Limb Movements* 1990-1997, \$575,055-funded with an extended budget as a *Javits Neuroscience Investigator Award* to J. L. Smith [PI]
- Principal Investigator (Alberta Heritage Foundation for Medical Research), *Functional Adaptation of Bone*, 1991-1994, \$220,000.
- Principal Investigator (University of Calgary Research Grants) *Diet-Related Effects on Bone*, 1993-1995, \$8,926.
- Co-Principal Investigator (Medical Research Council of Canada) *Cryopreservation of Osteochondral Grafts for Joint Reconstruction and Repair*, 1994-1997, \$420,060.
- Principal Investigator (Alberta Heritage Foundation for Medical Research) *High Speed Camera System for Motion Analysis*, 1996-1997, \$100,000
- Principal Investigator (Canadian Orthopaedic Foundation) *Gait Analysis after Total Hip Arthroplasty*, 1993-1997, \$25,500.
- Principal Investigator (TransCanada Pipeline Ltd.) *Children's Gait and Motion Analysis*, 1995-1998, \$15,000.
- Principal Investigator (Alberta Children's Hospital Foundation) *Assessing Scoliosis with Laser Imaging and Neural Networks*, 1995-1998, \$45,000.
- Co-Principal Investigator (Alberta Children's Hospital Foundation) *Relation between Femoral Antetorsion and Patellofemoral Knee Pain*, 1994-1998, \$34,000.
- Co-Principal Investigator (National Institutes of Health) *Vasoregulation in Aged Bone*, 1997-1999, \$71,107 (US\$); [Subgrant to University of Calgary, \$16,863 (US\$)]
- Co-Principal Investigator (Medical Research Council of Canada) *Vascular and Mechanical Responses to Joint Injury*, 1994-2000, \$387,855
- Principal Investigator (Whitaker Foundation) *Coordinated Graduate Programme in Biomedical Engineering for the Province of Alberta*, 1997-2000, University of Calgary, \$492,401 (US\$), (Total budget \$978,802 (US\$); Univ. of Alberta and Univ. of Calgary)
- Principal Investigator (Hospital for Sick Children Foundation) *Predicting Scoliosis Progression with Laser Imaging and Neural Networks*, 1998-2000, \$129,282.
- Co-Investigator (National Centres of Excellence—Canadian Arthritis Network) *Assessment of Meniscus Healing In Vivo*, 1999-2000, \$46,000
- Co-Investigator (National Centres of Excellence—Canadian Arthritis Network) *In Vivo Engineering of Ligament Scars*, 1999-2000, \$46,000
- Co-Principal Investigator (Johann Jacob Foundation) *Adaptive Bone Remodelling in Young Females*, 1996-2000, \$165,000.
- Principal Investigator (Arthritis Society of Canada) *Predicting Scoliosis Progression with Laser Imaging and Neural Networks*, 2000-2001, \$64,641.
- Co-Principal Investigator (Medical Research Council of Canada) *Cryopreservation of Osteochondral Grafts for Joint Reconstruction and Repair*, 1998-2001, \$211,383.
- Principal Investigator (ATCO Ltd) *Children's Gait and Motion Analysis*, 1995-2001, \$100,000.

RESEARCH SUPPORT (Past)

- Co-Investigator (National Centres of Excellence—Canadian Arthritis Network) *Gene Therapy Application to Ligament Healing*, 2000-2001, \$50,000.
- Co-Principal Investigator (Canadian Institutes for Health Research) *Vascular Adaptations in Post-Traumatic Osteoarthritis*, 2000-2003, \$232,776.
- Co-Principal Investigator (Canadian Natural Sciences and Engineering Research Council) Equipment Grant: *Kinetic and Kinematic Movement Analysis System*, 2001-2002, \$ 67,340.
- Co-Principal Investigator (Canadian Institutes for Health Research) *Vascular Adaptations in Post-Traumatic Osteoarthritis*, 2000-2003, \$232,776.
- Co-Principal Investigator (Alberta Heritage Foundation for Medical Research) Equipment Grant: *Optical Surface Scanning System*, 2002-2003, \$100,000
- Co-Investigator (Alberta Children's Hospital Foundation) *Relations among Postural Control and Locomotion in Youngsters with Spastic Diplegia*, 2001-2003, \$39,751.
- Principal Investigator (Proctor and Gamble) *Risedronate Use in a Rabbit Model of Post-Traumatic Osteoarthritis*, 2003-2004, \$187,820.
- Co-Investigator (Workmen's Compensation Board) *Quantitative Assessment of Prostheses with Traditional and CAD/CAM Sockets for Transtibial Amputees*, 1999-2004, \$109,000.
- Co-Investigator (Canadian Institutes for Health Research) *Targeting bFGF to Bone for Systemic Stimulation of Bone Formation*, 2002-2005, \$270,000.
- Principal Investigator (Canadian Institutes for Health Research) *Bone and Ligament Remodeling in Osteoarthritis*, 2003-2004, \$98,116.
- Principal Investigator (Canadian Natural Sciences and Engineering Research Council) *Bone Adaptation*, 1994-2005, \$393,920.
- Principal Investigator (Canadian Institutes for Health Research/Arthritis Society of Canada) *Predicting Scoliosis Progression with Laser Imaging and Neural Networks*, 2001-2005, \$207,900.
- Co-Investigator (Canadian Institutes for Health Research) *Building a Multidisciplinary Team in Adolescent Sport Injury Prevention*, Pilot–New Emerging Team Grant, 2004-2005, \$98,805.
- Co-Principal Investigator (Canada Foundation for Innovation) *Nutrition, Genetics & Human Performance*, 2001-2005, \$3,256,247. [Infrastructure]
- Co-Principal Investigator (Innovation & Science, Province of Alberta) *Nutrition, Genetics & Human Performance*, 2001-2005, \$3,256,247. [Infrastructure]
- Co-Investigator (Geomatics for Informed Decisions (GEOIDE) Network of Centre of Excellence). *Biometrology for Informed Decisions in Medical Diagnoses, Procedures and Treatment Evaluations*, 2002-2005, \$272,000.
- Co-Principal Investigator (Canada Foundation for Innovation) *Integrating Research in Osteoarthritis: From the Bedside to the Bench and Back Again*, 2002-2005, \$4,303,000. [Infrastructure]
- Co-Investigator (Canadian Institutes for Health Research) *Establishing the Foundation for a Methodology Aimed at Delivering Peptides and Proteins to Skeletal Tissues*, 2003-2005, \$100,000.

