Spine Summit 2019 is jointly provided by the Congress of Neurological Surgeons and the AANS/CNS Section on Disorders of the Spine and Peripheral Nerves.

March 14–17, 2019

Fontainebleau – Miami Beach – Florida

The Annual Meeting of the AANS/CNS Section on Disorders of the Spine and Peripheral Nerves

SPINE SUMMIT 2019

Fontainebleau – Miami Beach –
On behalf of the Joint Section on Disorders of the Spine and Peripheral Nerves Executive Committee, welcome to Spine Summit 2019 at the Fontainebleau Miami Beach. This year’s meeting promises to be another thrilling and thought-provoking exploration of the latest innovations in neurosurgical education.

This year, we are proud to welcome our 2019 International Guest Society, the International Society for the Advancement of Spine Surgery.

As always, we have a world-class program lined up surrounding our theme, Technical Innovation for Restoring Patient Function. We’re proud to honor Meritorious Awardees Robert F. Heary, MD, and Rolando Garcia, MD, as well as our Meritorious Member Awardees, John A. Wilson, MD, and Rajiv Midha, MD, for their contributions to the field. They, along with numerous other guest lecturers, will be sharing their knowledge during educational courses, specialized breakout sessions, award presentations, Happy Hour Debates, and the Cahill Controversies over the next several days.

In addition to all of the technologies and advancement that will be displayed from our industry partners in the exhibit hall, we are excited to offer unique Miami Beach experiences in the form of deep-sea fishing and a round of golf at the iconic Normandy Shores Golf Club for those who signed up.

Thank you for taking time out of your busy schedules to join us at Spine Summit 2019, and we wish you an insightful and fun meeting.

SINCERELY,

MICHAEL Y. WANG
SECTION CHAIR

JUAN S. URIBE
ANNUAL MEETING CHAIR

DOMAGOJ CORIC
SCIENTIFIC PROGRAM CHAIR
Complimentary Wi-Fi is available to all attendees throughout the Fontainebleau Miami Beach meeting space.

NETWORK NAME: 2019 Spine Summit
PASSWORD: spine2019
Michael Y. Wang, MD
Section Chair

Michael Y. Wang, MD, was born in Scottsdale, Arizona, and spent his childhood in Atlanta, Georgia. He then attended Stanford University in Palo Alto, California, where he received both his BS and MD degrees. He completed his residency at the University of Southern California/LA County General Hospital and Fellowship at the University of Miami under Drs. Barth Green and Allan Levi. He then went on to become the Spine Program Director and Spine Fellowship Director at USC. In 2007 he moved to South Florida and currently serves as a Professor in the Departments of Neurological Surgery and Rehabilitation Medicine at the University of Miami, Miller School of Medicine. He is the Director of Neurosurgery at University of Miami Hospital and the Spine Fellowship Director.

Dr. Wang has been an advocate for neurosurgeons and spinal surgeons. He was elected to the AANS Young Neurosurgeons Executive Committee in 2003, and in the AANS he has served as Local Host for the 2010 Annual Meeting, on the Member Benefits Committee, the Joint Sponsorship Committee, the Development Committee, the International Committee, and the Scientific Program Committee. In the Joint Section on Disorders of the Spine & Peripheral Nerves he has served as Chair of the Committees on Publications, Education, Fellowship, and Exhibits. He has also been Scientific Program Chair, Annual Meeting Chair, and Treasurer. In the CNS he has served as the Membership Chair and Public Relations Chair. He has been Secretary/Treasurer, Vice President, and President of the Society of University Neurosurgeons (SUNS). Within the North American Spine Society (NASS) he served as the Chair of the MIP (minimally invasive procedures). He has served in numerous other leadership roles in the International Society for the Advancement of Spinal Surgery (ISASS), Society for Minimally Invasive Spine Surgery (SMISS), the USA Enhanced Recovery After Surgery (ERAS) Society, and the International Spine Study Group (ISSG).
Meritorious Awardee,  
— Neurosurgery —

Robert F. Heary, MD

Dr. Robert F. Heary is the Director of the Spine Center of New Jersey and one of the premier physicians in comprehensive spine care providing a full range of conservative and surgical interventions for a wide range of spinal disorders. He is also a Professor of Neurosurgery at Rutgers New Jersey Medical School in Newark.

Dr. Heary is on the editorial boards of Neurosurgery, Clinical Spine Surgery, Spinal Deformity, and the Journal of Spinal Cord Medicine. He has authored 147 peer-reviewed journal articles, 116 abstracts, and 61 book chapters and has been on the faculty of over 300 instructional courses at national neurosurgery meetings. He is currently editing his third textbook. His major areas of research interest are revision spine surgery, spine and spinal cord injury, spine and spinal cord tumors, spinal deformity, and spinal biomechanics.

He is an active member of many societies. Dr. Heary is a director-at-large on the American Association of Neurological Surgeons (AANS) Board of Directors, a past Chair of the Joint Section on Disorders of the Spine & Peripheral Nerves, the immediate Past-President of the Cervical Spine Research Society (CSRS), and he is the current President of the Lumbar Spine Research Society. He is also a member of the Scoliosis Research Society, Neurosurgical Society of America, the Society of Neurological Surgeons, and the American Academy of Neurological Surgeons.

Dr. Heary earned his medical degree from the University of Pittsburgh School of Medicine and completed a residency in Neurological Surgery at the University of Medicine and Dentistry of New Jersey–New Jersey Medical School in Newark, New Jersey. Following his residency, Dr. Heary completed a spine fellowship in the Department of Orthopedic Surgery at Thomas Jefferson University in Philadelphia, Pennsylvania.
Dr. Rolando Garcia Jr. was born in Cuba to Cuban parents. He attended college at Tulane University graduating summa cum laude for the Department of Biology. Dr. Garcia completed medical school at Tulane University School of Medicine where he obtained both a Doctor of Medicine degree and a Masters of Public Health. 

In 1991, Dr. Garcia began a general surgery internship at Tulane followed by a four-year residency in orthopedic surgery which he completed in 1996. During his last year of residency, Dr. Garcia served as the Chief Resident of the Department of Orthopedics and was the recipient of the prestigious Irene C. Thibodeaux award presented annually to the senior resident who, as selected by the first year class, best exemplifies the qualities of leadership, care, and who has been an outstanding role model for junior residents.

At the completion of his orthopedic surgery training, Dr. Garcia participated in a one year spine surgery fellowship at the North Carolina Spine Center in Chapel Hill which he successfully completed in 1997. In 1997 Dr. Garcia joined the Orthopedic Care Center where he has been in practice for almost 20 years.

As an avid scientist and researcher, Dr. Garcia has participated in more than five FDA Investigational Device Exemption trials, serving as the co-lead investigator in the ActivL IDE trial. Dr. Garcia has multiple peer reviewed journal publications as well as several book chapters.

Dr. Garcia has served as Chief of Orthopedics and sat on the Board of Trustees at Aventura Hospital and Medical Center. In addition to his private practice, he has served the South Florida community as director of the scoliosis screening of Dade County and was awarded the Volunteer of the Year award by Easter Seals of Miami.
Rajiv Midha, MD

Dr. Rajiv Midha was born in India in 1962 and immigrated to North America in 1972. He received his medical degree (1987), MSc (under Susan Mackinnon’s supervision in 1991), and neurosurgical training (completed in 1995), all from the University of Toronto. He obtained clinical fellowships in peripheral nerve neurosurgery at St. Michaels’ Hospital in Toronto, and at Louisiana State University in New Orleans (under David Kline). Dr. Midha has published 150 peer-reviewed articles, as well as in textbooks, with over 300 total publications, mostly related to peripheral nerve neurobiology and surgery. He has co-edited 4 textbooks on peripheral nerve surgery. Dr Midha is internationally recognized as an authority on peripheral nerve surgery, having given over 250 lectures worldwide, and serving as past president of the two foremost international societies related to this speciality, American Society for Peripheral Nerve and the Sunderland Society. In addition he is or has served as section editor and board member for peripheral nerve for all three of the most prominent neurosurgery journals: Journal of Neurosurgery, Neurosurgery and World Neurosurgery.

Dr. Midha runs a CIHR peer-reviewed funded basic science laboratory investigation nerve regeneration, and is a Neuroscientist member and executive member of the Hotchkiss Brain Institute (HBI) at the University of Calgary. He has a special interest in peripheral nerve function, injury, repair, grafting, and regeneration. In the recent past, the main thrust of the research lab has been on developing novel cell based therapies to improve outcome from nerve repair.

Dr. Midha is presently Professor and Head of the Department of Clinical Neurosciences at the University of Calgary. The Department of Clinical Neurosciences is highly academic, composed of more than 100 Faculty members, and is organized into the Divisions of Neurology, Neurosurgery, Physical Medicine and Rehabilitation and Translational Neurosciences All areas of subspecialization in neurology, neurosurgery and physiatry are covered, and each clinical Division has strong residency training programs as well as multiple Fellowships.
John A. Wilson, MD, FAANS, FACS is the David L. and Sally Kelly Professor and vice-Chair of the Department of Neurological Surgery of Wake Forest University School of Medicine where he also serves as the co-Director of the Neuroscience Service line. Dr. Wilson graduated from Jefferson Medical College in 1982 and completed his neurosurgical residency at Tufts University New England Medical Center in 1990. After completing a fellowship at the Paracelsus Clinic in Osnabruk, Germany, Dr. Wilson began neurosurgical practice in Pittsburgh at Allegheny General Hospital. In 1993 he was recruited to the neurosurgical faculty at Wake Forest University School of medicine in Winston-Salem, NC, where he maintains an active practice focusing primarily on cerebrovascular and skull base disorders.

He has served as an advisor to the North Carolina state Medicare Carrier Advisory Committee and the national Medicare Coverage Advisory Committee. Dr. Wilson has served as an officer in a numerous national and regional societies including: President of the North Carolina Neurosurgical Society, President of the Southern Neurosurgical Society, President of the Society of University Neurosurgeons, Chair of the joint American Association of Neurological Surgeons and Congress of Neurological Surgeons Cerebrovascular Section and Chair of the AANS/CNS Washington Committee. He currently serves as the Treasurer of the AANS, Treasurer of Neuropoint Alliance, Treasurer of Neurosurgery Research and Education Foundation, and Treasurer of the Neurosurgery PAC.

Dr. Wilson lives in Winston-Salem with his wife Marian. They have two adult children, Jake and Megan. He is a member of the First Presbyterian Church in Winston-Salem and serves on the Board of Directors of the National Cycling Center and the Crosby Scholars Community Partnership. The NCC, located in Winston-Salem is a non-profit organization developing the country’s premier training destination for elite cyclists, which also provide athletes access to leading-edge sports medicine research as well as acting as a community resource for cycling-related fitness, activity, education, and advocacy. Crosby Scholars is a unique college access program for all 6th-to 12th-grade students in the Winston-Salem/Forsyth County School System. The program prepares students academically, financially, and personally for successful college admission, and aims to ensure that every public school student in Forsyth County has the opportunity to attend college. Crosby Scholars now serves more than 10,000 students per year.
Congratulations to the 2019 Award Recipients!

Andrew K.H. Chan  
J.A.N.E AWARD

John V. Wainwright  
MAYFIELD BASIC SCIENCE AWARD

Chad F. Claus  
MAYFIELD CLINICAL SCIENCE AWARD

Zachary Pennington  
KLINE PERIPHERAL NERVE TOP ABSTRACT

Christopher F. Dibble  
KLINE PERIPHERAL NERVE RESEARCH AWARD

Charles Kuntz IV Scholars

Owoicho Adogwa  
Mohammed A. Alvi  
Mark A. Attiah  
Oliver G.S. Ayling  
Andrew K.H. Chan  
Islam Fayed  
Shashank V. Gandhi  
Jack M. Haglin  
Allen L. Ho  
Sertac Kirnaz  
Mohamed Macki  
Anthony L. Mikula  
Aria Nouri  
Zachary Sanford  
Alisson R. Teles  
Zoe E. Teton  
Jamie R.F. Wilson  
Michael M.H. Yang  
Hesham M. Zakaria  
Scott L. Zuckerman

The 7D Surgical System is the first and only Machine-vision Image Guided Surgery (MvIGS) platform. The system delivers on the promise of image guided surgery (IGS) and allows surgeons to perform fast, cost-effective, radiation-free IGS. Unlike conventional IGS systems that rely on time-consuming intra-operative radiation emitting devices or laborious point matching techniques, MvIGS uses only visible light to easily register patients in less than 20 seconds.

7Dsurgical.com
contact@7Dsurgical.com

The 7D Surgical System Spine Module has FDA 510(k) clearance and Health Canada MDL approval for spine navigation.

©2018 7D Surgical. All rights reserved. MK-00007 Rev 0
THANK YOU for your support of Spine Summit 2019

Medtronic

AMBASSADOR
Non-CME Sponsored Lunch

12:00 – 1:00 pm
Splash Ballroom 13/14

Leading, Expanding, Advancing Anterior Column Realignment: Insights to Lateral Procedural Solutions, ALIF, and TLIF
Adam S. Kanter, Christopher I. Shaffrey, Juan S. Uribe
Corporate sponsor: NuVasive

Optimizing Post-Operative Pain Control: The Role of Liposomal Bupivacaine
Corporate sponsor: Pacira Pharmaceuticals, Inc.

Non-CME Cadaver Lab
Flicker Ballroom
1:30 – 5:30 pm
Hands-on Cadaver Session with the Masters (Non-CME)

Course Directors: Mark A. Mahan, Rishi K. Wadhwa
Course Faculty: Daniel Birk, Ali A. Baaj, Frank La Marca, Albert E. Telfeian, Domagoj Coric, Peter Miller, Michael P. Steinmetz, Nathaniel P. Brooks, Michael W. Groff, Paul J. Slosar
Course Description: Participants will engage in hands-on learning of innovative new technologies in spine and peripheral nerve surgery. In this four-hour cadaver lab, participants will learn advanced techniques in minimally invasive deformity spine surgery and peripheral nerve repair. Rotations will include various MIS and deformity approaches and instrumentation, as well as peripheral nerve grafting. One-on-one instruction will be performed with experienced faculty using the latest state-of-the-art devices. Surgeons with limited prior experience will learn practical techniques to introduce into their clinical practice. Those with advanced experience will have the opportunity to share surgical technique refinement with expert faculty, and to survey a variety of new technologies.

Efficiencies with Minimally Invasive Spine Surgery
Sponsored by: DePuy Synthes

Spinal Deformity techniques for the Thoracic and Lumbar Spine
Sponsored by: DePuy Synthes

ELSA®, Expandable Integrated Lateral Interbody Spacer
Peripheral Nerve
Sponsored by: Globus Medical
Transforaminal Access for Lumbar Decompression
Sponsored by: Joimax

NAV Posterior Cervical with NAV Midas Decompression (combined)
Sponsored by: Medtronic

NAV OLIF
Sponsored by: Medtronic

Transforaminal Endoscopic Discectomy
Sponsored by: Richard Wolf Medical Instruments

Interlaminar Endoscopic Discectomy
Sponsored by: Richard Wolf Medical Instruments

Complex Posterior Cervical Fusion with PERLA® Cervical System
Sponsored by: Spineart

Lateral Fusion Solutions Utilizing Titan Spine NanoLOCK Technology
Sponsored by: Titan Spine

Olympus providing Orbeye exoscopes to enhance learning experience at 3 stations

Special Course 1
Ocean Promenade East
1:30–5:30 pm $200
MIS/Navigation and Robotics Procedural Solutions

COURSE DIRECTORS: Paul Park, Juan S. Uribe


COURSE DESCRIPTION: This course will cover the latest advances in spinal navigation with an emphasis on minimally invasive surgery, and a detailed review of the present and future role of robotics in spinal surgery. The premise of the course is to maximize efficiency and accuracy in using navigation as well as discuss novel applications for image guidance and integration of robotic technology. This course will cover essential topics, including optimal workflow for integration of intra-operative image acquisition, positioning, frame placement, and instrumentation use. It will also review strategies for complex cases and complication avoidance.

LEARNING OBJECTIVES: Upon completion of this course, participants will be able to:
1. Identify current evidence supporting the use of spinal navigation in minimally invasive surgery
2. Learn the role of robotics and its integration into spinal surgery
3. Describe navigation techniques for minimally invasive surgery, including applications in trauma, tumor, and spinal deformity surgery

1:30–1:35 pm
Introduction
Paul Park, Juan S. Uribe
1:36 1:45 pm  
Applications and Evidence for Spinal Navigation in Minimally Invasive Spine Surgery  
Victor W. Chang

1:46 1:55 pm  
Navigation  
MIS TLIF (Technique)  
Roger Hartl

1:56 2:05 pm  
Navigation  
Percutaneous Screw Fixation (Technique)  
Jay D. Turner

2:06 2:15 pm  
Navigation  
Spinal Tumor (Technique)  
Khoi D. Than

2:16 2:25 pm  
Navigation  
Spinal Deformity (Technique)  
J. Patrick Johnson

2:26 2:35 pm  
Navigation  
Lateral Applications (Technique)  
Paul Park

2:36 2:45 pm  
MIS Trauma  
William R. Taylor

2:45 2:50 pm  
Questions and Discussion

2:50 3:20 pm  
Hands-on Workshop (Navigation)

3:20 3:40 pm  
Break

3:41 3:50 pm  
Image Guided Rod Contouring  
Juan S. Uribe

3:51 4:00 pm  
Robot-assisted Pedicle Screw Placement  
Gregory Basil

4:01 4:10 pm  
Current Evidence for and Future Applications for Robotics in Spinal Surgery  
Ronald A. Lehman

4:11 4:20 pm  
Cost Effectiveness of Navigation  
Eric W. Nottmeier

4:21 4:30 pm  
Questions and Discussion

4:30 4:40 pm  
Break

4:41 4:50 pm  
How to Advocate for New Technology at Your Hospital  
Michael P. Steinmetz

4:50 5:30 pm  
Hands-on Workshop (Robotics)

Educational grant provided by: Brainlab, DePuy Synthes, Globus, Medtronic, and Stryker
Spinal Deformity: Case-based Pearls and Pitfalls for the Practicing Spine Surgeon

COURSE DIRECTORS: Kai-Ming G. Fu, Praveen V. Mummaneni

SPEAKERS: Shay Bess, Kai-Ming G. Fu, Steven D. Glassman, Regis W. Haid, Adam S. Kanter, Isaac O. Karikari, Catherine Miller, Pierce D. Nunley, Christopher I. Shaffrey, Alexander Tuchman, Michael S. Virk

COURSE DESCRIPTION: Through an interactive case-based format, this course will address deformity concerns commonly encountered by the practicing spine surgeon.

LEARNING OBJECTIVES: Upon completion of this course, participants will be able to:
1. Identify deformity principles in regards to degenerative pathology
2. Analyze the current state of less invasive techniques and deformity

1:30–1:45 pm
Spondylolisthesis Grade 3: Optimal Management
Steven D. Glassman

1:46–2:01 pm
Degenerative Techniques and Sagittal Plane Alignment (ALIF Versus TLIF)
Regis W. Haid

2:02–2:07 pm
Questions and Discussion

2:08–2:23 pm
Adjacent Level Disease: When to Extend a Level Versus Spinal Reconstruction
Shay Bess

2:24–2:39 pm
Multiple SPO Versus PSO and How to Choose
Isaac O. Karikari

2:40–3:00 pm
Case-based Discussion
Isaac O. Karikari

3:00–3:15 pm
Break

3:16–3:31 pm
When to Consider MIS in Deformity Surgery
Kai-Ming G. Fu

3:32–3:47 pm
Pre Versus Trans Psoas in Lateral Deformity Surgery: How to Choose the Optimal Approach
Catherine Miller

3:48–3:53 pm
Questions and Discussion
3:54 4:09 pm
Stand Alone for MIS Deformity? When to Back Up Posteriorly
Adam S. Kanter

4:10 4:25 pm
Multidisciplinary Team Approach to Adult Deformity Patient Selection and Pre-op Optimization
Michael S. Virk

4:26 4:41 pm
Techniques to Minimize PJK
Christopher I. Shaffrey

4:42 4:47 pm
Complication Management-percutaneous Pedicle Screw Placement in MIS Deformity Surgery
Pierce D. Nunley

4:48 5:08 pm
Case-based Discussion
Alexander Tuchman

5:09 5:30 pm
Participant Cases

Special Course 3
Splash 12
1:30 5:30 pm
Surgical Treatment of Peripheral Pain

$200

COURSE DIRECTORS: Line G. Jacques, Mark A. Mahan
SPEAKERS: Allan J. Belzberg, Nicholas M. Boulis, Aaron G. Filler, Line G. Jacques, Mark A. Mahan, Zaman Mirzadeh, Julie G. Pilitsis, Konstantin V. Slavin, Robert J. Spinner, Christopher J. Winfree

COURSE DESCRIPTION: This course will explore the diverse surgical options for treatment of pain including decompression, neurologic reconstruction, ablative and stimulation procedures, including up-to-date research findings on clinical evaluation, patient reported outcomes, procedural options and outcomes. New and emerging technologies will be discussed, including the rational use and expectations of developing therapies.

LEARNING OBJECTIVES: Upon completion of this course, participants will be able to:
1. Define appropriate patient characteristics for surgical treatment of pain
2. Discuss the differential benefits of treatment options within reconstructive, ablative, and stimulation surgeries
3. Describe risks and a tiered approach for salvage options

1:30 1:35 pm
Introduction
Line G. Jacques, Mark A. Mahan

1:36 1:50 pm
Reconstruction for Pain
Robert J. Spinner
1:51–2:05 pm  
Ablative Surgery: DREZotomy, Neurectomies, and Neuromas  
Nicholas M. Boulis

2:06–2:20 pm  
Decompression Surgery for Upper Extremity Pain Syndromes  
Allan J. Belzberg

2:21–2:35 pm  
Decompression Surgery for Lower Extremity Syndromes  
Aaron G. Filler

2:36–2:50 pm  
Medical Management: New Options  
Christopher J. Winfree

2:51–3:05 pm  
Cancer Pain: Cordotomies, Myelotomy, and Pumps  
Zaman Mirzadeh

3:06–3:30 pm  
Case Discussion: Brachial Plexus Avulsion  
Allan J. Belzberg, Nicholas M. Boulis, Robert J. Spinner

3:30–3:45 pm  
Break

3:46–4:00 pm  
Dorsal Root Ganglion Stimulation  
Line G. Jacques

4:01–4:20 pm  
Epidural Stimulation: High Frequency Versus Traditional  
Julie G. Pilitsis

4:21–4:40 pm  
Peripheral Nerve Stimulation: New Technologies  
Konstantin V. Slavin

4:41–5:00 pm  
No One's Favorites: Meralgia Paresthetica and Occipital Neuralgia  
Line G. Jacques, Mark A. Mahan

5:01–5:15 pm  
Case Discussion: Dorsal Root Ganglion Versus Peripheral Nerve Stimulation Versus Epidural Stimulation for CRPS  
Line G. Jacques, Julie G. Pilitsis, Konstantin V. Slavin

5:16–5:30 pm  
Conclusion and Questions
COURSE DIRECTORS: Yakov Gologorsky, Wilson Z. Ray

COURSE DESCRIPTION: This is an interactive case-based format designed to prepare recent graduates or fellow level participants for the new spine specialty specific oral boards. Enrollment will be strictly limited to 20 participants and will allow for dedicated one-on-one sessions using both submitted cases and cases prepared by the faculty.

