

CONGRESS OF NEUROLOGICAL SURGEONS

# 2012 ANNUAL MEETING

OUR  
FUTURE  
IS NOW!



CONGRESS OF NEUROLOGICAL SURGEONS  
ANNUAL MEETING  
Education and Innovation

CHICAGO, ILLINOIS OCTOBER 6-10, 2012

## SCIENTIFIC PROGRAM



Welcome to our colleagues from the  
Central European Neurosurgical Society (CENS)  
2012 International Partner

2012 CNS ANNUAL MEETING

SCIENTIFIC PROGRAM

## TABLE OF CONTENTS

<b>Welcome Letter</b>	<b>2</b>
<b>Schedule of Events</b>	<b>3</b>
<b>General Scientific Sessions</b>	<b>21</b>
<b>Featured Speakers</b>	<b>31</b>
<b>Original Science Program</b>	<b>36</b>
<b>Exhibitors</b>	<b>78</b>
<b>Product &amp; Service Guide</b>	<b>94</b>
<b>Floor Plans</b>	<b>104</b>
<b>CME Information</b>	<b>115</b>
<b>General Meeting Information</b>	<b>118</b>
<b>Disclosures</b>	<b>122</b>



**CNS** The Congress of Neurological Surgeons exists to enhance health and improve lives worldwide through the advancement of education and scientific exchange.

# W E L C O M E !

On behalf of the Executive Committee, our international partner society, Central European Neurosurgical Society and our Honored Guest, Ralph G. Dacey, Jr., we welcome you to Chicago, Illinois for the 2012 CNS Annual Meeting, Our Future is Now!

Our scientific program offers the expert lectures, case-based courses and sessions and hands-on training opportunities necessary to advance your practice and ultimately improve patient care. Each session offers the latest techniques, skills and information available, providing you with a forum of scientific exchange to keep you ahead in this era of scientific progress.

While here, we encourage you to connect with thousands of your neurosurgical colleagues from across the globe through our dynamic Original Science Program, General Scientific Sessions, and optional courses, as well as our auxiliary program and multiple social events, including the Opening Reception with Jake and Elwood Blues and the Snack Break with CNS Exhibitors featuring Garrett's Popcorn.

We are excited you are here as we explore the most significant breakthroughs over the past year as well as look at what is happening today that will affect our field's future.

Sincerely,



**Christopher E. Wolfla, MD, FAANS**  
CNS President



**Ganesh Rao, MD**  
Annual Meeting  
Chair



**Alan M. Scarrow, MD, JD**  
Scientific Program  
Chair

# SATURDAY, OCTOBER 6

## SCHEDULE OF EVENTS

START END	EVENT	LOCATION
7:00 AM 9:30 AM	<b>CSNS NW Quadrant</b>	<b>Erie</b> Sheraton
7:00 AM 9:30 AM	<b>CSNS/CNS Caucus</b>	<b>Michigan A&amp;B</b> Sheraton
7:00 AM 9:30 AM	<b>CSNS SE Quadrant</b>	<b>Mississippi</b> Sheraton
7:00 AM 9:30 AM	<b>CSNS NE Quadrant</b>	<b>Ohio</b> Sheraton
7:00 AM 9:30 AM	<b>CSNS SW Quadrant</b>	<b>Ontario</b> Sheraton
7:00 AM 9:30 AM	<b>CSNS/AANS Caucus</b>	<b>Superior A&amp;B</b> Sheraton
7:00 AM 5:00 PM	<b>Sergeant-at-Arms</b>	<b>E254</b> McCormick Place Lakeside Center
7:00 AM 5:30 PM	<b>Association of Neurosurgical Physician Assistants 6th Annual CME Meeting</b>	<b>Ballroom V</b> Sheraton
7:00 AM 5:30 PM	<b>Registration</b>	<b>Arie Crown Lobby</b> McCormick Place Lakeside Center
7:00 AM 5:30 PM	<b>Speaker Ready Room</b>	<b>E256</b> McCormick Place Lakeside Center
8:00 AM 5:00 PM	<b>PC01 – Stroke Center Care for Allied Health Professionals</b> COURSE DIRECTORS: <i>Jay U. Howington, Adnan Hussain Siddiqui, Daniel L. Surdell</i> FACULTY: <i>Bernard R. Bendok, Andrew J. Ringer, Erol Veznedaroglu, Henry H. Woo, Adam S. Arthur, Peng Roc Chen, J D. Mocco, Babu Guai Welch, Ricardo A. Hanel, Pascal Jabbour, Rabih G. Tawk, Mandy Binning, Kenneth V. Snyder, Alexander Arash Khalessi, Laura Lewis-Mason</i>	<b>E253A</b> McCormick Place Lakeside Center
8:00 AM 5:00 PM	<b>PC02 – Minimally Invasive Spinal Surgery</b> COURSE DIRECTORS: <i>Richard G. Fessler, John C. Liu</i> FACULTY: <i>Langston T. Holly, Trent Lane Tredway, John E. O’Toole, Alfred T. Ogden, Kurt M. Eichholz, Justin S. Smith, Avelino Parajon</i>	<b>E353C</b> McCormick Place Lakeside Center
8:00 AM 12:00 PM	<b>PC03 – Trauma Update Part I: Traumatic Brain Injury</b> COURSE DIRECTOR: <i>Raj K. Narayan</i> FACULTY: <i>Harold L. ReKate, Shelly D. Timmons, Patricia B. Raksin</i>	<b>E265</b> McCormick Place Lakeside Center
9:00 AM 11:30 AM	<b>CSNS Plenary Session</b>	<b>Chicago Ballroom VI</b> Sheraton
11:30 AM 12:00 PM	<b>ACGME NS Milestone Lunch</b>	<b>E272</b> McCormick Place Lakeside Center
12:15 PM 1:30 PM	<b>CSNS Lunch</b>	<b>Chicago Ballroom X</b> Sheraton

# SATURDAY, OCTOBER 6

## SCHEDULE OF EVENTS

START END	EVENT	LOCATION
1:00 PM 5:00 PM	<b>PC04 – 3-D Anatomy (Supratentorial)</b> COURSE DIRECTOR: <i>Albert L. Rhoton, Jr.</i>	<b>E450B</b> McCormick Place Lakeside Center
1:00 PM 5:00 PM	<b>PC05 – The Essentials of Neurosurgical ICU Management</b> COURSE DIRECTORS: <i>Owen B. Samuels, Alex B. Valadka</i> FACULTY: <i>Peter D. LeRoux, Joshua E. Medow, Adam Webb</i>	<b>E253B</b> McCormick Place Lakeside Center
1:00 PM 5:00 PM	<b>PC06 – Cervical Spondylotic Myelopathy and Radiculopathy: Treatment Approaches and Options</b> COURSE DIRECTOR: <i>Michael G. Kaiser</i> FACULTY: <i>James S. Harrop, Langston T. Holly, John E. O’Toole, Kurt M. Eichholz</i>	<b>E353A</b> McCormick Place Lakeside Center
1:00 PM 5:00 PM	<b>PC07 – Cranial and Spinal Radiosurgery Update</b> COURSE DIRECTOR: <i>Randy L. Jensen</i> FACULTY: <i>William A. Friedman, Andrew E. Sloan, Kelly D. Foote, Jason P. Sheehan, Michael William McDermott, Antonio DeSalles</i>	<b>E353B</b> McCormick Place Lakeside Center
1:00 PM 5:00 PM	<b>PC08 – Using Evidence-Based Medicine to Manage Spinal Disorders</b> COURSE DIRECTORS: <i>Peter D. Angevine, Paul C. McCormick</i> FACULTY: <i>John E. O’Toole, John Chi</i>	<b>E253C</b> McCormick Place Lakeside Center
1:00 PM 5:00 PM	<b>PC09 – Masters of Cranial Neuroendoscopy</b> COURSE DIRECTORS: <i>Alan R. Cohen, James M. Drake</i> FACULTY: <i>David F. Jimenez, Carl B. Heilman, Mark M. Souweidane, John Anthony Jane Jr., Theodore H. Schwartz, John C. Wellons III, Johnathan A. Engh, Andre Grotenhuis, Dan Guillaume</i>	<b>E258</b> McCormick Place Lakeside Center
1:00 PM 5:00 PM	<b>PC10 – Open Aneurysm Surgery: A 3-D Practical Course</b> COURSE DIRECTORS: <i>Michael T. Lawton, Byron Gregory Thompson, Jr.</i> FACULTY: <i>Jacques J. Morcos, Fady T. Charbel, Howard A. Riina, Ali F. Krisht, Michael Tymianski</i>	<b>E271A</b> McCormick Place Lakeside Center
1:00 PM 5:00 PM	<b>PC11 – Trauma Update Part II: Spinal Cord and Spinal Column Injury</b> COURSE DIRECTOR: <i>Michael G. Fehlings</i> FACULTY: <i>Bizhan Aarabi, Richard G. Ellenbogen, Christopher I. Shaffrey, Steven Casha, James S. Harrop</i>	<b>E253D</b> McCormick Place Lakeside Center
1:00 PM 5:00 PM	<b>PC12 – Neurosurgery Board Review</b> COURSE DIRECTOR: <i>Allan D. Levi</i> FACULTY: <i>Thomas J. Leipzig, Allen K. Sills, James S. Harrop, Robert J. Spinner</i>	<b>E262</b> McCormick Place Lakeside Center
1:00 PM 5:00 PM	<b>PC13 – Epilepsy: Patient Selection, Operative Approaches and Complication Avoidance</b> COURSE DIRECTOR: <i>Gordon H. Baltuch</i> FACULTY: <i>David W. Roberts, Robert E. Wharen, Warren W. Boling, Timothy H. Lucas II, Kareem A. Zaghloul</i>	<b>E259</b> McCormick Place Lakeside Center

# SATURDAY, OCTOBER 6 SCHEDULE OF EVENTS

START END	EVENT	LOCATION
1:00 PM 5:00 PM	<b>PC14 - RRC Next Accreditation System, Milestones, and the Neurosurgery Matrix Curriculum</b> COURSE DIRECTOR: <i>Nathan R. Selden</i> FACULTY: <i>H. Hunt Batjer, Alexander Arash Khalessi, Ingrid Philibert, Pamela L. Derstine</i>	<b>E451A</b> McCormick Place Lakeside Center
1:30 PM 3:00 PM	<b>CSNS Executive Committee</b>	<b>Huron</b> Sheraton
3:00 PM 4:00 PM	<b>AANS/CNS Joint Officers Meeting</b>	
3:00 PM 4:00 PM	<b>AANS/CNS Communications and Public Relations Committee</b>	<b>Arkansas</b> Sheraton
3:30 PM 7:00 PM	<b>AANS/CNS Section on Disorders of the Spine and Peripheral Nerves Executive Committee Meeting</b>	<b>Michigan A&amp;B</b> Sheraton
4:30 PM 5:30 PM	<b>Neurosurgery PAC Board Meeting</b>	<b>Missouri</b> Sheraton
5:15 PM 5:45 PM	<b>CNS Congress Quarterly Committee Meeting</b>	<b>Parlor D</b> Sheraton
5:45 PM 6:15 PM	<b>CNS Publications Committee Meeting</b>	<b>Parlor D</b> Sheraton
6:00 PM 8:00 PM	<b>DINI: Treatment of Brain Metastases</b> MODERATOR: <i>Steven N. Kalkanis</i> FACULTY: <i>David W. Andrews, Mark E. Linskey, Timothy C. Ryken</i>	<b>MK Restaurant</b>

For tickets and pricing to all optional courses, go to Registration in Level 2 Lobby of Lakeside Center.

**Stay Connected** with the  
**CNS Annual Meeting Guide!**



Everything you need to stay connected with the 2012 CNS Annual Meeting, right at your fingertips.

Available in the Apple App Store for iPad and iPhone users Android, smartphone and web-users can access online at <http://m.cns.org>

# SUNDAY, OCTOBER 7

## SCHEDULE OF EVENTS

START END	EVENT	LOCATION
7:00 AM 5:30 PM	<b>Sergeant-at-Arms</b>	<b>E254</b> McCormick Place Lakeside Center
7:00 AM 6:00 PM	<b>Speaker Ready Room</b>	<b>E256</b> McCormick Place Lakeside Center
7:00 AM 7:00 PM	<b>Registration</b>	<b>Arie Crown Lobby</b> McCormick Place Lakeside Center
7:30 AM 3:00 PM	<b>ThinkFirst National Injury Prevention Foundation</b>	<b>Erie</b> Sheraton
8:00 AM 10:00 AM	<b>Council of Surgical Spine Societies (COSSS)</b>	<b>Ballroom III</b> Sheraton
8:00 AM 4:00 PM	<b>PC15 – Simulation Based Neurosurgical Training</b> COURSE DIRECTORS: <i>James S. Harrop, Darlene Angela Lobel, Ali R. Rezai</i> FACULTY: <i>Bernard R. Bendok, Andrew J. Ringer, Erol Veznedaroglu, Adnan Hussain Siddiqui, Aaron S. Dumont, Aruna Ganju, J D. Mocco, Pascal Jabbour, Clemens M. Schirmer, James Bradley Elder, Daniel J. Hoh, Peter Campbell, Daniel M. Prevedello, Rohan Chitale, Don Stredney, Thomas Kerwin</i>	<b>E263</b> McCormick Place Lakeside Center
8:00 AM 4:00 PM	<b>PC16 – Brain Tumor Update</b> COURSE DIRECTORS: <i>Andrew T. Parsa, Jason P. Sheehan</i> FACULTY: <i>Johnny B. Delashaw, Charles Teo, Franco DeMonte, Jeffrey N. Bruce, Frederick George Barker, John A. Boockvar, Russell R. Lonser, Philip V. Theodosopoulos, Mark Edwin Shaffrey, Michael Lim, Manish Kumar Aghi, Isaac Yang, Michael Edward Sughrue</i>	<b>E253A</b> McCormick Place Lakeside Center
8:00 AM 11:30 AM	<b>PC17 – 2012 CPT Coding Update</b> COURSE DIRECTORS: <i>Joseph S. Cheng, Mina Foroohar</i> FACULTY: <i>Peter D. Angevine, G. Edward Vates, John K. Ratliff, Luis M. Tumialan, Kim Pollock</i>	<b>E253B</b> McCormick Place Lakeside Center
8:00 AM 11:30 AM	<b>PC18 – Practical Spine Biomechanics for Clinical Practice</b> COURSE DIRECTORS: <i>Edward C. Benzel, Tyler R. Koski</i> FACULTY: <i>Zoher Ghogawala, Langston T. Holly, John H. Shin</i>	<b>E253C</b> McCormick Place Lakeside Center
8:00 AM 11:30 AM	<b>PC19 – Deep Brain Stimulation: Indications and Emerging Applications</b> COURSE DIRECTOR: <i>Robert E. Gross</i> FACULTY: <i>Kathryn L. Holloway, Jaimie M. Henderson, Guy M. McKhann, Brian H. Kopell, Kendall H. Lee</i>	<b>E450A</b> McCormick Place Lakeside Center
8:00 AM 11:30 AM	<b>PC20 – 3-D Anatomy (Infratentorial)</b> COURSE DIRECTOR: <i>Albert L. Rhoton, Jr.</i>	<b>E450B</b> McCormick Place Lakeside Center

# SUNDAY, OCTOBER 7

## SCHEDULE OF EVENTS

START END	EVENT	LOCATION
8:00 AM 11:30 AM	<b>PC21 – Surgical Management of Tumors in Eloquent Regions</b> COURSE DIRECTOR: <i>Linda M. Liau</i> FACULTY: <i>Joseph M. Piepmeier, Mitchel S. Berger, Frederick F. Lang, Alexandra J. Golby, Nader Pouratian, John K. Park</i>	<b>E451B</b> McCormick Place Lakeside Center
8:00 AM 12:00 PM	<b>ASSFN Executive Council Meeting</b>	<b>E259</b> McCormick Place Lakeside Center
8:00 AM 12:00 PM	<b>CNS Oral Board Review</b>	<b>N227B</b> McCormick Place North Building
9:00 AM 11:00 AM	<b>AANS/CNS Section on Pain Executive Committee Meeting</b>	<b>E272D</b> McCormick Place Lakeside Center
9:00 AM 12:00 PM	<b>SNS Neurosurgery Summit Meeting</b>	<b>E260</b> McCormick Place Lakeside Center
10:00 AM 11:00 AM	<b>CNS Fellowships Committee Meeting</b>	<b>E262</b> McCormick Place Lakeside Center
11:00 AM 12:00 PM	<b>CNS Information Technology and Web Editorial Board Committee Meeting</b>	<b>E272C</b> McCormick Place Lakeside Center
11:00 AM 12:30 PM	<b>AANS/CNS Quality Improvement Workgroup</b>	<b>N230A</b> McCormick Place North Building
11:30 AM 1:30 PM	<b>CNS Research Committee Meeting</b>	<b>E272D</b> McCormick Place Lakeside Center
12:00 PM 1:00 PM	<b>CSNS State Society Forum</b>	<b>Superior A&amp;B</b> Sheraton
12:00 PM 2:00 PM	<b>CNS International Division Meeting</b>	<b>E353B</b> McCormick Place Lakeside Center
12:00 PM 2:00 PM	<b>SNS Web Portal Work Group Meeting</b>	<b>E260</b> McCormick Place Lakeside Center
12:00 PM 3:00 PM	<b>CNS SANS Committee Meeting</b>	<b>E353A</b> McCormick Place Lakeside Center
12:30 PM 4:00 PM	<b>PC22 – Should You Retire or Not?</b> COURSE DIRECTORS: <i>James I. Ausman, Ivan S. Ciric, David G. Kline</i> FACULTY: <i>Ronald I. Apfelbaum, Melvin Cheatham, Donald F. Dohn, Joseph C. Maroon, William Hayes, Christopher Dwyer, Carolyn Dohn, Sara Yogev</i>	<b>E261</b> McCormick Place Lakeside Center
12:30 PM 4:00 PM	<b>PC23 – My Worst Spinal Complication: What I Learned</b> COURSE DIRECTOR: <i>Charles Kuntz, IV</i> FACULTY: <i>Regis W. Haid Jr., Christopher I. Shaffrey, Robert Bohinski, Joseph S. Cheng, Michael W. Groff, Laurence D. Rhines, Praveen V. Mummaneni, Michael P. Steinmetz</i>	<b>E271A</b> McCormick Place Lakeside Center



# SUNDAY, OCTOBER 7

## SCHEDULE OF EVENTS

START END	EVENT	LOCATION
12:30 PM 4:00 PM	<b>PC24 - Neurocritical Care and Neurosurgical Emergencies Update</b> COURSE DIRECTOR: <i>Jack Jallo</i> FACULTY: <i>Douglas Laske, Christopher J. Madden, John K. Ratliff, Pascal Jabbour, Matthew Vibbert</i>	<b>E451A</b> McCormick Place Lakeside Center
12:30 PM 4:00 PM	<b>PC25 - Neurosurgical Approaches to the Pain Patient: Patient Selection, Techniques, and Complication Avoidance</b> COURSE DIRECTORS: <i>Julie G. Pilitsis, Joshua M. Rosenow</i> FACULTY: <i>Parag G. Patil, Erika A. Petersen, Andre Machado, Ken Lofland, Jonathan Miller</i>	<b>E253C</b> McCormick Place Lakeside Center
12:30 PM 4:00 PM	<b>PC26 - Innovation and Intellectual Property Development: From Concept to Company</b> COURSE DIRECTORS: <i>Richard G. Fessler, Elad I. Levy, Erol Veznedaroglu</i> FACULTY: <i>John M. Abrahams, Kingsley Chin, Reginald Q. Knight, Stephen R. Ramee, Gwen Watanabe</i>	<b>E253B</b> McCormick Place Lakeside Center
12:30 PM 4:00 PM	<b>PC27 - Cranial Neurosurgery: Complication Avoidance and Management</b> COURSE DIRECTOR: <i>William T. Couldwell</i> FACULTY: <i>Allan H. Friedman, Raj K. Narayan, Mitchel S. Berger, Robert H. Rosenwasser, Jack P. Rock</i>	<b>E253D</b> McCormick Place Lakeside Center
1:00 PM 3:00 PM	<b>CNS Education Committee Meeting</b>	<b>E262</b> McCormick Place Lakeside Center
1:00 PM 3:00 PM	<b>CNS Resident SANS Challenge - Preliminary Rounds</b>	<b>E258</b> McCormick Place Lakeside Center
2:00 PM 3:00 PM	<b>SNS Bootcamp Meeting</b>	<b>E260</b> McCormick Place Lakeside Center
2:00 PM 3:00 PM	<b>AANS/CNS Section on Disorders of the Spine and Peripheral Nerves Rapid Response Committee</b>	<b>N230A</b> McCormick Place North Building
2:00 PM 3:00 PM	<b>AANS/CNS Joint Guidelines Committee</b>	<b>N227A</b> McCormick Place North Building
2:00 PM 6:00 PM	<b>SANS Green Room</b>	<b>E259</b> McCormick Place Lakeside Center
2:30 PM 3:30 PM	<b>World Federation of Neurosurgical Societies: CCII</b>	<b>Parlor A</b> Sheraton
2:30 PM 4:30 PM	<b>SNS - CAST Meeting</b>	<b>Parlor B</b> Sheraton
3:00 PM 4:00 PM	<b>SNS CORE Subcommittee Meeting</b>	<b>E260</b> McCormick Place Lakeside Center
3:00 PM 4:30 PM	<b>Multidisciplinary Oral Presentations I</b> MODERATOR: <i>Brian Lim Hoh</i>	<b>E350</b> McCormick Place Lakeside Center
3:00 PM 6:00 PM	<b>CNS Press Room</b>	<b>E251</b> McCormick Place Lakeside Center
4:00 PM 6:00 PM	<b>AANS/CNS Cerebrovascular Section Executive Committee Meeting</b>	<b>E353A</b> McCormick Place Lakeside Center

# SUNDAY, OCTOBER 7 SCHEDULE OF EVENTS

START END	EVENT	LOCATION
4:30 PM 6:00 PM	<b>General Scientific Session I</b> PRESIDING OFFICER: <i>Russell R. Lonser</i> MODERATORS: <i>Steven N. Kalkanis,</i> <i>Ganesh Rao</i>	<b>Arie Crown Theater</b> McCormick Place Lakeside Center
6:00 PM 8:00 PM	<b>OPENING RECEPTION</b>	<b>Lakeside Ballroom</b> McCormick Place Lakeside Center

6:00 - 8:00 PM

## CNS OPENING RECEPTION



Enjoy an evening in Sweet Home Chicago with Jake and Elwood Blues and your friends and colleagues from the CNS! With a sumptuous variety of food, beverages and entertainment you won't soon forget, the CNS Opening Reception brings the best of the city to the McCormick Place Lakeside Center Ballroom!

Each registered attendee will receive one complimentary ticket.

# MONDAY, OCTOBER 8

## SCHEDULE OF EVENTS

START END	EVENT	LOCATION
6:00 AM 7:00 AM	<b>AANS/CNS Section on Tumors Executive Committee Meeting</b>	<b>Michigan A&amp;B</b> Sheraton
6:00 AM 8:00 AM	<b>ThinkFirst Board of Directors Meeting</b>	<b>Ontario</b> Sheraton
6:30 AM 3:00 PM	<b>Speaker Ready Room</b>	<b>E256</b> McCormick Place Lakeside Center
6:30 AM 4:30 PM	<b>Registration</b>	<b>Arie Crown Lobby</b> McCormick Place Lakeside Center
7:00 AM 11:30 AM	<b>General Scientific Session II</b> PRESIDING OFFICER: <i>Ali R. Rezai</i> MODERATORS: <i>Alan M. Scarrow, Ashwini D. Sharan</i>	<b>Arie Crown Theater</b> McCormick Place Lakeside Center
7:00 AM 5:00 PM	<b>CNS Press Room</b>	<b>E251</b> McCormick Place Lakeside Center
8:00 AM 10:30 AM	<b>CNS Hospitality Suite</b>	<b>Columbus A</b> Sheraton
8:00 AM 3:00 PM	<b>Sergeant-at-Arms</b>	<b>E254</b> McCormick Place Lakeside Center
9:00 AM 10:00 AM	<b>DEMO THEATER AND BEVERAGE BREAK WITH THE EXHIBITORS</b>	<b>Hall D</b> McCormick Place Lakeside Center
9:00 AM 3:30 PM	<b>EXHIBIT HALL OPEN</b>	<b>Hall D</b> McCormick Place Lakeside Center
11:30 AM 12:00 PM	<b>BREAK WITH EXHIBITORS</b>	<b>Hall D</b> McCormick Place Lakeside Center
11:35 AM 12:00 PM	<b>Product &amp; Technology Showcase</b> <i>Presented by Carl Zeiss Meditec, Inc</i> <i>Advanced 3D Technology Brings Don't Miss Operative Moments to Life</i> MODERATOR: <i>Aaron A. Cohen-Gadol</i>	<b>Hall D</b> Demo Theater
12:00 PM 1:30 PM	<b>M01: Honored Guest Luncheon</b> MODERATOR: <i>Odette Harris</i> FACULTY: <i>Ralph G. Dacey, Jr.</i>	<b>E353A</b> McCormick Place Lakeside Center
12:00 PM 1:30 PM	<b>M02: Cervical and Lumbar Arthroplasty: Evolution of Techniques and Management Paradigms</b> MODERATOR: <i>Regis W. Haid, Jr.</i> FACULTY: <i>Peter D. Angevine, Wayne Gluf, Michael K. Rosner</i>	<b>E253A</b> McCormick Place Lakeside Center
12:00 PM 1:30 PM	<b>M03: Incorporating Psychosurgery into Your Neurosurgical Practice</b> MODERATOR: <i>Kathryn L. Holloway</i> FACULTY: <i>Robert E. Gross, Emad N. Eskandar, Kelly D. Foote, Brian H. Kopell</i>	<b>N227A</b> McCormick Place North Building
12:00 PM 1:30 PM	<b>M04: Improving Outcomes in Patients with Vestibular Schwannomas</b> MODERATOR: <i>Douglas Kondziolka</i> FACULTY: <i>William A. Friedman, Stephen J. Haines, Johnny B. Delashaw, Andrew T. Parsa, Martin Sames</i>	<b>E267</b> McCormick Place Lakeside Center

# MONDAY, OCTOBER 8

## SCHEDULE OF EVENTS

START END	EVENT	LOCATION
12:00 PM 1:30 PM	<b>M05: Innovations in the Management of Intracerebral Hemorrhage</b> MODERATOR: <i>Issam A. Awad</i> FACULTY: <i>Neil A. Martin, Mario Zuccarello, E. Sander Connolly, Pavel Haninec, Alan S. Hoffer</i>	<b>N229</b> McCormick Place North Building
12:00 PM 1:30 PM	<b>M06: Managing Long-term Complications of Cervical and Lumbar Spine Surgery</b> MODERATOR: <i>William Charles Welch</i> FACULTY: <i>Robert F. Heary, Praveen V. Mummaneni, Michael G. Kaiser, Gregory R. Trost</i>	<b>N426B</b> McCormick Place North Building
12:00 PM 1:30 PM	<b>M07: Controversies in Craniosynostosis: Endoscopic vs. Open Surgery for Craniosynostosis and Helmet Therapy</b> MODERATOR: <i>David F. Jimenez</i> FACULTY: <i>James T. Goodrich, Todd A. Maugans, Matthew D. Smyth, John A. Jane, Sr.</i>	<b>E259</b> McCormick Place Lakeside Center
12:00 PM 1:30 PM	<b>M08: Guidelines for the Management of Severe Traumatic Brain Injury in Pediatric Patients</b> MODERATORS: <i>Ann-Christine Duhaime</i> FACULTY: <i>Gerald A. Grant, Nathan R. Selden, Ashutosh Singhal</i>	<b>E271A</b> McCormick Place Lakeside Center
12:00 PM 1:30 PM	<b>M09: Peripheral Nerve Board Review</b> MODERATOR: <i>Lynda Jun-San Yang</i> FACULTY: <i>Allen H. Maniker, Rajiv Midha, Allan J. Belzberg, Robert J. Spinner</i>	<b>E450A</b> McCormick Place Lakeside Center
12:00 PM 1:30 PM	<b>M10: Strategies to Reduce Risk in Surgical Management of Tumors in Eloquent Regions</b> MODERATOR: <i>Frederick F. Lang</i> FACULTY: <i>Mitchel S. Berger, Linda M. Liao, Guy M. McKhann III, Miroslav Galanda</i>	<b>E450B</b> McCormick Place Lakeside Center
12:00 PM 1:30 PM	<b>M11: Hemorrhagic and Ischemic Stroke Update for Allied Health Professionals</b> MODERATOR: <i>Erol Veznedaroglu</i> FACULTY: <i>Christopher S. Ogilvy, Adnan Hussain Siddiqui, Brian Lim Hoh, Ricardo A. Hanel</i>	<b>N426A</b> McCormick Place North Building
12:00 PM 1:30 PM	<b>M12: Guidelines for Diagnosis and Treatment of Degenerative Lumbar Spinal Stenosis</b> MODERATOR: <i>Charles L. Branch, Jr.</i> FACULTY: <i>Eric J. Woodard, Joseph S. Cheng, Michael W. Groff, Sanjay S. Dhall</i>	<b>E253C</b> McCormick Place Lakeside Center
12:00 PM 1:30 PM	<b>M13: Surgical Management of Meningiomas</b> MODERATOR: <i>Philip H. Gutin</i> FACULTY: <i>Ossama Al-Mefty, L. Dade Lunsford, Franco DeMonte, Joung H. Lee, Vladimir Benes</i>	<b>E253B</b> McCormick Place Lakeside Center

For tickets and pricing to all optional courses, go to  
Registration in Level 2 Lobby of Lakeside Center.

# MONDAY, OCTOBER 8

## SCHEDULE OF EVENTS

START END	EVENT	LOCATION
12:00 PM 1:30 PM	<b>M14: Normal Pressure Hydrocephalus: Diagnosis, Management and Outcomes</b> MODERATOR: <i>Daniele Rigamonti</i> FACULTY: <i>Harold L. Rekate, Mark G. Luciano, Allan M. Burke, Petra Klinge</i>	<b>E253D</b> McCormick Place Lakeside Center
12:00 PM 1:30 PM	<b>M15: Transitioning to Hospital Based Practice: How to Negotiate a Fair Deal</b> MODERATOR: <i>Alex B. Valadka</i> FACULTY: <i>James I. Ausman, Gary M. Bloomgarden, Troy D. Payner, Edie E. Zusman, Deborah L. Benzil</i>	<b>N226</b> McCormick Place North Building
12:00 PM 1:30 PM	<b>M16: Multidisciplinary Management of Subarachnoid Hemorrhage and Vasospasm</b> MODERATOR: <i>Robert H. Rosenwasser</i> FACULTY: <i>Michael T. Lawton, Charles J. Prestigiacomo, Aaron S. Dumont, Murat Gunel</i>	<b>N227B</b> McCormick Place North Building
12:00 PM 1:30 PM	<b>M17: Management of Complex and Refractory Chiari Malformations and Syringomyelia</b> MODERATOR: <i>Richard G. Ellenbogen</i> FACULTY: <i>Arnold H. Menezes, Douglas L. Brockmeyer, John D. Heiss, Cormac O. Maher</i>	<b>N228</b> McCormick Place North Building
12:00 PM 1:30 PM	<b>M18: Evidence-Based Management of Brain Metastases</b> MODERATOR: <i>Raymond Sawaya</i> FACULTY: <i>David W. Andrews, Randy L. Jensen, Steven N. Kalkanis, Steven A. Toms</i>	<b>N427BC</b> McCormick Place North Building
12:00 PM 1:45 PM	<b>AANS/CNS Section on Neurotrauma and Critical Care Executive Committee</b>	<b>E262</b> McCormick Place Lakeside Center
12:00 PM 2:00 PM	<b>AANS/CNS Section on Disorders of the Spine and Peripheral Nerves Scientific Program Committee Meeting</b>	<b>E353B</b> McCormick Place Lakeside Center
1:30 PM 2:00 PM	<b>BEVERAGE BREAK WITH EXHIBITORS</b>	<b>Hall D</b> McCormick Place Lakeside Center
2:00 PM 3:30 PM	<b>Oral Presentations: Council of State Neurosurgical Societies</b> MODERATORS: <i>J. Adair Prall, Gregory R. Trost</i>	<b>E350</b> McCormick Place Lakeside Center
2:00 PM 3:30 PM	<b>Oral Presentations: Section on Stereotactic and Functional Neurosurgery</b> MODERATORS: <i>Konstantin V. Slavin, Ali R. Rezai</i>	<b>E353C</b> McCormick Place Lakeside Center
2:00 PM 3:30 PM	<b>Oral Presentations: Section on Tumors</b> MODERATORS: <i>Frederick F. Lang, Viviane S. Tabar, Dimitris G. Placantonakis</i>	<b>E351</b> McCormick Place Lakeside Center
2:00 PM 3:30 PM	<b>Oral Presentations: Section on Cerebrovascular Surgery</b> MODERATORS: <i>Nicholas C. Bambakidis, J.D. Mocco</i>	<b>E352</b> McCormick Place Lakeside Center
2:00 PM 3:30 PM	<b>Special Course I: Robotics: The Future of Neurosurgery?</b> MODERATORS: <i>Charles L. Rosen, Michael P. Steinmetz</i> FACULTY: <i>Akio Morita, Thomas Mroz, Cameron N. Riviera, Michael Wolf</i>	<b>E451B</b> McCormick Place Lakeside Center

# MONDAY, OCTOBER 8

## SCHEDULE OF EVENTS

START END	EVENT	LOCATION
2:00 PM 3:30 PM	<b>Consensus Session I: Treatment of Cervical Stenosis and Radiculopathy: Building Consensus From Controversy</b> MODERATOR: <i>John A. Jane, Sr.</i> FACULTY: <i>Anthony J. Caputy, Richard G. Fessler, Robert F. Heary, Beverly C. Walters</i>	<b>E451A</b> McCormick Place Lakeside Center
3:30 PM 4:30 PM	<b>Oral Presentation Award Photos</b>	<b>E251</b> McCormick Place Lakeside Center
3:30 PM 5:00 PM	<b>Neurosurgical Forum</b>	<b>Lakeside Ballroom</b> McCormick Place Lakeside Center
3:30 PM 5:00 PM	<b>3-D Operative Session: The Art of Microsurgery – Lessons Learned</b> MODERATORS: <i>Aaron A. Cohen-Gadol, Aaron S. Dumont</i> FACULTY: <i>Robert F. Spetzler, William T. Couldwell</i>	<b>Arie Crown Theater</b> McCormick Place Lakeside Center
5:00 PM 6:00 PM	<b>AANS/CNS Joint Military Section Meeting</b>	<b>E265</b> McCormick Place Lakeside Center
5:00 PM 6:30 PM	<b>CNS INTERNATIONAL RECEPTION</b>	<b>Chicago Ballroom VI</b> Sheraton
5:00 PM 6:30 PM	<b>Neurosurgery® Editorial Board Reception</b>	<b>Room CC24</b> Hyatt Regency McCormick Place
5:00 PM 7:00 PM	<b>American Association of South Asian Neurosurgeons</b>	<b>Sheraton Ballroom III</b> Sheraton
5:30 PM 7:00 PM	<b>Neurosurgery University of Utah</b>	<b>Ontario</b> Sheraton
5:30 PM 8:00 PM	<b>Jefferson Cocktail Reception</b>	<b>Erie</b> Sheraton
6:00 PM 8:00 PM	<b>Mayfield Clinic 75th Anniversary Reception</b>	<b>Missouri</b> Sheraton
6:00 PM 8:00 PM	<b>Mayo Clinic Alumni Association Reception</b>	<b>Colorado</b> Sheraton
6:30 PM 8:30 PM	<b>USC Neurosurgery Alumni Reception</b>	<b>Arkansas</b> Sheraton
6:30 PM 8:30 PM	<b>DIN2: Harnessing Social Media and the Web to Enhance Your Practice</b> MODERATOR: <i>Chaim B. Colen</i> FACULTY: <i>J. Brad Bellotte, Ann R. Stroink</i>	<b>Sepia</b>
6:30 PM 8:30 PM	<b>DIN3: Incidental Finding – What Next?</b> MODERATOR: <i>Edward R. Smith</i> FACULTY: <i>Sepideh Amin-Hanjani, Frederick George Barker, Paul Klimo Jr., Cormac O. Maher, Charles J. Prestigiacomo</i>	<b>N9NE</b> <b>Steakhouse</b>