RESEARCH SUPPORT (Current)

- Principal Investigator (Canadian Natural Sciences and Engineering Research Council) *Bone Adaptation*, 2005-2010, \$230,795
- Program Director (Canadian Institutes for Health Research/Alberta Heritage Foundation for Medical Research/ Arthritis Society) *Alberta Provincial Training Program for Bone and Joint Health*, 2002-2008, \$1,800,000.
- Principal Investigator (Canadian Institutes for Health Research) *Bone and Ligament Remodeling in Osteoarthritis*, 2003-2006, \$311,676.
- Co-Investigator (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*, 2002-2006, \$150,000.
- Co-Principal Investigator (Fraternal Order of Eagles, Alberta & Saskatchewan) *Scoliosis Research*, 1994-2006, \$401,000.
- Principal Investigator (Grand Aerie, Fraternal Order of Eagles, Lew Reed Spinal Cord Research Fund) *Scoliosis and Spinal Column Deformity Research*, 2005-2007, \$120,000.
- Co-Principal Investigator (Alberta Innovation and Science) *Integrating Research in Osteoarthritis: From the Bedside to the Bench and Back Again*, 2003-2008, \$5,054,176. [Infrastructure]
- Co-Investigator (Hospital for Sick Children Foundation) *Reliability Study of the Non-invasive Assessment of the 3-D External Asymmetry of Patients with Idiopathic Scoliosis*, 2004-2006, \$129,680
- Co-Principal Investigator (Canadian Institutes for Health Research) *Predicting Scoliosis Progression with Surface Imaging and Neural Networks*, 2005-08, \$240,939.
- Co-Investigator (Canadian Institutes for Health Research) *Targeting bFGF to Bone for Systemic Stimulation of Bone Formation*. 2005-2009, \$553,444.
- Co-Principal Investigator (Health Quality Council of Alberta) *Alberta Hip and Knee Replacement Project*. 2006-2007, \$100,000.
- Principal Investigator (The Arthritis Society of Canada) *Bone and Ligament Remodeling in Osteoarthritis*, 2006-2009, \$288,960.

RESEARCH SUPPORT (Pending)

- Co-Investigator (Alberta Heritage Foundation for Medical Research) *Scanco MicroCT 42*, 2006-2007, \$167,500. [Equipment]
- Co-Principal Investigator (Canadian Institutes for Health Research) *Improving Access of Standard Care for Knee Injuries*, 2006-2009, \$150,000.
- Co-Investigator (Canadian Institutes for Health Research) *Stem Cells as Promoters of Skeletal Repair*, 2006-2011, \$2,485,000.
- Principal Investigator (Canadian Institutes for Health Research) *Integrated Bone Health across the Lifespan: Enhancing Quality of Life*, 2006-2011, \$1,500,000.

UNIVERSITY SERVICE (UCLA)

UCLA Academic Senate Legislative Assembly (1981-1982)
UCLA Life Sciences Advisory Committee, USPHS Biomed Res Grant (1981-83 & 1985-89)
UCLA University Committee on Undergraduate Courses and Curricula (1982-1985)
UCLA University Committee on Teaching (1985-1988)
UCLA University Graduate Council—Review of Department of Pathology (1988)
UCLA Chancellor’s Committee to Evaluate the Dean of Life Sciences (1985-1986)
UCLA Academic Advisory Committee, Chemistry/Biological Sciences Renovation (1987-1989)
Advisory Committee, UCLA Dental Research Institute (1987-1991)
Advisory Committee, UCLA Sports Med and Dept of Intercollegiate Athletics (1989-91)
Executive Committee, Southern California Injury Prev and Res Center, UCLA (1989-92)
Selection Committee, UCLA Alumni Assoc, UCLA Outstanding Senior (1981)
Selection Committee, UCLA Alumni Association, Community Service Awards (1982)

UNIVERSITY SERVICE (University of Calgary)

Chair, Univ. of Calgary Coordinating Committee on Biomedical Engineering (1997-1998)
Chair, University of Calgary, Joint Injury and Arthritis Research Group (1996-1998)
Member, University of Calgary, Joint Injury and Arthritis Research Group (1991-date)
Member, University of Calgary, 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 Faculty Council (1993-1997, 1998-2003)
Member, Admissions, Promotions & Dismissal Committee (1993-1996)
Member, Animal Care Policy Committee—Health Sciences (1993-1996)
Member, University Dismissal Hearing Panel (1994-1998)
Member, Search Comm for Assoc Vice Pres (Research)/Dean, Fac 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, 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, Univ Calgary Dept of Surgery and Calgary Regional Health Authority (1996-1998)
Member, Executive Board, Calgary Olympic Development Association (1998-2003)
Chair, Health and Education Deans’ Cluster (Educ, Med, Nursing, Kines) (1999-2000)
Member, Deans’ Council Executive Committee (2000-2003)
Chair, Deans’ Council Executive Committee (2001-2002)