LEARNING OBJECTIVES: Upon completion of this course, participants will be able to:
1. Identify the new spine specialty specific oral boards pathway

1:30 1:49 pm
Introduction
John J. Knightly

1:50 3:30 pm
All Faculty  1:1 Oral Boards Style Case Presentations

3:30 3:50 pm
Break

3:50 5:30 pm
All Faculty  1:1 Oral Boards Style Case Presentations
6:30–8:00 pm
Opening Reception

Take in spectacular ocean views and watch the sunset while enjoying a lavish array of food and beverages as you network with friends and colleagues at the Opening Reception. Each medical attendee and spouse/guest registered for the meeting will receive one complimentary ticket. Please note this event is held outdoors. Resort casual attire is recommended.
We’re driving innovation to provide a better way to safely and effectively manage postsurgical pain.

Our in-depth knowledge of the postsurgical pain market, coupled with our passion for delivering improved patient care, drives our commitment.

THANK YOU
The following companies have provided an educational grant in support of Spine Summit 2019

Globus Medical
K2M
Medtronic
Stryker
Brainlab
DePuy Synthes
Cadaver Stations
Attend these private Cadaver Station sessions to receive hands-on training using the latest state-of-the-art devices and technology. If you wish to attend one of these sessions please stop by their booth for more information.

Sponsored by: Synaptive Medical

Featured technology ExcelsiusGPS® Revolutionary Robotic Navigation
Sponsored by: Globus Medical

Machine-Vision Image Guided Surgery – MvIGS Technology
Sponsored by: 7D Surgical

Advances in MIS Posterior Cervical Fusion
Sponsored by: Spine Wave

Mazor X Stealth Station (Demos)
Sponsored by: Medtronic

Posterior Cervical Fusion
Sponsored by: Providence Medical Technology

Challenging Cases 1
Board-style Challenging Cases: Cervical
Moderators: Aaron J. Clark, David J. Hart, Christopher M. Holland

Opening Remarks
Welcome
Domagoj Coric

Introduction
Michael Y. Wang
Scientific Session 1  Glimmer Ballroom

8:00–9:30 am
Innovation in Spine to Improve Patient Education

MODERATORS: R. John Hurlbert, Marjorie C. Wang

LEARNING OBJECTIVES: Upon completion of this session, participants will be able to:
1. Critically analyze the design, methodology, and content of basic science and clinical spine studies
2. Describe the impact of innovative technologies on the field of spine surgery
3. Describe how technological advances in spine surgery can positively impact patient care

8:00–8:01 am
Introduction of J.A.N.E. and Mayeld Award Winners
Daniel C. Lu

8:02–8:07 am
J.A.N.E. Award Presentation
100 Predictors of the Best Outcomes Following Minimally Invasive Surgery for Grade 1 Lumbar Spondylolisthesis

The J.A.N.E. award honors the legacy of Dr. John Anthony Jane Sr., 1931-2015. Dr. Jane was a world-renowned neurosurgeon, scientist, and teacher. Exceptionally influential in neurosurgery, he held leadership positions in the ABNS and the Senior Society, and served as editor of the Journal of Neurosurgery for more than 20 years.

8:07–8:11 am
J.A.N.E. Award Discussant
Daniel C. Lu
Mayfield Basic Science Award Presentation
101 Transplantation of Neural Precursors Derived from Spinal Progenitor Cells Improves Functional Recovery from Spinal Cord Injury by Reduced Inflammation via Inhibition of the Nuclear


Mayfield Basic Science Award Discussant
Marjorie C. Wang

Mayfield Clinical Award Presentation
102 Fusion and Opioid-sparing with the use of Ketorolac in Posterior Thoracolumbar Spinal Fusions: A Prospective Double-blinded Randomized Placebo-Controlled Trial

Chad F. Claus, Evan J. Lytle, Doris Tong, Diana Sigler, Dominick Lago, Matthew Bahoura, Amarpal Dosanjh, Michael H. Lawless, Dejan Slavnic, Jacob Jasinski, Robert W. McCabe, Karl Kado, Prashant S. Kelkar, Clifford Houseman, Peter L. Bono, Boyd Richards, Teck-Mun Soo

Mayfield Clinical Award Discussant
Ashwini D. Sharan

Announcement of Research Award
R. John Hurlbert

Questions and Discussion

Introduction of Meritorious Award Recipient, Neurosurgery
Iain H. Kalfas

Meritorious Service Award Recipient Presentation, Neurosurgery
Robert F. Heary

Introduction of Meritorious Service Award, Orthopedics
Michael Y. Wang

Meritorious Service Award Presentation, Orthopedics
Rolando Garcia

Introduction of DSPN Chair
Daniel K. Resnick

DSPN Chair’s Address
Michael Y. Wang
Beverage Break and What’s New
Session 1 Non-CME
in the Exhibit Hall
9:30–10:15 am
Sparkle Ballroom

9:37 9:47 am
Advances in MIS Posterior Cervical Fusion
Tim E. Adamson
Sponsored by: SpineWave

9:48 9:58 am
SpineCraft PANORAMA Slotted Retractor for MIS Lumbar Procedures
Adam Lewis
Sponsored by: SpineCraft

9:59 10:09 am
Mazor X Stealth™ Edition Navigated Robotic Guidance
John Pollina Jr.
Sponsored by: Medtronic

Scientific Session 2
Glimmer Ballroom

10:15 am 12:00 pm
Spine Controversies and Sports Trauma

MODERATORS: Shekar N. Kurpad, Mark E. Shaffrey
SPEAKERS: JJ Abitbol, Tim E. Adamson, James S. Harrop, Rolando Garcia, Steven D. Glassman, Gillian A. Hotz, Praveen V. Mummaneni, Jason M. Schwalb, Christopher I. Shaffrey, Nicholas Theodore
LEARNING OBJECTIVES: Upon completion of this session participants will be able to:
1. Identify controversial areas in the field of spine surgery and discuss treatment alternatives
2. Discuss surgical treatments for spinal pathologies commonly encountered in athletes
3. Describe how technological advances have been incorporated into the surgical treatment of athletic injuries

10:15 10:20 am
Introduction
Shekar N. Kurpad, Mark E. Shaffrey

10:21 10:29 am
Adult Deformity Surgery: Beyond Sagittal Balance What’s Next?
Christopher I. Shaffrey

10:30 10:38 am
What Every Spine Surgeon Should Know About Pain
Jason M. Schwalb

10:39 10:47 am
Jumped Facets: Anterior Versus Posterior? Does it Matter?
James S. Harrop
10:48–10:56 am
Evolution of BMP Use
Steven D. Glassman

10:57–11:05 am
NFL Update: Head and Neck Injuries
Nicholas Theodore

11:06–11:14 am
Return to Play Following Sports Injury
Gillian A. Hotz

11:15–11:23 am
MIS Posterior Cervical Foraminotomy: Treatment and Complication Avoidance in Athletes
Tim E. Adamson

11:24–11:32 am
Lumbar Arthroplasty: Not Dead Yet
Rolando Garcia

11:33–11:41 am
Awake MIS TLIF: How I Do It
Praveen V. Mummaneni

11:42–11:50 am
The Opioid Epidemic: What’s Next?
JJ Abitbol

11:51 am–12:00 pm
Questions and Discussion

Lunch with Exhibitors or Attend a Non-CME Sponsored Lunch

12:00 1:00 pm
Splash Ballroom 9/10
Taking Back Control in the Age of Denials for DDD: Defending Your Right to Treat Chronic Low Back Pain Patients
Rolando Garcia Jr., Kim Norton, Faheem A. Sandhu
Sponsored by: Aesculap®

Splash Ballroom 11/12
Prestige LP Two-Level Cervical Arthroplasty: 10 Year Outcomes from a Prospective, Randomized IDE Clinical Trial
Todd H. Lanman
Sponsored by: Medtronic

Splash Ballroom 13-15
The Lateral Approach To The Lumbar Spine: Considerations For When To Use A Plate
Steven J. Tresser
Sponsored by: K2M and Stryker

Sponsored by: Si-Bone®

Splash Ballroom 1-3
Scientific Session 3 Glimmer Ballroom
1:00–2:30 pm
Innovative Technology Special Session

MODERATORS: Zoher Ghogawala, Vincent C. Traynelis
SPEAKERS: Oscar L. Alves, Anthony L. Asher, Roger Hartl, Frank La Marca, John Peloza, Rick Sasso, Claudio E. Tatsui, Albert E. Telfeian, Miroslav J. Vukic, Jang Yoon

LEARNING OBJECTIVES: Upon completion of this session, participants will be able to:
1. Analyze innovative spine technologies and how they can be incorporated into clinical practice
2. Describe the impact of technological advances on improving patient care and outcomes
3. Discuss the pros and cons of adopting novel technologies into clinical practice

1:00–1:08 pm
Endoscopic Lumbar Decompression
Albert E. Telfeian

1:09–1:17 pm
Endoscopic Lumbar Fusion
Jang Yoon

1:18–1:26 pm
Exoscope Intraoperative Visualization
Anthony L. Asher

1:27–1:35 pm
Robotic Spine Surgery: State of the Art
Frank La Marca

1:36–1:44 pm
Cervical TDR: A New Standard?
Rick Sasso

1:45–1:53 pm
Cervical Arthroplasty: Expanded Indications
Oscar L. Alves

1:54–2:02 pm
Cervical TDR: OUS Experience and Results
Miroslav J. Vukic

2:03–2:11 pm
Minimally Invasive Posterior Cervical Fixation
John Peloza

2:12–2:20 pm
Minimally Invasive Surgery: Where We Go From Here
Roger Hartl

2:21–2:29 pm
LIT Laser Treatment of Spinal Metastases
Claudio E. Tatsui

2:29–2:30 pm
Questions and Discussion
2:30 3:15 pm  
Sparkle Ballroom

2:37 2:47 pm  
In nity Occipitocervical-Upper Thoracic System  
Domagoj Coric  
Sponsored by: Medtronic

2:48 2:58 pm  
Enhancing Ef ciencies and Safety During Pedicle Screw Insertion with the Ennovate Spinal System  
Eugene A. Bonaroti  
Sponsored by: Aesculap®

2:59 3:09 pm  
LLIF  
Christopher M. Maulucci  
Sponsored by: Globus Medical

Peripheral Nerve Session  
Splash 17/18

2:30 4:30 pm  
Case-based Approaches to Peripheral Nerve Trauma and Other Conditions

COURSE DIRECTORS: Holly Gilmer, Line G. Jacques, Mark A. Mahan


COURSE DESCRIPTION: This course will cover management of various peripheral nerve disorders. Using a case-based format, faculty will review indications, timing of intervention, and surgical approaches. Relevant anatomy, clinical presentation, and outcomes will be discussed. This course is an excellent review for oral board and maintenance of certifcation.

LEARNING OBJECTIVES: Upon completion of this session, participants will be able to:
1. Describe a systematic approach to patients with a wide range of peripheral nerve disorders
2. Develop a non-operative or operative management strategy for these conditions
3. Discuss advantages and disadvantages and expected outcomes of various surgical approaches
**Peripheral Nerve History and Physical Exam**
Allan J. Belzberg

**Fundamentals of Nerve Injury and Regeneration**
Rajiv Midha

**Brachial Plexus Trauma**
Justin M. Brown

**Discussant—Brachial Plexus Trauma**
Robert J. Spinner

**Upper Extremity Nerve Trauma**
Wilson Z. Ray

**Discussant—Upper Extremity Nerve Trauma**
Eric L. Zager

**Lower Extremity Nerve Trauma**
Mark A. Mahan

**Discussant—Lower Extremity Nerve Trauma**
Allan D. Levi

**Upper Extremity Entrapment**
Marie-Noelle Hebert-Blouin

**Discussant—Upper Extremity Entrapment**
Holly Gilmer

**Lower Extremity Entrapment**
Thomas J. Wilson

**Discussant—Lower Extremity Entrapment**
Amgad S. Hanna

**Nerve Tumors**
Zarina S. Ali

**Discussant—Nerve Tumors**
Allan J. Belzberg

**Neuropathic Pain Management**
Line G. Jacques

**Discussant—Neuropathic Pain Management**
Christopher J. Winfree

**Conclusion and Questions**
Robert J. Spinner
LEARNING OBJECTIVES: Upon completion of this session, participants will be able to:
1. Analyze the findings of novel neurosurgical studies, critique the design and methodology of these studies.
2. List important areas for further knowledge development and research.
3. Discuss ongoing innovative clinical and basic science studies, and how they may impact current practice.

Kuntz Scholars Top Abstracts Concurrent Session 1

Splash 1-3

MODERATORS: Khoi D. Than, Cheerag D. Upadhyaya, John E. Ziewacz

3:15–3:20 pm
Kline Top Peripheral Nerve
Giant Presacral Schwannoma 10-year Clinical Experience and Systematic Review of the Literature

3:20–3:25 pm
Discussant: Mark A. Mahan

3:25–3:30 pm
103 Long Term Costs of Maximum Non-operative Treatments in Patients with Symptomatic Lumbar Stenosis or Spondylolisthesis that Ultimately Required Surgery: A 5-year Costs Analysis
Owoicho Adogwa, Mark A. Davison, Victoria D. Vuong, Syed I. Khalid, Daniel Lilly, Shyam Desai, Jessica R. Moreno, Joseph S. Cheng, Carlos A. Bagley

3:30–3:35 pm
Discussant: Zoher Ghogowala

3:35–3:40 pm
104 Enhanced Recovery After Surgery (ERAS): Implementation in Posterior Lumbar Fusion Surgery

3:40–3:45 pm
Discussant: Daniel K. Resnick

3:45–3:50 pm
105 An Analysis of Medicare Reimbursement Rates in Spine Surgery: 2000-2018

3:50–3:55 pm
Discussant: John H. Chi
3:55–4:00 pm
106 Burnout and Quality of Life in Spine Surgeons: Results of a Worldwide Survey
Alisson R. Teles, Fahad H. Abduljabbar, Jean Ouellet, Catherine E. Ferland, Chung Chek Wong, Giuseppe Barbagallo, Darrel S. Brodke, Abdulaziz Al-Mutair, Asdrubal Falavigna

4:00–4:05 pm
Discussant: John E. O’Toole

4:05–4:10 pm
107 The Impact of Older Age on Functional Recovery after Surgical Decompression for Degenerative Cervical Myelopathy: Results from an International, Multicentre, Prospective Dataset in 757 patients
Jamie R.F. Wilson, Jetan H. Badhiwala, Frank Jiang, Jefferson R. Wilson, Branko Kopjar, Alexander R. Vaccaro, Michael G. Fehlings

4:10–4:15 pm
Discussant: R. John Hurlbert

4:15–4:20 pm
108 Predictors of Elbow Flexion Outcomes Following Reconstructive Nerve Transfers for Brachial Plexus Injury: An Analysis of 651 Patients
Mark A. Attiah, Anil Bhatia, Justin M. Brown

4:20–4:25 pm
Discussant: Robert J. Spinner

Kuntz Scholars Top Abstracts Concurrent Session 2

Splash 9/10 MODERATORS: Sanjay S. Dhall, Jay D. Turner, Robert G. Whitmore

3:15–3:20 pm
109 Ambulation on POD#0 is Associated with Decreased Adverse Events After Elective Lumbar Spine Surgery: Analysis of the Michigan Spine Surgery Improvement Collaborative (MSSIC)
Hesham M. Zakaria, Karam P. Asmaro, RichardRammo, Thomas Noh, Michael Bazydlo, Lonni Schultz, David Nerenz, Muwaffak Abdulhak, Victor W. Chang, Jason M. Schwalb

3:20–3:25 pm
Discussant: Frank La Marca

3:25–3:30 pm
110 Assessing the Differences in Characteristics of Patients Lost to Follow Up at 2 Years: Results from the Multi-site Quality Outcomes Database (QOD) Study of Impact of Fusion on Outcomes of Grade 1 Spondylolisthesis
Praveen V. Mummaneni, Mohamad Bydon, John J. Knightly, Mohammed A. Alvi, Andrew Kai-Hong Chan, Panagiotsis Kerezoudis, Jian Guan, Michael V. Biase, Andrea Strauss, Steven D. Glassman, Kevin T. Foley, Jonathan Slocin, Eric A. Potts, Christopher I. Shaffrey, Mark E. Shaffrey, Regis W. Haid Jr., Kai-Ming G. Fu, Michael Y. Wang, Paul Park, Anthony L. Ashley, Erica F. Bisson
3:30–3:35 pm  
Discussant: John J. Knightly

3:35–3:40 pm  
111 Use of Polyetheretherketone Interbody Devices for Multi-level Anterior Cervical Discectomy and Fusion Results in a 3-fold Higher Rate of Pseudarthrosis Compared to Structural Allograft  
Zoe E. Teton, Barry Cheaney II, Ahmed M.T. Raslan,  
Khoi D. Than

3:40–3:45 pm  
Discussant: Michael P. Steinmentz

3:45–3:50 pm  
112 The Effect of Peri-operative Adverse Events on Long-term Patient Reported Outcomes After Lumbar Spine Surgery  
Oliver G.S. Ayling, Nicolas Dea, Tamir T. Ailon,  
Charles Fisher

3:50–3:55 pm  
Discussant: Kai-Ming G. Fu

3:55–4:00 pm  
113 The Influence of Cervical Spondylolisthesis on Clinical Presentation and Surgical Outcome in Patients with Degenerative Cervical Myelopathy: Analysis of a Multicenter Global Cohort of 458 Patients  
Aria Nouri, So Kato, Jetan H. Badhiwala, Michael Robinson, Juan C. Mejia Munne, George L. Yang,  
William J. Jeong, Rani Nasser, David A. Gimbel,  
Joseph S. Cheng, Michael G. Fehlings

4:00–4:05 pm  
Discussant: Andrew T. Dailey

4:05–4:10 pm  
114 Analysis of the Hierarchical Condition Category (HCC) Score as a Predictor for Increased risk for Complication and Resource Utilization Following Spine Surgeries  
Zachary Sanford, Andrew Broda, Justin Turcotte,  
Chad Patton

4:10–4:15 pm  
Discussant: Dean Chou

4:15–4:20 pm  
115 Surgery for Potentially Unstable Spinal Metastasis Reduces 90-day Admissions  
Shashank V. Gandhi, Kevin Shah, Daniel Schneider,  
Maged Ghaly, Ahmad Latefi

4:20–4:25 pm  
Discussant: Patrick Hsieh
Kuntz Scholars
Top Abstracts Concurrent
Session 3

MODERATORS: Christopher M. Boneld, Kenneth M. Crandall, Aruna Ganju

3:15 3:20 pm
116 Teriparatide Treatment Improves Bone Quality in the Lumbar Spine Out of Proportion to DEXA Changes
Anthony L. Mikula, Ross Puffer, Jeremy L. Fogelson, Mohamad Bydon, Michael J. Yaszemski, Benjamin D. Elder

3:20 3:25 pm
Discussant: Adetokunbo A. Oyelese

3:25 3:30 pm
117 Which Patients Undergoing ACDF are Most Appropriate for an Ambulatory Surgery Center? A Pilot Study
Scott L. Zuckerman, Nikita Lakomkin, Ahilan Sivaganesan, Anthony L. Asher, Clinton J. Devin

3:30 3:35 pm
Discussant: Matthew J. McGirt

3:35 3:40 pm
118 Residual Exposed Endplate Predicts High Grade Heterotopic Ossification in Cervical Disc Arthroplasty
Michael M.H. Yang, Won Hyung A. Ryu, Steven Casha, Stephan DuPlessis, Bradley Jacobs, R. John Hurlbert

3:40 3:45 pm
Discussant: Mark E. Shaffrey

3:45 3:50 pm
119 Drivers of Episode Payments for Non-Cervical Spinal Fusion
Mohamed Macki, David Nerenz, Victor W. Chang

3:50 3:55 pm
Discussant: Nicholas Theodore

3:55 4:00 pm
120 Retrospective Review of Immediate Restoration of Lordosis in Single-level Minimally Invasive Transforaminal Lumbar Interbody Fusion (MI-TLIF): A Comparison of Static and Expandable Interbody Cages
Sertac Kirnaz, Christoph Wipplinger, Franziska A. Schmidt, Philip Saville, Avani Vaishnav, Catherine Gang, Sheeraz Qureshi, Roger H. rtl

4:00 4:05 pm
Discussant: Wilson Z. Ray

4:05 4:10 pm
121 Posterior Cervical Fusion: Analysis of Revision Rate Related to Crossing the Cervicothoracic Junction
Islam Fayed, Daniel Toscano, Matthew Triano, Steven M. Spitz, Amjad N. Anaizi, Nathan Nair, Faheem A. Sandhu, Jean-Marc Voyadzis

4:10 4:15 pm
Discussant: Daniel M. Sciubba
122 Utility of Crossing the Cervicothoracic Junction During Laminectomy and Posterior Spinal Fusion Surgery for Cervical Spondylotic Myelopathy
Andrew Kai-Hong Chan, Ryan Badiee, Joshua Rivera, Leslie Robinson, Ratnesh Mehra, Lee A. Tan, Dean Chou, Praveen V. Mummaneni

Discussant: Luke P. Henny

Beer and Wine Happy Hour Debates

4:30–6:45 pm Glimmer Ballroom

MODERATORS: Daniel J. Hoh, Juan S. Uribe

LEARNING OBJECTIVES: Upon completion of this session, participants will be able to:
1. Critically analyze and discuss various treatment alternatives for common spinal pathologies
2. Discuss the pros and cons of minimally invasive treatment options for the treatment of spinal trauma
3. Describe the advantages of and barriers to adopting cutting edge spine technologies into clinical practice

Grab a beverage and join us for this exciting debate session with lively presentations and discussion!

