

SPINEFEST 2019

11th Annual
Spine Academic Day



Surgery
UNIVERSITY OF TORONTO

Spine Program

Welcome to SpineFEST 2019

Monday June 10, 2019

Peter Gilgan Centre

For Research and Learning

CRL Auditorium (2-9330)

686 Bay Street

OBJECTIVES:

- Learn about minimal invasive surgery for spinal Deformity as an advanced technique to minimize tissue damage, pain complications and recovery time.
- Learn about Osteotomy choices as a surgical treatment for pediatric and adult spinal deformities.
- Learn about new advances in biomaterial, bioengineering technology as relevant to spine care.
- Acquire knowledge of patient outcomes of Spine care utilizing predictive model analysis as well as universal classification tools for Spinal Cord Injury.
- Learn about new educational strategies in the acquisition of cognitive and procedural spine care competencies.

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ACCREDITATION

Royal College of Physicians and Surgeons of Canada – Section 1:

This event is an Accredited Group Learning Activity (Section 1) as defined by the Maintenance of Certification Program of the Royal College of Physicians and Surgeons of Canada, approved by Continuing Professional Development, Faculty of Medicine, University of Toronto up to a maximum of (6 hours)

Spine Program Faculty

UHN-Toronto Western Hospital

W Mark Erwin PhD DC
Michael G. Fehlings MD PhD FRCSC FACS
Stephen Lewis MD MSc FRCSC
Eric Massicotte MD MSc FRCSC
Y Raja Rampersaud MD FRCSC
Alexander Velumian PhD

UHN-Toronto Rehabilitation Institute

Karl Zabjek BSc MSc PhD

UHN-Techna

Margarete Akens Dr med vet PhD

Sunnybrook Health Sciences Centre

Leo da Costa MD
Mahmood Fazl MD FRCSC
Joel Finkelstein MD MSc FRCSC
Michael H. Ford MD FRCSC
Jeremie Larouche MD FRCSC
Barry W. Malcolm MD FRCSC MBA
Meaghan O'Reilly PhD
Farhad Pirouzmand MD MSc FRCSC
Arjun Sahgal BSc MD FRCPC
Victor Yang MD PhD PEng FRCSC
Cari Whyne PhD
Albert Yee MD MSc FRCSC

Hospital for Sick Children

David Lebel MD PhD FRCSC
James Drake BSE MB BCh MSc FRCSC
Reinhard Zeller MD FRCSC

St. Michael's Hospital

Jefferson Wilson MD, PhD FRCSC
Henry Ahn MD PhD
Howard Ginsberg MD PhD FRCSC

Mount Sinai Hospital

Carlo Ammendolia DC PhD CCRF
Rita Kandel MD FRCPC

University of Toronto

Cindi M Morshead BSc PhD
Molly S Shoichet PhD FRSC

THE U of T Spine Program

is a combined neurosurgery and orthopaedic surgery program integrated across citywide clinical and research programs at the affiliated teaching hospitals; University Health Network (UHN), Sunnybrook Health Sciences Centre (SHSC), Hospital for Sick Children (HSC), St. Michael's Hospital (SMH), and Mount Sinai Hospital (MSH)

Remarks from the Co-Directors

COLLEAGUES,

This year the University Of Toronto Department Of Surgery Spine Program celebrates its 11th Annual Spine Academic Day "SpineFEST". It has been a productive academic year as our program continues to foster important city-wide collaborations within the University as well as participate and lead on several key regional and international initiatives.

SpineFEST is our city-wide annual academic spine event held in June of each year to celebrate the from both the clinical as well as scientific perspective. Because of your very strong support over the last decade, our program has grown a respected academic footprint locally, nationally, and globally. Collaboration, inter-professional, inter-departmental, and inter-disciplinary knowledge exchange remains the key recipe to our success.

Recent activities have leveraged our education platform that has included the creation of a national spine surgery fellowship training curriculum for cognitive and procedural competencies. Building on this, our program established enhanced Neurosurgery and Orthopaedic Surgery training opportunities between Toronto Academic Health Sciences Network (TAHSN) spine hospitals (Toronto Western Hospital (TWH-UHN); Sunnybrook Health Sciences Centre (SHSC); Saint Michael's Hospital (SMH) and Hospital for Sick Children (HSC)). We have built top tier academic hub attracting and training between 12-15 national and international fellow surgeons each year.

At the beginning of each academic year, we launch our university academic calendar of events. Dr. Stephen Lewis (TWH-UHN & HSC) chairs an introductory city-wide fellow surgical skills course, introducing advanced anatomy of spine with fellows performing anterior and posterior surgical approaches as well as spinal instrumentation. This year on April 9th, Dr. Lewis extended this course to include advanced complex procedures (e.g. deformity osteotomy, minimally invasive surgery (MIS), and trauma techniques).

Over the past two years, our program has piloted and continues to offer a two-year fellowship program with a first general spine training year followed by a second year with more focused and advanced subspecialty city-wide experience. Many thanks to Drs. Stephen Lewis, Eric Massicotte, Joel Finkelstein, Howard Ginsberg, Henry Ahn, and Reinhard Zeller for their valued help in shaping our city-wide fellowship training opportunities. Building on our national fellowship curriculum, in 2015 our program also continues with the surgical case-log for our citywide spine fellows. We thank Dr. Jeremie Larouche, Dr. Tony Bateman, and Ms. Nadia Jaber for designing a successful case-log program for our fellows. On March 2nd this year, our Program organized an excellent national spine surgical skills course at the Canadian Spine Society Annual meeting which was held in Toronto. The course utilized navigations system and focused on discussions of advanced cases in trauma, cervical myelopathy, deformity and metastatic tumor. We thank Drs. Massicotte, Jeff Wilson, and Larouche for their leadership in this course that was well received by trainee and staff surgeons in attendance.

For several years now, we have also complemented the resident's surgical training with our Royal

PREVIOUS SPINEFEST KEYNOTE SPEAKERS

- 2018 PROFESSOR SANFORD EMERY, WEST VIRGINIA UNIVERSITY
- 2017 PROFESSOR ZOHER GHOGAWALA, TUFTS UNIVERSITY SCHOOL OF MEDICINE
- 2016 PROFESSOR DANIEL RIEW, COLUMBIA UNIVERSITY MEDICAL CENTER
- 2015 PROFESSOR WILCO PEUL, LEIDEN UNIVERSITY MEDICAL CENTRE
- 2014 PROFESSOR KENNETH CHEUNG, UNIVERSITY OF HONG KONG
- 2013 PROFESSOR ALEXANDER RICHARD VACCARO, THOMAS JEFFERSON UNIVERSITY
- 2012 PROFESSOR JEAN DUBOUSSET, THE UNIVERSITY OF PARIS
- 2011 PROFESSOR JENS CHAPMAN, UNIVERSITY OF WASHINGTON
- 2010 PROFESSOR EDWARD BENZEL, CLEVELAND CLINIC
- 2009 PROFESSOR JEFFREY WANG, UNIVERSITY OF CALIFORNIA

College Mock Oral on Spine course, co-moderated by Drs. Fehlings and Yee. Our city-wide spine fellows took a key leadership role in teaching the residents and organizing a selection of representative case scenarios in examination format. The fellows also provided valuable tips and updated literature reviews. Our program continues to facilitate live platforms to disseminate knowledge and exchange advances in spinal surgery and research. We host City-wide Fellow Journal Club several times a year to discuss recent and controversial spine articles and a collection of relevant cases. We also combined research updates with periodic journal clubs. In our last Journal club – Research Update meeting on March 18th, our clinical fellows discussed current literature on trauma. We thank our citywide fellows Drs. Chris Small and Frank Lyons from SHSC, Drs. Michel Schneider and Frank Jiang from TWH, and Dr. Alexander Romanaga from SMH for taking the lead in interesting case presentations which stimulated productive discussions. We also extend our thanks to Drs. Karl Zabjek and Carlo Ammendolia for organizing the research update meeting in which we discussed multiple clinical and observational studies being conducted in the city. Given the increasing number of clinical trials in spine, the group discussed important issues regarding advancing team communications regarding patient eligibility and trial enrollment. We thank Drs. Jeff Wilson, Sukhvinder Kalsi-Ryan, Carlo Ammendolia and other city-wide trialists for their valued input and leadership promoting city-wide research. The international, multi-center RISCIS (Riluzole in Spinal Cord Injury Study) randomized controlled trial in patients with acute cervical spinal cord injury has now achieved an enrolment of 169 patients and remains a flagship trial led by Dr. Fehlings and the UofT Spine Program. Congratulations also to Dr. Jeff Wilson for his successful 7 year CIHR grant to examine the natural history of mild degenerative cervical myelopathy (DCM). It remains a desired opportunity to enhance awareness of promising research trials to both physicians as well as patients and their families.