UNIVERSITY SERVICE (University of Calgary)

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, West Campus Development Task Force (2005)
Member, Fundraising Vetting Committee, Joint 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, University of Calgary (2005-2006)

CONSULTANT

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 (1991-1992)
Canadian National Sports Development Centre, Calgary (1994-1995)
Fraser, Milner & Casgrain, Calgary, Alberta, (2000)

COMMUNITY SERVICE

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)

PUBLICATIONS

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. Youm, Y., Huang, T.C., **Zernicke, R. F.**, and Roberts, E. M. Mechanics of simulated kicking. In: *Mechanics and Sport* Bleustein, J. (ed.) American Society of Mechanical Engineers, New York, pp. 183-195, 1973.
3. Roberts, E. M., **Zernicke, R. F.**, Youm, Y., and Huang, T. C. Kinetic parameters of kicking. In: *Biomechanics IV* Nelson, R. C. and Morehouse, C. A. (eds.) University Park Press, Baltimore, pp. 157-162, 1974.
4. Roberts, T. M., Anderson, M. B., and **Zernicke, R. F.** Electromyographic analysis using metal oxide semiconductor circuitry. In: *Biomechanics IV* Nelson, R.C. and Morehouse, C.A. (eds.) University Park Press, Baltimore, pp. 328-331, 1974.
5. **Zernicke, R. F.**, and Roberts, E. M. Human lower extremity kinetic relationships during systematic variations in resultant limb velocity. In: *Biomechanics V-B* Komi, P.V. (ed.) University Park Press, Baltimore, pp. 20-25, 1975.
6. **Zernicke, R. F.**, Caldwell, G., and Roberts, E. M. Fitting biomechanical data with cubic spline functions. *Research Quarterly* **47**: 9-19, 1976.
7. **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.
8. **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.
9. **Zernicke, R. F.**, Gregor, R. J., and Cratty, B. J. Quantification of postural stability in normal children. In: *Biomechanics VI-A* Asmussen, E. and Jorgensen, K.J. (eds.) University Park Press, Baltimore, pp. 130-134, 1978.
10. Gregor, R. J., and **Zernicke, R. F.** Kinesiology as a life science: An undergraduate curriculum. In: *Proceedings of Kinesiology: A National Conference on Teaching* Dillman, C. J. and Sears, R. (eds.) University of Illinois, Champaign-Urbana, Illinois, pp. 31-36, 1978.
11. **Zernicke, R. F.**, and Gregor, R. J. Instructional audio-slide modules for biomechanics. In: *Proceedings of Kinesiology: A National Conference on Teaching* Dillman, C. J. and Sears, R. (eds.) University of Illinois, Champaign-Urbana, Illinois, pp. 245-251, 1978.
12. Broer, M. R., and **Zernicke, R. F.** *Efficiency of Human Movement* (4th Edition) W. B. Saunders, Philadelphia, Pennsylvania, 427 pages, 1979.
13. 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.
14. 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.
15. 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.

16. Clark, L. A., and **Zernicke, R. F.** Balance in lower limb child amputees. *Prosthetics and Orthotics International* **5**: 11-18, 1981.
17. **Zernicke, R. F.** The emergence of human biomechanics. In: *Perspectives on the Academic Discipline of Physical Education* Brooks, G. A. (ed.) Human Kinetics Publ., Champaign-Urbana, Illinois, pp. 124-136, 1981.
18. 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.
19. **Zernicke, R. F.** Biomechanical evaluation of bilateral tibial spiral fractures during skiing. *Medicine and Science in Sports and Exercise* **13**: 243-245, 1981.
20. 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.
21. **Zernicke, R. F.**, Gregor, R. J., and Cratty, B. J. Balance and visual proprioception in children. *Journal of Human Movement Studies* **8**: 1-13, 1982.
22. 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.
23. **Zernicke, R. F.**, and Gregor, R. J. The integrative role of cinematography in biomechanics research. *Proceedings of SPIE* **291**: 202-209, 1982.
24. 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.
25. 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.
26. 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.
27. Whiting, W. C., and **Zernicke, R. F.** Recognition and correlation of limb trajectory patterns. *Journal of Motor Behavior* **14**: 135-142, 1982.
28. Smith, J. L., Edgerton, V. R., Eldred, E., and **Zernicke, R. F.** The chronic spinalized cat: A model for neuromuscular plasticity. In: *Nervous System Regeneration* Giuffrida-Stella, A.M., Haber, B., Hashim, G. and Perez-Polo, R., (eds.) A. Liss Publ., New York, pp. 357-373, 1983.
29. **Zernicke, R. F.** Biomechanical and biochemical synthesis. *Medicine and Science in Sports and Exercise* **15**: 6-8, 1983.
30. 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.
31. **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.
32. 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.