4:30 4:55 pm
Topic 1: Adult Deformity Surgery in the Elderly

4:30 4:39 pm
PRO: Necessity for an Aging Population
Daniel M. Sciubba

4:40 4:49 pm
CON: Unsustainable Waste of Resources
Daniel K. Resnick

4:50 4:55 pm
Discussion and Verdict
Joseph S. Cheng

4:56 5:21 pm
Topic 2: Minimally Invasive Trauma Surgery

4:56 5:05 pm
CON: Marketing Gimmick
James S. Harrop
5:06 5:15 pm
PRO: New Standard of Care
Roger Hartl

5:16 5:21 pm
Discussion and Verdict
Justin S. Smith

5:22 5:47 pm
Topic 3: Robotic Spine Surgery

5:22 5:31 pm
PRO: The Future is Now
Jeffrey A. Goldstein

5:32 5:41 pm
CON: Hype - A Passing Fancy
Luis M. Tumialan

5:42 5:47 pm
Discussion and Verdict
Ashwini D. Sharan

5:48 6:13 pm
Topic 4: ASC Cervical and Lumbar Fusion

5:48 5:57 pm
PRO: The Next Big Thing
Matthew J. McGirt

5:58 6:07 pm
CON: Not Ready for Primetime
Gerald E. Rodts

6:08 6:13 pm
Discussion and Verdict
Vincent C. Traynelis

6:14 6:39 pm
Topic 5: Cervical Total Disc Replacement

6:14 6:23 pm
PRO: Better than ACDF
Pierce D. Nunley

6:24 6:33 pm
CON: ACDF - Still the Gold Standard
Charles L. Branch

6:34 6:39 pm
Discussion and Verdict
Christopher E. Wolfa

6:40 6:45 pm
Conclusion and Discussion
This is a casual educational experience between our Honored Orthopedic Guest, Rolando Garcia Jr., and residents and fellows. This session offers the opportunity for residents and fellows to exchange ideas related to cutting-edge topics in spine surgery while enjoying a sampling of world-class wines.

RSVP to meetings@cns.org
Space is limited to the first 50 people who RSVP. Walk-ins will be welcomed based on availability.
SATURDAY  
MARCH 16, 2019

6:30 am – 3:00 pm  
Luster Gallerie South

**Challenging Cases 2**  
Glimmer Ballroom

7:00 – 8:00 am
Board-style Challenging Cases: Thoracolumbar
**MODERATORS:** Aruna Ganju, John H. Shin

---

**Abstract Breakout Sessions**

8:00 – 9:30 am

**LEARNING OBJECTIVES:** Upon completion of this session, participants will be able to:
1. Analyze the findings of contemporary neurosurgical studies; critically evaluate the design and methodology of these studies
2. List areas of future research and critical investigation
3. Compare indications, relative contraindications and clinical outcomes for various minimally invasive and motion preserving techniques

---

**MIS/Motion Preservation Breakout**  
Splash 9/10

**MODERATORS:** Victor W. Chang, Eve C. Tsai, Alexander E. Ropper

8:00 – 8:02 am

200 Evaluation of Same Day Discharge Following Stand Alone Single Level Lateral Lumbar Interbody Fusion
Arpan A. Patel, Jakub Godzik, Corey T. Walker, Cory Hartman, Jay D. Turner, Juan S. Uribe

8:02 – 8:04 am

201 Perioperative and Postoperative Complications of Multi-level Minimally Invasive Transforaminal Lumbar Interbody Fusion for Spinal Degeneration in the Elderly
Chad F. Claus, Evan J. Lytle, Doris Tong, Matthew Bahoura, Jake Jasinski, Ascher B. Kaufmann, Boyd Richards, Teck-Mun Soo

8:04 – 8:06 am

202 Clinical Efficacy, Accuracy, and Radiation Reduction Using Instrument Tracking and Ultra-low Radiation Imaging in Minimally Invasive Surgery
Timothy Y. Wang, Vikram Mehta, Eric W. Sankey, Elizabeth P. Howell, Chester Yarbrough, Muhammad M Abd-El-Barr

8:06 – 8:08 am

203 Minimally Invasive Tethered Cord Release in the Pediatric Population
Saeed S. Sadrameli, Tiffany M. Chan, William Steele, Daniel Curry, Sandi Lam
8:08–8:10 am  
204 Early Surgical Outcome of Open Lumbar Discectomy versus Endoscopic Lumbar Discectomy  
Muhammad U. Anwar, Abdul Hameed

8:10–8:12 am  
205 Impact of Lower Thoracic Versus Upper Lumbar UIV in MIS Correction of Adult Spinal Deformity  

8:12–8:14 am  
206 Is Achieving Optimal Spinopelvic Parameters Necessary to Obtain Substantial Clinical Benefit: Analysis of Patients Who Underwent Circumferential MIS or Hybrid Surgery with Open Posterior Instrumentation  

8:14–8:16 am  
207 Does Extension Dysfunction Affect Postoperative Loss of Cervical Lordosis in Patients who Undergo Laminoplasty?  
Dong-Wuk Son, Geun-Sung Song, Sang-Weon Lee, Soonki Sung, Jun Seok Lee, Dookyung Son

8:16–8:18 am  
208 Influence of Prosthesis Design on the Relationship Between Preoperative and Postoperative Flexion-extension ROM After Cervical Disc Arthroplasty  
Avinash G. Patwardhan, Saeed Khayatzadeh, Robert M. Havey

8:18–8:20 am  
209 Indirect Decompression of Lumbar Spinal Stenosis Following Minimally Invasive Transforaminal Lumbar Interbody Fusion  
Jawad M. Khalifeh, Ammar H. Hawasli, Umang Khandpur, Ian G. Dorward, Wilson Z. Ray

8:20–8:22 am  
210 Percutaneous Transforaminal Lumbar Interbody Fusion with an Expandable Cage Through Kambin’s Triangle: Initial Results and Feasibility  

8:22–8:24 am  
211 Novel Single Step MIS 3D NAV Thoracolumbosacral Pedicle Screw System: Work ow, Accuracy, and Initial Clinical Experience  
Franziska A. Schmidt

8:24–8:26 am  
212 Sacroiliac Joint Fusion Outcomes at 2 Years: Triangular Versus Screw Fixation  
Ashish D. Patel, Sheela Vivekanandan, Mauricio Campos-Benitez
8:26 8:28 am
213 Vertebral Endplate Changes Observed by CT: Prevalence and Associations with Clinical Outcomes 3 Years after Lumbar Discectomy with or without an Annular Closure Device
Mark Arts, Adisa Kursumovic, Dharmi Nanda, Peter Vajkoczy

8:28 8:30 am
214 The Incidence of Postoperative Epidural Hematoma after Minimally Invasive Lumbar Decompression A Single Institution Retrospective Review of 1,000 Cases
Kyle Mueller, Marcelle Altshuler, Jean-Marc Voyadzis, Faheem A. Sandhu

8:30 8:32 am
215 A Comparison of Anterior Cervical Discectomy and Fusion versus Fusion Combined with Artificial Disc Replacement for Treating Patients with 3-level Cervical Spondylotic Disease
Lee Sang Bok, Jongho Ahn

8:32 8:34 am
216 The Selection Effect of Minimally Invasive Posterior Spinal Fusion on Surgical Site Infection
Mark B. Svet, Michael Cloney, Jonathan T. Yamaguchi, Benjamin Hopkins, Max Kelsten, Conor B. Driscoll, Jack Goergen, Zachary A. Smith, Tyler R. Koski, Nader S. Dahdaleh

8:34 8:36 am
217 Risk of Clinical Adjacent Segment Pathology Risk Through 7 Years Postop is Reduced Following Cervical Disc Arthroplasty Compared to Anterior Cervical Discectomy and Fusion
Andrew Utter, Pierce D. Nunley, Eubulus J. Kerr, David A. Cavanaugh, Peter Campbell, Kelly Frank, Kyle Marshall, Marcus B. Stone

8:36 8:38 am
218 How Well Does Indirect Decompression Work? Factors Affecting the Need for Additional Posterior Direct Decompression after Anterior or Lateral Interbody Fusion
Daehyun Park, Dean Chou, Praveen V. Mummaneni, Caleb S. Edwards

8:38 8:40 am
219 Minimally Invasive Surgery for the Treatment of Traumatic Monosegmental Thoracolumbar Burst Fractures: Clinical and Radiological Outcomes of 144 Patients with 6-years Follow Up Comparing Two Groups with or without Intermediate Screw
Antonino Raco, Sokol Trungu, Stefano Forcato, Antonio Scollato, Marco Cimatti, Massimo Miscusi

8:40 8:44 am
Questions and Discussion

8:44 8:46 am
220 Assessing the Difference in Clinical and Radiological Outcomes between Expandable Cage and Non-expandable Cage Among Patients Undergoing MIS-TLIF: A Systematic Review and Meta-analysis
Mohammed A. Alvi, Shyam Kurian, Waseem Wahood, Anshit Goyal, Benjamin D. Elder, Mohamad Bydon

MEETING AGENDA
– THURSDAY
– FRIDAY
– SATURDAY
– SUNDAY
8:46  8:48 am
221 Comparing Post-operative Opioid Use After Endoscopic and Open Spine Surgery
Rajeev D. Sen, Zeinab Birjandian, Jason Barber, Lynn B. McGrath Jr., Christoph P. Hofstetter

8:48  8:50 am
222 Indirect Decompression Failure after Lateral Lumbar Interbody Fusion: Reported Failures and Predictive Factors, Systematic Review
Sertac Kirnaz, Rodrigo Navarro-Ramirez, Jiaao Gu, Christoph Wipplinger, Ibrahim Hussain, Franziska A. Schmidt, Roger H’tl

8:50  8:52 am
223 Two-level Cervical Disc Arthroplasty Versus Anterior Cervical Discectomy and Fusion: 10-year Outcomes of a Prospective, Randomized IDE Clinical Trials
Todd H. Lanman, Matthew F. Gornet, J. Kenneth Burkus, Randall Dryer, Jeffrey McConnell, Scott Hodges

8:52  8:54 am
224 Subsidence Rates After Lateral Lumbar Interbody Fusion: A Systematic Review
Mohamed Macki, Paul Park, Victor W. Chang

8:54  8:56 am
225 Observations of Contralateral Facet Fusion in Minimally Invasive Transforaminal Lumbar Interbody Fusion (MIS-TLIF) for Spondylolisthesis
Lara W. Massie, Hesham M. Zakaria, Lonni Schultz, Azam Basheer, Victor W. Chang

8:56  8:58 am
226 Technical and Clinical Feasibility of Autologous Bone Marrow Mesenchymal Stem Cells as Fusion Substrate for Minimally Invasive Transforaminal Interbody Fusion: A Single-institution Cohort Study
Alex M. Butler, Eleonora F. Spinazzi, Garrett P. Banks, Alfred T. Ogden

8:58  9:00 am
227 Multi-level Minimally Invasive Lumbar Decompression: Clinical Efficacy and Durability
Hani Malone, Kavantissa M. Keppetipola, Ryan Khanna, Ricardo B. V. Fontes, John E. O Toole

9:00  9:02 am
228 Lumbar Spine Revision Surgery Through Minimally Invasive Muscle Separating Approach
Maureen A. Darwal, Allison Hubschmann, Saikiran Murthy, Otakar R. Hubschmann, Joseph M. Koziol

9:02  9:04 am
229 Kinematics of Cervical Disc Arthroplasty Above a Two-level Fusion: Index Level and Adjacent segments
Ryan C. Hoover, Kenneth Blank, Muturi Muriuki, Robert M. Havey, Arpan Patel, Jason Abbott, George A. Jones, Avinash G. Patwardhan

9:04  9:06 am
230 Comparison of Perioperative Complications in Minimally Invasive Surgery and Traditional Open Surgery for Decompression and Fusion
Kyle Mueller, Marcelle Altshuler, Jean-Marc Voyadzis, Faheem A. Sandhu, Ashley Macconnell, Peter Wirth
231 Clinical Outcomes Following Endoscopic Versus Minimally Invasive Unilateral Laminotomy in Patients with Moderate Degenerative Deformity
Lynn B. McGrath, Jr., Jason Barber, Rajeev D. Sen, Christoph P. Hofstetter

232 Evaluating the Differences in 30-day Outcomes for Repeat Arthroplasty and Repeat Fusion Procedures in the Lumbar Spine: Insights from a National Registry
Mohamad Bydon, Mohammed A. Alvi, Anshit Goyal, Brett Arthur Freedman, Bradford L. Currier, Benjamin D. Elder

233 Foraminal and Cross-sectional Area Changes Following Oblique Lateral Interbody Fusion (OLIF) as measured by CT or MRI and the Need for Additional Posterior Decompression
Caleb S. Edwards, Andrew Kai-Hong Chan, Leslie Robinson, Dean Chou, Praveen V. Mummmaneni

234 Clinical outcomes following Endoscopic Versus Minimally Invasive Unilateral Laminotomy for Bilateral Decompression in patients with Preoperative Spondylolisthesis
Lynn B. McGrath Jr., Jason Barber, Rajeev D. Sen, Christoph P. Hofstetter

235 Modular Approach to Minimally Invasive Treatment of Spinal Deformity: Evolution of Non-linear Thinking
Jakub Godzik, Corey T. Walker, Cory Hartman, Joshua T. Wewel, Juan S. Uribe

236 Assessing the Differences in 30-day Clinical and Surgical Outcomes between Repeat Cervical Disc Arthroplasty and Repeat Cervical Fusion: Results from a National Surgical Registry
Mohamad Bydon, Mohammed A. Alvi, Anshit Goyal, Brett A. Freedman, Bradford L. Currier, Benjamin D. Elder

237 Volumetric Analysis of Endoscopic Decompression for Lumbar Spinal Stenosis
Siri Sahib S. Khalsa, Hyeun S. Kim, Ravindra Singh, Osama N. Kashlan

238 Comparison of Clinical Outcome and Spino-Pelvic Parameters Modifications Between Minimally Invasive and Conventional Open Posterior Lumbar Interbody Fusion for Treatment of High-grade LS-S1 Isthmic Spondylolisthesis
Massimo Miscusi, Alessandro Ramieri, Sokol Trungu, Stefano Forcato, Giuseppe Costanzo, Antonino Raco

239 Transforaminal Percutaneous Endoscopic Foraminoplasty (TF-PELF) Against Lumbar Foraminal Stenosis.
Manabu Minami

9:06–9:08 am
9:08–9:10 am
9:10–9:12 am
9:12–9:14 am
9:14–9:16 am
9:16–9:18 am
9:18–9:20 am
9:20–9:22 am
9:22–9:24 am
9:24–9:30 am

Questions and Discussion
8:00–8:02 am
240 Anatomical and Radiographical Parameters in the Craniovertebral Junction to Predict Postoperative Dysphagia in Occipitocervical Fusion: O-EA Angle, O-C2 Angle, and C2-T Angle
Wataru Ishida, Seba Ramhmdani, Alexander Perdomo-Pantoja, Ziya L. Gokaslan, Jean-Paul Wolinsky, Nicholas Theodore, Daniel M. Sciubba, Timothy F. Witham, Ali Bydon, Sheng-fu Larry Lo

8:02–8:04 am
241 Timing of Decompression for Central Cord Syndrome: An Institutional Perspective
Maxwell Newby, Kyle A. Smith, Paul M. Arnold

8:04–8:06 am
242 The Impact of Hospital Transfer, Time to Surgical Treatment, and Acute Rehabilitation on Spinal Cord Injury Recovery: A Retrospective Cohort Analysis
Austin Gamblin, Herschel Wilde, Jared C. Reese, Jason Garry, Michael Karsy, Jian Guan, Janel Mortenson, Alexandra Flis, Jeffrey P. Rosenbluth, Erica F. Bisson, Andrew T. Dailey

8:06–8:08 am
243 Impact of the Inclusion of C2 in Posterior Cervical Fusions for Cervical Myelopathy on Sagittal Cervical Alignment
Royce Woodroffe, Logan Helland, Chanse Hollatz, Anthony Piscopo, Liesl Close, Kirill Nourski, Stephanus Viljoen, Andrew J. Grossbach, Patrick W. Hitchon

8:08–8:10 am
244 Outpatient Anterior Cervical Discectomy and Fusion (ACDF) in the Ambulatory Surgery Center Setting: Safety Assessment for the Medicare Population
Matthew J. McGirt, Vincent Rossi, Deborah Pfortmiller, Michael A. Cowan, Mark D. Smith, S. Taylor Jarrell, Craig A. VanDerVeer, Tim E. Adamson

8:10–8:12 am
245 Artificial Discs in Cervical Disc Arthroplasty: A Network Meta-Analysis for Comparison of Long-term Outcomes
Waseem Wahood, Yagiz U. Yolcu, Sandy Goncalves, Panagiotis Kerezoudis, Mohamad Bydon

8:12–8:14 am
246 Degenerative Cervical Myelopathy in North America, 2002-2014: A Silent Epidemic
Jetan H. Badhiwala, Farshad Nassiri, Christopher D. Witiw, Saleh A. Almenawer, James S. Harrop, Christopher I. Shaffrey, Jr., Michael G. Fehlings, Jefferson R. Wilson
8:14–8:16 am
247 Surgical Outcomes for Elderly Patients with Degenerative Lumbar Spondylolisthesis

8:16–8:18 am
248 The Impact of Certificate of Need (CON) Programs on the Site of Surgical Care: Do CON Programs Constrain Growth in Ambulatory Surgery Centers (ASCs)?
Nicholas M. Benson, Cyril Chang, E. O. George, Albert Okunade

8:18–8:20 am
249 Reduction in Narcotic Use After Lumbar Decompression and Fusion in Patients with Symptomatic Lumbar Stenosis or Spondylolisthesis
Owoicho Adogwa, Mark A. Davison, Victoria D. Vuong, Syed I. Khalid, Daniel Lilly, Shyam Desai, Jessica R. Moreno, Joseph S. Cheng, Carlos A. Bagley

8:20–8:22 am
250 Utility of Cervical Collars Following Cervical Fusion Surgery, Does it Improve Fusion Rates or Outcomes? A Systematic Review.

8:22–8:24 am
251 Machine Learning Analysis of Multiparametric Quantitative MRI to Develop a Diagnostic Model for Early Myelopathy
Muhammad Akbar, Allan R. Martin, Jetan H. Badihwala, Julien Cohen-Adad, Jefferson R. Wilson, Adrian Crawley, David J. Mikulis, Michael G. Fehlings

8:24–8:26 am
G. Damian Brusko, Julie A. Heger, Gregory Basil, John Paul G. Kolcun, Glen R. Manzano, Allan D. Levi, Michael Y. Wang

8:26–8:28 am
253 The Safety and Efficacy of Riluzole in Enhancing Clinical Outcomes in Patients Undergoing Surgery for Cervical Spondylotic Myelopathy: Results of the CSM-Protect Double-blinded, Multi-center Randomized Controlled Trial in 300 Patients
<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:28–8:30 am</td>
<td>254 Cost Analysis During Rehabilitation After Spinal Cord Injury: A Retrospective Cohort Analysis</td>
<td>Austin Gamblin, Jason Garry, Herschel Wilde, Jared C. Reese, Brandon Sherrod, Michael Karsy, Jian Guan, Janel Mortenson, Alexandra Flis, Jeffrey P. Rosenbluth, Erica F. Bisson, Andrew T. Dailey</td>
</tr>
<tr>
<td>8:30–8:32 am</td>
<td>255 Tubular Discectomy Versus Conventional Microdiscectomy for the treatment of Lumbar Disk Herniation: Long-term results of a Randomized Controlled Trial</td>
<td>Mark Arts, Gijsbert Overdevest, Ronald HMA Bartels, Wilco C. Peul</td>
</tr>
<tr>
<td>8:32–8:34 am</td>
<td>256 Faster Fusion with Stand-alone Interbody 3D-printed Porous Titanium Cervical Implants: Results of the EFFECT Trial</td>
<td>Mark Arts, Jasper Wolfs</td>
</tr>
<tr>
<td>8:40–8:44 am</td>
<td>Questions and Discussion</td>
<td></td>
</tr>
<tr>
<td>8:44–8:46 am</td>
<td>260 Novel Algorithm for the Surgical Management of Lumbar Adjacent-Segment Disease: Adding Modern Techniques to the Surgeon’s Armamentarium</td>
<td>Jason Ilias Liounakos, Iahn Cajigas, Jonathan N. Sellin, Michael Y. Wang</td>
</tr>
</tbody>
</table>
8:48–8:50 am  
262 The Effect of Relative Decrease in Blood Hemoglobin Levels on Perioperative Morbidity after Surgery for Metastatic Tumors of The Spine  
Rafael De la Garza Ramos, Michael Longo, Yaroslav J. Gelfand, Murray Echt, Vijay Yanamadala, David Kramer, Merritt D. Kinon, Reza Yassari

8:50–8:52 am  
263 Motion Capture Analysis Quantifies Trunk Control Deficits in Spinal Cord Injury  
Yevgeniy Freyvert, Lorie A. Brinkman, Ruyi Huang, Jacob S. Nusynowitz, Hamid Ghasemi, Daniel C. Lu

8:52–8:54 am  
264 The Effects of Preemptive Hypothermia on Neurophysiological and Functional Outcomes Following Iatrogenic Spinal Cord Impact Injury  
Ahmed Jorge, Shreya Umredkar, Erika Fish, Rohan Krishnan, Parthasarathy D. Thirumala

8:54–8:56 am  
265 Postoperative Intubation: A Significant Predictor of Morbidity and Severe Adverse Events in Patients Undergoing Elective Posterior Lumbar Fusion  
Yaroslav J. Gelfand, David Kramer, Rafael De la Garza Ramos, Michael Longo, Murray Echt, Jonathan P. Nakhla, Reza Yassari

