29th Annual Meeting
of the AANS/CNS Section on
Disorders of
the Spine and
Peripheral Nerves

Maximum Impact: Surgeons as Key Advocates in Patient Care

Scientific Program

March 6-9, 2013
JW Marriott Desert Ridge
Phoenix, Arizona

We welcome our 2013 International Guests –
the Irish Neurosurgery Group and
the Irish Spine Society!
CONGRATULATIONS TO THE 2013 AWARD AND FELLOWSHIP RECIPIENTS!

Peter Grunert, MD  Mayfield Basic Science
Scott L. Parker, MD  Mayfield Clinical Science
Saniya S. Godil, MD  Outcomes Committee
Kristin J. Weaver, MD  Ronald Apfelbaum Research Award supported by Aesculap
Bryan Bolinger  Cahill Fellowship supported by DePuy Synthes Spine
Rishi K. Wadhwa, MD  Cloward Fellowship supported by NuVasive
Rakov Kumar Jha, MD  Crockard International Fellowship supported by DePuy Synthes Spine
Matthew McGirt, MD  Regis W. Haid, Jr. Adult Deformity Research Award supported by Globus Medical
Doniel Drazin, MD, MA  Regis W. Haid, Jr. Adult Deformity Research Award supported by Globus Medical
Zarina S. Ali, MD  David Kline Research Award supported by Integra
Gurpreet S. Gandhoke, MD  Sanford Larson Research Award supported by DePuy Synthes Spine
Amey Savardekar, MD  Sonntag International Fellowship supported by NuVasive
Bradley Jacobs, MD  Clinical Trials Fellowship
Wilson Z. Ray, MD  Clinical Trials
Rory K. J. Murphy, MD  Clinical Trials
Doniel Drazin, MD  Clinical Trials
Welcome to the 2013 Annual Meeting!

On behalf of the AANS/CNS Section on Disorders of the Spine and Peripheral Nerves Executive Committee, Annual Meeting Committee and Meritorious Service Award Recipient, Charles L. Branch, Jr., we welcome you to the JW Marriott Desert Ridge for the 2013 Annual Meeting.

This dynamic scientific program, Maximum Impact: Surgeons as Key Advocates in Patient Care, is incredibly timely. Our expert faculty, scientific sessions and more than 200 scientific abstracts offer the latest techniques, skills and information available – all designed to immediately impact your practice and ultimately enhance patient care.

Plus, with multiple David Cahill Memorial Controversies Sessions, you will have an opportunity to watch as experts debate hot-button issues that are affecting our specialty and weigh in with your perspective. Additionally, with other societies actively participating in the meeting, including the Cervical Spine Research Society, AOSSpine, Scoliosis Research Society, and the American College of Osteopathic Medicine, you will gain more perspectives to assist in making critical decisions. Plus don’t miss our Exhibit Hall featuring over 55 exhibitors displaying the latest products and services in neurosurgical and orthopedic technology.

We encourage you to make time in your schedule for our numerous networking opportunities. Catch up with both your corporate contacts and colleagues at the Opening Reception, Reception in the Exhibit Hall and complimentary lunch in the Exhibit Hall on Thursday and Friday.

Again, we thank you for joining us in Phoenix and look forward to an outstanding meeting experience.

Sincerely,

Joseph S. Cheng, MD, MS, FAANS, FACS
Chair

Marjorie C. Wang, MD, MPH
Annual Meeting Chair

John J. Knightly, MD
Scientific Program Chair
Joseph S. Cheng, MD, MS, FAANS, FACS, grew up in Bridgewater, New Jersey before going to college at the University of Tennessee in Knoxville, Tennessee where he graduated in 1990 with Honors in Engineering Science with a focus in Biomedical Engineering. Dr. Cheng completed his medical degree in 1994 from the Medical College of Wisconsin (MCW) in Milwaukee, Wisconsin, and stayed to finish his Neurosurgery Residency under the mentorship of Dr. Sanford J. Larson. He remained at MCW for another year to complete his post-graduate Fellowship in Complex Spinal Surgery in 2002 under the guidance of Dr. Dennis J. Maiman.

In 2002, Dr. Cheng joined the faculty in the Department of Neurosurgery at Vanderbilt University in Nashville, Tennessee. Enjoying his 11th year as faculty at Vanderbilt, Dr. Cheng currently serves as Director of the Neurosurgery Spine Program at Vanderbilt University and is Associate Professor of Neurosurgery and Orthopedics.

Dr. Cheng has a diverse range of research interests including health care policy, coding and reimbursement, spinal biomechanics and modeling, spinal oncology, spinal deformity, spinal reconstruction and instrumentation, and minimally invasive spinal techniques. He has been an author on over 55 peer reviewed papers along with 17 chapters in medical and professional textbooks, as well as numerous non-peer reviewed work and editor of books on the topic of health care policy, coding, and reimbursement.

Dr. Cheng is an active member of many professional organizations including the American Association of Neurological Surgeons, AANS/CNS Section on the Disorders of the Spine and Peripheral Nerves, Congress of Neurological Surgeons, Council of State Neurosurgical Societies, among many others. He holds many leadership roles in these organizations, including chairperson of committees, officer, and executive positions on the board.

Dr. Cheng, his wife Rebecca, and son Josh live in Nashville with their Great Dane, Rhody where they enjoy golf, video games and raising Koi and goldfish in his pond.
Charles L. Branch, Jr., MD, is the Professor and Chairman, Department of Neurosurgery at Wake Forest University School of Medicine. Born in Montreal, Quebec, Canada, he received his medical degree from the University of Texas Southwestern Medical School in 1981. He completed his neurosurgical training at Wake Forest University in 1987 and completed a Clinical Fellowship in the Department of Neurological Surgery at the University of California in San Francisco. In 1987, he returned to Wake Forest as a faculty member in the Department of Neurosurgery. In June, 2000, Dr. Branch was appointed to the position of the Eben Alexander, Jr. Professor and Chairman of the Department of Neurosurgery, a position that he currently holds.

A renowned international lecturer, Branch has also published 20 book chapters and 47 journal articles. He has served as the Chair of the American Board of Neurological Surgery, the President of the North American Spine Society and Chair of the AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves. He served as Editor–in–Chief of The Spine Journal, the official journal of the North American Spine Society, from 2004–2009.

Based upon work by his father, Charles L. Branch began in the 1980s modifying the Cloward Posterior Lumbar Interbody Fusion (PLIF) technique, Dr. Branch has dedicated much of his career to the enhancement and education of minimally invasive PLIF techniques. He has been granted multiple patents recognizing unique fusion and minimally invasive spine technology. His current research effort centers on the development of minimally invasive lumbar fusion technology.

Dr. Branch and his wife Lesa have five children and live on their farm and wildlife preserve in Advance, NC. Their son Byron is currently a fourth year Neurosurgery resident at University of Texas–San Antonio. Daniel is currently in his third year of medical school at the University of Texas Medical Branch in Galveston, and their daughter Leslie is a Plastic Surgery resident at Wake Forest Baptist Health. Two daughters, Courtney and Emily have completed studies at Pepperdine University and have been recognized for their artistic talents.

In addition to his land and wildlife conservation interests, Dr. Branch is active in his church as a Deacon and as the director of medical mission programs in Haiti, Guyana, Nigeria, and most recently Guatemala. He also serves on the Governance Board of Eastern European Missions facilitating bible distribution and faith based humanitarian relief efforts.
MEETING AGENDA

WEDNESDAY, MARCH 6

1:30 – 5:30 PM  Grand Canyon Ballroom 12
**Pediatric Craniocervical Society**
$200 includes lunch
**Course Director:** Douglas L. Brockmeyer
**Faculty:** Richard C. E. Anderson, Daniel Edward Couture

1:30 – 3:30 PM
Roundtable Discussion and Presentations

3:30 – 3:45 PM
Break

3:45 – 5:30 PM
Roundtable Discussion and Presentations

1:30 – 5:30 PM  Desert Conference Suite VIII
**American College of Osteopathic Surgeons (ACOS) Neurosurgical Discipline**
$200 includes lunch
**Course Directors:** Robert M. Galler, Steven D. Vanni
**Faculty:** Larry Gene Armstrong, Kristophe Jemel Karami, Eric Marvin, Kamran Parsa, Nicholas A. Qandah, Yoav Ritter, Mark Rivkin

1:30 – 2:00 PM
**DO Lateral Approach in Spine Surgery**
Steven D. Vanni

2:00 – 2:30 PM
**Spinal Cord Fiber Optic Monitoring**
Robert M. Galler

2:30 – 3:00 PM
**Biomechanical Evaluation of Constructs Used to Prevent Proximal Junctional Kyphosis in Sagittal Deformity Patients**
Nicholas A. Qandah

3:00 - 3:30 PM
Break

3:30 – 4:00 PM
**The State of the Union of the ACGME and the AOA: A Neurosurgical Perspective**
Larry Gene Armstrong

4:00 – 4:15 PM
**Sagittal and Coronal Correction Using the Lateral Approach**
Yoav Ritter

4:15 – 4:30 PM
**Predictive Nature of Focal Kyphosis in Traumatic Unilateral Facet Fractures**
Eric Marvin
4:30 – 4:45 PM
A Multi–Institutional Review of a Protocol for the
Management of Lumbar Radiculopathy
Kamran Parsa

4:45 – 5:00 PM
Effects of Body Mass Index on Adverse Perioperative
Events in Patients Undergoing Elective Lumbar Fusion
Mark Rivkin

5:00 – 5:15 PM
Epidemiology and Survival Analysis of Patients with
Multiple Myeloma and Plasmacytoma of the Spine:
Results from the Largest Consecutive Surgical Series at a
Single Academic Center from 2002–2012
Kristophe Jemel Karami