Our Program continues to invite three to four world-renowned visiting professors each year to

our hospital-based visiting professorship series in order to provide lectures on their area of interest in spine care and research. This year on February 11th, jointly with Dr. Carlo Ammendolia at MSH, we were very pleased to host Dr. Greg Kawchuck, Professor of Rehabilitation Medicine at the University of Alberta to share new insights into mechanisms underlying spinal manipulation therapy.

PREVIOUS VISITING PROFESSORS

2019	FEB	PROFESSOR GREG KAWCHUK, UNIVERSITY OF ALBERTA
2018	MAY	PROFESSOR ASHWINI SHARAN, THOMAS JEFFERSON UNIVERSITY
	FEB	PROFESSOR MARCEL DVORAK, UNIVERSITY OF BRITISH COLUMBIA
2017	SEP	PROFESSOR ZIYA GOKASLAN, THE WARREN ALPERT MEDICAL SCHOOL OF BROWN UNIVERSITY
		PROFESSOR PETER VARGA, NATIONAL CENTER FOR SPINAL DISORDERS
		PROFESSOR LAURENCE RHINES, TEXAS MD ANDERSON CENTRE
		PROFESSOR CHARLES FISHER, UNIVERSITY OF BRITISH COLUMBIA
		PROFESSOR STEFANO BORIANI, IRCCS ISTITUTO ORTOPEDICO GALEAZZI
2016	MAY	PROFESSOR MARK BILSKY, WEILL MEDICAL COLLEGE OF CORNELL UNIV.
	APR	PROFESSOR JOHN KOSTUIK, CO-FOUNDER OF THE K2M
2015	FEB	PROFESSOR STEFAN PARENT, UNIVERSITY OF MONTREAL
	OCT	PROFESSOR YU LIANG, SCHOOL OF MEDICINE JIAOTONG UNIV.- SHANGHAI
	FEB	PROFESSOR FACKSON MWALE, MCGILL UNIVERSITY
2014	NOV	PROFESSOR ROBERT DUNN, UNIVERSITY OF CAPE TOWN
	APR	PROFESSOR DAVID CHOI, UCL INSTITUTE OF NEUROLOGY
2013	OCT	PROFESSOR ALWIN CRAWFORD, UNIV. OF CINCINNATI MEDICAL CENTER
	APR	PROFESSOR ALEX RABCHEVSKY, KENTUCKY CHANDLER MEDICAL CENTRE
2012	NOV	PROFESSOR CHARLES FISHER, UNIVERSITY OF BRITISH COLUMBIA
	MAY	PROFESSOR MAURO ALINI, MSK REGENERATION- AO FOUNDATION
2011	NOV	PROFESSOR THOMAS R OXLAND, UNIVERSITY OF BRITISH COLUMBIA
2010	OCT	PROFESSOR CHARLES E. JOHNSTON, UNIV. OF TEXAS SOUTHWESTERN MEDICAL CENTER
2009	OCT	PROFESSOR SATOSHI TANI, JAPAN JIKEI UNIVERSITY

Remarks

Cont'd

Dr. Kawchuck also provided a memorable talk in the evening UofT- GTA Spine Rounds, chaired by Dr. Joel Finkelstein (SHSC), highlighting his initiatives towards mentorship of the future generation of scientists. On May 30th, our Program's interdisciplinary collaboration continues as we, jointly with the Division of Orthopaedics at SHSC and TRI Lyndhurst Centre, hosted Dr. Allan Levi, from the University of Miami Miller School to feature Novel Treatment Strategies for Spinal Cord and Peripheral Nerve Injury. Special thanks to Drs. Sukhvinder Kalsi-Ryan and Albert Yee for organizing this visiting professorship. Last Fall on October 19th our Program, jointly with the Krembil Neuroscience Centre and the Collaborative Program in Neuroscience, hosted Dr. Mark Tuszynski (Professor of Neuroscience at University of California, San Diego) as the keynote speaker for our Tator-Turnbull SCI Symposium. Dr. Tuszynski highlighted opportunities using Neural Stem Cells for Spinal Cord Injury. Special thanks to Dr. Fehlings for organizing a successful symposium.

In innovations and best practice efforts, our program has contributed towards numerous initiatives. We are proud to have the AOSpine Clinical Practice Guidelines for the Management of Patients with Acute Spinal Cord Injury and Guidelines for the Management of Patients with Degenerative Cervical Myelopathy (an effort led by Dr. Michael Fehlings) approved and published in the Global Spine Journal (https://journals.sagepub.com/toc/gsj/7/3_suppl). The guidelines now implemented into clinical practice. Also, Dr. Raj Rampersaud (TWH-UHN) and colleagues continue to lead important efforts toward enhancing triage and care of many of our 'elective' patients with degenerative conditions of the spine. Arising from the success of Inter-professional Spine Assessment and Education Clinic (ISAEC) pilot, the Ministry of Health and Long Term Care (MOH-LTC) the provincial expansion of the

Low Back Pain (LBP) framework is progressing well and garnering interest by inter-professional health professionals. Leveraging the expertise of Advanced Practice Providers (APPs) link with primary care, Practice Leads (PL) are facilitating the triage of potential surgical patients through to our city-wide adult spinal centres. Moreover, Dr. Michael Fehlings has also led efforts at the provincial level aimed towards enhancing access to patients with urgent and emergent spinal conditions. In "Time is Spine" Dr. Fehlings and his team, supported by analyses from the Institute for Clinical Evaluative Sciences (ICES) database, are advocating for timely surgical intervention within the first 24 hours after injury as critical for minimizing complications and maximizing recovery for patients with SCI. Dr. Larouche, with U of T Surgeon Scientist Trainee (Dr. Matt Guttman) and senior author Dr. Avery Nathens have recently completed a study utilizing the TQIP (American College of Surgeon) database that further validates the opportunity for timely surgical fixation in spine trauma injured patients. Sunnybrook recently established a Division of Spine Surgery to enhance coordination of urgent spine care. Drs. Joel Finkelstein and Farhad Pirouzmand will co-lead activities as Division Head/service and Quality Leads respectively. Congratulations to Dr. Stephen Lewis for his appointment as the new chair of the AOSpine Knowledge Forum (KF) in Spinal Deformity. This KF is conducting a leading edge research in spine deformity management.

Towards the same goal, the Program is currently emerging as a translational research hub to foster collaborative efforts in multi-centre clinical trials and to improve data sharing between the respective research institutes. There is a number of clinical trials in progress or recently completed across our city-wide clinical research units (RISCIS, Riluzole in



Spinal Cord Injury Study; INSPIRE, the neuro-spinal scaffold in treatment of AIS A thoracic acute spinal cord injury; EPOSO, surgery versus radiotherapy in metastatic disease of the spine; VERTEX, VX-210 in acute traumatic cervical spinal cord injury; and the successfully completed Lumbar Spinal Stenosis Study). In this respect, we are currently looking into implementing recommendations arising from our December 2017 strategic planning summit in support of creating a the U of T Spine Clinical Unit that will further synergetic efforts to induce better outcomes for better spine care.

Our Program continues in engaging and highlighting our local communities in multiple national and international society meetings held in Toronto. This year, on February 27 thru March 2nd, we were delighted to local host the national spinal community at the Canadian Spine Society 19th Annual Scientific Conference. Our CSS surgical skills course received excellent feedback. We thank our faculty Drs. Massicotte, Wilson, and Larouche as well as our national faculty Dr. Scott Paquette for making this educational activity a possibility. We also acknowledge our industry partners who were instrumental in supporting this course and making available surgical and navigation equipment for the benefit of the attendees. We congratulate Dr. Albert Yee on becoming the CSS president for 2019-2021 and we look forward to further synergetic initiatives at the national level. We were very excited about hosting The Global Spine Congress in Toronto this year on May 15th -18th. The congress is considered the world largest spinal scientific platform. We thank Dr. Michael Fehlings, the local host, for bringing in to the University and the City an important society and fostering collaboration with AO Spine knowledge forums and key opinion leaders. At the GSC we enjoyed hosting a reunion dinner event for a large number of our Fellow Alumni who attended the congress and enjoyed being re-acquainted, making new contacts as well as collaborative networks. Dr. Fehlings is also hosting and leading a Toronto AOSpine Course "AOPEER" this Fall to help guide research staff and trainees towards

conducting successful clinical studies. We invite you to participate in this course being held at the UHN BMO Conference and Education Centre on November 9th -10th.