8:56–8:58 am  
266 Clinical Outcomes and Local Control Rates for Stereotactic Radiosurgery Following Surgery for Metastatic Spinal Tumors  
Robert Koff, Laura Van Beaver, Caroline M. Ayinon, Vijay Yanamadala, Ganesh Shankar, Kevin S. Oh, John H. Shin

8:58–9:00 am  
267 Penetrating Spinal Cord Injury in Civilians: Analysis of a National Database  
Mauricio J. Avila, Nikolay L. Martirosyan, Travis M. Dumont

9:00–9:02 am  
268 Comparative Study of Percutaneous Pedicle Screw Fixation after Direct Decompression with Anterior Column Reconstruction for Thoracolumbar Burst Fracture  
Seul-Kee Lee, Jung-Kil Lee, Jae Young Kim

9:02–9:04 am  
269 Ischemic Optic Neuropathy Following Spine Surgery: Case Series and Systematic Review of the Literature  
Anshit Goyal, Mohamed Elminawy, Mohammed A. Alvi, Yagiz U. Yolcu, Timothy R. Long, John J. Chen, Elizabeth A. Bradley, Brett Arthur Freedman, Mohamad Bydon

8:21–8:23 am  
270 Thoracolumbar Junction Orientation: Its impact on Thoracic Kyphosis and Sagittal Alignment in both Asymptomatic Volunteers and Symptomatic Patients  
Hong-Joo Moon, Munish C. Gupta

9:06–9:08 am  
271 Correlation of MR Diffusion Tensor Imaging Parameters with ASIA Score for Prognostication and Long-term Outcomes  
Saman Shabani, Mayank Kaushal, Matthew Budde, Brian Schmit, Shekar N. Kurpad
9:08–9:10 am
272 Should Multi-level Posterior Cervical Fusions Involving C7 Cross the Cervico-Thoracic Junction? A Systematic Review and Meta-analysis
Aya Akhras, Anshit Goyal, Waseem Wahood, Mohammed A. Alvi, Mohamad Bydon

9:10–9:12 am
273 Trends of Medicare Part B Utilization Among Neurosurgeons
Rasheeat Zakare, Christine Park, Oren N. Gottfried

9:12–9:14 am
274 The Limited Influence of the Surgical Team Behavior on the Inpatient Experience: A Retrospective Multi-hospital Analysis of HCAHPS Feedback
Rasheeat Zakare, Wes Dickson, Alessandra Garcia, Tracy Cheng, Oren N. Gottfried

9:14–9:16 am
275 Differences in Characteristics and Outcomes Among Patients Undergoing Surgery for Spondylolisthesis at a Private Versus Academic Institution: Analysis from the Multi-site Quality Outcomes Database (QOD) Study on Outcomes of Impact of Fusion on Grade 1 So
Mohamad Bydon, Praveen V. Mummaneni, Mohammed A. Alvi, Andrew Kai-Hong Chan, Jian Guan, Panagiotis Kerezoudis, Michael V. Biase, Andrea Strauss, Steven D. Glassman, Kevin T. Foley, Jonathan Slotkin, Eric A. Potts, Christopher I. Shaffrey Sr., Mark E. Shaffrey, John J. Knightly, Kai-Ming G. Fu, Michael Y. Wang, Paul Park, Anthony L. Asher, Erica F. Bisson

9:16–9:18 am
276 Impact of Anterior Plating Versus Stand-alone Cage on Rate of Fusion, Subsidence, and Adjacent Segment Disease in Single-level Cervical Corpectomy for Spondylosis
Murray Echt, Michael Longo, Rafael De la Garza Ramos, Yaroslav J. Gelfand, Jonathan P. Nakhla, Merritt D. Kinon, Reza Yassari

9:18–9:20 am
277 The True Penalty of the Waiting Room: The Role of Wait Time in Patient Satisfaction in a Busy Spine Practice
Rasheeat Zakare, Wes Dickson, Tracy Cheng, Oren N. Gottfried

9:20–9:22 am
278 Predicting Non-routine Discharge After Elective Spine Surgery: External Validation of Machine Learning Algorithms Using Institutional Data
Brittany Stopa, Faith C. Robertson, Aditya V. Kharade, Melissa Ming Jie Chua, Marike Broekman, Joseph H. Schwab, Timothy R. Smith, William B. Gormley

9:22–9:24 am
279 Correlation of Body Mass Index (BMI) and Global Sagittal Alignment with Anterior Correction Surgery in Adult Spinal Deformity
M. Burhan Janjua, Brendan McShane, William C. Welch, Vincent Arlet, Ali K. Ozturk

9:24–9:30 am
Questions and Discussion
Improving Healthcare Delivery and Patient Outcomes

MODERATORS: David M. Benglis, Erica F. Bisson, Michael D. Martin

8:00 8:02 am
280 The Effect of Best Practice Alerts in Electronic Medical Records for Low-back Pain Imaging
Yi-Ren Chen, Doris Chen

8:02 8:04 am
281 Preoperative Disability Predicts Prolonged Hospital Stay Following Elective Lumbar Fusion Surgery
Michael M.H. Yang, Daniel Yavin, Perry Pawandeep Singh Dhaliwal, Stefan T. Lang, W. Bradley Jacobs, Steven Casha, Stephan DuPlessis

8:04 8:06 am
282 Impact of Patient-controlled Analgesia on Clinical Outcomes after Posterior Lumbar Spinal Fusion Surgery
Corey T. Walker, Arpan A. Patel, Jakub Godzik, Virginia Prendergast, John Radosевич, Doneen Grimm, Alex Whiting, Juan S. Uribe, Jay D. Turner

8:06 8:08 am
283 Does the Height of Cervical Interbody Device Predict the Fusion and Quality of Life Outcomes after Anterior Cervical Fusion: A Regression Modeling Study

8:08 8:10 am
284 Preoperative PHQ-2 Scoring Predicts Patient Satisfaction and Return to Work up to 1 Year After Lumbar Fusion: A 2 year Analysis from the Michigan Spine Surgery Improvement Collaborative (MSSIC)
Hesham M. Zakaria, Karam P. Asmaro, Richard Rammo, Michael Bazydlo, Lonni Schultz, David Nerenz, Jason M. Schwalb, Paul Park, Victor W. Chang

8:10 8:12 am
285 Preventing Post-operative Urinary Retention (POUR) in Patients Undergoing Elective Lumbar Surgery: A Quality Improvement Project
Jake Jasinski, Doris Tong, Evan J. Lytle, Chad F. Claus, Matthew Bahoura, Clifford M. Houseman, Peter L. Bono, Teck-Mun Soo

8:12 8:14 am
286 Implications of Risk Adjustment for Physician Incentives in the Medicare Access and CHIP Reauthorization Act: Evidence from an Instrumental Variables Analysis of Patients with Low Back Pain
Daniel Vail, Tej D. Azad, John K. Ratliff
8:14–8:16 am
287 A Predictive Model and Nomogram for Predicting Return to Work at 3 Months After Cervical Spine Surgery: An Analysis from the Quality Outcome Database
Clinton J. Devin, Mohamad Bydon, Mohammed A. Alvi, Andrew Kai-Hong Chan, Panagiotis Kerezoudis, Inamullah Khan, Ahilan Sivaganesan, Matthew J. McGirt, Kristin Archer, Kevin T. Foley, Praveen V. Mummaneni, Erica F. Bisson, John J. Knightly, Christopher I. Shaffrey Sr., Anthony L. Asher

8:16–8:18 am
288 Development of Clinical Prognostic Models for Postoperative Survival and Quality of Life in Patients with Metastatic Epidural Spinal Cord Compression Treated Surgically
Anick Nater, Junior Chuang, Kuan Liu, Nasir A Quraishi, Dritan Pasku, Jefferson R. Wilson, Michael G. Fehlings

8:18–8:20 am
289 Comparison of Inpatient versus Outpatient Single Level Anterior Cervical Discectomy and Fusion for Cervical Radiculopathy: Utilization, Safety, and Economics from a National Perspective
Christopher D. Witiw, Fabrice Smieliauskas, John E. O Toole, Richard G. Fessler, Vincent C. Traynelis

8:20–8:22 am
290 A Partial Least Squares Analysis of Functional Status, Disability, and Quality of Life after Surgical Decompression for Degenerative Cervical Myelopathy
Jetan H. Badhiwala, Omar Khan, Frank Jiang, Jamie Wilson, Benjamin R. Morgan, George Ibrahim, Jefferson R. Wilson, Michael G. Fehlings

8:22–8:24 am
291 The Cost Effectiveness of Spine Clinic: An Analysis of 35,249 Patient Appointments and Subsequent Surgeries at a Single Academic Institution
Benjamin Hopkins, Aditya Mazmudar, Prithvi B. Bomdica, Michael Cloney, Wellington Hsu, Alpesh Patel, Zachary A. Smith, Tyler R. Koski, Jean-Paul Wolinsky, Nader S. Dahdaleh

8:24–8:26 am
292 Impact of Neurologic Deficits on Surgical Outcomes and HRQoL Following Treatment for Metastatic Epidural Spinal Cord Compression
8:28  8:30 am
294 The Impact of Breast Size on Sagittal Balance and Patient Reported Outcomes in a Retrospective Cohort of Elective Spine Surgery Patients
Lara W. Massie, Lonni Schultz, Elizabeth N. Kuhn, Hesham M. Zakaria, Donna Tepper, Victor W. Chang

8:30  8:32 am
295 Anterior Cervical Discectomy and Fusion: The Impact of Diabetes Mellitus on In-Hospital Complication Rates and Cost of Care
William Shuman, Sean N. Neifert, Daniel J. Snyder, Brian C. Deutsch, Jonathan S. Gal, Jeffrey Zimering, Robert J. Rothrock, John M. Caridi

8:32  8:34 am
296 The Association of Post-operative Opioids with Pain Management and Doctor Communication Scores in Elective Lumbar Decompression Surgery Patients
Robert Winkelman, Jay M. Levin, Joseph E. Tanenbaum, Dominic Pelle, Thomas Mroz, Michael P. Steinmetz

8:34  8:36 am
297 National Adverse Event Pro 1e After Lumbar Spine Surgery for Lumbar Degenerative Disease and Comparison of Complication Rate Between Hospitals: A COSRN Registry Study
Oliver GS Ayling, Rapha 1e Charest-Morin, Tamir T. Ailon, Nicolas Dea, Charles Fisher

8:36  8:38 am
298 The Impact of Preoperative Depression on Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) Survey Results in a Cervical Spine Surgery Setting
Jay M. Levin, Nicholas M. Rabah, Joseph E. Tanenbaum, Thomas E. Mroz, Michael P. Steinmetz

8:38  8:40 am
299 Quantifying the Unquantifiable: Using the Patient Satisfaction Index to Analyze the Impact of Opioids on Surgical Outcomes
Geoffrey R. O Malley Jr., Vanessa Kirschner, Michael V. Biase, Dimple Gandhi, Scott A. Meyer, John J. Knightly

8:40  8:44 am
Questions and Discussion

8:44  8:46 am
300 Predictors of Cost in Patients Undergoing Lumbar Spine Surgery
Sasha Vaziri, Christopher Henson, Kyle Scott, Omar Awan, Saptarshi Chakraborty, Kshitij Khare, Paul Kubilis, Daniel J. Hoh

8:46  8:48 am
301 Incidence and Risk Factors for 90-day Readmission Following Medical and Surgical Management of Spinal Epidural Abscess: A Multi-institutional Study
Michael Longo, Yaroslav J. Gelfand, Zach Pennington, Rafael De la Garza Ramos, Murray Echt, Ali K. Ahmed, Daniel M. Sciubba, Merritt D. Kinon, Reza Yassari
8:48 – 8:50 am
302 Trends in 30-day Unplanned Emergency Department Visits Following Elective Spine Surgery
Zachary Sanford, Andrew Broda, Justin Turcotte, Chad Patton

8:50 – 8:52 am
303 Chronicity of Preoperative Opioid Usage Predicts Patient Satisfaction, Return to Work, and Achieving ODI MCID up to 2 Years After Lumbar Fusion: Analysis from the Michigan Spine Surgery Improvement Collaborative (MSSIC)

8:54 – 8:56 am
305 Does Length of Stay Impact Likelihood of Unplanned Readmissions Following Spine Surgery? Insights from a National Surgical Registry
Anshit Goyal, Elena Blaginykh, Mohammed A. Alvi, Mohamad Bydon

8:56 – 8:58 am
306 Using Artificial Intelligence (AI) to Predict Postoperative Wound Infection: A Retrospective Cohort of 4,046 Posterior Spinal Fusions
Benjamin Hopkins, Michael Cloney, Nader S. Dahdaleh

8:58 – 9:00 am
307 Predictors of 30-day Morbidity and Mortality in Patients Undergoing C1-C2 fusion for the Surgical Treatment of C2 Fractures
Jonathan P. Nakhla, Yaroslav J. Gelfand, Rafael De la Garza Ramos, Sean M. Barber, Sanjay Konakondla, Jared Fridley, Adetokunbo A. Oyelese, Albert E. Telfeian, Ziya L. Gokaslan

9:00 – 9:02 am
308 Spine Surgery Patient-related Factors and Outcomes Predict HCAHPS Self-Reported Overall Hospital Rating
Elbert J. Mets, Michael R. Mercier, Ari S. Hilibrand, Michelle C. Scott, Arya G. Varthi, Jonathan Grauer

9:02 – 9:04 am
309 A Two-year Cost Analysis of Maximum Non-operative Treatments in Patients with Symptomatic Lumbar Stenosis or Spondylolisthesis that Ultimately Required Surgery
Owoicho Adogwa, Mark A. Davison, Daniel Lilly, Victoria D. Vuong, Shyam Desai, Jessica R. Moreno, Joseph S. Cheng, Carlos A. Bagley

9:04 – 9:06 am
310 Demographic Factors Associated with HCAHPS Reported Pain Management
Elizabeth P. Howell, Jihad Abdelgadir, Edmund Ong, Salma Abdalla, John Hunting, Mohamed M. Diab, Michael M. Haglund, C. Rory Goodwin, Padma Gulur
50

9:06 9:08 am
311 Machine Learning and Time Series Motion Classification: Is it Possible to Write Real-world, Single-sensor Algorithms to Detect the Activities of Daily Living Used in Patient Reported Outcome Questionnaires?
Nicholas M. Benson, Arjun S. Kurian, Andrew Fields, Newton Metcalf, Wing Au, Seth Georgian, Domagoj Coric, Shane Burch, Steven D. Glassman

9:08 9:10 am
312 Hospital Medicare Reimbursement Rates for Inpatient Episodes of Care in Spine Surgery
Jack M. Haglin, Jakub Godzik, Luis M. Tumialan, Kent Richter, Andrew R. Fines, Alan H. Daniels

9:10 9:12 am
313 Assessing Patient Comorbidities to Reduce Avoidable Readmission

9:12 9:14 am
Nicholas M. Rabah, Jay M. Levin, Thomas E. Mroz, Michael P. Steinmetz

9:14 9:16 am
315 Predictive Model for Prolonged Length of Stay after Anterior Cervical Discectomy and Fusion (ACDF): Insights from the Quality Outcomes Database (QOD)
Praveen V. Mummaneni, Mohamad Bydon, John J. Knightly, Anshit Goyal, Mohammed A. Alvi, Andrew Kai-Hong Chan, Jian Guan, Kevin T. Foley, Jonathan Slotkin, Eric A. Potts, Christopher I. Shaffrey Sr., Mark E. Shaffrey, Kai-Ming G. Fu, Michael Y. Wang, Anthony L. Asher, Erica F. Bisson

9:16 9:18 am
316 Surgical Management of Cervical Epidural Abscess: A Treatment Algorithm in Response to the Opioid Epidemic
Jason E. McGowan, D. Kojo Hamilton

9:18 9:20 am
317 Predictors of 90-day Readmission after Spinal Tumor Resection in Children
M. Burhan Janjua, Brendan McShane, William C. Welch, Vincent Arlet, Ali K. Ozturk

9:20 9:22 am
318 Dual Surgeon Operations for Long Segment Posterior Fusion Leads to Reduced Morbidity
Teddy Kim, Alexander K. Powers, John Frino, Eloise Jourbert

9:22 9:24 am
319 Matched-cohort Analysis of the Short-term Outcomes between Surgical Treatments for the Management of Cervical Radiculopathy
Yatindra Harilal Patel, Ryan J. Berger, Morad Chughtai, Linsen T. Samuel, Anton Khlopas, Assem A. Sultan

9:24 9:30 am
Questions and Discussion
8:00–8:02 am
320 Timing of Prophylactic Anticoagulation and Its Effect on Thromboembolic Events after Surgery for Metastatic Tumors of The Spine
Rafael De la Garza Ramos, Michael Longo, Yaroslav J. Gelfand, Murray Echt, Jonathan P. Nakhla, Vijay Yanamadala, Merritt D. Kinon, Reza Yassari

8:02–8:04 am
321 Low Back Pain after Lumbar Discectomy for Disc Herniation: What Can you Tell Your Patient?
Christian Iorio-Morin, Greg McIntosh, Charles Fisher, Nicholas Dea

8:04–8:06 am
322 Malignant Primary Spinal Column Tumors: Prognostic Significance of HTERT (Human Telomerase Reverse Transcriptase) Promoter Region Mutations C228T and C250T for Overall Survival
Stephen Yip, Chetan Bettegowda, Bowen Jiang, Wei-Lien Wang, Michelle J. Clarke, Aron Lazary, Marco Gambarotti, Ming Zhang, Daniel M. Scuibba, Jean-Paul Wolinsky, Edward McCarthy, Nicole Germscheid, Arjun Sahgal, Ziya L. Gokaslan, Stefano Boriani, Peter Varga, Charles Fisher, Laurence D. Rhines, AOSpine Knowledge Forum Tumor

8:06–8:08 am
323 Two-year Outcomes of Patients Treated with BVN Ablation for the Relief of Chronic Low Back Pain: Results of the SMART Trial
Alfred L. Rhyne, Jeffrey S. Fischgrund, Richard Sasso, Hyun W. Bae, Kevin C. Macadaeg

8:08–8:10 am
324 Consideration for Surgical Management of Osteomyelitis-Discitis at the Thoracolumbar Junction
Terence Verla, Robert Y. North, Venita Simpson, Alexander E. Ropper

8:10–8:12 am
325 Postoperative C5 Palsy Is Best Predicted by Use of Intraoperative C5 Laminectomy Among Patients Operated for Degenerative Cervical Myeloradiculopathy
Zach Pennington, Daniel Lubelski, Adam D Sa, Ali K. Ahmed, Erick M. Westbroek, Matthew Goodwin, Daniel M. Scuibba

8:12–8:14 am
326 Impact of Hypothyroidism on In-hospital Mortality and Cardiac Complications for Lumbar Spinal Fusions
Roberto Perez-Roman, Evan Luther, David J. McCarthy, Joshua D. Burks, Andrew Buskard, Karthik Madhavan, Steven Vanni, Michael Y. Wang
8:14  8:16 am
327 Hypervascular Metastatic Spine Tumors Are Rarely Angiographically Associated With The Artery of Adamkiewicz or Other Radiculomedullary Arteries
Erick M. Westbroek, A. Karim Ahmed, Zach Pennington, Matthew Goodwin, Yuanxuan Xia, Philippe Gailloud, Daniel M. Sciubba

8:16  8:18 am
328 Combined Magnetic Field Results in Higher Fusion Rates than Pulsed Electromagnetic Field Bone Stimulation after Thoracolumbar Fusion Surgery
Barry Cheaney II, Mahboub M. El Hashemi, Khoi D. Than

8:20  8:22 am
330 Sarcopenia Independently and Accurately Predicts Survival in Patients Undergoing Spine Surgery for Metastatic Tumors: A Multi-center Retrospective Cohort Study

8:22  8:24 am
331 Long-term Outcomes after Minimally Invasive Transforaminal Lumbar Interbody Fusion for Lumbar Spondylolisthesis
Mick J. Perez-Cruet, Esam A. Elkhatab, Elizabeth Abel

8:24  8:26 am
332 Outcome Analysis of Long-term Cancer Survivors Surgically Treated for Symptomatic Spinal Metastases
Oni Barzilai, Lily McLaughlin, Eric Lis, Yoshiya J. Yamada, Mark H. Bilsky, Ilya Laufer

8:26  8:28 am
333 C2-7 SVA and T1 Slope are Predictable Factors of the Dropped-Head Cervical Deformity after Laminoplasty
Tetsuryu Mitsuyama, Kaiji Ota, Takeshi Umebayashi, Ryuta Kono, Isao Oshima

8:28  8:30 am
334 Predictive Modeling of Adverse Event Occurrence after Spine Surgery
John K. Ratliff, Tej D. Azad, Summer Han

8:30  8:32 am
335 The Influence of Surgical Intervention and Sagittal Alignment on Frailty in Adult Cervical Deformity
8:32–8:34 am

336 A Comparison of 30-day Hospital Readmission Rates following Outpatient Versus Inpatient 1 and 2 level Anterior Cervical Discectomy and Fusion Surgeries: An Analysis of a Medicare Patient Sample

Owoicho Adogwa, Syed Ibad Khalid, Victoria D. Vuong, Mark A. Davison, Samantha Maasarani, Patrick Melville, Rita Wu, Jessica R. Moreno, Joseph S. Cheng, Carlos A. Bagley

8:34–8:36 am

337 Perioperative Transfusion Threshold of Hemoglobin \( \geq \) 9.0 mg/dL Results in Better Early Ambulation and Shorter Length of Stay for Patients Undergoing Complex Spine Surgery

Vijay Yanamadala, Anna Wright, Jean-Christophe A. Leveque, Rajiv Sethi

8:36–8:38 am

338 Can We Do Better? An Early Assessment of the First Real-time, Image-guided Robot in Spinal Surgery


8:38–8:40 am

339 Undesired Bony Overgrowth after use of rhBMP-2 in Spinal Surgery: A Case Series

Elizabeth N. Kuhn, Nicholas M. Laksay, Joseph H. Miller, Mark N. Hadley

8:40–8:44 am

Questions and Discussion

8:44–8:46 am

340 Can PROMIS be Used to Evaluate Patients with Primary or Metastatic Spine Tumors?

David N. Bernstein, Matthew St. John, Wajeeh Bakhsh, M. Owen Papuga, Emmanuel N. Menga, Paul T. Rubery, Addisu Mes