5:15 - 5:30 PM
Discussion

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

Special Course I – Neurosurgical Spine:
Business and Compensation (a joint Spine Section
and CSNS Special Course)
$200 includes lunch
Course Directors: Domagoj Coric, John K. Ratliff
Faculty: Edward C. Benzel, Joseph S. Cheng,
Dean G. Karahalios, Matthew McGirt, Michael P. Steinmetz

1:30 – 1:45 PM
Introduction
Domagoj Coric, John K. Ratliff

1:45 – 2:15 PM
2012 CPT Coding Update
John K. Ratliff

2:15 – 2:45 PM
Revenue Generation: Ancillary Income and
Operational Efficiency
Domagoj Coric

2:45 – 3:15 PM
Outcomes Data Collection in the Changing Healthcare
Environment: Defining the Quality and Value of your Care
Through Practice Data Collection
Matthew McGirt

3:15 – 3:30 PM
Break

3:30 – 4:00 PM
The Evolution of an Integrated Approach to Patient Care:
The Cleveland Clinic Approach
Edward C. Benzel
4:00 – 4:30 PM
Patient Satisfaction: What Really Drives Patient Perception
Michael P. Steinmetz

4:30 – 5:00 PM
Transition to Hospital Employment: A Surgeon’s Perspective
Dean G. Karahalios

5:00 – 5:30 PM
Hospital Accounting 101: What You Must Know to Negotiate with Hospitals
Joseph S. Cheng

1:30 – 5:30 PM Grand Canyon Ballroom Salon 10
Special Course II – Cases and Complications with the Masters
$200 includes lunch

Course Directors: Richard G. Fessler, Regis W. Haid, Jr.
Faculty: Charles Branch, Jr., Michael G. Fehlings, Robert F. Heary, Charles Kuntz, IV, Christopher I. Shaffrey, Volker K. H. Sonntag, Juan S. Uribe

1:30 – 1:35 PM
Welcome
Richard G. Fessler, Regis W. Haid, Jr.

1:35 – 2:00 PM
Optimal Treatment of Cervical Myelopathy
Michael G. Fehlings

2:00 – 2:30 PM
Lessons Learned the Hard Way: Pearls and Pitfalls
Volker K.H. Sonntag

2:30 – 2:35 PM
Questions and Discussion

2:35 – 2:40 PM
Patient and Technique Selection for Lumbar Fusion
Robert F. Heary

2:40 – 2:50 PM
Pearls of the Lateral Retroperitoneal Lateral Approach
Juan S. Uribe

2:50 – 3:00 PM
Questions and Answers

3:00 – 3:25 PM
Spino–Pelvic Balance: Why it Matters
Charles Kuntz, IV

3:25 – 3:35 PM
Questions and Answers
MEETING AGENDA

WEDNESDAY, MARCH 6

3:35 – 3:40 PM
MIS Options in Lumbar Fusion
Charles L. Branch, Jr.

3:40 – 3:50 PM
Questions and Answers

3:50 – 4:20 PM
Lessons Learned in Lumbar Degenerative Disease
Christopher I. Shaffrey

4:20 – 4:30 PM
Questions and Answers

4:30 – 5:30 PM
Case Presentations
Course Directors and Faculty

1:30 – 5:30 PM  Grand Canyon Ballroom Salon 11

Special Course III – Spinal Deformity: What the Surgeon Needs to Know
$200 includes lunch
Course Directors: Praveen V. Mummaneni, Christopher I. Shaffrey
Faculty: Christopher P. Ames, James S. Harrop, Adam S. Kanter, Tyler R. Koski, Charles Kuntz, IV, Frank La Marca

1:30 – 1:45 PM
Sacropelvic Parameters and how they Influence the Treatment of Lumbar Spondylosis
Charles Kuntz, IV

1:45 – 2:00 PM
Cervical Deformity
Frank La Marca

2:00 – 2:15 PM
Questions

2:15 – 2:30 PM
Trauma and Deformity
James S. Harrop

2:30 – 2:45 PM
PSO and SPO – When and How
Praveen V. Mummaneni

2:45 – 3:00 PM
Questions

3:00 – 3:15 PM
When to Extend Fixation to Sacrum and Pelvis
Tyler R. Koski

3:15 – 3:30 PM
MIS Deformity – When and How
Adam S. Kanter
3:30 – 3:45 PM
Questions

3:45 – 4:15 PM
Proximal Junctional Kyphosis Above a Thoracolumbar Construct – Prevention and Management
Christopher P. Ames

4:15 – 5:30 PM
Cases with Complications – Avoidance and Management
Praveen V. Mummaneni, Christopher I. Shaffrey

1:30 – 5:30 PM Desert Conference Suite III & V
Special Course IV – Advanced MIS Techniques/Managing MIS Complications

$200 includes lunch
Course Directors: Langston T. Holly, Michael Y. Wang
Faculty: Richard D. Fessler, II, Kevin T. Foley, Jean Pierre Mobasser, Praveen V. Mummaneni, Michael P. Steinmetz, Juan S. Uribe

1:30 – 1:45 PM
Introduction
Langston T. Holly, Michael Y. Wang

1:45 – 2:20 PM
Tubular Approach to Far Lateral Disc Herniations
Kevin T. Foley

2:20 – 2:55 PM
TLIF Complications
Michael P. Steinmetz

2:55 – 3:30 PM
Advanced Lateral Techniques for Deformity Correction
Juan S. Uribe

3:30 – 3:45 PM
Break

3:45 – 4:15 PM
MIS Fusions to the Sacrum and Pelvis
Praveen V. Mummaneni

4:15 – 4:45 PM
The Integration of Computer Image Guided Surgery and MIS
Jean Pierre Mobasser

4:45 – 5:15 PM
Spine Surgery in High Performance Athletes – The Impact of MIS
Richard D. Fessler, II

5:15 – 5:30 PM
Discussion
1:30 – 5:30 PM Grand Canyon Ballroom Salon 13

**Special Course V – NP/PA Course – Management of Spinal Trauma in the Elderly**

$110 includes lunch

**Course Directors:** Michael P. Steinmetz, Andrea L. Strayer, MSN, CNRN, ACNP

**Faculty:** Nathaniel P. Brooks, Denise Brost, Marc Eichler, David J. Hart, Daniel J. Hoh, Jeffrey R. Holtz, PAC, Ajit A. Krishnany, Shaarad Rajpal, Shelly Schmoller, John H. Shin, Carl W. Stopper, NP, Gregory R. Trost

This continuing nursing education activity was approved by the American Association of Neuroscience Nurses, an accredited provider by the American Nurses Credentialing Center’s COA.

1:30 – 1:45 PM

**Diagnosis of O–C Dislocation, Jefferson Fracture, Hangman’s Fracture and Odontoid Fractures**

*John H. Shin*

1:45 – 2:00PM

**Classification of O–C Dislocation, Jefferson Fracture, Hangman’s Fracture and Odontoid Fractures**

*Daniel J. Hoh*

2:00 – 2:15 PM

**Classification of Subaxial Spine Fractures and T/L Junction Fractures**

*Gregory R. Trost*

2:15 – 2:30 PM

**Treatment of O–C Dislocation, Jefferson Fracture, and Hangman’s Fracture**

*Sharad Rajpal*

2:30 – 2:45 PM

**Treatment of Odontoid Fractures: OP/nonOP**

*Michael P. Steinmetz*

2:45 – 3:00 PM

**Ankylosing Spondylitis**

*Andrea L. Strayer, MSN, CNRN, ACNP*

3:00 – 3:15 PM

**Break**

3:15 – 3:35 PM

**Medical/Pharmacologic Management of Osteoporosis**

*Shelly Schmoller, PAC*

3:35 – 3:55 PM

**Treatment of Thoracolumbar Dislocation, Burst and Compression Fractures**

*Nathaniel P. Brooks*

3:55 – 4:10 PM

**Vertebroplasty and Kyphoplasty**

*Carl W. Stopper, NP*
**Agenda**

**Meeting Agenda**

**Wednesday, March 6**

4:10 – 4:30 PM  
*Minimally Invasive Treatment of T/L Fractures*  
David J. Hart

4:30 – 4:45 PM  
Marc Eichler

4:45 – 5:00 PM  
*Trouble Shooting: Patient Calls after Discharge, When to Worry, including Halo Problem Solving, Change Functional Status, Brace Issues*  
Denise Brost

5:00 – 5:15 PM  
*Opioid Affect on Bowel and Bladder*  
Jeffrey R. Holtz, PAC

5:15 – 5:30 PM  
*Healing Endpoint*  
Ajit Krishnany

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1:30 – 5:30 PM Desert Conference Suite VII  
**Special Course VI – AOSpine: Aging Spine**

$200 includes lunch  
**Course Directors:** Roger Hartl, Darrel S. Brodke  
**Faculty:** Jens R. Chapman, Joseph S. Cheng, Theodore J. Choma, Richard A. Deyo, Michael G. Fehlings, Alpesh Patel, Christopher I. Shaffrey

1:30 – 1:35 PM  
*Introduction*  
Darrel S. Brodke, Roger Hartl

1:35 – 1:45 PM  
*What is AOSpine*  
Jens R. Chapman

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**Geriatric Cervical Spine**

1:45 – 1:50 PM  
*Case Presentation*  
Roger Hartl

1:50 – 2:05 PM  
*Decision-Making: Surgical vs. Non-Operative Management of Odontoid Fractures*  
Joseph S. Cheng

2:05 – 2:20 PM  
*The AOSpine Multicenter GOF Study*  
Alpesh A. Patel
2:20 – 2:35 PM  
**Cervical Myelopathy: Clinical Trials and Evidence–based Management**  
Michal G. Fehlings

