Surgery
UNIVERSITY OF TORONTO

Spine Program

UNIVERSITY OF TORONTO
SpineFEST™ VISITING PROFESSORSHIP

Monday, June 23rd, 2014
The Old Mill Inn
Toronto, Canada

University of Toronto Spine Program

Remarks from the Co-Directors:

Dr. Michael Fehlings Dr. Albert Yee

Colleagues,

The 2013-2014 academic year has marked an important time in our program's history. This year marks our 7th annual University of Toronto SpineFEST™, the last 6 years having being led by our UT Spine program that was formalized in the late fall of 2008. As many of you know, the program recently underwent an external review organized by the Department of Surgery, University of Toronto. The reviewers were Drs. Gunnar Andersson (Professor and Chair Emeritus, Orthopaedic Surgery, Rush University Medical Center) and Allan Levi (Professor in the Department of Neurosurgery at the University of Miami). Dr. Andersson was also a reviewer during our initial external review in 2007, prior to the program's inception. We would like to

thank Dr. James Rutka for his significant support, effort, and time in organizing this review on behalf of our program.

This successful review recognized our accomplishments over the years including the establishment of a city-wide trans-disciplinary academic calendar of events that highlight visiting professorships by international experts in spine surgery and in research. The review acknowledged our ongoing advocacy efforts in access to clinical spine care, international reputation in spinal research, as well as educational teaching by our faculty members. Indeed, this review highlighted our collaborative spirit and the success of this review would not be possible without the support and efforts of faculty and trainees around the city. As co-directors of this program, we are indebted to each of you for your contributions in guiding this program's success – this endeavor is truly a reflection of the collaborative and not individual.

The external review recommended exploring key opportunities for enhanced coordination and access to spine care, exploring mechanisms for more integration and collaboration in both clinical and translational research. The review suggested enhanced city-wide opportunities in our hospital based university spine surgical clinical fellowships, and to further strengthen our linkages with our community of practice. We took the opportunity to build upon the suggestions of this review and held both a special program council meeting in the Fall of 2013 as well as a strategic Summit meeting, held February 14, 2014. Thank you to Helena Axler & Associates for all their expertise in facilitating key discussions.

Our Summit meeting with over 40 participants was a key opportunity where we engaged the Ministry of Health and Long Term Care (MOH-LTC) as well as Toronto Academic Health Sciences Network leadership with an aim to further improve access for Ontarian's with emergent spinal conditions. Dr. Fehlings is leading a spine working group under Provincial Neurosurgical Ontario (PNO, MOH-LTC; Co-chaired by Drs. R. Bell and J. Rutka) to explore new initiatives. Our special program council as well as Summit meetings also provided opportunity to engage and disseminate our efforts in surgical education to the Royal College of Physicians and Surgeons of Canada (RCPSC). We were fortunate to benefit from the expertise and input of Ms. Sarah Taber (Associate Director, Education Strategy & Accreditation) and Ms. Lisa Gorman (Team Lead, Education Strategy Unit)) in fellowship education discussions. In research, we were updated on long awaited enhances to the city-wide Research Ethics Board approval process. Our program is well positioned, with several recently funding clinical research projects in spinal cord injury, to move forward a programmatic city-wide data sharing platform that will complement existing hospital databases. A working group has been established to move this forward.

The U of T Spine Program is increasingly recognized internationally as a strong international program. Locally, our program has garnered recognition within the university Department of Surgery and Faculty of Medicine, being a successful model is a great example aligning with our departmental strategic integration initiative. Several key visitors to Toronto this year included: our Research Visiting Professor Dr. Alexander Rabchevsky, our 2013 SpineFEST™ keynote speaker Dr. Alex Vaccaro, Dr. Alvin Crawford, the Hospital for Sick Children

Quarterly Spine Visiting Professor, Mr. David Choi, the Toronto Western Hospital Quarterly Visiting Professor, invited speaker Dr. Shekar Kurpad and our 2014 SpineFEST™ keynote speaker Professor Kenneth Cheung, who brings a unique international perspective of academic excellence to Toronto.

We continue to develop further our educational programs. Drs. Eric Massicotte and Joel Finkelstein are co-leading an education working group within our Educational Committee to explore enhanced collaborative opportunities that build on existing hospital-based fellowship programs. Dr. Stephen Lewis continues to chair the Clinical Fellows Surgical Skills Course at the beginning of the academic year providing an excellent opportunity to welcome our in-coming clinical fellows to the university program. Drs Karl Zabjek and Carlo Ammendolia continue to host and organize a popular semi-annual research update meeting. It has served a tremendous venue for collaborative research discussion and to hear of the great progress that our clinical and research trainees are achieving.

