

Making lives better through practice and research

John J. Triano, DC, PhD, FCCS (C, Hon)

Expert knowledge is the defining feature of any profession. Research is the currency by which ownership of that knowledge is vested. Among the nations, Canada rightfully stands as the historical champion for expertise within the chiropractic profession. As the evidence has accumulated and the era of competition engaged, Canada has again taken leadership through its efforts to integrate chiropractic clinician-scientists within the university system across the country. With the successes of placement to date, some might ask what is the value in accelerating research efforts within the chiropractic institutions? There are three fundamental reasons for such investment.

- 1) Chiropractic education is the nursery for future clinician-scientists who can cross-pollinate ideas and influence the broader research and clinical communities. Right now, we have fallen behind our challengers.
- 2) Our future requires a modern, competitive research culture to attract and to foster young minds that will lead on our behalf.
- 3) Society, the power that grants a profession privilege and self-regulating authority, expects a profession will rigorously develop, maintain and expand its own expert knowledge base for the betterment of the public it serves.¹

Achieving these objectives is no longer possible through collaboration alone. To be sustainable, the profession must develop its own research identity and create a credible footprint that fills a scientific niche, contributing knowledge and value to the public. This is the driving philosophy behind Canadian Memorial Chiropractic College as it looks forward to building on past achievements.

Based on both near and long term strategic planning, CMCC has embarked on a renewal program of its dual mission to educate and develop new knowledge that improves the health of society. Five new on-site laboratories

(Biomechanics and Elastography, Tissue Testing, Cellular and Molecular, Materials and Fabrication and Neurophysiology) have been established along with expansion of the research faculty. Research for both clinical and fundamental mechanisms relevant to chiropractic patients has been reorganised under themes represented by two Centres who share the efforts of faculty; 1) The Centre for Study of Interprofessional Health Dynamics, and 2) The Centre for Study of Mechanobiology, Injury and Health. Both Centres interact and collaborate with university scientists in Canada and the United States.

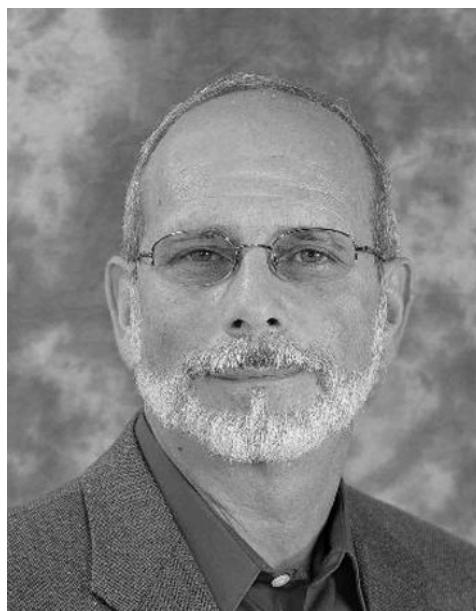
Interprofessional Dynamics, with 6 active members, perform clinical and health policy studies to improve the integration of chiropractic within the health care system. Marion McGregor, DC, MSc, PhD, with Dr. Sil Mior were the first to receive Ontario ministry funding as chiropractors over 20 years ago. She has rejoined CMCC and, with the lead of Dr. Sil Mior they have been awarded a new large Ministry grant. Besides examining the outcomes and mechanics of interprofessional care delivery, the Centre brings the analytic skills of system dynamics to bear asking questions on successful strategies for professional growth.² That is, the influence of various factors underpinning how professions advance and gain/lose cultural authority, influence and utilization of services by patients.¹

Mechanobiology, Injury and Health focuses on questions of clinical effectiveness and the mechanisms of health; particularly the homeostatic balance of mechanical factors that may promote health and those involved in what are now known as mechanotransduction diseases.³ Drs. Steve and Julita Injeyan investigate cellular biomarkers of the inflammatory cascade and their response to treatment. Dr. Erwin challenges common wisdom on how discs develop, age and heal from injury. Dr. Triano examines manual skills in effort to optimize treatment delivery and has recently lead an international team of researchers to obtain the first jointly funded NCAAM/NIH-CIHR

award to study the effects of forces on soft tissues. Dr. Vernon continues his interest in neck care, leading his team of investigators in another jointly funded NCAAM/NIH-CIHR award. Additional team members, which are introduced in the pages that follow, have joined CMCC bringing their own skills and research focus.