8:46–8:48 am

341 The Comparative Safety of Lumbar Spinal Fusion for Degenerative Spondylolisthesis among Older Adults

Jetan H. Badhiwala, Brij S. Karmur, Laureen D. Hachem, Jamie Wilson, Christopher D. Witiw, Farshad Nassiri, Michael G. Fehlings, Jefferson R. Wilson

8:48–8:50 am

342 Risk Factors for Surgical Site Infection After Posterior Spinal Fusion: A Single-center Experience with 4046 Patients

Michael Cloney, Jack Goergen, Benjamin Hopkins, Jonathan T. Yamauchi, Conor B. Driscoll, Mark B. Svet, Max Kelsten, Zachary A. Smith, Tyler R. Koski, Nader S. Dahdaleh

8:50–8:52 am

343 Closing the Treatment Gap for Lumbar Disc Herniation Patients with Large Annular Defects: Techniques and Outcomes for this High-risk Population

Joshua M. Ammerman, Mark, William C. Watters III, Jason Inzana, Eugene Carragee, Michael W. Groff
8:52–8:54 am 344 Worldwide Knowledge and Attitude of Spine Surgeons Regarding Radiation Exposure
Asdrubal Falavigna, Miguel B. Ramos, Chung C. Wong, Giuseppe Barbagallo, Darrel S. Brodke, Abdulaziz Al-Mutair, Zoher Ghogawala, K. Daniel Riew

8:54–8:56 am 345 Accuracy of Pedicle Screw Placement using Next-generation Spinal Robotics: Evaluation of Deviation from Pre-planned Trajectory

Yaroslav J. Gelfand, David Kramer, Rafael De la Garza Ramos, Michael Longo, Jonathan P. Nakhla, Merritt D. Kinon, Reza Yassari

8:58–9:00 am 347 Assessing the Performance of NSQIP Surgical Risk Calculator in Elective Spine Surgery: Insights from Patients Undergoing Single-level Posterior Lumbar Fusion
Arjun Sebastian, Anshit Goyal, Mohammed A. Alvi, Waseem Wahood, Mohamed Elminawy, Yagiz U. Yolcu, Elizabeth B. Habermann, Mohamad Bydon

9:00–9:02 am 348 Can Machine Learning Algorithms Accurately Predict Discharge to Rehabilitation and Early Unplanned Readmissions Following Spinal Fusion? Analysis of a National Surgical Registry
Panagiotis Kerezoudis, Anshit Goyal, Che Ngufor, Brandon A. McCutcheon, Curtis Storlie, Mohamad Bydon

9:02–9:04 am 349 Utility of Thoracolumbar Bracing following Spinal Fusion
Elizabeth P. Howell, Mostafa A. Gabr, Daniel Villalobos, Timothy Y. Wang, Elisabeth Touko, Brice Painter,Alexia Bwensa, Muhammad M. Abd-El-Barr, Isaac O. Karikari, C. Rory Goodwin

9:04–9:06 am 350 Assessing the Differences in Outcomes Between General and Regional Anesthesia in Spine Surgery: Results from a National Registry
Waseem Wahood, Mohammed A. Alvi, Yagiz U. Yolcu, Panagiotis Kerezoudis, Anshit Goyal, Timothy R. Long, Mohamad Bydon

9:06–9:08 am 351 Dysphagia After Occipitocervical Fusion: Are We Measuring the Correct Parameters?
Tyler Ball, Nicolas K. Khattar, Shawn W. Adams, Mayur Sharma, Rob Hruska, Thomas J. Altstadt
9:10 9:12 am
353 Opioid Use Associated with Worse Post-operative Lumbar Fusion Outcome at 1 Year
Nasya Mendoza-Elias, Melissa Dunbar, Robert Heller, Zoher Ghogawala, Robert G. Whitmore

9:12 9:14 am
354 Analysis of the Correlation of Intraoperative Neuromonitoring Changes with Postoperative Neurological Outcome
Joseph Frazetta, Ryan C. Hoer, William E. Adams, Michael J. Schneck, George A. Jones

9:14 9:16 am
355 Which Patients Undergoing Lumbar Decompression are most Appropriate for an Ambulatory Surgery Center? A Pilot Study
Scott L. Zuckerman, Nikita Lakomkin, Ahilan Sivaganesan, Anthony L. Asher, Clinton J. Devin

9:16 9:18 am
356 Incidence and Risk Factors for Venous Thromboembolism after Surgery for Metastatic Tumors of The Spine
Rafael De la Garza Ramos, Michael Longo, Yaroslav J. Gelfand, Murray Echt, Jonathan P. Nakhla, Vijay Yanamadala, Merritt D. Kinon, Reza Yassari

9:18 9:20 am
357 Ahead of the Curve: Automated Multi-modal Non-rigid Fusion of Preoperative MRI and Intraoperative CT for Neuro-navigation During Surgical Resection of Spinal Tumors
Nader Delavari, Keiji Drysdale, Carolina Gesteira Benjamin, Gillian Harrison, Donato Pacione, Anthony Frempong-Boadu

9:20 9:22 am
358 A Comparison of Peri-Operative Outcomes in Patients Undergoing 2-level Anterior Cervical Decompression and Fusion Versus 1-level Anterior Cervical Corpectomy for Treatment of Cervical Degenerative Conditions: A Propensity Score Matched Analysis
Anoop R. Galivanche

9:22 9:24 am
359 Objective Functional Assessment Using the Timed-up and Go Test in Patients with Lumbar Spinal Stenosis and Neurogenic Claudication
Martin N. Stienen, Nicolai Maldaner, Holger Joswig, Marco V. Corniola, David Bellut, Peter Prmmel, Luca Regli, Astrid Weyerbrock, Karl Schaller, Oliver P. Gautschi

9:24 9:30 am
Questions and Discussion
Beverage Break and What’s New Session 3 Non-CME in the Exhibit Hall

9:30 10:15 am Sparkle Ballroom

9:37 9:47 am
RISE® IntraLIF
Christoph P. Hofstetter
Sponsored by: Globus Medical

9:48 9:58 am
Long-Term Height Restoration Using Next Generation Luna®3D Multi-Expandable Interbody System
Richard G. Fessler
Sponsored by: Benvenue Medical

9:59 10:09 am
Local Hypothermia for Neuroprotection
Michael G. Fehlings
Sponsored by: Neuraxis

Scientific Session 4 Glimmer Ballroom

10:15 am 12:00 pm Interbody (Death) Cage Match

MODERATORS: Adam S. Kanter, Charles A. Sansur
LEARNING OBJECTIVES: Upon completion of this session, participants will be able to:
1. Analyze the findings of contemporary neurosurgical studies; critically evaluate the design and methodology of these studies
2. List areas of future research impacting healthcare delivery and patient outcomes
3. Discuss implications of healthcare policy changes on the delivery of healthcare and patient outcomes

10:15 10:22 am
Articulating Cages: Better Placement and Clinical Results
Paul K. Kim

10:23 10:30 am
Expandable Cages: Superior for MIS and Open
Steven Vanni

10:31 10:38 am
Monolithic Spacers: Work Just Fine
James S. Harrop
10:39–10:46 am  
Titanium: Surface Etching Offers More  
Paul J. Slosar

10:47–10:54 am  
Titanium: 3D Porous is Best in Class  
Michael P. Steinmetz

10:55–11:02 am  
Porous PEEK: The Best of All Worlds  
Frank M. Phillips

11:03–11:10 am  
Porous Titanium: Worth a Premium in the Cervical Spine  
Michael W. Groff

11:10–11:15 am  
Questions, Discussion, and Vote

11:16–11:19 am  
Introduction to Meritorious Member, Spine  
Domagoj Coric

11:20–11:30 am  
Meritorious Member Award Recipient Presentation, Spine  
John A. Wilson

11:31–11:34 am  
Introduction to Meritorious Member, Peripheral Nerve  
Allan D. Levi

11:35–11:45 am  
Meritorious Member Award Recipient Presentation, Peripheral Nerve  
Rajiv Midha

DSPN Business Meeting  
Glimmer Ballroom

11:45 am–12:00 pm

MODERATOR: Domagoj Coric

SPEAKERS: Adam S. Kanter, John J. Knightly, Eric A. Potts,  
Ganesh Rao, Marjorie C. Wang, Christopher E. Wolfa

11:45–11:48 am  
Treasurer’s Report  
Eric A. Potts

11:48–11:51 am  
Secretary’s Report  
Adam S. Kanter

11:51–11:54 am  
Nominating Committee Report  
Marjorie C. Wang

11:54–11:56 am  
CNS Board Report  
Ganesh Rao

11:56–11:58 am  
AANS Board Report  
John J. Knightly

11:58 am–12:00 pm  
Future Sites Committee Report  
Christopher E. Wolfa
### Lunch with Exhibitors or Attend a Non-CME Sponsored Lunch

12:00 – 1:00 pm  
Splash Ballroom 9/10

**ExcelsiusGPS® Revolutionary Robotic Navigation**  
Sabino J. D’Agostino, Charles W. Kanaly  
Sponsored by: Globus Medical

---

### Splash Ballroom 11/12

**Debating the Science of Fusion: What you Thought you Knew**  
Hyun W. Bae, Christoph P. Hofstetter, Frank La Marca, Praveen V. Mummaneni  
Sponsored by: DePuySynthes

---

### Seminar for APRN and PAs  
*Complimentary for Registered Nurses and PAs*

1:00 – 2:30 pm  
Splash 4

**COURSE DIRECTORS:** Megan Bellman, Eric A. Potts  
**SPEAKERS:** Megan Bellman, Erin Harrison, Sara M. McEvoy, Eric A. Potts, Emma Schulte  
**COURSE DESCRIPTION:** This course will cover preoperative evaluation, perioperative management and postoperative management of patients with degenerative spinal conditions. Special emphasis will be on teamwork, communication and use of order sets.  
**LEARNING OBJECTIVES:** Upon completion of this course, participants will be able to:

1. Differentiate different causes of arm and leg pain
2. Identify the impact of comorbidities on patient outcomes
3. Describe the impact of preoperative and postoperative patient communication
4. Identify the impact preoperative opioid use on postoperative pain control

---

1:00 – 1:15 pm  
**Overview of MRI Imaging Basics**  
Eric A. Potts

1:15 – 1:30 pm  
**Management of Medical Comorbidities (DM, Anticoagulation, Nutrition)**  
Sara M. McEvoy

1:30 – 1:45 pm  
**Advanced Perioperative Management: Support Staff, Patient Education**  
Emma Schulte

1:45 – 2:00 pm  
**Intraoperative Challenges**  
Megan Bellman
COURSE DIRECTORS: Langston T. Holly, Luis M. Tumialan

SPEAKERS: Kevin T. Foley, Steven D. Glassman, Regis W. Haid, Iain H. Kalfas, Luiz Pimenta, Volker K. H. Sonntag, Nicholas Theodore

COURSE DESCRIPTION: This special course offers the participant the opportunity to listen first hand to the surgeons who developed the technology that changed the face of spinal surgery. The inventors will discuss the barriers to innovation and how they overcame them to bring the technology into the mainstream. From cervical plates and minimally invasive access ports to navigation and robotic surgical guidance. Perspectives from these inventors will provide insight to the current generation of innovating surgeons.

LEARNING OBJECTIVES: Upon completion of this course, participants will be able to:

1. Discuss the evolution of the cervical plate and the rationale behind cervical plating technology that is currently in use for the treatment of cervical spondylosis with radiculopathy or myelopathy
2. Discuss the various options of surface technology in biomechanical spacers that create an environment for arthrodesis in cervical and lumbar operations
3. Identify the anatomical measurements that establish the rationale for minimally invasive access ports
4. Develop a greater understanding of the technology needed to develop and refine the various navigation platforms and robotic guidance systems

1:00 – 1:15 pm
Evolution of the Cervical Plate
Volker K. H. Sonntag

1:16 – 1:31 pm
Developing the Tubular Retractor System and the Beginning of MIS Spine Surgery
Kevin T. Foley

1:32 – 1:47 pm
Outcome Assessment and the Impact on Spine Surgery
Steven D. Glassman

1:48 – 2:03 pm
Revisiting the Transpsoas Approach and the Lateral Revolution
Luiz Pimenta

2:04 – 2:19 pm
Evolution of Cervical and Lumbar Interbody Spacers: From Metal to PEEK Back to Metal
Regis W. Haid
Special Course 6
Splash 13 15
1:00 3:00 pm $150
Spinal Tumors: Treatment and Complication Avoidance

COURSE DIRECTORS: John E. O'Toole, Daniel M. Sciubba

COURSE DESCRIPTION: This seminar is designed to review the myriad presentations of spinal tumors and to discuss the multi-disciplinary management options involving medical, radiation and surgical treatments.

LEARNING OBJECTIVES: Upon completion of this course, participants will be able to:
1. Analyze various treatment approaches to address spinal tumor pathologies
2. Discuss incorporating innovative technologies to facilitate avoidance in spinal tumor surgery
3. Discuss multi modal treatment of spinal tumors

1:00 1:05 pm
Introduction
John E. O'Toole, Daniel M. Sciubba

1:06 1:38 pm
Case 1: Management of Vertebral Column Tumor Metastasis

1:06 1:16 pm
Management of Acute/Subacute Presentations of Metastatic Epidural Cord Compression (Wait for Diagnosis? Radiation Alone? How Quickly to OR?)
Mark H. Bilsky

1:17 1:27 pm
When do Metastatic Spine Tumor Patients Require Stabilization?
John H. Shin

1:28 1:38 pm
My Worst Complications: Metastatic Tumor
Daniel M. Sciubba

1:39 2:22 pm
Case 2: Management of Solitary Primary Malignant Lesion of the Mobile Spine

1:39 1:49 pm
Pitfalls in the Initial Management of Isolated Spinal Tumors
Ehud Mendel
En Bloc Resection and Instrumented Fusion
Ziya L. Gokaslan

Separation Surgery with High Dose Radiation
Ilya Laufer

My Worst Complications: Primary Tumor of Mobile Spine
Laurence D. Rhines

Case 3: Management of Intradural Spinal Tumors
When and Where to Operate on Intramedullary Spinal Cord Tumors?
John E. O’Toole

Technique and Complication Avoidance
Ganesh Rao

My Worst Complications: Intradural Tumor
Paul C. McCormick

Questions and Discussion

Special Course 7
Splash 17/18

Causes and Treatments for Neurological Loss Associated with Cervical Spine Pathology

COURSE DIRECTORS: Justin M. Brown, Mark A. Mahan
SPEAKERS: Allan J. Belzberg, Justin M. Brown, Richard G. Fessler, Mark A. Mahan, Hiroshi Nakagawa, K. Daniel Riew, Robert J. Spinner, Andrea L. Strayer, Jau-Ching Wu

COURSE DESCRIPTION: Upper extremity weakness, either before or after spine surgery, is a vexing problem and many cases may not have a causal relationship with spine pathology. It is crucial to understand non-spinal causes, intraoperative considerations and potential treatments for these problems. The course will focus on alternative causes of weakness—particularly when the degree of weakness or atrophy is out of proportion to spinal stenosis, intraoperative complication avoidance and algorithmic steps for the management and treatment of post-operative weakness. Newer techniques on neurologic reconstruction for remedy of weakness will be reviewed.

LEARNING OBJECTIVES: Upon completion of this course, participants will be able to:
1. Describe the differential diagnosis of new onset weakness, clinical patterns, and natural histories
2. Discuss the intraoperative surgical strategies for complication avoidance, including appropriate use of neurophysiologic studies
3. Define the surgical treatment options for neurologic loss and the considerations on timing for neurologic reconstruction
1:00 1:02 pm
Introduction
Mark A. Mahan

1:03 1:15 pm
Weakness on Presentation  Concepts of Nerve Injury and Evaluation
Robert J. Spinner

1:16 1:28 pm
Clinical Work-up of Weakness  Differential Diagnosis and is it a Radiculopathy or Not?
Allan J. Belzberg

1:29 1:41 pm
Electrodiagnostic Work-up of Weakness
Justin M. Brown

1:42 1:54 pm
Weakness Before Cervical Spine Surgery  Treatment Options and Outcomes
Andrea L. Strayer

1:55 2:07 pm
Weakness after Cervical Spine Surgery  Techniques for Avoidance
K. Daniel Riew

2:08 2:20 pm
Treating Cervical Radiculopathy with MIS Foraminotomy
Richard G. Fessler

2:21 2:33 pm
Weakness after Cervical Spine Surgery  Treatment Options and Outcomes
Mark A. Mahan

2:34 2:46 pm
Treating Cervical Radiculopathy with Cervical Arthroplasty  HO and Complication Avoidance
Jau-Ching Wu

2:47 2:59 pm
Case Presentation and Discussion: Post-operative C5 Palsy
Hiroshi Nakagawa
Stronger together

K2M is now a part of Stryker.

Experience the latest innovations at booths #303 and #310.
THANK YOU
The following companies have provided in-kind equipment:

- Brainlab
- Globus Medical
- Medtronic
- Stryker

THANK YOU
for your support of
Spine Summit 2019

Partner: NuVasive
Abstract Breakout Sessions

7:45 9:15 am

LEARNING OBJECTIVES: Upon completion of this session, participants will be able to:
1. Analyze the findings of novel neurosurgical studies, critique the design and methodology of these studies
2. List important areas for further knowledge development and research
3. Compare indications and clinical outcomes for various minimally invasive and motion preservation techniques

General Spine Surgery 3 Breakout

7:45 9:15 am

MODERATORS: Ali A. Baaj, Byron Branch, Isaac O. Karikari

7:45 7:47 am
360 Cerebrospinal Fluid Leak and Symptomatic Pseudomeningocele Following Intradural Spine Surgery
Jonathan N. Sellin, John Paul G. Kolcun, Allan D. Levi

7:47 7:49 am
361 Consultation and Surgical Waits Time in Patients with Cervical Spondylotic Myelopathy: A Prospective Canadian Spine Outcomes and Research Network (CSORN) Study
Babak Sharifi, Charles Fisher, Bradley Jacobs, Christopher Bailey, Kenneth Thomas, Hamilton Hall, Andrew Natara, Raja Y. Rampersaud, Jerome Paquet, David W. Cadotte, Greg McIntosh, Nicolas Dea

7:49 7:51 am
362 Abdominal Obesity and Paraspinal Muscularity Predict Proximal Junctional Kyphosis Requiring Surgical Revision Among Patients Undergoing Thoracolumbosacral Fusion
7:51–7:53 am
363 Perioperative Neurological Complications Following Anterior Cervical Discectomy and Fusion: Clinical Impact on 317,789 Patients from the National Inpatient Sample

7:53–7:55 am
364 The Increasing Frequency of Intravenous Drug Abuse Associated Spinal Epidural Abscesses: A Case Series
Anthony M. DiGiorgio, Rachel Stein, Kevin D. Morrow, Jared Robichaux, Clifford Crutcher, Gabriel C. Tender

7:55–7:57 am
Ilyas Eli, Mohammed Azab, Jonathan B. Harper, Michael Karsy, Jian Guan, Andrea A. Brock, William T. Couldwell, Erica F. Bisson, Andrew T. Dailey

7:57–7:59 am
366 Durotomy Following Extradural Tumor Resection: A Retrospective Analysis of Risk Factors
Kevin T. Huang, Alexander E. Ropper, Kyle Wu, John H. Chi

7:59–8:01 am
367 Iliac Screws May Not Be Necessary in Long Segment Constructs with L5-S1 ALIF: Cadaveric Study of Instrumentation Strain
Randall Hlubek, Jakub Godzik, Anna Newcomb, Jennifer Lehrman, Bernardo De Andrade Pereira, Michael Bohl, S. Harrison Farber, Brian P. Kelly, Jay D. Turner

8:01–8:03 am
368 Predicting Outcomes after Surgical Decompression for Mild Degenerative Cervical Myelopathy: Moving Beyond the mJOA to Identify Surgical Candidates
Jetan H. Badhiwala, Laureen D. Hachem, Zamir Merali, Christopher D. Witw, Farshad Nassiri, Muhammad Akbar, Saleh A. Almenawer, Markus Schomacher, Jefferson R. Wilson, Michael G. Fehlings

8:03–8:05 am
369 The Utility of Cervical Spine Bracing as a Postoperative Adjunct to Multi-Level Anterior Cervical Spine Surgery.

