PURPOSE of the Section on Disorders of the Spine and Peripheral Nerves Spine Summit 2015

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.
The Section on Disorders of the Spine and Peripheral Nerves gratefully acknowledges:

Neurosurgical Leadership Ambassador

The Section on Disorders of the Spine and Peripheral Nerves gratefully acknowledges:

Future of Neurosurgery Ambassador

The Section on Disorders of the Spine and Peripheral Nerves gratefully acknowledges:

Neurosurgical Education Partner
Welcome to Spine Summit 2015

On behalf of the Section on Disorders of the Spine and Peripheral Nerves Executive Committee and Annual Meeting Committee, welcome to Spine Summit 2015 at the magnificent JW Marriott Desert Ridge in Phoenix, Arizona!

We extend greetings and special thanks to our partner societies: AO Spine, Association for Collaborative Spine Research, Cervical Spine Research Society, International Society for the Advancement of Spine Surgery, Scoliosis Research Society, and Society for Minimally Invasive Spinal Surgery. With six international spine societies co-leading this gathering, our scientific program is aptly named One Spine, One World.

We have selected a lineup of expert faculty, scientific sessions, and ground-breaking abstracts to offer innovative techniques and information that will advance your practice and patient care. The David Cahill Memorial Controversies Sessions are back—get a good seat to watch experts debate the hot-button issues that are affecting our specialty!

Opportunities for additional education include special courses (some led by our partner spine societies), three new luncheon symposia, and a cadaver course taking place at the state-of-the-art Barrow Neurological Institute.

Don't miss the What’s New sessions during your beverage breaks and lunches in the Exhibit Hall. These sessions offer an up-close look at the latest and greatest in neurosurgical and orthopedic technology from our industry partners.

Also, from Wednesday’s Opening Reception to Friday’s Young Neurosurgeons’ Dinner, take advantage of the opportunities to network with your peers—maybe even carry the networking over to the championship Wildfire Gold Club or Revive Spa while you’re here.

Thank you again for joining us at Spine Summit 2015. We hope your meeting experience is exceptional.

Sincerely,

Michael Y. Wang, MD, FACS  
Annual Meeting Chair

Zoher Ghogawala, MD, FACS  
Scientific Program Chair
MICHAEL FEHLINGS

Dr. Fehlings received his MD (Summa Cum Laude) from the University of Toronto in 1983. Following training in general surgery at Queen's University, Dr. Fehlings entered the University of Toronto Neurosurgical Residency Program. During his residency, he was one of the first surgeon scientist trainees at the University of Toronto to receive a PhD, which he attained in 1989 under Dr. Charles Tator. Dr. Fehlings became a fellow of the Royal College of Physicians and Surgeons of Canada in 1990 and a fellow of the American College of Surgeons in 2006. In 1991, he undertook a postdoctoral research fellowship at NYU Medical Center under Dr. Wise Young, which was followed by a clinical spine fellowship under Dr. P. Cooper at NYU. Dr. Fehlings joined the neurosurgical staff at the Toronto Western Hospital in 1992.

He is currently professor and vice chair research in the Department of Surgery at University of Toronto, member of the Institute of Medical Science School of Graduate Studies, scholar at the McLaughlin Centre, scientist at the McEwen Centre for Regenerative Medicine, senior scientist at Toronto Western Research Institute, co-director of University of Toronto Spine Program, Halbert Chair in Neural Repair and Regeneration, associate scientific director of the NeuroDevNet NCE, and chairman of AOSpine North America. He is also deputy editor of the journal Spine and past president of the US-based Cervical Spine Research Society.

His main clinical interests are in complex spinal neurosurgery, and he operates a vibrant, translationally-oriented research program focused on discovering novel treatments for the injured brain and spinal cord. He has authored over 500 highly cited peer-reviewed publications, edited key textbooks, presented innumerable invited international lectures, and received numerous prestigious international awards. In 2014, Dr. Fehlings was elected to Fellowship in the Canadian Academy of Health Sciences and to the Royal Society of Canada.

JEFFREY C. WANG

Dr. Wang earned his degree in biological sciences at Stanford University and his MD at the University of Pittsburgh School of Medicine. He completed his residency at UCLA and his fellowship in spine surgery at Case Western Reserve University. He returned to UCLA as the professor of orthopaedic surgery and neurosurgery, and executive co-director of the UCLA Comprehensive Spine Center. He was named vice chair of the Department of Orthopaedic Surgery.

In 2013, Dr. Wang was recruited to the University of Southern California (USC). He is currently a professor of orthopaedic
Societies and Guests!

surgery and neurosurgery at the Keck Medical Center. He is co-director of the USC Spine Center and fellowship director of the USC Spine Fellowship. He is the chairman of AOspine and on the board of directors of several major spine societies. He serves as the the secretary of the Cervical Spine Research Society and as the treasurer of the North American Spine Society. He continues to run a basic science research laboratory and is in full-time academic practice at the University of Southern California. His research focuses on gene therapy and regenerative technologies for spinal fusion and disc regeneration.

Association for Collaborative Spine Research (ACSR)

ALEXANDER RICHARD VACCARO

Dr. Vaccaro graduated summa cum laude from Boston College in 1983 with a BS in biology. He received his MD from Georgetown University School of Medicine, where he was promoted with distinction. He earned membership in the Alpha Omega Alpha (AOA) Honor Society and graduated with honors in 1987. He completed a year of surgical internship at Cedars-Sinai Medical Center in Los Angeles, and his orthopaedic surgery residency was at Thomas Jefferson University, where he graduated in 1992. Dr. Vaccaro completed a spine fellowship at the University of San Diego. He earned a PhD in 2007 in the field of spinal trauma. Dr Vaccaro is currently pursuing a MBA at the Fox School of Business at Temple University in Philadelphia.

Dr. Vaccaro is the Richard H. Rothman Professor and Chairman of Orthopaedic Surgery and Professor of Neurosurgery at the Sidney Kimmel Medical College at Thomas Jefferson University in Philadelphia. He was the recipient of the Leon Wiltse award given for excellence in leadership and clinical research for spine care by the North American Spine Society (NASS) and is the past president of the American Spinal Injury Association and current president of the Association for Collaborative Spine Research.

He has over 560 peer-reviewed and 200 non-peer-reviewed publications. He has published over 300 book chapters and is the editor of over 46 textbooks and co-editor of OKU-Spine I and editor of OKU-8. Dr. Vaccaro is the co-director of the Regional Spinal Cord Injury Center of the Delaware Valley and co-chief of Spine Surgery and the Spine Fellowship program at the Sidney Kimmel Medical College at Thomas Jefferson University, where he instructs current fellows and residents in the diagnosis and treatment of various spinal problems and disorders.
Cervical Spine Research Society (CSRS)

K. DANIEL RIEW

Dr. Riew was born in Seoul, South Korea, and immigrated when he was seven years old. He graduated from Harvard College and Case Western Reserve University Medical School. He finished a residency in internal medicine at Cornell Medical Center and orthopedics at George Washington University. He then did a spine fellowship under Dr. Henry Bohlman. He is board-certified in internal medicine as well as orthopedics. In 1995, he was recruited by Washington University to start the cervical spine service in the newly formed Department of Orthopedics. He is currently the Chief of Cervical Spine Surgery for Washington University Orthopedics, the Mildred B. Simon Distinguished Professor of Orthopedics, and Professor of Neurological Surgery. His practice is exclusively limited to the operative treatment of the cervical spine. He has consistently been recognized in the lists of America’s Top Doctors and Best Doctors in America since 2002. He has nearly 200 peer-reviewed papers and over 70 chapters and other manuscripts. He has won outstanding research paper awards multiple times from CSRS and NASS, as well as the Hibbs Award from SRS. He has operated in several countries and has served as a visiting professor, grand rounds speaker, key or named lecturer over 110 times in over 19 countries on six continents. He served as president of CSRS from 2012 to 2013, is currently the chair of AOSpine International Research Commission (2012 to 2015), and will serve as president of AOSpine International from 2015 to 2018.

International Society for the Advancement of Spine Surgery (ISASS)

JEFF GOLDSTEIN

Dr. Goldstein is director of the NYU Hospital for Joint Diseases Spine Service and director of the NYU Hospital for Joint Diseases Spine Fellowship. He is a clinical professor of orthopaedic surgery at the NYU School of Medicine.

He serves on the editorial and advisory boards of several peer-reviewed journals. Dr. Goldstein is involved in the research and development of biomedical materials and devices. His practice and research include a focus on minimally invasive spine surgery and artificial disc replacement. He also serves in an advisory capacity to the news media and several medically oriented companies.

Dr. Goldstein sits on the Board of Directors and is treasurer of the International Society for Advancement of Spine Surgery (ISASS). He is a member of the North American Spine Society, the Cervical Spine Research Society, the International Society for Study of
the Lumbar Spine, the Scoliosis Research Society, the American Orthopaedic Association, and the Lumbar Spine Research Society.

Dr. Goldstein was the recipient of the Leon Wiltse award for the Best Overall Paper at the ISASS meeting. He has been regularly recognized by New York magazine and Superdoctors as one of New York’s Best Doctors and by Castle Connolly as one of America’s Top Doctors.

Dr. Goldstein earned his undergraduate degree from Colgate University. He attended medical school at the State University of New York Downstate Medical Center at Brooklyn, where he graduated summa cum laude with distinction in research. He was trained in orthopaedic surgery at the Case Western Reserve University School of Medicine. Dr. Goldstein completed spine fellowship training in Baltimore, Maryland, at the Maryland Spine Fellowship.

Scoliosis Research Society (SRS)

DAVID WAYNE POLLY JR.

Dr. Polly is professor and chief of spine surgery for the Department of Orthopaedic Surgery at the University of Minnesota and holds the James W. Ogilvie Chair. He is also an adjunct professor for the Department of Neurosurgery. He was an undergraduate at West Point, completed medical school at the Uniformed Services University of the Health Sciences, completed his orthopaedic surgery residency at Walter Reed Army Medical Center, and his spine fellowship at the University of Minnesota. He then returned to Walter Reed as chief of spine surgery, eventually becoming chair of the Department of Orthopaedic Surgery and Rehabilitation. After retiring from the Army, he assumed his current position at the University of Minnesota. His professional interests involve spine deformity, spine biomechanics, diagnosis precision, improvements in technical execution of surgical procedures, and cost-benefit analyses of therapeutic interventions.

Dr. Polly is a world-renowned spinal surgeon, researcher, and teacher. In addition, his life has been marked by service—to the nation, learned professional societies, his colleagues, residents, post-doctoral fellows, and above all to his patients. He is currently president-elect of the Scoliosis Research Society. He is also a member of the American Academy of Orthopaedic Surgeons’ Board of Councilors as a representative for the state of Minnesota. He has a voluminous curriculum vitae, which includes receipt of more than 10 academic awards, over 150 peer-reviewed publications, principal or co-investigator on approximately 100 institutional review board-approved research protocols, hundreds of presentations and invited lectures, and many visiting professorships and talks given worldwide. Additionally, he has chaired many national and international spine education meetings.
Dr. Anderson was born in Fontana, California, and attended college at the University of California, Riverside, with a major in biomedical sciences. He graduated from Loma Linda University School of Medicine and completed residency training in orthopaedic surgery at the University of California, Irvine. He then served in the U.S. Air Force and was named the chief of orthopaedics at Langley Air Force Base. He then completed his formal medical training with a joint fellowship in Spinal Surgery through the Departments of Orthopaedics and Neurological Surgery at the Thomas Jefferson University. Following the completion of his training, Dr. Anderson worked as an assistant professor for the Department of Orthopaedic Surgery at the University of Virginia. He then relocated his practice to Philadelphia, where he currently holds the title of professor of orthopaedic and neurological surgery at Thomas Jefferson University and the Rothman Institute. Additionally he serves as a chief of the medical staff for the Rothman Orthopaedic Specialty Hospital.

Dr. Anderson's research focus has included both basic science and clinical medicine. He has an enduring interest in the development and implementation of the innovative techniques in the area of minimally invasive spine surgery. He has given numerous lectures at national and international meetings, and authored more than 151 peer-reviewed articles and 53 book chapters. He was a founding member of the Society for Minimally Invasive Spinal Surgery and is currently serving as chairman of the society.

**Brazilian Neurosurgery Society**

**ASDRUBAL FALAVIGNA**

Dear Brazilian Spine Surgeons,

I would like to personally welcome you to the Spine Summit 2015 in Phoenix, Arizona. This is an important meeting that shares the best of science, friendship, and the latest surgical and non-surgical approaches with six other spine societies. The Brazilian Spine Surgery Congress and the Spine Section Department of the Brazilian Neurosurgery Society are very proud to be together in this meeting. I hope that you will enjoy this unique time to share ideas and make great new friends.