2:35 – 2:50 PM  
**Case Resolution/Questions/Discussion**

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**THE OSTEOPOROTIC SPINE**

2:50 – 2:55 PM  
**Case Presentation**  
Darrel S. Brodke

2:55 – 3:10 PM  
**Biomechanics of Fixation in the Osteoporotic Spine**  
Theodore J. Choma

3:10 – 3:25 PM  
**Management of Complications in the Osteoporotic Spine**  
Jens R. Chapman

3:25 – 3:40 PM  
**Case Resolution/Questions/Discussion**

3:40 – 3:50 PM  
**Break**

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**THORACOLUMBAR DEGENERATION/DEFORMITY**

3:50 – 4:05 PM  
**Management of Thoracolumbar Deformity in the Elderly**  
Darrel S. Brodke

4:05 – 4:20 PM  
**Minimally Invasive Approaches in the Aging Spine: Pros and Cons**  
Roger Hartl

4:20 – 4:35 PM  
**Questions/Discussion**

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**SURGERY TRENDS AND HEALTH CARE COSTS IN THE ELDERLY: A DEBATE**

4:35 – 4:55 PM  
**Increasing Complexity of Surgeries in the Elderly: Are We Operating Too Much?**  
Richard A. Deyo

4:55 – 5:15 PM  
**Response: The Role of Surgery in Elderly Patients**  
Christopher I. Shaffrey

5:15 – 5:30 PM  
**Questions/Discussion**
MEETING AGENDA

WEDNESDAY, MARCH 6

6:30 – 8:00 PM
OPENING RECEPTION
Sage Court

Take in spectacular views of the mountains and watch the sunset while enjoying a lavish array of food and beverages as you network with old friends and new colleagues at the Opening Reception. Please note this event is held outdoors. Resort casual attire is recommended.

THURSDAY, MARCH 7

6:55 – 7:00 AM  Grand Saguaro Ballroom North
Introductory Remarks/Announcements
John J. Knightly

7:00 – 7:05 AM  Grand Saguaro Ballroom North
Meritorious Member Award
Allan D. Levi, Herbert S. Bell

7:05 – 8:20 AM  Grand Saguaro Ballroom North
Scientific Session I: Patient Advocacy
Moderators: John J. Knightly, Marjorie C. Wang, Matthew McGirt

7:05 – 7:15 AM
Spinal Surgery: The Good, The Bad & The Ugly
Nicholas Theodore

7:15 – 7:25 AM
Practicing Spine Surgery in a Socialized System – Irish/European Experience
David O’Brien

7:25 – 7:35 AM
How Will Increasing the Emphasis on Health-Related Quality of Life Measures and Economics Impact the Future of Spine Surgery?
Steven D. Glassman
7:35 – 7:45 AM
Government and Payers Perspective
Carl DeVore

7:45 – 7:55 AM
Spine Surgeons Advocating for Spine Surgeons
Daniel K. Resnick

7:55 – 8:05 AM
Organized Neurosurgery’s Role in Advocacy for Spine Surgery
John Allen Wilson

8:05 – 8:15 AM
Bundled Payment Plans: Potential Impact on Access to Care?
Zoher Ghogawala

8:15 – 8:20 AM
Roundtable Discussion: Who Are the True Guardians of Our Patients?

8:20 – 9:00 AM Grand Saguaro Ballroom North
Oral Platform Presentations I – Socioeconomic

Moderators: John J. Knightly, Marjorie C. Wang, Matthew McGirt
Discussants: John K. Ratliff, Christopher I. Shaffrey, Gregory R. Trost

8:20 – 8:32 AM
OUTCOMES COMMITTEE AWARD
100. Determining The Quality and Effectiveness of Spine Surgery: Patient Satisfaction is Not a Valid Proxy Topic
Saniya S. Godil

8:32 – 8:44 AM
101. The National Neurosurgery Quality and Outcomes Database (N2QOD) Pilot: Patient–centered Measurement of Quality and Effectiveness of Care
Matthew McGirt

8:44 – 8:56 AM
102. Spine Surgery Referrals Redirected through a Multidisciplinary Care Pathway: Appropriateness of Non–surgeon Triage and Effects on Imaging Utilization
Daryl R. Fourney

8:56 – 9:00 AM
Discussion

9:00 – 9:02 AM
Larson Memorial: In Memorium
Christopher E. Wolfia

9:02 – 9:05 AM
Introduction of Section Chairman
Michael Y. Wang
Thursday, March 7

9:05 – 9:20 AM
Presidential Address
Joseph S. Cheng

9:20 – 9:30 AM
Introduction of Meritorious Service Award Recipient
Joseph T. Alexander

9:30 – 9:45 AM
Meritorious Service Award Recipient
Charles L. Branch, Jr.

9:45 – 10:30 AM
Beverage Break with Exhibitors

What’s New Session I
Moderator: Francis Farhadi

10:30 AM – 12:30 PM
Grand Saguaro Ballroom North
Scientific Session II:
CSRS Co–Sponsored Session
Moderators: Michael G. Fehlings, James S. Harrop, Cheerag D. Upadhyaya

10:30 – 10:40 AM
Epidemiology of SCI
Maxwell Boakye

10:40 – 10:50 AM
Update on Pharmacology Interventions in SCI
Michael G. Fehlings

10:50 – 11:00 AM
Timing of Surgery in SCI
James S. Harrop

11:00 – 11:10 AM
Cell-Based Approaches to SCI
Allen D. Levi

11:10 – 11:20 AM
C5 Radiculopathy
Allan J. Belzberg

11:20 – 11:50 AM
David Cahill Memorial Controversies I:
What to do After Removing a Dumb–bell NST in the Cervical Spine: Fuse/No Fuse?
Agenda

Thursday, March 7

11:20 – 11:35 AM
No Fusion Necessary
Volker K.H. Sonntag

11:35 – 11:50 AM
Fuse
Ziya L. Gokaslan

11:50 AM – 12:30 PM
Oral Platform Presentations II

Moderators: Michael G. Fehlings, James S. Harrop, Cheerag D. Upadhyaya
Discussants: Edward C. Benzel, Curtis A. Dickman, Regis W. Haid

11:50 AM – 12:02 PM
103. Comparative Effectiveness, Cost Utility and Cost Benefit Analysis of Intra-Operative Neuromonitoring in Cervical Spine Surgery: Where is the Value?
Scott L. Zuckerman

12:02 – 12:14 PM
104. Incidence and Clinical Outcomes of Patients Requiring Repeat ACDF Surgery Due to Adjacent Level Disease
Mohamad Bydon

12:14 – 12:26 PM
105. Lateral Mass Screw Fixation in the Cervical Spine: A Systematic Review
Jeffrey D. Coe

12:26 – 12:30 PM
Discussion

12:30 – 1:25 PM
Grand Canyon Ballroom
LUNCH WITH THE EXHIBITORS

What’s New Session II
Moderator: Daniel J. Hoh

1:25 – 1:30 PM
Grand Saguaro Ballroom North
Meeting Announcements
John J. Knightly

1:30 – 3:30 PM
Grand Saguaro Ballroom North
Scientific Session III:
AOSpine Co-Sponsored Session

Moderators: Jens R. Chapman, Paul M. Arnold, Srinivas K. Prasad

1:30 – 1:32 PM
What is AOSpine
Jens R. Chapman
Agenda

Meeting Agenda

Thursday, March 7

1:32 – 1:44 PM
Risk Factors and Natural History of ASD
Darrel S. Brodke

1:44 – 1:56 PM
Indications for Treatment of ASD
Justin Smith

1:56 – 2:08 PM
Treatment of ASD in the Lumbar Spine
Dean Chou

2:08 – 2:20 PM
Treatment of ASD in the Cervical Spine
Daryl R. Fourney

2:20 – 2:23 PM
Discussion

2:23 – 2:50 PM
DAVID CAHILL MEMORIAL CONTROVERSIES II: Treatment Options for Symptomatic Lumbar Recurrent Disc Herniation

2:23 – 2:32 PM
Stimulator
Richard B. North

2:32 – 2:41 PM
Fusion
Michael W. Groff

2:41 – 2:50 PM
Discectomy
Christopher E. Wolfla

2:50 – 3:30 PM
Grand Saguaro Ballroom North
Oral Platform Presentations III

Moderators: Jens R. Chapman, Paul M. Arnold, Srinivas K. Prasad

2:50 – 3:02 PM
MAYFIELD CLINICAL SCIENCE AWARD
106. Comprehensive Medical Management of Lumbar Disc Herniation, Stenosis and Spondylolisthesis is Not Effective in Real–World Care: A Value Analysis of Cost, Pain, Disability, and Quality of Life
Scott L. Parker

3:02 – 3:14 PM
Saniya S. Godil
3:14 – 3:26 PM
108. Single Institution Clinical Outcomes Indicating Patients with Posterior Lumbar Fusion with an Interbody Device have Better Outcomes than Without an Interbody Device
Kate Cronk

3:26 – 3:30 PM
Discussion

3:30 – 4:15 PM Grand Canyon Ballroom

BEVERAGE BREAK

What’s New Session III
Moderator: Daniel M. Sciubba

4:15 – 5:30 PM Grand Saguaro Ballroom North

Scientific Session IV – Oral Poster Presentations I (Concurrent Session)
Moderators: Luis Tumialan, Michael Y. Wang

4:15 – 4:20 PM
200. Motor Axon Misdirection and Behavioral Deficit in Rat Sciatic Neuroma in Continuity Injuries
Jacob D. Alant

4:20 – 4:25 PM
201. Dual Regeneration of Muscle and Nerve by Intravenous Administration of Human Amniotic Fluid-derived Mesenchymal Stem Cells Regulated by Stromal Cell–derived Factor–1 in a Sciatic Nerve Injury Model
Dar-Yu David Yang