Strategically, our spine program continues to be active in enhancing collaboration in surgical education. Dr. Yee (along with Co-Chair Scott Paquette, UBC) continue to lead a national fellowship surgical education agenda. A nationally based fellowship curriculum for spine surgery is near finalization. Utilizing a Delphi-expert consensus approach, we are collaborating with the Canadian Spine Society in developing a curriculum that may serve the foundation towards an Areas of Focused Competency (AFC) Diploma with the RCPSC. At the residency level, we are appreciative of Dr. Massicotte's efforts in implementing an in-folded spine fellowship during neurosurgical residency. There has been tremendous feedback by our initial trainees with an increasing number of residents starting to expressing interest in this training opportunity.

Today, we would like to extend a sincere welcome and thank you to Professor Kenneth Cheung who is our Annual UT Spine Visiting Professor for SpineFEST™. We very much look forward to his Tator-Hall Lectureship on "Degeneration and the ageing spine: challenging traditional beliefs". He is recognized as an international leader in spine academia, both clinically and in research with focus on degenerative spine conditions.

The vision and aims since our inaugural SpineFEST™ continue to resonate with us – "enhancing city wide collaboration bringing together clinicians and researchers alike, from around the university and with a common interest in spinal academia". We are enhancing linkages amongst our faculty residents, fellows and research trainees. We are also continuing to bridge the continuum between clinical and fundamental research and to foster translational research by providing the infrastructure to facilitate collaboration and data collection. Thank you for joining us today in celebration of our program's accomplishments to date.

In closing, our Program is extremely grateful to Ms. Connie Johnson who continues to be instrumental in coordinating programmatic efforts. We would also like to acknowledge the very strong support of the Department of Surgery as well as the Divisions of Neurosurgery and Orthopaedic Surgery of our Program, all of who are committed to our vision. We look forward

in continuing to work together in further enhancing and developing new initiatives that build upon our collaborative vision.

Sincerely yours,

Michael Fehlings and Albert Yee
Co-Directors, U of T Spine Program

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Monday, June 23rd, 2014
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7:00– 7:30 Guildhall A & B	*Welcome Reception – Breakfast*
7:30 – 7:45 Westminster Room	***Introductory Comments*** University of Toronto Department of Surgery Spine Program ***Drs. Albert Yee and Michael Fehlings (Program Co-Directors)*** Greetings from the University of Toronto ***Dr. James Rutka, RS McLaughlin Professor & Chair Department of Surgery***
7:45 – 8:00	***Welcome Remarks*** ***Dr. Charles Tator, Dr. Hamilton Hall***
	THE TATOR-HALL VISITING PROFESSOR LECTURE
8:00 – 8:15	***Introduction of Visiting Lecturer*** Dr. Michael Fehlings **Visiting Professor- Professor Kenneth Cheung**
8:15 – 9:00	***Keynote Address*** Degeneration and the ageing spine: challenging traditional beliefs ***Professor Kenneth Cheung***
9:00 – 9:15	*Discussion – Dr. Michael Fehlings*

	SESSION 1 : Deformity
9:15 – 9:30	Management of Deformity in Ankylosing Spondylitis **Dr. Michael Ford**
9:30 – 9:45	Indications for Surgery in Adolescent Idiopathic Scoliosis **Dr. Reinhard Zeller**
9:45 – 10:00	Neuromonitoring in Deformity Surgery **S. Strantzas**
10:00– 10:15	Osteotomies for Spinal Deformities **Dr. Stephen Lewis**
10:15 – 10:30	Results of ScoliRisk-1 Study **Dr. Michael Fehlings**
10:30 – 10:45	Discussion
10:45– 11:00 Guildhall A & B	*Coffee Break*
11:00 – 12:15 Guildhall A & B	**Poster Presentations & Judging** Co-chairs, Dr. Ford, Dr. Finkelstein, Mark Erwin, Karl Zabjek, Cari Whyne, Dr. Ginsberg
	SESSION 2: **Translational research in intervertebral disc degeneration**
12:15 – 12:27	Disc Biologics **Mark Erwin**
12:27– 12:39	Patient expectations and therapeutic outcomes following lumbar degenerative spine surgery **Dr. Albert Yee**
12:39 – 12:49	**1st Prize Abstract (Tie)** Non-Invasive Gene Delivery to the Spinal Cord using MRI-guided Focused Ultrasound **Danielle Weber-Adrian**