Sincerely yours,

Asdrubal Falavigna
Dr. Hurlbert was born in Kinistino, Saskatchewan, Canada, on May 7, 1960. He attended high school and spent his first two years of university in Regina, majoring in biochemistry. He graduated from medical school at the University of Saskatchewan in Saskatoon in June of 1995. After a rotating internship at the Regina General Hospital, he spent the next 10 years in Toronto, Ontario, in his neurosurgical residency and completing a PhD in spinal cord injury research. He completed two complex spine surgery fellowships, one at the Toronto Western Hospital with Michael Fehlings, and one at the Barrow Neurological Institute with Volker Sonntag.

His first and only posting to date has been with the Division of Neurosurgery and the Faculty of Medicine at the University of Calgary, where he is currently an associate professor. He holds a cross-appointment with the Division of Orthopedic Surgery and is the founding chairman of the University of Calgary Spine Program. He is also the founding president of the Canadian Spine Society and the immediate past exam chair in neurosurgery for the Royal College of Physicians and Surgeons of Canada. He has been the neurosurgery residency program director at the University of Calgary since 2005.

Dr. Hurlbert’s clinical interests encompass spinal cord injury and complex cervical decompression and reconstruction. His research efforts are directed towards spinal cord injury and degenerative spine disease.

Mexican Society of Neurological Surgery

JOSE SORIANO

Dear Mexican Spine Surgeons,

It is a proud moment for me and for the Mexican Society of Neurological Surgery to participate as invited guests at the Scientific Program of the Spine Summit 2015 in Phoenix, Arizona. The goal is simple, to exchange approaches that allow us to conceptualize ideal solutions to improve the present and the future of patients with pathologies of the spine, while strengthening scientific and cultural achievements with other societies, in this globalized world.

Let’s enjoy it.

Sincerely,

Jose Soriano
Dr. Schacter is a native of North Bay, Ontario, Canada, and received his medical education at the University of Toronto. He completed his internship and General Surgical Residency at Beth El Hospital, and his neurosurgical residency at King’s County Hospital, both in Brooklyn, New York. Following, he became an instructor in neurosurgery at the State University of New York (Downstate Division).

Following his training, Dr. Schacter was appointed head of the Division of Neurosurgery at Mount Sinai Hospital in Toronto, where he actively practiced for 39 years. During his tenure he served as a neurosurgical consultant at Baycrest Hospital & Geriatric Centre, and as an assistant professor at the University of Toronto in the Department of Neurosurgery.

Dr. Schacter currently maintains an active neurosurgical consulting practice and serves on the associate staff of the Department of Surgery at Mount Sinai Hospital. He is also an adjunct assistant professor at University of Toronto and consults for Baycrest Hospital in Toronto.

His many professional memberships include the Spine and Peripheral Nerve Section, American Association of Neurological Surgery (AANS), Canadian Medical Association (CMA), Ontario Medical Association (OMA), and the Royal College of Physicians and Surgeons of Canada.
EDWARD C. BENZEL, MD
Chairman, Department of Neurosurgery
Cleveland Clinic

Dr. Benzel is chairman of the Department of Neurosurgery at Cleveland Clinic and holds a faculty appointment, professor of surgery, at the Cleveland Clinic Lerner College of Medicine (CCLCM). Dr. Benzel’s major clinical interests embrace many aspects of neurosurgery but are focused on spinal disorders, including cervical spondylosis, syringomyelia, complex spine instrumentation, and spine tumors. Clinical research has encompassed such issues as hydrocephalus, neonatal hemorrhage, cerebrovascular disorders, cranial trauma, critical care, brain death, microelectromechanical systems (MEMS), and, of course, spinal disorders. From a research perspective, he is currently focusing on spine biomechanics and clinical research, as well as sports-related concussion research. The latter has centered around strategies to reduce risk and increase protection for athletes involved in contact sports.

He has been actively involved in the Congress of Neurological Surgeons, American Association of Neurological Surgery, North American Spine Society, World Spinal Column Society, and Cervical Spine Research Society. Dr. Benzel is one of the founding members of the Lumbar Spine Research Society, formed in 2007. He serves on numerous committees and in different positions within the various societies. He was also the first chairman of the World Spine Society, which in 2009 was re-organized and restructured as the World Spinal Column Society.

Benzel’s continual rigorous review of clinical and research content for multiple professional neurosurgical and spine publications contributes significantly to the body of literature. He became the editor-in-chief of World Neurosurgery in 2015.

He has authored 10 textbooks, edited 28 texts, and contributed over 370 book chapters. His seminal texts, Biomechanics of Spine Stabilization and Spine Surgery: Techniques, Complications, Avoidance and Management are some of the highlights of his publication endeavors.

Dr. Benzel holds 11 patents and has participated in many medical advances. He is perhaps best known as an educator. He initiated and directed the neurosurgery residency training program and the spine fellowship program at the University of New Mexico, and has been instrumental in the development and success of these programs at the Cleveland Clinic. His innovations in neurosurgery resident education have won accolades and numerous awards. In February 2011, Dr. Benzel was chosen to receive the Paul C. Bucy Award for his exemplary efforts offering educational opportunities to his fellow neurosurgeons. In 2013, Dr. Benzel was honored to be acknowledged at the 13th Congress of Spine Surgery, Sao Paolo, Brazil, for “outstanding contribution to medical service worldwide.” Most recently, he was the Honored Guest at the 2014 Congress of Neurological Surgeons Annual Meeting in Boston.
Dr. Glassman received his BA in chemistry from Princeton University. He attended medical school at the College of Physicians and Surgeons of Columbia University in New York, where he graduated with Alpha Omega Alpha honors. He did his general surgery training at Montefiore Medical Center and completed his orthopaedic residency training at New York Orthopaedic Hospital of Columbia University.

Dr. Glassman finished his training with a spine fellowship at the Leatherman Spine Center.

Dr. Glassman is professor of orthopaedic surgery at the University of Louisville. He has held leadership positions in several major national spine societies, and is currently serving as immediate past president of the Scoliosis Research Society. He has also served as education council chair for the Scoliosis Research Society, as 2009 program chair for the North American Spine Society, and as co-chair of the Professional Society Coalition Task Force on Lumbar Fusion.

Dr. Glassman has also published extensively in major peer-reviewed orthopaedic and spine journals, including 13 first-author publications between 2009 and 2014. The quality of these studies has been recognized with a series of national awards, including the Whitecloud Award for Outstanding Clinical Paper at the International Meeting for Advanced Spine Techniques in 2008, 2009, and 2012. In 2012 he received the Cervical Spine Research Society Clinical Research Award. He also received a Spine Journal Outstanding Paper Award in 2008, and was co-author of the Spine Journal Editor’s Choice Award as the outstanding paper of the year in 2009. Dr. Glassman and the Leatherman research group have been recognized with multiple North American Spine Society Outstanding Paper Awards in 2008, 2009, and 2010 research. Dr. Glassman’s work has focused on patient-based outcomes and cost-effectiveness for spinal surgery. He has written extensively on the treatment of adult scoliosis and the role of biologics in spine fusion.
MEETING AGENDA

WEDNESDAY, MARCH 4

11:00 am – 6:00 pm Grand Canyon Ballroom Foyer

REGISTRATION

1:30 – 5:30 pm Grand Canyon Ballroom Salon 9

$250 includes lunch

SPECIAL COURSE I

Neurosurgical Spine: Business and Compensation

Course Directors: Luis M. Tumialán, Domagoj Coric
Faculty: Luis M. Tumialán, Domagoj Coric, Kevin Foley, John J. Knightly, Michael P. Steinmetz, Daniel Refai

Course Description: This course will provide up-to-date information on current issues in compensation and practice management for spine surgeons. Scenarios will be reviewed for the correct coding of routine as well as complex spinal procedures. The impact of quality measures on reimbursement will be discussed. Insights on the management of a spine practice will be reviewed.

Learning Objectives: Upon completion of this course, participants will be able to:
- Integrate the newest changes in CPT coding for spine
- Discuss the potential financial impact of different types of spine practices
- Explain how outcomes collection and quality measures may have significant impact on spine practices

1:30 – 1:45 pm

Introduction

Domagoj Coric, Luis M. Tumialán

1:45 – 2:15 pm

2014 CPT Coding Update

Luis M. Tumialán

2:15 – 2:45 pm

Hospital Negotiations and Ancillary Revenue Generation

Domagoj Coric

2:45 – 3:15 pm

Defining the Quality and Value of Your Care Through Practice Data Collection

Kevin Foley

3:15 – 3:30 pm

Break

3:30 – 4:00 pm

Transitioning from Private Practice to the Hospital-Employed Model

John J. Knightly

4:00 – 4:30 pm

Patient Satisfaction: What Really Drives Patient Perception

Michael P. Steinmetz
SPECIAL COURSE II
SRS—Improving Outcomes in Spine Deformity Surgery
Course Directors: Shay Bess, Steven Glassman, Praveen Mummaneni
Faculty: Michael Kelly, Themistocles Protopsaltis, Praveen Mummaneni, Michael Daubs, Eric Klineberg, Christopher I. Shaffrey, Christopher Ames, Shay Bess, Douglas Burton, Munish Gupta, Tyler Koski, Darrel Brodke, Tom Errico

Course Description: This course will explore the current management of spinal deformity conditions. The discussion will provide an opportunity for spine surgeons to expand their knowledge on the most up-to-date treatment options available for spinal deformity. Speakers will discuss what interventions are appropriate and when to operate.

Learning Objectives: Upon completion of this course, participants will be able to:
- Appraise the current management options for spinal deformity
- Integrate the current research regarding spinal deformity into clinical practice
- Recognize the challenges in spinal deformity management and best practices available

1:30 – 1:35 pm
Introduction
Shay Bess, Steven Glassman, Praveen Mummaneni

1:35 – 1:45 pm
Quality of Life Metrics: How Do We Identify Meaningful Clinical Improvement and Worsening
Michael Kelly

1:45 – 1:55 pm
Why Do Patients Improve and What Patients are at Risk for Not Improving
Darrel Brodke

1:55 – 2:05 pm
The Role of Patient Specific Spinal Alignment: Should We Plan Surgery and Are All Patient Deformities the Same?
Themistocles Protopsaltis

2:05 – 2:15 pm
How to Identify Patients That Are Most Appropriate for Osteotomy Procedures; When to Perform and When to Avoid
Daniel Sciubba
<table>
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<th>Time</th>
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| 2:15 – 2:25 pm | **Choosing the Most Appropriate Upper and Lower Instrumented Vertebra and the Consequences of Wrong Decisions**  
|             | *Justin Smith*                                                           |
| 2:25 – 2:40 pm | **Questions**                                                           |
| 2:45 – 2:55 pm | **How Does Adult Spinal Deformity Differ from Pediatric Spinal Deformity; Lessons Learned**  
|             | *Munish Gupta*                                                          |
| 2:55 – 3:05 pm | **Does Minimally Invasive Surgery Improve Outcomes for Adult Spinal Deformity and Who are the Most Appropriate Patients?**  
|             | *Praveen Mummaneni*                                                    |
| 3:05 – 3:15 pm | **Is There an Ideal Psychological Profile for Spinal Deformity Surgery?**  
|             | *Michael Daubs*                                                         |
| 3:15 – 3:30 pm | **Break**                                                               |
| 3:30 – 3:40 pm | **Do Complications Make a Difference and Are All Complications the Same?**  
|             | *Eric Klineberg*                                                       |
| 3:40 – 3:50 pm | **Reducing Complications in 3 Column Osteotomies**                      
|             | *Tyler Koski*                                                           |
| 3:50 – 4:00 pm | **Is This Patient Appropriate for Your Practice and Facility? Deciding When to Keep and When to Refer**  
|             | *Christopher I. Shaffrey*                                               |
| 4:00 – 4:10 pm | **Collaborative Efforts in Spine Surgery: Dual Surgeon Experience and Other Collaborations**  
|             | *Christopher Ames*                                                     |
| 4:10 – 4:30 pm | **Questions**                                                           |
| 4:30 – 5:10 pm | **Case Presentations: Alignment Mishaps, What I Have Learned, and What I Now Do Differently**  
|             | *First 5 Years Practice*                                               
|             | *Praveen Mummaneni*                                                    |
|             | *First 10 Years Practice*                                               
|             | *Shay Bess*                                                             |
MEETING AGENDA

4:50 – 5:00 pm  
First 15 Years Practice  
Doug Burton

5:00 – 5:10 pm  
First 20 Years Practice  
Tom Errico

5:10 – 5:30 pm  
Discussion, Questions, and Final Remarks  
Shay Bess, Steven Glassman, Praveen Mummaneni

1:30 – 5:30 pm  
Grand Canyon Ballroom Salons 2/3  
$250 includes lunch

SPECIAL COURSE III  
SMISS—Problem-Based Learning, Minimally Invasive Approaches

Course Directors: William Taylor, Langston Holly  
Faculty: Michael Wang, Anthony Frempong Boadu, Jean Pierre Mobasser,  
Juan Uribe, Adam Kanter, John O’Toole, Steven Ludwig, Neel Anand

Course Description: This course will utilize a problem-based learning format to explore minimally invasive spine approaches to a variety of cases. The discussion will focus on the impact of common problems that arise from these approaches.