4:25 – 4:30 PM
Robert G. Louis

4:30 – 4:35 PM
203. The Diagnostic Assessment of Hand Elevation Test in Carpal Tunnel Syndrome
Insoo Kim

4:35 – 4:40 PM
Discussion

4:40 – 4:45 PM
204. Nerve Isografts in Inbred Lewis Rats Have Minimal Rejection and Support Axonal Regeneration
Amgad S. Hanna

4:45 – 4:50 PM
WITHDRAWN
4:50 – 4:55 PM
206. Accurately Measuring Outcomes after Surgery for Adult Chiari I Malformation: Determining the Most Valid and Responsive Instruments
Saniya S. Godil

4:55 – 5:00 PM
207. The Biomechanics of a Unilateral Approach to Minimally Invasive Lumbar Decompression – A Cadaver Study
Zachary A. Smith

5:00 – 5:05 PM
Discussion

5:05 – 5:10 PM
208. The Impact of Obesity on Patient–Reported Outcome Measures after Degenerative Cervical Spine Disease Surgery
Brenda Machado Auffinger

5:10 – 5:15 PM
209. Extent of Pre–operative Depression is Associated with Return to Work after Lumbar Fusion for Spondylolisthesis
Stephen Mendenhall

5:15 – 5:20 PM
210. Laminoplasty vs. Laminectomy and Fusion to Treat Cervical Spondylotic Myelopathy: Outcomes of the Prospective Multicenter AOSpine International CSM Study
Michael G. Fehlings

5:20 – 5:25 PM
211. WITHDRAWn

5:25 – 5:30 PM
Discussion

4:15 – 5:30 PM Grand Canyon Ballroom Salon 9 & 10
Scientific Session IV – Oral Poster Presentations II (Concurrent Session)
Moderators: Sanjay S. Dhall, Michael W. Groff

4:15 – 4:20 PM
Cyrus Chi–Ho Wong

4:20 – 4:25 PM
213. Use of a Prospective Web–based Registry to Determine the Relative Value of Surgical and Medical Treatments of Degenerative Spine Disorders: Proving the Real–world Value of Surgical Care
Scott L. Parker
4:25 – 4:30 PM

214. Pharmacokinetics and Safety of Intrasite Vancomycin
Terrence F. Holekamp

4:30 – 4:35 PM

Charlotte Cosgrove

4:35 – 4:40 PM

Discussion

4:40 – 4:45 PM

216. Smoking Associated With Increased Health–Care Costs and Worse Outcomes in Spine Surgery
Christian Bowers

4:45 – 4:50 PM

217. Rate of Anterior Cervical Discectomy and Fusion Following Initial Posterior Cervical Foraminotomy
Timothy Y. Wang

4:50 – 4:55 PM

218. The Significance of Sagittal Alignment on Outcomes Following 3–Level Anterior Cervical Discectomy and Fusion
Michael Mumert

4:55 – 5:00 PM

MAYFIELD BASIC SCIENCE AWARD
219. Tissue–engineered Intervertebral Discs: Long Term Outcome in the Rodent Spine
Peter Grunert

5:00 – 5:05 PM

Discussion

5:05 – 5:10 PM

220. Tonsillar Ectopia is Not an Indicator of Symptom Severity in Chiari
Michael J. Rosner

5:10 – 5:15 PM

221. Prevalence of Osteoporosis and Necessity of Measurement of Bone Mineral Density in Patients Requiring Spine Surgery
Insoo Kim

5:15 – 5:20 PM

222. Intraoperative Radiographic Localization is Superior to Pre-incisional X-ray for Lumbar Microdiscectomy
Brandon George Rocque
MEETING AGENDA

THURSDAY, MARCH 7

5:20 – 5:25 PM

223. A Clinical Prediction Rule to Determine Outcomes in Patients with Cervical Spondylotic Myelopathy Undergoing Surgical Treatment: Data from the Prospective, Multicentre AOspine North America CSM Study
Michael G. Fehlings

5:25 – 5:30 PM
Discussion

5:30 – 6:30 PM

Grand Canyon Ballroom

RECEPTION WITH EXHIBITORS

Join us for this special event in the exhibit hall! Interact with colleagues and corporate contacts while enjoying pre-dinner cocktails and hors d’oeuvres. Business casual attire is recommended.

FRIDAY, MARCH 8

7:00 – 9:15 AM

Grand Saguaro Ballroom North

Scientific Session V: Specialty Breakout Sessions – Deformity, Trauma and Tumor

Deformity Breakout Co-Sponsored with SRS

Moderators: Steven D. Glassman, Robert F. Heary, Justin S. Smith

7:00 – 7:10 AM
Lumbar Scoliosis
Steven D. Glassman

7:10 – 7:20 AM
Minimally Invasive Approaches to Adult Spinal Deformity
Praveen V. Mummaneni

7:20 – 7:30 AM
How Does the Increasing Sophistication of Radiographic Assessments Impact the Management of Adult Spinal Deformity?
John R. Dimar

7:30 – 7:40 AM
Common Problems in Adult Spinal Deformity Surgery: Incidence and Management Approaches
Christopher I. Shaffrey

7:40 – 7:50 AM
Roundtable Session
7:50 – 8:30 AM Grand Saguaro Ballroom North

**Oral Platform Presentations IV – Deformity**
(Concurrent Session)

**Moderators:** Steven D. Glassman, Robert F. Heary, Justin S. Smith

**Discussants:** Langston T. Holly, Paul M. Arnold, Charles Kuntz, IV

7:50 – 8:02 AM

109. Does Recombinant Human Bone Morphogenetic Protein–2 (BMP) Use in Adult Spinal Deformity (ASD) Increase Complications and Are Complications Dose Related? A Prospective, Multicenter Study of 257 Consecutive Patients

*Shay Bess*

8:02 – 8:14 AM

110. Results of the AANS Membership Survey on Adult Spinal Deformity Knowledge Base: Impact of Training, Practice Experience and Assessment of Potential Areas for Improved Education

*Christopher P. Ames*

8:14 – 8:26 AM

111. The Schwab–SRS Adult Spinal Deformity Classification: Assessment and Clinical Correlations Based On A Prospective Operative and Non–Operative Cohort

*Virginie Lafage*

8:26 – 8:30 AM

Discussion

8:30 – 9:15 AM Grand Saguaro Ballroom North

**Oral Poster Presentations III – Deformity**
(Concurrent Session)

**Moderators:** Steven D. Glassman, Robert F. Heary, Justin S. Smith

8:30 – 8:35 AM

224. Outcomes Following Three Column Spinal Osteotomies: Impact of HRQOL and Age on Two Year Follow–up

*Christopher P. Ames*

8:35 – 8:40 AM

225. Reoperation Rates and Impact on Outcome in a Large Prospective Multicenter Adult Spinal Deformity Database

*Justin S. Smith*

8:40 – 8:45 AM

226. Likelihood of Reaching Minimal Clinically Important Difference (MCID) in Health Related Quality of Life (HRQOL) Measures: Prospective Analysis of Operative and Non–operative Treatment of Adult Spinal Deformity (ASD)

*Virginie Lafage*
8:45 – 8:50 AM
227. Change in Classification Grade by the Schwab–SRS Adult Spinal Deformity (ASD) Classification Predicts Impact on Health Related Quality of Life (HRQOL) Measures: Prospective Analysis of Operative and Nonoperative Treatment
Justin S. Smith

8:50 – 8:55 AM
Discussion

8:55 – 9:00 AM
228. The Posterior Pedicle Screw Construct: 5 Year Results for Thoracolumbar and Lumbar Curves
James T. Bennett

9:00 – 9:05 AM
229. Health Impact Comparison of Different Disease States and Population Norms to Adult Spinal Deformity (ASD): A Call for Medical Attention
Kai–Ming G. Fu

9:05 – 9:10 AM
Justin S. Smith

9:10 – 9:15 AM
Discussion

7:00 – 9:15 AM Wildflower Ballroom A
Trauma Breakout
Moderators: Marcel Dvorak, David O. Okonkwo, Sanjay S. Dhall

7:00 – 7:10 AM
Management of Dislocated Cervical Facet in the Neurologically Intact and Impaired Patient
Marcel Dvorak

7:10 – 7:20 AM
Minimally Invasive Anterior Column Reconstruction for Trauma
Juan S. Uribe

7:20 – 7:30 AM
Autologous Schwann Cell Transplantation for Spinal Cord Injury
Allan D. Levi

7:30 – 7:40 AM
Return to Play after Neuropraxia
Andrew T. Dailey

7:40 – 7:50 AM
Roundtable Discussion
Friday, March 8

7:50 – 8:30 AM  Wildflower Ballroom A

**Oral Platform Presentations V – Trauma** (Concurrent Session)

*Moderators:* Marcel Dvorak, David O. Okonkwo, Sanjay S. Dhall  
*Discussants:* Daniel C. Lu, Meic H. Schmidt, Michael K. Rosner  

7:50 – 8:02 AM

**112. Diffusion Tensor Imaging Detects Morphological Changes in the Spinal Cord after Stem Cell Transplantation**  
Shekar N. Kurpad

8:02 – 8:14 AM

**113. Improved Correlation of Motor or Sensory Deficits with Diffusion Tensor Imaging Study of the Spinal Cord in Patients with Unilateral Deficits**  
Eve C. Tsai

8:14 – 8:26 AM

**114. Responsiveness and Sensitivity of a Clinical Impairment Measure Specific for Traumatic Tetraplegia: An International Multi–Centre Assessment of the GRASSP Version 1.0**  
Sukhvinder Kalsi–Ryan