# TUESDAY, OCTOBER 9

## SCHEDULE OF EVENTS

START END	EVENT	LOCATION
6:00 AM 7:00 AM	<b>AANS/CNS Drugs and Devices Committee Meeting</b>	<b>Tennessee Sheraton</b>
6:30 AM 3:00 PM	<b>Speaker Ready Room</b>	<b>E256</b> McCormick Place Lakeside Center
6:30 AM 4:30 PM	<b>Registration</b>	<b>Arie Crown Lobby</b> McCormick Place Lakeside Center
7:00 AM 11:30 AM	<b>General Scientific Session III</b> PRESIDING OFFICER: <i>Nathan R. Selden</i> MODERATORS: <i>Richard W. Byrne, Ashok Asthagiri</i>	<b>Arie Crown Theater</b> McCormick Place Lakeside Center
7:00 AM 6:00 PM	<b>CNS Press Room</b>	<b>E251</b> McCormick Place Lakeside Center
8:00 AM 10:30 AM	<b>Spouse Hospitality Suite</b>	<b>Columbus A</b> Sheraton
8:00 AM 3:00 PM	<b>Sergeant-at-Arms</b>	<b>E254</b> McCormick Place Lakeside Center
9:00 AM 10:00 AM	<b>DEMO THEATER AND BEVERAGE BREAK WITH THE EXHIBITORS</b>	<b>Hall D</b> McCormick Place Lakeside Center
9:00 AM 5:00 PM	<b>EXHIBIT HALL OPEN</b>	<b>Hall D</b> McCormick Place Lakeside Center
11:30 AM 12:00 PM	<b>BREAK WITH EXHIBITORS</b>	<b>Hall D</b> McCormick Place Lakeside Center
12:00 PM 1:30 PM	<b>T19: Guidelines for the Surgical Management of Cervical Degenerative Disease</b> MODERATOR: <i>Joseph S. Cheng</i> FACULTY: <i>Daniel K. Resnick, Michael W. Groff, Frank LaMarca, Scott A. Meyer</i>	<b>N226</b> McCormick Place North Building
12:00 PM 1:30 PM	<b>T20: Skull Base Endoscopy: Utility and Limitations</b> MODERATORS: <i>Charles Teo, Paul A. Gardner</i> FACULTY: <i>Fred Gentili, John Anthony Jane Jr., Theodore H. Schwartz, Juan Carlos Fernandez-Miranda, Roman Bosnjak, Radim Lipina</i>	<b>N426C</b> McCormick Place North Building
12:00 PM 1:30 PM	<b>T21: Multimodal Management of Intracranial Arteriovenous Malformations</b> MODERATOR: <i>Bernard R. Bendok</i> FACULTY: <i>Robert F. Spetzler, Douglas Kondziolka, Jacques J. Morcos, Howard A. Riina, Jizong Zhao</i>	<b>E267</b> McCormick Place Lakeside Center
12:00 PM 1:30 PM	<b>T22: The Role of Surgical Ablation, Radiosurgery, and Neuromodulation in the Treatment of Epilepsy</b> MODERATOR: <i>Nicholas M. Barbaro</i> FACULTY: <i>Mojgan Hodaie, Warren W. Boling, Jean M. Regis</i>	<b>N227A</b> McCormick Place North Building
12:00 PM 1:30 PM	<b>T23: The Aging Spine: Considerations in Surgical Management</b> MODERATOR: <i>Christopher P. Ames</i> FACULTY: <i>Daniel Robert Fassett, Dean Chou, Vedat Deviren</i>	<b>N426A</b> McCormick Place North Building

# TUESDAY, OCTOBER 9

## SCHEDULE OF EVENTS

START END	EVENT	LOCATION
12:00 PM 1:30 PM	<b>T24: Guidelines for the Management of Acute Cervical Spine and Spinal Cord Injuries</b> MODERATOR: <i>Michael G. Fehlings</i> FACULTY: <i>Jack Jallo, Daryl R. Fourney, James S. Harrop, Curtis J. Rozzelle</i>	<b>E253A</b> McCormick Place Lakeside Center
12:00 PM 1:30 PM	<b>T25: Pituitary Adenomas: Operative Nuances and Management Considerations</b> MODERATOR: <i>Edward H. Oldfield</i> FACULTY: <i>Edward R. Laws, William T. Couldwell, Sandeep Kunwar, Russell R. Lonser</i>	<b>N426B</b> McCormick Place North Building
12:00 PM 1:30 PM	<b>T26: Advances in the Management of Trigeminal Neuralgia and Facial Pain</b> MODERATOR: <i>Kim J. Burchiel</i> FACULTY: <i>Robert M. Levy, Konstantin V. Slavin, Kendall H. Lee</i>	<b>E253C</b> McCormick Place Lakeside Center
12:00 PM 1:30 PM	<b>T27: Multidisciplinary Management Strategies for Unruptured Aneurysms</b> MODERATOR: <i>Robert A. Solomon</i> FACULTY: <i>Ralph G. Dacey, Jr., Aaron S. Dumont, Robert M. Friedlander, C. Michael Cawley</i>	<b>N230A</b> McCormick Place North Building
12:00 PM 1:30 PM	<b>T28: Anterior and Posterior Fusion Strategies in Pediatric Spine</b> MODERATOR: <i>Dachling Pang</i> FACULTY: <i>Arnold H. Menezes, Douglas L. Brockmeyer, Richard C. E. Anderson, Paul Klimo, Jr.</i>	<b>E253B</b> McCormick Place Lakeside Center
12:00 PM 1:30 PM	<b>T29: Managing Difficult Surgical Scenarios in Spinal Surgery</b> MODERATOR: <i>Edward C. Benzel</i> FACULTY: <i>J. Patrick Johnson, Michael P. Steinmetz, Michele Marie Johnson, Gregory R. Trost</i>	<b>E271A</b> McCormick Place Lakeside Center
12:00 PM 1:30 PM	<b>T30: Implementing an Electronic Medical Record (EMR) and Information Technology (IT) in Your Neurosurgical Practice</b> MODERATOR: <i>Brian T. Ragel</i> FACULTY: <i>Edie E. Zusman, Zoher Ghogawala, John K. Ratliff, Chaim B. Colen</i>	<b>E259</b> McCormick Place Lakeside Center
12:00 PM 1:30 PM	<b>T31: The Case for Open versus Endovascular Management of Cerebral Aneurysms</b> MODERATOR: <i>Christopher S. Ogilvy</i> FACULTY: <i>John Allen Wilson, Cameron G. McDougall, Sepideh Amin-Hanjani, Martin Smrcka</i>	<b>E253D</b> McCormick Place Lakeside Center
12:00 PM 1:30 PM	<b>T32: Guidelines for Neurocritical Care Management for Patients with Severe Traumatic Brain Injury</b> MODERATOR: <i>Shelly D. Timmons</i> FACULTY: <i>Raj K. Narayan, Alex B. Valadka, Odette Harris, Rocco Armonda</i>	<b>N227B</b> McCormick Place North Building
12:00 PM 1:30 PM	<b>T33: Controversies in Management of Low Grade Gliomas</b> MODERATOR: <i>Mitchel S. Berger</i> FACULTY: <i>Frederick F. Lang, John H. Sampson, Susan Chang, Hugues Duffau</i>	<b>N228</b> McCormick Place North Building



# TUESDAY, OCTOBER 9

## SCHEDULE OF EVENTS

START END	EVENT	LOCATION
12:00 PM 1:30 PM	<b>T34: Complication Avoidance and Advanced MIS Applications</b> MODERATOR: <i>Richard G. Fessler</i> FACULTY: <i>Faheem A. Sandhu, Michael Y. Wang, Jean-Paul Wolinsky</i>	<b>N229</b> McCormick Place North Building
12:00 PM 1:30 PM	<b>T35: Acute and Long-term Management of Peripheral Nerve Trauma</b> MODERATOR: <i>Eric L. Zager</i> FACULTY: <i>Rajiv Midha, Christopher J. Winfree, Line Jacques</i>	<b>N427BC</b> McCormick Place North Building
12:30 PM 4:30 PM	<b>2013 CNS Annual Meeting Scientific Program Committee</b>	<b>E265</b> McCormick Place Lakeside Center
1:30 PM 2:00 PM	<b>BEVERAGE BREAK WITH EXHIBITORS</b>	<b>Hall D</b> McCormick Place Lakeside Center
2:00 PM 3:30 PM	<b>Oral Presentations: Section on Disorders of the Spine and Peripheral Nerves</b> MODERATORS: <i>D. Kojo Hamilton, Charles A. Sansur</i>	<b>E450B</b> McCormick Place Lakeside Center
2:00 PM 3:30 PM	<b>Oral Presentations: Section on Neurotrauma and Critical Care</b> MODERATORS: <i>Jamie Sue Ullman, Jason H. Huang</i>	<b>E450A</b> McCormick Place Lakeside Center
2:00 PM 3:30 PM	<b>Oral Presentations: Section on Pain</b> MODERATORS: <i>Christopher J. Winfree, Parag G. Patil</i>	<b>E353A</b> McCormick Place Lakeside Center
2:00 PM 3:30 PM	<b>Oral Presentations: Section on Pediatric Neurological Surgery</b> MODERATORS: <i>Phillip R. Aldana, Vivek Mehta</i>	<b>E351</b> McCormick Place Lakeside Center
2:00 PM 3:30 PM	<b>Council of State Neurological Societies: Managing the Financial Challenges of Neurosurgical Practice in 2012</b> MODERATORS: <i>Ann R. Stroink, J. Brad Bellotte</i> FACULTY: <i>Joseph S. Cheng, Scott Butler, Gregory Dill</i>	<b>E353B</b> McCormick Place Lakeside Center
2:00 PM 3:30 PM	<b>Section on Cerebrovascular Surgery: The Future is Now...</b> MODERATORS: <i>Nicholas C. Bambakidis, J D. Mocco</i> FACULTY: <i>Sepideh Amin-Hanjani, M. Christopher Wallace, Joshua Bederson, Bernard R. Bendok, Giuseppe Lanzino, David J. Langer</i>	<b>E352</b> McCormick Place Lakeside Center
2:00 PM 3:30 PM	<b>Section on Stereotactic and Functional Neurosurgery: Update on Neurosurgery for Cognitive and Behavioral Disorders</b> MODERATORS: <i>Konstantin V. Slavin, Aviva Abosch</i> FACULTY: <i>Emad N. Eskandar, Robert E. Gross, Andres M. Lozano, Ashwin Viswanathan</i>	<b>E350</b> McCormick Place Lakeside Center
2:00 PM 3:30 PM	<b>Section on Tumors: Primary Spinal Neoplasms: Treatment and Science Updates</b> MODERATORS: <i>Frederick F. Lang, Viviane S. Tabar</i> FACULTY: <i>George I. Jallo, Paul C. McCormick, Laurence D. Rhines, Jay Loeffler</i>	<b>E353C</b> McCormick Place Lakeside Center

# TUESDAY, OCTOBER 9

## SCHEDULE OF EVENTS

START END	EVENT	LOCATION
2:00 PM 3:30 PM	<b>Special Course II: Functional Neuroimaging: Where Do We Go from Here?</b> COURSE DIRECTORS: <i>Charles L. Rosen, Michael P. Steinmetz</i> FACULTY: <i>Peter A. Bandettini, Michael V. Knopp, Wade M. Mueller, Walter Schneider</i>	<b>E451B</b> McCormick Place Lakeside Center
3:30 PM 4:30 PM	<b>Annual Business Meeting</b>	<b>E451A</b> McCormick Place Lakeside Center
3:30 PM 5:00 PM	<b>SNACK BREAK WITH EXHIBITORS</b>	<b>Hall D</b> McCormick Place Lakeside Center
3:30 PM 5:00 PM	<b>Operative Neurosurgery: Management of Desperate Intraoperative Moments</b> MODERATORS: <i>Aaron A. Cohen-Gadol, Aaron S. Dumont</i> FACULTY: <i>Robert F. Spetzler, Daniel L. Barrow, Daniel K. Resnick, Michael William McDermott</i>	<b>Arie Crown Theater</b> McCormick Place Lakeside Center
5:00 PM 6:00 PM	<b>CNS Resident SANS Challenge - Championship Round</b>	<b>E258</b> McCormick Place Lakeside Center
5:00 PM 6:30 PM	<b>ThinkFirst/Schwinn Helmets on Heads Open House</b>	<b>Sheraton Ballroom III</b> Sheraton
5:30 PM 7:30 PM	<b>AANS/CNS Section on Tumors Young Neurosurgeons Reception</b>	<b>Superior B</b> Sheraton
6:00 PM 7:00 PM	<b>CNS Resident Recruitment Social</b>	<b>E260</b> McCormick Place Lakeside Center
6:00 PM 8:00 PM	<b>WINS Reception</b>	<b>Chicago Ballroom VI</b> Sheraton
6:30 PM 8:30 PM	<b>DIN4: CSM - Front versus Back</b> MODERATORS: <i>Paul C. McCormick, Zoher Ghogawala</i> FACULTY: <i>Michael G. Fehlings, Paul K. Maurer</i>	<b>Chicago Cut Steakhouse</b>
6:30 PM 8:30 PM	<b>DIN5: Aneurysm: Clip and/or Coil?</b> MODERATOR: <i>Sepideh Amin-Hanjani</i> FACULTY: <i>Felipe Albuquerque, Bernard R. Bendok, Carlos A. David</i>	<b>Naha</b>

# WEDNESDAY, OCTOBER 10

## SCHEDULE OF EVENTS

START END	EVENT	LOCATION
6:30 AM 3:00 PM	<b>Registration</b>	<b>Arie Crown Lobby</b> McCormick Place Lakeside Center
6:30 AM 3:00 PM	<b>Speaker Ready Room</b>	<b>E256</b> McCormick Place Lakeside Center
7:00 AM 11:30 AM	<b>General Scientific Session IV</b> PRESIDING OFFICER: <i>Daniel K. Resnick</i> MODERATORS: <i>Aviva Abosh, James S. Harrop</i>	<b>Arie Crown Theater</b> McCormick Place Lakeside Center
7:00 AM 3:30 PM	<b>CNS Press Room</b>	<b>E251</b> McCormick Place Lakeside Center
8:00 AM 10:30 AM	<b>CNS Spouse Hospitality Suite</b>	<b>Columbus A</b> Sheraton
8:00 AM 3:00 PM	<b>Sergeant-at-Arms</b>	<b>E254</b> McCormick Place Lakeside Center
9:00 AM 10:00 AM	<b>DEMO THEATER AND BEVERAGE BREAK WITH THE EXHIBITORS</b>	<b>Hall D</b> McCormick Place Lakeside Center
9:00 AM 2:00 PM	<b>EXHIBIT HALL OPEN</b>	<b>Hall D</b> McCormick Place Lakeside Center
11:30 AM 12:00 PM	<b>BREAK WITH EXHIBITORS</b>	<b>Hall D</b> McCormick Place Lakeside Center
12:00 PM 1:30 PM	<b>W36: Recurrent, Thoracic and Far Lateral Lumbar Disc Herniations</b> MODERATOR: <i>J. Patrick Johnson</i> FACULTY: <i>Patrick W. Hitchon, Richard G. Fessler, John J. Knightly</i>	<b>E258</b> McCormick Place Lakeside Center
12:00 PM 1:30 PM	<b>W37: Complication Avoidance and Management in Skull Base Surgery</b> MODERATOR: <i>Albert L. Rhoton, Jr.</i> FACULTY: <i>Ossama Al-Mefty, Chandra N. Sen, Jacques J. Morcos, Juraj Steno, Bharat Guthikonda</i>	<b>E259</b> McCormick Place Lakeside Center
12:00 PM 1:30 PM	<b>W38: An Update on Movement Disorders: Novel Targets, Indications, and Approaches</b> MODERATOR: <i>Robert E. Gross</i> FACULTY: <i>Kelly D. Foote, Paul S. Larson, Julie G. Pilitsis, Peter Konrad</i>	<b>N226</b> McCormick Place North Building
12:00 PM 1:30 PM	<b>W39: Malignant Glioma: Where Are We Now?</b> MODERATOR: <i>Andrew T. Parsa</i> FACULTY: <i>Linda M. Liau, Mark Edwin Shaffrey, John H. Sampson, E. Antonio Chiocca</i>	<b>N227B</b> McCormick Place North Building
12:00 PM 1:30 PM	<b>W40: Lessons Learned: Avoidance and Management of Complications of Aneurysm Surgery</b> MODERATOR: <i>Giuseppe Lanzino</i> FACULTY: <i>Byron Gregory Thompson Jr., Andreas Raabe, Carlos A. David, Ali F. Krisht</i>	<b>N228</b> McCormick Place North Building

# WEDNESDAY, OCTOBER 10

## SCHEDULE OF EVENTS

START END	EVENT	LOCATION
12:00 PM 1:30 PM	<b>W41: Approaches to Managing Pineal Region Tumors in Children</b> MODERATOR: <i>Frederick A. Boop</i> FACULTY: <i>Alan R. Cohen, Mark M. Souweidane, Daniel James Guillaume, Mark D. Krieger</i>	<b>N229</b> McCormick Place North Building
12:00 PM 1:30 PM	<b>W42: Sagittal Balance in Spine Surgery</b> MODERATOR: <i>Regis W. Haid Jr.</i> , FACULTY: <i>Edward C. Benzel, Robert F. Heary, Justin S. Smith, Frank LaMarca</i>	<b>N427BC</b> McCormick Place North Building
12:00 PM 1:30 PM	<b>W43: Strategies for Maximizing Compensation for Your Neurosurgical Practice</b> MODERATOR: <i>Donald M. Whiting</i> , FACULTY: <i>James I. Ausman, Fernando G. Diaz, Gary M. Bloomgarden, Joseph S. Cheng</i>	<b>E265</b> McCormick Place Lakeside Center
12:00 PM 1:30 PM	<b>W44: Indications for Radiosurgery in Your Neurosurgical Oncology Practice</b> MODERATOR: <i>Michael William McDermott</i> FACULTY: <i>William A. Friedman, Steven D. Chang, Michael A. Vogelbaum, John G. Golfinos</i>	<b>E253C</b> McCormick Place Lakeside Center
12:00 PM 1:30 PM	<b>W45: Sports-related Head, Neck and Peripheral Nerve Injuries</b> MODERATOR: <i>Douglas L. Brockmeyer</i> FACULTY: <i>Richard G. Ellenbogen, Langston T. Holly, Christopher J. Winfree</i>	<b>E253D</b> McCormick Place Lakeside Center
12:00 PM 1:30 PM	<b>W46: Hematology and Coagulation for Neurosurgeons: Dangers and Solutions</b> MODERATOR: <i>Issam A. Awad</i> FACULTY: <i>Alex B. Valadka, Michael T. Lawton, Maciej S. Lesniak, Joseph E. Beshay</i>	<b>E353C</b> McCormick Place Lakeside Center
12:00 PM 1:30 PM	<b>W47: Managing Metastasis to the Spine</b> MODERATOR: <i>Laurence D. Rhines</i> FACULTY: <i>Narayan Sundaresan, Ziya L. Gokaslan, Meic H. Schmidt, Daniel M. Sciubba</i>	<b>N227A</b> McCormick Place North Building
12:00 PM 1:30 PM	<b>W48: Evaluating Outcomes in Pediatric Neurological Surgery</b> MODERATOR: <i>Stephen J. Haines</i> FACULTY: <i>Liliana Goumnerova, David F. Jimenez, Timothy M. George, Patricia Aronin</i>	<b>E271A</b> McCormick Place Lakeside Center
12:00 PM 1:30 PM	<b>W49: Open Skull Base Surgery: When is the Traditional Approach Necessary?</b> MODERATOR: <i>William T. Couldwell</i> FACULTY: <i>Laligam N. Sekhar, Jeffrey J. Olson, Theodore H. Schwartz, James K. Liu</i>	<b>E253A</b> McCormick Place Lakeside Center
12:00 PM 1:30 PM	<b>W50: Image Guidance in Spinal Surgery</b> MODERATOR: <i>Iain H. Kalfas</i> FACULTY: <i>H. Dennis Mollman, James M. Schuster, Jean-Paul Wolinsky, Kai Michael Scheuffler</i>	<b>E253B</b> McCormick Place Lakeside Center

# WEDNESDAY, OCTOBER 10

## SCHEDULE OF EVENTS

START END	EVENT	LOCATION
12:00 PM 2:00 PM	<b>2012-2013 CNS Executive Committee Meeting</b>	<b>E451A</b> McCormick Place Lakeside Center
1:30 PM 2:00 PM	<b>BEVERAGE BREAK WITH EXHIBITORS</b>	<b>Hall D</b> McCormick Place Lakeside Center
2:00 PM 3:30 PM	<b>Consensus Session II: Treatment of Acoustic Neuromas: Building Consensus From Controversy</b> MODERATOR: <i>John G. Golfinos</i> FACULTY: <i>David W. Andrews, Frederick George Barker, William A. Friedman, Carl B. Heilman, Jon H. Robertson</i>	<b>E451B</b> McCormick Place Lakeside Center
2:00 PM 3:30 PM	<b>Multidisciplinary Oral Presentations II</b> MODERATOR: <i>Costas George Hadjipanayis</i>	<b>E350</b> McCormick Place Lakeside Center
2:00 PM 3:30 PM	<b>Section on Disorders of the Spine and Peripheral Nerves: Communicating the Value of Spine Surgery</b> MODERATORS: <i>Joseph S. Cheng, Frank La Marca</i> FACULTY: <i>Mathew McGirt, Peter D. Angevine, Richard A. Roski, Charles A. Sansur, Gregory B. Lanford, Gregory J. Przybylski</i>	<b>E351</b> McCormick Place Lakeside Center
2:00 PM 3:30 PM	<b>Section on Neurotrauma and Critical Care: The Future is Now: Prevention, Brain Injury Treatment and Spinal Cord Injury Treatment</b> MODERATORS: <i>Craig H. Rabb, Shirley I. Stiver</i> FACULTY: <i>Daniel B. Michael, Geoffrey T. Manley, Eve C. Tsai</i>	<b>E352</b> McCormick Place Lakeside Center
2:00 PM 3:30 PM	<b>Section on Pain: Emerging Indications for Neurostimulation</b> MODERATORS: <i>Christopher J. Winfree, Julie G. Pilitsis</i> FACULTY: <i>Joshua M. Rosenow, Jason M. Schwalb, Andre Machado, Erika A. Petersen</i>	<b>E353A</b> McCormick Place Lakeside Center
2:00 PM 3:30 PM	<b>Section on Pediatric Neurological Surgery: International Volunteer Opportunities in Pediatric Neurosurgery</b> MODERATORS: <i>Greg Olavarria, David I. Sandberg</i> FACULTY: <i>Gail Linskey Rosseau, John Ragheb, Philipp R. Aldana</i>	<b>E353B</b> McCormick Place Lakeside Center

# GENERAL SCIENTIFIC SESSION I

## SUNDAY, OCTOBER 7

ARIE CROWN THEATER

4:30 – 6:00 PM

4:30 – 4:33 PM

### **Introduction / Disclosures**

*Ganesh Rao*

4:33 – 4:55 PM

### **Under the Radar: Human Glioma Dissemination through Stem Cell Corridors**

*Nader Sanai*

4:55 – 4:57 PM

### **Introduction to Albert L. Rhoton, Jr.**

*Steven N. Kalkanis*

4:57 – 5:25 PM

### **Navigating in the Final Frontier**

*Albert L. Rhoton, Jr.*

5:25 – 5:28 PM

### **Introduction to Thompson Lecture**

*Russell R. Lonser*



5:28 – 6:00 PM

### **JOHN THOMPSON HISTORY OF MEDICINE LECTURE**

### **The New Brain Tumors: What Can Your Neuroradiologist Really Tell You From Preoperative Imaging Studies?**

*Anne G. Osborn*



6:00 PM: Lakeside Ballroom Foyer

**Book Signing with Anne G. Osborn**

# GENERAL SCIENTIFIC SESSION II

## MONDAY, OCTOBER 8

ARIE CROWN THEATER

7:00 – 11:30 AM

7:00 – 7:05 AM

### **Introduction and Disclosures**

*Ali R. Rezai*

7:05 – 7:22 AM

### **Stroke Intervention: Evolution of Implementation of Cutting Edge Technologies**

*L. Nelson Hopkins*

7:22 – 7:39 AM

### **Expanding Indications for Stereotactic Radiosurgery in the Treatment of Brain Metastases**

*William A. Friedman*

7:39 – 7:56 AM

### **Future of Minimally Invasive Spine Surgery**

*John O'Toole*

7:56 – 8:11 AM

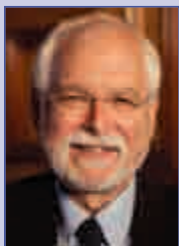
### **Editor's Update: *Neurosurgery*<sup>®</sup>**

*Nelson M. Oyesiku*

8:11 – 8:15 AM

### **Introduction of Special Lecturer**

*Ali R. Rezai*



8:15 – 8:35 AM

### **SPECIAL LECTURE**

### **Merging Mind and Machine to Restore Movement**

*John R. Donoghue*

8:35 – 8:40 AM

### **Introduction of Honored Guest**

*Daniel L. Barrow*



8:40 – 9:00 AM

### **HONORED GUEST LECTURE**

### **Patterns of Occurrence and Surgical Solutions Across the Spectrum of Saccular and Fusiform Middle Cerebral Artery Aneurysms**

*Ralph G. Dacey, Jr.*

9:00 – 10:00 AM

### **Beverage Break with Exhibitors**



**Medtronic**

*Introducing*

# The Midas Rex<sup>®</sup> of Microsaws

Reliability and Performance You Can Trust

## **Reliability and Performance You Can Trust**

The new electric Midas Rex<sup>®</sup> Microsaws offer legendary performance with innovative features for neurosurgical, spinal, oral, plastics, ENT, craniofacial, and orthopedic procedures.

- Optional **integrated irrigation** with IntelliFlow™ remote control
- Three color-coded handpieces available with **foot or finger control**
- Powered by the proven **IPC<sup>®</sup> System**

For more information, e-mail [microsaws@medtronic.com](mailto:microsaws@medtronic.com). You can also contact your Medtronic NT sales representative or refer to [www.MedtronicNT.com](http://www.MedtronicNT.com).

Refer to product instruction manual/package insert for instructions, warning, precautions and contraindications. Caution: Federal Law (USA) restricts this device for sale by or on the order of a physician. Midas Rex<sup>®</sup> and IPC<sup>®</sup> are registered trademarks of Medtronic, Inc. IntelliFlow™ is a trademark of Medtronic, Inc. © 2012, Medtronic, Inc. All rights reserved.

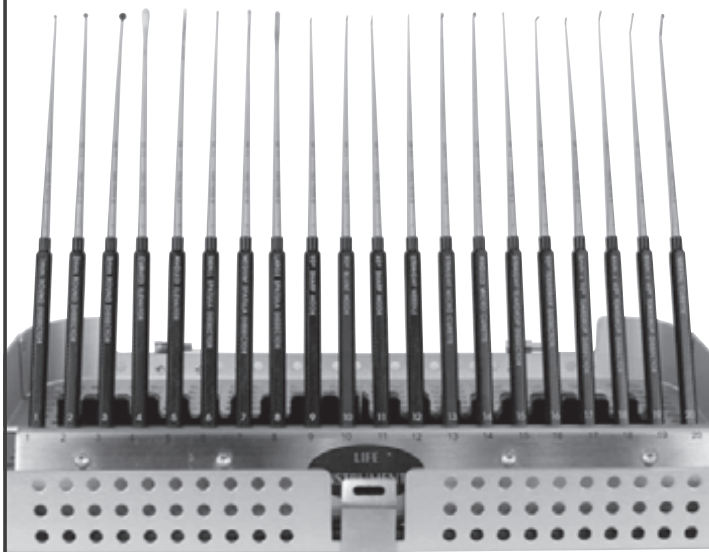
**Innovating for life.**





LIFE INSTRUMENT CORPORATION IS  
PLEASED TO EXHIBIT MANY NEW PRODUCTS  
AT THE CNS ANNUAL MEETING.

BOOTH #1106



*\* NEW \**

**MICRO DISSECTION INSTRUMENT SET**

Easy to read instrument descriptions on all handles  
Hand crafted in the USA  
Black knurled handles provide excellent feel and control

For a copy of our CATALOG  
please call or visit our website:  
(800) 925-2995  
[www.lifeinstruments.com](http://www.lifeinstruments.com)



# GENERAL SCIENTIFIC SESSION II

## MONDAY, OCTOBER 8

10:00 – 10:10 AM

### **The Role of the Neurosurgeon in the Community, with a Specific Eye Towards Injury Prevention and ThinkFirst**

*Daniel B. Michael*

10:10 – 10:25 AM

### **Does Monitoring ICP Improve Outcome from TBI? Results from an NIH Randomized Controlled Trial**

*Randall M. Chesnut*

10:25 – 10:30 AM

### **Introduction of CNS President Christopher E. Wolfla**

*Richard G. Ellenbogen*



10:30 – 10:50 AM

### **Presidential Address**

*Christopher E. Wolfla*

10:50 – 10:55 AM

### **Introduction of Dandy Orator**

*Ashwini Dayal Sharan*



10:55 – 11:30 AM

### **WALTER E. DANDY ORATION**

### **The Acceleration of Technology in the 21st Century: The Impact on Medicine, Health and Society**

*Raymond Kurzweil*



11:30 AM

**Book Signing in the Exhibit Hall with Raymond Kurzweil**

11:30 AM – 12:00 PM

**Break with Exhibitors**

### **International Reception**

5:00 - 6:30 PM    Sheraton Hotel



*All International Colleagues are invited to attend.*

# GENERAL SCIENTIFIC SESSION III

## TUESDAY, OCTOBER 9

ARIE CROWN THEATER

7:00 – 11:30 AM

7:00 – 7:03 AM

### **Introduction, Disclosures and Introduction of Leslie Sutton**

*Nathan R. Selden*

7:03 – 7:18 AM

### **The Fetal Myelomeningocele Story: From the Animal Lab to the MOMS Trial and Beyond**

*Leslie N. Sutton*

7:18 – 7:20

### **Introduction of Japanese CNS President**

*Christopher E. Wolfla*

7:20 – 7:35 AM

### **Simulation of CVD Surgery with 3D Fusion Images**

*Nobuhitsu Saito*



7:35 – 7:55 AM

### **HONORED GUEST LECTURE**

### **External Challenges to Neurosurgical Professionalism in 2012**

*Ralph G. Dacey, Jr.*

7:55 – 8:12 AM

### **The Future of the Utilization of Spine Surgery**

*Joseph S. Cheng*

8:12 – 8:14 AM

### **Introduction to Special Lecturer**

*Alan M. Scarrow*



8:14 – 8:31 AM

### **SPECIAL LECTURE**

### **Technology Growth and Cost Growth in Healthcare**

*Jonathan Skinner*

8:31 – 8:33 AM

### **Introduction of CENS President**

*Anil Nanda*

# GENERAL SCIENTIFIC SESSION III

## TUESDAY, OCTOBER 9



8:33 – 8:48 AM

### CENS PRESIDENT LECTURE

**Influence of the U.S. Democratic System on the Level of Neurosurgery in the CENS Post-Communist Countries**

*Eduard Zverina*

*President of the Central European Neurosurgical Society*



8:48 – 8:50 AM

### Neurosurgical Forum Winners

*Alan M. Scarrow*

8:50 – 8:55 AM

### Distinguished Service Award Winner Presentation to Dr. Joel D. MacDonald

*Gerald E. Rodts, Jr.*

8:55 – 9:00 AM

### CNS Founders' Laurel Presented posthumously to Dr. Christopher C. Getch

*Douglas Kondziolka*

9:00 – 10:00 AM

### Beverage Break with Exhibitors

10:00 – 10:40 AM

### Live Aneurysm Reconstruction with Flow Diversion via Telemedicine Technology

*L. Nelson Hopkins, III, Elad I. Levy and University at Buffalo Neurosurgery*

10:40 – 11:00 AM

### One of These Things is Not Like the Others: Inter and Intratumoral Heterogeneity as Barriers to Effective Therapy in Medulloblastoma

*Michael D. Taylor*

11:00 – 11:05 AM

### Introduction of Special Lecturer

*Russell R. Lonser*



11:05 – 11:30 AM

### SPECIAL LECTURE

**Talent is Overrated**

*Geoff Colvin*



11:30 AM

**Book Signing in the Exhibit Hall with Geoff Colvin**

11:30 AM – 12:00 PM

### Break with Exhibitors

# GENERAL SCIENTIFIC SESSION IV

## WEDNESDAY, OCTOBER 10

ARIE CROWN THEATER

7:00 – 11:30 AM

7:00 – 7:05 AM

### **Introduction and Disclosures**

*Daniel K. Resnick*

7:05 – 7:27 AM

### **Listening to the Brain: New Techniques in Intraoperative Functional Mapping**

*Eric C. Leuthardt*

7:27 – 7:47 AM

### **Future of Peripheral Nerve Repair**

*Allan J. Belzberg*

7:47 – 8:07 AM

### **Future of Stereotactic and Functional Neurosurgery**

*Roy Bakay*

8:07 – 8:27 AM

### **Future of Pain Neurosurgery**

*Christopher J. Winfree*

8:27 – 8:47 AM

### **Future of Personalized Brain Tumor Treatment**

*Cameron Brennan*

8:47 – 8:50 AM

### **Fellowship Award Winners**

*Steven N. Kalkanis*

8:50 – 8:55 AM

### **Guidelines Update on Spine Trauma**

*Beverly C. Walters*

8:55 – 9:00 AM

### **AANS Update**

*Mitchel S. Berger*

9:00 – 10:00 AM

### **Beverage Break with Exhibitors**

10:00 – 10:15 AM

### **CNS Resident Award**

### **Genome-wide shRNA Screening Defines the SUMO-activating Enzyme (SAE1/2) as a Novel Therapeutic Target for Tumors Driven by c-Myc Oncogenesis**

*Kristopher Thomas Kahle*

# GENERAL SCIENTIFIC SESSION IV

## WEDNESDAY, OCTOBER 10

10:15 – 10:16 AM

### Introduction of Special Lecturer

*Alan M. Scarrow*



10:16 – 10:38 AM

### SPECIAL LECTURE

#### **Future of Healthcare Delivery from Corporate America**

*Michael McMillan*



10:38 – 10:58 AM

### HONORED GUEST LECTURE

#### **The Impact of High Field Strength Intraoperative MRI on Brain Tumor Management**

*Ralph G. Dacey, Jr.*

10:58 – 11:03 AM

### Introduction to David Weinberger

*Ganesh Rao*



11:03 – 11:30 AM

### SPECIAL LECTURE

#### **Too Big to Know: Rethinking Knowledge Now That the Facts Aren't the Facts, Experts Are Everywhere, and the Smartest Person in the Room Is the Room**

*David Weinberger*



11:30 AM

**Book Signing with David Weinberger in the Exhibit Hall**

11:30 AM – 12:00 PM

### Break with Exhibitors

# THANK YOU

to the following companies for providing educational grants in support of CNS programs and activities!

## LEADER



## BENEFACTORS



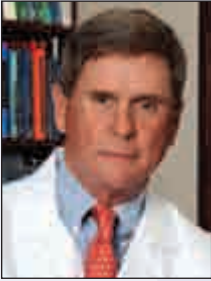
## SUPPORTERS



## CONTRIBUTORS



### Ralph G. Dacey, Jr., MD



Ralph G. Dacey, Jr. is the Henry G. and Edith R. Schwartz Professor and Chairman of the Department of Neurological Surgery at Washington University in St. Louis and is a consultant neurosurgeon for the St. Louis Rams and the St. Louis Blues. Dr. Dacey's clinical interests range from cerebrovascular surgery to the surgery of pituitary tumors and meningiomas. His research focuses on the physiology of intracerebral microcirculation.