Learning Objectives: Upon completion of this course, participants will be able to:
  - Discuss the potential utility and limitations of minimally invasive approaches to surgery
  - Relate approaches to commonly presented problems in spinal surgery

1:30 – 1:35 pm  
Introduction  
Langston Holly, William Taylor

1:35 – 1:55 pm  
Treating Patients with Spondylolisthesis:  
Patient with Grade I Spondylolisthesis, Neurogenic Claudication  
Langston Holly

1:55 – 2:10 pm  
How I Would Treat this Case and Why I Chose this Solution  
Michael Wang

2:10 – 2:15 pm  
Discussion

2:15 – 2:35 pm  
Treating Patients with Degenerative Disc Disease  
Patient with Focal DDD, Refractory Low Back Pain, Unilateral Leg Pain  
Adam Kanter
2:35 – 2:50 pm
How I Would Treat this Case and Why I Chose this Solution
Jean-Pierre Mobasser

2:50 – 2:55 pm
Discussion

2:55 – 3:15 pm
Treating Patients with Lumbar Stenosis and Low Back Pain: Patient with Lumbar Stenosis, Mechanical Low Back Pain, and a Lesser Degree of Leg Pain
William Taylor

3:15 – 3:30 pm
How I Would Treat this Case and Why I Chose this Solution
Steven Ludwig

3:30 – 3:35 pm
Discussion

3:35 – 3:45 pm
Break

3:45 – 4:05 pm
Treating Deformity Patients with MISS
Juan Uribe

4:05 – 4:20 pm
How I Would Treat this Case and Why I Chose this Solution
Neel Anand

4:20 – 4:25 pm
Discussion

4:25 – 4:45 pm
Intraoperative Image Guidance with MIS—Helpful or Hindrance?
Jean Pierre Mobasser

4:45 – 4:50 pm
Discussion

4:50 – 5:05 pm
Managing Complications in MIS
Anthony Frempong Boadu

5:05 – 5:10 pm
Discussion

5:10 – 5:25 pm
Healthcare Economics in MISS
John O’Toole

5:25 – 5:30 pm
Discussion
1:30 – 5:30 pm   Grand Canyon Ballroom Salon 12

$250 includes lunch

SPECIAL COURSE IV
AO Course—Spine Trauma: Case Based Controversies
Course Directors: Paul Arnold, Michael P. Steinmetz
Faculty: Paul Anderson, James Harrop, Bizhan Aarabi, Michael Fehlings, Darrel Brodke, Tom Mroz, Carlo Bellabarba, Paul Arnold, Richard Bransford, Sanjay Dhall

Course Description: This course will discuss the current surgical management of spinal trauma. The management of cervical, thoracic, and lumbar spinal trauma will be reviewed, and approaches to spinal regeneration will also be discussed.

Learning Objectives: Upon completion of this course, participants will be able to:
- Discuss the management of a dislocated cervical facet
- Discuss the role of minimally invasive techniques for spinal reconstruction
- Recognize the appropriate decision making process to return to play following neuropraxia

1:30 – 1:35 pm
Opening Remarks
Paul Arnold, Michael P. Steinmetz

1:35 – 1:55 pm
Cervical Spine Classification Systems
Paul Anderson

1:55 – 2:15 pm
GOF Case Presentations and Management Options
James Harrop

2:15 – 2:35 pm
Uni-lateral facet Fracture With/Without Neuro Deficit
Bizhan Aarabi

2:35 – 2:55 pm
Update on Management of Acute SCI
Michael Fehlings

2:55 – 3:05 pm
Break

3:05 – 3:25 pm
Update on Thoracolumbar Fracture Classification
Richard Branford

3:25 – 3:45 pm
Thoracolumbar Burst Fracture: Open vs. MIS/Timing
Sanjay Dhall

3:45 – 4:05 pm
Flexion Distraction Injury Thoracic Spine
Darrel Brodke

4:05 – 4:15 pm
Break
4:15 – 4:35 pm
**Low Lumbar Fractures: MIS vs. Open/Timing**
Tom Mroz

4:35 – 4:55 pm
**Sacral Fractures Classification and Management**
Carlo Bellabarba

4:55 – 5:15 pm
**Special Challenges: Ankylosing Spondylitis, Osteoporosis, Multi-injury**
Paul Arnold

5:15 – 5:30 pm
**Discussion**

1:30 – 5:30 pm   Grand Canyon Ballroom Salon 13

$250 includes lunch

**SPECIAL COURSE V**
American College of Osteopathic Surgeons (ACOS)
Neurosurgical Discipline Meeting

**Course Directors:** Steven Vanni, Robert Galler

**Faculty:** Pradeep Setty, Lee Sandquist, Clifford Housman, Francesco Mangano, Michael Wang, Larry Armstrong, Allan D. Levi, Robert Galler, Steven Vanni, Ryan Barrett, Ripul Panchal, Aaron Danison, Michael Thomas, Michael Campinelli, Korthic Madhaven

**Course Description:** This course will provide an update on progress in research by resident, fellow, and attending neurosurgical spine surgeons. Clinical and laboratory research will be presented and discussed in a forum intended to promote an active exchange of ideas. Insights on the identity of AOBS certified neurosurgeons in the United States will be reviewed.

**Learning Objectives:** Upon completion of this course, participants will be able to:
- Integrate the latest in research into clinical practice
- Discuss the various updates as they relate to cutting-edge research
- Describe how the new ACGME guidelines may have significant impact on AOBS neurosurgical practices

1:15 – 1:30 pm
**Opening Remarks**
Steven Vanni, Robert Galler

1:30 – 1:40 pm
**PEEK Rods: Efficacy and Safety in Lumbar Fusion**
Robert Galler

1:40 – 1:50 pm
**Cellular Matrix and rBMP in Lumbar Fusion**
Michael Thomas

1:50 – 2:00 pm
**Drug Delivery via Epidural Catheter for Post-op Pain Control and Review of the Literature and Description of a Novel Technique**
Aaron Danison
2:00 – 2:10 pm
4-Level Minimally Invasive TLIF, Clinical and Radiographic Outcomes
Pradeep Setty

2:10 – 2:20 pm
Segmental Correction of Cervical Kyphotic Deformity
Ripul Panchal

2:20 – 2:30 pm
Cross-sectional Study Evaluation: The Utility of Four Level Anterior Cervical Discectomy and Fusion
Lee Sandquist

2:30 – 2:45 pm
Discussion

2:45 – 3:00 pm
Rheumatoid Arthritis at Craniovertebral Junction Combined (Anterior & Posterior)
Karthic Madhaven

3:00 – 3:30 pm
Spinal Cord Injury Research Update
Allan D. Levi

3:30 – 4:00 pm
Intraduillary Spinal Cord Tumors: The Cincinnati Children’s Experience
Francesco Mangano

4:00 – 4:30 pm
Debate: Treatment Options for Grade 1 Degenerative Spondylolisthesis L4-L5
Virginia Tech Carilion vs. St. John’s Providence
Ripul Panchal, Ryan Barrett, Steven Vanni, Robert Galler

4:30 – 5:00 pm
Politics/Discussion: CNS and the ACOS State of Affairs
Michael Wang, Larry Armstrong, Michael Campinelli

5:00 – 5:30 pm
Discussion

1:30 – 5:30 pm   Grand Canyon Ballroom Salon 11
$250 includes lunch

SPECIAL COURSE VI
Mexican Spine Surgeon Symposium
Course Directors: Luis M. Tumialán, Juan Uribe, Jose Soriano
Faculty: Juan Uribe, Christopher I. Shaffrey, Jose Soriano, Luis M. Tumialán, Domagoj Coric, Zoher Ghogawala, Armando Alpizar-Aguirre, Carlos-Francisco Gutierrez-Partida, Roberta DeLeo-Vargas, Nicasio Arriada-Mendicoa, Felix Dominguez-Cortinas, Francisco-Gerardo Lopez-Espinoza, Guy Broc-Haro, Oscar Suarez-Rivera, Jose-Maria Jimenez-Avila
Course Description: This course will provide practical, current didactic information on spine disorders with particular emphasis on surgical approaches, stabilization techniques, complications avoidance and management, and surgical and non-surgical decision
making and management. Future trends in Mexican neurosurgery will also be discussed.

**Learning Objectives:** Upon completion of this course, participants will be able to:
- Analyze the evolution of spinal surgery in Mexico
- Recognize the technical nuances of spinal surgery practiced in Mexico
- Develop strategies for complication avoidance and management
- Describe the evaluation and appropriate management for a number of spinal pathologies
- List the advantages and disadvantages of spinal surgical techniques

1:30 – 2:15 pm

**Spinal Sagittal Balance**

**Moderator:** Christopher I. Shaffrey

**Measurement of Spinal and Pelvic Parameters: Do They Matter?**

Christopher I. Shaffrey

**Outcomes and Techniques to Achieve Sagittal Balance in Adult Deformity Surgery**

Armando Alpizar-Aguirre

2:15 – 3:00 pm

**Degenerative Lumbar Debate**

**Degenerative Spondylolisthesis: Interbody Fusion is Required**

**Pro:** Carlos-Francisco Gutierrez-Partida

**Con:** Roberto DeLeo-Vargas

**Discussion**

3:00 – 3:45 pm

**Craniovertebral Junction**

**Endoscopic Odontoidectomy in Congenital Craniovertebral Malformations**

Juan Barges Coll

**Posterior Cervical Fusion in Rheumatoid Arthritis: Long Term Outcomes**

Felix Dominguez-Cortinas

**Current Management of the Type II Odontoid Fractures**

Francisco-Gerardo Lopez-Espinoza

3:45 – 4:30 pm

**Cervical TDR vs ACDF**

Guy Broc-Haro

**Multilevel Cervical Spondylosis/Stenosis Laminoplasty vs Laminectomy/Fusion**

Oscar Suarez-Rivera

**Questions**

4:30 – 4:50 pm

**Spine Surgery: Advocacy and Leadership**

Zoher Ghogawala
MEETING AGENDA

4:50 – 5:10 pm
Scientific Production in Medline of the Spine Surgeons of Latin America in the Last Decade
Jose-Maria Jimenez-Avila

5:10 – 5:30 pm
Case Presentation – Degenerative Spondylolisthesis with Global Sagittal Imbalance
Juan Uribe

Discussion
Luis Tumialán & Jose Soriano

6:30 – 8:00 pm
Sage Court
OPENING RECEPTION
Mingle with your colleagues among the waterways and lush landscape of the Sage Court during the 2015 Opening Reception. Enjoy a delectable array of food and refreshments while taking in the spectacular Arizona sunset. Resort casual attire is recommended for this event.