33. 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.
34. Hoy, M. G., and **Zernicke, R. F.** Modulation of limb dynamics in the swing phase of locomotion. *Journal of Biomechanics* **18**: 49-60, 1985.
35. 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.
36. 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.
37. 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.
38. **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.
39. **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.
40. Smith, J. L., Bradley, N. S., Carter, M. C., Giuliani, C. A., Hoy, M. G., Koshland, G. F., and **Zernicke, R. F.** Rhythmical movements of the hindlimbs in spinal cat: Considerations for a controlling network. In: *Development and Plasticity of the Mammalian Spinal Cord* Goldberger, M., Gorio, A. and Murray, M., (eds.) Liviana Press, Padova, pp. 347-361, 1986.
41. Hoy, M. G., **Zernicke, R. F.**, and Smith, J. L. Emergence of stable limb oscillations during paw-shake response. In: *Biomechanics X-A*. Jonsson, B. (ed.) Human Kinetics Publ., Champaign, Illinois, pp. 465-470, 1987.
42. Hart, T. J., Cox, E. M., Hoy, M. G., Smith, J. L., and **Zernicke, R. F.** Intralimb kinetics of perturbed paw-shake response. In: *Biomechanics X-A*. Jonsson, B. (ed.) Human Kinetics Publ., Champaign, Illinois, pp. 471-478, 1987.
43. 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.
44. 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.
45. Hoy, M. G., and **Zernicke, R. F.** The role of intersegmental dynamics during rapid limb oscillations. *Journal of Biomechanics* **19**: 867-877, 1986.
46. **Zernicke, R. F.** Movement dynamics and connective tissue adaptation. In: *Future Directions in Exercise and Sport Science Research*. Skinner, J., Corbin, C., Landers, D., Martin, P., and Wells, C. (eds.) Human Kinetics Publ., Champaign, Illinois, pp. 137-150, 1989.

47. Smith, J. L., and **Zernicke, R. F.** Predictions for neural control based on limb dynamics. *Trends in Neuroscience* **10**: 123-128, 1987.
48. 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.
49. Shaw, S. R., Vailas, A. C., Grindeland, R., and **Zernicke, R. F.** Effects of a 1-week spaceflight on the morphological and mechanical properties of growing bone. *American Journal of Physiology: Regulatory, Integrative and Comparative Physiology* **254**: R78-R83, 1988.
50. 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.
51. Schneider, K., and **Zernicke, R. F.** Jerk-cost modulations during the learning of unrestrained rapid arm movements. *Biological Cybernetics* **60**: 221-230, 1989.
52. Schneider, K., and **Zernicke, R. F.** Computer simulation of head impact: Estimation of head-injury tolerance during soccer heading. *International Journal of Sport Biomechanics* **4**: 358-371, 1988.
53. Schneider, K., and **Zernicke, R. F.** Tolerance limits of the human head with respect to impact acceleration. *Unfallchirurg* **92**: 49-53, 1989.
54. Loitz, B. J., **Zernicke, R. F.**, Vailas, A. C., Kody, M. and Meals, R. A. Effects of short-term immobilization versus continuous passive motion on the biomechanical and biochemical properties of rabbit tendon. *Clinical Orthopaedics and Related Research* **244**: 265-271, 1989.
55. 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.
56. Smith, J. L., Buford, J. A., and **Zernicke, R. F.** Constraints during backward walking in the quadruped. In: *Posture and Gait: Development, Adaptation and Modulation*. Amblard, B., Berthoz, A. and Clarac, F. (eds.) Elsevier Science Publishers, New York, NY, pp. 391-400, 1988.
57. Schneider, K., **Zernicke, R. F.**, Ulrich, B. D., Jensen, J. L., and Thelen, E. Understanding movement control in infants through the analysis of limb intersegmental dynamics. *Journal of Motor Behavior* **22**: 493-520, 1990.
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62. Schneider, K., **Zernicke, R. F.**, and Clark, G. Modeling of jaw-head-neck dynamics during whiplash. *Journal of Dental Research* **68**: 1360-1365, 1989.
63. **Zernicke, R. F.**, Vailas, A. C., Grindeland, R. E., Li, K-C., and Salem, G. J. Interactive effects of nutrition, environment, and rat-strain on cortical and vertebral bone geometry and biomechanics. *Aviation, Space, and Environmental Medicine* **61**: 640-647, 1990.
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65. Wisleder, D., **Zernicke, R. F.**, and Smith, J. L. Speed-related changes in cat hindlimb interactive and muscular torques during the swing phase of locomotion. *Experimental Brain Research* **79**: 651-660, 1990.
66. Hou, J. C-H., Salem, G. J., **Zernicke, R. F.**, and Barnard, R. J. Structural and mechanical adaptations of immature trabecular bone to strenuous exercise. *Journal of Applied Physiology: Respiratory, Environmental, and Exercise Physiology* **69**: 1309-1314, 1990.
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70. **Zernicke, R. F.**, Vailas, A. C., and Salem, G. J. Biomechanical response of bone to weightlessness. *Exercise and Sport Sciences Reviews* **18**: 167-192, 1990.
71. Buford, J. A., **Zernicke, R. F.**, and Smith, J. L. Adaptive control for backward quadrupedal walking: I. Posture and hindlimb kinematics. *Journal of Neurophysiology* **64**: 745-755, 1990.
72. Koshland, G. F., Hoy, M. G., Smith, J. L. and **Zernicke, R. F.**, Coupled and uncoupled limb oscillations during paw-shake response. *Experimental Brain Research* **64**: 1653-1667, 1990.
73. Gregor, R. J., and **Zernicke, R. F.** (eds.) Proceedings of the XII Congress, International Society of Biomechanics, *Journal of Biomechanics*, **23** (Supplement): 1-105, 1990.
74. **Zernicke, R. F.**, and Salem, G. J. Flexibility training. In: *Sports Medicine: The School Age Athlete*. Reider, B. (ed.) W. B. Saunders, Philadelphia, Pennsylvania, pp. 1-18, 1991. (Revised in 2nd Edition, 1995).
75. **Zernicke, R. F.**, Salem, G. J. and Alejo, R. K. Endurance training. In: *Sports Medicine: The School Age Athlete*. Reider, B. (ed.) W. B. Saunders, Philadelphia, Pennsylvania, pp. 40-51, 1991. (Revised in 2nd Edition, 1995).
76. Hou, J. C-H., **Zernicke, R. F.**, and Barnard, R. J. Experimental diabetes, insulin treatment, and femoral neck morphology and biomechanics in rats. *Clinical Orthopaedics and Related Research* **264**: 278-285, 1991.
77. **Zernicke, R. F.**, Schneider, K., and Buford, J. A. Intersegmental dynamics during gait: Implications for control. In: *Adaptability of Human Gait: Implications for the Control of Locomotion*. Patla, A. E. (ed.), Elsevier Science Publishers, Amsterdam pp. 187-202, 1991.