8:26 – 8:30 AM  
Questions

8:30 – 9:15 AM  Wildflower Ballroom A

**Oral Poster Presentations IV – Trauma** (Concurrent Session)

*Moderators:* Marcel Dvorak, David O. Okonkwo, Sanjay S. Dhall

8:30 – 8:35 AM

**231. Diffusion Tensor Imaging Offers Correlation with Severity of Experimental Models of Spinal Cord Injury**  
Nikolay L. Martirosyan

8:35 – 8:40 AM

**232. Return to Play after Spine Trauma: A Review of the Current Guidelines**  
Jeffrey Michael Rice

8:40 – 8:45 AM

**233. Cervical Pedicle Fractures: Surgical vs. Conservative Treatment**  
Basem I. Awad

8:45 – 8:50 AM

**234. Comparative Effectiveness of Anterior versus Posterior Approach for Treatment of Thoracolumbar Burst Fractures Without Neurological Deficit**  
Stephen Mendenhall
8:50 – 8:55 AM
Discussion

8:55 – 9:00 AM
235. Initiation of a Pre–Operative “Spine Camp” Significantly Decreases Hospital Length of Stay following Elective Spine Surgery
Ryan M. Kretzer

9:00 – 9:05 AM
236. Distraction, Compression and Extension Reduction of Basilar Invagination and Atlanto–Axial Dislocation: A Novel Technique
Sarat P. Chandra

9:05 – 9:10 AM
237. Timing of Tracheostomy after Anterior Cervical Discectomy and Fusion
Jacob H. Bagley

7:00 – 9:15 AM Wildflower Ballroom B

**Tumor Breakout**

**Moderators:** Charles Fisher, Daryl R. Fourney, Daniel M. Sciubba

7:00 – 7:10 AM
Primary Tumor Management
Charles Fisher

7:10 – 7:20 AM
SINS
Daryl R. Fourney

7:20 – 7:30 AM
MISS Applications
Mike W. Chou

7:30 – 7:40 AM
Metastatic Disease
Daniel M. Sciubba

7:40 – 7:50 AM
Roundtable Discussion
Daniel C. Lu

7:50 – 8:30 AM Wildflower Ballroom B

**Oral Platform Presentations VI – Tumor**
(Concurrent Session)

**Moderators:** Charles Fisher, Daryl R. Fourney, Daniel M. Sciubba

**Discussants:** Paul C. McCormick, Marjorie C. Wang, Frank La Marca
7:50 – 8:02 AM
115. Adult Intramedullary Spinal Cord Tumors: A 12–year Institutional Experience
Kalil G. Abdullah

8:02 – 8:14 AM
116. Adverse Events in Emergent Oncologic Spine Surgery: A Prospective Analysis
Charles Fisher

8:14 – 8:26 AM
117. Predictors of Survival Following Surgical Management of Breast Cancer Metastatic to the Spine
Derek Ju

8:26 – 8:30 AM
Questions

8:30 – 8:35 AM
241. Survival Following Surgical Resection of Spinal Sarcoma: A Report of Twenty–five Consecutive Cases
Mari L. Groves

8:35 – 8:40 AM
239. Improving Quality: Establishing Standard Performance Measures for Adult Patients with Spinal Column Tumors
Daniel J. Hoh

8:40 – 8:45 AM
240. Influence of Preoperative Chemo– and Hormonal Therapy and/or Spinal Radio Therapy on Postoperative Complications in Patients with Prostate Cancer Metastases to the Spine
Steven Spitz

8:45 – 8:50 AM
238. Targeting Brachyury Using A Lipid–based Nanoparticle Delivery System for shRNA Inhibits Chordoma Cell Growth In Vitro
Wesley Hsu

8:50 – 8:55 AM
Discussion

8:55 – 9:00 AM
242. Independent Predictors for Local Recurrence Following Surgery for Spinal Metastasis
Darryl Lau

8:30 – 9:15 AM Wildflower Ballroom B
Oral Poster Presentations V – Tumor (Concurrent Session)
Moderators: Charles Fisher, Daryl R. Fourney, Daniel M. Sciubba

8:30 – 8:35 AM
241. Survival Following Surgical Resection of Spinal Sarcoma: A Report of Twenty–five Consecutive Cases
Mari L. Groves

8:35 – 8:40 AM
239. Improving Quality: Establishing Standard Performance Measures for Adult Patients with Spinal Column Tumors
Daniel J. Hoh

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240. Influence of Preoperative Chemo– and Hormonal Therapy and/or Spinal Radio Therapy on Postoperative Complications in Patients with Prostate Cancer Metastases to the Spine
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242. Independent Predictors for Local Recurrence Following Surgery for Spinal Metastasis
Darryl Lau
<table>
<thead>
<tr>
<th>Time</th>
<th>Agenda</th>
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| 9:00 – 9:05 AM | **243. Differential Cost and Rates of Readmission in Surgical Treatment of Primary and Metastatic Spinal Tumors at a Large Tertiary Referral Center**  
Christopher P. Ames |
Jeremy Lee Fogelson |
| 9:10 – 9:15 AM | Discussion                                                             |
| 9:15 – 10:00 AM | Grand Canyon Ballroom                                               |
|               | **BEVERAGE BREAK**                                                    |
| 10:00 AM – 12:00 PM | Grand Saguaro Ballroom North                                        |
|               | **Scientific Session VI: Top Papers and Socioeconomic Session**       |
|               | **Moderators:** Charles L. Branch, Jr., Joseph S. Cheng               |
| 10:00 – 10:15 AM | **MAYFIELD AWARDS**                                                   |
|               | Michael P. Steinmetz                                                  |
| 10:15 – 11:15 AM | **TOP ORAL POSTER BREAKOUTS**                                        |
|               | **Moderators:** Charles L. Branch, Jr., Joseph S. Cheng               |
Scott L. Parker  
Discussant: Praveen Mummaneni |
| 10:27 –10:39 AM | **119. Comparative Effectiveness and Cost–Benefit Analysis of Topical Vancomycin Powder in Posterior Spinal Fusion for Spine Trauma and Degenerative Spine Disease**  
Michael C. Dewan  
Discussant: Michael Y. Wang |
| 10:39 – 10:51 AM | **120. The Effect of Surgery on Health Related Quality of Life and Functional Outcome in Patients with Metastatic Epidural Spinal Cord Compression – the AOSpine North American Prospective Multicenter Study**  
Michael G. Fehlings  
Discussant: Michael W. Groff |
10:51 – 11:03 AM  
**121. Analysis of Lumbar Plexopathies and Nerve Injury after Lateral Retroperitoneal Transpsoas Approach: Diagnostic Standardization and Review**  
Amir Ahmadian  
**Discussant:** Eric L. Zager

11:03 – 11:10 AM  
**Discussion**

11:10 AM – 12:00 PM  
**Socioeconomic: Quality and Advocacy in Spine Surgery and Medicine**  
**Moderators:** Katie O. Orrico, Joseph S. Cheng, Praveen V. Mummaneni

11:10 – 11:13 AM  
**Introduction of Keynote Speaker**  
John J. Knightly

11:13 – 11:35 AM  
**Keynote Address: Over–Utilization and Poor Quality in Spine Surgery and Medicine – Hype or Fantasy?**  
Richard “Buzz” Cooper

11:35 – 11:38 AM  
**Keynote Address Response: American Association of Neurological Surgeons**  
Paul C. McCormick

11:38 – 11:41 AM  
**Keynote Address Response: Congress of Neurological Surgeons**  
Christopher E. Wolfla

11:41 – 11:44 AM  
**Keynote Address Response: Washington Committee**  
Katie O. Orrico

11:44 – 11:49 AM  
**Update on N2QoD**  
Anthony Asher

11:49 AM – 12:00 PM  
**Panel Discussion**

12:00 – 12:25 PM  
**Spine Section Executive Committee Report and Business Meeting**  
Joseph S. Cheng, Praveen V. Mummaneni

12:00 – 12:04 PM  
**Summary of Meeting and Action Item**  – Joseph S. Cheng

12:04 – 12:08 PM  
**Treasurer Report**  – Charles Kuntz, IV

12:08 – 12:12 PM  
**Future Sites Report**  – Iain Kalfas

12:12 – 12:16 PM  
**Guidelines Report**  – John E. O’Toole
28

12:16 – 12:20 PM
Nominating Committee Report, Chair-Elect Votes –
Christopher E. Wolfla

12:20 – 12:25
Passing of Ribbon and Adjourn – Joseph S. Cheng

12:25 – 1:25 PM  Grand Canyon Ballroom

**LUNCH WITH EXHIBITORS**

*What’s New Session V*

**Moderator:** Michael Y. Wang

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12:30 – 2:30 PM  Grand Canyon Ballroom Salon 9

**Luncheon Symposium I – Revision Spine Surgery**

$200 includes lunch

**Course Directors:** Michael W. Groff, Iain H. Kalfas

**Faculty:** Francis Farhadi, Robert F. Heary, Gregory R. Trost

12:30 – 12:54 PM  
**Revision Surgery for Thoracolumbar Instrumentation Failure**

Gregory R. Trost

12:54 – 1:18 PM  
**Revision Surgery for Latrogenic Cervical Deformity**

Iain Kalfas

1:18 – 1:42 PM  
**Role of MIS in Revision Cases**

Francis Farhadi

1:42 – 2:06 PM  
**Flat Back after Fusion**

Robert F. Heary

2:06 – 2:30 PM  
**Revision Surgery for CSF Leak/Pseudomeningocele**

Michael W. Groff

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12:30 – 2:30 PM  Grand Canyon Ballroom Salon 10