	1st Prize Abstract (Tie)
12:49- 12:59	Outcomes of surgical management of cervical spondylotic myelopathy: Results of the Prospective, Multicentre, AOSpine International Study in 479 Patients **Dr. Ahmed Ibrahim**
12:59 -13:15	Discussion
13:15 – 14:00 Guildhall A & B	***Lunch & Poster Viewing***
Westminster Room	**SESSION 3: Trainee Presentations**
	I: Invited Presentations
14:00 – 14:15	Elderly Patients Have Similar Outcomes Compared to Younger Patients after Minimally Invasive Surgery for Spinal Stenosis **Ilyas Aleem**
14:15 – 14:30	Time is Spine: Streamlining the Acute Medical and Surgical Care of Traumatic Spinal Cord Injury Patients **Jeff Wilson**
	II: SpineFEST Abstract Presentations
14:30 – 14:40	**2nd place Abstract (Tie)** A Combined Clinical and Imaging Model for Predicting Postsurgical Outcome in Patients with Cervical Spondylotic Myelopathy: Results from the Prospective AOSpine-North America Multicenter Study. **Aria Nouri MD**
14:40– 14:50	**2nd place Abstract (Tie)** Riluzole Promotes Motor and Respiratory Recovery Associated with Enhanced Neuronal Protection and Synaptic Strengthening following High Cervical Hemisection **Kajana Satkunendrarajah**
14:50 – 15:00	**Honorable Mention** De Novo vs. Progression of an Existing Vertebral Compression Fracture (VCF) Following Spine Stereotactic Body Radiotherapy (SBRT): Separate Risk Profiles to Consider **Chia-Lin Tseng**

15:00– 15:10	Clinical and Surgical Predictors of Specific Complications following surgery for the treatment of degenerative cervical myelopathy: Results from the multicenter, prospective AOSpine International study on 479 patients **Lindsay Tetreault**
15:10 -15:20	Development of a Lumbar Spinal Cord Injury Model in the Rat **Gray Moonen**
15:20 – 15:30	Development of an in vitro model of oxidative stress in adult spinal cord-derived neural stem/progenitor cells to examine cell survival factors **Laureen Hachem**
15:30 – 15:45	Discussion
15:45– 16:00	**Awards Presentations and Closing Remarks (Drs. Michael Fehlings and Albert Yee)**

2014 SpineFEST™ VISITING PROFESSOR

Professor Kenneth Cheung

Kenneth M.C. Cheung is the Jessie Ho Professor in Spine Surgery and the Head of the Department of Orthopedics and Traumatology, The University of Hong Kong, and the President of The Hong Kong College of Orthopaedic Surgeons. In 1987, he obtained his undergraduate medical degree at the Medical College of St Bartholomew's Hospital, The University of London, UK. He became a fellow of the Royal College of Surgeons of England in 1991, and a Fellow of the Hong Kong Academy of Medicine in 1995. After returning to Hong Kong from the UK in 1992, he pursued both a clinical career in Spinal Surgery, as well as a research career culminating in the award of an MD from The University of Hong Kong in 2007.

His research interests are in the genetics of intervertebral disc degeneration and scoliosis, stem cell regeneration of the disc, and the development of novel surgical technologies for the treatment of spinal deformities. He has been invited as visiting professor and speaker on multiple occasions to international meetings. He has published 11 book chapters and 195 publications in top scientific and spine journals, including Lancet, American Journal of Human Genetics, Arthritis and Rheumatism, Biomaterials, Journal of Bone and Joint Surgery and Spine.

Professor Cheung holds 15 patents and has 15 personal and 26 team awards for research excellence. Notable in 2008, he received the Henry Farfan Award from the North American Spine Society for his outstanding contributions in spine related basic science research; in 2010, he received the prestigious ISSLS prize from the International Society for the Study of the Lumbar Spine; and in 2012 received a prestigious endowed professorship in Spine Surgery from the University of Hong Kong. He has secured multiple research grants from local, regional and international granting bodies totaling over US$5 million.

Professor Cheung is the Editor-in-Chief for Journal of Orthopaedic Surgery and also sits on the Board of Directors of the Scoliosis Research Society, as well as being the Chair of their Research Council. He is the past Chairman of the AOSpine Research Commission, coordinating research on a global level for AOSpine, and is the Organizing Chairman of the World Forum for Spine Research in Kyoto (2008), Montreal (2010), Helsinki (2012), and Xian (2014).