78. Li, K-C., **Zernicke, R. F.**, Barnard, R. J. , and Li, A. F-Y. Differential response of rat limb bones to strenuous exercise. *Journal of Applied Physiology: Respiratory, Environmental, and Exercise Physiology* **70**: 554-560, 1991.
79. **Zernicke, R. F.**, and Loitz, B. J. Exercise-related adaptations in connective tissue. In: *Encyclopedia of Sports Medicine: Strength and Power in Sports*. Komi, P. (ed.) Blackwell Scientific Publ., Oxford, United Kingdom, pp.77-95, 1991.
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294. MacNeil, J., Boyd, S. K., Doschak, M. R., and **Zernicke, R. F.** Maintaining periarticular cancellous morphology and mechanical strength in post-traumatic experimental osteoarthritis by antiresorptive therapy. *Transactions of 5th Alberta Biomedical Engineering Conference*, Banff, Alberta, October 2005.
295. Wu, H., Ronsky, J. L., Poncet, P., Harder, J., Chariet, F., and **Zernicke, R. F.** Natural history and progression of adolescent idiopathic scoliosis by consecutive spinal radiographs. *Transactions of Canadian Orthopaedic Research Society*, Toronto, Ontario, June 2006.
296. Goulet, G., Cooper, D., Coombe, D., MacKay, C. J., Martinuzzi, R., and **Zernicke, R. F.** Modeling hierarchical levels of fluid flow in cortical bone: Integrating fluid flow simulation with micro-CT. *Transactions of the 29th Annual Meeting Canadian Medical and Biological Engineering Society*. Vancouver, British Columbia, June 2006.
297. Monteleone, B., Meeuwisse, W., Ronsky, J. and **Zernicke, R. F.** Ankle Joint complex kinematics and muscle activity in functional ankle instability. *Transactions of Annual Meeting Canadian Academy of Sport Medicine*, Edmonton, Alberta, May 2006.
298. Cooper, M. L., Goulet, G. C., Thomas, C. D., Clement, J. G., Coombe, D., and **Zernicke, R. F.** Impact of age-dependent cortical bone rarefaction on tissue fluid pressure: Implications for mechanotransduction. *Transactions of the 5th World Congress of Biomechanics*, Munich, Germany, August 2006 [*Journal of Biomechanics* 39: S411, 2006].
299. Goulet, G. C., Cooper, D. M. L., Coombe, D., and **Zernicke, R. F.** Modelling geometrically accurate basic-multicellular-uni morphologies: Implications for regulation of cortical bone remodeling. *Transactions of the 5th World Congress of Biomechanics*, Munich, Germany, August 2006 [*Journal of Biomechanics* 39: S410, 2006].
300. Schneider, P. S., Wakeling, J. M., and **Zernicke, R. F.** Adaptation to varied ankle-foot orthotic resistance during treadmill walking. *Transactions of the 5th World Congress of Biomechanics*, Munich, Germany, August 2006 [*Journal of Biomechanics* 39: S30-S31, 2006].
301. MacKay, C. J., Goulet, G. C., Cooper, D. M. L., Coombe, D., and **Zernicke, R. F.** Validation and quantification of an in vivo model of functional bone adaptation. *Transactions of the 5th World Congress of Biomechanics*, Munich, Germany, August 2006 [*Journal of Biomechanics* 39: S451, 2006].
302. Croft, J., von Tschaner, V., and **Zernicke, R. F.** Postural mechanisms during unipedal quiet stance on compliant surfaces. *Transactions of the 5th World Congress of Biomechanics*, Munich, Germany, August 2006 [*Journal of Biomechanics* 39: S33, 2006].
303. Wu, H., Ronsky, J. L., Chariet, F., Harder, J., and **Zernicke, R. F.** Scoliotic progression patterns in prognostic factors and future prediction of spinal deformity progression. *Transactions of International Research Society of Spinal Deformities*, Ghent, Belgium June 2006.
304. Schneider, P. S., Wakeling, J. M., and **Zernicke, R. F.** Humans rapidly adapt to varied ankle-foot orthotic resistance during treadmill walking. *Transactions of the Canadian Society for Clinical Investigation*, Ottawa, Canada, September 2006.
305. Varkey, M., Kucharshi, C., Winn, S., Murray, S., Matyas, J. R., **Zernicke, R. F.**, and Uludag, H. Response of bone marrow stromal cells to low dose of systemic bFGF treatment in normal and ovariectomized rats. *Transactions of the Canadian Biomaterials Society*, Calgary, Canada, June 2006.