Enjoy SpineFEST 2019! We had an excellent program last year with an enlightening keynote address from our visiting professor Dr. Sanford Emery (Professor and Chair of the Department of Orthopaedics and Director of Surgical Services at West Virginia University). Dr. Emery shared valued perspectives on Leadership Training for the Future Generation of Spine Surgeons. This year we are delighted to welcome our keynote speaker Dr. Praveen Mummaneni (Professor of Neurosurgery at the University of California- San Francisco) as our keynote Tator-Hall Lecturer. Dr. Mummaneni is the Director of the Cervical Spine Program and Minimally Invasive Spine Program, and Vice-Chair of the UCSF Department of Neurosurgery. We very much look forward to his address on Advances in MIS Deformity Surgery. In addition, we also welcome our guest speaker and the Canadian Orthopaedic Association Travelling fellow Dr. Guillaume Lonjon from Paris Descartes University and Paris European Hospital George Pompidou who will be featuring his views on Enhanced Recovery After spinal Surgery (ERAS).

In closing, we would like to thank all our program faculty members and industry partners for their support over many years. We are privileged to benefit from the diverse and specialized expertise of our program membership. Special thanks to Ms. Nadia Jaber, our Program Coordinator, for her outstanding expertise and valued help in moving forward our collaborative agenda.

Sincerely,

Michael & Albert

SpineFEST 2019 Agenda

7:00 BREAKFAST & REGISTRATION

INTRODUCTION

7:30 OPENING REMARKS

MICHAEL FEHLINGS & ALBERT YEE
CO-DIRECTORS, UNIVERSITY OF TORONTO DEPARTMENT OF SURGERY SPINE PROGRAM

GREETINGS FROM THE UNIVERSITY OF TORONTO

ANDRES LOZANO
UNIVERSITY PROFESSOR AND DAN FAMILY CHAIRMAN OF NEUROSURGERY

PETER FERGUSON
ALBERT AND TEMMY LATNER CHAIR, DIVISION OF ORTHOPAEDIC SURGERY

RICHARD HEGELE
VICE DEAN, RESEARCH & INNOVATION FACULTY OF MEDICINE

THE TATOR-HALL VISITING PROFESSOR LECTURE (CHAIR: MICHAEL FEHLINGS)

7:45 WELCOME REMARKS

CHARLES TATOR (PROFESSOR OF NEUROSURGERY) & HAMILTON HALL (PROFESSOR OF ORTHOPAEDIC SURGERY)

8:00 INTRODUCTION OF VISITING PROFESSOR DR PRAVEEN MUMMANENI

MICHAEL FEHLINGS

8:10 KEYNOTE ADDRESS

ADVANCES IN MIS DEFORMITY SURGERY

PRAVEEN MUMMANENI, PROFESSOR OF NEUROSURGERY, UNIVERSITY OF CALIFORNIA - SAN FRANCISCO

8:55 DISCUSSIONS (20 MINUTES)

9:15-9:30 COFFEE BREAK

Agenda

Cont'd

SESSION I: ADVANCED TECHNIQUES, TRAINING, AND ENHANCED RECOVERY IN SPINE SURGERY (CHAIR: ALBERT YEE)

- 9:30 INTRODUCTION
- 9:35 EARLY ONSET SCOLIOSIS, IMPLEMENTATION OF NEW TECHNOLOGIES.
DAVID LABEL MD - NEW FACULTY (HSC)
- 9:50 FROM LEGO BLOCKS TO COMPLEX SPINE SURGERY: PEDAGOGICAL STRATEGIES FOR THE DEVELOPMENT OF OUR NEXT GENERATION OF SPINE SURGEONS.
JEREMIE LAROUCHE MD - NEW FACULTY (SHSC)
- 10:05 CHOOSING OSTEOTOMIES IN SPINAL DEFORMITY SURGERY
STEPHEN LEWIS MD (TWH & HSC)
- 10:20 ENHANCED RECOVERY AFTER SPINAL SURGERY
GUILLAUME LONJON MD (GUEST SPEAKER) PARIS DESCARTES, GEORGES-POMPIDOU EUROPEAN HOSPITAL- FRANCE
- 10:35 PANEL DISCUSSIONS (20 MINUTES)
- 10:55-12:15 E-POSTER PRESENTATIONS & JUDGING (CO-CHAIRS: CARLO AMMENDOLIA, KARL ZABJEK)
- 12:15-13:00 LUNCH AND E-POSTER VIEWING

SESSION II: ASSESSING OUTCOMES OF SPINE SURGERY (CHAIR: MICHAEL FEHLINGS)

- 13:00 INTRODUCTION
- 13:05 PATIENT-REPORTED OUTCOMES IN SPINE SURGERY: PAST, CURRENT, AND FUTURE DIRECTIONS
JOEL FINKELSTEIN MD (SHSC)
- 13:20 ASSESSMENT OF THE UPPER LIMB POST CERVICAL SPINE PATHOLOGY
SUKHVINDER KALSI-RYAN PhD (LYNDHURST CENTRE)
- 13:35 MACHINE LEARNING AND SPINE SURGERY: WHAT DOES THE FUTURE HOLD?
JEFFERSON WILSON MD (SMH)
- 13:50 PANEL DISCUSSIONS (20 MINUTES)
- 14:10-14:20 COFFEE BREAK

Agenda

Cont'd

SESSION III: RESEARCH TRAINEE PRESENTATION (CHAIR: JOEL FINKELSTEIN)

INVITED TRAINEES

- 14:20 REDEFINING AND RECLASSIFYING ACUTE TRAUMATIC CERVICAL INCOMPLETE SPINAL CORD INJURY: IMPLICATIONS FOR AN AGING POPULATION.
JETAN BADHIWALA PGY-4, NEUROSURGERY
- 14:30 PERIOPERATIVE ANEMIA IN MINIMALLY INVASIVE VERSUS OPEN POSTERIOR LUMBAR DECOMPRESSION AND FUSION FOR DEGENERATIVE SPINAL STENOSIS
TAN CHEN PGY-4, ORTHOPAEDIC SURGERY
- 14:40 PANEL DISCUSSIONS (15 MINUTES)

ABSTRACTS/ ORAL PRESENTATIONS

- 14:55 MACHINE LEARNING MODELS SHOW EXCELLENT PERFORMANCE IN PREDICTION OF FUNCTIONAL OUTCOMES AFTER TRAUMATIC SPINAL CORD INJURY
OMAR KHAN MSc, MD CANDIDATE (1ST PLACE BEST ABSTRACT)
- 15:05 FOCUSED ULTRASOUND + MICROBUBBLE MEDIATED BLOOD-SPINAL CORD BARRIER OPENING (BSCBO) USING SHORT BURST, PHASE KEYING EXPOSURES
STECIA-MARIE FLETCHER PhD CANDIDATE, DEPARTMENT OF MEDICAL BIOPHYSICS (2ND PLACE BEST ABSTRACT - TIE)
- 15:15 DIAGNOSTIC VALUE OF MULTIPARAMETRIC QUANTITATIVE MRI IN DEGENERATIVE CERVICAL MYELOPATHY: AN EXPLORATORY ANALYSIS USING TRADITIONAL STATISTICAL AND SUPERVISED MACHINE LEARNING METHODOLOGY
MUHAMMAD ALI AKBAR PGY-4, NEUROSURGERY (2ND PLACE BEST ABSTRACT - TIE)
- 15:25 PANEL DISCUSSIONS (15 MINUTES)
- 15:40 AWARD PRESENTATION (MICHAEL & ALBERT)
- 15:55 CLOSING REMARKS (MICHAEL & ALBERT)

Keynote Speaker

Tator-Hall Visiting Professor Lecture



Dr. Praveen Mummaneni is the Joan O'Reilly Endowed Professor in Spinal Surgery. He serves as the Director of the Cervical Spine Program, Director of the Minimally Invasive Spine Program, Director of the Minimally Invasive and Complex Spine Fellowship Program, Co-Director of the UCSF Spine Center, and Vice-Chair of the UCSF Department of Neurosurgery. Dr. Mummaneni specializes in complex cervical spine surgery for C1-2 pathologies and instability, cervicothoracic kyphosis, cervical myelopathy and in minimally invasive spine surgery for degenerative lumbar spondylolisthesis, thoracolumbar stenosis, adult spinal kyphosis and scoliosis, spinal tumors, and spinal trauma.