THURSDAY, MARCH 5

6:00 – 7:00 am
Grand Saguaro Ballroom Foyer
COMPLIMENTARY CONTINENTAL BREAKFAST

6:00 am – 6:00 pm
Grand Canyon Ballroom Foyer
REGISTRATION

6:30 – 6:55 am
Grand Saguaro Ballroom East/West
TALES FROM THE FRONT LINES: CASE PRESENTATIONS
Speakers: Steven Hwang, Robert Whitmore

6:55 – 7:00 am
Introductory Remarks/Meeting Announcements
Zoher Ghogawala

7:00 – 8:00 am
Grand Saguaro Ballroom East/West
SCIENTIFIC SESSION I
New Lumbar Spine Techniques
Moderators: Srini Prasad, Daniel Refai
Faculty: Srini Prasad, Alex Powers, Michael Wang, Daniel Refai
Learning Objectives: Upon completion of this course, participants will be able to:
- Assess the current literature on surgical treatment of degenerative lumbar spine disease
- Analyze the indications and expected outcomes for new lumbar spine surgical procedures
7:00 – 7:10 am
**Expandable Interbody Cages**
Srini Prasad

7:10 – 7:20 am
**Alternate Posterior Stabilization**
Alex Powers

7:20 – 7:30 am
**Percutaneous Discectomy—Decompression**
Michael Wang

7:30 – 7:40 am
**Robotics and Spinal Surgery**
Daniel Refai

7:40 – 8:00 am
**Discussion**

8:00 – 9:00 am
**Grand Saguaro Ballroom East/West**

**SCIENTIFIC SESSION II**

**SRS Co-sponsored Session—Spine Deformity**

**Moderators:** Shay Bess, Praveen Mummaneni, Steven Glassman

**Faculty:** Steven Glassman, Christopher I. Shaffrey, Sigurd Berven, Praveen Mummaneni, Frank LaMarca, David Polly

**Learning Objectives:** Upon completion of this course, participants will be able to:
- Discuss the different treatment options for spinal deformity cases
- Describe how sagittal balance relates to clinical outcomes
- Discuss complications and avoidance

8:00 – 8:08 am
**Alignment vs. Balance**
Steven Glassman

8:08 – 8:16 am
**Anterior Options for Deformity Correction**
Christopher I. Shaffrey

8:16 – 8:24 am
**Osteotomies**
Sigurd Berven

8:24 – 8:32 am
**MIS Approaches to Deformity Surgery**
Praveen Mummaneni

8:32 – 8:40 am
**Complications—Adjacent Level Disease**
Frank LaMarca

8:40 – 8:48 am
**The Role of Pelvic Derotation in Deformity Correction**
David Polly

8:48 – 9:00 am
**Discussion**

9:00 am – 7:00 pm
**Grand Canyon Ballroom Salons 6-8**

**EXHIBIT AND DIGITAL POSTER VIEWING**
9:00 – 9:50 am  Grand Saguaro Ballroom East/West

SOCIETY CAREER AWARD, RESEARCH AWARD, AND FELLOWSHIP AWARD WINNERS

Moderator: R. John Hurlbert

9:00 – 9:05 am  
Spine Section Research Award Winners and Fellowship Award Winners

9:05 – 9:10 am  
Meritorious Member Award Recipient
Bernard Schacter
To be introduced by R. John Hurlbert

9:10 – 9:13 am  
Introduction of Meritorious Award Winner—Orthopaedic Surgery
Daniel K. Resnick

9:13 – 9:30 am  
Meritorious Award Winner Address—Orthopaedic Surgery
Steven Glassman

9:30 – 9:33 am  
Introduction of Meritorious Award Winner—Neurosurgery
Michael P. Steinmetz

9:33 – 9:50 am  
Meritorious Award Winner Address—Neurosurgery
Edward Benzel

9:50 – 10:40 am  Grand Saguaro Ballroom East/West

CHAIRMAN TALKS

History of the Spine Societies

9:50 – 9:55 am  
Introduction of Chairmen
Zoher Ghogawala

9:55 – 10:00 am  
One Spine—One World
R. John Hurlbert

10:00 – 10:05 am  
History of CSRS
K. Daniel Riew

10:05 – 10:10 am  
History of SRS
David Polly

10:10 – 10:15 am  
History of ISASS
Jeffrey Goldstein

10:15 – 10:20 am  
History of AO Spine
Michael Fehlings
10:20 – 10:25 am
History of AO Spine International
Jeffrey Wang

10:25 – 10:30 am
History of ACSR
Alex Vaccaro

10:30 – 10:35 am
History of SMISS
D. Greg Anderson

10:35 – 10:40 am
Questions and Discussion

10:40 – 11:00 am  Grand Canyon Ballroom Salons 6-8
BEVERAGE BREAK AND WHAT’S NEW SESSION I

11:00 – 11:45 am  Grand Saguaro Ballroom East/West
SCIENTIFIC SESSION III
Advances in CSM Treatment
Moderators: Erica Bisson, Langston Holly
Faculty: Erica Bisson, Langston Holly, Shekar Kurpad, Michael Fehlings
Learning Objectives: Upon completion of this course, participants will be able to:
  ▶ Assess the most current treatment options for cervical spondylotic myelopathy
  ▶ Analyze the indications and expected outcomes for new CSM procedures
  ▶ Describe novel imaging modalities to assess spinal cord injury in CSM

11:00 – 11:08 am
Outcomes Following Surgery – N2QOD
Erica Bisson

11:08 – 11:16 am
Diffusion Tensor Imaging
Shekar Kurpad

11:16 – 11:24 am
Magnetic Resonance Spectroscopy
Langston Holly

11:24 – 11:32 am
CSM-Protect Trial
Michael Fehlings

11:32 – 11:45 am
Discussion and Questions

11:45 am – 12:00 pm  Grand Saguaro Ballroom East/West
CSRS DEBATE

11:45 – 11:47 am
Introduction of CSRS Debate
James Harrop
11:47 – 11:52 am  
**Neuromonitoring is Useful**  
Alan Hillibrand

11:52 – 11:57 am  
**Neuromonitoring is Dangerous**  
Vincent Traynelis

11:57 am – 12:00 pm  
**Discussion**

12:00 – 1:00 pm  
Grand Canyon Ballroom Salons 6-8  
**LUNCH WITH EXHIBITORS**

1:00 – 2:30 pm  
Grand Saguaro Ballroom East/West  
**SCIENTIFIC SESSION IV**  
**Outcomes**

**Moderator:** Zoher Ghogawala, Asdrubal Falavigna  
**Faculty:** Jens Chapman, Daniel K. Resnick, Douglas Burton, Robert Harbaugh, Nathan R. Selden, Sigurd Berven, Tom Mroz, Alex Vaccaro

**Learning Objectives:** Upon completion of this course, participants will be able to:
- Discuss how outcomes collection and quality measures may have significant impact on spine practices
- Describe the impact of value based care on spine practices

1:00 – 1:09 pm  
**Big Data and the Big Picture**  
Jens Chapman

1:09 – 1:18 pm  
**NASS—Non-operative and Operative Outcomes**  
Daniel K. Resnick

1:18 – 1:27 pm  
**SRS—What are We Learning?**  
Douglas Burton

1:27 – 1:36 pm  
**AANS: N2QOD Registry**  
Robert Harbaugh

1:36 – 1:45 pm  
**CNS: Guidelines Defend Access and Improve Quality**  
Nathan R. Selden

1:45 – 1:54 pm  
**The Value Proposition**  
Sigurd Berven

1:54 – 2:03 pm  
**Will Outcomes Improve My Practice**  
Tom Mroz

2:03 – 2:12 pm  
**Next Steps in Registry Development**  
Alex Vaccaro
2:12 – 2:30 pm  
**Discussion**

2:30 – 3:30 pm  
**Grand Saguaro Ballroom East/West**

**ORAL PRESENTATIONS I**  
**Top Oral Papers I**

**Moderators:** Frank LaMarca, Sanjay Dhall

**Discussants:** Michael Groff, Robert G. Whitmore, Luis M. Tumialán, Christopher Wolfla, John Chi, John O’Toole

2:30 – 2:38 pm  
**100** SRS Top Paper: Intraocular Pressure in Lumbar Spine Fusion Patients—A Randomized, Prospective Study  
Sanford E. Emery, Scott D. Daffner, John C. France, Matthew Ellison, Brian W. Grose, Gerry R. Hobbs, Nina B. Clovis

2:38 – 2:40 pm  
**Discussant:** Michael Groff

2:40 – 2:48 pm  
**101** CSRS Top Paper: Costs of Cervical Disc Replacement vs. ACDF for Single-level Cervical Disc Disease—Analysis of Blue Health Intelligence Database for Acute and Long-term Costs and Complications  
Kris E. Radcliff, Jeffrey D. Zigler, Jack E. Zigler

2:48 – 2:50 pm  
**Discussant:** Robert G. Whitmore

2:50 – 2:58 pm  
**102** AO Top Paper: Laminoplasty vs Laminectomy and Fusion to Treat Cervical Spondylotic Myelopathy: Outcomes of the Prospective Multicenter AOSpine International CSM Study  

2:58 – 3:00 pm  
**Discussant:** Luis M. Tumialán

3:00 – 3:08 pm  
**103** Comparison of Best versus Worst Clinical Outcomes for Adult Spinal Deformity Surgery: A Prospective, Multicenter Assessment with Two-year Follow-up  

3:08 – 3:10 pm  
**Discussant:** Christopher Wolfla
MEETING AGENDA

2:30 – 6:00 pm  Grand Saguaro Ballroom  South

PERIPHERAL NERVE SURGERY: CASE-BASED APPROACH AND REVIEW

Course Directors: Rajiv Midha, Robert Spinner

Faculty: Robert Spinner, Holly Gilmer, Jason Huang, Greg Trost,
Marie-Noelle Hebert-Blouin, Amgad Hanna, Shaun O’Leary, Allan D. Levi

Learning Objectives: Upon completion of this course, participants will be able to:
- Discuss indications for the timing of and types of operative intervention on peripheral nerve injuries
- Discuss pathological anatomy, clinical presentation, and management of common entrapments in the upper and lower limbs
- Explain the indications for and approaches to operative interventions on different types of peripheral nerve tumors
- Explain the different current alternatives to manage common peripheral nerve pain problems
- Review how to manage difficult peripheral nerve case problems

2:30 – 2:40 pm
Clinical Approach to the Peripheral Nerve
Robert Spinner

2:40 – 2:50 pm
Fundamentals of Nerve Injury and Regeneration
Holly Gilmer

2:50 – 3:10 pm
Upper Extremity Entrapments
Jason Huang

3:10 – 3:30 pm
Brachial Plexus Injury
Greg Trost

3:30 – 3:50 pm
Break
3:50 – 4:10 pm
**Lower Extremity Entrapments**
*Marie-Noelle Hebert-Blouin*

4:10 – 4:30 pm
**Injury and Repair**
*Amgad Hanna*

4:30 – 4:50 pm
**Nerve Tumors**
*Rajiv Midha*

4:50 – 5:10 pm
**Pain**
*Shaun O’Leary*

5:10 – 5:30 pm
**Hot Seat Cases**
*Allan D. Levi*

5:30 – 6:00 pm
**Discussion**

3:30 – 4:00 pm  Grand Canyon Ballroom Salons 6-8

BEVERAGE BREAK AND WHAT’S NEW SESSION II

4:00 – 6:00 pm  Grand Saguaro Ballroom East/West

**ORAL PRESENTATIONS II**

*Moderator: Langston Holly, Charles Sansur*
*Discussants: David Polly, Praveen Mummaneni*

4:00 – 4:08 pm
**112 SMISS Top Paper: Comparative Clinical and Economic Outcomes of Minimally Invasive Surgery for Posterior Lumbar Fusion: A Systematic Review and Meta-Analysis**
*Christina Goldstein, Kevin Macwan, Kala Sundararajan, Y. Raja Rampersaud*

4:08 – 4:10 pm
**Discussant: David Polly**

4:10 – 4:18 pm
*D.G. Crandall, J. Revella, K. Schmidt, R. McLemore*

4:18 – 4:20 pm
**Discussant: Praveen Mummaneni**

4:20 – 4:25 pm
**200 Operative versus Non-operative Management In Elderly Patients over 75 years Undergoing Reconstructive Spinal Deformity Surgery**
*Daniel M. Sciubba, Justin K. Scheer, Justin S. Smith, Eric Klineberg, Munish Gupta, Gregory Mundis, Themistocles Protopsaltis, Virginie Lafage, Han Jo Kim, Tyler R. Koski, Khaled Kebaish, Christopher I. Shaffrey, Shay Bess, Robert Hart, Frank Schwab, Christopher P. Ames*
4:25 – 4:30 pm

201 The Influence of Spinopelvic Alignment on Development of Symptomatic Adjacent Level Disease Following Single Level Lumbar Fusion

Zachary J. Tempel, Bryan D. Bolinger, Gurpreet Surinder Gandhoke, Phillip Parry, David O. Okonkwo, Adam S. Kanter

4:30 – 4:35 pm

202 Cost and Quality of Life Implications of Adjacent Segment Disease Following Lumbar Fusion

Vincent J. Alentado, Daniel Lubelski, Andrew T. Healy, Jacob A. Miller, Douglas Orr, Michael P. Steinmetz, Edward C. Benzel, Thomas E. Mroz

4:35 – 4:40 pm

203 The Impact of Dynamic Alignment, Motion and Center of Rotation on Myelopathy Grade and Regional Disability in Cervical Spondylotic Myelopathy