As the sophistication of scientific method and the profession have evolved, daunting questions on spinal function have remained. CMCC believes that we are at the brink of technological advance, social demand and professional need convergence; making it possible to address these questions. As a result, the college has authorized the formation of a private research chair position. A search has commenced to identify the appropriate candidate whose talent and interest are in the fields of joint instability, degeneration and subluxation research. Each of these topics is served by similar tools and knowledge. While some question the use of the term “subluxation,” its connotations are the creation of this profession. Only this profession can settle its validity, role and value by having the courage of dispassionate query. Society grants cultural authority founded on its expectation that a profession will caretake its expert knowledge and base it on the public’s interest.

- 1 Abbott A. *The System of Professions An Essay on the Division of Expert Labor*. Chicago: The University of Chicago Press; 1988.
- 2 McGregor-Triano M. *Jurisdictional control of conservative spine care: Chiropractic versus Medicine*. Dallas: University of Texas at Dallas; 2006.
- 3 Ingber, D. *Mechanobiology and Diseases of Mechanotransduction*. *Ann Med* 2003; 35: 1–14.



Dr. John J. Triano, DC, PhD, FCCS (C) (Hon)
Dean, Graduate Education and Research Programs
Professor

John J. Triano, DC, PhD, is a graduate of Logan College (DC), Webster College (MA), and the University of Michigan (PhD). He is a Fellow of the College of Chiropractic Scientists (Canada) and serves as an editorial advisor to the *Journal of Manipulative and Physiological Therapeutics* (since 1986), *Spine* (since 1994), and *The Spine Journal* (since 2000). Dr. Triano was Research Professor in the University of Texas Southwestern Medical Center Arlington, Joint Biomedical Engineering Program. To date he has written 51 scientific and clinical articles and 14 book chapters. From 1992 to 2005 he was the Co-Director of Conservative Medicine and Director for the Chiropractic Division at the Texas Back Institute, a multidisciplinary spine facility caring for 15,000 new patients per year. Currently, he is a Professor and Dean, Graduate Education and Research Programs at the Canadian Memorial Chiropractic College and is cross-appointed as Associate Professor within the Rehabilitation Sciences department at McMaster University.

Dr. Triano is the recipient of a number of awards and honours including the Researcher of the Year from the ICA and FCER, and a service award from the US Department of Health and Human Services. Dr. Triano has served as the only chiropractor on the US National Committee for Quality Assurance that recently released its first Spine Physician Recognition Program in the US (2007), a program that acknowledges quality spine care by chiropractors on par with medical physicians. He is recipient of the first NCCAM-NIH/CIHR research award supporting studies in the mechanisms of spinal manipulation.

His research has focused on clinical trials for low back pain management and skill development in adjusting and manipulation biomechanics.



Dr. Kim Ross, DC, PhD
Director, Year I
Assistant Professor

Dr. J. Kim Ross is the Chair for the Department of Applied Chiropractic and Director of Education, Year 1 at CMCC. He received his BSc and MSc from the University of Toronto in 1980 and 1984 respectively. Dr. Ross graduated from CMCC in 1987 and since 1988, he has been teaching chiropractic skills and body biomechanics at CMCC. He currently holds the title of Associate Professor.

Dr. Ross received his Ph.D. in Biomechanics from the University of Waterloo in 2003. His thesis work focused on the biomechanics of spinal manipulation. He has published papers on this topic in the journals *Spine*, *Clinical Biomechanics* and *the Journal of Manipulative and Physiological Therapeutics*. In 2003, he received the Professional Service Award for Research by the Ontario Chiropractic Association. He has been lecturing on gait biomechanics, orthotic therapy and the biomechanics of manipulation to field practitioners worldwide since 1995.

Among other ongoing research, Dr. Ross is currently co-investigator on an NIH-CIHR funded grant that involves the use of a technique he developed using accelerometry to document the location of cavitation during spinal manipulation.

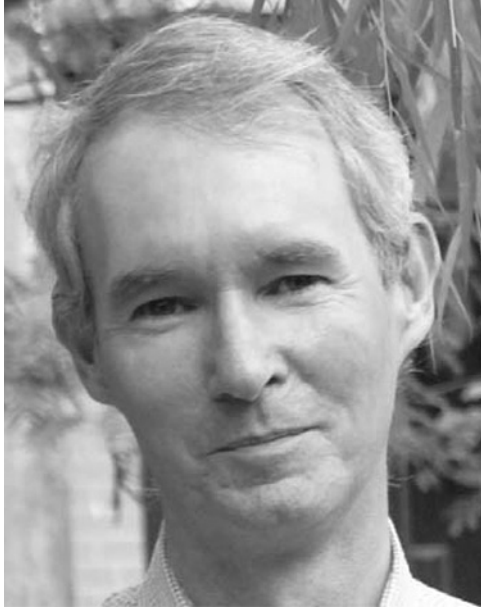


Dr. Guy Sovak, BSc, MSc, PhD, PEng
Assistant Professor, Anatomy

Dr. Sovak is an Assistant Professor in the Department of Anatomy at CMCC, where he teaches histology and performs research. He graduated with a degree in Education of Biological Sciences, and proceeded to do an MSc at the Faculty of Medicine in the Technion, Haifa Israel. While there, he studied biocompatibility of implant materials, emphasizing on implant coatings that could prolong implant longevity within the body.