Dr. Mummaneni was board certified by the American Board of Neurological Surgery in 2005 and currently serves as an ABNS scholar (spine focused examiner) for the Oral Board Exam.

Since 2005 he has been selected as one of the Best Doctors in America every year. He has also been named a San Francisco Super Doctor by the San Francisco Chronicle, a Top Doctor by Marin Magazine, and a Top Doctor by Castle Connolly. He is internationally recognized for his work on cervical kyphosis and minimally invasive approaches to

Praveen Mummaneni MD

PROFESSOR OF NEUROSURGERY

DIRECTOR OF THE CERVICAL SPINE PROGRAM

DIRECTOR OF THE MINIMALLY INVASIVE SPINE PROGRAM

DIRECTOR OF MINIMALLY INVASIVE AND COMPLEX SPINE FELLOWSHIP PROGRAM.

CO-DIRECTOR OF THE UCSF SPINE CENTER

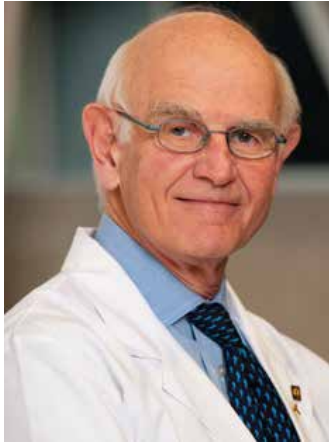
VICE-CHAIR OF THE UCSF DEPARTMENT OF NEUROSURGERY

spinal deformity surgery and spinal tumors. He has been invited as the honored guest lecturer at numerous international meetings on six continents. He was one of the first neurosurgeons elected to active membership in the Scoliosis Research Society and was also the first neurosurgeon to win the Scoliosis Research Society's Edgar Dawson Memorial Scholarship as well as the SRS Travelling Fellowship Award.

He is the editor of seven textbooks including: Spinal Deformity: A Guide to Surgical Planning and Management, Handbook of Minimally Invasive and Percutaneous Spine Surgery, Handbook of Spine Surgery, Cervical Spine Surgery: Current Trends and Challenges, Minimally Invasive Spinal Deformity Surgery: An Evolution of Modern Techniques, Spinal Deformity: A Case Based Approach to Managing and Avoiding Complications, and Handbook of Neurosurgery and Neurology and Spinal Medicine for Nurses and Advanced Practice Health Professionals.

Dr. Mummaneni served as the 2013 President of the San Francisco Neurological Society. He also served as a Director at Large for the Scoliosis Research Society from 2014-2016. In 2015-2016, he served as the Chair of the AANS-CNS Joint Section on Disorders of the Spine and Peripheral Nerves. In 2016-2017, he served as President of the California Association of Neurological Surgeons. Dr. Mummaneni completed his term as editor in chief of the Journal of Neurosurgery: Spine in 2017. He is now serving as the Treasurer of the Congress of Neurological Surgeons. He has published over 300 manuscripts in peer reviewed journals.

Charles Tator & Hamilton Hall



CHARLES H TATOR DC MD PhD FRCS FACS

PROFESSOR OF NEUROSURGERY
UNIVERSITY OF TORONTO
DIV OF NEUROSURGERY
TORONTO WESTERN HOSPITAL
FOUNDING DIRECTOR, PARACHUTE CANADA
DIRECTOR, CANADIAN CONCUSSION CENTRE

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 2012, ThinkFirst merged with three other charities to form Parachute Canada, the country's foremost injury prevention agency, of which he is a founding Director.

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. In 2017, he was promoted to Officer within the Order of Canada, and was also inducted into Canada's Sports Hall of Fame for his work on prevention of sports injuries.



HAMILTON HALL MD FRCS

PROFESSOR OF ORTHOPAEDIC SURGERY
UNIVERSITY OF TORONTO
ORTHOPAEDIC DIVISION, SUNNYBROOK
HEALTH SCIENCES CENTRE FOUNDER &
MEDICAL DIRECTOR, CANADIAN
BACK INSTITUTE HEALTH GROUP

DR HAMILTON HALL is a Professor in the Department of Surgery at the University of Toronto and on the orthopaedic staff at the Sunnybrook Health Sciences Centre. He completed his medical degree at the University of Toronto then joined CARE and was stationed at a rural hospital in Malaysia. Dr Hall returned to Toronto for his orthopaedic residency which concluded with a fellowship in medical education at the University of Dundee, Scotland.

In 1974, because of his interest in patient education and rehabilitation, Dr Hall founded the Canadian Back Institute which expanded into the CBI Health Group, now, with over 13,000 employees, the largest rehabilitation company in Canada. Dr Hall continues to serve as its Medical Director. He is co-founder and Executive Director of the Canadian Spine Society and has served on the editorial boards of Spine, The Spine Journal and The BackLetter.

Dr Hall has received Outstanding Paper and Poster awards from the North American Spine Society and the International Society for the Study of the Lumbar Spine. He is a recipient of the Best Undergraduate Clinical Lecturer Award at the University of Toronto, the NASS Henry Farfan Award for outstanding contributions to the field of spine care and a Lifetime Achievement Award from the Canadian Spine Society. Dr Hall's concept of a syndrome approach to classifying mechanical back pain is an essential component of several Canadian provincial initiatives to improve spine care. In addition to over 130 published articles and book chapters and over 1200 invited presentations, many as Visiting Professor, to universities in North America, Europe and Asia, he is author of the best-selling Back Doctor series of books for the lay public.

Spine Program Co-Directors



MICHAEL FEHLINGS MD PhD

PROFESSOR OF NEUROSURGERY

VICE CHAIR RESEARCH, DEPARTMENT OF SURGERY

GERRY AND TOOTSIE HALBERT CHAIR IN NEURAL REPAIR AND REGENERATION CO-DIRECTOR, SPINE PROGRAM

McLAUGHLIN SCHOLAR IN MOLECULAR MEDICINE

UNIVERSITY OF TORONTO

HEAD, SPINAL PROGRAM

SENIOR SCIENTIST, TORONTO WESTERN RESEARCH INSTITUTE SCIENTIST McEWEN CENTRE FOR REGENERATIVE MEDICINE

TORONTO WESTERN HOSPITAL, UNIVERSITY HEALTH NETWORK

DR. MICHAEL FEHLINGS is the Vice Chair Research for the Department of Surgery at the University of Toronto and Head of the Spinal Program at Toronto Western Hospital, University Health Network. Dr. Fehlings is a Professor of Neurosurgery at the University of Toronto, holds the Gerry and Tootsie Halbert Chair in Neural Repair and Regeneration, is a Scientist at the McEwen Centre for Regenerative Medicine and a McLaughlin Scholar in Molecular Medicine. In the fall of 2008, Dr. Fehlings was appointed the inaugural Director of the University of Toronto Neuroscience Program (which he held until June 2012) and Co-Director of the newly formed University of Toronto Spine Program.

Dr. Fehlings combines an active clinical practice in complex spinal surgery with a translationally oriented research program focused on discovering novel treatments for the injured brain and spinal cord. This is reflected by the publication of over 800 peer-reviewed articles (h-index 81) chiefly in the area of central nervous system injury and complex spinal surgery. Dr. Fehlings leads a multi-disciplinary team of researchers which is examining the application of stem cells, nanotechnology and tissue engineering for CNS repair and regeneration. He is also a principal investigator in the Christopher and Dana Reeve Foundation North American Clinical Trials Network, chair of the internationally renowned AOSpine North America network and leads several international clinical research trials.