**MONDAY, OCTOBER 8**

**8:40 AM**

**Patterns of Occurrence and Surgical Solutions Across the Spectrum of Saccular and Fusiform Middle Cerebral Artery Aneurysms**

**TUESDAY, OCTOBER 9**

**7:35 AM**

**External Challenges to Neurosurgical Professionalism in 2012**

**WEDNESDAY, OCTOBER 10**

**10:38 AM**

**The Impact of High Field Strength Intraoperative MRI on Brain Tumor Management**

## FEATURED SPEAKERS



### Anne Osborn, MD

**SUNDAY, OCTOBER 7**

**5:28 PM**

**The New Brain Tumors: What Can Your Neuroradiologist Really Tell You From Preoperative Imaging Studies?**

Anne G. Osborn, MD, is University Distinguished Professor of Radiology at the University of Utah School of Medicine. She holds the William H. and Patricia W. Child Presidential Endowed Chair in Radiology at the University of Utah. Dr. Osborn is an internationally-acclaimed teacher and lecturer and is regarded as one of the world's most prominent neuroradiologists.

**Book signing in Lakeside Ballroom Foyer at 6:00 PM**



## FEATURED SPEAKERS



### John Donoghue, PhD

MONDAY, OCTOBER 8

8:15 AM

#### Merging Mind and Machine to Restore Movement

John Donoghue, PhD, is Henry Merritt Wriston Professor in the Department of Neuroscience at Brown University, Director of the Brown Institute for Brain Science, and a Senior Career Research Scientist of the Rehabilitation R&D Service with the Department of Veterans Affairs. For more than 20 years, Dr. Donoghue has conducted research on brain computer interfaces and his laboratory is internationally recognized as a leader in this field.



### Ray Kurzweil

MONDAY, OCTOBER 8

10:55 AM

#### The Acceleration of Technology in the 21st Century: The Impact on Medicine, Health and Society

Ray Kurzweil was the principal developer of the first CCD flat-bed scanner, the first omni-font optical character recognition, the first print-to-speech reading machine for the blind, the first text-to-speech synthesizer, the first music synthesizer capable of recreating the grand piano and other orchestral instruments, and the first commercially marketed large-vocabulary speech recognition and is considered one leading inventors of our time.

**Book signing in the Exhibit Hall at 11:30 AM**



### Jonathan Skinner, PhD

TUESDAY, OCTOBER 9

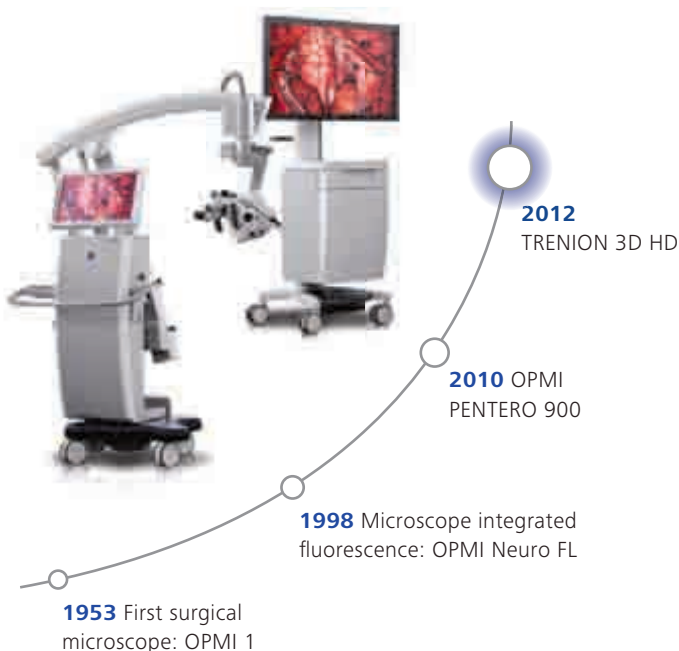
8:14 AM

#### Technology Growth and Cost Growth in Healthcare

Jonathan Skinner, PhD, is John Sloan Dickey Third Century Chair of Economics, Dartmouth College, and a professor in the Dartmouth Institute of Health Policy and Clinical Practice, Dartmouth Medical School. Dr. Skinner is a research associate at the National Bureau of Economic Research and a former editor of the *Journal of Human Resources*.

# The Continuation of Brilliance

*from Carl Zeiss*



Introducing  
**TRENION 3D HD**  
*a spectacular breakthrough  
in surgical visualization*

Visit us at booth 920  
for a demonstration.

**Monday, October 8 at 11:35am**

See Aaron Cohen-Gadol, M.D. present  
spectacular operative moments with  
TRENION™ 3D HD in the CNS Product  
& Technology Showcase.\*

**Monday, October 8 at 9:30am**

**Tuesday, October 9 at 9:30am**

In-booth demonstration of  
TRENION 3D HD with Aaron  
Cohen-Gadol, M.D.

**100** YEARS  
MEDICAL TECHNOLOGY  
MADE BY CARL ZEISS



We make it visible.

\*The Product & Technology Showcase content and the views expressed therein are those of the presenting corporate entity and not of the CNS. The content is not part of the CNS Annual Meeting as approved by the CNS Annual Meeting Scientific Committee.



# REIMAGINE RADIOSURGERY

## Introducing TrueBeam STx with RapidArc Radiosurgery.

There are individuals who aspire to do more and do it better for the advancement of radiosurgery. The TrueBeam STx™ system was designed for these leaders. Visionaries who, throughout their careers, have pushed the boundaries of the possible. Visionaries like you.

To learn more, visit [varian.com/radiosurgery](http://varian.com/radiosurgery)

See us at CNS 2012, booth #420

**VARIAN**  
medical systems  
A partner for **life**



## Geoff Colvin

TUESDAY, OCTOBER 9

11:05 AM

### Talent is Overrated

Geoff Colvin's regular column in *Fortune* magazine, his frequent cover stories for the magazine, and his broadcasts on the CBS Radio Network, have garnered him millions of eyes and ears who count on and respect his insights on the issues driving change in business and the economy. His groundbreaking book, *Talent Is Overrated: What Really Separates World-Class Performers From Everybody Else* - has remained a popular-selling book since it was released in 2008.

**Book signing in the Exhibit Hall at 11:30 AM**



## Michael McMillan

WEDNESDAY, OCTOBER 10

10:16 AM

### Future of Healthcare Delivery from Corporate America

Michael McMillan is the Executive Director of Market and Network Services for Cleveland Clinic, a 6 billion dollar healthcare system with operations in Ohio, Florida, Nevada, and around the globe.



## David Weinberger, PhD

WEDNESDAY, OCTOBER 10

11:05 AM

### Too Big to Know: Rethinking Knowledge Now That the Facts Aren't the Facts, Experts are Everywhere and the Smartest Person in the Room is the Room

David Weinberger, PhD, brings his remarkable range of experience, from professor of philosophy to marketing guru and author, and knowledge to the most important question facing every business today: How is technology changing the way employees, partners and customers are putting themselves together, and how is that changing the basics of business, culture, education, politics, and government?

**Book signing in the Exhibit Hall at 11:30 AM**

3:00 – 4:30 PM

Room E350

**MULTIDISCIPLINARY ORAL PRESENTATIONS I**

MODERATOR: *Brian Lim Hoh*

3:03 PM – 3:10 PM

**100**

**Immediate Procedural Outcomes in 35 Consecutive Pipeline Embolization Cases: A Single-Center, Single-User Experience**

*Geoffrey P. Colby, Li-Mei Lin, Juan F. Gomez, Alexandra Paul, Judy Huang, Rafael J. Tamargo, Alexander Lewis Coon*

3:10 PM – 3:17 PM

**101**

**The Sodium Channel/Glutamate Blocker Riluzole is Complementary to Decompression in a Preclinical Experimental Model of Cervical Spondylotic Myelopathy (CSM): Implications for Translational Clinical Application**

*Spyridon Karadimas, Eun Su Moon, Michael G. Fehlings*

3:17 PM – 3:24 PM

**102**

**The Incidence of Arachnoid Web Formation in Patients with Chiari I Malformation and Syringomyelia**

*Robert Austin Miller, Yuefang Chang, Matthew Tormenti, Stephanie Greene*

3:24 PM – 3:31 PM

**103**

**Unilateral Transnasal Endoscopic Extradural Optic Nerve Decompression for Idiopathic Intracranial Hypertension: A Small Clinical Series of Eight Patients**

*Altay Sencer, Ismet Arslan, Fahir Sencan, Banu Satana, Osman Akcakaya, Ali Guven Yorukoglu, Bora Basaran, Yavuz Aras, Aydin Aydoseli, Faruk Unal, Ali Tuncay Canbolat*

3:31 PM – 3:38 PM

**104**

**Multipotent Adult Progenitor Cell Therapy for Traumatic Brain Injury: Systemic Modulation of Microglia**

*Supinder Singh Bedi, Peter Walker, Shinil Shah, Fernando Jimenez, Chelsea Thomas, Philippa Smith, Robert Hetz, Jason Hamilton, Robert W. Mays, Charles S. Cox, Jr.*

3:38 PM – 3:45 PM

**105**

**Pseudomeningocele Formation Following Chiari Decompression: Nineteen Year Retrospective Chart Review of Predisposing and Prognostic Factors**

*Richard Menger, David E. Connor, Anil Nanda*

3:45 PM – 3:52 PM

**106**

## **Variability in Outcomes After Surgery for Spinal Stenosis and Degenerative Spondylolisthesis**

*Atman Desai, Kimon Bekelis, Perry Ball, Jon Lurie, Sohail Mirza, Tor D. Tosteson, James N. Weinstein*

3:52 PM – 3:59 PM

**107**

## **Gamma Knife Radiosurgery for Patients with Unruptured Arteriovenous Malformations**

*Dale Ding, Chun-Po Yen, Zhiyuan Xu, Robert M. Starke, Jason P. Sheehan*

3:59 PM – 4:06 PM

**108**

## **Stereotactic Radiosurgery or Radiotherapy for Spinal Metastases, with or without Initial Open Surgical Decompression and Stabilization**

*Berkeley Graham Bate, Brent Young Kimball, Kyle Gabrick, Jason Andrew Weaver*

4:06 PM – 4:13 PM

**109**

## **Radiographic and Clinical Follow-up of Syringomyelia in Patients Treated for Tethered Cord Syndrome without Other Radiographic Abnormalities**

*Charles Glen Kulwin, Neal Balvant Patel, Joel C. Boaz, Daniel H. Fulkerson*

4:13 PM – 4:20 PM

**110**

## **Modulation of the Inflammatory Response: A Potential Novel Use for Vagus Nerve Stimulation**

*Sudhakar Vadivelu, Megan McCarty, Sangeeta Chavan, Sara Stream, Kevin J. Tracey, Ashesh Mehta*

4:20 PM – 4:27 PM

**111**

## **Magnetic Resonance Spectroscopic Imaging Measurement of Early Response to Vorinostat Treatment in Recurrent Glioblastoma**

*Jeffrey J. Olson, Alfredo Voloschin, Li Wei, Andrew Miller, Daniel Brat, Chad Holder, Hui-Kuo Shu, Xioaping Hu, Hyunsuk Shim*

## MONDAY, OCTOBER 8

2:00 – 3:30 PM

## ORAL PRESENTATIONS

Room E350

## COUNCIL OF STATE NEUROSURGICAL SOCIETIES

MODERATORS: J. Adair Prall, Gregory R. Trost

## **SAM HASSENBUSCH YOUNG NEUROSURGEON AWARD**

2:00 PM - 2:09 PM

**113**

### **An Observational Study of Hospital Paging Practices and Workflow Interruption Among On-call Junior Neurosurgery Residents**

*Kyle Michael Fargen, Tim O'Connor, Steven Raymond, Justin M. Sporrer, William A. Friedman*

2:09 PM - 2:18 PM

**114**

### **The Relative Impact of Lumbar Spondylosis on Quality of Life in the United States: A Population Health Perspective**

*Scott L. Parker, Cyrus Chi-Ho Wong, Marcus J. Gates, Saniya S. Godil, Matthew McGirt*

## **JULIUS GOODMAN RESIDENT AWARD**

2:18 PM - 2:27 PM

**115**

### **Differences in Defensive Practices between Neurosurgeons in Malpractice Crisis versus Non-Crisis States**

*Maya A. Babu, Brian V. Nahed, Timothy R. Smith, Robert F. Heary*

2:27 PM - 2:36 PM

**116**

### **Improved Resource Utilization is Associated with High Volume Surgical Centers, Low Complication Rates, and Shorter Length of Stay in Patients Undergoing Transsphenoidal Surgery for Cushing's Disease**

*Andrew S. Little, Kristina Chapple*

2:36 PM - 2:45 PM

**117**

### **Digital Subtraction Angiography in CT Angiography Negative Spontaneous Subarachnoid Hemorrhage: A Cost-Effectiveness Analysis**

*Pinakin Rameshchandra Jethwa, Vineet Punia, Tapan Patel, Chirag D. Gandhi, Charles J. Prestigiacomo*

2:45 PM - 2:54 PM

**118**

### **Feasibility and Utilization of Teleradiology in Neurosurgery**

*Martina Stippler, Howard Yonas, Anne Karlovitz*

2:54 PM - 3:03 PM

**119**

### **Identification of Knowledge Gaps in Neurosurgery Through Analysis of Responses to the Self Assessment in Neurological Surgery (SANS)**

*Jason P. Sheehan, Robert M. Starke, Nader Pouratian, Zachary N. Litvack, Ashok Rajappa Asthagiri*

3:03 PM – 3:12 PM

**120**

**Defining the Relative Utility of Lumbar Spine Surgery: A Systematic Literature Review of Common Surgical Procedures and their Impact on Health States**

Scott L. Parker, Saniya S. Godil, Marcus J. Gates, Matthew McGirt

3:12 PM – 3:21 PM

**121**

**Characteristics of Neurosurgery's Most Successful Research Programs**

Edie E. Zusman, Riti Mahadevia, Michael Fost, Robert M. Friedlander, Gregory J. Zipfel, David V. Laborde

3:21 PM – 3:30 PM

**122**

**Residents as Teachers: Integration of a Formal Certificate in Education Program into Residency Training**

Zachary N. Litvack, Larrie Greenberg, Benjamin Blatt, Nancy Gaba, Anthony J. Caputy

2:00 – 3:30 PM

**Room E352**

**SECTION ON CEREBROVASCULAR SURGERY**

MODERATORS: Nicholas C. Bambakidis, J D. Mocco

2:00 – 2:09 PM

**123**

**Safety and Efficacy of Intra-Operative Angiography in Craniotomies for Cerebral Aneurysms and Arteriovenous Malformations: A Review of 1089 Cases**

Nohra Chalouhi, Thana Theofanis, Pascal Jabbour, Aaron S. Dumont, L. Fernando Gonzalez, Robert M. Starke, Robert H. Rosenwasser, Stavropoula I. Tjoumakaris

2:09 PM – 2:18 PM

**124**

**In-Hospital Morbidity and Mortality After Treatment of Arteriovenous Malformations in the United States, 2000-2009: The Impact of Hospital and Surgeon Volume**

Jason Davies, Vijay Yanamadala, William L. Young, Michael T. Lawton

2:18 PM – 2:27 PM

**125**

**Final Results of the ELANA FDA-IDE Study on High Flow Cerebral Bypasses for Surgical Treatment of Anterior Circulation Aneurysms**

David J. Langer, Peter Vajkoczy, Shamik Chakraborty, Michael Tymianski, Sepideh Amin-Hanjani, Fady T. Charbel, Babu Guai Welch, Duke S. Samson, Leena Kivipelto, Jacques J. Morcos, Ricardo A. Hanel, Michael Reinert, Ali F. Krisht, Luca Regli, Martin Lehecka, Ulf Schneider, Marcus Czabanka, Lars Kihlstrom, Tristan Van Doomaal, Cornelius Tulleken, Bart Van der Zwan



2:27 PM - 2:36 PM

**126**

### **Histopathological Assessment of Delayed Ipsilateral Parenchymal Hemorrhages After the Treatment of Paraclinoid Aneurysms with the Pipeline Embolization Device**

Vivek Deshmukh, Yin C. Hu, Cameron G. McDougall, Stanley L. Barnwell, Felipe Albuquerque, David Fiorella

2:36 PM - 2:45 PM

**127**

### **Intra-arterial Chemotherapy for Retinoblastoma: Pearls and Pitfalls**

Nohra Chalouhi, Stavropoula I. Tjoumakaris, L. Fernando Gonzalez, Aaron S. Dumont, Rohan Chitale, Robert H. Rosenwasser, Carlos Biancotto, Carol Shields, Pascal Jabbour

## **GALBRAITH AWARD**

2:45 PM - 2:54 PM

**128**

### **Subarachnoid Hemorrhage Patients: To Transfer or Not to Transfer?**

Miriam Nuno, Chirag G. Patil, Patrick Lyden, Doniel Drazin

## **SYNTHES CEREBROVASCULAR AWARD**

2:54 PM - 3:03 PM

**129**

### **Ruptured Basilar Apex Aneurysms: Current Outcomes at a Tertiary High Volume Center**

Ryan Morton, Louis J. Kim, Basavaraj Ghodke, Farzana Tariq, Laligam N. Sekhar

3:03 PM - 3:12 PM

**130**

### **Evidence for an Ischemic Preconditioning Effect on Cerebral Vasospasm in Patients with Aneurysmal Subarachnoid Hemorrhage**

Young Woo Kim, Christopher S. Ogilvy, Katie Pricola, John F. Reavey-Cantwell, Craig R. Kelman, Gregory J. Zipfel, Chad Washington, Felipe Albuquerque, M. Yashar S. Kalani, Brian Lim Hoh

3:12 PM - 3:21 PM

**131**

### **Threshold for Packing Density in Stent-Assisted Coiling of Intracranial Aneurysms**

Nohra Chalouhi, Aaron S. Dumont, Stavropoula I. Tjoumakaris, Fernando Gonzalez, Robert M. Starke, Richard Dalyai, Sedeek El Moursi, Robert H. Rosenwasser, David M. Hasan, Pascal Jabbour

3:21 PM - 3:30 PM

**132**

### **Urgent EC-IC Bypass for Symptomatic Atherosclerotic Ischemic Stroke**

Tetsuyoshi Horiuchi, Kazuhiro Hongo, Junpei Nitta

2:00 – 3:30 PM

Room 353C

**SECTION ON STEREOTACTIC AND FUNCTIONAL NEUROSURGERY**

MODERATORS: Ali R. Rezai, Konstantin V. Slavin

2:00 PM – 2:08 PM

**173****Long-term Follow-up After Multiple Hippocampal Transection (MHT)***Arun-Angelo Patil, Richard V. Andrews*

2:08 PM – 2:16 PM

**174****Convection-Enhanced Delivery of Muscimol to the Epileptic Focus: Preclinical and Clinical Research***John D. Heiss, Stuart Walbridge, Rene' Smith, Susumu Sato, Edward H. Oldfield, Russell R. Lonser*

2:16 PM – 2:24 PM

**175****Language Reorganization in Temporal Lobe Epilepsy: A Corticocortical Evoked Potential Study***Rei Enatsu, Yuichi Kubota, Yosuke Kakisaka, Juan Bulacio, Zhe Piao, Timothy O'Connor, Karl Horning, John Mosher, Richard Burgess, William E. Bingaman, Dileep Nair*

2:24 PM – 2:32 PM

**176****Functional Mapping Using Infra-slow Gamma Band Fluctuations in Spontaneous Electrocorticography***Andrew Lin Ko, Jeffrey G. Ojemann*

2:32 PM – 2:40 PM

**177****Pre-clinical Validation of Superparamagnetic Iron Oxide Nanoparticle-Labeled Neural Stem Cells for In Vivo Tracking and Post-Mortem Identification in the Spinal Cord***Jason J. Lamanna, Eleanor M. Donnelly, John N. Oshinski, Nicholas M. Boulis, Thais Federici*

2:40 PM – 2:48 PM

**178****Utility of 7T Imaging for Deep Brain Stimulation Surgery***Aviva Abosch, Noam Harel, Guillermo Sapiro, Yuval Duchin, Essa Yacoub***STEREOTACTIC AND FUNCTIONAL NEUROSURGERY RESIDENT AWARD**

2:48 PM – 2:56 PM

**179****Stimulation of the Human Periaqueductal Gray Modulates Activity in the Sensory Thalamus and Vice Versa***Dali Wu, Shouyan Wang, John F. Stein, Tipu Z. Aziz, Alexander L. Green*

2:56 PM – 3:04 PM

**180**

## **SEEG After Subdural Grid Placement for Difficult to Localize Epilepsy**

*Sumeet Vadera, Jeffrey Paul Mullin, William E. Bingaman, Jorge Alvaro Gonzalez-Martinez*

3:04 PM – 3:12 PM

**181**

## **In-Vivo Segmentation of the Human Nucleus Accumbens Using Diffusion Tensor Imaging and Probabilistic Tractography**

*Ausaf A. Bari, Zhong Zheng, Antonio DeSalles, Nader Pouratian*

3:12 PM – 3:20 PM

**182**

## **Deep Brain Stimulation (DBS) Surgery for Treatment-resistant Hypertension: A Promising Solution to a Silent Killer**

*Shazia Javed, Fiona McBryde, Sadaquate Khan, Julian Paton, Nikunj K. Patel*

3:20 PM – 3:28 PM

**183**

## **The Risk of Vertebral Compression Fracture (VCF) Post-spine Stereotactic Body Radiotherapy (SBRT) and Evaluation of The Spinal Instability Neoplastic Score (SINS)**

*Marcelo Cunha, Ameen Al-Omair, Eshetu Atenafu, Daniel Letourneau, Renee Korol, Eugene Yu, Laura Masucci, Leodante B. Da Costa, Jr, Michael G. Fehlings, Arjun Sahgal*

---

2:00 – 3:30 PM

**Room E351**

---

## **SECTION ON TUMORS**

MODERATORS: *Frederick F. Lang, Dimitris G. Placantonakis, Viviane S. Tabar*

---

### **INTEGRA FOUNDATION AWARD**

2:00 PM – 2:09 PM

**184**

## **Cranial Nerve Function Before and After Stereotactic Radiosurgery for Cavernous Sinus Meningiomas: A Twenty-three Year Assessment**

*Hideyuki Kano, Kyung-Jae Park, Aditya K. Iyer, Ajay Niranjani, John Flickinger, Douglas Kondziolka, L. Dade Lunsford*

### **NATIONAL BRAIN TUMOR SOCIETY MAHALEY CLINICAL RESEARCH AWARD**

2:09 PM – 2:18 PM

**185**

## **Peptide Vaccine Therapy for Childhood Gliomas: Interim Results of a Pilot Study**

*Ian F. Pollack, Regina Jakacki, Lisa H. Butterfield, Hideho Okada*

## **STRYKER NEURO-ONCOLOGY AWARD**

2:18 PM – 2:27 PM

**186**

### **Quantitative Volumetric Response After Gamma Knife Radiosurgery For Meningiomas**

*Gillian Harrison, Hideyuki Kano, L. Dade Lunsford, John Flickinger, Douglas Kondziolka*

## **SYNTHES SKULL BASE SURGERY AWARD**

2:27 PM – 2:36 PM

**187**

### **Stereotactic Radiotherapy (SRT) is Associated with Improved Rates of Hearing Preservation for Patients with Vestibular Schwannoma**

*Isaac Yang, Marko Spasic, Patrick Pezeshkian, Brendan Manuel Fong, Winward Choy, Alessandra A. Gorgulho, Michael T. Selch, Antonio DeSalles*

## **JOURNAL OF NEURO-ONCOLOGY AWARD**

2:36 PM – 2:45 PM

**188**

### **Radiogenomic Mapping of MRI-FLAIR-Phenotypes Identifies a Novel Gene-microRNA Regulatory Axis to Target Glioblastoma Invasion**

*Pascal O. Zinn, Pratheesh Sathyan, Bethany Veo, Frederick F. Lang, Raymond Sawaya, Rivka R. Colen, Sadhan Majumder*

## **AMERICAN BRAIN TUMOR ASSOCIATION YOUNG INVESTIGATOR AWARD**

2:45 PM – 2:54 PM

**189**

### **Establishing a Link Between Genomic Patterns of Radiation-Induced DNA Damage Repair in Human Astrocytes and Somatic Mutations in Gliomas**

*Raymund L.M. Yong, Chunzhang Yang, Russell R. Lonser, Zhengping Zhuang*

2:54 PM – 3:03 PM

**190**

### **Glioblastoma Derived Exosomes Induce Apoptosis in Cytotoxic T cells Through a Fas Ligand Mediated Mechanism**

*Keith Z. Sabin, Richard A. Rovin, Johnathan E. Lawrence, Robert J. Belton, Jr., Robert J. Winn*

3:03 PM – 3:12 PM

**191**

### **Subcortical Mapping: Correlation Between Stimulation Intensity and Distance to the Corticospinal Tract**

*Ehab Shiban, Sandro M. Krieg, Niels Buchmann, Bernhard Meyer, Florian Ringel*

3:12 PM – 3:21 PM

**192**

## **Epidermal Growth Factor Receptor Antibody-Conjugated Iron-Oxide Nanoparticles: Therapeutic Targeting and Radiosensitivity Enhancement of Glioblastoma**

*Alexandros Bouras, Milota Kaluzova, Costas George Hadjipanayis*

### **PREUSS AWARD**

3:21 PM – 3:30 PM

**193**

## **Development of Pediatric Glioma Models for BRAF-targeted Therapy**

*Shih-Shan Lang, Angela J. Sievert, Katie L. Boucher, Peter J. Madsen, Erin Slaunwhite, Danielle Brewington, Phillip B. Storm, Adam C. Resnick*

3:30 – 5:00 PM

Lakeside Ballroom

## **NEUROSURGICAL FORUM**

### **COUNCIL OF STATE NEUROSURGICAL SOCIETIES**

MODERATORS: *J. Adair Prall, Gregory R. Trost*

**300**

## **Validation of a Mixed Reality Ventriculostomy Simulator**

*Kristopher Gray Hooten, J. Richard Lister, Gwen Lombard, Frank J. Bova, Gregory J. Murad*

**301**

## **Race and Income Disparity in Ischemic Stroke Care: Nationwide Inpatient Sample Database, 2002-2008**

*Matthew Michael Kimball, Dan Neal, Michael F. Waters, Brian Lim Hoh*

**302**

## **Insights into the Neurosurgical Trainee: Personality Typing of Residents Spanning a Decade at a Single Institution**

*Jeffrey Paul Mullin, Alejandro M. Spiotta, Richard P. Schlenk, Edward C. Benzel*

**303**

## **Towards a Reduction of Unnecessary Crossmatching in Elective Neurosurgery**

*Raul Lopez Serna, Juan Luis Gomez Amador, Nicasio Arriada-Mendicoa, Jacqueline Ruiz-Granados, Miguel Ramos-Peek, Juan Barges Coll, Miguel Celis-Lopez*

**304**

## **Increasing Medical Student Awareness and Education in Neurosurgery through Interest Group Participation**

*Krystal Lynne Tomei, Nitin Agarwal, Chirag D. Gandhi, Charles J. Prestigiacomo*

**305**

**Reduction of ACGME Resident Work Hour Violations with 3-Person Night Float System without Change in Operative Caseload**

*Mark P. Piedra, Brian T. Ragel, Paul Klimo, Jr., Nathan R. Selden*

**306**

**Simulation Training for Neuroendoscopy: A Canadian National Needs Assessment Survey**

*Faizal A. Haji, Adam Dubrowski, James M. Drake, Sandrine de Ribaupierre*

**307**

**Evaluation of Web-Based Resources: A Neurosurgical Perspective**

*Michelle J. Clarke*

**308**

**Is there a Regional Disparity in Outcome after Treatment of Cerebral Aneurysm? A United States Nationwide Inpatient Sample (NIS) Database Study**

*Ashish Sonig, Jai D. Thakur, Rishi Kumar Wadhwa, Imad S. Khan, Anil Nanda*

**309**

**Variation in Outcomes for Management of Unruptured Intracranial Aneurysms at High Volume Centers in New York State**

*Brad E. Zacharia, Zachary Lee Hickman, Samuel S. Bruce, Kerry Alexandra Vaughan, Robert A. Solomon, E. Sander Connolly, Jr.*

---

**SECTION ON CEREBROVASCULAR SURGERY**

MODERATORS: *Rose Du, J D. Mocco, Amir R. Dehdashti*

---

**310**

**Cilostazol Prevents Cerebral Vasospasm After Aneurysmal Subarachnoid Hemorrhage: A Multicenter Prospective, Randomized, Open-label Blinded Endpoint Trial**

*Nobuo Senbokuya, Hiroyuki Kinouchi, Kazuya Kanemaru, Yoshihisa Nishiyama, Hideyuki Yoshioka, Toru Horikoshi*

**311**

**Callosal Lesions After Subarachnoid Hemorrhage are Related to Poor Clinical Grade and Poor Outcome**

*Hidetsugu Maekawa, Hiromu Hadeishi, Michihiro Tanaka*

**312**

**Early Carotid Artery Stenting for Symptomatic Carotid Artery Stenosis**

*Kyung Sun Song, Chang Wan Oh, Jae Seung Bang, O-Ki Kwon*

**313**

**Prognostic Factors for Acute Ischemic Stroke Patients with and without Neurosurgical Endovascular Intervention**

Benjamin M. Zussman, Adam Olszewski, Naomi Sell, Jill Galvao, Elisabeth Colacino, Mitchell Gil Maltenfort, Stavropoula I. Tjoumakaris, Aaron S. Dumont, Robert H. Rosenwasser, Pascal Jabbour, L. Fernando Gonzalez

**314**

**Clip Ligation of Unruptured Intracranial Aneurysms: A Prospective Midterm Outcome Study**

Yunus Aydin, Halit Çavusoglu, Okan Kahyaoglu, Ahmet Müslüman, Osman Türkménoglu, Adem Yılmaz, Meltem Can, Yüksel Sahin

**316**

**Endovascular Treatment of Posterior Communicating Artery Aneurysms with Third Nerve Palsy: Clinical Outcomes and Predictors of Nerve Recovery**

Nohra Chalouhi, Thana Theofanis, Pascal Jabbour, Aaron S. Dumont, L. Fernando Gonzalez, Robert H. Rosenwasser, Robert M. Starke, Stavropoula I. Tjoumakaris

**317**

**MR Imaging Assessment of Cerebral Arteriovenous Malformations After Stereotactic Radiosurgery**

Tim O'Connor, William A. Friedman

**318**

**Treatment of Small Ruptured Intracranial Aneurysms: Comparison of Surgical and Endovascular Options**

Nohra Chalouhi, David Penn, Stavropoula I. Tjoumakaris, Pascal Jabbour, L. Fernando Gonzalez, Robert M. Starke, Muhammad Ali, Robert H. Rosenwasser, Aaron S. Dumont

**319**

**Simvastatin with Niaspan Improves Neurological Outcome After Experimental Intracerebral Hemorrhage**

Dongmei Yang, Yuxia Han, Jianfeng Zhang, Michael Chopp, Donald M. Seyfried

**320**

**Cost Comparison of Endovascular Treatment of Anterior Circulation Aneurysms with the Pipeline Embolization Device Versus Stent-Assisted Coiling.**

Geoffrey P. Colby, Li-Mei Lin, Alexandra Paul, Judy Huang, Rafael J. Tamargo, Alexander Lewis Coon

**321**

**Angioplasty without Stenting for Symptomatic Intracranial Atherosclerotic Stenosis**

Travis Michael Dumont, Peter Kan, Jorge Luis Eller, Kenneth V. Snyder, L. Nelson Hopkins, III, Adnan Hussain Siddiqui, Elad I. Levy

**322****Long Term Outcomes After Staged Volume Stereotactic Radiosurgery for Large Arteriovenous Malformations***Paul P. Huang, Stephen Rush, Bernadine Donahue, Ashwatha Narayana, Tibor Becske, Peter K. Nelson, Kerry Han, Jafar J. Jafar***323****Cilostazol Improves Postoperative Outcome After Good-Grade Aneurysmal Subarachnoid Hemorrhage***Nobutake Sadamasa, Masaomi Koyanagi, Osamu Narumi, Tsukasa Sato, Akira Handa, Sen Yamagata***324****Analysis of Complications in Aneurysm Treatment Using the Neuroform, Enterprise, and Pipeline Stents***Andrew Kelly Johnson, Daniel M Heiferman, Louis Fogg, Demetrius K. Lopes***325****The Evolution of Endovascular Treatment of Carotid Cavernous Fistulas: A Single Institution Experience***Andrew F. Ducruet, Felipe Albuquerque, R. Webster Crowley, M. Yashar S. Kalani, Cameron G. McDougall***326****Anatomical and Functional Improvements in Corticospinal Tract Regeneration in Chronic Stroke Patients After an Intracranial Implantation of Autologous CD34 Stem Cells: Phase II Trial***Shinn-Zong (John) Lin, Woei-Cherng Shyu, Demeral Liu***328****Effect of Pre-Operative Embolization on AVM Blood Flow***Ali Alaraj, Victor Aletich, Alexander Ivanov, Andrew P. Carlson, Gerald Oh, Fady T. Charbel, Sepideh Amin-Hanjani***329****Embolization followed by Radiosurgery for the Treatment of Brain Arteriovenous Malformations (AVMs).***Justin G. Santarelli, Gary K. Steinberg, Huy M. Do, Robert L. Dodd, John Adler, Steven D. Chang, Mary Marcellus, Ryan A. McTaggart, Michael P. Marks***330****Intra-Arterial Viral Mediated Gene Therapy After Osmotic Blood Brain Barrier Disruption in Mice***David Rubin, Conor Foley, Alejandro Santillan, Dolan Sondhi, Neil Hackett, Ronald Crystal, Y. Pierre Gobin, Douglas J. Ballon***331****Subarachnoid Hemorrhage-Induced Hydrocephalus in Rats***Shuichi Okubo, Richard Keep, Ya Hua, Jennifer Strahle, Guohua Xi*



### 332

#### **Lack of Functional Patency of Lamina Terminalis After Fenestration following Clipping of Anterior Circulation Aneurysms**

Muhammad Omar Chohan, Andrew P. Carlson, Blaine Hart, Howard Yonas

### 334

#### **Calculation of Arterial Supply Fraction of Intracranial Arteriovenous Malformations with Vessel Encoded Arterial Spin Labeling MRI**

Songlin Yu, Rui Wang, Shuo Wang, Rong Wang, Dong Zhang, Yuanli Zhao, Danny JJ Wang, Jizong Zhao

### 335

#### **Long-term Seizure Outcome Following Intracranial Cavernous Malformation Resection**

Churl-Su Kwon, Sameer A. Sheth, Jonathan Neal, Emad N. Eskandar, Christopher S. Ogilvy

### 336

#### **The Effect of Preoperative Smoking on Cerebral Blood Flow and Cognitive Improvement After Carotid Revascularization**

Alison L. Brzoska, Jill Curran, Sepideh Amin-Hanjani, Michael Westerveld, Alejandro Berenstein, David J. Langer, Andrea F. Douglas, Zoher Ghogawala

### 337

#### **Cerebral Aneurysms in Pregnancy: Pregnancy and Delivery Do Not Increase the Risk of Aneurysm Rupture**

Young Woo Kim, Dan Neal, Brian Lim Hoh

### 338

#### **Stromal Cell-Derived Factor-1 Promotes Vasculogenesis and Inflammatory Cell Invasion and Proliferation in Aneurysm Walls: A Proposed Mechanism for Aneurysm Growth and Rupture**

Brian Lim Hoh, Koji Hosaka, Daniel Downes, Kamil Nowicki, Erin N. Wilmer, Gregory James Velat, Edward W. Scott