A recipient of the Levi Eshkol fellowship for interdisciplinary research, during his PhD Dr. Sovak studied biological coatings for titanium implants, revealing early implant fixation with fibronectin coated implants. His undergraduate and graduate research led to the acquisition of different histological and microscopic techniques. As a postdoctoral NIH fellow in the Albert Einstein College of Medicine in New York, he helped build a laboratory to study the composition of lysosomal membrane proteins under starvation, Parkinson's disease, and aging rats. He then landed a CIHR senior postdoctoral position at the Hospital for Sick Children in Toronto, studying the quality control at the post golgi compartment of Cystic fibrosis transmembrane conductance regulators under the supervision of Dr. Gergely Lukacs.

Dr. Sovak is now researching fascia and intermuscular connective tissue in the psoas major muscle and its implication on non-uniform psoas deformation under tensile load using histology, immunohistology and biochemistry methods. One of his main interests lies in finding whether there are differences in protein levels within different cross-sectional planes in and the effects on treatment load transfer through soft tissue during therapy.



Dr. Brian Budgell, DC, MSc, PhD
Director, Neurophysiology Research Laboratory
Associate Professor



Dr. Diane Grondin, DC, MHK
Research Scientist
Instructor

Dr. Brian Budgell is currently Director of the Neurophysiology Lab at CMCC, and is pursuing his interest in the effects of somatic stimulation on spinal cord blood flow. After graduating from CMCC in 1986, Dr. Budgell moved to Japan where he conducted research into somatoautonomic reflexes under the direction of the late Professor Akio Sato. Upon Dr. Sato's retirement, he moved to Kyoto University to continue his work with scientists there.

Dr. Budgell has established an international collaboration involving Kyoto University and Australian researcher Philip Bolton at University of Newcastle. His research interests include investigating cerebrospinal fluid pressure changes during upper cervical displacement and chiropractic adjustment, the effects of spinal cord compression on somatic evoked autonomic reflexes.

He also continues to collaborate with Dr. Weimin Li at the Shanghai Research Center for Acupuncture and Meridians, investigating the science underlying acupuncture.

Dr. Diane Grondin is a relatively recent addition to the research team at CMCC. Her research interests lie primarily in biomechanical testing as it relates to the work place. She is presently managing an externally funded study that is looking at the effects of comfort and posture on productivity within the office environment. She is testing the effect of different levels of back support on muscular effort, centre of pressure distributions, and estimates of lumbar compressive forces. The project is a joint effort with the research team at McMaster University. She also teaches Injury Biomechanics to the Chiropractic Residents at CMCC.

Dr. Grondin continues in private chiropractic practice and is an Ergonomic Consultant across the Greater Toronto Area. She graduated from the Masters program in Human Kinetics at the University of Windsor, where she studied muscle exertion levels, posture and motor activation patterns during a variety of workplace and daily tasks, such as lifting, hand tool use, and installing child restraint systems into vehicles.

Dr. Grondin is committed to chiropractic research and believes it is an integral component to the advancement of the profession.



Dr. Carol Ann Weis, MSc, DC
Research Scientist
Tutor

Carol Ann Weis graduated from the University of Western Ontario with a Bachelor of Arts (Honours) in Physical Education (1992) and a Masters of Science (1997). During her master's degrees she worked with Michelle Mottola, PhD and assistant professor at UWO and the director of the Exercise and Pregnancy Lab. She looked at the effects of exercise on carbohydrate metabolism in pregnant women. Since then she has written a number of articles and co-authored a manual for fitness professionals on exercising during pregnancy.

Upon entry into CMCC, Carol Ann knew that her required research project would include pregnant women and low back pain. Her current directions of study are focused on the biomechanics of pregnancy, including the morphological changes in abdominal musculature. Her ultimate objective is to enhance our ability to prevent and manage musculoskeletal complications of pregnancy.