Dr. Fehlings has received numerous prestigious awards including the Gold Medal in Surgery from the Royal College of Physicians and Surgeons (1996), nomination to the Who's Who list of the 1000 most influential scientists of the 21st century (2001), the

Lister Award in Surgical Research (2006), the Leon Wiltse Award from the North American Spine Society for excellence in leadership and/or clinical research in spine care (2009), the Olivecrona Award (2009) -- the top award internationally for neurosurgeons and neuroscientists awarded by the Nobel Institute at the Karolinska Institute in Stockholm for his important contributions in CNS injury repair and regeneration, the Reeve-Irvine Research Medal in Spinal Cord Injury (2012), the Golden Axon Leadership Award (2012), the Mac Keith Basic Science Lectureship Award for significant contributions to the basic science of cerebral palsy and childhood onset disabilities (2012), and was the Mayfield Lecturer (2012). In 2012, Dr. Fehlings served as the 40th President of the Cervical Spine Research Society (CSRS) -- the only Canadian to do so -- and was honoured with the CSRS Presidential Medallion for outstanding leadership and contributions to cervical spine research. In 2013, Dr. Fehlings was honoured with the Queen Elizabeth II Diamond Jubilee Medal presented to him by the Honourable Stephen Harper, the H. Richard Winn Prize from the Society of Neurological Surgeons, the Jonas Salk Award for Scientific Achievements from the March of Dimes Canada and the Henry Farfan Award from the North American Spine Society. In 2014, Dr. Fehlings was elected to the Fellowship of the Royal Society of Canada and to the Canadian Academy of Health Sciences, and in 2016 won the Royal College of Physicians and Surgeons Mentor of the Year Award.

Dr. Fehlings is active in many medical societies and journal editorial boards including Journal of Neurosurgery: Spine (Past-Chairman Editorial Board), Neurosurgery (Associate Editor) and Spine where he holds the position of Deputy Editor.

Spine Program Co-Directors



ALBERT YEE MD MSc

PROFESSOR OF ORTHOPAEDIC SURGERY
VICE-CHAIR RESEARCH, DIVISION OF ORTHOPAEDIC SURGERY
DEPARTMENT OF SURGERY
CO-DIRECTOR SPINE PROGRAM
UNIVERSITY OF TORONTO

HOLLAND BONE & JOINT CHIEF
MARVIN TILE CHAIR DIVISION OF ORTHOPAEDIC SURGERY
SUNNYBROOK HEALTH SCIENCES CENTRE

DR. ALBERT YEE is the Holland Bone and Joint Program Chief and the Head of the Division of Orthopaedic Surgery at Sunnybrook Health Sciences Centre, where he holds the Marvin Tile Chair in Orthopaedic Surgery. Dr. Yee is an Orthopaedic Spine Surgeon at Sunnybrook Health Sciences Centre, an Associate Scientist (Physical Sciences Platform) at Sunnybrook Research Institute and a Consultant in Surgical Oncology, Bone Metastasis Clinic, Odette Cancer Centre. He is a Full Professor at the University of Toronto in the Institute of Medical Sciences with a cross appointment in the Institute of Biomaterials and Biomedical Engineering. He is the Vice Chair of Research in the Division of Orthopaedic Surgery and Co-Director of the University of Toronto's Department of Surgery Spine Program. Dr. Yee is the Past President of the Canadian Orthopaedic Research Society, President of the Canadian Spine Society and Co-Chair of Bone & Joint Canada. He is the Canadian Lead for the Young Investigators Initiative (YII) of Bone & Joint Canada, and the US Bone & Joint Initiative, a grant mentorship and career development program.

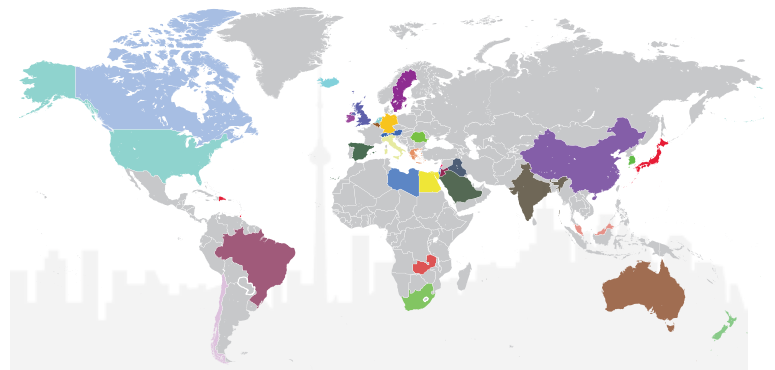
Dr. Yee has over 100 peer reviewed publications and has received academic honours including the American British Canadian (ABC) International Travelling Fellowship (American Orthopaedic Association / Canadian Orthopaedic Association, 2013), the Charles H. Tator Surgeon-Scientist Mentoring Award (2012), and the Canadian Orthopaedic Foundation J. Edouard Samson Award (2011).

Dr. Yee's laboratory focuses on translational orthopaedic research utilizing pre-clinical surgical models

to evaluate novel minimally invasive vertebral metastatic therapies (e.g. Photodynamic Therapy, Radiofrequency Ablation). His work has led to first in human clinical trials and FDA approval with commercialization of new minimally invasive spine technology. He has interest in understanding mechanisms of disease in cancer invasiveness to bone with an aim towards identifying potential new promising therapeutic targets.

GLOBAL IMPACT

U OF T SPINE PROGRAM TRAINING





DAVID LABEL MD PhD
STAFF PEDIATRIC ORTHOPEDIC SURGEON
HOSPITAL FOR SICK CHILDREN
ASSISTANT PROFESSOR, ORTHOPAEDIC SURGERY
U OF T SPINE PROGRAM
UNIVERSITY OF TORONTO

DR. DAVID LABEL is a pediatric orthopedic surgeon with a special interest in complex spine deformities, early onset scoliosis and growing spine.

Dr. Lebel was trained at the Hospital for Sick Children as a pediatric orthopedic and a pediatric spine surgeon from 2011-2012. He recently moved from Israel with his family to join the faculty at HSC. He has been involved in several clinical studies about spine biomechanics with the novel 3D EOS reconstruction, long term follow up of brace treated patients and long term follow up of muscular dystrophy patients treated with steroids.

In order to provide better treatment for patients with spine deformities, Dr. Lebel plans to conduct prospective studies about better post-operative pain management strategies and a translational research for better understating the etiology of scoliosis.



JEREMIE LAROUCHE MD MSc
STAFF ORTHOPEDIC SURGEON
SUNNYBROOK HEALTH SCIENCES CENTRE
ASSISTANT PROFESSOR, ORTHOPAEDIC SURGERY
U OF T SPINE PROGRAM
UNIVERSITY OF TORONTO

DR. JEREMIE LAROUCHE is an orthopedic trauma and spine surgeon at Sunnybrook Health Sciences Centre. Dr. Larouche first completed a fellowship in Orthopaedic Trauma at the University of British Columbia, before returning to Toronto to complete a Spine surgery fellowship at Sunnybrook Health Sciences Centre.

Dr. Larouche began his academic career at the University of California San Francisco, where he was hired as an Assistant Professor of Clinical Orthopaedics. There, he worked at the Zuckerberg San Francisco General Hospital & Trauma Center, where he specialized in providing care to poly-traumatized patients with complex orthopaedic and spine injuries.

Dr. Larouche is now working out of Sunnybrook Health Sciences Centre. He is recently completed a Master of Science degree in Quality Improvement and Patient Safety. His clinical interest focuses on orthopaedic trauma, spine trauma, and spinal oncology.



STEPHEN LEWIS MD MSc

STAFF ADULT AND PEDIATRIC ORTHOPAEDIC SURGEON,
TORONTO WESTERN HOSPITAL AND HOSPITAL FOR SICK CHILDREN
ASSOCIATE PROFESSOR, ORTHOPAEDIC SURGERY
U OF T SPINE PROGRAM
UNIVERSITY OF TORONTO

DR. STEPHEN LEWIS is an Orthopaedic adult and pediatric spinal surgeon with a focus in spinal deformity at the Toronto Western Hospital and Hospital for Sick Children in Toronto, Canada. An Associate Professor of Surgery at the University of Toronto. He completed his medical school training at McGill University in Montreal, Canada in 1990, and Orthopaedic residency at the University of Toronto in 1997. During his orthopaedic training, he completed his Masters of Science under the supervision of Dr. Robert Salter. Following a spine fellowship in Toronto at St. Michael's Hospital under Dr. Robert McBroom, he performed a second spinal fellowship at Washington University in St. Louis under Drs. Keith Bridwell, Larry Lenke, and Daniel Riew, gaining valuable experience in spinal deformity corrections.

Dr. Lewis is a core member of the steering committee of the AO Knowledge Forum deformity section, involved in education and research in this role. He is Associate Editor for Spine and Spinal Deformity journals and an active member of the Scoliosis Research Society and participates on committees and organization for the society. He served as the local host for the 2010 IMAST meeting in Toronto and committee chairman for the Awards Committee. He also chaired and participated as faculty in multiple national and international spinal educational events.

Dr. Lewis has several publications and presentations and won numerous teaching awards. He has helped train several Canadian and international spine fellows who have become leaders in their communities.