Shian Liu, Renaud Lafage, Justin S. Smith, Themistocles Protopsaltis, Virginie Lafage, Vincent Chailier, Christopher I. Shaffrey, Han Jo Kim, Paul M. Arnold, Jens Chapman, Frank Schwab, Eric M. Massicotte, Tim Yoon, Michael G. Fehlings, Christopher P. Ames, Justin K. Scheer

4:40 – 4:45 pm

Discussion

4:45 – 4:50 pm

204 Comparative Sensitivity of Intraoperative Neuromonitoring with MEP in Predicting Post-operative Neurological Deficits: Non-degenerative versus Degenerative Myelopathy

Aaron J. Clark, Michael Safaee, Dean Chou, Philip R. Weinstein, Annette Molinaro, John P Clark III, Praveen V. Mummaneni

4:50 – 4:55 pm

205 Clinical and Surgical Predictors of Perioperative Complications in Patients with Degenerative Cervical Myelopathy: Results from the Multicenter, Prospective AOSSpine International Study on 479 Patients


4:55 – 5:00 pm

Discussion

5:00 – 5:05 pm


Branko Skovrlj, John M. Caridi, Samuel K. Cho
5:05 – 5:10 pm
207 Scoliosis Surgery in the Elderly: Complications, Readmissions, Reoperations, and Mortality
Doniel Drazin, Lutfi Al-Khouja, Beatrice Ugiliweneza, Faris Shweikeh, J. Patrick Johnson, Terrence T. Kim, Maxwell Boakye

5:10 – 5:15 pm
208 Comparison of Resource Use and Health-related Quality-of-life Outcomes Across Multiple Centers Performing Adult Spinal Deformity Surgeries

5:15 – 5:20 pm
Discussion

5:20 – 5:25 pm
209 Regional and Global Correction Loss in Long Adult Deformity Constructs: Magnitude, Location, and Factors from 183 Patients with Two-year Follow-up

5:25 – 5:30 pm
210 Complications of the Minimally Invasive Anterior Column Release after Restoration of Global Sagittal Balance in Adult Deformity Surgery
Gisela Murray, Juan S. Uribe, Konrad Bach, Joshua Marshall Beckman

5:30 – 5:35 pm
211 Re-operation Rates in Minimally Invasive, Hybrid and Open Surgical Treatment for Adult Spinal Deformity with Minimum Two-year Follow-up
Kai-Ming G. Fu, Adam S. Kanter, David O. Okonkwo, Gregory Mundis, Praveen V. Mummaneni, Neel Anand, Richard G. Fessler, Paul Park, Frank LaMarca, Juan S. Uribe, Michael Y. Wang

5:35 – 5:40 pm
Discussion

5:40 – 5:45 pm
212 Simultaneous Lateral Interbody Fusion and Posterior Percutaneous Instrumentation: A Multicenter Analysis

5:45 – 5:50 pm
213 Rate of Radiographic Appearance of Fusion and Vertebral Body Fracture Following Lateral Interbody Instrumentation
Timothy C. Ryken, Steven Dillavou, Laura Chapin, Tia Derflinger, Kelly Ward
214 Short-segment Percutaneous Pedicle Screw Fixation with Cement Augmentation for Tumor-induced Spinal Instability  
Nelson Moussazadeh, David Rubin, Lily McLaughlin, Eric Lis, Mark H. Bilsky, Ilya Laufer

Discussion

ORAL PRESENTATIONS III

215 Assessing the Impact of Thoracolumbar Deformity on Cervical Disability and Pain: How the Back Affects the Neck  
Aaron J. Clark, Taemin Oh, Rajiv Saigal, Carol M.Y. Li, Devon J. Ryan, Eric Klineberg, Robert Hart, Han Jo Kim, Frank Schwab, Justin S. Smith, Themistocles Protopsaltis, Virginie Lafage, Christopher P. Ames, Justin K. Scheer

4:05 – 4:10 pm

216 Adult Spinal Deformity Patients with Concomitant Preoperative Cervical Deformity Have Inferior Outcomes at Two-year Follow-up  
Justin K. Scheer, Justin S. Smith, Peter G Passias, Alex Soroceanu, Anthony Boniello, Frank Schwab, Christopher I. Shaffrey, Han Jo Kim, Themistocles Protopsaltis, Gregory Mundis, Munish Gupta, Eric Klineberg, Virginie Lafage, Christopher P. Ames

4:10 – 4:15 pm

217 Impact of Regional and Focal Cervical Alignment on Myelopathy Severity: Report of 151 Patients  
Themistocles Protopsaltis, Michael G. Fehlings, Shian Liu, Justin S. Smith, Virginie Lafage, Christopher I. Shaffrey, Han Jo Kim, Paul M. Arnold, Jens Chapman, Renaud Lafage, Vincent Challier, Frank Schwab, Eric M. Massicotte, Tim Yoon, Christopher P. Ames, Justin K. Scheer

4:15 – 4:20 pm

Discussion

218 Frequency of Symptomatic Vertebral Body Compression Fractures Requiring Intervention Following Single Fraction Stereotactic Radiosurgery for Spinal Metastases  
Michael Virk, James Han, Eric Liss, Yoshiya Josh Yamada, Mark H. Bilsky, Ilya Laufer

4:25 – 4:30 pm

219 Novel Osteoinductive Spinal Instrumentation Enhances Osteogenesis and Fusion: A Preliminary Study  
Matthew R. MacEwan, Michael Talcott, Daniel Moran, Eric C. Leuthardt
4:30 – 4:35 pm

**220** Geriatric Co-Management Reduces Peri-Operative Complications and Shortens Duration of Hospital Stay After Lumbar Spine Surgery: A Prospective Single Institutional Experience

Owoicho Adogwa, Parastou Fatemi, Terence Verla, Daniel B. Loriaux, Harrison Farber, Gustavo Chagoya, Jessica Rose Moreno, Mitchell Heflin, Oren N. Gottfried, Carlos Antonio Bagley

4:35 – 4:40 pm

Discussion

4:40 – 4:45 pm

**221** Effects of Psoas Muscle Thickness on Outcomes of Extreme Lateral Interbody Fusion (XLIF) Surgery

Terence Verla, Owoicho Adogwa, Jessica Rose Moreno, Harrison Farber, Daniel B. Loriaux, Oren N. Gottfried, Joseph S. Cheng, Robert E. Isaacs, Carlos Antonio Bagley

4:45 – 4:50 pm

**222** XLIF vs. MAS TLIF for the Treatment of Degenerative Spondylolisthesis: Interim Results from an Ongoing Prospective Multicenter Comparative Study

Robert E. Isaacs, Antoine Tohmeh, Jonathan N. Sembrano

4:50 – 4:55 pm

Discussion

4:55 – 5:00 pm

**223** Measures of Surgical Effectiveness One Year After Lumbar Spine Surgery Accurately Predict Two-year Outcomes

Owoicho Adogwa, Parastou Fatemi, Terence Verla, Harrison Farber, Joseph S. Cheng, Carlos Antonio Bagley, Oren N. Gottfried

5:00 – 5:05 pm

**224** The Effect of Parkinson's Disease on Patients Undergoing Lumbar Spine Surgery

Branko Skovrlj, Javier Zabdi Guzman, Christopher A. Sarkiss, Samuel K. Cho, John M. Caridi

5:05 – 5:10 pm

**225** Opioid-related Adverse Events with Lumbar Spine Surgery: Is the Risk Real?

David W. Polly Jr., Kevin L. Ong, Scott Lovold, Edmund Lau, Mark Kurd, Kris Radcliff

5:10 – 5:15 pm

Discussion

5:15 – 5:20 pm

**226** Role of Quantitative MRI Assessments in Predicting Surgical Outcome in Cervical Spondylotic Myelopathy Patients: Results from the Prospective, Multicenter AOSpine North American Study

Aria Nouri, Michael G. Fehlings, Lindsay Tetreault, Kristian Dalzell, Juan Jose Zamorano
5:20 – 5:25 pm

227 Anterior Cervical Discectomy and Fusion (ACDF): Comparison Between Zero Profile Implants and Anterior Cervical Plate and Spacer
Marjan Alimi, Innocent Njoku, Christoph Hofstetter, Kartik Kesavabhotla, Apostolos Tsiouris, John A. Boockvar, Roger Hartl

5:25 – 5:30 pm
Discussion

5:30 – 5:35 pm

228 Occipitocervical Fixation: A Single Surgeon Experience with 120 Patients
Eduardo Martinez del Campo Oviedo, Samuel Kalb, Jay D. Turner, Luis Perez-Orribo, Leonardo Rangel-Castilla, Hector Enrique Soriano-Baron, Nicholas Theodore

5:35 – 5:40 pm

229 Comparison Between Hinged and Contoured Rods for Occipitocervical Arthrodesis
Kingsley O. Abode-Iyamah, Brian J. Dlouhy, Patrick W. Hitchon, Nader S. Dahdaleh

5:40 – 5:45 pm
Discussion

5:45 – 5:50 pm

230 Rate of 30-day Postoperative Myocardial Infarction in Patients Undergoing Spine Surgery
Timothy Y. Wang, Joel Martin, Daniel Loriaux, Oren N. Gottfried

5:50 – 5:55 pm

231 Defining the Prevalence of Unidentified Psychological Comorbidity in a Referral Population for Spinal Cord Stimulation
Mohammed F. Shamji, Alina Shcharinsky, Jessica Rodriguez

5:55 – 6:00 pm
Discussion

6:00 – 7:00 pm
Grand Canyon Ballroom Salons 6-8

RECEPTION WITH EXHIBITORS

6:30 – 8:30 pm
Grand Canyon Ballroom Salons 11-12

DINNER SEMINAR
The Ethical and the Medical-Legal World of Neurosurgery
Faculty: James Bean, Bradley Jacobs, Katie Orrico, Richard Wohns
Course Description: Neurosurgeons are sued more often and for more money than any other specialty – and elective spine surgery tops the lawsuit frequency list. At this dinner seminar, learn what the CNS and AANS are doing to advocate for medical liability reform.
FRIDAY, MARCH 6

6:00 – 7:00 am  Grand Saguaro Ballroom Foyer
COMPLIMENTARY CONTINENTAL BREAKFAST

6:00 am – 6:00 pm  Grand Canyon Ballroom Foyer
REGISTRATION

9:00 am – 2:00 pm  Grand Canyon Ballroom Salons 6-8
EXHIBITS AND DIGITAL POSTER VIEWING

6:30 – 6:55 am  Grand Saguaro Ballroom East/West
TALES FROM THE FRONT LINES: CASE PRESENTATIONS
Speakers: Charles Sansur, John Shin

7:00 – 8:00 am  Grand Saguaro Ballroom East/West
SCIENTIFIC SESSION V
Spine Trauma
Moderators: James Harrop, Eve Tsai
Faculty: Michael P. Steinmetz, Charles Agbi, James Harrop, Charles Fisher, Ann Parr, Michael Fehlings, Paul Arnold
Learning Objectives: Upon completion of this course, participants will be able to:
- Assess different approaches to spine trauma treatment to determine what is the best option for the patient
- Describe the protocols for identifying and assessing spine injuries

7:00 – 7:05 am
Screening for Vertebral Artery Injuries
Michael P. Steinmetz

7:05 – 7:10 am
Thoracolumbar Burst Fracture—Case Presentation
Charles Agbi

7:10 – 7:20 am
Operative Strategies
James Harrop

7:20 – 7:30 am
Conservative Approaches
Charles Fisher

7:30 – 7:35 am
Cahill Debate: Timing of Surgery for Central Cord Injury
Ann Parr

7:35 – 7:40 am
Operate Early
Michael Fehlings

7:40 – 7:45 am
Do Not Operate Early
Paul Arnold

7:45 – 8:00 am
Discussion
8:00 – 9:30 am  Grand Saguaro Ballroom  East/West

ORAL PRESENTATIONS IV
Moderators: Kurt Eichholtz, Erica Bisson

8:00 – 8:05 am  
232 The Risk of Acute Spinal Cord Injury After Minor Trauma in Patients with Preexisting Cervical Stenosis
Victor Chang, Langston T. Holly

8:05 – 8:10 am  
Sean Mitchell Aubuchon, Xiaoping Luo, Tyler Bogus, Hung-Yuan Chen, Daniel J. Hoh