306. **Zernicke, R. F.**, Goulet, G., LaMothe, J., Cooper, D., MacKay, C., Lorincz, C., Coombe, D., Judex, S., Boyd, S., Wohl, G., and Doschak, M. Bone: Cellular mechanisms to functional adaptation. *Transactions of the Canadian Society of Biomechanics*, Waterloo, Canada, August 2006.
307. Goulet, G. C., Cooper, D. M. L., Coombe, D. and **Zernicke, R. F.** Modelling fluid flow and nutrient transport in Haversian bone: Integrating μ CT imaging with fluid flow simulation. *Transactions of the Canadian Society of Biomechanics*, Waterloo, Canada, August 2006.
308. MacNeil, J. A., Doschak, M. R., **Zernicke, R. F.**, and Boyd, S. K. Preservation of periarticular cancellous morphology and mechanical strength in post-traumatic experimental osteoarthritis by antiresorptive therapy. *Transactions of the Orthopaedic Research Society*, San Diego, California, February 2007 (Submitted).
309. Cooper, D. M. L., Goulet, G. C., Coombe, D., and **Zernicke, R. F.** Impact of bone loss on simulated load-induced fluid pressure. *Transactions of the Orthopaedic Research Society*, San Diego, California, February 2007 (Submitted).

INVITED PRESENTATIONS & LECTURES

1. Annual Meeting of the California Association of Health, Physical Education, and Recreation, Los Angeles, California, March 1975: *Biomechanical effects of exercise on fibrous connective tissue.*
2. Departments of Orthopaedic Surgery and Physical Education, University of Arizona, Tucson, March 1977: *Kinetic analysis in athletics.*
3. Departments of Orthopaedic Surgery and Physical Education, University of Arizona, Tucson, March 1977: *Biomechanics and athletic injuries.*
4. Conference for Engineering Consultants, Failure Analysis Associates, Pajaro Dunes, California, June 1977: *Biomechanics and musculoskeletal failures.*
5. Kinesiology: A National Conference on Teaching, University of Illinois, Champaign-Urbana, June 1977: *Acquiring federal funds for undergraduate equipment—the NSF instructional scientific equipment program.*
6. Australian Sports Medicine Federation, Los Angeles, California, June 1979: *Biomechanics and sports medicine.*
7. International Congress in Physical Education—The Skillfulness of Movement: Theory and Application. Trois-Riveres, Quebec, Canada, June 1979: *Evidence for generalized motor programs using gait pattern analysis.*
8. Department of Physical Education, University of California, Berkeley, California, February 1980: *Quantification of intersegmental patterns.*
9. North American Society for Psychology of Sports and Physical Activity, Annual Meeting, University of Colorado, Boulder, Colorado, May 1980: *Biomechanical constraints in motor control.*
10. International Symposium on Motor Control, UCLA, June 1980: *Mechanisms underlying the achievement of final limb position.*
11. Department of Orthopaedic Surgery, University of Cincinnati, Ohio, May 1981: *Locomotion of the chronic spinal cat.*
12. II International Symposium of Biomechanics Cinematography and High Speed Photography, International Society for Optical Engineering, San Diego, California, August 1981: *Computerized simulation of whole body dynamics—human movement modeling.*
13. II International Symposium of Biomechanics Cinematography and High Speed Photography, International Society for Optical Engineering, San Diego, California, August 1981: *The integrative role of cinematography in biomechanics research.*
14. UCLA Extension Lecture, Los Angeles, California, Seminar "Exercise and Your Health", November 1981: *Exercise, biomechanics & injuries.*
15. Annual Meeting of the California Bar Association, Defense Counsels, San Diego, California, November 1981: *Graphic evidence in product liability and personal injury cases.*
16. UCLA Extension Engineering Short Course—Failure Analysis, Prevention, and Risk Assessment, Los Angeles, California, March 1982: *Biomechanics and crash worthiness.*
17. Prosthetics-Orthotics Education Program, UCLA Division of Orthopaedic Surgery, Los Angeles, California, May 1982: *Biomechanics of child amputee gait: the CAPP and SACH foot prostheses.*
18. University of Calgary, Calgary, Alberta, Canada, November 1982: *Tissue biomechanics.*

19. Hughes Aircraft Corporation, Executive Health Program, Canoga Park, California, July 1983: *Biomechanics, posture, and back pain.*
20. Glendale Adventist Medical Center, Physical Therapy Department, Glendale, California, September 1983: *Collagen structure and the effects of aging, immobilization, and exercise on connective tissue properties.*
21. IInd International Symposium of Biomechanics in Sports, Colorado Springs, Colorado, January 1984: *Integrating tissue biomechanics with mechanisms of sports injuries.*
22. IInd National Symposium on Teaching Kinesiology and Biomechanics, Colorado Springs, Colorado, January 1984: *Graduate programs in biomechanics/kinesiology.*
23. Annual Meeting of American College of Sports Medicine, San Diego, California, May 1984: *Integrating tissue biomechanics with sport injuries.*
24. Hughes Aircraft Corporation, Executive Health Program, El Segundo, California, July 1984: *Biomechanics, posture, and back pain.*
25. XXXVII Annual Conference on Engineering in Medicine and Biology, Los Angeles, California, September 1984: *Non-uniform strain distributions in ligaments and tendons.*
26. Engineering Foundation—Conference on Sport Biomechanics, Santa Barbara, California, February 1985: *Biomechanics, product liability, and sport injuries.*
27. Physics Department, California State University, Los Angeles, October 1985: *Physics and human movement.*
28. National Symposium on Future Directions in Exercise/Sport Research, Arizona State University, Tempe, Arizona, January 1986: *Movement dynamics and connective tissue adaptation.*
29. 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.*
30. Engineering Foundation—Conference on Biomechanics and Control, Henniker, New Hampshire, July 1987: *Role of intersegmental dynamics in the control of rapid limb oscillations.*
31. 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.*
32. Alberta Heritage Foundation for Medical Research Visiting Lecturer, Faculty of Medicine, University of Calgary, Calgary, Alberta, Canada, October 1987: *The response of fibrocartilage and bone to altered mechanical stress.*
33. Department of Biomedical Engineering, University of Southern California, Los Angeles, California, February 1988: *Dynamical control of limb trajectories.*
34. 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.*
35. North American Society for Psychology of Sport and Physical Activity Annual Meeting, Knoxville, Tennessee, June 1988: *Intersegmental dynamics: New dimensions in motor development.*