THE TATOR-HALL VISITING PROFESSOR LECTURE

Dr. Charles Tator is a Professor in the Department of Surgery, at the University of Toronto, and a neurosurgeon at the Toronto Western Hospital. He is the former Chair of Neurosurgery at the University of Toronto. He started the first Acute Spinal Cord Injury Unit in Canada in 1974, and has reported on the epidemiology, prevention and treatment of spinal cord injury. He has undertaken seminal translational and clinical research in spinal cord injury. In 1992, he founded ThinkFirst, Canada, a national brain and spinal cord injury foundation whose mission is to reduce the incidence of catastrophic injuries in Canada. In 2008, the University of Toronto Press published his book "Catastrophic Injuries in Sports and Recreation, Causes and Prevention-a Canadian Study." He has held two research chairs at the University of Toronto, the Dan Family Chair in Neurosurgery and the Campeau Family-Charles Tator Chair in Brain and Spinal Cord Research. In 2000, he received the Order of Canada, and in 2009 he was inducted into the Canadian Medical Hall of Fame.

Dr. Hamilton Hall is a Professor in the Department of Surgery at the University of Toronto and a staff consultant at the Sunnybrook Health Sciences Center. In 1974 Dr. Hall founded the Canadian Back Institute (CBI Health Group), now the largest rehabilitation company in Canada. Dr. Hall continues to serve as its Medical Director. In addition to over 100 published articles and book chapters, Dr. Hamilton Hall is the author of the best-selling Back Doctor series, most recently A Consultation with the Back Doctor. He lectures internationally on the management of Pain Disorder. Locally, his medical student course in the evaluation of the low back has been a favorite of trainees over the years; he has a reputation as an engaging speaker and a superb teacher. He is co-founder and currently Executive Director of the Canadian Spine Society and has been instrumental in bringing together the diverse disciplines in spinal care and in advocating for the specialty.

TRAINEE PRESENTATIONS

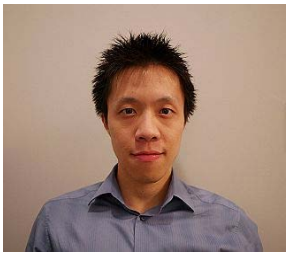
My name is **Ilyas Aleem** and I am presently a PGY-5 resident in Orthopaedic Surgery in Toronto. I completed my undergraduate degree in Neuroscience at the University of Toronto and medical degree at McMaster University. During my residency I had the opportunity to work with several mentors in spine surgery, and hope to continue my training in this area. Outside of medicine I enjoy spending time with my wife Saleema, 2-year old son Bilal and newborn baby Amina.

Dr Jefferson Wilson is a PGY 5 Neurosurgery Resident in the University of Toronto training program. During residency he completed a PhD through the Surgeon Scientist Program at the Institute of Medical Sciences focused on the clinical epidemiology of acute Spinal Cord Injury. His research, funded largely by the Christopher and Dana Reeve Foundation, has focused on the development of statistical models to help predict outcomes after SCI . Jeff plans to undertake a fellowship in complex spine surgery at Thomas Jefferson University in Philadelphia at the completion of residency.

Danielle Weber-Adrian is a graduate student in the Laboratory Medicine & Pathobiology department at the University of Toronto. Her thesis focuses on non-invasive gene delivery to the central nervous system using MRI-guided focused ultrasound. She completed her undergraduate degree in biochemistry at the University of Waterloo in 2011.

Aria Nouri received his undergraduate degree from Western University where he studied both finance and medical science. He then went on to complete his medical degree at the Medical University of Lodz in Poland and spent some of his time training at Epsom University Hospital in England. During his medical training, Aria actively engaged in research and authored peer-reviewed articles in the areas of fetal-maternal medicine, cardiology, orthopedic surgery, and neurosurgery. He is also a former medical writer for the American Association for the Advancement of Science (AAAS), the largest non-profit science advocacy organization and publisher of Science. Aria is currently enrolled at the Institute of Medical Science where he is studying the role of MRI in predicting surgical outcome in patients with degenerative cervical myelopathy under the mentorship of Michael Fehlings.