8:10 – 8:15 am  
234 Cervical Spondylotic Myelopathy: Does Surgical Approach Influence Post-operative Sagittal Alignment and Outcomes?
Michael G. Fehlings, Vincent Chailley, Christopher I. Shaffrey, Han Jo Kim, Paul M. Arnold, Jens Chapman, Themistocles Protopsaltis, Virginie Lafage, Shian Liu, Renaud Lafage, Frank Schwab, Eric M. Massicotte, Tim Yoon, Christopher P. Ames, Justin K. Scheer

8:15 – 8:20 am  Discussion

8:20 – 8:25 am  
235 Outcomes of Intact Thoracolumbar Burst Fractures: Operative vs. Non-operative Treatment
Patrick W. Hitchon, Nader S. Dahdaleh, Christopher I. Shaffrey, Jennifer Noeller, Wenzhuan He, Toshio Moritani, Kingsley O. Abode-Iyamah

8:25 – 8:30 am  
236 Bracing After Surgical Instrumentation of Thoracolumbar Fractures: A Systematic Review of Practices, Evidence and Indications
Jesse Skoch, Carmine Zoccali, Nikolay L. Martirosyan, Orel Zaninovich, Christina M. Walter, Philip Maykowski, Ali A. Baaj

8:30 – 8:35 am  Discussion

8:35 – 8:40 am  
237 Safety of L4-5 Lateral Interbody Fusion via Minimally Invasive Lateral Transpsoas Approach: The Long Term Clinical Experience
Gisela Murray, Joshua Marshall Beckman, Konrad Bach, Juan S. Uribe

8:40 – 8:45 am  
238 Can Triggered Electromyography Monitoring Throughout Retraction Predict Postoperative Symptomatic Neuropraxia after XLIF? Results from a Prospective Multicenter Trial
Juan S. Uribe, Jim A. Youssef, Robert E. Isaacs, SOLAS Degenerative Study Group
8:45 – 8:50 am
239 Hip Flexion Weakness After XLIF
Juan S. Uribe, Jim A. Youssef, Robert E. Isaacs,
SOLAS Degenerative Study Group

8:50 – 8:55 am
240 The Effects of Cage Size on Motor and Sensory Nerve Function During the XLIF® Procedure: Preliminary Results from a Prospective, Multi-center Study
Robert E. Isaacs, Jim A. Youssef, Juan S. Uribe,
SOLAS Degenerative Study Group

8:55 – 9:00 am
Discussion

9:00 – 9:05 am
241 Morbidity of Repeat Surgery for Recurrent Spinal Metastases Following Combined Separation Surgery and Stereotactic Radiosurgery
Vijay Yanamadala, Joseph Schwab, Kristina Shultz, Kevin Oh, John H. Shin

9:05 – 9:10 am
242 Posterior Thoracic Corpectomies with Cage Reconstruction for Metastatic Spinal Tumors: Comparing the Mini-Open Approach to the Open Approach
Darryl Lau, Dean Chou

9:10 – 9:15 am
Discussion

9:15 – 9:20 am
243 Estimating Incremental Cost-Effectiveness of Adult Spinal Deformity Surgery Using the SRS-Schwab Classification System
Chessie Robinson, Richard A. Hostin Jr., Michael F. O'Brien,
Christopher P. Ames, Frank Schwab, Justin S. Smith, Virginie Lafage,
Munish Gupta, Eric Klineberg, Robert Hart, Ian McCarthy

9:20 – 9:25 am
244 Surgical Outcomes for Minimally Invasive vs. Open Transforaminal Lumbar Interbody Fusion (TLIF): An Updated Systematic Review and Meta-Analysis
Aaron J. Clark, Nickalus Khan, Siang Liao Lee, Garrett T. Venable,
Nicholas Rossi, Kevin T. Foley

9:25 – 9:30 am
Discussion

9:30 – 10:00 am
Grand Canyon Ballroom Salons 6-8
BEVERAGE BREAK AND WHAT'S NEW SESSION III
SCIENTIFIC SESSION VI
Quality in Spine Surgery
Moderator: Daniel K. Resnick, Jose Soriano
Faculty: Joseph Cheng, Christopher Wolfla, John J. Knightly, Rajiv Midha, Michael Groff, Kris Radcliff, K. Daniel Riew, Ian Kalfas
Learning Objectives: Upon completion of this course, participants will be able to:
- Discuss how quality improvement measures can be successfully applied in surgery
- Describe how to implement and sustain comprehensive value-based quality improvement

10:00 – 10:10 am
Who is Watching?
Joseph Cheng

10:10 – 10:20 am
Patient Perspective
Christopher Wolfla

10:20 – 10:30 am
Payer Perspective
John J. Knightly

10:30 – 10:40 am
Positioning in the OR—Avoiding Injury
Rajiv Midha

10:40 – 10:50 am
Avoiding Wrong Level Surgery
Michael Groff

10:50 – 11:00 am
Reducing Infection—Vancomycin Powder
Kris Radcliff

11:00 – 11:10 am
Assessment of Fusion—Too Many CTs?
K. Daniel Riew

11:10 – 11:20 am
Re-operations—Avoidable?
Ian Kalfas

11:20 – 11:30 am
Discussion
11:30 – 11:38 am

**106 Cervical Disc Arthroplasty vs. Anterior Cervical Discectomy and Fusion: Seven-year Outcomes from a Prospective, Multicenter Investigational Device Exemption Study**

Mark Edwin Shaffrey, Matthew F. Gornet, John Kenneth Burkus, Perry J. Argires

11:38 – 11:40 am

**Discussant: Domagoj Coric**

11:40 – 11:48 am

**107 Cost Analysis of Postoperative Cervical Sagittal Balance for Cervical Spondylotic Myelopathy**


11:48 – 11:50 am

**Discussant: Adam Kanter**

11:50 – 11:58 am

**108 Predictors of Readmission Within 30 Days After Spinal Surgery: A Single-center, Multivariate Analysis**

Ryan Khanna, Joseph L. McDevitt, Jamal McClendon Jr., Zachary Adam Smith, Nader S. Dahdaleh, Richard G. Fessler

11:58 am – 12:00 pm

**Discussant: Paul Park**

12:00 – 12:08 pm


12:08 – 12:10 pm

**Discussant: Michele M. Johnson**

12:10 – 12:18 pm

**110 Predicting Occurrence of Spine Surgery Complications Using “Big Data” Modeling of an Administrative Claims Database**

John K. Ratliff, Lu Tian, Anand Veeravagu, Tyler Scott Cole, Richard Olshen

12:18 – 12:20 pm

**Discussant: Ziya Gokaslan**

12:20 – 12:28 pm

**111 How to Predict Return to Work After Lumbar Discectomy: Answers from the NeuroPoint-SD Registry**

Khoi Duc Than, Jill Curran, Daniel K. Resnick, Christopher I. Shaffrey, Zoher Ghogawala, Praveen V. Mummaneni
MEETING AGENDA

12:28 – 12:30 pm
Discussant: Daniel Hoh

12:30 – 1:00 pm Grand Saguaro Ballroom East/West
SPINE SECTION BUSINESS MEETING
12:30 – 12:36 pm
Washington Committee Report
John Wilson

12:36 – 12:42 pm
Secretary’s Report
Marjorie Wang

12:42 – 12:48 pm
Treasurer’s Report
Charlie Kuntz

12:48 – 12:54 pm
Future Sites Committee Report
Christopher Wolff

12:54 – 1:00 pm
Nominating Committee Report
Michael Groff

1:00 – 1:30 pm Grand Canyon Ballroom Salons 6-8
LUNCH WITH EXHIBITORS AND WHAT'S NEW
SESSION IV

1:00 – 2:30 pm Grand Canyon Ballroom Salon 9
$200 includes lunch
LUNCHEON SYMPOSIUM I
Complication Management with the Masters
Directors: Eric Potts
Faculty: Vincent Traynelis, Christopher I. Shaffrey, Tyler Koski, Gerald E. Rodts, Joseph Cheng
Course Description: This course will discuss the evolution in the diagnosis and treatment of spinal disorders, as well as management of complications of treatment from the perspective of those who have extensively contributed to that evolution. Attendees will gain wisdom from historical knowledge and experiential narration.
Learning Objectives: Upon completion of this course, participants will be able to:
- Discuss the gravity of decisions that lead to complications
- Discuss the underlying principles that might be used to minimize complications
- Develop strategies that can be used to deal with surgical complications
LUNCHEON SYMPOSIUM II
Metastatic Spine Disease—Treatment Options
Directors: John Shin, Ziya Gokaslan, Laurence Rhines
Faculty: Daniel Sciubba, John Chi, Michelle Clarke, Ilya Laufer, Claudio Tatsui
Course Description: This course will provide a comprehensive review of the care of patients with metastatic spine tumors. The experts in the field of Spinal Oncology will discuss topics such as evaluation of patients with metastatic spine disease, minimally invasive and open surgical treatment options, conventional and stereotactic radiosurgery as well as vertebroplasty/kyphoplasty with relevant up-to-date review of the literature.
Learning Objectives: Upon completion of this course, participants will be able to:
- Evaluate patients with metastatic spine tumors presenting with myelopathy, cauda equine syndrome, or pain
- Discuss the appropriate treatment options for a given patient including conventional radiation therapy, stereotactic surgery, minimally invasive, and traditional open surgical procedures
- Identify appropriate patients who are candidates for vertebroplasty and kyphoplasty
- Review published data on the effectiveness of these various treatment modalities in patients with metastatic spine disease

LUNCHEON SYMPOSIUM III
Advanced Lateral Access Interbody Fusion: Deformity
Directors: Adam Kanter, Juan Uribe
Faculty: Adam Kanter, Juan Uribe, William Taylor, Larry Khoo, John O’Toole
Course Description: This course will focus on the indications, outcomes and complications of the advanced lateral access interbody fusion technique. Specific lectures will concentrate on anatomy and approach, literature based outcomes, complication avoidance and management, and clinical pearls.
Learning Objectives: Upon completion of this course, participants will be able to:
- Review and discuss indications for advanced lateral access approaches and surgery
- Discuss the complications and their avoidance in these procedures
- Review the clinical and radiographic results in advanced lateral access interbody fusion procedures
MEETING AGENDA

1:00 – 5:00 pm  
Barrow Neurological Institute  
$500 includes lunch  
Shuttle departs at 12:30 pm from the JW Marriott Desert Ridge Ballroom Entrance  
**Spine Section Cadaveric Instruction with Lunch** Non-CME Course  
Directors: Luis M. Tumialán, Daniel Hoh  
Faculty: Lynda Yang, Eric Zager, Zachary Ray, Line Jacques, Frederick Pennings, Nicholas Theodore, Faheem Sandhu, Ross Moquin, Daniel Laich, Albert Telfeian, Jonathan Sherman, Todd Francis, Michael Musacchio, Daniel Scibba, Randall Porter  
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 include direct lateral lumbar approaches, minimally invasive lumbar fusion, percutaneous screw fixation, endoscopic decompression, spinal deformity correction, and peripheral nerve grafting. One-on-one instruction will be performed with experienced faculty using the latest state-of-the-art instrumentation and 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.  
Learning Objectives: Upon completion of this course, participants will be able to:  
- Describe indications and techniques for various new technologies in spine surgery  
- Describe indications and techniques for various new technologies in peripheral nerve surgery  
- Describe complication avoidance and management for various new technologies in spine and peripheral nerve surgery  

Sponsored by: Biomet, DePuy Synthes, Globus Medical, Integra, Joimax, K2M, Medtronic, Paradigm Spine, Spine Wave  

6:30 – 9:00 pm  
Wildflower Ballroom Terrace & Meeting Room B  
**YOUNG NEUROSURGEONS’ RECEPTION AND DINNER**  

SATURDAY, MARCH 7  

7:30 – 8:30 am  
Grand Saguaro Ballroom Foyer  
**COMPLIMENTARY CONTINENTAL BREAKFAST**  

7:30 am – 12:00 pm  
Grand Canyon Ballroom Foyer  
**REGISTRATION**  

8:00 – 9:00 am  
Grand Saguaro Ballroom East/West  
**SCIENTIFIC SESSION VIII**  
Arthroplasty—ISASS and CSRS  
Moderators: Domagoj Coric, Jeffrey Goldstein, Gunnar Andersson
Faculty: Vincent Traynelis, Praveen Mummaneni, Robert Whitmore

Learning Objectives: Upon completion of this course, participants will be able to:
- Analyze current state-of-the-art cervical disc arthroplasty technology
- Determine indications for the use of these technologies and potential complications and costs