### 339

#### **Long-term Outcome of Endovascular Embolization of Complex Intracranial Aneurysms with Onyx: Experience from a Single Tertiary Center**

Leonardo Rangel-Castilla, Yi Jonathan Zhang, Sean Barber, Richard Klucznik, Diaz M. Orlando

### 340

#### **Clinical Assessment of Deficits After SAH - Hasty Neurosurgeons and Accurate Neurologists**

Christian Fung, Jürgen Beck, Lara Lauber, René Müri, Andreas Raabe, Thomas Nyffeler

**341****Utilization of Quantitative MRA in Assessing Leptomeningeal Collateralization in Adult Patients with Unilateral Moyamoya Disease***Jeff Beecher, Shital Gandhi, Jeffrey Katz, Karen Black, Jacob Januszewski, David J. Langer***342****Minocycline Prevents Transient Focal Neurologic Deterioration due to Cerebral Hyperperfusion After EC-IC Bypass for Moyamoya Disease***Miki Fujimura, Hiroaki Shimizu, Takashi Inoue, Masayuki Ezura, Hiroshi Uenohara, Teiji Tominaga***343****Does Timely Intervention for Ruptured Aneurysm Affect Outcome? A United States Nationwide Inpatient Sample Database Study***Jai D. Thakur, Ashish Sonig, Prashant Chittiboina, Imad S. Khan, Bharat Guthikonda, Anil Nanda***344****Contouring Intracranial Arteriovenous Malformations for CyberKnife Stereotactic Radiosurgery with Three Dimensional Rotational Angiography: Technical Note***Anand Veeravagu, Ake Hansasuta, Bowen Jiang, Robert E. Lieberman, Steven D. Chang***345****An International Survey of Asymptomatic Incidental Aneurysm Management: The Gap between Isuia and Practice***Nabeel Al-Shafai, Michael Cusimano***346****Outcomes and Long-term Economic Impact of Coiling Versus Clipping for Unruptured Intracranial Aneurysms***Michael Rhee, Robbi Lyle Franklin, Ranjith Babu, Beatrice Ugiliweneza, Jonathan E. Hodes, Shahid Mehdi Nimjee, Ali R. Zomorodi, Chirag G. Patil, Shivanand P. Lad, Maxwell Boakye***347****Aneurysm Embolization Treatment Efficiency: Comparing the Penumbra Coil 400 System to Conventional Coils***Justin Robert Mascitelli, Aanand Patel, Ashwin Kamath, Maritsa Polykarpou, Henry Moyle, Aman B. Patel***348****Ethanol Administration After Stroke Regulates Mitochondrial Oxidative Phosphorylation by Targeting Cytochrome c Oxidase and Pyruvate Dehydrogenase***Karam Asmaro, Ryan Benjamin Kochanski, Changya Peng, Tetsuhiro Higashida, Icksoo Lee, Maik Hüttemann, Murali Guthikonda, Yuchuan Ding*

**349**

**Biphasic Expression of NF-kappaB in Experimental Subarachnoid Hemorrhage in Vivo and Vitro**

*Wanchun You, Mengliang Zhou, Wei Li, Zong Zhuang, Xiangjun Ji, Yong Tang, Jixin Shi*

**351**

**Multi-center Comparison of Forced-Suction Thrombectomy to All Other Techniques in the Treatment of Acute Stroke**

*Scott Douglas Simon, Kathryn Kunigelis, Kenneth C. Liu*

**352**

**Cerebral Aneurysm “Re-clipping”: – A United States Nationwide Inpatient Sample (NIS) Database Study.**

*Ashish Sonig, Rishi Kumar Wadhwa, Jai D. Thakur, Imad S. Khan, Anil Nanda*

**353**

**Compatibility of Dimethyl Sulfoxide with Off-Label Endovascular Catheters**

*Paul Richard, Brian T. Jankowitz*

**354**

**Differential Protocol Adherence Affects Rates of TPA Delivery**

*Richard Donald Fessler, Chiu To, Robert Dunne, Paul Cullis, Omar M. Qahwash, Boyd Richards, Vickie Gordon, Carrie Stover*

**355**

**Role of The Haptoglobin Protein in Carotid Artery Aneurysm Formation**

*Jacob James Ruzevick, Christopher Mitchell Jackson, Gustavo Pradilla, Tomas Garzon-Muvdi, Rafael J. Tamargo*

**356**

**High-Resolution Vessel Wall MRI Identifies the Source of Subarachnoid Hemorrhage In Patients with Multiple Aneurysms: Preliminary Results**

*Charles Christian Matouk, Daniel M Mandell, Murat Gunel, Ajay Malhotra, Ketan R. Bulsara, Ryan Matthew Hebert, Michelle H. Johnson, David J. Mikulis, Frank J. Minja*

**357**

**Management of Vasospasm in Subarachnoid Haemorrhage: Goal-Targeted Haemoglobin Therapy.**

*Adam Grose*

**358**

**Intracranial Aneurysm Treatment Modalities over a 10-year Period at a Single Institution: Trends and Insights**

*Christopher S. Eddleman, Babu Guai Welch, Jonathan A. White, G. Lee Pride, Duke S. Samson*

**359**

**Are Aneurysms Treated with Balloon Assisted Coiling and Stent Assisted Coiling Morphologically Different? Results from a Modern Endovascular Series**

*Eric C. Peterson, Brian Hanak, Michael Robert Levitt, Joshua William Osburn, Ryan Patrick Morton, Laligam N. Sekhar, Louis J. Kim*

**360**

**Disposition Following Endovascular Treatment of Unruptured Intracranial Aneurysms: ICU or Regular Ward?**

*Anthony Michael Burrows, Giuseppe Lanzino*

---

**SECTION ON DISORDERS OF THE SPINE AND PERIPHERAL NERVES**

MODERATORS: *Zoher Ghogawala, Justin S. Smith*

---

**361**

**Preoperative Laryngoscopic Examination in Patients Undergoing Repeat Anterior Cervical Discectomy and Fusion**

*William F. Young*

**362**

**5-HT<sub>2C</sub> Receptors and NMDA Interact In Situ via a Src Kinase Pathway to Enhance Spinal Cord Motoneuronal Activity**

*Nauman Shaukat Chaudhry, Gregory E. Bigford, Robert W. Keane, Alice Holohean*

**363**

**A Prospective Multicenter Registry on Clinical Value of the O-arm® Imaging System and StealthStation® Navigation for Improving the Rate of Correct Thoraco-lumbar Pedicle Screw Placement**

*Erik Van de Kelft, Francesco Costa, David Van der Planken, Frederic Schils*

**364**

**Rates and Causes of Mortality Associated with Spine Surgery Based on 108,419 Procedures: A Review of the Scoliosis Research Society Morbidity and Mortality Database**

*Manish K. Kasliwal, Justin S. Smith, Dwight Saulle, Christopher P. Ames, Lawrence Lenke, Steven D. Glassman, David W. Polly, Jr., Christopher I. Shaffrey*

## 365

### **Operatively Treated Young Adult Spinal Deformity (ASD) Patients (d<sup>></sup> 50 Years of Age) Have Larger Scoliosis and Worse Quality of Life than Nonoperative Patients Despite Normal Sagittal Alignment**

Kai-Ming G. Fu, Shay Bess, Christopher I. Shaffrey, Justin S. Smith, Virginie Lafage, Frank Schwab, Douglas C. Burton, Behrooz A. Akbarnia, Christopher P. Ames, Oheneba Boachie-Adjei, Robert Hart, Eric Klineberg, Munish Gupta, Praveen V. Mummaneni

## 366

### **Health Impact Comparison of Different Disease States and Population Norms to Adult Spinal Deformity (ASD): A Call for Medical Attention**

Kai-Ming G. Fu, Shay Bess, Frank Schwab, Christopher I. Shaffrey, Virginie Lafage, Justin S. Smith, Christopher P. Ames, Oheneba Boachie-Adjei, Douglas C. Burton, Robert Hart, Eric Klineberg, Richard A. Hostin, Gregory Mundis, Praveen V. Mummaneni

## 367

### **Radiographic Outcomes of Spinal Deformity Correction in Adult Patients: A Critical Analysis of Variability and Failures Across Deformity Patterns**

Virginie Lafage, Bertrand Moal, Frank Schwab, Christopher P. Ames, Justin S. Smith, Praveen V. Mummaneni, Gregory Mundis, Jamie Terran, Eric Klineberg, Robert Hart, Oheneba Boachie-Adjei, Shay Bess, Christopher I. Shaffrey, International Spine Study Group

## 368

### **Proximal Junctional Failure (PJF) Classification and Severity Scale: Development and Validation of a Standardized System**

Robert Hart, Shay Bess, Douglas C. Burton, Christopher I. Shaffrey, Themistocles Protopsaltis, Oheneba Boachie-Adjei, Christopher P. Ames, Vedat Deviren, Richard A. Hostin, Eric Klineberg, Praveen V. Mummaneni, Gregory Mundis, Justin S. Smith, Frank Schwab

## 369

### **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, Eric Klineberg, Frank Schwab, Christopher I. Shaffrey, Bertrand Moal, Christopher P. Ames, Richard A. Hostin, Kai-Ming G. Fu, Douglas C. Burton, Behrooz A. Akbarnia, Munish Gupta, Robert Hart, Shay Bess, Virginie Lafage, International Spine Study Group

**370****Outcomes Following 3 Column Spinal Osteotomies: Impact of HRQOL and Age on Two-Year Follow-up**

Christopher P. Ames, Justin K. Scheer, Justin S. Smith, Munish Gupta, Eric Klineberg, Robert Hart, Douglas C. Burton, Richard A. Hostin, Michael F. O'Brien, Christopher I. Shaffrey, Shay Bess, Frank Schwab, Vedat Deviren, Khaled Kebaish, International Spine Study Group

**371****Reoperation Rates and Impact on Outcome in a Large Prospective Multicenter Adult Spinal Deformity Database**

Christopher P. Ames, Justin K. Scheer, Justin S. Smith, Eric Klineberg, Robert Hart, Gregory Mundis, Douglas C. Burton, Richard A. Hostin, Michael F. O'Brien, Christopher I. Shaffrey, Shay Bess, Frank Schwab, Khaled Kebaish, Vedat Deviren, International Spine Study Group

**372****Analysis of the Cost-Effectiveness of Surgical Treatment for Adult Spinal Deformity**

Richard A. Hostin, Michael F. O'Brien, Ian McCarthy, Neil Fleming, Gerald Ogola, Rustam Kudyakov, Kathleen Richter, Rajiv Saigal, Sigurd Berven, Vedat Deviren, Shay Bess, Christopher P. Ames, International Spine Study Group

**373****Clinical Improvement Through Surgery for Adult Spinal Deformity (ASD): What can be Expected and Who is Likely to Benefit Most?**

Bertrand Moal, Virginie Lafage, Justin S. Smith, Christopher P. Ames, Praveen V. Mummaneni, Gregory Mundis, Jamie Terran, Eric Klineberg, Robert Hart, Shay Bess, Oheneba Boachie-Adjei, Christopher I. Shaffrey, Frank Schwab, International Spine Study Group

**374****Effect of Upper Instrumented Vertebra (UIV) on Adult Spinal Deformity (ASD) Correction, Maintenance of Correction, and Health Related Quality of Life (HRQOL) Following Lumbar Pedicle Subtraction Osteotomy (PSO)**

Christopher P. Ames, Justin K. Scheer, Vedat Deviren, Justin S. Smith, Shay Bess, Richard A. Hostin, Eric Klineberg, Robert Hart, Gregory Mundis, Michael F. O'Brien, Christopher I. Shaffrey, Virginie Lafage, Khaled Kebaish, Frank Schwab, International Spine Study Group

**375****Analysis of Health Related Quality of Life Improvements among Patients with Adult Spinal Deformity**

Christopher P. Ames, Richard A. Hostin, Ian McCarthy, Neil Fleming, Gerald Ogola, Rustam Kudyakov, Kathleen Richter, Shay Bess, Rajiv Saigal, Sigurd Berven, Vedat Deviren, Michael F. O'Brien, International Spine Study Group

**376**

**The Safety and Benefits of Hyperacute Stabilisation for Unstable Spinal Fractures.**

Rory K.J. Murphy, Yizheng He, S. Kathleen Bandt,  
Neill Marshall Wright

**377**

**Long-term Outcome of Unilateral Laminotomy with Bilateral Decompression on Lumbar Stenosis: Outcome in SF-36, Rate of Progress of Spondylolisthesis and Re-operation on Patients with or without Preoperative Spondylolisthesis.**

Han Soo Chang, Tsuchiya Tsukasa, Soichi Oya, Toru Matsui

**378**

**Operating Room Radiation Exposure in Cone Beam Computed Tomography-based, Image-guided Spinal Surgery**

Eric W. Nottmeier, Stephen M. Pirris, Cammi Bowman,  
Sherri Kimes, Steve Edwards, Kevin Nelson

**379**

**Related Quality of Life Outcomes with Minimally Invasive Transforaminal Lumbar Interbody Fusion Based on Long-term Analysis of 318 Consecutive Patients**

Mick J. Perez-Cruet, G. Zachary White, Evan M. Begun,  
Robert A. Collins

**380**

**Biomechanics of Lumbar Lateral Interbody Fixation Augmented with Pedicle Screws, Facet Screws, or Spinous Process Plate**

Kingsley Chin, Luis Perez-Orribo, Phillip M. Reyes, Anna Sawa,  
Steven Anagnost, Vivek Kushwaha, Josue Gabriel, Roger Sung,  
S. Craig Meyer, Carl A. Bruce, Warren Yu, Neil R. Crawford

**381**

**Biomechanics of Constructs utilizing Pedicle Screws, Facet Screws, and Spinous Process Plates After TLIF**

Kingsley Chin, Luis Perez-Orribo, Phillip M. Reyes, Anna Sawa,  
Steven Anagnost, Vivek Kushwaha, Josue Gabriel, Roger Sung,  
S. Craig Meyer, Carl A. Bruce, Warren Yu, Neil R. Crawford

**382**

**Biomechanics of Stand-Alone Lateral Interbody Fixation at L4-5 and L5-S1**

Kingsley Chin, Luis Perez-Orribo, Phillip M. Reyes, Anna Sawa,  
Steven Anagnost, Vivek Kushwaha, Josue Gabriel, Roger Sung,  
S. Craig Meyer, Carl A. Bruce, Warren Yu, Neil R. Crawford

**383**

**A Retrospective Study of 113 Consecutive Cases of Surgically Treated Spondylodiscitis Patients. A Single Center Experience**

Ehab Shiban, Insa Janssen, Florian Ringel, Bernhard Meyer,  
Michael Stoffel

**384****A Comparative Study of Centerpiece Micro-Plate Fixation and Suture Suspension Fixation in Unilateral Open-Door Laminoplasty Surgery***Hua Chen, Liu Hao***385****A Clinical Prediction Rule to Determine Outcomes in Patients with Cervical Spondylotic Myelopathy undergoing Surgical Treatment: Data from the Prospective, Multicentre AOSpine CSM Study***Lindsay Tetreault, Michael G. Fehlings, Branko Kopjar, Alexander R. Vaccaro, Paul M. Arnold, Sangwook Yoon, Eric M. Massicotte***386****Long-term Re-operation Rates and Health Related Cost with Surgical Treatment of Lumbar Spondylolisthesis***Abdul Baker, Shivanand P. Lad, Chirag G. Patil, Maxwell Boakye***387****Comparison of Operative and Non-operative Management of Spinal Epidural Abscess: a Retrospective Review of Clinical and Laboratory Predictors of Outcome***David E. Connor, Prashant Chittiboina, Gloria Caldito, Anil Nanda***388****Surgical Site Infections in Minimally Invasive Lumbar Spine Surgery: A Case Series***Amjad Nasr Anaizi, Dana E. Adkins, Faheem A. Sandhu***389****Palliative Surgical Treatment of Spinal Metastases Using Posterolateral Decompression with Sole Posterior Instrumentation – Analysis Of 57 Consecutive Patients and Review of the Literature***Jan Walter, Pedro Dünisch, Rupert Reichart, Albrecht Waschke, Rolf Kalff, Christian Ewald***390****Lumbar Disc Degeneration Induced by Annular Injury in an Ovine Model. Radiological Analysis and Comparison With Biochemical Changes***David A. Oehme, Peter Ghosh, Tony Goldschlager, Susan Shimmon, Angela Wu, Ian Ghosh, Jeffrey Victor Rosenfeld, Graham Jenkin***391****Comparison of Motion Changes and Clinical Outcomes between Cervical Disc Replacement and Anterior Cervical Discectomy and Fusion in Single Level Cervical Degenerative Disease***Jae-Won Jang, Jung-Kil Lee, Sang-Deok Kim, Hyung-Sik Moon, Bo-Ra Seo, Tae-Sun Kim, Soo-Han Kim*



**392**

## **Long-term Effects of Bone Morphogenetic Protein in Lumbar Fusion**

*Beatrice Ugiliweneza, Ranjith Babu, Chirag G. Patil, Shivanand P. Lad, Abdul Baker, Maxwell Boakye*

**393**

## **Imaging Progression of Spinal Tumors in Neurofibromatosis Type II**

*Gregory P. Lekovic, Doniel Drazin, John L. Go, Marc S. Schwartz*

**395**

## **Central Cord Syndrome: Review of Treatment at a Level One Trauma Center**

*Vernard S Fennell, Jesse Skoch, Mandana (Moni) Behbahani, Tracy Lynn Ansay, Milad Behbahaninia, Rein Anton*

**396**

## **Impact of Instrumented Single Level Lumbar Surgical Strategies on Quality of Life**

*Bahattin Tanrikulu, Zafer Orkun Toktas, Gulden Demirci, Deniz Konya*

**397**

## **Modified Frailty Index Predicts 30 Day Morbidity and Mortality from Spine Surgery**

*Rushna Ali, Jason M. Schwalb, Heath J. Antoine, Ilan Rubinfeld*

**398**

## **Should Suboptimal Lumbar Pedicle Screws be Revised?: A Cadaveric Biomechanical Study**

*Rishi Kumar Wadhwa, Jai D. Thakur, Jeremy James, Imad S. Khan, Osama Ahmed, Alan Ogden, Bharat Guthikonda, Anil Nanda*

**400**

## **Transforaminal vs Posterior Interbody Fusion: A Comparison of Outcomes.**

*Katharine Cronk-Bendett, Samuel Kalb, Richard Donald Lefevre, Ali M. Elhadi M., Nicholas Theodore*

**401**

## **Prodisc-C System for Cervical Arthroplasty**

*Giovanni Grasso, Rosario Maugeri, Francesco Certo, Domenico Gerardo Iacopino*

**402**

## **Role of Erythropoietin and its Receptor in Intervertebral Disc Degeneration**

*Giovanni Grasso, Rosario Maugeri, Francesco Certo, Francesca Graziano, Domenico Gerardo Iacopino*

**403**

## **Minimally Invasive Treatment of Lumbar Spinal Stenosis by Interspinous Devices: Critical Analysis Based on Six-years of Clinical Experience**

*Giovanni Grasso, Rosario Maugeri, Francesco Certo, Francesca Graziano, Domenico Gerardo Iacopino*

**404**

**Do Patients with Cervical Spondylotic Myelopathy Have Neural Degeneration Rostral to the Level of Compression? A Diffusion Tensor Imaging Study**

*Aditya Vedantam, Shekar N. Kurpad, Michael Jirjis, Brian Schmit, John L. Ulmer, Marjorie C. Wang*

**405**

**The Benefits of Adjustable Scout Lines in Advanced Cervical Spinal Imaging**

*Brian W. Hill, Bowei Song, Robert A. Morgan, Matthew Kang*

**406**

**Characterization and Limitations of Diffusion Tensor Imaging Metrics in the Cervical Spinal Cord in Neurologically Intact Subjects.**

*Shekar N. Kurpad, Aditya Vedantam, Marjorie C. Wang, Michael Jirjis, Brian Schmit, John L. Ulmer*

**407**

**Pedicle Screw Hubbing in the Adult and Immature Thoracic Spine: A Biomechanical and Micro-Computed Tomography Evaluation**

*Daniel Gene Kang, Ronald A. Lehman, Anton E. Dmitriev, Rachel Gaume, Adam J. Bevevino, Haines Paik, Lawrence Lenke*

**408**

**Preoperative Patients Perception of Motor Deficit Caused by Lumbar Disc Herniation and its Influence on the Health-Related Quality of Life Measures**

*Asdrubal Falavigna, Orlando Righesso, Alisson Teles, Julia Bossardi*

**409**

**Independent Predictors of Complication, Recurrence, and Survival in Patients Who Underwent Surgery for Spinal Metastasis**

*Darryl Lau, Matthew R. Leach, Frank La Marca, Paul Park*

**410**

**Thoracolumbar Burst Fractures: Anterior Decompression and Stabilization versus Transpedicular Decompression and Short Segment Fixation**

*Amgad El-said Matter*

---

## SECTION ON NEUROTRAUMA AND CRITICAL CARE

MODERATORS: *Jack Jallo, Christopher J. Madden, Joseph Christopher Zacko*

---

**411**

**Assessment of Ultrasound as a Diagnostic Modality for Detecting Cervical Spine Fractures in Head-injured Patients**

*Deepak Agrawal, Sanjeev Bhoi, Tej Prakash Sinha*

**412**

### **Decompressive Craniectomy Complications: A Review of 191 Patients**

*Sandra Ho, Benjamin M. Zussman, Yinn Cher Ooi, Muhammad Sheikh, Vishal C. Patel, Mitchell Gil Maltenfort, Peter Amenta, Jack Jallo*

**413**

### **Effect of Insurance and Racial Disparities on Outcomes in Traumatic Brain Injury Patients**

*Michael Schiraldi, Chirag G. Patil, Debraj Mukherjee, Beatrice Ugiliweneza, Miriam Nuno, Shivanand P. Lad, Maxwell Boakye*

**414**

### **Predictors of Outcome in The Treatment of Geriatric Odontoid Fractures: A Multi-Center Prospective Study**

*Michael G. Fehlings, Arun Ranganathan, Branko Kopjar, Alexander R. Vaccaro, Paul M. Arnold*

**415**

### **Expression of CD24 in the Cerebral Cortex After Experimental Closed Head Injury in Mice**

*Wei Li, Haiping Ling, Huandong Liu, Wanchun You, Zhenrui Chen, Yong Tang, Mengliang Zhou, Chunhua Hang*

**416**

### **Mild Elevations of INR are not Associated with Significantly Increased Risk in Coumadin-associated Subdural Hematoma**

*Marie Roguski, Julian K. Wu*

**417**

### **Brainbook: A Statewide Pilot for Educating High School Athletes About Traumatic Brain Injury**

*Nicholas Theodore, Javier Cardenas, M. Yashar S. Kalani, Quincy Conley, Angela Barrus, Robert Christopherson, Renee Pilbeam*

**419**

### **Outcome of Acute and Chronic Subdural Hematomas in Patient 90 Years and Older**

*Martina Stippler, Pedro Miguel Ramirez, Chamiza McIndoe, Aldo Fabrizio Berti, Edwin Nemoto, Nicholas Villalobos*

**420**

### **Angiopoietin-2 in Cerebrospinal Fluid and Serum as a Predictive Biomarker for Brain Injury**

*Prashant Chittiboina, Vijay Ganta, Keith L. Soctt, Walter E. Cromer, Michael J. Mathis, Anil Nanda, Steven J. Alexander*

**421**

### **Early Thromboembolism Chemoprophylaxis is Safe and Efficacious After Intracranial Hemorrhage from Traumatic Brain Injury**

*Ali Farooqui, Bradley Hiser, N. Scott Litofsky*

**422**

**Complete Traumatic Occlusion of the Carotid and Vertebral Arteries: Acute Stroke Rate in the Biffi IV population**

Ryan Morton, Brian Hanak, Michael Robert Levitt, Jason Jer Jia Chang, Eric C. Peterson, Joshua William Osbun, Louis J. Kim, Randall M. Chesnut

**423**

**Aseptic Bone Resorption After Autologous Bone Flap Reinsertion Following Decompressive Craniotomy-Risk Factors for Bone Flap Necrosis**

Pedro Duenisch, Jan Walter, Peter Schmidt, Yasser Sakr, Rolff Kalff, Albrecht Waschke, Christian Ewald

**424**

**Response to Acute Concussive Injury in Soccer Players: Is Gender a Modifying Factor?**

Scott L. Zuckerman, Gary Solomon, Richard F Haase, Jonathan Forbes, Young M. Lee, Mitchell Odom, Allen K. Sills, Jr., Mark R. Lovell

**425**

**A Longitudinal MRI Study of Traumatic Axonal Injury in Patients with Moderate and Severe Traumatic Brain Injury**

Kent Gøran Moen, Toril Skandsen, Mari Folvik, Veronika Brezova, Kjell Arne Kvistad, Jana Rydland, Geoffrey T. Manley, Anne Vik

**426**

**Raised ICP Secondary Insults – Analysis of Preceding Blood Pressure Instability and Outcomes from the BrainIT Database**

Maaz BJ Syed, Kamran Gaba, Imran Liaquat, Ian Piper

**427**

**Mechanical Tissue Resuscitation Treatment Reduces Injured Brain Tissue Swelling and Intracerebral Hemorrhage in a Pig Traumatic Brain Injury Model**

Zhenlin Zheng, Louis C. Argenta, Michael Morykwas

**429**

**Decompressive Craniectomy for Post-Traumatic Refractory Intracranial Hypertension: Update on the RESCUEicp Trial**

Angelos G. Koliass, Ivan Timofeev, Elizabeth A. Corteen, Sian C Ingham, Marek Czosnyka, John Douglas Pickard, David K. Menon, Peter J. Kirkpatrick, Peter J. Hutchinson

---

## SECTION ON PAIN

MODERATORS: Andre Machado, Christopher J. Winfree

---

**431**

**Analgesic Efficacy of Diclofenac Sodium in Reducing the Total Dose of Morphine Injection and Its Adverse Effect After Lumbar Disc Surgery**

Yazdan Dokht Ghafari M., Mohamad Shimia

**432**

### **Unilateral Temporalis Muscle Hypertrophy: A Rare Cause of Swelling of the Temple**

*Huan Wang, Arash Farahvar, William C. Olivero, Bonnie Wang, Seong-Jin Moon*

**433**

### **MR Diffusion Tensor Imaging Applied to the Spinal Cord of Patients with Neuropathic Pain Secondary to Herpes Zoster Infection**

*Adriano Yacubian Fernandes, Erich T. Fonoff, Fabio Eduardo Fernandes, Massako Okada, Daniel Ciampi, Maria da Graça Martins, Marcelo Bordalo, Manoel Jacobsen Teixeira*

**434**

### **Caps on Postoperative Analgesia Do Not Impact Length of Stay in Spine Surgery Patients**

*Mohammad Sami Walid, Kevin Douglas Waits, Joe S. Robinson*

**435**

### **Spontaneous Superior Sagittal Sinus Thrombosis After Lumboperitoneal Shunt Insertion for Pseudotumor Cerebri**

*Konstantina Svokos, Alan R. Turtz, Sarah Woodrow*

**436**

### **Durability of Neurosurgical Intervention for Trigeminal Neuralgia: Evidence from a Validated Measure of Pain and Daily Function at Long-term Follow-Up**

*Sukhmeet Sandhu, Casey H. Halpern, Venus BS Vakhshori, Maxwell B. Merkow, John Y.K. Lee*

---

## **SECTION ON PEDIATRIC NEUROLOGICAL SURGERY**

MODERATORS: *Paul Klimo, Jr., Cormac O. Maher*

---

**437**

### **Conservative Management of Incidental Low-grade Gliomas in the Pediatric Population**

*Zarina S. Ali, Shih-Shan Lang, Leslie N. Sutton*

**438**

### **Surgical Mortality and Selected Complications in 273 Consecutive Craniotomies for Intracranial Tumors in Pediatric Patients**

*Torstein Ragnar Meling, Benjamin Lassen, Pål A Rønning, Eirik Helseth*

**439**

### **Rh-BMP-2 for L5-S1 Arthrodesis in Long Fusions to the Pelvis for Neuromuscular Spinal Deformity in the Pediatric Age Group: Analysis of 9 Patients**

*Akash J. Patel, Loyola V. Gressot, Steven Wei-Hung Hwang, Daniel H. Fulkerson, Andrew Jea*

**441**

**Pediatric Meningioma: A Single-center Experience with Fifteen Consecutive Cases**

*Ricardo Santos de Oliveira, Marcelo Santos Volpon, Luciano Furlanetti, Elvis Terci Valera, Maria Sol Brassesco, Helio Rubens Machado*

**443**

**Design and Validation of a Synthetic Pediatric Spinal Simulator for Tethered Cord Syndrome**

*Tobias Alecio Mattei, Carlos R. Goulart, Julian Lin*

**444**

**Nonterminal Myelocystoceles: A Prospective Study**

*Natarajan Muthukumar*

**445**

**Computed Tomography Morphometric Analysis for Lateral Mass Screw Placement in the Pediatric Middle to Lower Cervical Spine**

*George Al Shamy, Akash J. Patel, Javier Mata, Jacob Cherian, Steven Hwang, Andrew Jea*

**446**

**Pediatric Vagus Nerve Stimulation: Where Are We Now and Where Do We Go From Here?**

*Eric R. Trumble, Matthew Diehl*

**447**

**Anatomical Variation in Endoscopic III Ventricular Floor Anatomy: Analysis of 228 Procedures**

*Tenneti Venkata Ramakrishna Murty, Syed Ameer Basha Paspala, Narasimha Rao Thiriveedhi*

**448**

**Surgical Intervention Versus Observation for Pediatric Patients with Epidural Hematomas**

*Joshua J. Loya, Brian Flaherty, Alan Schroeder, John Scherk, Roland A. Torres*

**449**

**Neuroendoscopic Management of Intraventricular Neurocysticercosis in the Pediatric Population**

*Jaime G. Torres-Corzo, José Juan Sánchez-Rodríguez, J. Humberto Tapia-Pérez, Roberto Rodríguez-Della Vecchia, Enrique Rentería-Palomo, Leonardo Rangel-Castilla*

**450**

**The Effect of Decompression Surgery on the 4th Ventricle in Chiari Malformation Type I**

*Noam Alperin, Sang H. Lee, Derek Monette, Lisa Kornse, Barth A. Green*

**451**

**Moyamoya Disease with Vascular Collateralization along Ventriculoperitoneal Shunt: A Case Series**

*Amit Singla, R. Michael Scott, Edward R. Smith*

**452**

**Recessive LAMC3 Mutations Cause Malformations of Occipital Cortical Development**

*Tanyeri Barak, Angeliki Louvi, Hande Kaymakcalan-Celebiler, Saliha Yilmaz, Mehmet Bakircioglu, Ahmet Okay Caglayan, Ali Kemal Ozturk, Katsuhito Yasuno, Kaya Bilguvar, Murat Gunel*

**453**

**Moyamoya Associated with Alagille Syndrome: A Multicenter Study of Surgical Revascularization and Outcomes**

*Lissa Catherine Baird, Binita Kamath, Nancy B Spinner, Rebecca N. Ichord, Tim Bernard, Heather Miller, David Piccoli, R. Michael Scott, Edward R. Smith*

**454**

**Percutaneous Destructive Procedures for Pain Control in Pediatric Oncology: Report of 2 Cases and Technical Considerations**

*Ashwin Viswanathan, Gaddum Reddy*

**455**

**Concordance of Urinary Biomarker Levels with Source Tissue Gene Expression in Pediatric Ependymoma**

*Brendan McNeish, Xuezhe Han, Tomoshige Akino, Michael Klagsbrun, Edward R. Smith*

**456**

**Outcome of Surgical Management of Patients with Split Cord Malformation Associated with Myelomeningocele**

*Ahmed Mohamed Elsayaf, Amgad El-said Matter*

---

## **SECTION ON STEREOTACTIC AND FUNCTIONAL NEUROSURGERY**

MODERATORS: *Aviva Abosch, Emad N. Eskandar, Michael Gordon Kaplitt, Peter Konrad*

---

**458**

**Surgical Outcome in Non-lesional Intractable Pediatric Epilepsy.**

*Michael Opoku-Darko, L. Bello-Espinosa, B. Brooks, WJ Hader*

**459**

**Intraoperative Radiography During DBS Utilizing CT Scan and Fluoroscopy: Differences in Radiation Doses Received by Patients. Preliminary Results from a Prospective Non-randomized Study**

*Prasad Vannemreddy, Steven M. Falowski, Roy A.E. Bakay*

460

**Post-mortem Brain Dissections for Clarification of the Three-Dimensional Anatomy Involved in Deep Brain Stimulation for OCD***Takashi Morishita, Albert L. Rhoton, Jr., Michael S. Okun, Kelly D. Foote*

463

**The Surgical Results, Imaging, EEG and Pathological Features of the Intractable Epilepsy Secondary to Ulegyria***Fang Tie*

464

**Multi-electrode Cortical Prosthesis for Vision Restoration in the Blind***Jeffrey Victor Rosenfeld, Arthur James Lowery, Marcello Rosa, Ramesh Rajan, Wai Ho Li, Anthony John Hall, Helen M. Ackland*

467

**Transmantle Sign (TMS) in Cortical Dysplasia: A Unique Radiologic Entity with Excellent Prognosis for Seizure-control***Doris D. Wang, Abby Deans, A. James Barkovich, Nicholas M. Barbaro, Paul Garcia, Edward F. Chang*

470

**Theta-band Specific Changes in Phase-Synchronization between Ecog Electrodes during Movement***Anthony Harris, Felix Darvas, Jeffrey G. Ojemann*

471

**Neuroendoscopic Assisted Anterior Selective Amigdalohippocampectomy: Report of Two Cases***Mauricio Mandel, Matheus S. Soares, Felipe Saad, Hugo Sterman*

473

**Accuracy of DBS Electrode Placement using NexFrame and the Ceretom Intraoperative CT Scanner***Ahmed M. Raslan, Kim J. Burchiel, Stephen E. Griffith, Valerie C. Anderson*

474

**Ventricular Size and Executive Functioning Outcome in Endoscopic Third Ventriculostomy***Maureen Lacy, David Levy, Sophia Shakur, David M. Frim*

475

**Deep Brain Stimulation in Patients over 70 Years of Age***James McInerney, Elana Farace, Nicholas James Brandmeir, Emily P. Sieg*

476

**De-afferentation Pain Treatment with DBS – A Case Series of 7 Patients***Shazia Javed, Jim Dunham, Pankaj K. Singh, Sadaquate Khan, Tony Pickering, Peter Mews, Nikunj K. Patel*



## SECTION ON TUMORS

MODERATORS: *Frederick George Barker, Frederick F. Lang, Viviane S. Tabar*

**477**

### **MRI Tractography Determining Extent of Resection in Intrinsic Brain Lesions Surgery: Clinical Study**

*Mohamed E. El-Fiki, Ahmed Rabie*

**478**

### **Prognosis of Patients with Multifocal Glioblastoma: A Case-Controlled Study**

*Debraj Mukherjee, Anthony Yi, Adam Elramsisy, Jethro Hu, John S. Yu, Dwain Irvin, Serguei Bannykh, Keith L. Black, Miriam Nuno, Chirag G. Patil*

**481**

### **Outcome Analysis of Endoscopic Endonasal Approach for Growth Hormone Secreting Pituitary Adenoma using 2000 and 2010 Consensus Criteria for Remission**

*Samuel S. Shin, Matthew J. Tormenti, Alessandro Paluzzi, Sue M. Challinor, William E. Rothfus, Yue-Fang Chang, Hanady Zainah, Juan Carlos Fernandez-Miranda, Carl Snyderman, Paul A. Gardner*

**482**

### **A Bispecific Tandem ScFv Recruits Immune Cells to Treat Established Intracranial Tumors in Mice Implanted with Orthotopic EGFRvIII-expressing Human Glioma Xenograft.**

*Bryan D. Choi, Chien-Tsun Kuan, Mingqing Cai, Allan H. Friedman, Darell Bigner, John H. Sampson*