8:05–8:07 am
370 The Utility of Lumbar Spine Bracing as a Postoperative Adjunct to Multi-Level Posterior Lumbar Spine Surgery.
371 Systematic Review and Meta-Analysis of Randomized Controlled Trials in Anchored Spacers Versus Plate-Screw Systems in Anterior Cervical Discectomy and Fusion
Mostafa A. Gabr, Elisabeth Touko, Amol Yadav, Isaac O. Karikari, C. Rory Goodwin, Muhammad M. Abd-El-Barr

372 Symptomatic Improvement of Dysautonomia and Pain in Patients with Craniovertebral Instability via Occipital Cervical Fusion
Timothy G. White, Shashank V Gandhi, Orseola Arapi, Justin Noble Virojanapa, Salvatore Insinga, Harold L. Rekate

373 Persistent or Newly Developed Buttock and/or Leg Pain after Lumbar Degenerative Spine Surgery
Masahiko Akiyama

374 Pediatric Occipital Condyle Morphometric Analysis Using Computed Tomography with Evaluation for Occipital Condyle Screw Placement Post-operative Dysphagia in Patients Undergoing a Four Level ACDF
James T. Ebot, Hugh G. Deen, Mark A. Pichelmann, Rabih G. Tawk, Eric W. Nottmeier

375 A Two-year Cost Analysis of Maximum Non-operative Treatments in Patients with Cervical Stenosis that Ultimately Required Surgery
Owoicho Adogwa, Mark A. Davison, Victoria D. Vuong, Shyam Desai, Daniel Lilly, Jessica R. Moreno, Joseph S. Cheng, Carlos A. Bagley

376 Chlorhexidine Showers are Associated With a Reduction in Surgical Site Infection Following Spine Surgery: An Analysis of 4,266 Consecutive Surgeries
Andrew Kai-Hong Chan, Simon Ammanuel, Alvin Y. Chan, Taemin Oh, Henry C. Skrehot, Caleb S. Edwards, Sravani Kondapavulur, Catherine Miller, Amy D. Nichols, Catherine Liu, Sanjay S. Dhall, Aaron J. Clark, Dean Chou, Christopher P. Ames, Praveen V. Mummaneni

377 Development and Validation of Clinical Prediction Models of Survival and Clinical Outcomes for Patients with Metastatic Epidural Spinal Disease: A Systematic Literature Review
Jetan H. Badhiwala, Anick Nater, James Hong, So Kato, Melanie Anderson, Michael G. Fehlings

378 The Prophylactic use of Closed Incisional Negative Pressure Therapy (ciNPT) to Reduce Surgical Site Infections in Posterior Spine Procedures: Initial Experience of 30 High-risk Patients
Kyle Mueller, Nirali Patel, Gnel Pivazyan, Karen Evans, Nathan Nair
8:23–8:25 am
379 Enhanced Recovery After Surgery (ERAS): Implementation in Anterior Lumbar Interbody Fusion Surgery

8:25–8:29 am
Questions and Discussion

8:29–8:31 am
380 Regional Differences in Prolonged Non-Operative Therapy Utilization Prior to Primary ACDF Surgery
Mark A. Davison, Daniel Lilly, Shyam Desai, Victoria D. Vuong, Jessica R. Moreno, Carlos A. Bagley, Owoicho Adogwa

8:31–8:33 am
381 The Incidence of Sacroiliac Fusion After Lower Lumbar Fusion: A Multi-center Retrospective Cohort Study
Justin G. Thomas, Doris Tong, Matthew Bahoura, Clifford Houseman, Teck-Mun Soo

8:33–8:35 am
382 Complications Related to Immobilization of Cervical Spine Fractures with a Halo Vest
Nikolay L. Martirosyan, Mauricio J. Avila, Travis M. Dumont, R. John Hurlbert

8:35–8:37 am
383 SINS Score and Stability—Evaluating the Need for Stabilization Within the Uncertain Category
Zach Pennington, Ali K. Ahmed, Erick M. Westbroek, Ethan Cottrill, Daniel Lubelski, Matthew Goodwin, Daniel M. Sciubba

8:37–8:39 am
384 The July Effect Revisited: July Surgeries at Residency Training Programs are Associated With Equivalent Outcomes Following Lumbar Spondylolisthesis Surgery

8:39–8:41 am
385 Targeting The Renin-Angiotensin System Might Enhance Spinal Fusion: Retrospective Analysis of Antihypertensives in ACDF Patients
Alexander Perdomo-Pantoja, Shamoun Feras, Wataru Ishida, Seba Ramhmdani, Christina Holmes, Ethan Cottrill, Ali Bydon, Nicholas Theodore, Sheng-fu L. Lo, Timothy F. Witham

8:41–8:43 am
386 90-day and 1-year Mortality in Spinal Metastatic Disease: Machine Learning Prediction and Explanation
Aditya V. Karhade, Quirina Thio, Paul Ogink, Christopher Bono, Marco Ferrone, Kevin S. Oh, Philip Saylor, Andrew J. Schoenfeld, John H. Shin, Mitchel Harris, Joseph H. Schwab
387 Incidence and Risk Factors for Hardware Failure After Instrumentation for Spine Metastasis: A Single-institutional Series
Michael Longo, Yaroslav J. Gelfand, Rafael De la Garza Ramos, Murray Echt, Merritt D. Kinon, Reza Yassari

388 Surgical Approach and Cervical Spine Alignment: Analyzing Changes in Radiographic Sagittal Alignment after Anterior Versus Posterior Procedures

389 Feasibility of Quantitative Magnetic Resonance Imaging in the Spinal Cord
Muhammad Akbar, Allan R. Martin, David J. Mikulis, Julien Cohen-Adad, Michael G. Fehlings

390 Outcomes Following Surgical Versus Endovascular Treatment of Spinal Dural Arteriovenous Fistula: Systematic Review and Meta-analysis
Anshit Goyal, Joseph Cesare, Victor M. Lu, Yagiz U. Yolcu, Mohamad Bydon

391 Evaluating Pain in Patients with and without Stabilization Surgery using Multifraction Stereotactic Body Radiation Therapy for Spine Metastases
Jonathan P. Nahhla, Yaroslav J. Gelfand, Krisztina Moldovan, Rafael De la Garza Ramos, Sean M. Barber, Sanjay Konakonda, Jared Fridley, Albert E. Telfeian, Jaroslaw Hapel, Ziya L. Gokaslan, Adetokunbo A. Oyelese

392 Quantitative Assessment of Hand Function in Cervical Spondylotic Myelopathy and Response to Surgical Treatment

393 Epidural Dose Constraints in Stereotactic Body Radiation Therapy
Elizabeth P. Howell, Patrick Jensen, John Kirkpatrick, Scott Floyd, Jordon Torok, Qiuwen Wu, C. Rory Goodwin

394 Health Economics of BMP: Cost Utility and Cost Awareness Effect Analysis
Margaret Jeakins-Cooley, Rajiv Saigal

395 Preoperative Embolization of Vascular Spinal Metastasis Does Not Confer Improved Perioperative and Postoperative Outcomes
Ankush Chandra, Darryl Lau, Harsh Wadhwa, Ramin A. Morshed, Jonathan W. Rick, Dean Chou

396 Balloon Kyphoplasty for Vertebral Fractures with Posterior Wall Disruption
Alp Ozpinar, Nima Alan, Peter C. Gerszten
9:03 9:05 am
397 The Occipitocervical Angle and Post-operative Dysphagia Following Occipitocervical Fusion: An Analysis of 55 Patients
Nikil Prasad, Benjamin Hopkins, Nader S. Dahdaleh

9:05 9:07 am
398 Pain Sensitivity and Modulation in Patients with Spinal Stenosis selected for Lumbar Fusion
Alisson R. Teles, Jean Ouellet, Michael Weber, Carlo Santaguida, Peter Jarzem, Rudy Reindl, Guillaume L. onard, Catherine E. Ferland

9:07 9:09 am
399 Impact of Distal And Proximal Extensions on Short- and Long-term Outcomes in Long-segment Posterior Fusion involving the Cervicothoracic Junction
Adam D Sa, Wataru Ishida, Joshua Casasos, Arun Chandra, Seba Ramhmdani, Alexander Perdomo-Pantoja, Nicholas Theodore, Ziya L. Gokaslan, Jean-Paul Wolinsky, Daniel M. Scibba, Ali Bydon, Timothy F. Witham, Sheng-fu L. Lo

9:09 9:15 am
Questions and Discussion

General Spine Surgery 4
Splash 1-3

7:45 9:15 am
MODERATORS: Kurt M. Eichholz, Asdrubal Falavigna, Hasan A. Zaidi

7:45 7:47 am
400 Current Treatment Strategy for Newly Diagnosed Chordoma of the Mobile Spine and Sacrum: Results of an International Survey

7:47 7:49 am
401 A Quantitative Assessment of the Accuracy and Reliability of Robotically Guided Percutaneous Pedicle Screw Placement: Technique and Application Accuracy
Jakub Godzik, Corey T. Walker, Cory Hartman, Clinton D. Morgan, Steve W. Chang, Randall W. Porter, Laura A. Snyder, Juan S. Uribe

7:49 7:51 am
402 PROMIS Pain Interference is Superior to the Numeric Pain Rating Scale for Pain Assessment in Spine Patients
David N. Bernstein, Matthew St. John, Paul T. Rubery, Addisu Mes

7:51 7:53 am
403 Clinical Outcomes Following Surgical Obliteration of Cerebrospinal Fluid Venous Fistula in Patients with Intracranial Hypotension: A Prospective Study
Timothy Y. Wang, Isaac O. Karikari, Timothy J. Amrhein, Linda L. Gray, Peter G. Kranz
7:53–7:55 am
404 Complications of Robotic Spine Surgery
Daniel Myers, Alexander Kwong-Tak Yu, Alejandro Castellvi, Donald M. Whiting, Terrence D. Julien

7:55–7:57 am
405 MRI-Guided Cryoablation for Metastatic Spine Disease
Ziev Moses, Jeffrey P. Guenette, Thomas C. Lee, John H. Chi

7:57–7:59 am
406 Assessing the Differences in Measurement of Degree of Spondylolisthesis between Supine MRI and Erect X-ray: An Institutional Analysis of 255 Cases
Mohammed A. Alvi, Mohammed A. Sebai, Yagiz U. Yolcu, Waseem Wahood, Timothy Kaufmann, Mohamad Bydon

7:59–8:01 am
407 Regional Variation in Opioid Use After Lumbar Decompression and Fusion Surgery
Owoicho Adogwa, Mark A. Davison, Victoria D. Vuong, Daniel Lilly, Shyam Desai, Jessica R. Moreno, Joseph S. Cheng, Carlos A. Bagley

8:03–8:05 am
409 Outpatient and Inpatient Readmission Rates of 1 and 2 Level Anterior Cervical Discectomy and Fusion Surgeries
Owoicho Adogwa, Syed I. Khalid, Mark A. Davison, Victoria D. Vuong, Shyam Desai, Daniel Lilly, Jessica R. Moreno, Joseph S. Cheng, Carlos A. Bagley

8:05–8:07 am
410 Axial Radiculopathy as a Manifestation of Cervical Stenosis: A Retrospective Review of 800 Patients
Drew Brown, Stefan Prada, Michael Weiss, Stephen Songhurst, Chip Wade, Reginald J. Davis

8:07–8:09 am
411 Surgical Outcomes In Patients With Congenital Cervical Spinal Stenosis
Karam Atli, Vikram Chakravarthy, Bryan S. Lee, Gino Ciolfi, Jill Barnholtz-Sloan, Don K. Moore, Thomas E. Mroz, Michael P. Steinmetz

8:09–8:11 am
412 Complication Rates of Spine Surgeries in Patients Aged 80 or Over: A Single-center Retrospective Series and Review of Literature
Arun Chandra, Wataru Ishida, Joshua Casasos, Adam D Sa, Seba Ramhmndani, Alexander Perdomo-Pantoja, Nicholas Theodore, Ziya L. Gokaslan, Jean-Paul Wolinsky, Daniel M. Scibbba, Ali Bydon, Timothy F. Witham, Sheng-fu L. Lo

8:11–8:13 am
413 The Surgical Management of Giant-Invasive Spinal Schwannomas, Experience over 15 Years from a Single Tertiary Spinal Referral Centre.
Jamie R.F. Wilson, Pratipal Kalsi, Frank Jiang, Jessica Bauer, Anick Nater, Nardin Samuel, Francois Mathieu, Suganth Suppiah, Jethan H. Badhiwala, Gelareh Zadeh, Eric M. Massicotte, Michael G. Fehlings

8:13–8:15 am
414 Validation of a Wireless, Non-optical System for Measurement of Intra-operative Spine Alignment
Eric W. Nottmeier, Thomas J. Morrison III, Kevin N. Ammar, Jahangir Asghar, Tapan Daftari, Ashutosh A. Pradhan, Matthew J. McGirt
8:15–8:17 am
415 The Timing and Management of Surgical Site Infections after Posterior Spinal Fusion
Michael Cloney, Benjamin Hopkins, Jonathan T. Yamaguchi, Conor B. Driscoll, Max Kelsten, Jack Goergen, Mark B. Svet, Tyler R. Koski, Jean-Paul Wolinsky, Nader S. Dahdaleh

8:17–8:19 am
416 Surgical Site Infection in the Intensive Care Setting after Posterior Spinal Fusion
Max Kelsten, Michael Cloney, Benjamin Hopkins, Jonathan T. Yamaguchi, Jack Goergen, Conor B. Driscoll, Mark B. Svet, Zachary A. Smith, Tyler R. Koski, Nader S. Dahdaleh

8:19–8:21 am
417 Three-month Cost of Nonoperative Care in Patients with Symptomatic Lumbar Herniated Disc prior to Microdiscectomy
Mark A. Davison, Daniel Lilly, Shyam Desai, Victoria D. Vuong, Jessica R. Moreno, Joseph S. Cheng, Carlos A. Bagley, Owoicho Adogwa

8:21–8:23 am
418 Retrospective Analysis of the Relationship Between Post-operative Delirium and Quality-of-life Outcomes in Patients Who Underwent Spine Surgery
Kelsey C. Goon, Heath P. Gould, Joseph E. Tanenbaum, Robert Winkelman, Thomas E. Mroz, Michael P. Steinmetz

8:23–8:25 am
419 CVJ Anomaly: An Overlooked Cause of Stroke in Young
Vivek Tandon, Kanwaljeet Garg, Sarat P. Chandra, Shashank Sharad Kale

8:25–8:29 am
Questions and Discussion

8:29–8:31 am
420 Utility of Patient Specific Rod Instrumentation in Deformity Correction: Single-institution Experience
Zain Boghani, William Steele, Saeed S. Sadrameli, Paul J. Holman

8:31–8:33 am
421 The Use of Antibiotic-impregnated Poly-methyl Methacrylate (AI-PMMA) for Spinal Reconstruction in Pyogenic Spondylitis: Efficacy and Safety
Dejan Slavnic, Evan J. Lytle, Gustavo Anton, Matthew Bahoura, Rani Bashiti, Doris Tong, Boyd Richards, Teck-Mun Soo

8:33–8:35 am
422 Improvement in Sexual Function Following Degenerative Lumbar Spondylolisthesis Surgery
8:35 8:37 am
423 Dynamic Magnetic Resonance Imaging Parameters for Objective Assessment of the Magnitude of Tethered Cord Syndrome in Patients with Spinal Dysraphism
Sanjay Behari, Suyash Singh, Vivek Singh, Rajendra V. Phadke

8:37 8:39 am
424 Outpatient Posterior Lumbar Fusion May be Associated With Higher Reoperations: Insights from a National Surgical Registry
Mohammed A. Alvi, Elena Blaginykh, Anshit Goyal, Panagiotis Kerezoudis, Mohamad Bydon

8:39 8:41 am
425 Nuchal Thickness and Risk of Surgical Site Infection in Posterior Cervical Spine Operations
Dennis T. Lockney, Timothy Gooldy, Paul Kubilis, Gregory J. Murad

8:41 8:43 am
426 Predictive Factors for Conservative Medical Management in Urban Population Patients Presenting with Spinal Epidural Abscess: A Retrospective Bi-institutional Study
Yaroslav J. Gelfand, Michael Longo, Zach Pennington, A. Karim Ahmed, Rafael De la Garza Ramos, Daniel M. Scuibba, Reza Yassari

8:43 8:45 am
427 Maximizing Sacral Chordoma Resection with Augmented Intra-operative Navigation
Sanjay Konakondla, Xun Li, J Andrew Albers, Jared Fridley, Sean M. Barber, Jonathan P. Nakhla, Albert Edward Telfeian, Adetokunbo A. Oyelese, Ziya L. Gokaslan

8:45 8:47 am
428 Human Mesenchymal Stem Cell Morphology, Migration, and Differentiation on Micro- and Nano-textured Titanium
Justin L. Brown, Jennifer M. Schneider, Michelle B. Gallagher

8:47 8:49 am
429 A Retrospective Cohort Analysis of the Effects of the Renin-angiotensin System Inhibitors on Spinal Cord Dysfunction and Imaging Features of Spinal Cord Compression in Symptomatic Cervical Spondylosis

8:49 8:51 am
430 Use of SPECT Imaging for Hypermetabolic Facet Identification in Diagnosis of Axial Pain
Roberto Perez-Roman, G. Damian Brusko, Joshua D. Burks, Stephen S. Burks, Michael Y. Wang

8:51 8:53 am
431 Radiographic Implications of Anterior Column Reconstruction at the Upper Instrumented Vertebra
Clinton D. Morgan, Joshua T. Wewel, Cory Hartman, Jay D. Turner, Juan S. Uribe
8:53 8:55 am
432 Management Dilemmas in Congenital Craniovertebral Junction Anomalies and their Addressal

8:55 8:57 am
433 An Overlooked Cause of Neck Pain: Calcific Tendinitis of the Longus Colli
Jae Y. Kim, Jung-Kil Lee, Seul-Kee Lee

8:57 8:59 am
4m34 Predictive Model for Return to Work After Lumbar Spine Surgery in Canada
Alisson R. Teles, Steven Casha, Bradley Jacobs, Kenneth Thomas, Greg McIntosh, Raphaele Charest-Morin, Jeff D. Golan, Carlo Santaguida, Peter Jarzem, Jean Ouellet, Michael Weber

8:59 9:01 am
435 Diagnostic and Therapeutic Values of Intraoperative Neuro-Monitoring for Resection of Spinal Tumors: Meta-analysis and Systematic Review Encompassing 26 articles and 1,563 patients
Wataru Ishida, Alexander Perdomo-Pantoja, Risheng Xu, Seba Ramhmdani, Ethan Cottrill, Yuanxuan Xia, Ali Bydon, Timothy F. Witham, Sheng-fu L. Lo

9:01 9:03 am
436 Who Needs Detailed Radiographical Evaluations in Freehand S2-Alar-Iliac Screw Insertion?: S2AI Screw Difficulty Index as a Novel Predictor
Wataru Ishida, Seba Ramhmdani, Alexander Perdomo-Pantoja, Joshua Casaos, Ziya L. Gokaslan, Jean-Paul Wolinsky, Nicholas Theodore, Daniel M. Sciubba, Ali Bydon, Timothy F. Witham, Sheng-fu L. Lo

9:03 9:05 am
437 Pedicled Omental Flaps for Complex Wound Reconstruction for Chordoma of the Mobile Spine and Sacrum
Robert Koffe, Laura Van Beaver, Muhamed Hadzipasic, John Wain, John Mullen, Francis Hornicek, Joseph H. Schwab, John H. Shin

9:05 9:07 am
438 Intraneural Lipomas: Institutional and Literature Review
Tomas Marek, Kimberly K. Amrami, Mark A. Mahan, Robert J. Spinner

9:07 9:09 am
439 Osteosarcoma survivors have a higher rate of second primary malignancies of the bones, joints, and spine
Isaac G. Freedman, Hollie N. Dowd, Aladine Elsamadicy, Jonathan Grauer

9:09 9:15 am
Questions and Discussion
Peripheral Nerve/Basic Science/General Spine 5

Splash 9/10

7:45 9:15 am MODERATORS: Holly Gilmer, Eve C. Tsai

7:45–7:47 am
441 The Incremental Value of Magnetic Resonance Neurography to the Neurosurgeon
Hamilton C. Newhart, John Patterson, Arunprasad Gunasekaran, Manoj Kumar, Tarun Pandey, Noojan Kazemi

7:47–7:49 am
442 Thoracic Ossification of Ligamentum Flavum Caused by Skeletal Fluorosis: Breaking the Etiopathological Barrier Answer to the Crippling Disease of the Society.
Shivanand Reddy, Mudumba V. Saradhi

7:49–7:51 am
443 Development of Machine Learning Algorithm to Increase Accuracy of Anatomic Diagnosis for Spinal Pain Conditions
Michael Verdon

7:51–7:53 am
444 Autocorrect: Using Text Messaging to Improve Enhanced Recovery After Surgery (ERAS) Behaviors for Patients Undergoing Spine Surgery

7:53–7:55 am
445 Effect of Spinal Decompression on Back Pain in Lumbar Spinal Stenosis: A Canadian Spine Outcomes Research Network (CSORN) study
Shreya Srinivas, Charles Fisher, Greg McIntosh, Nicolas Dea

7:55–7:57 am
446 Optimizing Biomechanics of Anterior Column Realignment (ACR) Constructs: A Cadaveric Study of Rod Strain and Construct Stability
Jakub Godzik, Bernardo Andrada, Anna Newcomb, Jennifer Lehrman, Gregory M. Mundis, Jr., Randall Hlubek, Juan S. Uribe, Brian P. Kelly, Jay D. Turner

7:57–7:59 am
447 Facilitated Growth of Cortical Neurons Using a Dorsal Root Ganglion Bridge

7:59–8:01 am
448 Histologic Analysis of Human NP-like Cells Regeneration Derived from Umbilical Cord Stem Cells to Treat Degenerative Disc Disease
Mick J. Perez-Cruet, Esam A. Elkhatab, Naimisha R. Beeravolu, Jared Brougham, Irfan Khan, Christina M. McKe, Rasul Chaudhry
8:01 8:03 am  
449 Long-term (72 month) Radiographic Results of Cervical Disc Arthroplasty Utilizing a Restrained Compressible-Core Prosthesis  
Holger Bang, Avinash G. Patwardhan

8:03 8:05 am  
450 The Effect of Sacroiliac Fusion and Pelvic Fixation on Rod Strain in Thoracolumbar Fusion Constructs: A Biomechanical Investigation  
Phelan Shea, Harry M. Mushlin, Daina M. Brooks, Bryan Ferrick, Joshua R. Olexa, Brandon Bucklen, Charles A. Sansur

8:05 8:07 am  
451 Anterior Versus Posterior Cervical Decompression and Fusion in Patients with Multi-level Degenerative Cervical Myelopathy  
Jetan H. Badhiwala, Yosef Ellenbogen, Jamie Wilson, Farshad Nassiri, Christopher D. Witw, Saleh A. Almenawer, Jefferson R. Wilson, Michael G. Fehlings

8:07 8:09 am  
452 In Vitro and In Vivo Comparison of the Antibacterial effect of Titanium and Cobalt-Chromium Alloys  
Kota Watanabe, Satoshi Fukuzaaki, Atsushi Sugino, Newton Metcalf, Nicholas M. Benson

8:09 8:11 am  
453 When to Abort the Transpsoas Lateral Lumbar Approach  
Joshua T. Wewel, Cory Hartman, Juan S. Uribe

8:11 8:13 am  
454 Accuracy of Modified Freehand Technique for Placement of Subaxial Cervical Pedicle Screws: A Cadaveric Feasibility Study  
Samuel H. Farber, Jakub Godzik, Randall Hlubek, James Zhou, Corey T. Walker, Jay D. Turner

8:13 8:15 am  
455 A Biomechanical Investigation of the Sacroiliac Joint in the Setting Lumbosacral Fusion: The Impact of Pelvic Fixation Versus Sacroiliac Joint Fixation  
Harry M. Mushlin, Daina M. Brooks, Joshua R. Olexa, Bryan Ferrick, Stephen Carbine, Brandon Bucklen, Charles A. Sansur

8:15 8:17 am  
456 Minimally Invasive Technique for Intradural Spinal Tumor Resection and Other Pathology  
Richard V. Chua

8:17 8:19 am  
457 Cost and Outcomes Associated with Stereotactic Navigation in 2 and 3-6 Level Lumbar Fusions: A Propensity Matched Database Analysis  
Arjun V. Pendharkar, Paymon Rezaii, Allen L. Ho, Eric S. Sussman, Anand Veeravagu, John K. Ratliff, Atman Desai