8:00 – 8:08 am
Which Patient is Ideal?
Domagoj Coric

8:08 – 8:16 am
Long-Term Results
Praveen Mummaneni

8:16 – 8:24 am
Complications Following Cervical Arthroplasty
Gunnar Andersson

8:24 – 8:32 am
Adjacent Level Disease
Vincent Traynelis

8:32 – 8:40 am
Cost
Robert Whitmore

8:40 – 9:00 am
Discussion

9:00 – 9:30 am
Grand Saguaro Ballroom Foyer
COFFEE BREAK

9:30 – 10:30 am
Grand Saguaro Ballroom East/West
CAHILL CONTROVERSIES SESSION
Moderators: Edward Benzel, Adam Kanter

9:30 – 9:38 am
Introduction of Cahill Session
Charles Branch

9:38 – 9:46 am
Percutaneous Screws Thoracolumbar Trauma
Sanjay Dhall

9:46 – 9:54 am
Open Surgery is the Best Treatment for Trauma
James Harrop

9:54 – 10:02 am
Indirect Decompression is Best for Scoliosis with Foraminal Stenosis
Juan Uribe

10:02 – 10:10 am
Laminectomy and Fusion for Scoliosis with Foraminal Stenosis
Christopher I. Shaffrey

10:10 – 10:30 am
Questions and Comments
MEETING AGENDA

10:30 am – 12:00 pm Grand Saguaro Ballroom East/West

ORAL PRESENTATIONS V
Moderators: Michele M. Johnson, Luis M. Tumialán

10:30 – 10:35 am
245 Computer-assisted Navigation for Real-Time Planning of Pedicle Subtraction Osteotomy for Cervicothoracic Deformity Correction
Vijay Yanamadala, Thomas D. Cha, John H. Shin

10:35 – 10:40 am
246 C-Arm Positioning is a Significant Source of Unnecessary Radiation Exposure
Elizabeth W Reiser, Sarah Byrd, Cary Idler, Robert E. Isaacs, Kris Radcliff, Frank M. Phillips

10:40 – 10:45 am
247 Comparative Biomechanics of Bryan and Pro-C Cervical Artificial Discs in a Caprine Model—Does Load Response Effect the Development of Heterotropic Ossificans?
Jamie Baisden, Gerald Eckardt, Joe Cochran, Frank A. Pintar, Narayan Yoganandan

10:45 – 10:50 am Discussion

10:50 – 10:55 am
248 Do MIS Deformity Interventions Result in Similar Reductions of Disability When Compared with Traditional Open Spinal Deformity Correction at One and Two Years? A Propensity Matched Cohort Analysis
Kai-Ming G. Fu, Adam S. Kanter, Gregory Mundis, Paul Park, Christopher I. Shaffrey, Frank LaMarca, Michael Y. Wang, Juan S. Uribe, Richard G. Fessler, Praveen V. Mummaneni

10:55 – 11:00 am
249 Simulated Long-Term Biomechanical Evaluation of Revision Surgical Techniques in the Event of Long Fusion Implant Failure
Seth Shawn Molloy, Karthik H. Madhavan, Jonathan Harris, Allan D. Levi, Mir Hussain, Sean BS Jenkins, Yiwei Cai, John Hao, Brandon Bucklen

11:00 – 11:05 am Discussion

11:10 – 11:15 am
251 The Clinical Correlation of the Hart-ISSG Proximal Junctional Kyphosis Severity Scale (PJKSS) with Health Related Quality of Life Outcomes and Need for Revision Surgery
Darryl Lau, Haruki Funao, Aaron J. Clark, Fred Nicholls, Justin S. Smith, Shay Bess, Christopher I. Shaffrey, Frank Schwab, Virginie Lafage, Vedat Deviren, Robert Hart, Khaled Kebaish, Christopher P. Ames
11:15 – 11:20 am

252 Recovery Kinetics in 149 Adult Spinal Deformity Patients with Two-year Follow-up: The Effect of Complications and Reoperation Using an Area Under the Curve Analysis


11:20 – 11:25 am

253 A Prospective, Multicenter Matched and Unmatched Cohort Assessment of Outcomes for Operative and Nonoperative Treatment in Adult Spinal Deformity (ASD)


11:25 – 11:30 am

Discussion

11:30 – 11:35 am

254 Biomechanical Comparison of Cortical Screws to Traditional Pedicle Screws with Immediate and Simulated Long-term Stabilization Results in a Lumbar Laminectomy Model

Kris Radcliff, Noelle F. Klocke, Jonathan Harris, Yiwei Cai, Omar Elkassabany, John Hao, Brandon Bucklen

11:35 – 11:40 am

255 Assessment of Impact of Long-Cassette Standing X-rays on Surgical Planning for Lumbar Pathology: An International Survey of Spine Surgeons


11:40 – 11:45 am

Discussion

11:45 – 11:50 am

256 Radiographic Fate of S2-Alar-Iliac Screws after 12-month Minimum Follow-up

Marcus D. Mazur, Mark Alexander Mahan, Lubdha Shah, Andrew T. Dailey

11:50 – 11:55 am

257 Sacro-Iliac Joint Fusion with Two Different Minimally Invasive Techniques: Posterior vs. Trans-Articular

Hector Enrique Soriano-Baron, Nestor Gregorio Rodriguez-Martinez, Eduardo Martinez del Campo Oviedo, Phillip M. Reyes, Anna Newcomb, Scott Yerby, Derek Lindsey, Nicholas Theodore, Neil R. Crawford

11:55 am – 12:00 pm

Discussion
**EXHIBIT HALL HOURS:**
Thursday, March 5  9:00 am – 7:00 pm  
Friday, March 6  9:00 am – 2:00 pm

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Corporate Supporters of the 2015 Annual Meeting and Special Courses

The following companies have provided an educational grant in support of the Annual Meeting:

Biomet
Depuy Synthes
Medtronic
Stryker

The following companies have provided support for Special Courses:

Biomet
Depuy Synthes
Medtronic
Nuvasive
Spine Wave
Stryker
ACCREDITATION
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 the Congress of Neurological Surgeons (CNS) and the Section on Disorders of the Spine and Peripheral Nerves. The Congress of Neurological Surgeons is accredited by the ACCME to provide continuing medical education for physicians.

AMA CREDIT DESIGNATION STATEMENT
The Congress of Neurological Surgeons designates this live activity for a maximum of 28.75 AMA PRA Category 1 Credits™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

CME CREDIT
A maximum of 19 AMA PRA Category 1 Credits™ may be earned for Scientific Sessions only.

MID-LEVEL PRACTITIONERS
Attendees will receive credits for attendance at the general Scientific Program and for any optional events attended. Please contact your individual membership association and certification board to determine the requirements for accepting credits. All attendees will receive a Certificate of Attendance.

ADDITIONAL CME CREDITS CAN BE EARNED BY ATTENDING THE FOLLOWING:

Special Courses
Attendees will receive a maximum of 3.75 AMA PRA Category 1 Credits™ for each eligible half-day special course. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Lunch Symposia
Attendees will receive a maximum of 1.5 AMA PRA Category 1 Credits™ for each eligible half-day symposium. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Dinner Seminar
Attendees will receive a maximum of 2 AMA PRA Category 1 Credits™ for each eligible half-day dinner seminar. Physicians should claim only the credit commensurate with the extent of their participation in the activity.
POSTERS
Physicians may claim AMA PRA Category 1 Credit™ directly from the AMA for preparing a poster presentation, which also includes the published abstracts. Physicians may claim them on their AMA PRA certificate application or apply directly to the AMA for an AMA PRA Category 1 Credit™ certificate. Physicians may claim AMA PRA Category 2 Credit™ for viewing scientific digital posters. Physicians should self-claim credit on their AMA PRA certificate application form.

CLAIMING CME CREDIT
CME credits can be claimed through the online CME system at www.cns.org. Log in using your last name and the email address with which you registered. 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 the DSPN Spine Summit 2015 in which they actively participated. The CME tracking system lets you create and email a CME certificate immediately following the DSPN Spine Summit 2015, either while you are still in Phoenix 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. 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. 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.

FDA STATEMENT
Some drugs or medical devices demonstrated at the DSPN Spine Summit 2015 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 2015 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.
GENERAL INFORMATION

SPEAKER READY ROOM
The Speaker Ready Room is located in Pinnacle Peak Conference Suite 3. The hours are as follows:

- **Wednesday, March 4**: 11:00 am – 6:00 pm
- **Thursday, March 5**: 6:00 am – 6:00 pm
- **Friday, March 6**: 6:00 am – 5:00 pm
- **Saturday, March 7**: 6:00 am – 12:00 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
Grand Canyon Ballroom  Salons 6/7/8

- **Thursday, March 5**: 9:00 am – 7:00 pm
- **Friday, March 6**: 9:00 am – 2:00 pm

REGISTRATION
Grand Canyon Ballroom  Foyer

- **Wednesday, March 4**: 11:00 am – 6:00 pm
- **Thursday, March 5**: 6:00 am – 6:00 pm
- **Friday, March 6**: 6:00 am – 6:00 pm
- **Saturday, March 7**: 7:30 am – 12:00 pm

NO SMOKING POLICY
Smoking is not permitted at any official DSPN Spine Summit 2015 event. The JW Marriott Desert Ridge is a non-smoking hotel.

DISCLAIMER
The material presented at the DSPN Spine Summit 2015 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

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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

Sage Court

Wednesday, March 4  6:30 – 8:00 pm

Mingle with your colleagues among the waterways and lush landscape of the Sage Court during the Opening Reception. Enjoy a delectable array of food and refreshments while taking in the spectacular Arizona sunset. Resort casual attire is recommended for this event.

RECEPTION WITH EXHIBITORS

Grand Canyon Ballroom  Salons 6/7/8

Thursday, March 5  6:00 – 7:00 pm

Join us for this special event in the Exhibit Hall. Attendees have the opportunity to interact with exhibiting companies, corporate contacts, and colleagues while enjoying pre-dinner cocktails and hors d’oeuvres. Business casual attire is recommended for this event.

YOUNG NEUROSURGEONS’ DINNER

Wildflower  Ballroom B

Friday, March 6  6:30 pm

All residents, fellows, and young neurosurgeons are welcome. RSVP to DePuy Synthes in Booth #302.
The Congress of Neurological Surgeons controls the content and production of this CME activity and attempts to assure the presentation of balanced, objective information. In accordance with the Standards for Commercial Support established by the Accreditation Council for Continuing Medical Education, speakers are asked to disclose any relationship they have with commercial companies which may be related to the content of their lecture.

Speakers who have disclosed a relationship with commercial companies whose products may have a relevance to their presentation are listed below. Faculty who are also considered Planners are designated by P.

### Positional Interest Codes

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#### Christopher P. Ames, MD

**Consulting Agreement** – Medtronic (6), Stryker (6), Other – Depuy (6), Doctors Research Group (6), Fish & Richardson PC (6), TranS1 Inc. (6), Visualase (6), **Royalty** – Aesculap (6), Lanx (6),

#### Neel Anand, MD

**Consulting Agreement** – Medtronic (2), **Ownership Interest** – Globus Medical (6), **Royalty** – Baxano Surgical (6), Globus Medical (6), Medtronics (6), Nuvasive (6)

#### David Greg Anderson, MD

**Consulting Agreement** – Globus (2), **Ownership Interest** – Innovative Surgical Designs (2), **Royalty** – DePuy Synthes Spine (2), Medtronic (2)

#### Paul Anderson, MD

**Consulting Agreement** – Aesculap (2), **Other** – Expanding Orthopedics (6), SI Bone (6), Spartec (6), Titan Spine (6), **Royalty** – RTI (6), Stryker (6)

#### Gunnar B.J. Andersson, MD, PhD

**Consulting Agreement** – Bioset (2), ISTO (2), Ouroboros (2), Spinal Kinetics (2), Zimmer Inc. (2)

#### Paul M. Arnold, MD

**Consulting Agreement** – FzioMed (2), Medtronic Sofamor Danek (2), Stryker Spine (2), Other – AOSpine North America (7), **Ownership Interest** – Z–Plasty (8)

#### Edward C. Benzel, MD

**Consulting Agreement** – Axiomed (2), **Grants** – Orthopedic Research Education Foundation (6), Rawlings (6), **Royalty** – Elsevier Publications (6), Thieme Publications (6)

#### Sigurd Berven, MD

**Honoraria** – Biomet (2), DePuy Spine (2), Globus Spine (2), Medtronic (2), Stryker Spine (2), **Ownership Interest** – Providence Medical (2), Simpircia Spine (2), **Royalty** – Medtronic (2)