**483**

### **Multiple Surgical Resections for Patients with Glioblastoma: Prolonging Survival**

*Kaisorn Chaichana, Jon D. Weingart, Alessandro Olivi, Gary L. Gallia, Michael Lim, Henry Brem, Alfredo Quinones-Hinojosa*

**485**

### **Transarterial Onyx Embolization of Paragangliomas of the Carotid Body**

*M. Yashar S. Kalani, Andrew F. Ducruet, R. Webster Crowley, Felipe Albuquerque, Robert F. Spetzler, Cameron G. McDougall*

**486**

### **The Effect of Surgery on Health Related Quality of Life and Functional Outcome in Patients with Metastatic Epidural Spinal Cord Compression – the AOSpine North America Prospective Multicenter Study**

*Michael G. Fehlings, Branko Kopjar, Charles Fisher, Alexander R. Vaccaro, Paul M. Arnold, James M. Schuster, Joel Finkelstein, Laurence D. Rhines, Mark B. Dekutoski, Ziya L. Gokaslan, John France*

487

**Sporadic Spinal Hemangioblastomas can be Effectively Treated by Microsurgery Alone***Halil Ibrahim Sun, Imre M. Usseli, Koray Ozduman, Serdar Ozgen, Necmettin Pamir*

488

**Novel Oncogene Discovery in Meningiomas***Peleg M Horowitz, Priscilla Brastianos, Sandro Santagata, Robert Jones, Aaron McKenna, Gad Getz, Keith L Ligon, Emanuele Palescandolo, Paul Van Hummelen, William Hahn, Ian F. Dunn, Rameen Beroukhim*

489

**3D Orbital Anatomy as Seen in a Fronto-Orbito Zygomatic Approach***Collin Tebo, Alexander Evins, Davide Boeris, Philip E. Stieg, Antonio Bernardo*

490

**Perioperative Changes of Thyroid Hormone Concentrations in Brain Tumor Patients are Associated with Outcomes***Adomas Bunevicius, Vytenis Deltuva, Arimantas Tamasauskas, Sarunas Tamasauskas, Robertas Bunevicius*

491

**Patterns of Care and Prognosis of Patients with Anaplastic Astrocytoma***Miriam Nuno, Kristen Nosova, Christine Carico, Debraj Mukherjee, Jeremy D. Rudnick, Jethro Hu, John S. Yu, Keith L. Black, Chirag G. Patil*

492

**Neural Stem Cell (NSC)-Mediated Conversion of 5-Fluorocytosine (5-FC) to 5-Fluorouracil (5-FU) in Recurrent Glioma Patients: A Proof of Concept.***Jana Portnow, Timothy W. Synold, Simon F Lacey, Massimo D'Apuzzo, Paul H Frankel, Mike Yue Chen, Karen S. Aboody, Behnam Badie*

493

**The Occipital Interhemispheric Approach to Lesions of the Pineal Region – A Single Institution Experience***Anil Nanda, Marc Christopher Manix*

494

**Feasibility of Improvement in Ophthalmic Functions in Cavernous Sinus Meningiomas: Single-Surgeon Experience and a Systematic Review***Jai D. Thakur, Ashish Sonig, Rishi Kumar Wadhwa, Imad S. Khan, Anil Nanda*

495

**Preservation of Glial Regulatory Gene Network in Glioblastoma Multiforme***Bartley Mitchell, Stacey Glasgow, Benjamin Deneen*

**497**

**Analysis of 3610 Cerebral Metastases Treated by Gamma Knife Radiosurgery Reveals Cumulative Tumor Volume as a Novel Prognostic Factor for Patient Survival.**

*David D. Gonda, Teddy E Kim, J. Dawn Waters, John F. Alksne, Kenneth Ott, Steven J. Goetsch, David W. Hodgens, Bob S. Carter, Clark C. Chen*

**498**

**Multi-Disciplinary Management of Skull Base Paragangliomas**

*Gregory P. Lekovic*

**499**

**Insurance Status Predicts Survival Outcomes in Patients with GBM**

*Gurvinder Kaur, Matthew Sun, Orin Bloch, Michael Oh, Rajwant Kaur, Michael Safaee, Michael Edward Sughrue, Shaghaygh Mortezaei, Annette Molinaro, Jennifer L. Clarke, Nicholas Butowski, Michael Prados, Susan Chang, Manish Kumar Aghi, Michael William McDermott, Mitchel S. Berger, Andrew T. Parsa*

**500**

**Neuronal Immunoexpression Defines a Distinct Subtype of Adult Primary Supratentorial Glioblastoma with a Better Prognosis**

*Johan Pallud, Edouard Dezamis, Etienne Audureau, Bertrand Devaux, Nader Sanai, Philippe Page, Catherine Oppenheim, Jean-François Meder, Pascale Varlet, François-Xavier Roux*

**501**

**Olfactory Groove Meningiomas: Our Clinical Experience**

*David Baruch Schul, Stefan Wolf, Christiano B. Lumenta*

**503**

**Patients with Cerebellar Glioblastoma Have the Same Prognosis as Patients with Supratentorial Glioblastoma.**

*Sunil Jeswani, Miriam Nuno, Debraj Mukherjee, Vanessa Folkerts, Shivanand P. Lad, John S. Yu, Maxwell Boakye, Keith L. Black, Chirag G. Patil*

**504**

**Radiographic Response in Metastatic Brain Lesions Treated with Stereotactic Radiosurgery**

*Alireza Mohammad Mohammadi, Pablo F. Recinos, Michael A. Vogelbaum, Samuel T. Chao, Robert J. Weil, Gene H. Barnett, John H. Suh, Gennady Neyman, Lilyana Angelov*

**505**

**Preliminary Results: Effectiveness and Safety of 5-Aminolevulinic Acid for Surgical Resection of High Grade Glioma**

*Manel Tardáguila Serrano, Pilar Teixidor, Eva Montané, Gloria Villalba, Arráez Miguel Angel, Ramón Florensa Brichs*

**506**

**Surgical Management and Outcome of Meningiomas with Tentorial Involvement: Our Institutional Experience**

*David Baruch Schul, Stefan Wolf, Matthias Krammer, Christiano B. Lumenta*

**507**

**A Targeted Non-viral Vector Based On Polyethylenimine Increases Transfection Efficiency of U87 Glioblastoma Cells**

*Chuanwei Wang, Liping Ning, Zaijun Lu, Jie Gong, Hongwei Wang, Shugan Zhu, Xingang Li, Yuguang Liu*

**508**

**Intracranial Injectable Tumor Model: Technical Advancements**

*Cristian Gragnaniello, Filippo Gagliardi, Remi Nader, Alan Siu, Zachary N. Litvack, Bruno De Luca, Anthony J. Caputy, Pietro Mortini, Kevin Seex*

**509**

**Maxillary Swing Approach to Extended Infratemporal Fossa Tumors**

*Sacit Bulent Omay, Stewart Adam, Nazlee Zebardast, Ketan R. Bulsara, Benjamin L. Judson*

**510**

**Safety and Efficacy of Endoscopic Endonasal Approach for Recurrent Pituitary Lesions**

*Yi Lu, Garni Barkhoudarian, Edward R. Laws*

**511**

**The Utility of Dynamic CT Angiography in Pre-operative Evaluation of Skull Base Tumors**

*Wenya Linda Bi, Patrick Brown, Mohamad Abolfotoh, Ossama Al-Mefty, Srinivasan Mukundan, Jr., Ian F. Dunn*

**512**

**Ventricular Tumors Neuroendoscopic Diagnosis and Treatment**

*Piero Andrea Oppido, Fabio Cattani, Carmine Carapella, Enzo Morace*

**513**

**Multi-center Study of Frameless Stereotactic Radiosurgery for Breast Cancer Brain Metastases**

*Eric K. Oermann, Marie-Adele S Kress, David Morris, Jing Wu, Riane B Hoffman, Sean P. Collins, Huma Chaudry, Brian T. Collins, Matthew G. Ewend*

**514**

**Readability Assessment of Internet-Based Patient Education Materials Related to Pituitary Tumors**

*Deepa V. Cherla, Jean Anderson Eloy, James K. Liu*

**515**

**Challenges and Surgical Nuances in Reconstruction of Large Planum Sphenoidale Tuberculum Sellae Defects After Endoscopic Endonasal Resection of Parasellar Skull Base Tumors**

*Jean Anderson Eloy, Pratik A. Shukla, Osamah J. Choudhry, James K. Liu*

**516**

**Intra-arterial and Intra-venous Delivery of Bevacizumab Have Synergistic Effects in Recurrent Glioblastoma Treatment: Impact on Symptom Control, Steroid Dose and MRI Tumor Volume**

*Matei A. Banu, Michael Mooney, Kartik Kesavabhotla, Casey Tsai, Nicholas Berry, John A. Boockvar*

**517**

**Evaluation of Intra-arterial Bevacizumab Delivery on Tumor Growth, Oncogenic Signaling, and Stem Cell Microenvironment in a Human GBM Xenograft**

*Nicholas Berry, Matei A. Banu, Demirkan B. Gursel, Kartik Kesavabhotla, Casey Tsai, Alejandro Santillan, Conor Foley, Jan-Karl Burkhardt, John A. Boockvar*

**518**

**Tuberculoma of the Central Nervous System: Optimal Treatment and Post-Surgical Management**

*Arthur Raymond DeLance, Michael Oh, Michael Safaee, Gurvinder Kaur, Matthew Sun, Andrew T. Parsa*

**519**

**Free Nasoseptal Mucosal Flap for Endoscopic Endonasal Transsphenoidal Skull Base Surgery: Results and Operative Technique**

*Jared Knopman, Nicholas Berry, Daniel Hill, Lauren K. Broderick, Alejandro Pino, Alexander Sarkisian, Meng-Ko Tsai, Jose Villa-Uribe, Anna Starikova, Michelle Siao, Matei A. Banu, Clark Huang, John A. Boockvar*

**520**

**A Systematic Analysis of Tumor Control for Surgical Treatment with Stereotactic Radiation in Craniopharyngioma Patients**

*Winward Choy, Andy Trang, Marko Spasic, Andrew T. Parsa, Isaac Yang*

**521**

**Characterizing Isoform Expression of EMR2 in Glioblastoma**

*Michael Safaee, Joseph Kim, Matthew Sun, Gurvinder Kaur, Michael Oh, Andrew T. Parsa*

**522**

**Elucidating the Role of CD97 in Malignant Glioma**

*Michael Safaee, Matthew Sun, Joseph Kim, Gurvinder Kaur, Michael Oh, Andrew T. Parsa*

**523****Treatment Options for Third Ventricular Colloid Cysts: Evaluation of Results***Amgad El-said Matter, Khaled Mohamed El-Sayed***524****The Endoscopic Endonasal Approach to Extradural and Intradural Clival Lesions***Eduardo A. S. Vellutini, Aldo Stamm, Leonardo Balsalobre, Diego Hermann***525****The Role of Surgical Navigation-Assisted Endoscopic Biopsy for Brain Tumors***Shinya Nagahisa, Takuro Hayashi, Mitsuhiro Hasegawa, Yuichi Hirose***TUESDAY, OCTOBER 9**

2:00 – 3:30 PM

**ORAL PRESENTATIONS**

Room E450B

**SECTION ON DISORDERS OF THE SPINE AND PERIPHERAL NERVES**MODERATORS: *D. Kojo Hamilton, Charles A. Sansur*

2:00 PM – 2:09 PM

**133****International Variations in the Clinical Presentation and Management of Cervical Spondylotic Myelopathy: One-Year Outcomes of the AOSpine Multicenter Prospective CSM-I Study***Michael G. Fehlings, Branko Kopjar, Shashank Sharad Kale, Helton Defino, Guiseppe Barbagallo, Ronald H.M.A. Bartels, Qiang Zhou, Paul M. Arnold, Mehmet Zileli, Gamaliel Tan, Osmar Moraes, Yasutsugu Yukawa, Manuel Alvarado, Massimo Scerrati, Tomoaki Toyone, Masato Tanaka, Ciaran Bolger*

2:09 PM – 2:18 PM

**134****BMP and Cancer Risk: Results of a Large, Propensity Matched Study***Shivanand P. Lad, Jacob H. Bagley, Beatrice Ugiliweneza, Ranjith Babu, Isaac Karikari, Chirag G. Patil, Maxwell Boakye*

2:18 PM – 2:27 PM

**135**

**Comprehensive Medical Management of Lumbar Stenosis and Spondylolisthesis is not Effective in Real-world Care: A Value Analysis of Cost, Pain, Disability and Quality of Life**

Scott L. Parker, Scott Zuckerman, David Shau, Stephen Mendenhall, Saniya S. Godil, Matthew McGirt

2:27 PM – 2:36 PM

**136**

**Diffusion Tensor Imaging for the Assessment of Cord Compression in Degenerative Cervical Stenosis**

Zafer Orkun Toktas, Bahattin Tanrikulu, Gulden Demirci, Deniz Konya

2:36 PM – 2:45 PM

**137**

**Comparison Between Patient and Surgeon Perception of Outcomes of Operations for Degenerative Spine Disease: A Prospective Blinded Database Study**

Ben Z. Roitberg, Bart Thaci, Frederick D. Brown, Jingjing Shen, Sandi Karen Lam

2:45 PM – 2:54 PM

**138**

**The Schwab-SRS Adult Spinal Deformity Classification: Assessment and Clinical Correlations Based On a Prospective Operative and Non-Operative Cohort**

Frank Schwab, Virginie Lafage, Christopher I. Shaffrey, Justin S. Smith, Bertrand Moal, Christopher P. Ames, Kai-Ming G. Fu, Praveen V. Mummaneni, Douglas C. Burton, Munish Gupta, Vedat Deviren, Gregory Mundis, Robert Hart, Shay Bess, International Spine Study Group

2:54 PM – 3:03 PM

**139**

**Prevalence and Risk Factors for Proximal Junctional Kyphosis (PJK) Following Realignment Surgery by Pedicle Subtraction Osteotomy: A Multicenter Review**

Gregory Mundis, Virginie Lafage, Frank Schwab, Christopher P. Ames, Bertrand Moal, Richard A. Hostin, Praveen V. Mummaneni, Khaled Kebaish, Justin S. Smith, Vedat Deviren, Christopher I. Shaffrey, Eric Klineberg, Shay Bess, International Spine Study Group

3:03 PM – 3:12 PM

**140**

**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, Breton G. Line, Oheneba Boachie-Adjei, Robert Hart, Virginie Lafage, Frank Schwab, Behrooz A. Akbarnia, Christopher P. Ames, Douglas C. Burton, Richard A. Hostin, Eric Klineberg, Gregory Mundis, Christopher I. Shaffrey, Justin S. Smith, International Spine Study Group

3:12 PM – 3:21 PM

**141****Local Disease Control for Spinal Metastases Following Separation Surgery and Adjuvant Hypofractionated or High-Dose Single-Fraction Stereotactic Radiation Therapy: Outcomes Analysis in 186 Patients***Ilya Laufer, Bryan Iorgulescu, Talia Chapman, Eric Lis, Weiji Shi, Zhigang Zhang, Brett Cox, Mark H. Bilsky, Yoshiya Josh Yamada*

3:21 PM – 3:30 PM

**142****Intradiscal Injection of Simvastatin Results in Radiologic, Histologic, and Genetic Evidence of Disc Regeneration in a Rat Model of Degenerative Disc Disease***Khoi Duc Than, Shayan Rahman, Lin Wang, Adam Khan, Kwaku A. Kyere, Frank La Marca, Huina Zhang, Paul Park, Chia-Ying Lin*

Room E450A

**SECTION ON NEUROTRAUMA AND CRITICAL CARE**MODERATORS: *Jason H. Huang, Jamie Sue Ullman***SYNTHES AWARD FOR RESIDENT RESEARCH ON BRAIN AND CRANIOFACIAL INJURY**

2:00 PM – 2:09 PM

**143****Diffusion Tensor and Susceptibility-weighted Imaging in Concussion Assessment of National Football League Players***Neal Luther, Sumit Niogi, Kenneth Kutner, Scott Rodeo, Teena Shetty, Russell Warren, Leigh Weiss, Ronnie Barnes, Robert Zimmerman, Apostolos Tsiouris, Roger Hartl***SYNTHES AWARD FOR RESIDENT RESEARCH ON SPINAL CORD AND SPINAL COLUMN INJURY**

2:09 PM – 2:18 PM

**144****Visualizing Plasticity and Altered Neuronal Signaling in the Injured Human Spinal Cord with fMRI***David W. Cadotte, Patrick Stroman, Rachael Bosma, David J. Mikulis, Natalia Nugaeva, Michael G. Fehlings*

2:18 PM – 2:27 PM

**145****Sport-Related Concussion and Age: Number of Days to Neurocognitive Baseline***Scott L. Zuckerman, Mitchell Odom, Young M. Lee, Jonathan Forbes, Allen K. Sills, Jr., Gary Solomon*

2:27 PM – 2:36 PM

**146****Modeling and Machine Learning of Cerebrovascular Dynamics: A Framework for Monitoring Unmeasurable Patient Variables***Ahilan Sivaganesan, Yusuf Erol, Geoffrey T. Manley, Stuart Russell*



2:36 PM - 2:45 PM

**147**

**Correlation between the Thoracolumbar Injury Classification and Severity Score (TLICS) and Delayed Surgery for Acute Thoracolumbar Compression and Burst Fractures in Patients without Neurologic Injury**

*Christopher Michael Bonfield, Matthew B. Maserati, David O. Okonkwo, Adam S. Kanter*

2:45 PM - 2:54 PM

**148**

**Preinjury Antithrombotic Therapy and the Elderly TBI Patient**

*Ramesh Grandhi, Gillian Harrison, Joshua S. Bauer, Zoya Voronovich, Phillip Parry, Dederia H. Nicholas, Gary Marshall, Louis H. Alarcon, David O. Okonkwo*

2:54 PM - 3:03 PM

**149**

**Nanoprodrug Accumulates in Experimental Traumatic Brain Injury**

*John S. Yu, Bong-Seop Lee, Morgan Clond, Eric Ley*

3:03 PM - 3:12 PM

**150**

**Rethinking Autoregulation in Traumatic Brain Injury: A Majority of Patients with Disruptive Dynamic Autoregulation Do Not Respond to an Elevated Cerebral Perfusion Pressure**

*Eric C. Peterson, Kathleen Tozer, Wendy Cohen, Arthur M. Lam, Randall Matthew Chesnut*

3:12 PM - 3:21 PM

**151**

**Retrospective Review of Fresh Frozen Plasma Dosing To Correct Elevated INR Due To Warfarin: Development of a Dose Response Curve**

*David Stockwell, Travis Michael Dumont, Bruce I. Tranmer, Paul Jarvis*

3:21 PM - 3:30 PM

**152**

**The Value of Scheduled Repeat Cranial Computed Tomography Following Mild Head Injury: Single Center Experience and Meta-Analysis**

*Saleh A. Almenawer, Julia Bogza, Blake Yarascavitch, Niv Sne, Forough Farrokhyar, Naresh Murty, Kesava Reddy*

**SECTION ON PAIN**MODERATORS: *Christopher J. Winfree , Parag Patil***RONALD TASKER AWARD**

2:00 PM – 2:09 PM

**153****Accurately Measuring Outcomes After Surgery for Adult Chiari I Malformation: Determining the Most Valid and Responsive Instruments***Saniya S. Godil, Scott L. Parker, Scott Zuckerman, Stephen Mendenhall, Matthew McGirt*

2:09 PM – 2:18 PM

**154****Determination of Minimum Clinically Important Difference (MCID) in Pain After Percutaneous Stereotactic Rhizotomy (PSR) for Trigeminal Neuralgia (TN)***Vishruth K. Reddy, Scott L. Parker, Samit A. Patrawala, Dennis T. Lockney, Pei-Fang Su, Robert A. Mericle*

2:18 PM – 2:27 PM

**155****Percutaneous Balloon Compression versus Percutaneous Retrogasserian Glycerol Rhizotomy for the Treatment of Trigeminal Neuralgia***Par Asplund, Patric Blomstedt, Tommy A. Bergenheim*

2:27 PM – 2:36 PM

**156****Neuroimaging Biomarkers of Chronic Neuropathic Pain and its Modulation: Resting State fMRI Signals during Spinal Cord Stimulation***Chima Oluigbo, Amir Abduljalil, Xiangyu Yang, Andrew Kalnin, Michael V. Knopp, Ali R. Rezai*

2:36 PM – 2:45 PM

**157****Utilization of Spinal Cord Stimulation in Patients with Failed Back Surgery Syndrome***Jonathan Choi, Ranjith Babu, Jacob H. Bagley, Vijay Agarwal, Mary I. Huang, Beatrice Ugiliweneza, Chirag G. Patil, Maxwell Boakye, Shivanand P. Lad*

2:45 PM – 2:54 PM

**158****Experience with Fifteen Years of Dorsal Root Entry Zone (DREZ) Lesioning at a Single Institution***Jonathan Forbes, Walter Jermakowicz, Luke Tomycz, Peter Konrad*

2:54 PM – 3:03 PM

**159****Microsurgical Descending Tractotomy in Cases of Intractable Trigeminal Pain Syndromes***John A. Braca, Nikhil Kanti Patel, Douglas E. Anderson*

3:03 PM – 3:12 PM

**160**

### **Surgical Outcomes of Trigeminal Neuralgia in Patients with Multiple Sclerosis**

*Alireza Mohammad Mohammadi, Joung H. Lee, Gene H. Barnett*

3:12 PM – 3:21 PM

**161**

### **Intraoperative Magnetic Resonance Imaging as a Guide to Patient Selection for Duraplasty After Bony Decompression for Adult Chiari I Malformation: A Preliminary Experience**

*S. Kathleen Bandt, Spiros L. Blackburn, Chris Lim, John Evans, Michael R. Chicoine*

3:21 PM – 3:30 PM

**162**

### **The Value of Endoscopy in Microvascular Decompression Procedures**

*Morgan Broggi, Paolo Ferroli, Francesco Acerbi, Giovanni Tringali, Angelo Franzini, Giovanni Broggi*

---

Room E351

---

## **SECTION ON PEDIATRIC NEUROLOGICAL SURGERY**

MODERATORS: *Philipp R. Aldana, Vivek Mehta*

---

### **SHERRY APPLE RESIDENT TRAVEL SCHOLARSHIP**

2:00 PM – 2:09 PM

**163**

### **Beneficial Functional Outcomes of Selective Dorsal Rhizotomy (SDR) Are Long Lasting and Alter the Natural History of Motor Development in Spastic Cerebral Palsy**

*Roy W.R. Dudley, Michele Parolin, Bruno Gagnon, Rajeet Singh Saluja, Rita Yap, Kathleen Monpetit, Joanne Ruck, Chantal Poulin, Marie-Andree Cantin, Thierry Benaroch, Jean-Pierre Farmer*

2:09 PM – 2:18 PM

**164**

### **L1CAM as a Marker of an Aggressive Tumor Phenotype in Children with Juvenile Pilocytic Astrocytoma**

*Dawn Kernagis, Michael Datto, Roger McLendon, Gerald A. Grant*

2:18 PM – 2:27 PM

**165**

### **Multiplexed Urinary Biomarkers Identify the Presence of Pediatric Medulloblastoma**

*Xuezhe Han, Brendan McNeish, Edward R. Smith*

2:27 PM – 2:36 PM

**166**

### **An Analysis of Factors Determining the Need for CSF Diversion Procedures After Posterior Fossa Tumor Surgery in Children**

*Gopalakrishnan Chittur Viswanathan, Girish Ramachandran Menon, Suresh Nair, Amit Dhakoji*

2:36 PM – 2:45 PM

**167**

## **Isolated Fourth Ventricle: To Shunt or Stent?**

*Aaron Mohanty, Satyanarayana Satish, Kim H. Manwaring*

2:45 PM – 2:54 PM

**168**

## **Moyamoya Syndrome Associated with Neurofibromatosis Type 1 in Children: Perioperative and Long-Term Outcome After Pial Synangiosis**

*Nicole J. Ullrich, McKenzie Koss, R. Michael Scott, Edward R. Smith*

2:54 PM – 3:03 PM

**169**

## **Efficacy and Safety of Endoscopic Transventricular Lamina Terminalis Fenestration for Hydrocephalus**

*Jaime G. Torres-Corzo, Leonardo Rangel-Castilla, Andrew Jea, Steven Wei-Hung Hwang*

3:03 PM – 3:12 PM

**170**

## **Cognitive Changes Following Disconnective Surgery for Intractable Hemispheric/Sub-hemispheric Pediatric Epilepsy**

*Roy Thomas Daniel, Ari G. Chacko, Santhosh George Thomas*

3:12 PM – 3:21 PM

**171**

## **Computed Tomography Based Anatomical Study to Assess Feasibility of Pedicle Screw Placement in the Lumbar and Lower Thoracic Pediatric Spine**

*Kashif Ajaz Shaikh, Garrett Bennett, Ian Kainoa White, Carli Bullis, Daniel H. Fulkerson*

3:21 PM – 3:30 PM

**172**

## **Rate of Pediatric Ventriculo-peritoneal Shunt Infection After Prophylactic Administration of Intrathecal Vancomycin**

*Nathan Christopher Rowland, Sue Ditmyer, Peter P. Sun*

2:00 – 3:30 PM

Room E350

**MULTIDISCIPLINARY ORAL PRESENTATIONS II**

MODERATOR: *Costas George Hadjipanayis*

2:03 PM – 2:10 PM

**194**

**The Effect of Temozolomide on Glioblastoma Survival in a Well-defined Population**

*Pål A. Rønning, Torstein Ragnar Meling, Eirik Helseth, Tom B. Johannesen*

2:10 PM – 2:17 PM

**195**

**Improving Benchmarking in Spine Surgery: Suggested Modifications of the UHC Algorithm for Calculating Readmission Rates Following Spine Surgery**

*Beejal Y. Amin, William Schairer, Tsung-Hsi Tu, Christopher P. Ames, Sigurd Berven, Dean Chou, Vedat Deviren, Steven Takemoto, Praveen V. Mummaneni*

2:17 PM – 2:24 PM

**196**

**Intrathecal Infusion of Decorin to Sub-acute Contusion Spinal Cord Injury Promotes Robust Functional Recovery**

*Kenneth Minor, Kyle Jasper, Jeannette E. Davies, Stephen Davies*

2:24 PM – 2:31 PM

**197**

**Career Satisfaction and Burnout Among U.S. Neurosurgeons: A Feasibility and Pilot Study**

*Paul Klimo, Jr., Michael G. DeCuypere, Brian T. Ragel, Shirley McCartney, William T. Couldwell, Frederick A. Boop*

2:31 PM – 2:38 PM

**198**

**An Antigen Vault Nanoparticle Vaccine Can Effectively Stimulate Dendritic Cells and Activate a Specific T cell Immune Response**

*Isaac Yang, Yang Jian, Heather Garcia, Winward Choy, Daniel Tetsuji Nagasawa, Marko Spasic, Andy Trang, Horacio Soto, Kate Ericsson, Dominique Lisiero, Michelle Hickey, Carol Kruse, Robert M. Prins, Leonard Rome, Linda M. Liau*

2:38 PM – 2:45 PM

**199**

**Outcomes After Microvascular Decompression for Patients with Trigeminal Neuralgia and Suspected Multiple Sclerosis**

*Bruce E. Pollock, Kathy J. Stein*

2:45 PM – 2:52 PM

**200**

## **Continued Concern of Parent Vessel Steno-Occlusive Progression with Onyx HD-500 and the Utility of Quantitative MRI in Serial Assessment**

*Andrew P. Carlson, Ali Alaraj, Sepideh Amin-Hanjani, Fady T. Charbel, Victor Aletich*

2:52 PM – 2:59 PM

**201**

## **Comparative Evaluation of Percutaneous Radiofrequency Rhizotomy, Stereotactic Radiosurgery and Microvascular Decompression in the Management of Refractory Trigeminal Neuralgia**

*Patrick W. Hitchon, Shafik N. Wassef, Ed Pennigton, Jennifer Noeller, Voncille Johnson*

2:59 PM – 3:06 PM

**202**

## **Diffusion Tensor Imaging Changes with Decompression of Chiari I Malformation**

*Sergey Abeshaus, Seth Friedman, Sandy Poliachik, Andrew Poliakov, Dennis Shaw, Jeffrey G. Ojemann, Richard G. Ellenbogen*

3:06 PM – 3:13 PM

**203**

## **Cross-frequency Coupling in the Human Hippocampus During Item Retrieval in Episodic Memory**

*Bradley Lega, John Burke, Joshua J. Jacobs, Ashwini Dayal Sharan, Gordon H. Baltuch, Michael J. Kahana*

3:13 PM – 3:20 PM

**204**

## **Determining The Quality and Effectiveness of Spine Surgery: Is Patient Satisfaction a Valid Proxy?**

*Saniya S. Godil, Scott L. Parker, Scott Zuckerman, Stephen Mendenhall, Matthew McGirt*

## **BRAINLAB COMMUNITY NEUROSURGERY AWARD**

3:20 PM – 3:27 PM

**205**

## **Surgical Management of Adult Intrinsic Brainstem Tumors**

*Charles Teo*

# **CORPORATE SUPPORTERS OF THE CNS ANNUAL MEETING AND THE PRACTICAL COURSES**

*The following companies have provided support for  
the CNS Practical Courses:*

**Ad-Tech Medical Instrument Corporation**  
**Alpha Omega**  
**Brainlab, Inc.**  
**Codman, a Johnson & Johnson Company**  
**DePuy Spine, Inc., a Johnson & Johnson Company**  
**Elekta, Inc.**  
**Fred Haer Corporation (FHC)**  
**Globus Medical Inc.**  
**Integra**  
**Karl Storz Endoscopy**  
**Lanx**  
**Medtronic**  
**Medtronic Powered Surgical Solutions (Medtronic NT)**  
**MRI Interventions (SurgiVision, Inc.)**  
**NuVasive**  
**Stryker CMF**  
**Stryker Spine**  
**Synthes CMF**  
**Synthes Spine**  
**TrueVision Systems, Inc.**  
**Varian Surgical Sciences**

---

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

**Codman, a Johnson & Johnson Company**  
**Covidien**  
**DePuy Synthes Spine, a Johnson & Johnson Company**  
**Integra**  
**Lippincott Williams and Wilkins - WKH**  
**Stryker**

## NEURO ALERT

INTRA-OPERATIVE NEUROMONITORING (IONM) SERVICES



## A VISION TO PROTECT THE NERVES

Our Clinical Director Has Provided IONM Since 1982

neuroalert.com

### INTRA-OPERATIVE NEUROMONITORING:

- Provides improved patient safety
- Offers reduced liability for physician and facility
- Enhances outcomes
- IONM has become the standard of care for many spine and neurological surgeries

The delivery of IONM is not standardized, and there are substantial variations among IONM providers. For the best patient outcomes, trust **Neuro Alert!**

## COMMITMENT TO SAFETY, QUALITY AND ACCURACY

Please allow us a short appointment so we can review the benefits of working with our team at Neuro Alert.