GUILLAUME LONJON MD PhD

FACULTY, ORTHOPAEDIC SURGERY, PARIS DESCARTES
ORTHOPAEDIC SPINE SURGEON
GEORGES-POMPIDOU EUROPEAN HOSPITAL
PARIS- FRANCE
(GUEST SPEAKER)

DR. GUILLAUME LONJON is visiting Toronto as he has been recently selected as the Canadian Orthopaedic Association Travelling fellow for 2019. Dr. Lonjon is currently an orthopaedic spine surgeon at the Georges-Pompidou European Hospital in Paris-France. He completed his MD in 2007 from The University of Montpellier school of Medicine in Paris. He completed his residency training in orthopaedic spine surgery under Professor Catonne at Hôpital Pitié, Paris. Dr. Lonjon holds multiple Masters' degree in anatomy, molecular biology and genetics, also a PhD degree in Public health.

Dr. Lonjon's special interest is Spine trauma, and has published several papers in the field in peer reviewed journals.



JOEL FINKELSTEIN MD MSc
STAFF ORTHOPEDIC SURGEON
SUNNYBROOK HEALTH SCIENCES CENTRE
ASSOCIATE PROFESSOR, ORTHOPAEDIC SURGERY
U OF T SPINE PROGRAM
UNIVERSITY OF TORONTO

Dr. Joel Finkelstein did his orthopaedic training at the University of Toronto. He is a fellowship trained spinal surgeon completed his spinal training at Sunnybrook Health Sciences Center in 1995 and the University of Washington in 1996. He has been on active staff practicing spinal surgery at Sunnybrook Health Sciences Center since 1997. He is an Associate Professor at the University of Toronto and has been appointed the inaugural Chief of the Division of Spinal Surgery at Sunnybrook Health Sciences Center in June 2019. He holds the Feldberg Chair in Spinal Research.

Dr. Finkelstein's surgical interests are spine trauma and metastatic disease. Dr. Finkelstein's research interest has included the role cognitive appraisal and response shift plays in the patient reported outcomes for health related quality of life.



SUKHVINDER KALSI-RYAN BScPT, MSc, PhD
AFFILIATE SCIENTIST, LYNDHURST CENTRE
REHABILITATION ENGINEERING LABORATORY
ASSISTANT PROFESSOR, DEPARTMENT OF PHYSICAL THERAPY
UNIVERSITY OF TORONTO

Dr. Sukhvinder Kalsi-Ryan is a Clinician Scientist in the field of upper limb assessment and recovery and spine pathology at Toronto Rehabilitation Institute, Lyndhurst Centre and is also Assistant Professor at the University of Toronto, Department of Physical Therapy. Her research is oriented to establishing methods to quantify neurological change after injury and studying neuro-restorative methods to enhance and optimize function for those with neurological impairment. She has recently transitioned into a new role at TRI where she is Program Lead of the Rocket Neuro-Restorative Upper Extremity Program. Her role is to build a strong research foundation that will propel the clinic, while enhancing access to care for patients with SCI, and implementing new innovations and technologies.

Dr. Kalsi-Ryan provides academic teaching within the Neurosurgical Resident training and Physical Therapy programs at the University of Toronto. She is the founder of her own company, which manufactures the GRASSP; she acts as a consultant for neurological trials worldwide. Her interests include: outcome measurement, upper limb recovery, traumatic and non traumatic SCI, quantification of neurological disorders.

Assessing Outcomes of Spine Surgery **Speakers**

Research Trainee **Speakers**



JEFFERSON WILSON MD PhD
STAFF NEUROSURGEON, ST MICHAEL'S HOSPITAL
ASSISTANT PROFESSOR, NEUROSURGERY
U OF T SPINE PROGRAM
UNIVERSITY OF TORONTO

DR. JEFF WILSON entered the neurosurgery program at University of Toronto after completing his MD at the University of Saskatchewan in 2007. During residency he earned a PhD through IMS and the Surgeon Scientist Program under the mentorship of Michael Fehlings and Abhaya Kulkarni with his research focused on the epidemiology and clinical epidemiology of traumatic spinal cord injury. Jeff's research has been funded by multiple grants from the Christopher and Dana Reeve Foundation, Cervical Spine Research Society and the Ontario Neurotrauma Foundation; further, he has been the recipient of numerous prestigious awards including: the K.G. McKenzie Prize from the Canadian Federation of Neurological Sciences, the Synthes Spinal Cord Injury Award from the American Association of Neurological Surgeon and the Shafie S. Fazel Outstanding Resident Surgeon and Investigator Award from the U of T Department of Surgery.

After obtaining his FRCSC in neurosurgery in 2015, Jeff undertook a combined neurosurgery orthopedic fellowship in complex spine surgery at Thomas Jefferson University in Philadelphia, PA under the mentorship of James Harrop and Alex Vaccaro. Jeff returns to Toronto as a Surgeon Scientist at St. Michael's Hospital with clinical focus on the full spectrum of spinal disorders. From a research perspective, he is primarily interested in topics related to the epidemiology and clinical epidemiology of spinal trauma and spinal cord injury. Currently he serves as the Deputy Editor of the journal Clinical Spine Surgery.



JETAN BADHIWALA MD
PHD CANDIDATE
PGY4, NEUROSURGERY
DEPARTMENT OF SURGERY
UNIVERSITY OF TORONTO

DR JETAN BADHIWALA received his MD from McMaster University in 2014 and thereafter entered the Neurosurgery Residency Training Program at the University of Toronto. He is an aspiring academic spinal neurosurgeon. Jetan is currently pursuing a PhD through the Surgeon Scientist Training Program under the mentorship of Dr. Michael G. Fehlings. He is conducting clinical epidemiology and outcomes research in spinal disorders and neurotrauma. Specifically, Jetan's PhD thesis centers on redefining and reclassifying acute traumatic cervical spinal cord injury, and takes a closer look at the contemporary outcomes of 'central cord syndrome' and the value of early surgical decompression in this context. Jetan has developed knowledge and expertise in a variety of study designs and analytic techniques, including clinical trials, cohort studies, systematic reviews, meta-analyses, advanced regression techniques, propensity score matching, survival analysis, prediction modelling, and machine learning. He has an interest in harnessing big data to address clinical knowledge gaps and the application of artificial intelligence to healthcare data for 'personalized' or 'precision' medicine.

Jetan has published over 75 peer-reviewed papers, 40 conference abstracts, and 10 book chapters to date. Many of these have been published in high impact general medical journals, such as The Lancet, JAMA, BMJ, The Lancet Neurology, and Annals of Internal Medicine, as well as subspecialty journals, such as Neurosurgery, Journal of Neurosurgery, Journal of Neurotrauma, The Spine Journal, and Spine.

Research Trainee **Speakers**

Jetan has also served as an independent peer reviewer for multiple journals, including Spine, Global Spine Journal, Operative Neurosurgery, Stroke, and BMJ. Jetan has been the recipient of a number of honors and awards, including the CIHR Fellowship, the AANS/CNS Spine Section Research Grant, First Place Resident/Fellow Paper (CSRS), and the Steward B. Dunsker Award (AANS/CNS).



Tan Chen MD
PGY4, ORTHOPAEDIC SURGERY
DEPARTMENT OF SURGERY
UNIVERSITY OF TORONTO

Dr Tan Chen is currently completing his final year of residency in Orthopaedic Surgery at the University of Toronto. Originally raised in Vancouver BC, Tan moved to New Hampshire to complete his undergraduate degree in neuroscience, before moving again to Michigan for medical school. As an avid competitive fencer, Tan developed his skills while abroad and eventually switched one blade for another when he began his surgical training in Toronto. He is very grateful for the support of his family, wife, friends, and mentors, and lucky to be part of the Toronto Orthopaedic Division.