36. Center for Locomotion Studies, The Pennsylvania State University, State College, Pennsylvania, September 1988: *The role of intersegmental dynamics in the control of limb trajectories.*
37. Department of Exercise and Sport Sciences, Arizona State University, Tempe, Arizona, November 1988: *Control of inertial and muscular torques during coordinated limb movements.*
38. Department of Exercise and Sport Sciences, The Pennsylvania State University, State College, Pennsylvania, February 1989: *The dynamics of motor control and connective tissue adaptation.*
39. 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.*
40. 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.*
41. Department of Surgery, University of Calgary, Alberta, Canada, March 1990: *Osteoregulatory function of bone strain.*
42. 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.*
43. American College of Sports Medicine, Southwest Chapter Annual Meeting, San Diego, California, November 1990: *Adaptation of immature and mature bone to strenuous exercise.*
44. Department of Family Medicine, UCLA, Sports Medicine Conference, February 1991: *Stress fractures and bone response to strenuous exercise.*
45. 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.*
46. Division of Rheumatology, Faculty of Medicine, University of Calgary, May 1992: *Sports medicine.*
47. Engineering Foundation Conference on Biomechanics and Neuroscience, Ventura, CA, July 1992: *Intersegmental dynamics and motor control of human limb movements.*
48. Western Canadian Prosthetics Symposium, Alberta Children's Hospital, Calgary, Alberta, October, 1992: *Static and dynamic alignment of the prosthesis and the effect on gait.*
49. Department of Medicine, Grand Rounds, University of Calgary, Calgary, Alberta, November 1992: *Connective tissue physiology, mechanics, and injuries.*
50. Alberta Neuroscience Association, Kananaskis Centre, Kananaskis, Alberta, November 1992: *Changes in limb dynamics in the first year of life.*
51. 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.*
52. Research Day, Department of Clinical Neurosciences, University of Calgary, March 1993: *Predictions for neural control based on limb dynamics.*

53. 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*.
54. 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*.
55. Université du Québec à Montréal, Montréal, Québec, Département de kinanthropologie, February 1994: *Intersegmental dynamics and motor skill acquisition*.
56. Canadian Society of Biomechanics, 8th Biennial Conference, Calgary, Alberta, Invited lecture, August 1994: *Assessing outcome efficacy in child amputee locomotion*.
57. Annual Meeting of the Southeast American College of Sports Medicine, Lexington, Kentucky, Keynote Lecture, February 1995: *The response of bone to exercise and diet*.
58. XVth Congress of the International Society of Biomechanics, Jyväskylä, Finland, Presidential Keynote Lecture, July 1995: *Functional adaptation of bone to physiological and mechanical stimuli*.
59. 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*.
60. American Physical Therapy Association Scientific Meeting and Exposition, Minneapolis, Minnesota, Invited Lecture, June 1996: *Biomechanics and motor control in orthopaedic related pathologies*.
61. Cleveland Clinic Foundation, Department of Biomedical Engineering, Cleveland, Ohio, Invited Lecture, May 1997: *Response of bone to physiological stimuli*.
62. Canadian Orthopaedic Association Annual Meeting, Invited Lecture, Hamilton, Ontario, June, 1997: *Biomechanics and osteoporosis*.
63. Whitaker Foundation Research Conference, Keynote Lecture, Snowbird, Utah, July 1997: *Biomedical engineering and orthopaedic clinical care*.
64. Southwest Chapter of the American College of Sports Medicine, Invited Lecture, Las Vegas, Nevada, November, 1997: *Musculoskeletal injuries to the knee and leg*.
65. Department of Kinesiology, University of Waterloo, Waterloo, Ontario, Invited Lecture, February, 1998: *Orthopaedic biomechanics: Function, diagnosis, and mechanisms*.
66. CORS Presidential Guest Lecture, Canadian Orthopaedic Research Society, Ottawa, Ontario, June 1998: *Functional adaptation of bone*.
67. Canadian Medical and Biological Engineering Society, Invited Lecture, Edmonton, Alberta, June, 1998: *Cryopreservation of osteochondral tissues for joint replacement and repair*.
68. Alberta Society for Motor Control, Keynote Lecture, Jasper, Alberta, October, 1998: *Biomechanics and motor control*.
69. Marquette University, Visiting Professor Lecture, Department of Biomedical Engineering, Milwaukee, WI, February, 1999: *Functional adaptation of bone*.

70. University of California, Davis. Departments of Orthopaedics and Exercise Science and Biomedical Engineering Program, Invited Lecture, Davis, CA, February, 1999: *Functional adaptation of bone*.
71. Canadian Orthopaedic Nursing Association Annual Meeting, Keynote Lecture, Calgary, AB, October 1999: *Functional adaptation of bone*.
72. The Arthritis Society, Keynote Lecture, Research and Public Symposium, October, 1999: *Osteoarthritis—treatments and new directions*.
73. McMurtry Lecturer (Invited Keynote Lecture), Surgeons' Day, University of Calgary, Calgary, AB, June 2000: *Orthopaedic surgery research*.
74. Canadian Society of Biomechanics, Keynote Lecture, Montreal, PQ, August 2000: *Factors in skeletal adaptation*.
75. IOC Pre-Olympic Scientific Congress, Keynote Lecture, Brisbane, Australia, September 2000: *Functional adaptation of bone*.
76. Sigma Xi Research Society, University of Calgary, Invited Lecture, November 2000: *Osteoarthritis and joint mechanics and physiology*.
77. Biomedical Engineering Society—Republic of China, Keynote Lecture, Taipei, Taiwan, December 2000: *Responses of bone to exercise and injury*.
78. 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*.
79. 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*.
80. 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*.
81. 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*.
82. Shanghai Second Medical School, The Ninth People's Hospital, Department of Orthopaedics, Invited Lecture, Shanghai, China, November 2001: *Bioengineering advances in orthopaedics*.
83. 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*.
84. Alberta Health Industry Alliance, Invited Lecture, Calgary, Alberta, June 2002: *Health and wellness — Vision for southern Alberta*.
85. Center for Complex Systems and Brain Science, Florida Atlantic University, Boca Raton, Florida, August 2002: *Bioengineering systems and orthopaedic biomechanics*.
86. International Biomechanics Congress—Biomechanics of Man, Invited Keynote Lecture, Prague, Czech Republic, November 2002: *Response of bone to exercise and injury*.