Neuro Alert Offers a Multi-Modality Monitoring Approach

SSEP

EMG

MEP

Triggered EMG

BAER

TCMEP

EEG

ECOG

Speech Mapping

Motor Mapping



A clinical **POWERHOUSE** in the use and interpretation of IONM



## EXHIBITORS

**Accelitech** 2413

773-850-3300  
www.accelitech.biz

**Accuray, Inc.** 629

408-716-4600  
www accuray.com

**Ad-Tech Medical Instrument Corporation** 1703

800-776-1555  
www.adtechmedical.com

**Advanced Biologics** 1629

800-272-0267  
www.advancedbiologics.com

**Allen Medical Systems** 1203

978-263-5401  
www.allenmedical.com

**AlloSource** 626

720-873-0213  
www.allosource.org

**Alpha Omega** 1829

877-919-6288  
www.alphaomega-eng.com

**Amedica Corp.** 808

801-839-3500  
www.amedicacorp.com

**American Association of Neurological Surgeons** 2425

847-378-0500  
www.aans.org

**American Surgical Company** 2029

800-343-0060  
www.americansurgical.com

**\* Apex Medical, Inc.** 503

610-240-4905  
www.apexmed.com

**Arteriocyte Medical Systems** 828

866-660-2674  
http://www.arteriocyte.com

**Aspen Medical Products** 1506

949-681-0200  
www.aspenmp.com

*\* Thank you to these companies for providing an educational grant in support of CNS programs and activities!*

<b>ASSI-Accurate Surgical</b>	<b>310</b>
800-645-3569 www accuratesurgical.com	
<b>Bassett Medical Center</b>	<b>730</b>
607-547-6982 www.bassett.org	
<b>Baxano, Inc.</b>	<b>306</b>
408-514-2200 www.baxano.com	
<b>Baxter Healthcare</b>	<b>1227</b>
224-948-5243 www.baxterbiosurgery.com	
<b>* Biomet Microfixation</b>	<b>1609</b>
904-741-4400 www.biometmicrofixation.com	
<b>Biomet Spine &amp; Bone Healing Technologies</b>	<b>1613</b>
973-299-9300 www.biometspine.com	
<b>BK Medical Systems Inc.</b>	<b>507</b>
800-876-7226 www.bkmed.com	
<b>Blue Chip Surgical Center Partners, LLC</b>	<b>2007</b>
513-561-8900 x16 www.bluechipsurgical.com	
<b>Boss Instruments Ltd</b>	<b>323</b>
540-832-5000 www.bossinst.com	
<b>Boston Scientific</b>	<b>525</b>
661-949-4000 www.controlyourpain.com	
<b>Bradshaw Medical, Inc</b>	<b>2308</b>
262-925-1374 www.bradshaw-medical.com	
<b>Brainlab, Inc.</b>	<b>1220</b>
708-409-1343 www.brainlab.com	
<b>Buxton BioMedical</b>	<b>506</b>
973-560-4848 www.buxtonbio.com	
<b>Cadence Health - Central Dupage Hospital/Delnor Hospital</b>	<b>2131</b>
509-735-6481 www.cadwell.com	

## EXHIBITORS

<b>Cadwell Laboratories, Inc.</b>	<b>325</b>
509-735-6481 www.cadwell.com	
<b>* Carl Zeiss Meditec</b>	<b>920</b>
925-557-4100 www.meditec.zeiss.com	
<b>CCV</b>	<b>627</b>
877-272-4869 www.citowcv.com	
<b>Centers for Medicare and Medicaid Services</b>	<b>425</b>
410-786-7423 www.cms.gov/MLNGenInfo	
<b>Centinel Spine, Inc.</b>	<b>703</b>
212-583-9700 www.centinelspine.com	
<b>Cleveland Clinic</b>	<b>1431</b>
216-448-8216 www.clevelandclinic.org	
<b>CMF Medicon</b>	<b>704</b>
904-642-7500 www.cmfmedicon.com	
<b>* Codman</b>	<b>1811</b>
508-880-8100 www.codman.com	
<b>Congress of Neurological Surgeons</b>	<b>812</b>
847-240-2500 www.cns.org	
<b>ContainMed, Inc.</b>	<b>2127</b>
317-487-8800 www.containmed.com	
<b>Cosman Medical</b>	<b>809</b>
781-272-6561 www.cosmanmedical.com	
<b>* Covidien</b>	<b>825</b>
203-845-1000 www.covidien.com	
<b>* DePuy Synthes Spine</b>	<b>1811</b>
508-880-8100 www.depuyshnthes.com	
<b>Designs For Vision, Inc.</b>	<b>810</b>
800-345-4009 www.designsforvision.com	

**DP Clinical, Inc. 424**

301-294-6226  
www.dpclinical.com

**Dynamic Disc Designs Corp. 1131**

250-751-0897  
www.dynamicdiscdesigns.com

**Eisai, Inc. 1604**

201-692-1100  
www.eisai.com

**Elekta 620**

770-300-9725  
www.elekta.com

**Elliquence LLC 707**

516-277-9000  
www.elliquence.com

**Elsevier Inc. 806**

215-239-3400  
www.elsevierhealth.com

**Exactech, Inc. 1132**

352-377-1140  
www.exac.com

**Fehling Surgical Instruments, Inc. 406**

800-334-5464  
www.fehlingsurgical.com

**Flagship Surgical, LLC 426**

888-633-5843  
www.flagshipsurgical.com

**Gauthier Biomedical 2032**

866-546-0010  
www.gauthierbiomedical.com

**Globus Medical 609**

610-930-1800  
www.globusmedical.com

**Harlequin Recruiting 725**

303-832-1866  
www.harlequinna.com

**Harvest Technologies Corp. 606**

508-732-7500  
www.harvesttech.com

# EXHIBITORS

<b>Hemedex, Inc.</b>	<b>2003</b>
617-577-1759 www.hemedex.com	
<b>Hitachi Aloka Medical</b>	<b>2210</b>
203-269-5088 www.hitachi-aloka.com	
<b>Hospital Corporation of America (HCA)</b>	<b>403</b>
866-889-0203 www.practicewithus.com	
<b>IMRIS</b>	<b>415</b>
204-480-7070 www.imris.com	
<b>Industrial Pharmacy Management</b>	<b>2404</b>
800-803-7776 www.ipmr.com	
<b>Inion Inc.</b>	<b>2207</b>
954-659-9224 www.inion.com	
<b>Innerspace, Inc.</b>	<b>1927</b>
714-259-7900 www.innerspacemedical.com	
<b>Innovasis, Inc.</b>	<b>1903</b>
801-261-2236 www.innovasis.com	
<b>inomed Medizintechnik GmbH</b>	<b>2406</b>
+49-7641-9414-771 www.inomed.com	
<b>* Integra</b>	<b>1520</b>
609-275-0500 www.integralife.com	
<b>IsoRay Medical Inc.</b>	<b>729</b>
509-375-1202 www.isoray.com	
<b>Journal of Neurosurgery</b>	<b>2423</b>
434-924-5503 www.thejns.org	
<b>K2M, Inc.</b>	<b>1026</b>
703-777-3155 www.k2m.com	

**Kaiser Permanente - SCPMG 1730**

800-541-7946  
<http://physiciancareers.kp.org>

**Karl Storz Endoscopy-America, Inc. 906**

800-421-0837  
[www.karlstorz.com](http://www.karlstorz.com)

**Kelyniam Global, Inc. 1530**

800-280-8192  
[www.kelyniam.com](http://www.kelyniam.com)

**Kilgore International INC 1109**

517-279-9000  
[www.kilgoreinternational.com](http://www.kilgoreinternational.com)

**Kinamed, Inc. 706**

805-384-2748  
[www.kinamed.com](http://www.kinamed.com)

**Kirwan Surgical Products, LLC 1206**

781-834-9500  
[www.ksp.com](http://www.ksp.com)

**KLS Martin Group 612**

904-641-7746  
[www.klsmartin.com](http://www.klsmartin.com)

**Kogent Surgical 1630**

636-399-7644  
[www.kogentneuro.com](http://www.kogentneuro.com)

**Koros USA, Inc. 1706**

805-529-0825  
[www.korosusa.com](http://www.korosusa.com)

**LDR 2203**

512-344-3300  
[www.ldrspine.com](http://www.ldrspine.com)

**Leica Microsystems, Inc. 1525**

800-526-0355  
[www.leica-microsystems.com](http://www.leica-microsystems.com)

**Life Instrument Corporation 1106**

781-849-0109  
[www.lifeinstruments.com](http://www.lifeinstruments.com)

**Life Spine, Inc. 326**

847-884-6117  
[www.lifespine.com](http://www.lifespine.com)

# EXHIBITORS

**\* Lippincott Williams and Wilkins - WKH 1606**

215-521-8300  
www.lww.com

**Market Access Partners 2104**

303-526-1900  
www.marketaccesspartners.com

**Mary Washington Healthcare - Physician Recruitment 2414**

540-741-4831  
www.marywashingtonhealthcare.com

**MASEP Infini Medical Science Technology Dev. Co. LTD 2213**

855-MASEP-88  
www.masepinfini.com

**Mazur Marketing 303**

630-892-2797  
www.newrongeur.com

**Medtech 1003**

+33-467-107740  
www.medtechsurgical.com

**Medtrak 1029**

414-731-7150  
www.medtrak.co

**\* Medtronic 1213**

901-396-3133  
www.medtronic.com

**MEI Healthcare Group 625**

954-341-3302  
www.mei.com

**\* MicroVention 1603**

714-247-8000  
www.microvention.com

**minSURG Corporation 1632**

727-466-4550  
www.trufuse.com

**\* Mizuho America, Inc. 1103**

800-699-2547  
www.mizuho.com

**Monteris Medical, Inc. 1230**

204-272-2220  
www.monteris.com

**Mountain States Health Alliance 404**

423-202-5654  
www.msha.com

**MRI Interventions Inc. 1129**

949-900-6833  
www.mriinterventions.com

**Nadia International, Inc. 2208**

512-301-3888  
www.ronadro.com

**National Research Council Canada 1232**

613-993-9101  
www.nrc-cnrc.gc.ca

**NEOS Surgery, S.L. 1529**

+34 93 594 47 26  
www.neosurgery.com

**Neuro Alert Monitoring Services 2129**

914-949-8501  
www.neuroalert.com

**NeuroLogica 803**

978-564-8500  
www.neurologica.com

**NeuroPoint Alliance (NPA) 2424**

847-378-0500  
www.aans.org

**New World Rarities, Ltd. 311**

631-767-7123  
www.newworldrarities.com

**NICO Corporation 1904**

317-660-7118  
www.niconeuro.com

**Nihon Kohden America 524**

800-325-0283  
www.nkusa.com

**North American Neuromodulation Society 1030**

847-375-7400  
www.neuromodulation.org

**North American Skull Base Society 1631**

310-424-3326  
www.nasbs.org



# EXHIBITORS

<b>North American Spine Society</b>	<b>2306</b>
630-230-3600 www.spine.org	
<b>NovaBone Products LLC</b>	<b>2103</b>
904-807-0140 www.novabone.com	
<b>NSI</b>	<b>2307</b>
303-860-0261 www.nsi-healthsystems.com	
<b>NuTech Medical</b>	<b>2220</b>
205-290-2158 www.nutechmedical.com	
<b>Oncology Data Systems</b>	<b>523</b>
405-680-5222 www.mucheck.com	
<b>Orthofix, Inc.</b>	<b>1110</b>
214-937-2200 www.orthofix.com	
<b>OsteoMed</b>	<b>1409</b>
972-677-4600 www.osteomed.com	
<b>OsteoSymbionics LLC</b>	<b>1827</b>
216-881-8500 www.osteosymbionics.com	
<b>Paradigm Spine, LLC</b>	<b>2226</b>
212-367-7274 www.paradigmspine.com	
<b>Paramed Medical Systems</b>	<b>2130</b>
847-470-0580 www.paramedmedicalsyste.ms.com	
<b>Peachtree Financial Solutions</b>	<b>304</b>
866-303-2032 www.peachfunding.com	
<b>* Penumbra, Inc.</b>	<b>1729</b>
510-748-3200 www.penumbrainc.com	
<b>PeriOptix, Inc.</b>	<b>2206</b>
949-366-3333 www.perioptix.com	

**Pfizer Injectables 412**

212-733-2323  
www.pfizer.com

**Piezosurgery Incorporated 1732**

614-459-4922  
www.piezosurgery.us

**Pioneer Surgical 2420**

906-226-9909  
www.pioneersurgical.com

**PMT Corporation 2216**

800-626-0866  
www.pmtcorp.com

**Prism Clinical Imaging, Inc. 1031**

414-727-1930  
www.prismclinical.com

**Pro Med Instruments 1306**

239-369-2310  
www.headrest.de

**Pro-Dex, Inc. 316**

949-769-3200  
www.pro-dex.com

**ProNerve, LLC 1330**

303-339-1499  
www.pronerve.com

**Renishaw 313**

+41-22-362-6974  
www.renishaw.com/neuro

**Riverside Health System 1130**

757-224-4990  
www.riversideonline.com

**Rose Micro Solutions 308**

716-608-0009  
www.rosemicrosolutions.com

**RosmanSearch, Inc. 1006**

216-287-2302  
www.rosmansearch.com

**RTI Biologics, Inc. 928**

386-418-8888  
www.rtibiologics.com

## EXHIBITORS

<b>Scanlan International, Inc.</b>	<b>1503</b>
651-298-0997 www.scanlaninternational.com	
<b>Scott &amp; White Healthcare</b>	<b>1928</b>
254-724-0535 www.sw.org	
<b>Sentio, LLC</b>	<b>2403</b>
248-595-0420 www.sentiommg.com	
<b>SheerVision</b>	<b>2408</b>
310-265-8918 www.sheervision.com	
<b>SI-BONE, Inc.</b>	<b>1731</b>
408-207-0700 www.si-bone.com	
<b>Siemens Healthcare</b>	<b>1803</b>
888-826-9702 www.usa.siemens.com/healthcare	
<b>Sonowand</b>	<b>1331</b>
678-395-6849 www.sonowand.com	
<b>Sophysa USA, Inc.</b>	<b>2223</b>
219-663-7711 www.sophysa.com	
<b>Spiegelberg GmbH &amp; Co. KG</b>	<b>1432</b>
+49-40-790178-0 www.spiegelberg.de	
<b>Spinal Elements, Inc.</b>	<b>903</b>
760-607-1821 www.spinalelements.com	
<b>SpinalMotion, Inc.</b>	<b>2407</b>
650-947-3472 www.spinalmotion.com	
<b>Spine Wave</b>	<b>1806</b>
203-944-9494 www.spinewave.com	
<b>SpineFrontier, Inc.</b>	<b>1929</b>
978-232-3990 www.spinefrontier.com	

**Spineology Inc. 409**

651-256-8500  
www.spineology.com

**SpineView, Inc. 2106**

510-623-1931  
www.spineview.com

**St. Jude Medical 603**

972-309-8000  
www.sjmneuro.com

**\* Stryker 1820**

800-253-3210  
www.stryker.com

**Surgical Acuity 504**

608-831-2404  
www.surgicalacuity.com

**Surgical Theater LLC 726**

216-496-7884  
www.surgicaltheater.net

**SurgiTel/General Scientific Corporation 1406**

734-996-9200  
www.surgitel.com

**TeDan Surgical Innovations 1209**

713-726-0886  
www.tedansurgical.com

**TFM Publishing Limited 324**

+44 (0) 1952 510061  
www.tfmpublishing.com

**The Brain Aneurysm Foundation 807**

781-826-5556  
www.bafound.org

**The New York Times 2304**

781-890-2666  
www.ontheavenuemarketing.com

**Thieme Medical Publishers 1303, 1404**

800-782-3488  
www.thieme.com

**ThinkFirst National Injury Prevention Foundation 2030**

630-961-1400  
www.thinkfirst.org

# EXHIBITORS

<b>Thompson Surgical Instruments</b>	<b>2229</b>
800-227-7543 www.thompsonsurgical.com	
<b>Transonic</b>	<b>2303</b>
607-257-5300 www.transonic.com	
<b>TrueVision Systems, Inc.</b>	<b>1531</b>
805-963-9700 www.truevisionsys.com	
<b>UFSK-International OSYS GmbH</b>	<b>1831</b>
+49-941-78862-15 www.ufsk-osys.com	
<b>Varian Medical Systems</b>	<b>420</b>
650-493-4000 www.varian.com	
<b>Vertebral Technologies, Inc.</b>	<b>2031</b>
952-912-5400 www.vti-spine.com	
<b>VG Innovations, LLC</b>	<b>2410</b>
727-565-1235 www.vginnovations.com	
<b>Visionsense Inc.</b>	<b>2126</b>
845-680-0233 www.visionsense.com	
<b>Vycor Medical, Inc.</b>	<b>2026</b>
561-558-2020 www.vycormedical.com	
<b>Weatherby Healthcare</b>	<b>2006</b>
800-586-5022 www.weatherbylocums.com	
<b>Wenzel Spine, Inc.</b>	<b>1429</b>
512-469-0604 www.wenzelspine.com	
<b>X-spine Systems, Inc.</b>	<b>320</b>
937-847-8400 www.x-spine.com	
<b>Ziehm Imaging, Inc.</b>	<b>727</b>
407-615-8560 www.ziehm.com	
<b>Zimmer Spine</b>	<b>1616</b>
952-832-5600 www.zimmerspine.com	

**FIND**  
the **Latest Advances**  
and **Technology**



**GET** Hands-on  
**Demonstrations**

**MEET**  
your **Corporate**  
**Contacts**



# IN THE EXHIBIT HALL!

The 2012 CNS Annual Meeting Exhibit Hall provides you with the opportunity to meet and connect with hundreds of your exhibitor contacts in Chicago. Look for these activities during your stay and take advantage of the time to learn more about the newest products and services in the field of neurosurgery!

- ◆ Product and Technology Showcase
- ◆ In-Booth Demonstrations
- ◆ Tuesday afternoon Snack Break with Exhibitors
- ◆ Daily Beverage Breaks
- ◆ Digital Poster Center
- ◆ CNS Member Services Booth

# PRODUCT AND SERVICE GUIDE

## Allografts / Human Tissue

Advanced Biologics	1629
AlloSource	626
Amedica Corp.	808
Arteriocyte Medical Systems	828
Innovasis, Inc.	1903
K2M, Inc.	1026
minSURG Corporation	1632
NuTech Medical	2220
Orthofix, Inc.	1110
RTI Biologics, Inc.	928
Spineology Inc.	409
VG Innovations, LLC	2410

## Anatomical Charts / Models

Dynamic Disc Designs Corp.	1131
Kilgore International INC	1109

## Aneurysm Clips and Accessories

Apex Medical, Inc.	503
CMF Medicon	704
Mizuho America, Inc.	1103
Scanlan International, Inc.	1503
Surgical Theater LLC	726

## Aspirators

Kogent Surgical	1630
-----------------	------

## Bone Growth Stimulators

Advanced Biologics	1629
AlloSource	626
Baxter Healthcare	1227
Biomet Spine & Bone Healing Technologies	1613
NovaBone Products LLC	2103
Orthofix, Inc.	1110

## Bone Substitute

Biomet Microfixation	1609
Biomet Spine & Bone Healing Technologies	1613
Harvest Technologies Corp.	606
Kelyniam Global, Inc.	1530
KLS Martin Group	612
NovaBone Products LLC	2103
Orthofix, Inc.	1110
OsteoMed	1409
OsteoSymbionics LLC	1827
Spineology Inc.	409

## Business Management Solutions

Accelitech	2413
Blue Chip Surgical Center Partners, LLC	2007
NeuroPoint Alliance (NPA)	2424

# PRODUCT AND SERVICE GUIDE

## Cervical Collars

Aspen Medical Products	1506
Biomet Spine & Bone Healing Technologies	1613
PMT Corporation	2216

## Computer Software for Office Management

Blue Chip Surgical Center Partners, LLC	2007
National Research Council Canada	1232
TrueVision Systems, Inc.	1531

## Computer Software for Surgical Applications

Brainlab, Inc.	1220
Medtech	1003
Monteris Medical, Inc.	1230
Oncology Data Systems	523
Prism Clinical Imaging, Inc.	1031
ProNerve, LLC	1330
Renishaw	313
Surgical Theater LLC	726

## Continuing Medical Education Courses

American Association of Neurological Surgeons	2425
Centers for Medicare and Medicaid Services	425
Congress of Neurological Surgeons	812
North American Neuromodulation Society	1030
North American Skull Base Society	1631
North American Spine Society	2306

## Craniotomes, Drills & Accessories

CMF Medicon	704
Kelyniam Global, Inc.	1530
Kinamed, Inc.	706
Monteris Medical, Inc.	1230
NEOS Surgery, S.L.	1529
Pro-Dex, Inc.	316
Stryker	1820
Vycor Medical, Inc.	2026

## CSF Drainage Devices

Innerspace, Inc.	1927
Integra	1520
Sophysa USA, Inc.	2223
Spiegelberg GmbH & Co. KG	1432
Vycor Medical, Inc.	2026

## CT/MRI Magnetic Source Imaging

Brainlab, Inc.	1220
IMRIS	415
Medtrak	1029
MEI Healthcare Group	625
Monteris Medical, Inc.	1230
NeuroLogica	803
Paramed Medical Systems	2130
Sonowand	1331



# PRODUCT AND SERVICE GUIDE

## Diagnostic Imaging

BK Medical Systems Inc.	507
Medtrak	1029
MEI Healthcare Group	625
TrueVision Systems, Inc.	1531
Ziehm Imaging, Inc.	727

## Dura Substitute

Integra	1520
---------	------

## Electronics

Pro-Dex, Inc.	316
---------------	-----

## Endoscopes, Neurological

Apex Medical, Inc.	503
Carl Zeiss Meditec	920
Karl Storz Endoscopy-America, Inc.	906
Medtech	1003
Vycor Medical, Inc.	2026

## Endovascular Devices

MicroVention	1603
Penumbra, Inc.	1729
Stryker	1820

## Financial Services (professional & personal)

New World Rarities, Ltd.	311
Peachtree Financial Solutions	304

## Fluoroscopes

Ziehm Imaging, Inc.	727
---------------------	-----

## Functional Stereotactic Surgery

Alpha Omega	1829
Cosman Medical	809
inomed Medizintechnik GmbH	2406
Medtech	1003
Monteris Medical, Inc.	1230
MRI Interventions Inc.	1129
North American Neuromodulation Society	1030
Pro Med Instruments	1306
Renishaw	313
Sonowand	1331

## Halo Systems / Spinal Orthosis / Spinal Support Systems

Aspen Medical Products	1506
PMT Corporation	2216

## Headlights, Surgical

Carl Zeiss Meditec	920
Designs For Vision, Inc.	810
KLS Martin Group	612
PeriOptix, Inc.	2206
Rose Micro Solutions	308

## PRODUCT AND SERVICE GUIDE

SheerVision	2408
Surgical Acuity	504

### Hemostats

Baxter Healthcare	1227
-------------------	------

### Image-Guided Navigation Systems

BK Medical Systems Inc.	507
Brainlab, Inc.	1220
IMRIS	415
inomed Medizintechnik GmbH	2406
Medtech	1003
Medtrak	1029
Medtronic	1213
Monteris Medical, Inc.	1230
MRI Interventions Inc.	1129
Pro Med Instruments	1306
Renishaw	313
Siemens Healthcare	1803
Sonowand	1331
Stryker	1820
TrueVision Systems, Inc.	1531

### Management Consultants

Blue Chip Surgical Center Partners, LLC	2007
DP Clinical, Inc.	424

### Medical Devices

Accuray, Inc.	629
Ad-Tech Medical Instrument Corporation	1703
Advanced Biologics	1629
Allen Medical Systems	1203
Amedica Corp.	808
Apex Medical, Inc.	503
ASSI-Accurate Surgical	310
Arteriocyte Medical Systems	828
Baxano, Inc.	306
Biomet Microfixation	1609
Biomet Spine & Bone Healing Technologies	1613
BK Medical Systems Inc.	507
Boston Scientific	525
Bradshaw Medical, Inc	2308
Brainlab, Inc.	1220
Cadwell Laboratories, Inc.	325
CCV	627
Centinel Spine, Inc.	703
Codman	1811
ContainMed, Inc.	2127
Cosman Medical	809
Covidien	825
DePuy Synthes Spine	1811
Elekta	620
Elliquence LLC	707
Exactech, Inc.	1132
Fehling Surgical Instruments, Inc.	406

## PRODUCT AND SERVICE GUIDE

Globus Medical	609
Harvest Technologies Corp.	606
Hemedex, Inc.	2003
Inion Inc.	2207
Innerspace, Inc.	1927
IsoRay Medical Inc.	729
K2M, Inc.	1026
Karl Storz Endoscopy-America, Inc.	906
Kelyniam Global, Inc.	1530
Kinamed, Inc.	706
Kogent Surgical	1630
LDR	2203
MASEP Infini Medical Science Technology Dev. Co. LTD	2213
Medtech	1003
Medtronic	1213
MEI Healthcare Group	625
MicroVention	1603
minSURG Corporation	1632
Mizuho America, Inc.	1103
NEOS Surgery, S.L.	1529
NeuroLogica	803
NICO Corporation	1904
Nihon Kohden America	524
NovaBone Products LLC	2103
NSI	2307
Oncology Data Systems	523
Orthofix, Inc.	1110
OsteoMed	1409
OsteoSymbionics LLC	1827
Paradigm Spine, LLC	2226
Penumbra, Inc.	1729
Piezosurgery Incorporated	1732
Pioneer Surgical	2420
PMT Corporation	2216
Pro-Dex, Inc.	316
Renishaw	313
Scanlan International, Inc.	1503
Sentio, LLC	2403
SheerVision	2408
SI-BONE, Inc.	1731
Sophysa USA, Inc.	2223
Spiegelberg GmbH & Co. KG	1432
Spinal Elements, Inc.	903
SpinalMotion, Inc.	2407
Spine Wave	1806
SpineFrontier, Inc.	1929
Spineology Inc.	409
St. Jude Medical	603
Transonic	2303
Varian Medical Systems	420
Vertebral Technologies, Inc.	2031
VG Innovations, LLC	2410
X-spine Systems, Inc.	320
Zimmer Spine	1616

# PRODUCT AND SERVICE GUIDE

## Microscope Systems

Carl Zeiss Meditec	920
Leica Microsystems, Inc.	1525
PeriOptix, Inc.	2206
TrueVision Systems, Inc.	1531

## Microsurgical Instrumentation

Apex Medical, Inc.	503
ASSI-Accurate Surgical	310
Biomet Microfixation	1609
CMF Medicon	704
Karl Storz Endoscopy-America, Inc.	906
Kirwan Surgical Products, LLC	1206
Kogent Surgical	1630
Mizuho America, Inc.	1103
Pro Med Instruments	1306
Scanlan International, Inc.	1503
Transonic	2303
Vycor Medical, Inc.	2026

## Monitoring Systems

Cadwell Laboratories, Inc.	325
Hemedex, Inc.	2003
Innerspace, Inc.	1927
Innovasis, Inc.	1903
inomed Medizintechnik GmbH	2406
Integra	1520
Neuro Alert Monitoring Services	2129
Nihon Kohden America	524
ProNerve, LLC	1330
Sentio, LLC	2403
Sophysa USA, Inc.	2223
Spiegelberg GmbH & Co. KG	1432
Transonic	2303

## Operating Tables & Accessories

Allen Medical Systems	1203
CCV	627
Flagship Surgical, LLC	426
IMRIS	415
Medtrak	1029
Mizuho America, Inc.	1103
UFSK-International OSYS GmbH	1831

## Patient Education Information

American Association of Neurological Surgeons	2425
Congress of Neurological Surgeons	812
Dynamic Disc Designs Corp.	1131
Nadia International, Inc.	2208
North American Neuromodulation Society	1030
North American Skull Base Society	1631
The Brain Aneurysm Foundation	807
ThinkFirst National Injury Prevention Foundation	2030

# PRODUCT AND SERVICE GUIDE

## Pharmaceuticals

Eisai, Inc.	1604
Industrial Pharmacy Management	2404
Pfizer Injectables	412

## Practice Management

American Association of Neurological Surgeons	2425
Kaiser Permanente - SCPMG	1730
NeuroPoint Alliance (NPA)	2424
North American Skull Base Society	1631

## Publishers, Scientific / Journals

American Association of Neurological Surgeons	2425
Congress of Neurological Surgeons	812
Elsevier Inc.	806
Journal of Neurosurgery	2423
Lippincott Williams and Wilkins - WKH	1606
TFM Publishing Limited	324
The New York Times	2304
Thieme Medical Publishers	1303, 1404

## Recruiters

Bassett Medical Center	730
Cadence Health - Central Dupage Hospital/Delnor Hospital	2131
Cleveland Clinic	1431
Harlequin Recruiting	725
Hospital Corporation of America (HCA)	403
Kaiser Permanente - SCPMG	1730
Mary Washington Healthcare - Physician Recruitment	2414
NeuroPoint Alliance (NPA)	2424
Riverside Health System	1130
RosmanSearch, Inc.	1006
Scott & White Healthcare	1928
Weatherby Healthcare	2006

## Research, Medical Marketing

DP Clinical, Inc.	424
Market Access Partners	2104
MEI Healthcare Group	625

## Rigid Fixation / Plating Systems

Biomet Microfixation	1609
CMF Medicon	704
Innovasis, Inc.	1903
K2M, Inc.	1026
Kinamed, Inc.	706
KLS Martin Group	612
Mizuho America, Inc.	1103
NEOS Surgery, S.L.	1529
OsteoMed	1409
Stryker	1820
VG Innovations, LLC	2410

## Robotics

Accuray, Inc.	629
Renishaw	313

## Shunts & Valves

Codman	1811
Integra	1520
Sophysa USA, Inc.	2223
Spiegelberg GmbH & Co. KG	1432

## Spinal Cord Stimulation Systems

inomed Medizintechnik GmbH	2406
North American Neuromodulation Society	1030
ProNerve, LLC	1330
SpineView, Inc.	2106
St. Jude Medical	603

## Spinal Fixation Instrumentation

Amedica Corp.	808
Covidien	825
DePuy Synthes Spine	1811
Fehling Surgical Instruments, Inc.	406
Gauthier Biomedical	2032
Globus Medical	609
Innovasis, Inc.	1903
K2M, Inc.	1026
Life Spine, Inc.	326
Orthofix, Inc.	1110
OsteoMed	1409
Pioneer Surgical	2420
Spine Wave	1806
SpineFrontier, Inc.	1929
Spineology Inc.	409
SpineView, Inc.	2106
Stryker	1820
VG Innovations, LLC	2410
Wenzel Spine, Inc.	1429
Zimmer Spine	1616

## Spinal Support Systems

Aspen Medical Products	1506
Elekta	620
PMT Corporation	2216
Pro Med Instruments	1306
Spineology Inc.	409
SpineView, Inc.	2106
Zimmer Spine	1616

# PRODUCT AND SERVICE GUIDE

## Stereotactic Radiosurgery Systems

Accuray, Inc.	629
Brainlab, Inc.	1220
Elekta	620
inomed Medizintechnik GmbH	2406
Integra	1520
Medtrak	1029
MEI Healthcare Group	625
Oncology Data Systems	523
Sonowand	1331
Varian Medical Systems	420

## Sterilization Containers

Fehling Surgical Instruments, Inc.	406
Scanlan International, Inc.	1503

## Surgical Instruments / Supplies

Apex Medical, Inc.	503
ASSI-Accurate Surgical	310
Baxano, Inc.	306
Biomet Microfixation	1609
BK Medical Systems Inc.	507
Boss Instruments Ltd	323
Bradshaw Medical, Inc	2308
Buxton BioMedical	506
CCV	627
CMF Medicon	704
Covidien	825
Exactech, Inc.	1132
Fehling Surgical Instruments, Inc.	406
Flagship Surgical, LLC	426
Gauthier Biomedical	2032
Innovasis, Inc.	1903
K2M, Inc.	1026
Karl Storz Endoscopy-America, Inc.	906
Kinamed, Inc.	706
Kirwan Surgical Products, LLC	1206
KLS Martin Group	612
Kogent Surgical	1630
Koros USA, Inc.	1706
Life Instrument Corporation	1106
Mazur Marketing	303
Nihon Kohden America	524
NSI	2307
PMT Corporation	2216
Pro Med Instruments	1306
Pro-Dex, Inc.	316
Scanlan International, Inc.	1503
TeDan Surgical Innovations	1209
Thompson Surgical Instruments	2229
VG Innovations, LLC	2410
Vycor Medical, Inc.	2026

# PRODUCT AND SERVICE GUIDE

## Sutures / Sponges

American Surgical Company	2029
---------------------------	------

## Telescopes, Surgical (Loupes)

Carl Zeiss Meditec	920
Designs For Vision, Inc.	810
PeriOptix, Inc.	2206
Rose Micro Solutions	308
SheerVision	2408
Surgical Acuity	504
SurgiTel/General Scientific Corporation	1406

## Ultrasound Equipment

BK Medical Systems Inc.	507
Hitachi Aloka Medical	2210
Siemens Healthcare	1803
Sonowand	1331

## Video Equipment

Carl Zeiss Meditec	920
Karl Storz Endoscopy-America, Inc.	906
Leica Microsystems, Inc.	1525
SurgiTel/General Scientific Corporation	1406
TrueVision Systems, Inc.	1531
Visionsense Inc.	2126

***Look for the following in the Exhibit Hall!***

### Product & Technology Showcase

**Carl Zeiss Meditec, Inc. Demo Theater**

**Advanced 3D Technology Brings Don't Miss Operative Moments to Life**

Monday, October 8 11:35 AM – 12:00 PM

MODERATOR: Aaron A. Cohen-Gadol

### In-Booth Demos

**Carl Zeiss Meditec, Inc. #920**

**TRENION 3D HD - The Next Level in Visualization**

Monday, October 8 9:30 – 10:00 AM

Tuesday, October 9 9:30 – 10:00 AM

**Intraoperative Fluorescence - INFRARED 800**

Monday, October 8 1:30 – 2:00 PM

Tuesday, October 9 1:30 – 2:00 PM

**Leica Microscope #1525**

**Innovations in the OH Family of Surgical Microscopes**

Monday, October 8 9:30 AM & 1:45 PM

Tuesday, October 9 11:45 AM

**New Tools for Editing Surgical Microscope Video**

Monday, October 8 11:45 AM

Tuesday, October 9 9:30 AM & 1:45 PM

**Varian #420**

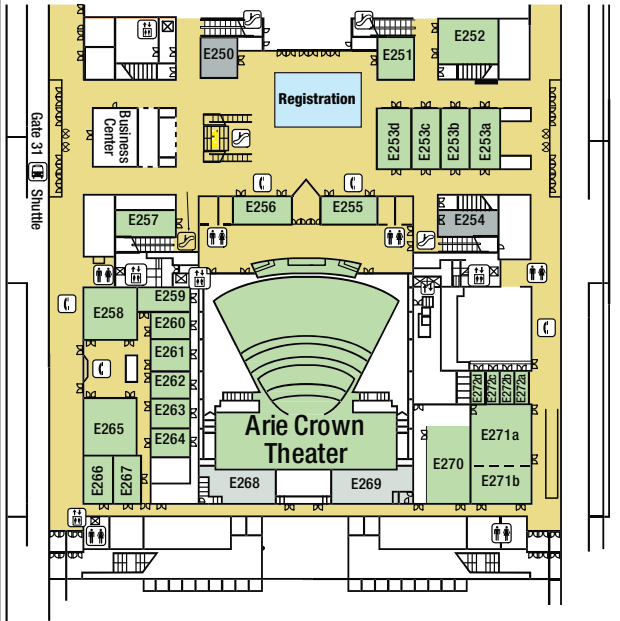
**RapidArc® Radiosurgery**

During all Exhibit Hall Hours



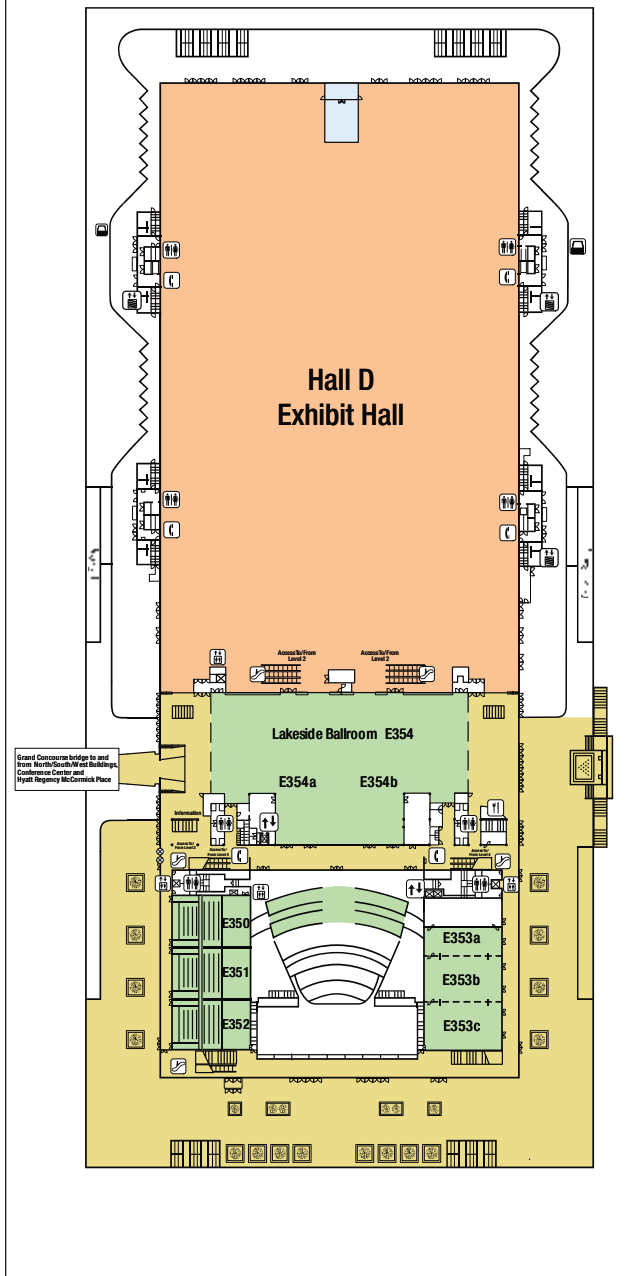
## LAKESIDE LEVEL 2

- ◆ Registration
- ◆ General Scientific Sessions
- ◆ Practical Courses
- ◆ Luncheon Seminars
- ◆ CNS Resident SANS Challenge
- ◆ Resident Recruitment Social
- ◆ Sergeant-at-Arms (E251)
- ◆ Speaker Ready Room (E256)