8:19 8:21 am  
458 Development of a Novel Technique for In-vitro Biomechanical Testing to Allow Comparison of Surgical Interventions for Low Back Pain Due to Bertolotti Syndrome  
Joshua L. Golubovsky, Robb Colbrunn, Ryan Klatte, Edward C. Benzel, Michael P. Steinmetz
8:21–8:23 am
459 Effects of Radiographic Disc Health on Cervical Spine Biomechanics
Vijay N. Permeswaran, Vikas V. Patel, Kee Kim, Dinesh Ramanathan, Anup Gandhi

8:23–8:25 am
460 Assessment and Comparison of Insertional Torque and Insertional Energy with Pull-out Strength of Pedicle and Cortical Bone Screws
James L. West, Wesley Hsu

8:25–8:29 am
Questions and Discussion

8:29–8:31 am
461 Anterior Lumbar Interbody Fusion for Salvage of Long-Segment Thoracolumbar Construct Pseudoarthrosis
James L. West, Keyan Peterson, Alexander K. Powers

8:31–8:33 am
462 Headache Relief is Maintained 7 Years after Anterior Cervical Spine Surgery: Post Hoc Analysis from Multicenter Randomized Clinical Trial
Harjot Thind, Dinesh Ramanathan, Kee D. Kim, Julius O. Ebinu

8:33–8:35 am
463 Differences in Cervical Sagittal Alignment Changes in Patients Undergoing Laminoplasty and Anterior Cervical Discectomy and Fusion
Dong-Wuk Son, Geun-Sung Song, Sang-Weon Lee, Soon-ki Sung, Jun-Seok Lee, Dookyung Son

8:35–8:37 am
464 Implantation of Freshly Isolated Adipose-derived and Bone Marrow-derived Stem Cells Achieves Successful Spinal Fusion in a Rat Model
Alexander Perdomo-Pantoja, Christina Holmes, Maritza Taylor, Colson Tamberlin, Wataru Ishida, Ethan Cottrill, Sheng-fu L. Lo, Timothy F. Witham

8:37–8:39 am
465 The History of and Controversy over Kambin’s Triangle: A Historical Analysis of the Lumbar Transforaminal Corridor for Endoscopic and Surgical Approaches
Luis M. Tumialan, Karthik Madhavan, Michael Y. Wangs

8:39–8:41 am
466 Adipose-derived Stem Cells Treated Ex Vivo with Low-dose of Bone Morphogenetic Protein-2 Augment Their Efficacy in Spinal Fusion
Alexander Perdomo-Pantoja, Christina Holmes, Ethan Cottrill, Wataru Ishida, Sheng-fu L. Lo, Timothy F. Witham

8:41–8:43 am
467 Axillary Nerve Repair By Lower Subscapular Nerve In Upper Brachial Plexus Palsy
Pavel Haninec, Libor Mencl

8:43–8:45 am
468 Impact of Hypothyroidism on In-hospital Mortality for Cervical Spinal Fusions
Evan Luther, Roberto Perez-Roman, David McCarthy, Joshua D. Burks, Andrew Buskard, Karthik Madhavan, Steven Vanni, Michael Y. Wang

8:21–8:23 am
459 Effects of Radiographic Disc Health on Cervical Spine Biomechanics
Vijay N. Permeswaran, Vikas V. Patel, Kee Kim, Dinesh Ramanathan, Anup Gandhi

8:23–8:25 am
460 Assessment and Comparison of Insertional Torque and Insertional Energy with Pull-out Strength of Pedicle and Cortical Bone Screws
James L. West, Wesley Hsu

8:25–8:29 am
Questions and Discussion

8:29–8:31 am
461 Anterior Lumbar Interbody Fusion for Salvage of Long-Segment Thoracolumbar Construct Pseudoarthrosis
James L. West, Keyan Peterson, Alexander K. Powers

8:31–8:33 am
462 Headache Relief is Maintained 7 Years after Anterior Cervical Spine Surgery: Post Hoc Analysis from Multicenter Randomized Clinical Trial
Harjot Thind, Dinesh Ramanathan, Kee D. Kim, Julius O. Ebinu

8:33–8:35 am
463 Differences in Cervical Sagittal Alignment Changes in Patients Undergoing Laminoplasty and Anterior Cervical Discectomy and Fusion
Dong-Wuk Son, Geun-Sung Song, Sang-Weon Lee, Soon-ki Sung, Jun-Seok Lee, Dookyung Son

8:35–8:37 am
464 Implantation of Freshly Isolated Adipose-derived and Bone Marrow-derived Stem Cells Achieves Successful Spinal Fusion in a Rat Model
Alexander Perdomo-Pantoja, Christina Holmes, Maritza Taylor, Colson Tamberlin, Wataru Ishida, Ethan Cottrill, Sheng-fu L. Lo, Timothy F. Witham

8:37–8:39 am
465 The History of and Controversy over Kambin’s Triangle: A Historical Analysis of the Lumbar Transforaminal Corridor for Endoscopic and Surgical Approaches
Luis M. Tumialan, Karthik Madhavan, Michael Y. Wangs

8:39–8:41 am
466 Adipose-derived Stem Cells Treated Ex Vivo with Low-dose of Bone Morphogenetic Protein-2 Augment Their Efficacy in Spinal Fusion
Alexander Perdomo-Pantoja, Christina Holmes, Ethan Cottrill, Wataru Ishida, Sheng-fu L. Lo, Timothy F. Witham

8:41–8:43 am
467 Axillary Nerve Repair By Lower Subscapular Nerve In Upper Brachial Plexus Palsy
Pavel Haninec, Libor Mencl

8:43–8:45 am
468 Impact of Hypothyroidism on In-hospital Mortality for Cervical Spinal Fusions
Evan Luther, Roberto Perez-Roman, David McCarthy, Joshua D. Burks, Andrew Buskard, Karthik Madhavan, Steven Vanni, Michael Y. Wang
8:45–8:47 am
469 Transplanted Bone Marrow Stem Cells Treated With Bone Morphogenetic Protein-2: Tracking In Vivo Their Survival And Proliferation In A Murine Spinal Fusion Model
Alexander Perdomo-Pantoja, Wataru Ishida, Maritza Taylor, Colson Tomberlin, Sheng-fu L. Lo, Timothy F. Witham, Christina Holmes

8:47–8:49 am
470 Combined Annulus Fibrosus and Nucleus Pulposus Repair In An In-vivo Sheep Model
Christoph Wippinger, Stephen Sloan, Sertac Kirnaz, Rodrigo Navarro-Ramirez, Franziska A. Schmidt, Antonella Schiavinato, Lawrence J. Bonassar, Roger H. rtl

8:49–8:51 am
471 Adenoviral Delivery of Botulinum Toxin Genes Inhibits Synaptic Activity in the Rat Spinal Cord: An Evaluation of Different Toxin Domains in Gene-based Neuromodulation
Long Di, Yujin Kim, Muhibullah S. Tora, Orion P. Keifer, Hannah Chen, Paavali Hannikainen, Anthony Donsante, Nicholas M. Boulis

8:51–8:53 am
472 The National Prevalence and Characteristics of Opioid Use in Patients Undergoing Elective Spine Surgery
Lara W. Massie, Vidhya Gunaseelan, Hesham M. Zakaria, Jennifer Waljee, Chad Brummett, Jason M. Schwalb

8:53–8:55 am
473 In Vitro Response to Implants with Internally Roughened Micron and Nano Features
Justin L. Brown, Michelle B. Gallagher, Jennifer M. Schneider

8:55–8:57 am
474 Influence of Lumbar Lordosis on Posterior Rod Strain in Long-segment Pedicle Screws and Rods Instrumentation and Anterior Column Realignment: Cadaveric Study
Bernardo De Andrade Pereira, Jakub Godzik, Jennifer Lehrman, Anna Newcomb, Randall Hlubek, Juan S. Uribe, Jay D. Turner, Brian P. Kelly

8:57–8:59 am
475 Biomechanical Evaluation of a Corpectomy Device with Self-adjusting End Cap
Sasidhar Vadapalli, Thomas J. Stinch eild, Daniel M. Sciubba, Gregory Schroeder, Rishe Sivagnanam, Julien Prevoist

8:59–9:01 am
476 Spinal Cord High-grade In trating Gliomas in Adults: Clinico-pathological and Molecular Evaluation
Panagiotis Kerezoudis, Mohammed A. Alvi, Cristiane Idia, Michael Paolini, Jenna Meyer, Emily G. Barr Fritcher, Sandy Goncalves, Fredric B. Meyer, Mohamad Bydon, Aditya Raghu Nathan

9:01–9:03 am
477 Spinal Cord Stimulator (SCS) Trial Lead Placement Under General Anesthesia: A Feasibility, Accuracy, and Reliability Study
Tianyi Niu, Yevgeniy Freyvert, Daniel C. Lu, Irene Wu
9:03 9:05 am 478 Inflammatory Mediators Modulate Mitochondrial Dynamics in Spinal Facet Chondrocytes
Logan Helland

9:05 9:07 am 479 Synergistic Inhibitory Effect of Anti-PD-1 Antibodies and LXR-623 Against Chordomas in an NSG-SGM3-BLT Humanized Mouse Model
Wataru Ishida, Alexander Perdomo-Pantoja, Betty Tyler, Michael Lim, Timothy F. Witham, Sheng-fu L. Lo

9:07 9:09 am 480 Leveraging microRNAs for Spinal Cord Injury Repair
Verl Siththanandan, Jessica L. Diaz, Victoria Lu, Nicole Gonzalez-Nava, Lincoln Pasquina, Jessica MacDonald, Mollie B. Woodworth, Vibhu Sahni, Peter Sarnow, Theo D. Palmer, Jeffrey Macklis, Suzanne A. Tharin

9:09 9:15 am Questions and Discussion

Spinal Deformity Breakout Splash 11/12

7:45 9:15 am MODERATORS: Tyler R. Koski, Randall W. Porter, Justin S. Smith

7:45 7:47 am 481 Association of Body Mass Index, Sagittal Vertical Axis Change, and Health-related Quality of Life Outcomes Following Adult Deformity Surgery

7:47 7:49 am 482 Risk Factors of Proximal Junctional Kyphosis in Neuromuscular Scoliosis
Shashank V. Gandhi, Amer F. Samdani, Brandon J. Toll, M. Burhan Janjua, Joshua M. Pahys, Steven Wei-Hung Hwang

7:49 7:51 am 483 Supplemental Rods are Needed to Maximally Reduce Rod Strain across the Lumbosacral Junction with TLIF but not ALIF in Long Constructs
Jakub Godzik, Randy Hlubek, Anna Newcomb, Jennifer Lehrman, Bernardo Andrada, S. Harrison Farber, Lawrence Lenke, Brian P. Kelly, Jay D. Turner

7:51 7:53 am 484 Early and Late Complications in Surgical Correction of Proximal Junctional Kyphosis
Christopher G. Wilkerson, Hussam Abou-Al-Shaar, Michael Karsy, Andrew T. Dailey, Darrel S. Brodke
7:53–7:55 am
485 Transforaminal Versus Anterior Lumbar Interbody Fusion at L5-S1 in MIS Treatment of ASD: Effect on Spinopelvic Parameters and Outcomes in Degenerative Scoliosis

7:55–7:57 am
486 Operative Correction of Adult Spinal Deformity Is Not Associated with Reduced Risk of Persistent Opioid Prescribing
Jay K. Nathan, Bridger Rodoni, Jennifer Waljee, Paul Park, Mark E. Oppenlander

7:57–7:59 am
487 The Role of the Fractional Lumbosacral Curve in Persistent Coronal Malalignment following Adult Thoracolumbar Deformity Surgery
Alexander Theologis, Thamrong Lertudomphonwanit, Lawrence Lenke, Keith Bridwell, Munish C. Gupta

7:59–8:01 am
488 Quantitative Age-adjusted Targets for Ideal Cervicothoracic Sagittal Alignment in Asymptomatic Adults
Peter G. Passias, Cole Bortz, Dennis Vasquez-Montes, Frank Segreto, Samantha R. Horn, Nicholas Frangella, Nicholas B. Stekas, Leah Steinmetz, Christopher Varlotta, David Ge, Jordan Manning, Avery Brown, Katherine Pierce, Haddy Alas, Bassel G. Diebo, Shaleen Vira, Michael Gerling, Renaud Lafage, Frank Schwab, Charla Fischer, Themistocles Protopsaltis, Virginie Lafage, Aaron J. Buckland, Thomas Errico

8:01–8:03 am
489 Grading of Complications Following Cervical Deformity-corrective Surgery: Are Existing Classification Systems Applicable?

8:03–8:05 am
490 Development of a Novel Cervical Deformity Surgical Invasiveness Index
8:05–8:07 am
491 Reciprocal Changes of Mild and Severe Cases of Proximal Junctional Kyphosis After Lumbo-Pelvic Spinal Fusions
Peter G. Passias, Nicholas Frangella, Renaud Lafage, Virginie Lafage, Justin S. Smith, Breton G. Line, D. Kojo Hamilton, Bassel G. Diebo, Khaled Kebaish, Haddy Alas, Frank Segreto, Alex Soroceau, Jeffrey L. Gum, Munish C. Gupta, Eric Klineberg, Douglas C. Burton, Robert A. Hart, Christopher P. Ames, Shay Bess, Christopher I. Shaffrey Sr., Frank Schwab

8:07–8:09 am
492 Impact of Presenting Patient Characteristics on Surgical Complications and Morbidity in Early Onset Scoliosis
Frank Segreto, Peter G. Passias, Samantha R. Horn, Cole Bortz, Dennis Vasquez Montes, Bassel G. Diebo, Shaleen Vira, Nicholas B. Stekas, David Ge, Mohamed A. Moawad, Renaud Lafage, Virginie Lafage, Edward M. DelSole, Aaron Hockley, Anthony M. Petrizzo, Aaron J. Buckland, Thomas Errico, Michael Gerling

8:09–8:11 am
493 Is Frailty Responsive to Surgical Correction of Adult Spinal Deformity? An Investigation of Sagittal Re-alignment and Frailty Component Drivers

8:11–8:13 am
494 The Effect of Postoperative Sagittal Vertical Axis (SVA) on Discharge Disposition
Mohamed Macki, Lara W. Massie, Hesham M. Zakaria, Victor W. Chang

8:13–8:15 am
495 Incidence of Acute, Progressive, and Delayed Proximal Junctional Kyphosis over an 8-year Period in Adult Spinal Deformity Patients

8:15–8:17 am
496 Anterior Column Realignment Versus Pedicle Subtraction Osteotomy: Biomechanical Comparison of Stability and Rod Strain Distribution
Jakub Godzik, Bernardo De Andrada Pereira, Anna Newcomb, Jennifer Lehrman, Randall Hlubek, Gregory M. Mundis Jr., Juan S. Uribe, Brian P. Kelly, Jay D. Turner
497 Pilot Assessment of OLIF/ATP in the Treatment of Adult Degenerative Scoliosis
Kamal R. Woods, Rafeek O.J. Woods, Richard Gorman

498 The Efficacy of Intraoperative Multimodal Monitoring in Pedicle Subtraction Osteotomies of the Lumbar Spine
Jianning Shao, Maxwell Y. Lee, Shreya Louis, Konrad Kn susceptible, Bryan S. Lee, Dominic Pelle, Joseph E. Tanenbaum, Jason Savage, Thomas E. Mroz, Michael P. Steinmetz

499 Thoracolumbar Junction Orientation: A Novel Guideline for Sagittal Correction to Reduce Proximal Junctional Kyphosis in Adult Spinal Deformity Patients with UIV at the Thoracolumbar Junction
Hong Joo Moon, Munish C. Gupta

500 Effect of Tobacco Smoking on Implant Failure Rate and Risk of Intra-Operative Bleeding: Analysis of 270 patients from the Prospective, Multi-center SCOLI-RISK-1 study of Complex Adult Spinal Deformity Surgery
Jamie Wilson, Frank Jiang, Christopher I. Shaffrey Sr., Leah Y. Carreon, Kenneth Cheung, Benny Dahl, Stephen Lewis, Lawrence Lenke, Michael G. Fehlings

501 Semi-automated Method for Calculation of Sagittal Alignment from CT Scans
Eric W. Nottmeier, Thomas John Morrison III, Kevin N. Ammar, Jahangir Asghar, Tapan Daftari, Ashutosh A. Pradhan, Matthew J. McGirt

502 Characterization of Gait and Spinopelvic Alignment Using 3D Kinematic Analysis and Support Vector Machine Regression
Haydn Hoffman, Ruyi Huang, Hamid Ghasemi, Daniel C. Lu

503 Readmission, Reoperation, and Infection after Long-segment Posterior Spinal Fusion
Michael Cloney, Benjamin Hopkins, Jonathan T. Yamaguchi, Jack Goergen, Mark B. Svet, Max Kelsten, Conor B. Driscoll, Kartik Kesavabhotla, Tyler R. Koski, Zachary A. Smith, Nader S. Dahdaleh

504 Lumbar Spinal Segmental Curvature Changes Are Sex- and Level-specific: A Controlled Upright MRI Study
Jamie Baisden, Karin R. Swartz, Joseph Avila, Narayan Yoganandan, Frank A. Pintar

505 Lumbar Spine Stiffness and Motion as a Function of Sagittal Alignment Under Complex Loading
Jamie Baisden, John R. Humm, Narayan Yoganandan, Frank A. Pintar
506 Preoperative Chronic Opiate Use Associated with Lower Post-Surgical Clinical Outcomes After Complex Spinal Deformity Surgery
David Salvetti, Kamil W. Nowicki, Nitin Agarwal, Nima Alan, Gurpreet S. Gandhoke, D. Kojo Hamilton, Adam S. Kanter, David O. Okonkwo

507 Lumbosacral TLIF Increases Proximal Junctional Motion in Long Segment Constructs
Randall Hlubek, Jakub Godzik, Anna Newcomb, Jennifer Lehrman, Bernardo De Andrada Pereira, Brian P. Kelly, Jay D. Turner

508 Evaluating the Need for Iliac Fixation in Long Segment Thoracolumbar Fusions

509 Intermittent Retraction of Great Vessels during Anterior Lumbar Interbody Fusion

510 The Influence of Spinopelvic Parameters on Infection Rates Following Lumbar Spine Surgery
Timothy Y. Wang, Ranjith Babu, Elizabeth P. Howell, C. Rory Goodwin

511 The Effect of More Interbody Fusion to Treat the Fractional Curve in Adult Scoliosis: Impact on Lordosis, Curve Correction, and Complications
Dominic Amara, Praveen V. Mummaneni, Christopher P. Ames, Bobby Tay, Vedat Deviren, Shane Burch, Sigurd Berven, Dean Chou

512 Hardware Complications in Adult Spine Deformity Correction When Using Computer-assisted Rod Bending technology: A Single Institution’s Experience
Nima Alan, Song Kim, David Salvetti, Nitin Agarwal, Alp Ozpinar, D. Kojo Hamilton, David O. Okonkwo, Adam S. Kanter

513 Mechanical Complications in Adult Spinal Deformity Surgery: Can the Alignment Explain Everything?
Alisson R. Teles, Bradley Jacobs, Fred Nicholls, Kenneth Thomas, Ganesh Swamy
8:55–8:57 am
514 Evidence of Impaired Pain Modulation in Adolescents with Idiopathic Scoliosis and Chronic Back Pain
Alisson R. Teles, Don D. Ocay, Abdulaziz Bin Shebreen, Andrew Tice, Neil Saran, Jean Ouellet, Catherine E. Ferland

8:57–8:59 am
515 Back Pain in Adolescent Idiopathic Scoliosis: The Moderation Effect of Pain Catastrophizing
Alisson R. Teles, Maxime St-Georges, Fahad H. Abduljabbar, Leonardo Simoes, Fan Jiang, Neil Saran, Jean Ouellet, Catherine E. Ferland

8:59–9:01 am
516 Posterior Ligamentous Augmentation Prevents Acute Proximal Junctional Failure In Upper Thoracic Constructs But Not In Lower Thoracic Constructs
Randall Hlubek

9:01–9:03 am
517 Surgical Treatment of Flat Back Syndrome with Anterior Hyperlordotic Cages
M. Burhan Janjua, William C. Welch, Brendan McShane, Vincent Arlet, Ali K. Ozturk

9:03–9:05 am
518 Reduced Impact of Obesity on Surgical Outcomes, Patient Reported Pain Scores and 30-Day Readmission Rates After Complex Spinal Fusion (>=7 Levels) for Adult Deformity Correction

9:05–9:07 am
519 Rate of Instrumentation Changes on Post-Operative and Follow-Up Radiographs After Primary Complex Spinal Fusion (5 Levels) for Adult Deformity Correction
Aladine Elsamadicy, Joaquin Q. Camara-Quintana, Adam Kundishora, Isaac G Freedman, Isaac O. Karikari

9:07–9:09 am
520 Gender Does Not Influence Discharge Disposition After Spinal Fusion (>=4 Levels) for Adult Spine Deformity Correction: A National Study of 4,972 Patients

9:10–9:15 am
Questions and Discussion
Special Session
Glimmer Ballroom

9:15–10:15 am
Business of Spine Surgery/CPT Update

MODERATORS: John K. Ratliff, Luis M. Tumialan

SESSION DESCRIPTION: Content will focus on the socioeconomic factors that have an impact on the practice of spinal surgery.