Kajana Satkunendrarajah is a Post Doctoral fellow in Dr. Michael Fehlings' laboratory at the Toronto Western Research Institute continuing her research interests in neuronal networks. Kajana's PhD work consisted of examining the cellular mechanisms mediating the theophylline-induced respiratory plasticity following spinal cord injury under the supervision of Dr. Harry Goshgarian. Current research interests are directed towards studying: 1) the mechanisms by which traumatic and non-traumatic spinal cord injury affects spinal neuronal circuitry and their connectivity to spinal and supraspinal networks 2) investigating therapeutic strategies that could potentially augment endogenous anatomical and functional modifications that lead to significant improvements in somatic and respiratory motor function after spinal cord injury. Kajana enjoys both the challenges and rewards of neuroscience research and would like to pursue her research in the field of spinal cord injury in the hopes of one day discovering effective therapeutic strategies for the treatment of spinal cord injury.

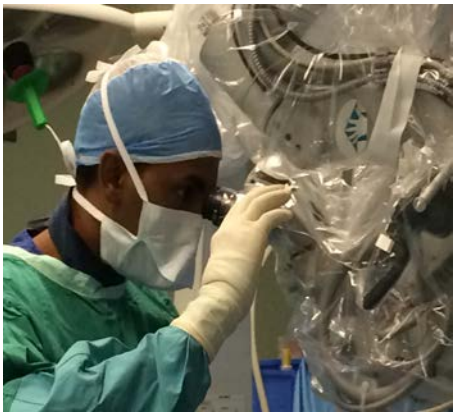


Chia-Lin (Eric) Tseng obtained his M.D.,C.M. at McGill University, and is a 4th-year resident in the Department of Radiation Oncology at University of Toronto, training primarily at Princess Margaret Cancer Centre and Sunnybrook's Odette Cancer Centre. He is currently involved in spine stereotactic body radiotherapy (SBRT) and breast cancer research.

Lindsay Tetreault is a doctoral candidate at the Institute of Medical Sciences at the University of Toronto. She currently works in Dr. Fehlings' clinical research lab at the Toronto Western Hospital. Her primary research is looking at important imaging and clinical predictors of surgical outcome in patients with cervical spondylotic myelopathy.

Gray Moonen completed his undergraduate studies in 2011 at the University of Toronto's St. George campus with a specialist degree in Psychology & Biology. He is currently a second year Masters student at the Institute of Medical Science, University of Toronto under the tutelage of Dr. Charles Tator. His research project is on the development and characterization of a lumbar spinal cord injury model in the rat. Other interests include heading Brain Day Toronto, an educational outreach program teaching middle school children about the brain and injury prevention, playing music and intramural sports.

Laureen Hachem is entering her second year in the Doctor of Medicine Program at the University of Toronto. She joined Dr. Charles Tator's lab in 2009 and continued throughout her undergraduate studies in the Neuroscience Specialist Program at UofT. Laureen has been involved in a number of projects in the lab investigating stem cell based therapies for spinal cord injury. She is currently developing an in vitro model of oxidative stress in adult spinal-cord derived neural stem cells to examine cell survival factors. Laureen is continuing her work in the lab as a 2014 AANS Medical Student Summer Research Fellow.



Ahmed Ibrahim trained in neurosurgery in London UK and is currently pursuing a spinal fellowship at the University of Toronto under Dr Fehlings. Ahmed also completed basic research on spinal cord injury and neuronal regeneration in Professor Raismans laboratory in London where he gained a PhD. Ahmed was recently awarded the 2013/14 Crockard international fellowship from the CNS/AANS Spine section.

Poster Presentations:

Poster: Impact of cervical spine alignment on severity of cervical spondylotic myelopathy
Presenter: Chandan B. Mohanty

Poster: Characterizing signal properties of the channeling portion of pedicle screw insertion
Presenter: Daniel Vena

Poster: A Non-Surgical Model of Cervical Spinal Cord Injury Induced with Focused Ultrasound and Microbubbles
Presenter: Wendy Oakden

Poster: Metabolic syndrome is not independently associated with increased complication rates following instrumented lumbar fusion for spine osteoarthritis
Presenter: Rushil Chaudhary

Poster: Impact of prophylactic dexamethasone on pain flare following spine stereotactic body radiotherapy (SBRT)
Presenter: Luluel Khan

Poster: Neural precursor cell-mediated recovery of forelimb function in a translational rat model of cervical spinal cord injury
Presenter: **Jared Wilcox**

Poster: Spinal Chordoma and Chondrosarcoma: A study of Outcome Measures, Utility and Health Status
Presenter: Safraz Mohamed

Poster: Bilateral Contusion-Compression Model of Incomplete Traumatic Cervical Spinal Cord Injury
Presenter: Nicole Forgione