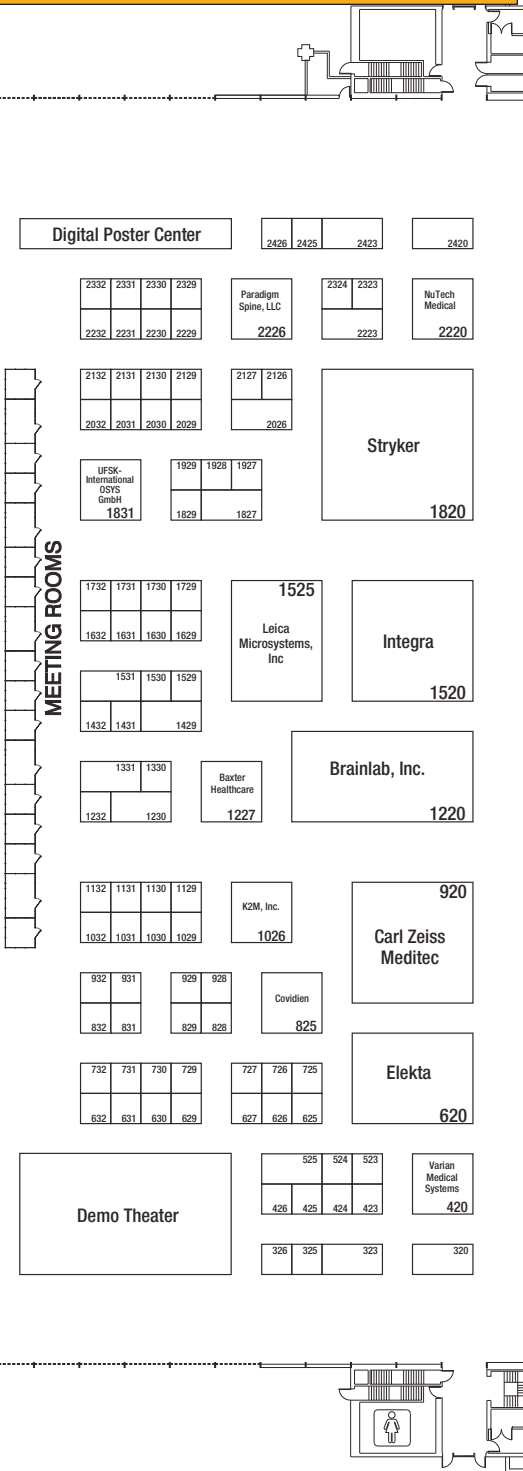


## LAKESIDE LEVEL 3

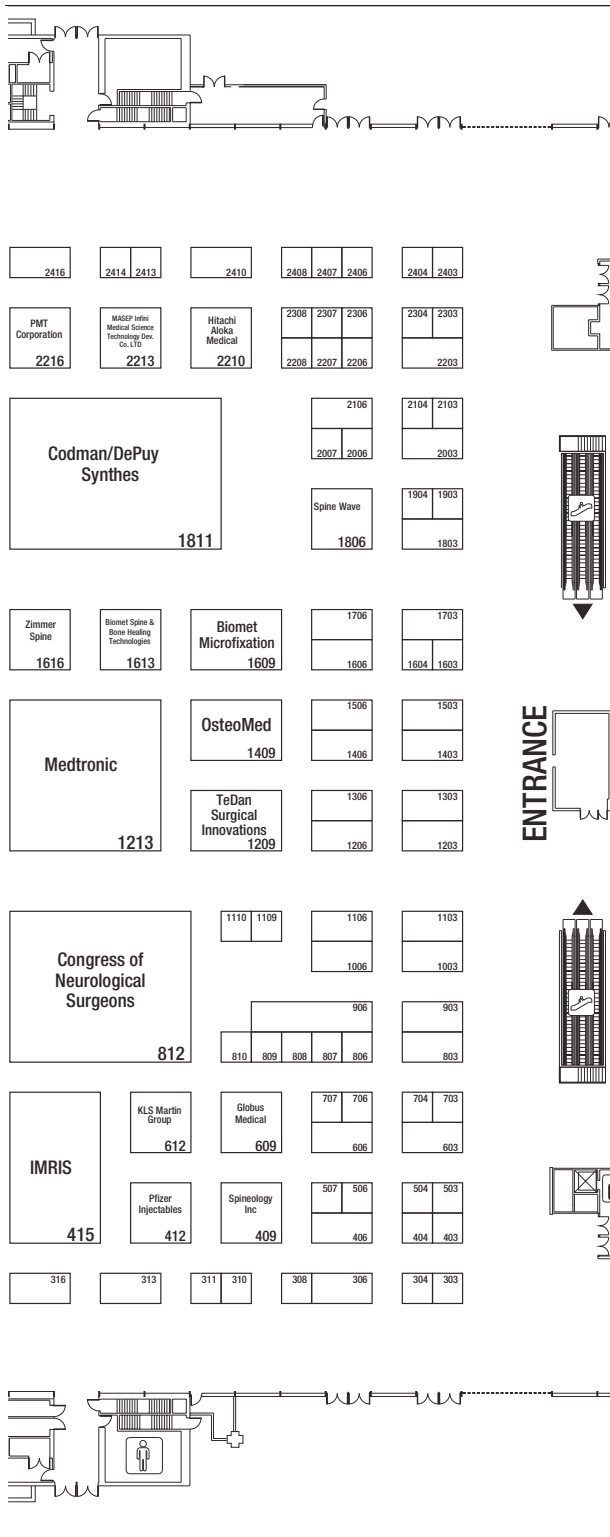
- ◆ Opening Reception
- ◆ Neurosurgical Forum
- ◆ Exhibit Hall
- ◆ Practical Courses
- ◆ Oral Presentations
- ◆ Luncheon Seminars



## LAKESIDE CENTER, EXHIBIT HALL D

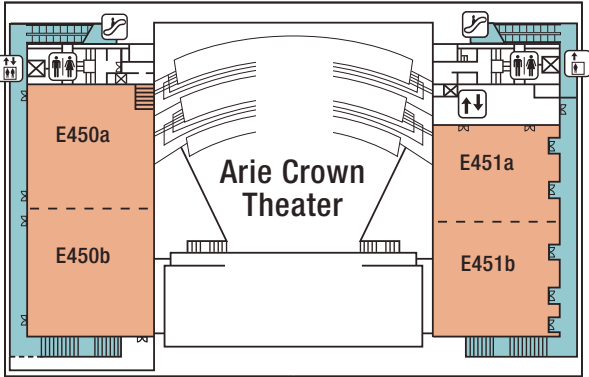


# FLOOR PLANS - McCORMICK PLACE



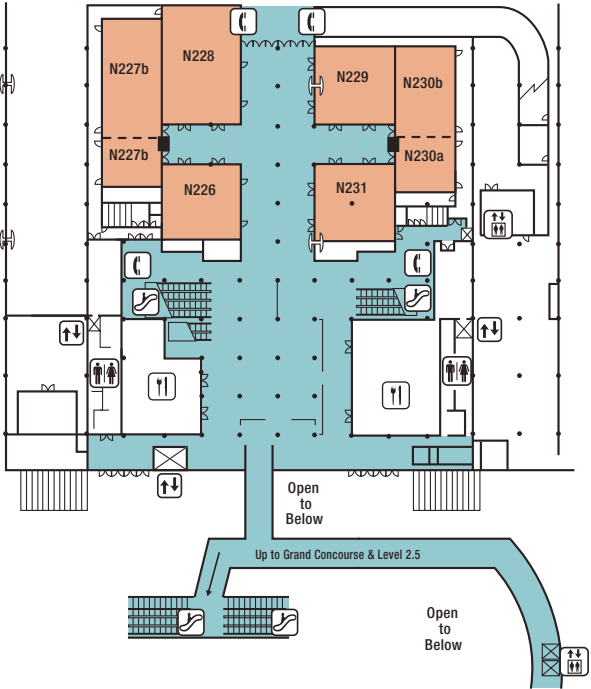
**LAKESIDE LEVEL 4**

- ◆ Practical Courses
- ◆ Consensus Sessions
- ◆ Special Courses
- ◆ Annual Business Meeting



## NORTH LEVEL 2

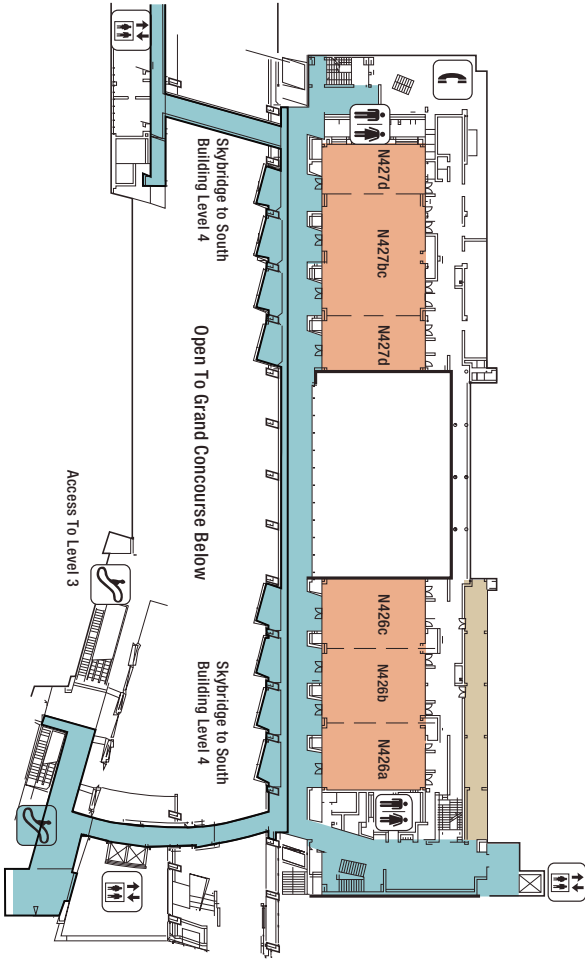
◆ Luncheon Seminars



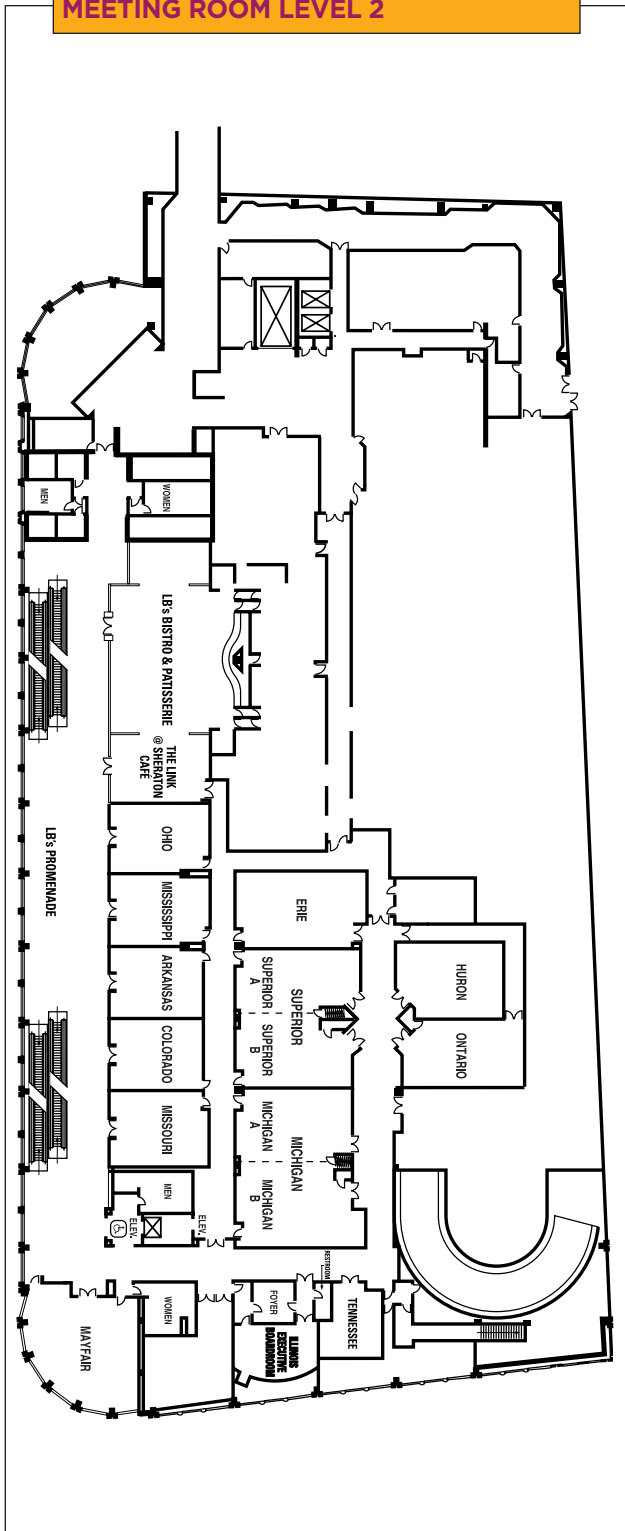
# FLOOR PLANS - McCORMICK PLACE

## NORTH LEVEL 4

◆ Luncheon Seminars

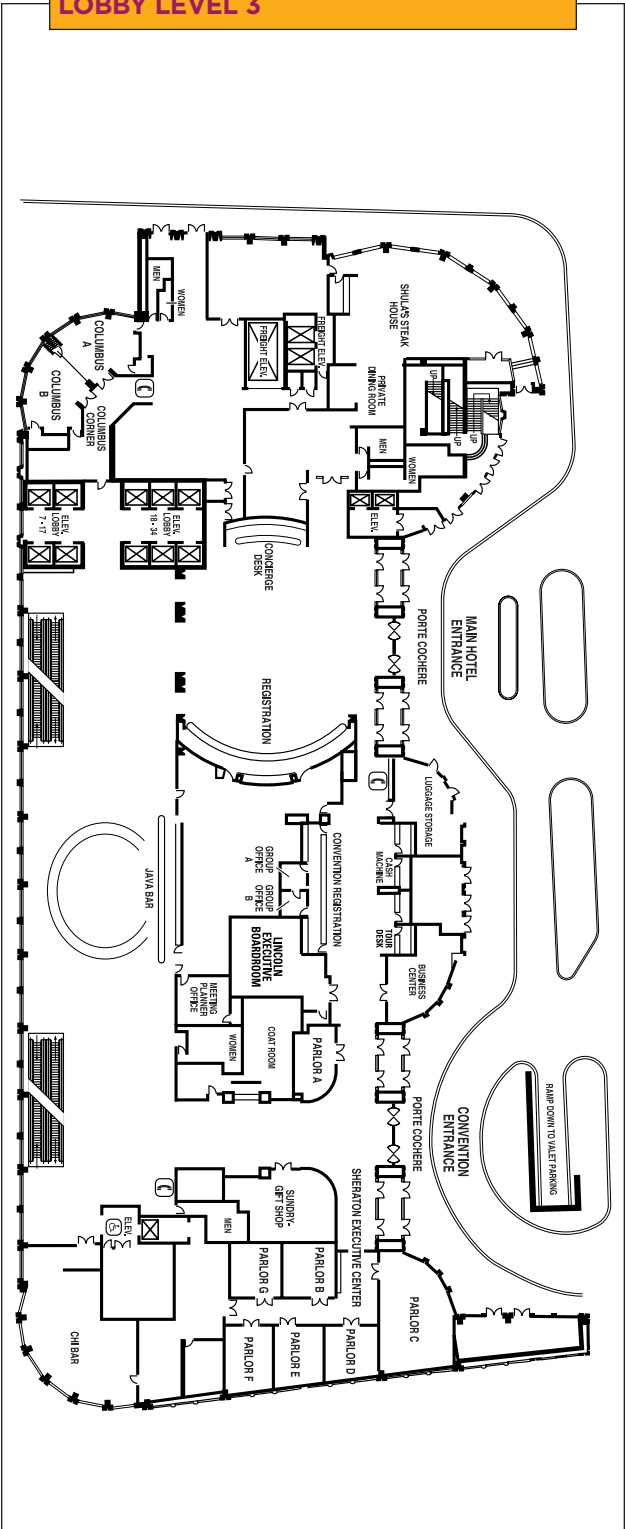


MEETING ROOM LEVEL 2

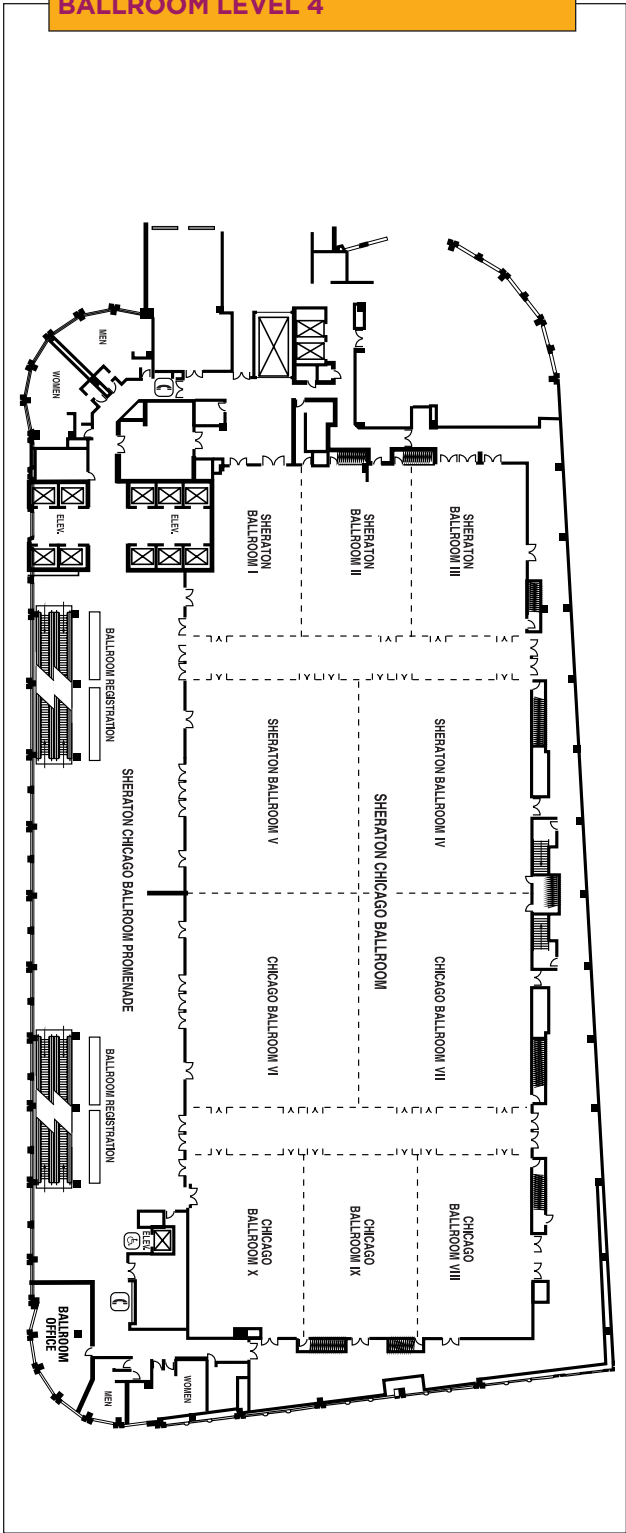




## LOBBY LEVEL 3



BALLROOM LEVEL 4



Living up to Life



## Presentations in Leica Booth #1525

### Innovations in the OH Family of Surgical Microscopes

Presented by **Max Sturgis, Mitaka USA**

Monday, October 8 9:30 a.m., 1:45 p.m.

Tuesday, October 9 11:30 a.m., 4:00 p.m.

### Editing Surgical Videos, 1-2-3

Presented by **Seth Kardos, Med X Change**

Monday, October 8 11:45 a.m.

Tuesday, October 9 9:30 a.m., 1:45 p.m.



Designed with **you** in mind.  
**The Best Just Got Better**

Don't miss the **NEW** Leica family of neurosurgical microscopes at Booth #1525. See more than ever before with new, brilliant illumination, and HD documentation systems.

Come see our **NEW** surgical innovations at Leica Microsystems' booth #1525.

### **Congress of Neurological Surgeons 2012 Annual Meeting Objectives**

The Congress of Neurological Surgeons exists to enhance health and improve lives worldwide through the advancement of education and scientific exchange in the field of neurosurgery. The CNS Continuing Medical Education (CME) program provides participants with various learning formats to keep current in the field and to improve skills and enhance professional performance to provide the best possible care for their patients.

The CNS CME program is designed, planned, and implemented to evaluate a comprehensive collection of activities within the subspecialty of neurosurgery. The CNS plans to yield results that not only contribute to lifelong learning, but also demonstrate change and improvement in competence and performance.

### **At the conclusion of the 2012 CNS Annual Meeting participants will be able to:**

1. Alter their current practice patterns in accordance with the latest data.
2. Compare techniques based on findings discussed during case presentations.
3. Apply and/or perform new techniques based on best practices and current procedures.
4. Practice evidence-based, informed neurosurgical medicine.
5. Interpret newly found outcomes as a result of the scientific abstract presentations.
6. Demonstrate change in competence or performance.

### **Accreditation**

The Congress of Neurological Surgeons 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 46.5 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 AMA PRA Category 1 Credits™ awarded will be applied toward the Continuing Education Award in Neurosurgery.

\* A maximum of 21 AMA PRA Category 1 Credits™ may be earned for general sessions only.

**Allied Health Professionals:** The CNS cannot designate its Annual Meeting as meeting the criteria for credit for nurses and other allied health professionals. For credit that may be acceptable to state medical associations, specialty societies or state boards for medical licensure, please contact those organizations directly.

## Additional CME Credits can be earned by attending the following:

	PRACTICAL COURSES	LUNCHEON SEMINARS	DINNER SEMINARS
Saturday half-day	4		
Saturday full-day	8		
Sunday half-day	3.5		
Sunday full-day	7		
Monday-Wednesday		1.5	2

Physicians should only claim credit commensurate with the extent of their participation in the activity.

## Posters

Physicians may claim a maximum of five (5) AMA PRA Category 1 Credits™ directly from the AMA for preparing a poster presentation, which is also included in 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](http://www.ama-assn.org).

## Claiming Credit

Credits can be claimed through the online system at [www.cns.org](http://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 or certificate of attendance will be sent to you via e-mail at the e-mail address you used at registration. The system lets you create and print a certificate immediately following the CNS Annual Meeting either while you are still in Chicago 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 device 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.

# Thank You!

# INTEGRA™

LIMIT UNCERTAINTY



*For providing  
Leader Level educational  
grants in support of  
CNS educational activities.*

# GENERAL INFORMATION

## ANNUAL MEETING SCHEDULES

### Annual Meeting Guide

To quickly and easily search for meetings, abstracts, events, faculty exhibitors and more, use your smartphone or laptop to visit the online Annual Meeting Guide <http://m.cns.org>. iPhone and iPad users can download the Annual Meeting Guide app at the Apple App Store. The Annual Meeting Guide lets you browse or search meeting details by keyword, message other registrants, set up appointments with exhibitors and more.

### Open Exhibit Hall Hours

Admittance to the Exhibit Hall is by the CNS name badge only. Children under the age of 18 are not allowed in the CNS Exhibit Hall.

<b>MONDAY, OCTOBER 8</b>	<b>9:00 AM - 3:30 PM</b>
<b>TUESDAY, OCTOBER 9</b>	<b>9:00 AM - 5:00 PM</b>
<b>WEDNESDAY, OCTOBER 10</b>	<b>9:00 AM - 2:00 PM</b>

### Member Services

Be sure to stop and visit the CNS Member Services staff in booth #812 for demos of our most popular products, or to answer any of your questions about the CNS, your *Neurosurgery*<sup>®</sup> subscription and your CNS membership.

### Beverage Breaks and Demonstration Theater in the Exhibit Hall

Join your colleagues and exhibitors for coffee and networking in the hall. Demonstration theater presentation schedules will be posted in the exhibit hall.

<b>MONDAY, OCTOBER 8</b>	<b>9:00 - 10:00 AM</b> <b>1:30 - 2:00 PM</b>
<b>TUESDAY, OCTOBER 9</b>	<b>9:00 - 10:00 AM</b> <b>1:30 - 2:00 PM</b> <b>3:30 - 5:00 PM</b>
	<b>Snack Break Featuring GARRETT'S POPCORN!</b>
<b>WEDNESDAY, OCTOBER 10</b>	<b>9:00 - 10:00 AM</b> <b>1:30 - 2:00 PM</b>

### Registration Schedule

Registration is located in McCormick Place Lakeside Center Level 2. Visit during these hours to add a ticketed course, reprint lost badges and ask general questions related to the Annual Meeting.

<b>SATURDAY, OCTOBER 6</b>	<b>7:00 AM - 5:30 PM</b>
<b>SUNDAY, OCTOBER 7</b>	<b>7:00 AM - 7:00 PM</b>
<b>MONDAY, OCTOBER 8</b>	<b>6:30 AM - 4:30 PM</b>
<b>TUESDAY, OCTOBER 9</b>	<b>6:30 AM - 4:30 PM</b>
<b>WEDNESDAY, OCTOBER 10</b>	<b>6:30 AM - 3:00 PM</b>

## Shuttle Schedule

Shuttle service to McCormick Place Lakeside Center will be available from all official CNS hotels, with the exception of the Hyatt Regency, which is adjacent to McCormick Place. A shuttle schedule will be posted at the hotels and convention center.

<b>SATURDAY, OCTOBER 6</b>	<b>7:00 AM - 5:30 PM</b>
<b>SUNDAY, OCTOBER 7</b>	<b>7:00 AM - 8:30 PM</b>
<b>MONDAY, OCTOBER 8</b>	<b>6:30 AM - 5:30 PM</b>
<b>TUESDAY, OCTOBER 9</b>	<b>6:30 AM - 7:30 PM</b>
<b>WEDNESDAY, OCTOBER 10</b>	<b>6:30 AM - 4:00 PM</b>

## SCIENTIFIC CONTENT AND EVENTS

### Abstract Posters

The CNS Neurosurgical Forum features dynamic oral presentations supported by illustrated posters. This interdisciplinary session will be presented on Monday, 3:30 –5:00 PM in E354a/b on Level 3 of McCormick Place Lakeside Center. Digital Posters will be displayed electronically, Monday – Wednesday in the Exhibit Hall, and can be searched by author, topic or keyword.

### Auxiliary Tours, Optional Evening Events and CNS Social Activities

All tours will depart from the Sheraton Chicago Hotel and Towers. Please arrive 15 minutes prior to the scheduled departure time. All registered CNS Annual Meeting spouses and guests are invited to visit the Spouse Hospitality Suite, Monday through Wednesday for continental breakfast from 8:00 –10:30 AM. (Please note that admittance to the Spouse Hospitality Suite is by Spouse/Guest badge only.) The Spouse Hospitality Suite is located in Parlor C at the Sheraton Chicago Hotel and Towers.

### Course Agendas and Faculty

Agendas are occasionally subject to change. As we continue to strive to improve the quality of your educational experience, the CNS may substitute faculty with comparable expertise when necessary.



## Disclaimer

The material presented at the 2012 Annual Meeting has been made available by the Congress of Neurological Surgeons for educational purposes only. The material is not intended to represent the only, nor necessarily the best, method or procedure appropriate for the medical situations discussed, but rather is intended to present an approach, view, statement or opinion of the faculty which may be helpful to others who face similar situations. Neither the content (whether 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 CNS or by its Committees or Affiliates.

The CNS disclaims any and all liability for injury or other damages resulting to any individual attending the Annual Meeting, and for all claims which may arise out of the use of the techniques demonstrated therein by such individuals, whether these claims shall be asserted by physicians or any other person.

No reproductions of any kind, including audiotapes and videotape, may be made of the presentations at the CNS Annual Meeting. The CNS reserves all of its rights to such material, and commercial reproduction is specifically prohibited.

## GENERAL GUIDELINES

### Attire

Professional attire is appropriate at the Annual Meeting and the Exhibit Hall. Some Chicago restaurants require coats and ties for gentlemen. Please check each restaurant's policy when making reservations.

### Badges

CNS Annual Meeting badge colors represent the registration category of attendees:

- ◆ Blue Medical attendee including CNS Members and Non-members
- ◆ Gray Medical Students, Allied Health, Nurses
- ◆ Clear Guests and Spouses
- ◆ Yellow Exhibitors
- ◆ Red Staff

### Children

Children over the age of 12 may register as a guest at the Guest Registration fee. This will allow full participation in Auxiliary Program activities. (Please note that children under the age of 18 are not allowed in the Exhibit Hall.) Should you require babysitting services, please contact the concierge desk at your hotel. The CNS has no control over and assumes no responsibility for the care that is provided through hotels for these services. This information is provided solely to assist participants in identifying possible sources for childcare.

### Press

Credentialed members of the media may register to attend the conference and are required to provide CNS staff with a copy of their press credentials and letters of assignment. Qualified media outlets must be represented by editorial staff, not publishers or advertising or marketing staff. Only two registrations are allowed per media outlet.

### Restaurant Reservations

Contact your hotel concierge in advance to secure popular restaurant reservations. (See hotel information for contact phone and e-mail information.)

## ***Stay Connected*** with the **CNS Annual Meeting Guide!**



Everything you need to stay connected with the 2012 CNS Annual Meeting, right at your fingertips.

Available in the Apple App Store for iPad and iPhone users Android, smartphone and web-users can access online at <http://m.cns.org>

## DISCLOSURE INFORMATION

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 <sup>P</sup> and faculty by <sup>F</sup>.

### Key:

Faculty = F  
Planner = P

### Positional Interest Codes

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

#### **Karen S. Aboody, MD<sup>F</sup>**

*Ownership Interest – TheraBiologics, Inc (8)*

#### **Aviva Abosch, MD, PhD<sup>P, F</sup>**

*Consulting Agreement – Boston Scientific (2); Consultant – Medtronic (2)*

#### **Behrooz A. Akbarnia, MD<sup>F</sup>**

*Consulting Agreement – DePuy Spine (2); K2M (2); Nuvasive (2); Royalty – DePuy Spine (2); Nuvasive (2)*

#### **Ali Alaraj, MD<sup>F</sup>**

*Honoraria – Cordis-Codman (6)*

#### **A. Leland Albright, MD<sup>P</sup>**

*Consulting Agreement – Medtronic (2)*

#### **Victor Aletich, MD<sup>F</sup>**

*Consulting Agreement – Cordis-Codman (6)*

#### **Christopher P. Ames, MD<sup>F</sup>**

*Consulting Agreement – DePuy Spine (2); Medtronic Sofamor Danek (2); Royalty – Aesculap (2); Lanx (2); Stryker (2)*

#### **Sepideh Amin-Hanjani, MD, FAANS, FACS, FAHA<sup>P, F</sup>**

*Other – GE Healthcare (6); N/A – VasSol, Inc. (10)*

#### **Steven Anagnost, MD<sup>F</sup>**

*Consulting Agreement – SpineFrontier Inc. (2)*

#### **Paul M. Arnold, MD<sup>F</sup>**

*Consulting Agreement – Fziomed (2); K2M (2); Medtronic (2); Stryker Spine (2); Theken Spine (2); Other – AOSpine North America (6); Other – ApaTech (6)*

#### **Anthony L. Asher, MD, FACS<sup>P</sup>**

*Consultant – Hyperbranch Medical Technologies (2); Johnson and Johnson (2); Medtronic Corporation (2)*

#### **James I. Ausman, MD<sup>F</sup>**

*Board Trustee or Officer Position – Future Healthcare Strategies; Ownership Interest – Future Healthcare Strategies (1)*

#### **Roy A. E. Bakay, MD<sup>F</sup>**

*Consulting Agreement – Schering (6); Other – NIH, Ceregene, Medtronic (6)*

#### **Nicholas C. Bambakidis, MD<sup>P, F</sup>**

*Consulting Agreement – Medtronic Sofamor Danek (2)*

#### **Stanley L. Barnwell, MD<sup>F</sup>**

*Consulting Agreement – Covidien (6); Johnson and Johnson (6); Microvention (6); Stryker (6)*

**Bernard R. Bendok, MD, FACS<sup>F</sup>**

*Other* – Keeney Foundation (6)

**Edward C. Benzel, MD<sup>P, F</sup>**

*Ownership Interest* – AxioMed (8);  
N/A – DePuy (9); Elseviere (9)

**Mitchel S. Berger, MD<sup>P, F</sup>**

*Consulting Agreement* – Ivivi  
Health Sciences LLC (2);  
*Consultant* – Pharmaco-Kinesis  
Corporation (2)

**Sigurd Berven, MD<sup>F</sup>**

*Royalty* – Medtronic (2); Pioneer  
(6); *Consulting Agreement* –  
Allosource (6); DePuy Spine (6);  
Medtronic Sofamor Danek (6);  
*Other* – OREF (6)

**Keith L. Black, MD<sup>F</sup>**

*Ownership Interest* –  
Immunocellular Therapeutics (2)

**Oheneba Boachie-Adjei, MD<sup>F</sup>**

*Consulting Agreement* – DePuy  
Spine (2); Trans1 Inc (2);  
*Honoraria* – DePuy Spine (6); K2M  
(6); Trans1 Inc (6); *Other* – DePuy  
Spine (6); K2M (6); Medtronic (6);  
*Royalty* – DePuy Spine (6); K2M (6)

**Robert Bohinski, MD<sup>F</sup>**

*Consulting Agreement* – Synthes (2)

**Nicholas M. Boulis, MD<sup>P, F</sup>**

*Consulting Agreement* – Ceregene  
(2); *Consultant* – Medtronic (2);  
N/A – NeuralStem (10)

**Charles L. Branch, MD<sup>F</sup>**

*Royalty* – Medtronic (6)

**Carl A. Bruce, MD<sup>F</sup>**

*Consulting Agreement* –  
SpineFrontier Inc. (2)

**Adomas Bunevicius, MD<sup>F</sup>**

*Other* – This study was  
supported by the Lithuanian  
Science Council. Grant No: MIP-  
10315. (6)

**Douglas C. Burton, MD<sup>F</sup>**

*Consulting Agreement* – DePuy  
Spine (6); *Royalty* – DePuy Spine (6)

**Richard W. Byrne, MD<sup>P</sup>**

*Ownership Interest* – LANX (6)

**Susan Chang, MD<sup>F</sup>**

*Other* – Novartis, Schering  
Plough (6); Schering Plough (6)

**Fady T. Charbel, MD<sup>F</sup>**

*Consulting Agreement* – Transonic  
Inc. (2); *Other* – VasSol Inc. (8)

**Thomas C. Chen, MD, PhD<sup>P</sup>**

*Ownership Interest* – Applied  
Integrin Sciences (7); *Officer* –  
Axoncology (8); C5Rx (8); NeOnC  
(8); *Pharmaco-kinesis* (5);  
Tocagen (8)

**Michael R. Chicoine, MD<sup>F</sup>**

*Other* – iMRIS unrestricted  
educational grant (6)

**Kingsley Chin, MD, FAAOS<sup>F</sup>**

*Ownership Interest* –  
SpineFrontier Inc. (1)

**Dean Chou, MD<sup>F</sup>**

*Consulting Agreement* – Stryker (2)

**Guy L. Clifton, MD<sup>P</sup>**

*Ownership Interest* – Baxter (6);  
*Owner* – Becton Dickinson (8);  
Johnson and Johnson (8);  
MedeCoach (8); Novartis (8);  
Roche Pharmaceuticals (8);  
Sanofy Aventis (8)

**Chaim B. Colen, MD, PhD<sup>P, F</sup>**

*Ownership Interest* – Colen  
Publishing, LLC (1)

**Brian T. Collins, MD<sup>F</sup>**

*Honoraria* – Accuray  
Incorporated (6)

**Alexander Lewis Coon, MD<sup>F</sup>**

*Consulting Agreement* – Covidien  
(2)

**Jeroen R. Coppens, MD<sup>P</sup>**

*Consulting Agreement* –  
Osteomed (6)

**Charles S. Cox, MD<sup>F</sup>**

*Other* – Athersys (6)

**Neil R. Crawford, PhD<sup>F</sup>**

*Other* – Research Grant (6)

**Marek Czosnyka, MD<sup>F</sup>**

*Other* – ICM+ software is  
licensed by University of  
Cambridge, Cambridge  
Enterprise Ltd. PS and MC have  
a financial interest in a part of  
the licensing fee (6)

**Carlos A. David, MD<sup>P, F</sup>**

*Consulting Agreement* – Codman  
Neurovascular (2); *Ownership  
Interest* – Surpass Medical LTD  
(6)

## DISCLOSURE INFORMATION

**Sandrine de Ribaupierre, MD<sup>F</sup>**

*Other* – University of Western Ontario Instructional Innovation and Development Fund (6); University of Western Ontario Internal Research for Education Fund (6)

**Mark B. Dekutoski, MD<sup>F</sup>**

*Consulting Agreement* – Mayo Medical Ventures/Medtronic (2); *Honoraria* – AO Foundation (6); *Other* – Broadwater Associates CME Group (6); DePuy (6); Medtronic (6); Stryker (6); Synthes (6)

**Antonio DeSalles, MD, PhD<sup>F</sup>**

*Royalty* – Consultant (2)

**Vinay Deshmukh, MD<sup>P</sup>**

*Consulting Agreement* – Pioneer Surgical Technology (6)

**Vedat Deviren, MD<sup>F</sup>**

*Consulting Agreement* – Guidepoint (2); Medtronic (2); Stryker (2)

**Fernando G. Diaz, MD<sup>F</sup>**

*Ownership Interest* – NOC2 (8); Southeastern Michigan Gammaknife (8)

**James M. Drake, MD<sup>F</sup>**

*Other* – MaRS Innovation grant support (6); MDA, L3MAPPs, Phillips (6); Medical Modeling – licensing agreement (6)

**James M. Ecklund, MD<sup>P</sup>**

*Consulting Agreement* – Brainscope (2); CEO – NeuroStrike, LLC (8)

**Michael G. Fehlings, MD, PhD, FRCSC, FACS<sup>F</sup>**

*Consulting Agreement* – Depuy (6)

**Richard G. Fessler, MD<sup>F</sup>**

*Ownership Interest* – In Queue Innovations (8); *Royalty* – Depuy (6); Medtronic (6); Stryker (6)