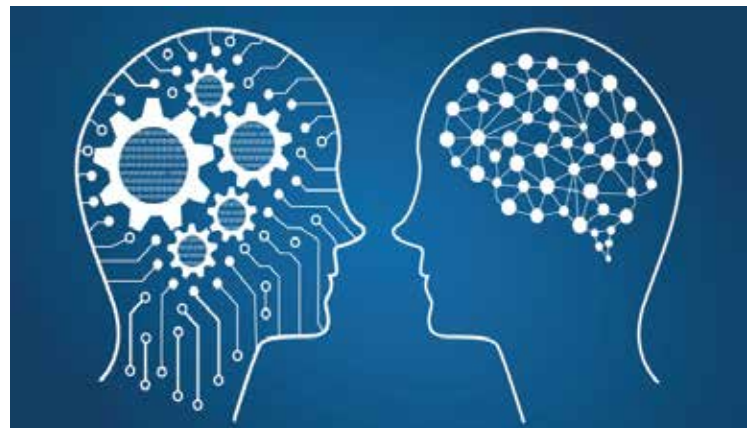
Next year, Tan will be staying in Toronto to complete his Spine Fellowship at Sunnybrook and St. Michael's Hospital. He hopes to practice as a spine surgeon specializing in minimally invasive techniques. Tan would like to thank U of T Spine for the opportunity to speak at this year's SpineFEST.



Omar Khan MSc
MD CANDIDATE
FACULTY OF MEDICINE
UNIVERSITY OF TORONTO

Omar Khan is a 2nd year medical student at the University of Toronto. He received a Bachelor of Science in Physics and Physiology at McGill University, followed by a Master of Applied Science in Chemical Engineering at the University of Waterloo. Since the 1st year of medical school, Omar has worked on Dr. Michael Fehlings' clinical research team as a CREMS Research Scholar. Throughout his project, he has worked on integrating novel software tools like machine learning to solving problems in the epidemiology of spine disease. He hopes to continue using his Engineering background to pursue more neurosurgical research in the future.

Outside of medicine, Omar runs a YouTube channel (Faculty of Khan) where he teaches university level Math and Physics to students around the world.





STACIA-MARIE FLETCHER
PHD CANDIDATE
DEPARTMENT OF MEDICAL BIOPHYSICS
UNIVERSITY OF TORONTO

STACIA-MARIE FLETCHER is a PhD candidate affiliated with the University of Toronto Department of Medical Biophysics and the Focused Ultrasound Laboratory at Sunnybrook Research Institute. In 2016, she received her undergraduate degree in Medical Physics with first class honours from University College London, U.K. Under the supervision of Dr. Meaghan O'Reilly, she develops methods for focused ultrasound-induced drug delivery to the spinal cord. To date, she has published work on ultrasound pulse sequence development for creating a controlled focal area within the spinal canal at clinical scale.

Stacia's current projects include demonstrating efficient blood-spinal cord barrier opening under MRI guidance and developing methods of acoustic signal analysis for treatment control.



MUHAMMAD ALI AKBAR MD
PHD CANDIDATE
PGY-4 NEUROSURGERY
DEPARTMENT OF SURGERY
UNIVERSITY OF TORONTO

DR. MUHAMMAD ALI AKBAR is a PGY-4 neurosurgery resident at University of Toronto and a 2nd year PhD student under the supervision of Dr. Michael Fehlings at the University Health Network. He completed a bachelor's degree in molecular biology and biotechnology in 2010 at University of Waterloo and subsequently his medical training in 2014 at University of Toronto before joining their neurosurgery program. Ali's research focuses on evaluating and establishing the clinical utility of advanced quantitative MRI in spinal cord injury and degenerative cervical myelopathy.

After his training is complete, Ali hopes to establish a career as a surgeon-scientist, adapting his practice to his interests in translational research, AI and global health


CHRISTOPHER AHUJA PGY 4 NEUROSURGERY

1	Allison Clement , Cari Whyne, Margarete Akens, Phoenix Wilkie, Albert Yee, Michael Hardisty	DIFFERENTIATION BETWEEN OSTEOBLASTIC AND HEALTHY TISSUE IN METASTATICALLY INVOLVED VERTEBRAE USING RADIOMIC FEATURES
2	A Desimone , JM Badhiwala, MG Fehlings	THE ROLE OF APOLIPOPROTEIN E4 IN THE PATHOPHYSIOLOGY AND CLINICAL OUTCOMES OF DEGENERATIVE CERVICAL MYELOPATHY
3	A Post , M Khazaei, MG Fehlings	THE EFFECT OF CONDITIONAL GDNF EXPRESSION IN IPSC-NPCS USING CELL STATE-SPECIFIC PROMOTERS FOLLOWING SPINAL CORD INJURIES.
4	Christopher S. Ahuja , Mohamad Khazaei, Yao Yao, Nayaab Punjani, Sohanthen Udayashankar, Zijian Lou, Vjura Senthilnathan, Inaara Walji, Ali Hasan, William Luong, Alex Post, Gokce Ozdemir, Edward Robinson, Priscilla Chan, Michael G. Fehlings	QL6 PEPTIDE BIOMATERIAL TO ENHANCE HUMAN NEURAL STEM CELL THERAPY FOR TRAUMATIC SPINAL CORD INJURY
5	Dallis Ferguson , William Lo, Daniel Molenhuis, Lothar Lilge, Fynn Schwiigelshohn, Vaughn Betz Cari M. Whyne, Margarete K. Akens	BPD-MA MEDIATED PDT OF SPINAL BONE METASTASES: DETERMINING PDT THRESHOLD VALUES
6	Amanda Hope , Hikmat Sahak, Cari Whyne, Michael Hardisty, and Joel Finkelstein	SURGICAL SIMULATOR FOR SPINAL DECOMPRESSION
7	Jonathon Chio , Jian Wang ¹ , Anna Badner, James Hong, Vithushan Surendran, Michael Fehlings	DRUG REPURPOSING: HIGH DOSE HUMAN IMMUNOGLOBULIN G FOR TREATMENT OF TRAUMATIC CERVICAL SPINAL CORD INJURY
8	Jamie RF Wilson , Jetan H Badhiwala, Fan Jiang, Jefferson R Wilson, Branko Kopjar, Alexander Vaccaro, Michael G Fehlings	THE IMPACT OF OLDER AGE ON FUNCTIONAL RECOVERY AND QUALITY OF LIFE OUTCOMES AFTER SURGICAL DECOMPRESSION FOR DEGENERATIVE CERVICAL MYELOPATHY: RESULTS FROM AN INTERNATIONAL, MULTICENTRE, PROSPECTIVE DATASET OF 757 PATIENTS.
9	Jamie Wilson , F Jiang, JH Badhiwala, CI Shaffrey, LY Carreon, KMC Cheung, BT Dahle, LG Lenke, MG Fehlings	THE EFFECT OF TOBACCO SMOKING ON ADVERSE EVENTS FOLLOWING ADULT COMPLEX DEFORMITY SURGERY: ANALYSIS OF 270 PATIENTS FROM THE PROSPECTIVE, MULTI-CENTER SCOLI-RISK-1 STUDY.a
10	Jamie Wilson , H Joshi, F Jiang, PH Wu, J Bauer, F Mathieu, EM Massicotte.	DAY SURGERY ANTERIOR CERVICAL DISCECTOMY AND FUSION AT ONE, TWO AND THREE LEVELS IS SAFE AND EFFECTIVE IN A PUBLIC HEALTH SYSTEM; EXPERIENCE FROM 273 PATIENTS AT A SINGLE CANADIAN INSTITUTION.
11	Ajay Matta , M. Zia Karim DVM, MPhil, Hoda Gerami, Alyssa Goldstein, Warren Foltz Marshall Sussman, Peter Jun, Martha Funabashi, Greg Kawchuk, W Mark Erwin	A NOVEL, BIOLOGICAL THERAPEUTIC (NTG-101) FOR THE TREATMENT OF DEGENERATIVE DISC DISEASE
12	M.M. Schneider , L.Tetreault, J. Badhiwala, M.P Zhu, R.K. Idler, J.R. Wilson, M.G. Fehlings	INCIDENCE AND ASSOCIATED FACTORS OF NECK PAIN IN PATIENTS WITH DEGENERATIVE CERVICAL MYELOPATHY: RESULTS FROM THE MULTICENTER INTERNATIONAL PROSPECTIVE AOSPINE STUDIES
13	M.M. Schneider , J. Badhiwala,, L.Tetreault, M.P Zhu, R.K. Idler, J.R. Wilson, M.G. Fehlings	NECK PAIN RESPONSE TO OPERATIVE INTERVENTION IN PATIENTS WITH DEGENERATIVE CERVICAL MYELOPATHY: RESULTS FROM THE MULTICENTER INTERNATIONAL PROSPECTIVE AOSPINE STUDIES
14	Mohammad Zavvarian , James Hong, Mohamad Khazaei, Jian Wang, Michael G. Fehlings.	SYSTEMIC PROTEIN KINASE INHIBITION REDUCES LOCAL INFLAMMATION AFTER CERVICAL SPINAL CORD INJURY
15	Omar Khan ; Jetan Badhiwala; Michael Fehlings,	MACHINE LEARNING MODELS SHOW EXCELLENT PERFORMANCE IN PREDICTION OF FUNCTIONAL OUTCOMES AFTER TRAUMATIC SPINAL CORD INJURY
16	Omar Khan ; Jetan Badhiwala; Michael Fehlings,	PREDICTION OF WORSE FUNCTIONAL OUTCOMES AFTER DECOMPRESSION SURGERY FOR DEGENERATIVE CERVICAL MYELOPATHY USING MACHINE LEARNING