Poster: Does new digital imaging technology with 3D reconstruction enhance the reliability of spinal measurements?
Presenter: Elaine Robinson

Poster: Clinical and Surgical Predictors of Perioperative Complication Development in Patients with Cervical Spondylotic Myelopathy: Results from a Survey of AOSpine International
Presenter: Lindsay Tetreault

Poster: Evaluation of the role of the adaptive immune system during the chronic phase of experimental cervical spinal cord injury.
Presenter: Antigona Ulndreaj

Poster: Disease Severity Fully Mediates the Effect of Pain Catastrophizing and Low Back Pain on Pain Impact in Hip and Knee Osteoarthritis
Presenter: Lisa C. Carlesso

Poster: Canadian Spine Surgery Fellowship Education: Evaluating Opportunity in Developing a Nationally Based Training Curriculum
Presenter: Jeremie Larouche

Poster: Dosimetric impact of combined rotational and translational setup errors on spinal cord dose in patients treated with spine stereotactic body radiotherapy (SBRT) for spinal metastasis
Presenter: Alireza Fotouhi Ghiam

Poster: Development and evaluation of an open-source 3D virtual simulator as a teaching tool for competency-based surgical training in the area of pedicle screw insertion
Presenter: Stewart McLachlin

Poster: Factors Influencing Vertebral Compression Fracture Specific to Renal Cell Carcinoma Spinal Metastases after Stereotactic Body Radiotherapy: A Mulit-institutional Study
Presenter: Isabelle Thibault

Poster: Salvage Spine Stereotactic Body Radiotherapy (SBRT) for Spinal Metastases That Failed Initial SBRT: A First Report
Presenter: Isabelle Thibault

Poster: Preclinical Evaluation of a Novel Coil-shaped Radiofrequency Probe in the Spine
Presenter: Padina Pezeshki

UNIVERSITY OF TORONTO SPINE FACULTY

Dr. Henry Ahn: St. Michael's Hospital

Dr. Margarete Akens : Sunnybrook Research Institute

Dr. Benjamin Alman: The Hospital for Sick Children

Dr. Carlo Ammendolia: Mt. Sinai Hospital

Dr. Leo da Costa: Sunnybrook Health Sciences Centre

Dr. James Drake: Hospital for Sick Children

Dr. Mark Erwin: Toronto Western Hospital

Dr. Mahmood Fazl: Sunnybrook Health Sciences Centre

Dr. Michael G. Fehlings: Toronto Western Hospital

Dr. Joel Finkelstein: Sunnybrook Health Sciences Centre

Dr. Michael Ford: Sunnybrook Health Sciences Centre

Dr. Howard Ginsberg: St. Michael's Hospital

Dr. Hamilton Hall: Sunnybrook Health Sciences Centre

Dr. G. Hawryluk: Neurosurgery Resident

Dr. Rita Kandel: Mt. Sinai Hospital

Dr. Stephen Lewis: Toronto Western Hospital

Dr. Todd Mainprize: Sunnybrook Health Science Centre

Dr. Barry Malcolm: Sunnybrook Health Sciences Centre

Dr. Eric Massicotte: Toronto Western Hospital

Dr. Cindi Morshead: Donnelly Centre for Cellular and Biomolecular Research

Dr. Farhad Pirouzmand: Sunnybrook Health Sciences Centre

Dr. Raj Rampersaud: Toronto Western Hospital

Dr. Arjun Sahgal: Sunnybrook Health Sciences Centre

Dr. Michael Schwartz: Sunnybrook Health Sciences Centre

Dr. Mohammed Shamji: Toronto Western Hospital

Dr. Molly Shoichet: Terrance Donnelly Centre for Cellular & Biomolecular Research

Dr. Charles Tator: Toronto Western Hospital

Dr. Alexander Velumian: Toronto Western Hospital

Dr. James G. Wright: The Hospital for Sick Children

Dr. Cari Whyne: Sunnybrook Health Sciences Centre

Dr. Albert Yee: Sunnybrook Health Sciences Centre

Dr. Karl Zabjek: Toronto Rehabilitation Institute

Dr. Reinhard Zeller: The Hospital for Sick Children

The U of T Spine Program gratefully acknowledges the support of:

U of T Dept. of Surgery

U of T Division of Orthopaedic Surgery

U of T Division of Neurosurgery

DePuy Synthes

for the 2014 SpineFEST™ Visiting Professorship in Spinal Surgery

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