**Luncheon Symposium II – Spine Tumors**

$200 includes lunch

**Course Directors:** Daryl R. Fourney, Laurence D. Rhines

**Faculty:** Ziya L. Gokaslan, Ilya Laufer, Meic H. Schmidt

12:30 – 12:35 PM  
**Welcome and Introductions**

Daryl R. Fourney, Laurence D. Rhines

12:35 – 1:35 PM  
**Case-based Discussion of Spine Tumor Investigation and Management**

Ziya L. Gokaslan, Ilya Laufer, Meic H. Schmidt
1:35 – 1:50 PM
Minimally Invasive Options Including Vertebral Augmentation
Meic H. Schmidt

1:50 – 2:10 PM
Evolving Role of Radiosurgery for Metastatic and Primary Tumors
Ilya Laufer

2:10 – 2:30 PM
Primary Tumors: En Bloc Surgery Feasibility, Justification?
Ziya L. Gokaslan

12:30 – 2:30 PM  Grand Canyon Ballroom Salon 11
Luncheon Symposium III – Update of Spine Guidelines
$200 includes lunch

Course Directors: Michael G. Kaiser, Daniel K. Resnick
Faculty: Andrew T. Dailey, Sanjay S. Dhall, Zoher Ghogawala, Timothy C. Ryken

12:30 – 12:50 PM
Strengths and Limitations of Guidelines
Zoher Ghogawala

12:50 – 1:10 PM
Fusion for Axial Back Pain
Michael G. Kaiser

1:10 – 1:30 PM
Fusion for Spondylolisthesis
Daniel K. Resnick

1:30 – 1:50 PM
ICU Management of SCI
Sanjay S. Dhall

1:50 – 2:10 PM
Steroids and SCI
Timothy C. Ryken

2:10 – 2:30 PM
Use of Intraoperative Monitoring with Lumbar Surgery
Andrew T. Dailey

12:30 – 2:30 PM  Grand Canyon Ballroom Salon 12
Luncheon Symposium IV – Lateral Retroperitoneal Interbody Fusion: Technique and Outcomes
$200 includes lunch

Course Directors: Adam S. Kanter, Juan S. Uribe
12:30 – 12:50 PM
Introduction: Historical Overview and Surgical Indications
Juan S. Uribe

12:50 – 1:05 PM
Anatomic Considerations of the Retroperitoneal Approach
Allen D. Levi

1:05 – 1:20 PM
Surgical Technique and Clinical Pearls
Luiz Pimenta

1:20 – 1:35 PM
Stand Alone Grafts vs. Supplemental Fixation: When, Why & How
William R. Taylor

1:35 – 1:50 PM
Complication Avoidance of the Lateral Approach
Adam S. Kanter

1:50 – 2:05 PM
Evidence Based Clinical Outcomes Following Lateral Interbody Fusion
John Liu

2:05 – 2:20 PM
Advanced Indications: Corpectomy, Deformity, Tumors, etc.
William Douglas Smith

2:20 – 2:30 PM
Discussion/Questions

12:30 – 2:30 PM Grand Canyon Ballroom Salon 13
Luncheon Symposium V – My Worst Outcome: Complications Avoidance & Management Strategies

$200 includes lunch
Course Directors: Volker K.H. Sonntag, Michael K. Rosner, Scott A. Meyer
Faculty: Domagoj Coric, Christopher J. Neal

12:30 – 1:35 PM
Introduction: Common Complications in Spinal Surgery
Scott A. Meyer, Michael K. Rosner, Volker K. H. Sonntag

1:35 – 1:45 PM
Neurologic Injury
Case Presentation

1:45 – 1:50 PM
Vascular Injury
Case Presentation

1:50 – 2:05 PM
Instrumentation
Case Presentation
2:05 – 2:20 PM
CSF Leaks

2:20 – 2:30 PM
Avoidance and Management Strategies
Case Presentations

1:30 – 5:30 PM Desert Conference Suite IV and VI
Special Course VII – Peripheral Nerve Exposures and Nerve Repair Techniques
(Complimentary to Residents)
$200 includes lunch

Course Directors: Linda Jun–San Yang, Eric L. Zager
Faculty: Allan J. Belzberg, Line Jacques, Michel Kliot, Rajiv Midha, Robert J. Spinner, Gregory R. Trost, Christopher J. Winfree

This course will prepare residents for written board examinations and young neurosurgeons for oral board examinations. This course will be presented in an interactive, round-robin format to facilitate small group teaching of peripheral nerve anatomy and exposures as well as nerve repair techniques.

Nerve Repair Techniques (Direct Repair, Grafting, Nerve Transfers, Conduits)
Robert J. Spinner
Discussion

Median and Ulnar Nerves
Eric L. Zager
Discussion

Radial and Musculocutaneous Nerves
Line Jacques
Discussion

Suprascapular and Axillary Nerves
Michal Kliot
Discussion

Exposures to Nerves in Hip and Thigh (e.g., Sciatic, Femoral, Lateral Femoral Cutaneous)
Gregory R. Trost
Discussion

Exposures to Nerve in Leg (Knee and Below – e.g., Tibial Nerve Peroneal Nerve)
Allan J. Belzberg
Discussion

Supraclavicular Brachial Plexus and Spinal Accessory Nerve
Lynda Jun–San Yang
Discussion
Meeting Agenda

Friday, March 8

Infraclavicular Brachial Plexus
Christopher J. Winfree

Discussion

Common Nerve Transfers
Rajiv Midha

Discussion

6:30 PM Wildflower Terrace

Young Neurosurgeons’ Reception

All residents, fellows and young neurosurgeons are encouraged to attend this special event. RSVP to DePuy Synthes Spine, Booth 307

Saturday, March 9

7:00 – 10:20 AM Grand Saguaro Ballroom North
Scientific Session VII – General Session I and David Cahill Memorial Controversies Sessions
Moderators: Daniel Refai, Srinivas K. Prasad, Cyrus Wong

7:00 – 8:20 AM Grand Saguaro Ballroom North
Oral Poster Presentation VI
Moderators: Daniel Refai, Cyrus Wong

7:00 – 7:05 AM
James T. Bennett

7:05 – 7:10 AM
246. Proximal Junctional Failure (PJF) Classification and Severity Scale: Development and Validation of a Standardized System
Kai-Ming G. Fu

7:10 – 7:15 AM
247. Health Related Quality Of Life Outcomes With Minimally Invasive Transforaminal Lumbar Interbody Fusion Based On Long-Term Analysis Of 318 Consecutive Patients
Mick J. Perez

7:15 – 7:20 AM
248. WITHDRAWN

7:20 – 7:25 AM Discussion
7:25 – 7:30 AM  
249. Minimally Invasive Laminectomy through Tubular Retractors for Lumbar Spinal Stenosis in Patients With and Without Pre-operative Spondylolisthesis: Clinical Outcome and Re-operation Rate  
Marjan Alimi

7:30 – 7:35 AM  
250. Measuring Surgical Outcomes in Subaxial Degenerative Cervical Spine Disease Patients: Minimum Clinically Important Difference as a Tool for Determining Meaningful Clinical Improvement  
Brenda Machado

7:35 – 7:40 AM  
251. Anterior versus Lateral Extra-cavitary Approach for Thoracic Corpectomy: A Retrospective Review of Consecutive Cases  
Matthew Frank Gary

7:40 – 7:45 AM  
252. WITHDRAWN

7:45 – 7:50 AM  
Discussion

7:50 – 7:55 AM  
253. Incidence and Risk Factors for the Development of Post-operative Urinary Retention in Neurosurgery Patients  
Azam Basheer

7:55 – 8:00 AM  
254. Radiologic Outcomes of Static Versus Expandable Titanium Cages After Corpectomy: Analysis of Subsidence  
Darryl Lau

8:00 – 8:05 AM  
255. Radiation Use During Minimally Invasive Lateral Interbody Fusion: How Much and How to Reduce?  
Jacob H. Bagley

8:05 – 8:10 AM  
256. Safety and Efficacy of an Ultrasonic Bone Curette in Reduction of Intraoperative Durotomies: Outcomes in 337 Patients  
Mohamad Bydon

8:10 – 8:20 AM  
Discussion

8:20 – 8:44 AM  
DAVID CAHILL MEMORIAL CONTROVERSIES III: Cervical HNP with Radiculopathy  
Moderators: Adam S. Kanter, Charles A. Sansur

8:20 – 8:28 AM  
ACDF  
Domagoj Coric
8:28 – 8:36 AM  
**Arthroplasty**  
*Praveen Mummaneni*

8:36 – 8:44 AM  
**MISS Decompression**  
*R. Patrick Jacob*

8:44 – 9:08 AM  
**DAVID CAHILL MEMORIAL CONTROVERSIES IV:**  
Inter–Spinous Fusion Devices vs Lami/Fusion with Pedicle Screws for Low Grade Spondylolithesis

8:44 – 8:56 AM  
**Inter–Spinous Devices**  
*Michael P. Steinmetz*

8:56 – 9:08 AM  
**Traditional Lami–Fusion**  
*Gerald E. Rodts, Jr.*

9:08 – 9:32 AM  
**DAVID CAHILL MEMORIAL CONTROVERSIES V:**  
Treatment for Symptomatic Grade I L4–5 Degenerative Spondylolithesis

9:08 – 9:20 AM  
**Posterior Approach**  
*Charles L. Branch, Jr.*

9:20 – 9:32 AM  
**Transpoas**  
*Luiz Pimenta*

9:32 – 9:56 AM  
**DAVID CAHILL MEMORIAL CONTROVERSIES VI:**  
SI Joint Fusion for SI Joint Pain: To Fuse or not to Fuse?