LEARNING OBJECTIVES: Upon completion of this session, participants will be able to:
1. Discuss the impact clinical databases have on the practice of spinal surgery
2. Identify the process of establishing the value of a CPT code and how insurance companies have attempted to alter it
3. Discuss the recent activity of the Washington Committee with regards to spinal surgery
4. Incorporate CPT changes into their practice and have a better understanding of the performance metrics for “pay for performance”

9:15–9:22 am
The QOD Effect: How Big Data is Changing What We Do in the OR
Erica F. Bisson

9:23–9:30 am
Changes in Spine Codes Affecting Your Practice in 2019: CPT Update
Joseph S. Cheng

9:31–9:38 am
Washington Update
Scott A. Meyer

9:39–9:46 am
Anatomy of a Disvalued Code: 63047 and 22633
Luis M. Tumialan

9:47–9:54 am
What is a Coverage Determination Policy and How Does It Affect My Practice?
Anand Veeravagu

9:55–10:02 am
Consolidation of Insurance Companies and the Impact on Spinal Surgery
John J. Knightly

10:03–10:10 am
MIPS and MACRA Update
John K. Ratliff

10:10–10:15 am
Owning and Operating a Surgicenter: How to Do It
Kurt M. Eichholz
THANK YOU for your support of Spine Summit 2019
CASE PRESENTATIONS  Jedi Knight Versus Jedi Master
MODERATORS: D. Kojo Hamilton, Charles A. Sansur
LEARNING OBJECTIVES: Upon completion of this session, participants will be able to:
1. Discuss controversial areas related to common spinal approaches and techniques
2. Discuss the pros and cons of traditional versus minimally invasive techniques to address spinal deformity
3. Discuss the pros and cons of aggressive versus more limited separation techniques to address spine tumor pathologies
4. Describe how advanced spinal navigation can be incorporated into the clinical practice of spine surgery

10:15–10:40 am
Lumbar Stenosis/Spondylotheses: Indirect Versus Direct Decompression

10:15 10:24 am
Lateral CON: Prefer not to Utilize a Procedure for Leg Pain, Whose Major Complication is Leg Pain
John J. Knightly

10:25 10:34 am
Lateral PRO: Stenosis can be Adequately Addressed from a Lateral Approach
Scott A. Meyer

10:35 10:40 am
Discussion and Verdict
Michael S. Virk

10:41 11:06 am
Degenerative Scoliosis  Posterior Versus Lateral/MIS

10:41 10:50 am
Lateral/MIS: The Future
Adam S. Kanter

10:51 11:00 am
Posterior: Tried and True
Christopher I. Shaffrey

11:01 11:06 am
Discussion and Verdict
Tyler R. Koski
11:07 11:32 am
Tumor Surgery

11:07 11:16 am
Aggressive Spinal Reconstruction is Best
Ziya L. Gokaslan

11:17 11:26 am
Less is More: Separation Surgery + XRT
Ilya Laufer

11:27 11:32 am
Discussion and Verdict
John E. O Toole

11:33 11:58 am
Fixation at the Bottom of a Long Construct

11:33 11:42 am
Sacropelvic Fixation is Mandatory
Gregory M. Mundis

11:43 11:52 am
No Need for Pelvic Fixation
Juan S. Uribe

11:53 am 11:58 am
Discussion and Verdict
Daniel J. Hoh

11:59 am 12:24 pm
Spinal Navigation

11:59 am 12:08 pm
Robots are the Future
Nicholas Theodore

12:09 12:18 pm
Robots are All Hype
Eric W. Nottmeier

12:19 12:24 pm
Discussion and Verdict
Michael P. Steinmetz

12:25 12:30 pm
Questions and Conclusion

12:30 pm
Meeting Adjourns
THANK YOU for your support of Spine Summit 2019
## Exhibitor List

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Booth #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thompson Surgical Products</td>
<td>100</td>
</tr>
<tr>
<td><a href="http://www.thompsonsurgicalinstruments.com">www.thompsonsurgicalinstruments.com</a></td>
<td></td>
</tr>
<tr>
<td>Neuraxis</td>
<td>102</td>
</tr>
<tr>
<td><a href="http://www.neuraxismed.com">www.neuraxismed.com</a></td>
<td></td>
</tr>
<tr>
<td>Zimmer Biomet</td>
<td>103</td>
</tr>
<tr>
<td><a href="http://www.zimmerbiomet.com">www.zimmerbiomet.com</a></td>
<td></td>
</tr>
<tr>
<td>SI-BONE</td>
<td>104</td>
</tr>
<tr>
<td><a href="http://www.si-bone.com">www.si-bone.com</a></td>
<td></td>
</tr>
<tr>
<td>Alphatec Spine</td>
<td>107</td>
</tr>
<tr>
<td><a href="http://www.alphatecspine.com">www.alphatecspine.com</a></td>
<td></td>
</tr>
<tr>
<td>RIWO Spine - A Richard Wolf Company</td>
<td>108</td>
</tr>
<tr>
<td><a href="http://www.riospine.com/us">www.riospine.com/us</a></td>
<td></td>
</tr>
<tr>
<td>ORTHOReBIRTH USA</td>
<td>111</td>
</tr>
<tr>
<td><a href="http://www.orthorebirthusa.com">www.orthorebirthusa.com</a></td>
<td></td>
</tr>
<tr>
<td>Anchor Orthopedics</td>
<td>113</td>
</tr>
<tr>
<td><a href="http://www.anchorortho.com">www.anchorortho.com</a></td>
<td></td>
</tr>
<tr>
<td>Intrinsic Therapeutics</td>
<td>112</td>
</tr>
<tr>
<td><a href="http://www.intrinsictherapeutics.com">www.intrinsictherapeutics.com</a></td>
<td></td>
</tr>
<tr>
<td>Synaptive Medical</td>
<td>202</td>
</tr>
<tr>
<td><a href="http://www.synaptivemedical.com">www.synaptivemedical.com</a></td>
<td></td>
</tr>
<tr>
<td>DePuy Synthes</td>
<td>203</td>
</tr>
<tr>
<td><a href="http://www.depuysynthes.com">www.depuysynthes.com</a></td>
<td></td>
</tr>
<tr>
<td>Amplify Surgical</td>
<td>204</td>
</tr>
<tr>
<td><a href="http://www.amplifysurgical.com">www.amplifysurgical.com</a></td>
<td></td>
</tr>
<tr>
<td>Aesculap</td>
<td>206</td>
</tr>
<tr>
<td><a href="http://www.aesculapimplantsystems.com">www.aesculapimplantsystems.com</a></td>
<td></td>
</tr>
<tr>
<td>Brainlab</td>
<td>207</td>
</tr>
<tr>
<td><a href="http://www.brainlab.com">www.brainlab.com</a></td>
<td></td>
</tr>
<tr>
<td>Baxter Healthcare</td>
<td>210</td>
</tr>
<tr>
<td><a href="http://www.baxter.com">www.baxter.com</a></td>
<td></td>
</tr>
<tr>
<td>NuVasive</td>
<td>211</td>
</tr>
<tr>
<td><a href="http://www.nuvasive.com">www.nuvasive.com</a></td>
<td></td>
</tr>
<tr>
<td>SeaSpine</td>
<td>216</td>
</tr>
<tr>
<td><a href="http://www.seaspine.com">www.seaspine.com</a></td>
<td></td>
</tr>
<tr>
<td>Globus Medical</td>
<td>217</td>
</tr>
<tr>
<td><a href="http://www.globusmedical.com">www.globusmedical.com</a></td>
<td></td>
</tr>
<tr>
<td>Life Instrument Corporation</td>
<td>218</td>
</tr>
<tr>
<td><a href="http://www.lifeinstruments.com">www.lifeinstruments.com</a></td>
<td></td>
</tr>
<tr>
<td>7D Surgical</td>
<td>222</td>
</tr>
<tr>
<td><a href="http://www.7dsurgical.com">www.7dsurgical.com</a></td>
<td></td>
</tr>
<tr>
<td>SpineCraft</td>
<td>224</td>
</tr>
<tr>
<td><a href="http://www.spinecraft.com">www.spinecraft.com</a></td>
<td></td>
</tr>
<tr>
<td>Misonix</td>
<td>226</td>
</tr>
<tr>
<td><a href="http://www.misonix.com">www.misonix.com</a></td>
<td></td>
</tr>
<tr>
<td>ChoiceSpine</td>
<td>228</td>
</tr>
<tr>
<td><a href="http://www.choicespine.net">www.choicespine.net</a></td>
<td></td>
</tr>
<tr>
<td>Medtronic</td>
<td>302</td>
</tr>
<tr>
<td><a href="http://www.medtronic.com">www.medtronic.com</a></td>
<td></td>
</tr>
<tr>
<td>Stryker</td>
<td>303</td>
</tr>
<tr>
<td><a href="http://www.stryker.com">www.stryker.com</a></td>
<td></td>
</tr>
<tr>
<td>4WEB Medical</td>
<td>305</td>
</tr>
<tr>
<td><a href="http://www.4webmedical.com">www.4webmedical.com</a></td>
<td></td>
</tr>
<tr>
<td>Company Name</td>
<td>Booth #</td>
</tr>
<tr>
<td>------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>Olympus America</td>
<td>307</td>
</tr>
<tr>
<td><a href="http://www.olympusamerica.com">www.olympusamerica.com</a></td>
<td></td>
</tr>
<tr>
<td>K2M, Inc.</td>
<td>310</td>
</tr>
<tr>
<td><a href="http://www.k2m.com">www.k2m.com</a></td>
<td></td>
</tr>
<tr>
<td>Joimax, Inc</td>
<td>311</td>
</tr>
<tr>
<td><a href="http://www.joimax.com">www.joimax.com</a></td>
<td></td>
</tr>
<tr>
<td>Simplify Medical</td>
<td>313</td>
</tr>
<tr>
<td><a href="http://www.simplifymedical.com">www.simplifymedical.com</a></td>
<td></td>
</tr>
<tr>
<td>Providence Medical Technology</td>
<td>316</td>
</tr>
<tr>
<td><a href="http://www.providencemt.com">www.providencemt.com</a></td>
<td></td>
</tr>
<tr>
<td>Tobra Medical</td>
<td>317</td>
</tr>
<tr>
<td><a href="http://www.tobramedical.com">www.tobramedical.com</a></td>
<td></td>
</tr>
<tr>
<td>Benvenue Medical</td>
<td>318</td>
</tr>
<tr>
<td><a href="http://www.benvenuemedical.com">www.benvenuemedical.com</a></td>
<td></td>
</tr>
<tr>
<td>Orthox</td>
<td>319</td>
</tr>
<tr>
<td><a href="http://www.orthofx.com">www.orthofx.com</a></td>
<td></td>
</tr>
<tr>
<td>Spine Wave</td>
<td>323</td>
</tr>
<tr>
<td><a href="http://www.spinewave.com">www.spinewave.com</a></td>
<td></td>
</tr>
<tr>
<td>Titan Spine</td>
<td>325</td>
</tr>
<tr>
<td><a href="http://www.titanspine.com">www.titanspine.com</a></td>
<td></td>
</tr>
<tr>
<td>Cerapedics</td>
<td>327</td>
</tr>
<tr>
<td><a href="http://www.cerapedics.com">www.cerapedics.com</a></td>
<td></td>
</tr>
<tr>
<td>CTL Amedica</td>
<td>329</td>
</tr>
<tr>
<td><a href="http://www.ctlmed.com">www.ctlmed.com</a></td>
<td></td>
</tr>
<tr>
<td>RTI Surgical</td>
<td>400</td>
</tr>
<tr>
<td><a href="http://www.rtix.com">www.rtix.com</a></td>
<td></td>
</tr>
<tr>
<td>Biologica Technologies</td>
<td>401</td>
</tr>
<tr>
<td><a href="http://www.biologicatechnologies.com">www.biologicatechnologies.com</a></td>
<td></td>
</tr>
<tr>
<td>MiRus</td>
<td>402</td>
</tr>
<tr>
<td><a href="http://www.mirusmed.com">www.mirusmed.com</a></td>
<td></td>
</tr>
<tr>
<td>Spineology</td>
<td>403</td>
</tr>
<tr>
<td><a href="http://www.spineology.com">www.spineology.com</a></td>
<td></td>
</tr>
<tr>
<td>Bioventus</td>
<td>404</td>
</tr>
<tr>
<td><a href="http://www.bioventusglobal.com">www.bioventusglobal.com</a></td>
<td></td>
</tr>
<tr>
<td>Medtech International Group</td>
<td>405</td>
</tr>
<tr>
<td><a href="http://www.medtechinternationalgroup.com">www.medtechinternationalgroup.com</a></td>
<td></td>
</tr>
<tr>
<td>Biedermann Motech</td>
<td>406</td>
</tr>
<tr>
<td><a href="http://www.biedermann.com">www.biedermann.com</a></td>
<td></td>
</tr>
<tr>
<td>Integrity Implants</td>
<td>409</td>
</tr>
<tr>
<td><a href="http://www.integrityimplants.com">www.integrityimplants.com</a></td>
<td></td>
</tr>
<tr>
<td>Additive Implants</td>
<td>410</td>
</tr>
<tr>
<td><a href="http://www.additiveimplant.com">www.additiveimplant.com</a></td>
<td></td>
</tr>
<tr>
<td>Hans Biomed</td>
<td>411</td>
</tr>
<tr>
<td><a href="http://www.hansbiomed.com/eng/">www.hansbiomed.com/eng/</a></td>
<td></td>
</tr>
<tr>
<td>DJO</td>
<td>412</td>
</tr>
<tr>
<td><a href="http://www.djoglobal.com">www.djoglobal.com</a></td>
<td></td>
</tr>
<tr>
<td>Augmedics</td>
<td>413</td>
</tr>
<tr>
<td><a href="http://www.augmedics.com">www.augmedics.com</a></td>
<td></td>
</tr>
<tr>
<td>Stimwave</td>
<td>416</td>
</tr>
<tr>
<td><a href="http://www.stimwave.com">www.stimwave.com</a></td>
<td></td>
</tr>
<tr>
<td>Surgentec</td>
<td>418</td>
</tr>
<tr>
<td><a href="http://www.surgentec.com">www.surgentec.com</a></td>
<td></td>
</tr>
<tr>
<td>NeuroPoint Alliance</td>
<td>419</td>
</tr>
<tr>
<td><a href="http://www.aans.org">www.aans.org</a></td>
<td></td>
</tr>
</tbody>
</table>
Adhering to the three core principles of Advanced Materials Science™—Surface, Structure, and Imaging—NuVasive® has pioneered design and manufacturing methods that combine the inherent benefits of porosity with the advantageous material properties of PEEK and titanium to create implants intelligently designed for fusion.

Visit NuVasive booth 211 to discover more about our implant solutions.
Adhering to the three core principles of Advanced Materials Science™—Surface, Structure, and Imaging—NuVasive® has pioneered design and manufacturing methods that combine the inherent benefits of porosity with the advantageous material properties of PEEK and titanium to create implants intelligently designed for fusion.

Visit NuVasive booth 211 to discover more about our implant solutions.
Accreditation Statement

This activity has been planned and implemented in accordance with the accreditation requirements and policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint providership of Congress of Neurological Surgeons and the Section on Disorders of the Spine and Peripheral Nerves. The Congress of Neurological Surgeons is accredited by the Accreditation Council of Continuing Medical Education (ACCME) to provide continuing medical education for physicians.

AMA PRA Category 1 Credits™ Designation Statement

The Congress of Neurological Surgeons designates this live activity for a maximum of 26.75 AMA PRA Category 1 Credits™. Physicians should only claim credit commensurate with the extent of their participation in the activity.

* A maximum of 21.00 AMA PRA Category 1 Credits™ may be earned for Scientific Sessions only.

* A maximum of 5.75 AMA PRA Category 1 Credits™ may be earned for Special Courses.

Nursing Credit

This continuing nursing education activity was approved by the American Association of Neuroscience Nurses, an accredited approver by the American Nurses Credentialing Center Commission on Accreditation.

Physician’s Assistant Credit

This program has been reviewed and is approved for a maximum of 26.75 AMA PRA Category 1 Credits™ by the AAPA Review Panel. PAs should claim only the credit commensurate with the extent of their participation in the activity.

This program was planned in accordance with AAPA CME Standards for Live Programs and for Commercial Support of Live Programs.

Claiming Credit

CME and attendance credits can be claimed through the online credit system at www.cns.org. You will need to enter the number of hours you are claiming for each session.
you attended. Physicians should only claim credit for the learning activities at Spine Summit 2019 in which they actively participated. The tracking system lets you create and email a certificate immediately following Spine Summit 2019, either while you are still in Miami, or from the convenience of your home or office.

Disclosures

The Accreditation Council for Continuing Medical Education Updated Standards for Commercial Support requires that anyone in a position to control the content of the educational activity has disclosed all financial relationships with any commercial interest. The ACCME defines a “commercial interest” as any entity producing, marketing, re-selling, or distributing healthcare goods or services consumed by, or used on, patients. All reported conflicts are managed by a designated official to ensure a bias-free presentation. Failure or refusal to disclose, or the inability to satisfactorily resolve the identified conflict, may result in the withdrawal of the invitation to participate in any of the CNS educational activities.

FDA Statement

Some drugs or medical devices demonstrated at Spine Summit have not been cleared by the FDA, or have been cleared by the FDA for specific purposes only. The FDA has stated that it is the responsibility of the physician to determine the FDA clearance status of each drug or medical devices he or she wishes to use in clinical practice. The CNS policy provides that “off label” uses of a drug or medical device may be described at the DSPN Spine Summit so long as the “off label” use of the drug or medical device is also specifically disclosed. Any drug or medical device is “off label” if the described use is not set forth on the products approval label. It is also each speaker’s responsibility to include the FDA clearance status on any device or drug requiring FDA approval discussed or described in their presentation or to describe the lack of FDA clearance for any “off label” uses discussed. Speakers from the audience are also required, therefore, to indicate any relevant personal/professional relationships as they discuss a given topic. Handout materials are prepared and submitted for distribution by the presenters who are solely responsible for their content.
Speaker Ready Room

The Speaker Ready Room is located in **Splash 5/6**. The hours are:

- **Thursday, March 14**: 8:00 am - 6:00 pm
- **Friday, March 15**: 6:00 am - 7:00 pm
- **Saturday, March 16**: 6:00 am - 4:00 pm
- **Sunday, March 17**: 6:00 am - 12:30 pm

All speakers and abstract presenters should visit the Speaker Ready Room prior to their presentation. All Scientific Session faculty are required to check in at the Speaker Ready Room 24 hours ahead of your presentation.

Exhibit Hall

**Sparkle Ballroom**

- **Friday, March 15**: 9:00 am - 4:30 pm
- **Saturday, March 16**: 9:00 am - 1:00 pm

Registration

**Luster Gallerie South**

- **Thursday, March 14**: 11:00 am - 5:30 pm
- **Friday, March 15**: 6:30 am - 7:00 pm
- **Saturday, March 16**: 6:30 am - 3:00 pm
- **Sunday, March 17**: 6:30 am - 12:30 pm

No Smoking Policy

Smoking is not permitted at any official Spine Summit 2019 event. The Fontainebleau Miami Beach Hotel is a non-smoking hotel. Smoking is only permitted in designated outdoor areas.
We’re driving innovation to provide a better way to safely and effectively manage postsurgical pain.

Our in-depth knowledge of the postsurgical pain market, coupled with our passion for delivering improved patient care, drives our commitment.

Disclaimer

The material presented at the DSPN Annual Meeting has been made available by the Section on Disorders of the Spine and Peripheral Nerves and the CNS for educational purposes only. These materials are not intended to represent the only, nor necessarily the best method or procedure appropriate for the medical situations discussed, but rather are intended to present an approach, view, statement or opinion of the faculty, which may be helpful to others who face similar situations.

All drugs and medical devices used in the United States are administered in accordance with the Food and Drug Administration (FDA) regulations. These regulations vary depending on the risks associated with the drug or medical devices compared to products already on the market, and the scope of the clinical data available.

Some drugs and medical devices demonstrated or described within the print publications of the Section of Disorders of the Spine and Peripheral Nerves jointly sponsored by the CNS have FDA clearance for use for specific purposes or for use only in restricted research settings. The FDA has stated that it is the responsibility of the physician to determine the FDA status of each drug or device he or she wants to use in compliance with applicable laws.

Neither the content (written or oral) of any course, seminar or other presentation in the program, nor the use of a specific product in conjunction therewith, nor the exhibition of any materials by any parties coincident with the program, should be construed as indicating endorsement or approval of the views presented, the products used or the materials exhibited by the Section on Disorders of the Spine and Peripheral Nerves jointly sponsored by the CNS, or by its committees, commissions or affiliates.
Opening Reception

Ocean Lawn
Thursday, March 14  6:30–8:00 pm

Take in spectacular views with the ocean as the backdrop. Enjoy a lavish array of food and beverages and listen to live entertainment as you network with old friends and new colleagues at the Opening Reception. Each medical attendee and spouse/guest registered for the meeting will receive one complimentary ticket. Resort casual attire is recommended.

Wine & Spine for Young Neurosurgeons

Ocean Promenade East
Friday, March 15  7:00 pm

All residents, fellows, and young neurosurgeons are welcome. RSVP to meetings@cns.org Space is limited to the first 50 people who RSVP. Walk-ins will be welcomed based on availability.

Purpose of the Section on Disorders of the Spine and Peripheral Nerves
Spine Summit 2019

To foster the use of spinal neurosurgical methods for the treatment of diseases of the spinal neural elements, the spine and peripheral nerves. To advance spinal neurosurgery and related sciences, improve patient care, support meaningful basic and clinical research, provide leadership in undergraduate and graduate continuing education and promote administrative facilities necessary to achieve these goals.
Thank you to our 2019 Spine Summit Supporters

AMBASSADOR LEVEL SUPPORT

Medtronic
DePuy Synthes

PARTNER LEVEL SUPPORT

Globus Medical
K2M
Pacira Pharmaceuticals, Inc.
NuVasive
Stryker

BENEFACTOR LEVEL SUPPORT

Aesculap
Si-BONE

SUPPORTERS

70 Surgical
Richard Wolf
Olympus
SpineWave
Zimmer Biomet
SPINE SUMMIT 2020

FOCUS on Data-driven Innovation

SEE YOU NEXT YEAR!

LAS VEGAS
MARCH 5-8
HIGH-RISK CERVICAL FUSION PATIENTS DESERVE MORE

Risk factors for nonunion affect millions. We are dedicated to improving outcomes and preventing surgical failures.

DIABETES\(^1,2,3\)

OSTEOPOROSIS\(^4,5,6\)

NICOTINE USE\(^7,8,9\)

MULTI-LEVEL DISEASE\(^10,11,12\)

Learn More—Visit Booth #316

www.providencemt.com

References
1. Long-term trends in Diabetes, April 2017, CDC Division of Diabetes Translation, United States Diabetes Surveillance System

©2018. Providence Medical Technology, Inc. All rights reserved. MKT-PMT-318 Rev 5
TRANSFORMING SPINE CARE THROUGH PROCEDURAL SOLUTIONS.

MAZOR X Stealth™ Edition

Learn more at booth 302.