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- 17 **Omar Khan**; Jetan Badhiwala; Michael Fehlings, TREATMENT APPROACHES FOR DEGENERATIVE LUMBAR SPONDYLOLISTHESIS: A SYSTEMATIC REVIEW AND NETWORK META-ANALYSIS OF RANDOMIZED CONTROLLED TRIALS.
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- 18 **Kalsi P**, Charalampidis A, Rampersaud R OUTCOMES FOR MINIMALLY INVASIVE TLIF FOR LOW-GRADE LUMBAR SPONDYLOLISTHESIS: A FIVE-YEAR FOLLOW-UP STUDY
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- 19 **Paige Smith**, Natalia Ogrodnik, Meaghan O'Reilly LOW-INTENSITY FOCUSED ULTRASOUND AND MICROBUBBLES CAUSES INCREASED AND LOCALIZED DELIVERY OF TRASTUZUMAB INTO LEPTOMENINGEAL METASTASES SITUATED IN THE SPINAL CORD
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- 20 **Rui Xu**, Meaghan O'Reilly. A SPINE-SPECIFIC ULTRASOUND ARRAY FOR NON-INVASIVE SPINAL CORD THERAPY.
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- 21 **Stecia-Marie Fletcher**, Meaghan O'Reilly FOCUSED ULTRASOUND + MICROBUBBLE MEDIATED BLOOD-SPINAL CORD BARRIER OPENING (BSCBO) USING SHORT BURST, PHASE KEYING EXPOSURES
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- 22 **William Luong**, Christopher S. Ahuja, Mohamad Khazaei, and Michael G. Fehlings GENOME ENGINEERING NEURAL PRECURSOR CELLS FOR CLOSED-LOOP DELIVERY OF CHONDROITINASE ABC
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- 23 **Zijian Lou**, Mohamed Khazaei, Christopher S Ahuja, and Michael G Fehlings TRIPOTENT NEUROGENIC NPCS FOR REPAIR AND REGENERATION OF THE INJURED SPINAL CORD
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- 24 **Gokce Ozdemir**, Mohamad Khazaei, Michael G Fehlings THE EFFECT OF SYNAPTIC ACTIVITY ON DIFFERENTIATION AND INTEGRATION OF TRANSPLANTED NEURAL PROGENITOR CELLS AND FUNCTIONAL RECOVERY AFTER SPINAL CORD INJURY
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- 25 **Jennifer A. Dermott**, Reinhard Zeller, David E. Lebel COMPARISON OF SURGEON VERSUS PHYSICAL THERAPIST APPLIED SPINAL CASTS FOR THE TREATMENT OF SEVERE EARLY ONSET SCOLIOSIS: RESULTS AND COMPLICATIONS
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- 26 **Muhammad Ali Akbar**, Allan Martin, Jetan Badhiwala1, Julien Cohen-Adad, David Mikulis, Sukhvinder Kalsi-Ryan, Jefferson Wilson, Michael Fehlings DIAGNOSTIC VALUE OF MULTIPARAMETRIC QUANTITATIVE MRI IN DEGENERATIVE CERVICAL MYELOPATHY: AN EXPLORATORY ANALYSIS USING TRADITIONAL STATISTICAL AND SUPERVISED MACHINE LEARNING METHODOLOGY
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- 27 **Mohamad Khazaei**, Hiroaki Nakashima, Christopher S Ahuja, Priscilla Chan, Jian Wang, Balazs Varga, Andras Nagy, Michael G Fehlings DISTINCTIVE RESPONSE OF NEUROEPITHELIAL STEM CELLS WITH CORTICAL AND SPINAL CORD IDENTITY TO THE NOTCH SIGNALING IN INJURED SPINAL CORD MICROENVIRONMENT
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- 28 **Carlo Ammendolia**, Pierre Cote, Michael Schneider, Raja Rampersaud, Gillian Hawker DOES DURATION OF SYMPTOMS AFFECT WALKING OUTCOMES IN PATIENTS RECEIVING NON-SURGICAL CARE FOR LUMBAR SPINAL STENOSIS?
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- 29 **Mior SA**, Hogg-Johnson S, Ammendolia C. THE ASSOCIATION BETWEEN PATIENT EXPECTATION AND IMPROVED WALKING DISTANCE IN PATIENTS RECEIVING NON-SURGICAL CARE FOR LUMBAR SPINAL STENOSIS
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- 30 **Carlo Ammendolia**, Pierre Cote, Michael Schneider, Raja Rampersaud, Gillian Hawker WHO SHOULD RECEIVE NON-OPERATIVE TREATMENT FOR LUMBAR SPINAL STENOSIS? PREDICTORS OF IMPROVED WALKING DISTANCE USING THE BOOT CAMP PROGRAMS
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- 31 **Frank Lyons**, Matthew Guttman, Avery Nathens, Jeremie Larouche SURGICAL MANAGEMENT OF SPINAL FRACTURES IN THE ABSENCE OF NEUROLOGICAL INJURY: DOES TIMING OF SURGERY INFLUENCE PATIENT OUTCOME? A RETROSPECTIVE COHORT STUDY FROM THE AMERICAN COLLEGE OF SURGEONS TRAUMA QUALITY IMPROVEMENT PROGRAM DATABASE.
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21	Vinay Kulkarni, Kunal Bhanot, Albert Yee, Greg McIntosh, Henry Ahn, Jeremie Larouche	Determining the Extent of Clinical Practice Variation Across Canada for Single-Level Posterior Surgery for Lumbar Degenerative Spondylolisthesis
22	Laureen D. Hachem, Andrea J. Mothe, Charles H. Tator	AMPA Receptor Modulation as a Therapeutic Strategy to Enhance Survival of Spinal Cord Neural Stem Cells
23	Allison Clement, Soroush Ghomashchi, Cari M. Whyne, Margarete K. Akens	Establishing and Imaged Based Evaluation of a New Preclinical Rat Model of Osteoblastic Vertebral Metastasis
24	Mohamad Khazaei, Christopher S. Ahuja, Hiroaki Nakashima, Narihito Nagoshi, Jian Wang, Michael G. Fehlings	Transplantation of human spinal oligodendrogenic neural progenitor cells enhances remyelination and functional recovery after traumatic spinal cord injury
25	Carl Fisher, Zakariya Ali, Arjun Sahgal, Elizabeth David, Edward Chow, Cari Whyne, Shane Burch, Brian C. Wilson, Albert Yee	A Phase I Trial on the Use of Photodynamic Therapy in Vertebral Metastases
26	Earvin Tio, Jack Wunder, Michael Hardisty, Normand Robert, Cari Whyne	CT-Ultrasound Fusion for Spinal Surgery
27	Rui Xu, Meaghan O'Reilly	A CT-Based Simulation for Predicting Trans-Vertebral Ultrasound Propagation: Simulation Accuracy
28	Robert A. Ravinsky, Eric J. Crawford, Raja Rampersaud	Slip Progression in Low-Grade Degenerative Lumbar Spondylolisthesis and Symptomatic Deterioration after Minimally Invasive Decompression
29	Robert A. Ravinsky, Jay Toor, Sam Keshen, Colleen Magee, Stephen J. Lewis	Does UIV Affect Rate of PJK in Adult Spinal Deformity Surgery Fused to the Pelvis?
30	R Robert A. Ravinsky, Colby Oitment, Stephen J. Lewis	Interbody impaction grafting in adult spinal deformity: 2-year fusion outcomes
31	Zachary Tan, Joel Finkelstein	Validation of a novel freehand technique for transcortical screws in the lumbar spine
32	Daipayan Guha, Raphael Jakubovic, Shaurya Gupta, Michael G. Fehlings, Albert Yee, Victor Yang	Optical Topographic Imaging for Intra-Operative Three-Dimensional Navigation in Mini-Open Approaches: Initial Pre-Clinical and Clinical Feasibility
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Thank You




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