9:32 – 9:44 AM  
**Fuse**  
*William Douglas Smith*

9:44 – 9:56 AM  
**No Fusion**  
*Curtis Dickman*

9:56 – 10:20 AM  
**DAVID CAHILL MEMORIAL CONTROVERSIES VII:**  
Moderate Degenerative Scoliosis Presenting as Primarily Radicular Pain

9:56 – 10:04 AM  
**Correct the Deformity**  
*Christopher I. Shaffrey*

10:04 – 10:12 AM  
**Short Segment Correction**  
*Edward C. Benzel*

10:12 – 10:20 AM  
**MIS Decompression/Short Segment Alone**  
*Richard G. Fessler*
10:20 – 10:45 AM

BEVERAGE BREAK

10:45 AM – 12:30 PM  Grand Saguaro Ballroom North

Scientific Session VIII: General Session II

Moderators: Domagoj Coric, Patrick Hsieh

10:45 – 11:00 AM

Fellowship Awards

John Chi, Adam S. Kanter, Daniel C. Lu

11:00 AM – 12:30 PM  Grand Saguaro Ballroom North

Oral Poster Presentations VII

Moderators: Domagoj Coric, Patrick Hsieh

11:00 – 11:05 AM


Beejal Y. Amin

11:05 – 11:10 AM

258. Accurately Measuring the Quality and Effectiveness of Cervical Spine Surgery in Registry Efforts: Determining the Most Valid and Responsive Instruments

Saniya S. Godil

11:10 – 11:15 AM

259. Improving Quality: Establishing Standard Performance Measures for Patients with Adult Spinal Deformity

Daniel J. Hoh

11:15 – 11:20 AM

260. Economic Value of ACDF – Analysis of a 5 Year Follow-up Cohort from FDA Trials

Praveen V. Mummaneni

11:20 – 11:25 AM

261. Accurately Measuring the Quality and Effectiveness of Lumbar Surgery in Registry Efforts: Determining the Most Valid and Responsive Instruments

Scott L. Parker

11:25 – 11:30 AM

Discussion

11:30 – 11:35 AM

262. Analysis of the Cost-Effectiveness of Surgical Treatment for Adult Spinal Deformity

Christopher P. Ames

11:35 – 11:40 AM

263. A Novel Mouse Model of Cervical Spondyloitic Myelopathy: An Opportunity to Identify New Targets

Spyridon K. Karadimas
36. Incidence of Vitamin D Deficiency in Patients Undergoing Elective Spine Surgery
Vihay Ravindra

265. Intraoperative Monitoring Does NOT Improve Outcomes in Cervical Spine Surgery
Sanjay S. Dhall

266. Outcome Following Unilateral versus Bilateral Instrumentation in Patients Undergoing Minimally Invasive Transforaminal Lumbar Interbody Fusion: A Single Center Randomized Prospective Study
Nader S. Dhdaleh

267. A Review of 295 Cases of Spinal Epidural Abscess: What is Chance that Medical Management Alone will Fail?
Akil Patel

268. Unplanned Return to the Operating Room in Patients with AIS: Are We Doing Better with Pedicle Screws?
James T. Bennett

269. WITHDRAWN

270. Surgical Manifestations of Thoracic Arachnoid Pathology: Case Series of Twenty-Eight Patients and Review of the Literature
Christoph Johannes Griessenauer

271. Predictors of Loss of Kyphotic Deformity Correction and Scoliosis after Anterolateral Vertebrectomy and Spinal Fusion for Thoracolumbar Burst Fractures
Farhan Siddiq

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See Who’s Registered
Explore the Exhibit Hall
And More!
The Exhibit Hall, located in Grand Canyon Ballroom 1–8, features more than 55 companies displaying the latest neurosurgical and orthopedic technology, equipment, products and services.

**EXHIBIT HALL HOURS**

<table>
<thead>
<tr>
<th>Thursday, March 7</th>
<th>9:00 AM – 6:30 PM</th>
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<td>Friday, March 8</td>
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**Advanced Biologics**
800–272–0267
www.advancedbiologics.com

**Aesculap Implant Systems, LLC**
800–258–1946
www.aesculapiimplantsystems.com

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781–849–0109
www.lifeinstruments.com

Lilly USA, LLC  700
317–651–6557
www.lilly.com
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* Indicates a 2013 Annual Meeting Corporate Supporter

Exhibitors as of 2/12/13
Find the latest research, procedures, products and services during the What’s New sessions!

Join these exhibitors in the Demonstration Theater for these exciting 10-minute presentations.

THURSDAY, MARCH 7
9:45 – 10:30 AM

12:30 – 1:25 PM

3:30 – 4:15 PM

FRIDAY, MARCH 8
9:15 – 10:00 AM

12:30 – 1:25 PM
ACCREdITATION
This activity has been planned and implemented in accordance with the Essential Areas and Policies of the Accreditation Council for Continuing Medical Education through the joint sponsorship of the Congress of Neurological Surgeons and the AANS/CNS Section on Disorders of the Spine and Peripheral Nerves. The CNS is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

AMA CREDIT DESIGNATION STATEMENT
US Physicians: The CNS designates this live activity for a maximum of 25.5 AMA PRA Category 1 Credits™. Physicians should only claim credit commensurate with the extent of their participation in the activity.

CME CREDIT
The same number of category 1 credits awarded will be applied toward the Continuing Education Award in Neurosurgery.

* A maximum of 16.5 AMA PRA Category 1 Credits™ may be earned for general sessions only.

Allied Health Professionals: Attendees will receive credits for attendance at the general Scientific Program and for any optional events attended. Each physician assistant/physician extender/nurse/allied health professional should contact his or her 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:

Society/Special Courses

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<th>Day</th>
<th>Credits</th>
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<tr>
<td>Wednesday</td>
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Luncheon Symposia

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Physicians should only claim 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 Credits™ certificate.

Physicians may claim AMA PRA Category 2 Credits™ for viewing scientific posters. Physicians should self-claim credit on their AMA PRA certificate application form. Please visit the AMA web site for details at www.ama-assn.org.
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 e–mail 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 number of credits for the learning activities at the Annual Meeting in which they actively participated. Upon completion of this process your CME certificate will be sent to you via e–mail at the e-mail address you used at registration. The CME tracking system lets you create and print a CME certificate immediately following the Annual Meeting 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 Annual Meeting 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 Annual Meeting 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 of 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, located in Pinnacle Peak 3, will be available:

- **Wednesday**: 8:00 AM – 6:00 PM
- **Thursday**: 6:00 AM – 6:00 PM
- **Friday**: 6:00 AM – 5:00 PM
- **Saturday**: 6:00 AM – 12:30 PM

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

EXHIBIT HALL
Grand Canyon Ballroom 1–8

- **Thursday**: 9:00 AM – 6:30 PM
- **Friday**: 9:00 AM – 2:00 PM

REGISTRATION
North Registration

- **Wednesday**: 11:00 AM – 6:00 PM
- **Thursday**: 6:00 AM – 6:00 PM
- **Friday**: 6:00 AM – 6:00 PM
- **Saturday**: 6:00 AM – 12:30 PM

NO SMOKING POLICY
Smoking is not permitted at any official AANS/CNS Section on Disorders of the Spine and Peripheral Nerves Annual Meeting event. The JW Marriott Desert Ridge is a non–smoking hotel.

DISCLAIMER
The material presented at the 2013 Annual Meeting has been made available by the AANS/CNS 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 AANS/CNS Section of Disorders of the Spine and Peripheral Nerves jointly sponsored by the CNS have FDA clearance for use for specific
purposes or for use only in restricted research settings. The FDA has stated that it is the responsibility of the physician to determine the FDA status of each drug or device he or she wants to use in compliance with applicable laws.

Neither the content (written or oral) of any course, seminar or other presentation in the program, nor the use of a specific product in conjunction therewith, nor the exhibition of any materials by any parties coincident with the program, should be construed as indicating endorsement or approval of the views presented, the products used or the materials exhibited by the AANS/CNS 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 6   6:30 – 8:00 PM
Feast on a lavish array of food and beverages while you take in the spectacular mountain views and connect with colleagues at the 2013 Opening Reception. Resort casual attire is recommended.

RECEPTION WITH EXHIBITORS
Grand Canyon Ballroom Salon 1–8

Thursday, March 7   5:30 – 6:30 PM
Interact with colleagues and corporate contacts while enjoying pre–dinner cocktails and hors d’oeuvres during this exciting networking event in the Exhibit Hall. Business casual attire is recommended.

YOUNG NEUROSURGEONS’ DINNER
Wildflower Terrace

Friday, March 8   6:30 PM
All residents, fellows and young neurosurgeons are welcome. RSVP to DePuy Synthes Spine, Booth #307

PURPOSE OF THE SPINE AND PERIPHERAL NERVES SECTION
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 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. Planners are designated by P and faculty by F.