Dr. Deborah Kopansky-Giles, BPHE, DC, FCCS(C),
FCCRS(C), FICC (Hon)
Coordinator, Integrated Care and Care Research
Associate Professor

Dr. Kopansky-Giles graduated from CMCC in 1982, attained her Fellowship in Chiropractic Sciences in 1993. She is a Fellow of the International College of Chiropractors and is currently pursuing her MSc. She is Coordinator of Integrative Care and Care Research and an associate professor at CMCC. She coordinates the DC program at the Department of Family and Community Medicine at St. Michael's Hospital, and lectures in the Faculty of Medicine at the University of Toronto.

The project at St. Michael's began with an award from the government to evaluate the integration of chiropractors at a teaching hospital. She has several publications in health system resources. Her research interests are in the field of integrated health service delivery models and inter-professional health education.

Dr. Kopansky-Giles has received several professional service awards. Her work has raised awareness of the benefits of chiropractic to the underserved populations. The involvement with the inter-professional education has garnered the Education Scholarship award from St. Michael's Hospital and the Interprofessional Health Teaching Award from the Faculty of Medicine, University of Toronto. She represents North America on the WFC Public Health Committee and the chiropractic profession on the United Nations Bone and Joint Decade. A member of the National Advisory Group on Complementary Therapies and AIDS and the Research Agenda Roundtable on AIDS, she has also been on several conference organizing committees, most recently the WFC Biennial Congress, 2009 in Montreal.



Dr. Stephen Injeyan, MSc, PhD, DC
Chair, Department of Pathology and Microbiology
Resource Clinician, Campus Clinic
Professor

Dr. Injeyan earned a BSc in Biology, an MSc in Tropical Health from the American University of Beirut, and a PhD from the Institute of Parasitology, McGill University. He received his chiropractic training at the Canadian Memorial Chiropractic College, graduating in 1984. As well as being in private practice since graduation, he has continued as an educator and scientist.

Dr. Injeyan's diverse research interests that interface health and chiropractic include microbiology, cell biology and clinical research. His current research focus is on the study of the effects of spinal manipulation on the immune response and exploration of possible mechanism. Leading a team of scientists and clinicians at CMCC, he has three recent publications on changes in the pro-anti inflammatory chemical cascade following adjustment. Other research interests include effects of alternative manipulation strategies, as well as infection control in chiropractic practice.

Dr. Injeyan is a recipient of several research grants both internal and external to the institution to support his work.



Dr. Howard Vernon, BA, DC, FCCS (Hons), PhD
Director, Centre of the Study of Cervical Spine
Professor

Dr. Vernon graduated from CMCC in 1977, completed his Fellowship in Clinical Science in 1980 and received his PhD from the University of Glamorgan, Wales, UK, in 2003. His thesis covered the manual therapy of headaches of spinal origin.

In private practice since graduation, Dr. Vernon has also been on faculty at CMCC since 1979 serving in various capacities. He founded the CMCC Midtown Chiropractic Clinic, the CMCC Midtown Rehabilitation Clinic and the CMCC Disability Designated Assessment Centre and has been director, Centre of the Study of Cervical Spine since 2000.

Dr. Vernon coauthored the first report of an outcome measure for assessing disability due to neck pain – the Neck Disability Index (NDI), in 1991. Currently the most widely used instrument to assess self-reported neck pain, it has over 380 international citations.

He is the author of more than 70 peer-reviewed articles, 15 book chapters and has edited two text books on the upper cervical spine. Dr. Vernon received the Foundation for Chiropractic Education and Research Researcher of the Year Award in 1993 and the Canadian Chiropractic Association Researcher of the Year Award in 1995. He was chair, Consortium of Canadian Chiropractic Research Centres from 1997 to 2004.

His primary area of research is the relationship between the upper cervical spine and headache. He currently is the Principal Investigator on an NIH-CIHR, jointly funded research project on neck manipulation.



Dr. Julita T-Injeyan, MSc, PhD
Associate Professor

Dr. T-Injeyan has an MSc in Forensic (Medical) Anthropology and a PhD in Immuno-pharmacology. She became a Post-Doctoral Fellow of the Medical Research Council of Canada in 1976. Dr. T-Injeyan has been a research associate and assistant professor of surgery and immunology, University of Toronto, a staff research scientist at the Toronto Hospital and the Sunnybrook Trauma Research Group, Department of National Defence Research Scientist and a senior research scientist at Wellesley Hospital Institute.

She joined CMCC in 1999, and her research interests include investigations of immune consequences of neoplasia, severe trauma (e.g. thermal, mechanical trauma), shock and clinical sepsis. Dr. T-Injeyan is currently involved in studies of cellular and molecular mechanisms of systemic (visceral) effects of spinal manipulative therapy (SMT) with emphasis on the effect of SMT on the integrated neuro-immune cytokine network regulating the inflammatory response associated with musculoskeletal disorders.