#### Shay Bess, MD

**Consulting Agreement** – Allosource (6), K2 Medical (6), **Royalty** – Pioneer (6)

#### Erica Fay Bisson, MD, FAANS

**Consulting Agreement** – rView Medical Company (2)

#### Charles L. Branch, MD

**Consulting Agreement** – Medtronic (2), **Royalty** – Medtronic (6)

#### Richard Bransford, MD

**Honoraria** – AOSpine North America (6), Globus (6)
Darrel S. Brodke, MD  
Ownership Interest – Amedica (2), Royalty – Amedica (2), DePuy Synthes (2), Medtronic (2)  

Douglas C. Burton, MD  
Consulting Agreement – DePuy Spine (6), Royalty – DePuy Spine (6)  

Jens Chapman, MD  
Other – AOSNA (6), HJ Wyss Foundation (6)  

John Chi MD, MPH  
Consulting Agreement – Depuy Synthes Spine (2)  

Donagoj Coric, MD  
Consulting Agreement – DiscGenics (2), Globus Medical (2), Medtronic (2), Spine Wave (2), United Healthcare (2), Ownership Interest – Spinal Wave (2), Royalty – Spine Wave (2)  

Dennis Grant Crandall, MD  
Consulting Agreement – Ellipse Technology (2), Kspine (2), Medtronic (2), SpineWave (2), Stryker (2), Zyga (2), Royalty – Medtronic (6)  

Michael Daubs, MD  
Royalty – Depuy Synthes Spine (2)  

Sanjay S. Dhall, MD  
Honoraria – Depuy (6), Globus (6)  

Michael G. Fehlings, MD, PhD, FRCS(C), FACS  
Royalty – Depuy (6)  

Charles Fisher, MD  
Consulting Agreement – Medtronic (2), Nuvasive (2), Grants – OREF (6), Other – AO (6), Royalty – Medtronic (6)  

Kevin T. Foley, MD, FACS, FAANS  
Consulting Agreement – ArthroCare (2), Medtronic (2), NuVasive (2), Intellectual Fees – ArthroCare (6), Ownership Interest – DiscGenics (3), TrueVision (3), Royalty – Medtronic (6)  

Anthony Frempong-Boadu, MD  
Honoraria – Medtronic (6)  

Kai-Ming G. Fu, MD, PhD  
Honoraria – Depuy (2)  

Robert Michael Galler, DO, FACS  
Grants – Medtronic (6)  

Steven D. Glassman, MD  
Other – Medtronic (6), Nuvasive – Funds to Database (6), Past President (7), Royalty – Medtronic (2), Salary – Norton Health Care (5)  

Ziya L. Gokaslan, MD  

Jeffrey Goldstein, MD  
Consulting Agreement – Medtronic, Nuvasive, Synthes, K2M (2), Ownership Interest – Nuvasive (2)  

Michael W. Groff, MD, FACS  
Consulting Agreement – Depuy (2), EBI Spine Biomet (2)  

Munish Gupta, MD  
Ownership Interest – DePuy Spine (2), Osteotech (2), Honoraria – AO (2), Intellectual Fees – Medtronic (6), Other – FOSA (7), Ownership Interest – Acrotech (6), J&J (6), Pfizer (6), Pioneer (6), Proctor and Gamble (6), Royalty – DePuy Spine (6)  

Alan S. Hilibrand, MD  
Ownership Interest – Benevenue, Paradigm Spine, Spinal Ventures, Vertiflex, PSD, Lifespine (6), Royalty – Aesculap, Amedica, Biomet, Stryker (6)  

Langston T. Holly, MD  
Consulting Agreement – Medtronic (2), Grants – NIH (6)  

Steven Wei–Hung Hwang, MD  
Other – Non-financial Speaker Agreement with Depuy–Synthes (6)  

Iain H. Kalfas, MD  
Honoraria – Stryker Spine (6), Royalty – Mako Surgical (6)  

Adam S. Kanter, MD  
Royalty – Biomet (2)  

Michael P Kelly, MD  
Consulting Agreement – Advance Medical (2), Grants – AOSpine (6), Barnes-Jewish Hospital Foundation (6), OREF (6)  

Larry T. Khoo, MD  
Consulting Agreement – Aesculap Spine (2), Globus Medical, Trasn1, Zimmer Spine (6)  

Eric Klineberg, MD  
Grants – DePuy Synthes Spine (6), OREF (6), Honoraria – AO (6), DePuy Synthes Spine (6)  

Tyler R. Koski, MD  
Consulting Agreement – Globus (2), MB Innovations/Spinewave (2), Medtronic (2), Nuvasive (2)
Charles Kunz, MD
Other – Neurosurgery (4), Synthes/DePuy – Research/Education (6), Ownership Interest – Mayfield Clinic (8), Precision Radiotherapy (8), Priority Consult (8), The Christ Hospital Spine Surgery Center (8), Salary – University of Cincinnati (5)

Frank La Marca, MD
Consulting Agreement – Biomet (2), Globus (2), Royalty – Globus (6)

Ilya Lauffer, MD
Consulting Agreement – DePuy/Synthes (2), SpineWave (2)

Allan D. Levi, MD, PhD
Honoraria – Medtronic (6)

Steven C Ludwig, MD
Consulting Agreement – Depuy Synthes Spine (2), K2M (2), Other – Globus Medical (2), Ownership Interest – ASIP/PST (8), ISD (7), Royalty – Depuy Synthes Spine (6)

Jean-Pierre Mobasser, MD
Consulting Agreement – Medtronic (2), Other – ProNerve (6), Royalty – Innomed (6), Medtronic (6)

Ross Moquin, MD
Consulting Agreement – K2M (2)

Thomas Mroz, MD
Consulting Agreement – Ceramtec (2), Stryker Spine (2), Ownership Interest – PearlDiver, Inc. (6)

Praveen V. Mummaneni, MD
Grants – NREF (6), Honoraria – DePuy Spine (6), Globus (6), Other – Spinicity (6), Ownership Interest – 2N LLC (Royalty from DePuy, QMP, and Thieme) (8)

Michael J. Musacchio, MD
Consulting Agreement – Paradigm Spine (6), Honoraria – RTI/Pioneer (6)

John E. O'Toole, MD, MS
Consulting Agreement – Globus Medical (2), Pioneer Surgical (2)

Ripul R. Panchal, DO
Consulting Agreement – Precision Spine (2), Other – Baxter (6), Globus (6)

Paul Park, MD
Consulting Agreement – Biomet (2), Globus (2), Medtronic (2), Royalty – Globus (6)

Frederik Pennings, MD, PhD
Consulting Agreement – DePuy (2), Consultant (Instructor for Cadaver Courses) – Trans 1 (2), Orthofix (2), Other – Accel Spine (6)

Randall W. Porter, MD
Consulting Agreement – Biomet (2)

Alexander K. Powers, MD
Consulting Agreement – Depuy (6), Medtronic (6), Stryker Spine (6)

Srinivas K. Prasad, MD, MS
Consulting Agreement – Stryker Spine (6), Honoraria – Depuy Synthes Spine (6)

Themistocles Protopsaltis, MD
Consulting Agreement – Biomet Spine (2), Medicrea (2), Grants – Zimmer Spine (6)

Kris Radcliff, MD
Consulting Agreement – Depuy (6), Globus Medical (6), Grants – Depuy (6), Medtronic (6), Paradigm (6), Other – Medtronic Advanced Energy (6), Royalty – Globus Medical (6)

Raja Y. Rampersaud, MD, FRCS(C)
Consulting Agreement – Medtronic (2)

Wilson Zachary Ray, MD
Consulting Agreement – Ulrich (2), Honoraria – Depuy/Synthes Spine (6)

Laurence D. Rhines, MD
Honoraria – Globus (2), Stryker (2), Other – AOSpine International (7)

K. Daniel Riew, MD
Other – Amedica (6), Benvvenue (6), Broadwater (6), Nexgen Spine (6), Osprey (6), Paradigm Spine (6), PSD (6), Spinal Kinetics (6), Spineology (6), Vertiflex (6), Ownership Interest – Expanding Orthopedics (6), Royalty – Biomet (6), Medtronic (6), Osprey (6)

Gerald Rodts, MD

Charles A. Sansur, MD, MHSc
Consulting Agreement – Depuy Synthes (2), Medtronic (2), Honoraria – Globus (2)

Daniel M. Sciubba, BS, MD
Other (Recipient of Research Grant) – Depuy Spine (6), Consulting Relationship – Medtronic (2), Nuvasive (2), Globus (2), Depuy (2)
Nathan R. Selden, MD, PhD
Consulting Agreement – Shire (2), Other (Committee Chair) – Society of Neurological Surgeons (3), NeuroPoint Alliance (3)

Christopher I. Shaffrey, MD, FACS
Consulting Agreement – Biomet (6), Medtronic (6), Nuvasive (6), Honoraria – Globus (6), Stryker (6), Intellectual Fees – Biomet (6), Medtronic (6), Nuvasive (6), Stryker (6), Other – AOSpine North America (6), AOSpine North America (6), Department of Defense (6), NACTN (6), NIH (6), NREF (6), Nuvasive (6), Royalty – Biomet (6), Medtronic (6), Nuvasive (6)

Jonathan D. Sherman, MD
Consulting Agreement – Spine Wave (2)

Justin S. Smith, MD, PhD
Consulting Agreement – Biomet (2), Cerapedics (2), Globus (6), Nuvasive (2), Honoraria – Biomet (6), Depuy Spine (6), Globus (6), Nuvasive (2), Other – Depuy Spine (6), Royalty – Biomet (2)

Michael P. Steinmetz, MD
Consulting Agreement – Biomet Spine (6), Depuy-Synthes (6)

William R. Taylor, MD
Consulting Agreement – Depuy (2), Royalty – Alphatec (2), Nuvasive (2)

Nicholas Theodore, MD
Royalty – Depuy Synthes Spine (2), Globus Medical (2), Stryker Spine (6)

Vincent C. Traynelis, MD
Consulting Agreement – Medtronic (2), Grants – Globus (6), Royalty – Medtronic (6)

Gregory R. Trost, MD
Consulting Agreement – Medtronic (2), Medtronic (2)

Luis M. Tumialan, MD
Consulting Agreement – Depuy–Synthes (2), Medtronic (2), Spine Wave (2)

Juan S. Uribe, MD
Consulting Agreement – NuVasive (2), Orthofix (2), Royalty – Nuvasive (2)

Alexander R. Vaccaro, MD
Consulting Agreement – Ellipse (2), Gerson Lehman Group (2), Globus Medical (2), Guidepoint Global (2), Innovative Surgical Design (2), Medacorp (2), Medtronics (2), Orthobullets (2), Stryker Spine (2), Grants – Cerapedics (6), Other – AOSpine (4), AO Spine (4), Innovative Surgical Design (4), SpinoCyt (4), Owneship Interest – Advanced Spinal Intellectual Properties (6), Bonovo Orthopaedics (6), Computational Dynamics (6), Cross Current (6), Cytomics (6), Electrocore (6), Flagship Surgical (6), Flow Pharma (6), Gamma Spine (6), Globus Medical (6), In Vivo (6), Innovative Surgical Design (6), Location Based Intelligence (6), Paradigm Spine (6), Progressive Spinal Technologies (6), R.S.I (6), Replication Medica (6), Rothman Institute and Related Properties (5), Small Bone Innovations (6), Spine Medica (6), SpinoCyt (6), SpinoLogy (6), Stout Medical (6), Stout Medical (6), Royalty – Aesculap (6), Biomet (6), Depuy (6), Elsevier (6), Globus Medical (6), JayPee (6), K–2 Medical (6), Medtronics (6), Stryker Spine (6), Taylor Francis (6), Thieme (6)

Jeffrey Wang, MD
Royalty – Aesculap (6), Amedica (6), Biomet (6), Osprey (6), Seaspine (6), Stryker (6), Synthes (6)

Michael Y. Wang, MD, FACS
Consulting Agreement – Aesculap Spine (2), Depuy Spine (2), Intellectual Fees – Depuy Spine (2)

Richard N. Wohns, MD, MBA
Consulting Agreement – LDR (2), Medtronic (2), Nuvasive (2), Precision Image Analysis (2), Synthes (2), Other – Aquedect Technology (3), Ranier Technology (6)

Jack E. Zigler, MD
Consulting Agreement – DePuy Synthes (6)
NOTHING TO DISCLOSE

The following individuals have disclosed that they do not have a relationship with commercial companies whose products may have a relevance to their participation in the meeting. Faculty who are also considered Planners are designated by 🏷.

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