### Positional Interest Codes

1. **CEO**
2. **Consultant**
3. **Director**
4. **Editorial Board**
5. **Employee**
6. **N/A**
7. **Officer**
8. **Owner**
9. **Royalty**
10. **Other**
11. **Honoraria**

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**Christopher P. Ames, MD**
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**Paul A. Anderson, MD**
Ownership Interest – Expanding Orthopedics (6), Pioneer (6), Spatec (6), Titan Surgical (6); Royalty – Stryker (6); Consulting Agreement – K2M (2), Stryker Spine (2); Other – AOSpine North America (6)

**Anthony L. Asher, MD, FACS**
Consulting Agreement – Baxano Corporation (2), Johnson and Johnson (2)

**Edward C. Benzel, MD**
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**Sigurd Berven, MD**
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**Shay Bess, MD**
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**Randal Betz, MD**
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**Charles L Branch, MD**
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**Keith Bridwell, MD**
Other – NIH funded study research support (6)

**Darrel S. Brodke, MD**
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**Patrick Cahill, MD**
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**Leah Y. Carreon, MD, MSc**
Other – Medtronic (6), Salary – Norton Healthcare (6)

**Jens Chapman, MD**
Other – AOSNA (6), Medtronic (6)

**Mokbel K. Chedid, MD, FACS**
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Theodore J. Choma, MD †
Consulting Agreement – Gentis, Inc (2)

Dean Chou, MD †, F
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Jeffrey D. Coe, MD †
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Domagoj Coric, MD †, F
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Honoraria – AO North America (6)

Mark B. Dekutoski, MD †
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Vedat Deviren, MD †
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Curtis A. Dickman, MD †
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Marcel Dvorak, MD †
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Michael G. Fehlings, MD, PhD, FRSC, FACS †
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Richard G. Fessler, MD †, F
Royalty – Depuy (6), Stryker (6)

Charles Fisher, MD †
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Kevin T. Foley, MD, FACS †
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Daryl R. Fourney, MD, FACS, FRCS(C) †, F
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John France, MD †
Other – Medtronic (6)

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

Steven D. Glassman, MD †
Other – Nuvasive–funds to database (6); Royalty – Medtronic (2)

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

Munish Gupta, MD †
Consulting Agreement – DePuy Spine (2), Osteotech (2); Intellectual Fees – Medtronic (6); Ownership Interest – Acrotech (6), Pfizer (6), Proctor and Gamble (6)

Regis W. Haid, MD †
Consulting Agreement – Globus Medical (2); Other – Nuvasive (6); Other Financial or Material Support – Medtronic Sofamor Danek (10); Royalty – Medtronic (6)

James S. Harrop, MD, FACS †, F
Consulting Agreement – Depuy Spine (2); Other – Axiomed (6)

David J. Hart, MD †
Consulting Agreement – Trans1 (2)

Robert Hart, MD †
Consulting Agreement – Medtronic (6); Other – DePuy Spine (6), OREF (6), Synthes (6)

Roger Hartl, MD †
Consulting Agreement – BrainLab (2), SpineWave (2)

Robert F. Heary, MD †
Royalty – DePuy Spine (6), ZimmerSpine (6)

Richard A. Hostin, MD †
Honoraria – DePuy Spine (6)

Patrick C. Hsieh, MD, MSc P
Consulting Agreement – Medtronic (2)

R. Patrick Jacob, MD †, F
Consulting Agreement – Synthes Spine (2)

Iain H. Kaifas, MD †
Honoraria – Synthes (6)

Adam S. Kanter, MD †
Consulting Agreement – Lanz (6)

Khaled Kebaish, MD †
Consulting Agreement – DePuy Spine (2)

Han Jo Kim, MD †
Consulting Agreement – Medtronic (6)

Eric Klineberg, MD †
Consulting Agreement – Synthes (6); Honoraria – DePuy Spine (6); Other – AO (6), Synthes (6)
Branko Kopjar, MD
Consulting Agreement – Salt Creek Medical (2)

Tyler R. Koski, MD
Consulting Agreement – Medtronic (6); Honoraria – Depuy (11)

Ryan M. Kretzer, MD
Consulting Agreement – Chestnut Medical, Inc. (2); Consulting Agreement – NLT Spine, Inc. (2); Ownership Interest – KG Spine, Inc. (6)

Charles Kuntz, MD
Consulting Agreement – Medtronic (6); Honoraria – Depuy (11)

Brian Kwon, MD, PhD
Consulting Agreement – Medtronic (2)

Virginie Lafage, PhD
Consulting Agreement – Medtronic Sofamor Danek (6)

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

Lawrence Lenke, MD
Other – Axial Biotech (6); Royalty – Medtronic (6)

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

John C. Liu, MD
Consulting Agreement – Medtronic (2)

Baron Lonner, MD
Ownership Interest – Axial Biotech (6), Paradigm Spine (6)

Steven C. Ludwig, MD
Other – Globus Medical (2); Royalty – Depuy Synthes Spine (6)

Ian McCarthy, PhD
Other – Nuvasive (6)

Matthew McGirt, MD
Other – Globus Medical (6)

Firoz Miyanji, MD
Other – DePuy Spine (2)

Praveen V. Mummaneni, MD
Consulting Agreement – Depuy Spine (2); Royalty – 2N LLC (Royalty from DePuy Spine and QMP publishers and Thieme medical publishers) (8)

Gregory Mundis, MD
Consulting Agreement – Nuvasive (6); Other – OREF (6)

Peter Newton, MD
Consulting Agreement – Stryker (2); Ownership Interest – NuVasive (6); Royalty – Thieme (6)

Richard B. North, MD
Other Financial or Material Support – Boston Scientific Corp. (10), St. Jude Medical, Inc. (10)

David O. Okonkwo, MD, PhD
Consulting Agreement – Medtronic (6)

Paul Park, MD
Consulting Agreement – Globus (2)

Alpesh Patel, MD
Consulting Agreement – Amedica (2), GE Healthcare (2), Zimmer (2); Ownership Interest – Cytonics (6); Royalty – Amedica (2)

Mick J. Perez-Cruet, MD, MS
Consulting Agreement – Stryker (2); Ownership Interest – MI4Spine (1), Thompson MIS (3)

Luiz Pimenta, MD
Consulting Agreement – Zyga Tech (2)

Srinivas Prasad, MD
Honoraria – Stryker Spine (6)

Themistocles Protopsaltis, MD
Honoraria – Nemaris (6)

John K. Ratliff, MD
Consulting Agreement – Stryker Spine (2)

Daniel Refai, MD
Consulting Agreement – Aesculap Implant Systems (2); Ownership Interest – Depuy Education (2)

Laurence D. Rhines, MD
Honoraria – Stryker (2)

Gerald E. Rodts, MD
Consulting Agreement – Medtronic (2), Orthofix, Inc. (2); Royalty – Globus Medical (2)

Timothy C. Ryken, MD, MS, FACS
Consulting Agreement – Eisai (2), Merck Inc / Schering-Plough Inc (2)

Amer F. Samdani, MD
Consulting Agreement – SpineGuard (2), Synthes (2)

Charles A. Sansur, MD, MHSc
Consulting Agreement – Medtronic (2)

Rick Sasso, MD
Other – Cerapdics (6)

Meic H. Schmidt, MD
Consulting Agreement – Aesculap (2)
<table>
<thead>
<tr>
<th>Name</th>
<th>Role/Consulting Agreement/Ownership Interest/Royalty</th>
<th>Honoraria</th>
<th>Other/Consulting Agreement/Ownership Interest/Royalty</th>
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<tr>
<td>James M. Schuster, MD</td>
<td>Other – Synthes Spine (6)</td>
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<td>Frank Schwab, MD, PhD</td>
<td>Consulting Agreement – Medtronic (2)</td>
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<tr>
<td>Daniel M. Sciubba, BS, MD</td>
<td>Consulting Agreement – Depuy (2);</td>
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<td>Global (6)</td>
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<td>Christopher I. Shaffrey, MD, FACS</td>
<td>Consulting Agreement – Depuy (2); Honoraria – Nuvasive (6); Other – AOSPINE North America (6); Department of Defense (6), NIH (6); Royalty – Medtronic (6)</td>
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<td>Suken A. Shah, MD</td>
<td>Other – De (2)</td>
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<td>Harry Shufflerbarger, MD</td>
<td>Other – Setting Scoliosis Straight Foundation of Harms Study Group (6)</td>
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<td>Justin S. Smith, MD, PhD</td>
<td>Consulting Agreement – Biomet (2), Medtronic Sofamor Danek (2); Honoraria – DePuy Spine (6), Medtronic Sofamor Danek (6); Other – Medtronic Sofamor Danek (6)</td>
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<td>William D. Smith, MDF</td>
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<td>Volker K. Sonntag, MD</td>
<td>Royalty – Medtronic (6)</td>
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<td>Paul Sponseller, MD</td>
<td>Other – Children’s Specialist FDN (6); Royalty – DePuy Spine (2)</td>
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<td>Michael P. Steinmetz, MD</td>
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<td>John Street, MD</td>
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<td>Nicholas Theodore, MD</td>
<td>Royalty – Synthes Spine (6)</td>
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<td>Vincent C. Traynelis, MD</td>
<td>Consulting Agreement – United HealthCare (2); Royalty – Medtronic (6)</td>
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<td>Gregory R. Trost, MD</td>
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<td>Eve C. Tsai, MD, PhD, FRCSC, CIP</td>
<td>Consulting Agreement – Nuvasive (2), Orthofix (2)</td>
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<tr>
<td>Juan S. Uribe, MD</td>
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<td>Alexander R. Vaccaro, MD</td>
<td>Consulting Agreement – Guidepoint Global (2); Ownership Interest – Advanced Spinal Intellectual Properties (6), Computational Biodynamics (6), Cytonics (6), Electrolux (6), Flow Pharma (6), Globus Medical (6), K2 Medical (6), Neurocure (6), Paradigm Spine (6), R.I.S (6), Small Bone Innovations (6), Spinoology (6), Syndicom (6); Royalty – Aesculap (6), DePuy (6), K-2 Medical (6), Stryker Spine (6)</td>
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<td>Michael Y. Wang, MD, FACS</td>
<td>Consulting Agreement – Depuy Spine (2)</td>
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<tr>
<td>Eric J. Woodard, MD</td>
<td>Honoraria – Depuy Spine (2); Royalty – Stryker Spine (2)</td>
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<td>Sangwook Yoon, MD</td>
<td>Other – Biomet (6), OREF (6); Royalty – Nexgen (6)</td>
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</tbody>
</table>
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 Annual Meeting. Planners are designated by \( p \) and Faculty by \( f \).
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The following companies have provided an educational grant in support of the 2013 Annual Meeting Special Courses:

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