Dr. T-Injeyan has contributed numerous articles in *Journal of Chiropractic Education*, *Journal of Manipulative Therapeutics Journal*, *Journal of Clinical Immunology*, and in several other leading journals. She is also a co-investigator on a large clinical trial of pain management by the Neuro Research Group, evaluating the clinical and biological effects of a novel form of electrical stimulation for pain management. In the past 5 years, she has taught General Pathology (PA1201) and Immunology (PA 2204) at the Canadian Memorial Chiropractic College.



Dr. Mark Erwin, BA, DC, PhD
Associate Professor

Dr. Erwin holds a DC degree from CMCC, class of 1984 and a PhD obtained from the Institute of Medical Science, University of Toronto 2004. He holds the academic rank of Assistant Professor within the Division of Orthopaedic Surgery at the University of Toronto and the Toronto Western Hospital. He is also cross-appointed to The Spine Programme and is a scientist within the Arthritis and Autoimmunity Research Centre (AARC) at the University Health Network.

Dr. Erwin currently holds the position of Scientist in Disc Biology at the University of Toronto—a position jointly funded by the Canadian Chiropractic Research Foundation, the Musculoskeletal Health and Arthritis and Neuroscience programmes at the Toronto Western Hospital. He is an appointed Associate Professor at CMCC within the research division, joining the faculty in 2007.

Dr. Erwin's principal area of interest is in development and regenerative medicine applications concerning the intervertebral disc.



Dr. Marion McGregor, DC, MSc, PhD
Director, Education Year 2
Associate Professor

Dr. McGregor graduated from CMCC in 1980 and completed a Fellowship in the College of Clinical Sciences. She went on to earn her MSc in Medical Epidemiology from McMaster University in 1987 and a PhD in Public Policy and Political Economy at the University of Texas at Dallas in 2006.

In clinical practice for 10 years, Dr. McGregor has taught both at CMCC and at the National College of Chiropractic (now the National University of Health Sciences) in Illinois.

After moving to Texas in 1993, Dr. McGregor acted as a consultant in Research Design and Biostatistics with scientists across the United States. She has published in a variety of journals and has acted as a reviewer for the *Journal of Manipulative Physiological Therapeutics*, the *Journal of the Canadian Chiropractic Association* and the *Journal of Chiropractic Education*. In 2002 she was appointed to the Geriatrics and Rehabilitation Medicine Study Section for the National Institutes of Health and subsequently, the Musculoskeletal Rehabilitation Sciences Study Section through 2005; a first for the chiropractic profession.

Dr. McGregor has been a recipient of research funding from the Ontario Ministry of Health, the National Institute of Chiropractic Research, the National Chiropractic Mutual Insurance Company, and most recently as a co-investigator from the National Centre for Complementary and Alternative Medicine, NIH and CIHR. Her research focuses on how the decisions made by professions affect their growth and development. Hers is the first work to examine strategies in the competition between medicine and chiropractic over dominance of spine care.



Dr. Silvano A. Mior, DC, FCCS(C), FICC (Hon)
Special Assistant to the President
Professor

Dr. Mior graduated from CMCC with a Doctor of Chiropractic in 1980 and received his Fellowship in the College of Chiropractic Sciences in 1984. He is currently a PhD candidate in the Department of Health Policy Management and Evaluation, Faculty of Medicine, University of Toronto. Dr. Mior serves as the Special Assistant to the President at CMCC, a Professor in the Division of Research at CMCC and has a private practice in Markham. Until recently he was seconded to the Ministry of Health and Long Term Care (MOHLTC) as a senior clinical consultant working to develop and implement a model of collaboration between chiropractors and physicians in the community primary care setting.

He has served as an Associate Editor to a number of chiropractic journals, and authored numerous articles and book chapters in areas related to clinical chiropractic practice and outcomes. He has participated in international guideline efforts for quality assurance and standards of practice.

In 1994, he was awarded with the Chiropractor of the Year Award by the Ontario Chiropractic Association, and in 1995 the Chiropractic Centennial Award of Excellence by the Canadian Chiropractic Association. Recently in 2003 he was awarded with the Professional Service Award for Research and in 2006 the President's Distinguished Service Award.

His research interests are in the areas of clinical outcomes and program evaluation, health services, and inter-professional collaborative practice. Currently, he is the Principal Investigator on a large ministry funded grant evaluating chiropractic contributions to health care delivery.