87. 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.*
88. Lawson Health Research Institute, University of Western Ontario, Sister Mary Doyle Research Symposium, Invited Keynote Lecture, March 2003: *Bone adaptation and orthopaedic biomechanics.*
89. CCAT/BioAlberta—Opportunities in Bioinformatics: Technology, Partnerships and Commercialization, Invited Lecture, March 2003: *Innovations in bone modelling.*
90. 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.*
91. American College of Sports Medicine, Annual Meeting, Symposium Invited Lecture, San Francisco, California, June 2003: *The bone-injury connection.*
92. 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.*
93. Whitaker Conference on Biomedical Engineering, La Jolla, California, Workshop Invited Speaker, August 2003: *Strategies for Research: Individual vs. Team—How best to succeed.*
94. Department of Biomedical Engineering, State University of New York, Stony Brook, Invited Lecture, September 2003: *Adaptation of bone to exercise and injury.*
95. Departments of Orthopaedics and Anatomy & Cell Biology, Indiana University-Purdue University, Indianapolis, Invited Lecture, September 2003: *Adaptation of bone to exercise and injury.*
96. 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.*
97. Department of Kinesiology and Leisure Studies, University of Hawaii, Honolulu, Hawaii, Invited Lecture, March, 2004: *Adaptation of the musculoskeletal system to exercise and injury.*
98. Bone Health Research Symposium, University of British Columbia, Vancouver, Invited Keynote Lecture, May 2004: *Adaptation of the musculoskeletal system to exercise and injury.*
99. Rodeo Research & Clinical Care—1st International Conference, Calgary, Alberta, Invited Lecture, July 2004: *Biomechanics, sport medicine & rodeo research.*
100. Canadian Society of Biomechanics, Annual Meeting, Halifax, Nova Scotia, Invited Lecture, August 2004: *Successful strategies for crafting grants for CIHR.*
101. Whitaker Conference on Biomedical Engineering, La Jolla, California, Workshop Invited Speaker, August 2004: *Strategies for research: individual vs. team—How best to succeed.*
102. 6th International Bone Fluid Flow Workshop, Seattle, Washington, Invited Lecture, September 2004: *Functional adaptation of bone.*
103. Canadian Society of Exercise Physiology, Annual Meeting, Winnipeg, Manitoba, Invited Lecture, October 2004: *Formulating successful applications for NSERC/CIHR.*

104. 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?*
105. Departments of Orthopaedics/Sport Medicine and Biomedical Engineering. Stanford University, Palo Alto, California, February, 2005: *Adaptation of the musculoskeletal system to exercise and injury.*
106. Exercise Biology Program and Department of Biomedical Engineering, University of California, Davis, California, February, 2005: *Adaptation of the musculoskeletal system to exercise and injury.*
107. 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.*
108. Kerby Centre of Excellence and Network in Applied Gerontology, Calgary, Alberta, Invited Lecture, April 2005: *Healthy and successful aging.*
109. Canadian Athletic Therapy Association, Annual Meeting, Calgary, Alberta, Invited Lecture, May 2005: *Bone-injury connection.*
110. 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.*
111. Department of Physical Medicine and Rehabilitation, University of Virginia, Charlottesville, Virginia, Invited Lecture, August, 2005: *Adaptation of the musculoskeletal system to exercise and injury.*
112. School of Human Kinetics, University of British Columbia, Vancouver, British Columbia, Invited Lecture, November, 2005: *Adaptation of the musculoskeletal system to exercise and injury.*
113. MENTOR CIHR Program, Annual Research Symposium, Invited Lecture, Montreal, Canada March, 2006: *Alberta CIHR Training Program in Bone and Joint Health.*
114. IT for Healthcare Wait Times, The Canadian Institute, Invited Lecture, Toronto, Ontario, May 2006: *Redesign of bone & joint health care.*
115. International Space Life Sciences Working Group and International Osteoporosis Foundation Congress, Invited Lecture, Toronto, Ontario, June 2006: *Space bone research—key questions and directions.*
116. JUVENT, Invited Lecture, Toronto, Ontario, June 2006: *Alberta hip and knee replacement project.*
117. 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.*
118. The Arthritis Society of Alberta and Northwest Territories, Research Day, Invited Keynote Lecture, Calgary, Alberta, June 2006: *Redesigning bone & joint health services.*
119. Canadian Society of Biomechanics, Biennial Meeting, Invited Keynote Lecture, Waterloo, Ontario, August 2006: *Bone: Cellular mechanisms to functional adaptation.*
120. Alberta Health Care Auxillary, Annual Conference, Invited Keynote Lecture, Red Deer, Alberta, October 2006: *Redesigning bone & joint healthcare.*