**David Fiorella, MD<sup>F</sup>**

*Consulting Agreement* – Johnson and Johnson (6); Nfocus (6); WL Gore (6); *Other* – microvention (6); Siemens (6)

**Charles Fisher, MD<sup>F</sup>**

*Consulting Agreement* – Medtronic (2); *Other* – AO (6); DePuy (6); Synthes (6); *Royalty* – Medtronic (6)

**Michael Fost, BA, MS<sup>F</sup>**

*Consulting Agreement* – Emory University (2)

**John France, MD<sup>F</sup>**

*Other* – AOSpine (6); Medtronic (6)

**Josue Gabriel, MD<sup>F</sup>**

*Consulting Agreement* – SpineFrontier (2)

**Peter Ghosh, DSc, PhD, FRACI, FRSC<sup>F</sup>**

*Consulting Agreement* – Consultant to Mesoblast. The authors are supported by research funding from the Victorian Government's Operational Infrastructure Support Program and Sponsored Research Agreement funding from Mesoblast Ltd. (2)

**Steven D. Glassman, MD<sup>F</sup>**

*Royalty* – Medtronic (2); *Employee* – Norton Health Care (5)

**Tony Goldschlager, MD<sup>F</sup>**

*Consulting Agreement* – Consultant to Mesoblast. The authors are supported by research funding from the Victorian Government's Operational Infrastructure Support Program and Sponsored Research Agreement funding from Mesoblast Ltd. (2)

**John G. Golfinos, MD<sup>F</sup>**

*Consulting Agreement* – Stryker (2); *Honoraria* – Medtronic (2); *Ownership Interest* – Viewray (6)

**Michael W. Groff, MD, FACS<sup>F</sup>**

*Consulting Agreement* – EBI Spine Biomet (2); Smith & Nephew (2); *Royalty* – Depuy Spine (2)

**Robert E. Gross, MD, PhD<sup>F</sup>**

*Consulting Agreement* – Bayer Healthcare (2); Boston Scientific (2); Medtronic/Lilly (2); Neupace (2); St. Judes Medical (2); *Ownership Interest* – Neurovista (8)

**Andre Grotenhuis, MD, PhD<sup>F</sup>**

*Consulting Agreement* – B.Braun/Aesculap (2); Covidien (2)

**Munish Gupta, MD<sup>F</sup>**

Consulting Agreement – DePuy Spine (2); Lanx (2); Osteotech (2); Honoraria – AO (2); Intellectual Fees – Medtronic (6); Other – FOSA (7); Ownership Interest – Acrotech (6); Pfizer (6); Pioneer (6); Proctor and Gamble (6); Royalty – DePuy Spine (6)

**Costas George Hadjipanayis, MD, PhD<sup>P, F</sup>**

Consulting Agreement – Meditech (2); N/A – Nx Development Corp. (10)

**Regis W. Haid, MD<sup>F</sup>**

Consulting Agreement – Globus Medical (2); Piedmont Health Care (2); Other – Nuvasive (6); Other Financial or Material Support – Globus Medical; Medtronic Sofamor Danek; Ownership Interest – Spine Universe (4); Royalty – Medtronic (6)

**Faizal A. Haji, MD, PhD<sup>F</sup>**

Other – Royal College Fellowship for Studies in Medical Education (6)

**Jason Hamilton, PhD<sup>F</sup>**

Employee – Athersys (5)

**James S. Harrop, MD, FACS<sup>P, F</sup>**

N/A – Axioned (10); Consulting Agreement – Depuy Spine (2); N/A – Ethicon (11); Geron (10); Stryker Spine (11)

**Robert Hart, MD<sup>F</sup>**

Consulting Agreement – DePuy Spine (6); Medtronic (6); Honoraria – Synthes (6); Other – DePuy Spine (6); Medtronic (6); OREF (6); Synthes (6); Royalty – Seaspine (6)

**Robert F. Heary, MD<sup>P, F</sup>**

Honoraria – Depuy Spine (6); Other – Biomet (6); Royalty – DePuy Spine (6); Thieme Medical Publishers (6); ZimmerSpine (6)

**Carl B. Heilman, MD<sup>F</sup>**

Consulting Agreement – Integra (2); Medtronic (2)

**Jaimie M. Henderson, MD<sup>F</sup>**

Other – Nevro Corp (7); Proteus Biomedical (6)

**Mojgan Hodaie, MD, MSc, FRCSC<sup>F</sup>**

Honoraria – Medtronic (6); Other – Elekta (6)

**Langston T. Holly, MD<sup>F</sup>**

Consulting Agreement – Medtronic (6)

**L. Nelson Hopkins, MD<sup>F</sup>**

Consulting Agreement – Abbott Vascular (2); Abbott Vascular (6); AccessClosure (7); Boston Scientific (2); Micrus (7); Micrus (2); W. L. Gore (2); Honoraria – BARD (6); Boston Scientific (6); Cleveland Clinic (6); Complete Conference Management (6); Cordis (2); Memorial Healthcare System (6); SCAI (6); Ownership Interest – AccessClosure (6); Boston Scientific (6); Micrus (6); Valor Medical (6)

**Richard A. Hostin, MD<sup>F</sup>**

Honoraria – DePuy Spine (6)

**Jay U. Howington, MD<sup>F</sup>**

Consulting Agreement – Codman Neurovascular (2)

**Chris Idemmili, MD<sup>F</sup>**

Consulting Agreement – Ilion Medical (2)

**Graham Jenkin, MD<sup>F</sup>**

Other – The authors are supported by research funding from the Victorian Government's Operational Infrastructure Support Program and Sponsored Research Agreement funding from Mesoblast Ltd. (6)

**Randy L. Jensen, MD<sup>F</sup>**

Consulting Agreement – Medtronic (6); Pharmo Kinesis (2)

**J. Patrick Johnson, MD<sup>F</sup>**

Consulting Agreement – Alphatec (2); Biomet (2); Nuvasive (2); Pioneer (2); Spine Wave (2); Synthes (2)

**Iain H. Kalfas, MD<sup>F</sup>**

Honoraria – Stryker Spine (6); Synthes (6); Royalty – Mako Surgical (6)

**Michael G. Kaplitt, MD, PhD<sup>F</sup>**

Consulting Agreement – Medtronic (2); Neurologix (2)

## DISCLOSURE INFORMATION

**Khaled Kebaish, MD<sup>F</sup>**

Consulting Agreement – DePuy Spine (2); K2M (2)

**Eric Klineberg, MD<sup>F</sup>**

Consulting Agreement – Alphatec (6); Synthes (6); Honoraria – AO (6); Honoraria – DePuy Spine (6); Synthes (6); Other – AO (6); OREF (6); Synthes (6)

**Richard Klucznik, MD<sup>F</sup>**

Consulting Agreement – Consultant for EV3 (2)

**Reginald Q. Knight, MD, MHA<sup>F</sup>**

Consulting Agreement – Stryker Spine (2)

**Douglas Kondziolka, MD, MSc, FRCS(C), FACS<sup>F</sup>**

Consulting Agreement – AB Elekta (2); Ownership Interest – ScienceEngines Inc. (7)

**Peter Konrad, MD, PhD<sup>F</sup>**

Consulting Agreement – Medtronic (2)

**Branko Kopjar, MD<sup>F</sup>**

Consulting Agreement – Cerapedics, Inc (2); Salt Creek Medical (2)

**Tyler R. Koski, MD<sup>F</sup>**

Consulting Agreement – Globus (2); Medtronic (6); Nuvasive (2); Honoraria – Depuy; Stryker

**Charles Kuntz, MD<sup>F</sup>**

Consulting Agreement – Synthes/DePuy (2); Other – Neurosurgery (4); Synthes/DePuy – Research/Education (6); Ownership Interest – Mayfield Clinic / CKIV Alignment (8); Precision Radiotherapy (8); Priority Consult (8); Employee – University of Cincinnati (5)

**Vivek Kushwaha, MD<sup>F</sup>**

Consulting Agreement – SpineFrontier (2)

**Frank La Marca, MD<sup>F</sup>**

Consulting Agreement – Biomet (2); Globus (2); Lanx (2); Royalty – globus (6); Stryker (2)

**David V. Laborde, MD<sup>F</sup>**

Ownership Interest – Iconic Data (1)

**Virginie Lafage, PhD<sup>F</sup>**

Consulting Agreement – DePuy Spine (6); Medtronic Sofamor Danek (6); Ownership Interest – Nemaris (8)

**David J. Langer, MD<sup>F</sup>**

Consulting Agreement – ELANA (2); Mizuho (2)

**Giuseppe Lanzino, MD<sup>F</sup>**

Other – synthes (6); ev3 (6); Covidien (6)

**Paul S. Larson, MD<sup>F</sup>**

Honoraria – Medtronic, Inc.; Other – MRI Interventions, Inc. (6)

**Ilya Laufer, MD<sup>F</sup>**

Consulting Agreement – SpineWave Inc. (2)

**Michael T. Lawton, MD<sup>F</sup>**

Royalty – Mizuho America (6)

**Lawrence Lenke, MD<sup>F</sup>**

Other – Axial Biotech (6); DePuy Spine (6); Royalty – Medtronic (6); Quality Medical Publishing (6)

**Peter D. LeRoux, MD<sup>F</sup>**

Consulting Agreement – Codman (2); Other – Brain Gate (4); Edge Therapeutics (4); Interga (6); Neurologica (6); NIH (6)

**Eric C. Leuthardt, MD<sup>P, F</sup>**

N/A – Allied Minds (5); Owner – General Sensing (8); Neuroolutions (8); Consulting Agreement – Intellectual Ventures (2); Consultant – Monteris (2)

**Allan D. Levi, MD, PhD<sup>F</sup>**

Honoraria – Medtronic (6)

**Elad I. Levy, MD, FACS, FAHA<sup>P, F</sup>**

N/A – Abbott Vascular (10); Boston Scientific (11); Boston Scientific (10); Codman & Shurtleff, Inc. (10); Ev3 (10); Consulting Agreement – Codman & Shurtleff, Inc. (2); Consultant – Cordis Neurovascular (2); EV3 (2); Micrus Endovascular (2); TheraSyn Sensors, Inc. (2); Owner – Mynx/Access Closure (8); Intratech Medical Ltd. (8)

# DISCLOSURE INFORMATION

**Robert M. Levy, MD, PhD<sup>F</sup>**

Consulting Agreement – Bioness Incorporated; Codman & Shurtleff, Inc. (2); Medtronic Neurological; Spinal Modulation; Stryker; Vertos Medical

**Andrew S. Little, MD<sup>F</sup>**

Honoraria – Johnson and Johnson (6)

**James K. Liu, MD<sup>P, F</sup>**

Honoraria – Ipsen (6)

**John C. Liu, MD<sup>F</sup>**

Consulting Agreement – Medtronic (2)

**Jay Loeffler, MD<sup>F</sup>**

Honoraria – UptoDate (4); Other – Procure Corporation (2)

**Demetrius K. Lopes, MD<sup>F</sup>**

Consulting Agreement – Covidien (2); Stryker (2); Ownership Interest – Penumbra, Inc. (2)

**Mark R. Lovell, MD<sup>F</sup>**

Other – ImPACT Applications (3)

**Andres M. Lozano, MD<sup>F</sup>**

Consulting Agreement – Medtronic; St Jude

**Mark G. Luciano, MD, PhD<sup>F</sup>**

Other – Aesuculap (6); Codman (6); Medtronic (6)

**L. Dade Lunsford, MD<sup>F</sup>**

Consulting Agreement – AB Elekta (6)

**Andre Machado, MD, PhD<sup>P, F</sup>**

N/A – ATI (8); Cardionomics (8); IntElect (8); Consulting Agreement – IntElect Medical (2); Consultant – Monteris (2)

**Kim H. Manwaring, MD<sup>F</sup>**

Consulting Agreement – Domain Surgical (2)

**Robert W. Mays, PhD<sup>F</sup>**

Other – Athersys (5)

**Ian McCarthy, PhD<sup>F</sup>**

Other – Nuvasive (6)

**Cameron G. McDougall, MD<sup>F</sup>**

Consulting Agreement – Covidien (6)

**Matthew McGirt, MD<sup>F</sup>**

Other – Globus Medical (6)

**S. Craig Meyer, MD<sup>F</sup>**

Consulting Agreement – SpineFrontier Inc. (2)

**J. D. Mocco, MD<sup>P, F</sup>**

Consulting Agreement – Actelion (2); Consultant – Concentric (2); Edge Therapeutics (2); Nfocus (2) Officer – Lazarus Effect (10)

**Alon Y. Mogilner, MD<sup>F</sup>**

Consulting Agreement – Medtronic Neurological (2); Honoraria – Intelect Medical (6)

**Tom Mroz, MD<sup>F</sup>**

Consulting Agreement – Globus Medical (2); Honoraria – AO Spine (6); Ownership Interest – PearlDiver Inc (6)

**Praveen V. Mummaneni, MD<sup>P, F</sup>**

Owner – 2N LLC (Royalty from DePuy Spine and QMP publishers) (9); Consulting Agreement – DePuy Spine (2)

**Gregory Mundis, MD<sup>F</sup>**

Consulting Agreement – K2M (6); Nuvasive (6); Other – DePuy Spine (6); OREF (6)

**Eric W. Nottmeier, MD<sup>F</sup>**

Consulting Agreement – Synthes Spine (6); Royalty – Globus (2)

**Michael F. O'Brien, MD<sup>F</sup>**

Consulting Agreement – DePuy Spine (2); Medtronic (2); Osteotech (6); Intellectual Fees – DePuy Spine (6); Ownership Interest – Axial Biotech (6); Royalty – DePuy Spine (6); Medtronic (6)

**Hideho Okada, MD, PhD<sup>F</sup>**

Intellectual Fees – Stemline (2)

**David O. Okonkwo, MD, PhD<sup>F</sup>**

Consulting Agreement – Lanx (6); Medtronic (6)

**Shaun T. O'Leary, MD<sup>P</sup>**

Consulting Agreement – Spinewave (2)

**Jeffrey J. Olson, MD<sup>F</sup>**

Consulting Agreement – American Cancer Society (6); Other – Genentech (6); Merck (6); Millenium (6)

**John E. O'Toole, MD<sup>F</sup>**

Consulting Agreement – Globus Medical (2); Pioneer Surgical (2); Royalty – Globus Medical (2)



# DISCLOSURE INFORMATION

**Paul Park, MD<sup>F</sup>**

Consulting Agreement – DePuy (2);  
Globus (2)

**Aman B. Patel, MD<sup>F</sup>**

Consulting Agreement – Codman  
Neurovascular (2); Penumbra (2)

**Mick J. Perez-Cruet, MD, MS<sup>F</sup>**

Consulting Agreement – Aesculap  
(2); Stryker (2); Zimmer Spine  
(2); Ownership Interest – MI4Spine  
(1); Spineology (2); Thompson  
MIS (3)

**Erika A. Petersen, MD<sup>F</sup>**

Consulting Agreement – St Jude  
Medical (6)

**Julie G. Pilitsis, MD, PhD<sup>P, F</sup>**

Other – St Jude (6)

**Eric A. Potts, MD<sup>P</sup>**

Consulting Agreement – Lanx (2);  
Owner – Lanx (8); Consultant –  
Medtronic (2)

**Srinivas K. Prasad, MD<sup>P</sup>**

N/A – Stryker Spine (11);  
Consulting Agreement – Synthes  
Spine (6)

**Charles J. Prestigiacomo, MD,  
FACS<sup>P, F</sup>**

Consulting Agreement – Aesculap  
(2); Consultant – Edge  
Therapeutics (2); Officer –  
International Brain Research  
Foundation (10); Editorial Board  
Member – Journal  
NeuroInterventional Surgery  
(10); Consultant – Thermopeutix  
(2)

**Themistocles Protopsaltis, MD<sup>F</sup>**

Honoraria – K2M (6); Honoraria –  
Nemaris (6)

**Stephen R. Ramee, MD<sup>F</sup>**

Consulting Agreement – Maya  
Medical (6); Neurointerventions  
(2); Honoraria – Gore Medical (6);  
Other – Access Closure (6)

**John K. Ratliff, MD<sup>F</sup>**

Consulting Agreement – Stryker  
Spine (2); Ownership Interest –  
Johnson and Johnson (6);  
Royalty – Biomet Spine (6)

**Daniel Refai, MD<sup>P</sup>**

Consulting Agreement – Aesculap  
Implant Systems (2); Consultant  
– Stryker Education (2)

**Jean M. Regis, MD<sup>F</sup>**

Other Financial or Material Support  
– Accuray; BrainLab; Elekta;  
Tomotherapy

**Harold L. Rekate, MD<sup>F</sup>**

Consulting Agreement – Codman  
Corporation (2)

**Ali R. Rezai, MD<sup>P, F</sup>**

Consulting Agreement –  
Autonomic Technologies (6);  
Director – Autonomic  
Technologies (8); N/A – MRI  
Interventions (8)

**Laurence D. Rhines, MD<sup>F</sup>**

Honoraria – Medtronic (2);  
Stryker (2)

**Howard A. Riina, MD<sup>P, F</sup>**

N/A – eVisio Medical Systems  
(8); Consulting Agreement – New  
York Presbyterian Hospital  
Research Grant (2); Owner –  
Reach Bionics (8)

**Cameron N. Riviere, PhD<sup>F</sup>**

Ownership Interest – HeartLander  
Surgical, LLC (6)

**David W. Roberts, MD<sup>P, F</sup>**

N/A – Dusa Pharmaceuticals  
(10); Consulting Agreement –  
Medtronic (6); N/A – Medtronic  
(10); Zeiss (10)

**Gerald E. Rodts, MD<sup>P, F</sup>**

Consultant – Globus Medical, Inc.  
(2); Globus Medical, Inc. (9);  
Orthofix, Inc. (2); Director –  
SpineUniverse.com (10)

**Charles L. Rosen, MD<sup>P, F</sup>**

Other – BHR Pharma (6); N/A –  
Medtronic (8); Merck (8); NIH  
(10); N/A – Pfizer (8); N/A –  
Synthes (10); Director – Optika  
Technologies (8)

**Jeffrey Victor Rosenfeld, MD<sup>F</sup>**

Other – The authors are  
supported by research funding  
from the Victorian  
Government's Operational  
Infrastructure Support Program  
and Sponsored Research  
Agreement funding from  
Mesoblast Ltd. (6)

**Joshua M. Rosenow, MD, FACS<sup>F</sup>**

Consulting Agreement – Boston  
Scientific Neuromodulation (2)

**Richard A. Roski, MD<sup>F</sup>**

Ownership Interest – Blue Chip Surgery Center Partners, LLC (6)

**Timothy C. Ryken, MD, MS, FACS<sup>F</sup>**

Consulting Agreement – Eisai (2); Merck Inc / Schering-Plough Inc. (2)

**Arjun Sahgal, MD<sup>F</sup>**

Consulting Agreement – Medtronic kyphoplasty (6)

**Faheem A. Sandhu, MD<sup>F</sup>**

Royalty – Custom Spine (6); K2M (6)

**Charles A. Sansur, MD, MHSc<sup>P, F</sup>**

Consulting Agreement – Medtronic (2); Consultant – Synthes (2)

**Kai M. Scheufler, MD, PhD<sup>F</sup>**

Consulting Agreement – Medtronic, BrainLAB (2); BrainLAB (2)

**Meic H. Schmidt, MD<sup>F</sup>**

Consulting Agreement – Aesculap (2)

**Henry W. Schroeder, MD, PhD<sup>F</sup>**

Consulting Agreement – Karl Storz GmbH & Co. KG, Tuttlingen, Germany (2)

**Michael Schulder, MD<sup>F</sup>**

Honoraria – BrainLAB (6)

**James M. Schuster, MD<sup>F</sup>**

Other – Synthes Spine (6)

**Frank Schwab, MD<sup>F</sup>**

Consulting Agreement – DePuy Spine (2); Ownership Interest – Nemaris (8)

**Laligam N. Sekhar, MD, FACS<sup>F</sup>**

Ownership Interest – SPI Surgical, Inc (6); Viket Medical, Inc (6)

**Nathan R. Selden, MD, PhD, FACS, FAAP<sup>P, F</sup>**

Other – Bioscience Innovation Fund (6); Editorial Board Member – Committee Chair – Society of Neurological Surgeons (10); NeuroPoint Alliance (10)

**Christopher I. Shaffrey, MD, FACS<sup>P, F</sup>**

N/A – AOSPINE North America (10); Consulting Agreement – Biomet (6); Department of Defense (10); Depuy (11); Medtronic (9); NIH (10); Stryker (11); Editorial Board Member – Spine (10); Journal of Neurosurgery (10)

**Jonathan D. Sherman, MD<sup>P</sup>**

Consulting Agreement – Medtronic (2)

**Adnan Hussain Siddiqui, MD, PhD<sup>P, F</sup>**

N/A – Abbott Vascular for training other neurointerventionists (10); American Association of Neurological Surgeons' courses (11); Annual Peripheral Angioplasty and All That Jazz Course (11); Codman – Trainer of other neurointerventionists (11); Codman Advisory Board (10); Codman Speaker's Bureau (11); Emergency Medicine Conference (11); Genetech Speaker's Bureau (11); Hotspur (8); Intratech Medical (8); Stimsox (8); University at Buffalo (10); Valor Medical (8); Consulting Agreement – Codman & Shurtleff, Inc. (2); National Institute of Health (11); National Institutes of Health (10); Neocure Group, LLC (11); Consultant – Concentric Medical (2); ev3/Covidien Vascular Therapies (2); Guidepoint Global Consulting (2); Micrus Endovascular (2); Penumbra (2)

**Konstantin V. Slavin, MD<sup>F</sup>**

Consulting Agreement – Greatbatch (2); St. Jude Medical (2); Vycor Medical (2); Honoraria – Medtronic (2); St. Jude Medical (2); Other – Boston Scientific (6); Integra (6)

**Andrew E. Sloan, MD<sup>P, F</sup>**

N/A – Genentech (10); Roche Pharmaceuticals, Inc (10); Consulting Agreement – Monteris Medical (2); Consultant – Nanofiber Solutions (2); National Cancer Institute (10); RealBio (2); Rubicon Genomics (8)

## DISCLOSURE INFORMATION

**Justin S. Smith, MD, PhD<sup>P, F</sup>**

Consulting Agreement – Axial Biotech (2); Consultant – Biomet (2); Medtronic Sofamor Danek (2); N/A – Medtronic Sofamor Danek (10); DePuy (10); Globus (11)

**Martin Smrcka, MD<sup>F</sup>**

Consulting Agreement – North Med (6)

**Kenneth V. Snyder, MD, PhD<sup>F</sup>**

Honoraria – Toshiba (6)

**Guillermo Solorzano, MD<sup>P</sup>**

Honoraria – Pfizer; spouse has received honoraria (2)

**Mark M. Souweidane, MD<sup>F</sup>**

Consulting Agreement – Aesculap, Inc.

**Robert F. Spetzler, MD<sup>F</sup>**

Consulting Agreement – Zeiss (2); Ownership Interest – Boston Scientific (6); Dicom Grid (6); iCo Therapeutics (6); Katalyst/Kogent (6); RSB Spine (6); Stereotaxis (6); Synergetics (6); Royalty – Codman (6); Stryker (6)

**John G. Stark, MD<sup>F</sup>**

Honoraria – Signus Medical (2); Ownership Interest – Ilion Medical (1)

**Michael P. Steinmetz, MD<sup>P, F</sup>**

Consultant – Biomet Spine (11); Consulting Agreement – Medtronic (2)

**International Spine Study Group<sup>F</sup>**

Other – DePuy Spine (6)

**Roger Sung, MD<sup>F</sup>**

Consulting Agreement – SpineFrontier (2)

**Nicholas Theodore, MD<sup>F</sup>**

N/A – Stryker Spine (9); Synthes Spine (9)

**Shelly D. Timmons, MD, PhD<sup>F</sup>**

Honoraria – Solvay Pharmaceuticals (2); Synthes (6)

**Kevin J. Tracey, MD<sup>F</sup>**

Intellectual Fees – Critical Therapeutics (6)

**Trent L. Tredway, MD<sup>F</sup>**

Honoraria – Aesculap (6); Medtronic (6); Synthes (6)

**Gregory R. Trost, MD<sup>F</sup>**

Consulting Agreement – Medtronic (2); Medtronic/Midas Rex (2)

**Alexander R. Vaccaro, MD<sup>F</sup>**

Ownership Interest – Advanced Spinal Intellectual Properties (6); Bonovo Orthopaedics (6); Computational Biodynamics (6); Cross Current (6); Cytonics (6); Disc Motion Technology (6); Electrolux (6); Flagship Surgical (6); Flow Pharma (6); Gamma Spine (6); Globus Medical (6); Syndicom (6); Vertiflex (6); K2 Medical (6); Location Based Intelligence (6); Orthovita (6); Paradigm Spine (6); Progressive Spinal Technologies (6); R.I.S (6); Replication Medica (6); Small Bone innovations (6); Spinology (6); Stout Medical (6); Neucore (6); In Vivo (6); Consulting Agreement – Medacorp (2); Gerson Lehman Group (2); Royalty – K-2 Medical (6); Nuvasive (6); Stryker Spine (6); Aesculap (6); Globus Medical (6); DePuy (6)

**Erol Veznedaroglu, MD<sup>P, F</sup>**

Consultant – Codman (2); Cordis (2); Microvention (2); Micrus (2)

**Michael Y. Wang, MD, FACS<sup>F</sup>**

Consulting Agreement – Aesculap Spine (2); Depuy Spine (2); Royalty – Depuy Spine (2)

**Babu Guai Welch, MD<sup>F</sup>**

Other – Medtronic (6)

**William C. Welch, MD, FACS, FICS<sup>F</sup>**

Consulting Agreement – Best Doctors (2); Synthes Spine (2); Zimmer Spine (2); Ownership Interest – Pittsburgh Standard Spine (7); Welch Research and Development (8)

**Robert E. Wharen, MD<sup>F</sup>**

Other – Participating Investigator in RNS Trial (6)

**Donald M. Whiting, MD<sup>F</sup>**

Consulting Agreement – Medtronic (2); Ownership Interest – Innovative Performance Technologies (8)

**Henry H. Woo, MD<sup>P, F</sup>**

Consultant – Codman and Shurtleff (9); Consulting Agreement – ev3 Neurovascular (2); N/A – Siemens (10); Director – Vascular Simulations LLC (8)

**Eric J. Woodard, MD<sup>F</sup>**

Honoraria – Depuy Spine (2); Royalty – Stryker Spine (2)

**Sarah Woodrow, MD<sup>F</sup>**

Consulting Agreement – Depuy (2)

**Graeme F. Woodworth, MD<sup>P</sup>**

Honoraria – Integra Neurosciences (2)

**Neill Marshall Wright, MD<sup>F</sup>**

Consulting Agreement – Ulrich Medical (2); Vertebral Technologies, Inc. (2); Royalty – Nuvasive (2)

**Sangwook Yoon, MD<sup>F</sup>**

Other – AOSNA (6); Biomet (6); OMEGA (6); OREF (6); Phygen (6); Royalty – Nexgen (6); Stryker (6)

**Warren Yu, MD<sup>F</sup>**

Consulting Agreement – Spine Frontier Inc. (2)

## 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 Annual Meeting. Planners are designated by <sup>P</sup> and Faculty by <sup>F</sup>.

Bizhan Aarabi, MD<sup>F</sup>  
Amir Abduljalil, PhD<sup>F</sup>  
Sergey Abeshaus, MD<sup>F</sup>  
Mohamad Abolfotoh, MD<sup>F</sup>  
John M. Abrahams, MD<sup>F</sup>  
Francesco Acerbi, MD, PhD<sup>F</sup>  
Helen M. Ackland, MD, MHSc<sup>F</sup>  
Stewart Adam, MD<sup>F</sup>  
P. David Adelson, MD, FACS, FAAP<sup>P</sup>  
Dana E. Adkins, BS, MD<sup>F</sup>  
John Adler, MD<sup>F</sup>  
Vijay Agarwal, MD<sup>F</sup>  
Nitin Agarwal, BS<sup>F</sup>  
Manish Kumar Aghi, MD, PhD<sup>P, F</sup>  
Deepak Agrawal, MBBS, MS, MCh<sup>F</sup>  
Osama Ahmed, MD<sup>P, F</sup>  
Michele Renee Aizenberg, MD<sup>P</sup>  
Osman Akcakaya, MD<sup>F</sup>  
Tomoshige Akino, MD<sup>F</sup>  
George Al Shamy, MD<sup>F</sup>  
Louis H. Alarcon, MD<sup>F</sup>  
Felipe Albuquerque, MD<sup>F</sup>  
Philipp R. Aldana, MD, FAAP<sup>F</sup>  
Steven J. Alexander, PhD<sup>F</sup>  
Muhammad Ali, MD<sup>F</sup>  
Zarina S. Ali, MD<sup>F</sup>  
Rushna Ali, MD<sup>F</sup>  
Ossama Al-Mefty, MD<sup>F</sup>  
Saleh A. Almenawer, MD<sup>F</sup>  
Ameen Al-Omair, MD<sup>F</sup>  
Noam Alperin, PhD<sup>F</sup>  
Nabeel Al-Shafai, MD<sup>F</sup>  
Manuel Alvarado, MD<sup>F</sup>  
Peter Amenta, MD<sup>F</sup>  
Beejal Y. Amin, MD<sup>F</sup>  
Amjad Nasr Anaizi, MD<sup>F</sup>  
Richard C. E. Anderson, MD<sup>P, F</sup>  
William S. Anderson, MD<sup>P</sup>  
Valerie C. Anderson, PhD<sup>P, F</sup>  
Douglas E. Anderson, MD, FAANS<sup>F</sup>  
David W. Andrews, MD<sup>F</sup>  
Richard V. Andrews, MD<sup>F</sup>  
Lilyana Angelov, MD<sup>F</sup>  
Peter D. Angevine, MD<sup>F</sup>  
Tracy Lynn Ansay, MD<sup>F</sup>  
Heath J. Antoine, BS, MD<sup>F</sup>  
Rein Anton, MD, PhD<sup>F</sup>  
Yavuz Aras, MD<sup>F</sup>  
Louis C. Argenta, MD<sup>F</sup>  
Rocco Armonda, MD<sup>P, F</sup>  
Gregory D. Arnone, MD<sup>F</sup>  
Patricia Aronin, MD<sup>F</sup>  
Nicasio Arriada-Mendicoa, MD<sup>F</sup>  
Ismet Arslan, MD<sup>F</sup>  
Pär Asplund, MD<sup>F</sup>  
Ashok Rajappa Asthagiri, MD<sup>P, F</sup>  
Eshetu Atenafu, PhD<sup>F</sup>  
Etienne Audureau, MD<sup>F</sup>  
Issam A. Awad, MD, MSc, FACS, MA<sup>P, F</sup>

Yunus Aydin, MD<sup>F</sup>  
Aydin Aydoseli, MD<sup>F</sup>  
Tipu Z. Aziz, MD, FRCS<sup>F</sup>  
Maya A. Babu, MD, MBA<sup>F</sup>  
Ranjith Babu, MS<sup>F</sup>  
Behnam Badie, MD<sup>F</sup>  
Jacob H. Bagley, BS<sup>F</sup>  
Lissa Catherine Baird, MD<sup>F</sup>  
Abdul Baker, MD<sup>F</sup>  
Mehmet Bakircioglu, MD<sup>F</sup>  
Perry Ball, MD<sup>F</sup>  
Douglas J. Ballon, MD<sup>F</sup>  
Leonardo Balsalobre, MD<sup>F</sup>  
Gordon H. Baltuch, MD<sup>F</sup>  
Peter A. Bandettini, PhD<sup>F</sup>  
S. Kathleen Bandt, MD<sup>F</sup>  
Jae Seung Bang, MD<sup>F</sup>  
Serguei Bannykh, MD<sup>F</sup>  
Matei A Banu, MD<sup>F</sup>  
Tanyeri Barak, MD<sup>F</sup>  
Guiseppe Barbagallo, MD<sup>F</sup>  
Nicholas M. Barbaro, MD<sup>F</sup>  
Juan Barges Coll, MD, MSc<sup>F</sup>  
Ausaf A. Bari, MD, PhD<sup>F</sup>  
Frederick G. Barker, MD<sup>F</sup>  
Garni Barkhoudarian, MD<sup>P, F</sup>  
A. James Barkovich, MD<sup>F</sup>  
Ronnie Barnes, MD<sup>F</sup>  
Gene H. Barnett, MD<sup>F</sup>  
Daniel L. Barrow, MD<sup>F</sup>  
Angela Barrus, MD<sup>F</sup>  
Ronald H.M.A. Bartels, MD, PhD<sup>F</sup>  
Bora Basaran, MD<sup>F</sup>  
Berkeley Graham Bate, MD<sup>F</sup>  
H. Hunt Batjer, MD<sup>F</sup>  
Joshua S. Bauer, BS, MS<sup>F</sup>  
Jürgen Beck, MD<sup>F</sup>  
Tibor Becske, MD<sup>F</sup>  
Supinder Singh Bedi, BS, MS, PhD<sup>F</sup>  
Jeff Beecher, DO<sup>F</sup>  
Evan M. Begun, BS<sup>F</sup>  
Mandana (Moni) Behbahani, MS<sup>F</sup>  
Milad Behbahaninia, MD<sup>F</sup>  
Kimon Bekelis, MD<sup>F</sup>  
L. Bello-Espinosa, MD<sup>F</sup>  
J. Brad Bellotte, MD<sup>F</sup>  
Robert J. Belton, Jr., PhD<sup>F</sup>  
Allan J. Belzberg, BSc, MD, FRCS(C)<sup>F</sup>  
Thierry Benaroch, MD<sup>F</sup>  
Garrett Bennett, BS<sup>F</sup>  
Deborah L. Benzil, MD, FACS, FAANS<sup>P, F</sup>  
Alejandro Berenstein, MD<sup>F</sup>  
David C. Berg<sup>P</sup>  
Tommy A. Bergenheim, MD, PhD<sup>F</sup>  
Tim Bernard, MD<sup>F</sup>  
R.J. Bernardi, MD<sup>F</sup>  
Antonio Bernardo, MD<sup>F</sup>  
Rameen Beroukhim, MD, PhD<sup>F</sup>  
Nicholas Berry, MD<sup>F</sup>

Aldo Fabrizio Berti, MD<sup>F</sup>  
 Adam J. Bevevino, MD<sup>F</sup>  
 Sanjeev Bhoi, MD<sup>F</sup>  
 Wenya Linda Bi, MD, PhD<sup>F</sup>  
 Carlos Biancotto, MD<sup>F</sup>  
 Gregory E. Bigford, PhD<sup>F</sup>  
 Darell Bigner, MD<sup>F</sup>  
 Kaya Bilguvar, MD<sup>F</sup>  
 Mark H. Bilsky, MD<sup>F</sup>  
 William E. Bingaman, MD<sup>F</sup>  
 Mandy Binning, MD<sup>F</sup>  
 Karen Black, MD<sup>F</sup>  
 Spiros L. Blackburn, MD<sup>F</sup>  
 Benjamin Blatt, MD<sup>F</sup>  
 Orin Bloch, BS, MD<sup>F</sup>  
 Patric Blomstedt, MD, PhD<sup>F</sup>  
 Gary M. Bloomgarden, MD<sup>P, F</sup>  
 Maxwell Boakye, MD<sup>F</sup>  
 Davide Boeris, MD<sup>F</sup>  
 Julia Bogza, MD<sup>F</sup>  
 Ciaran Bolger, MD<sup>F</sup>  
 Warren W. Boling, MD, FRCS(C)<sup>F</sup>  
 Christopher Michael Bonfield, MD<sup>F</sup>  
 John A. Boockvar, MD<sup>F</sup>  
 Frederick A. Boop, MD<sup>F</sup>  
 April L. Booze<sup>P</sup>  
 Marcelo Bordalo, MD<sup>F</sup>  
 Rachael Bosma, BSc<sup>F</sup>  
 Roman Bosnjak, MD<sup>F</sup>  
 Julia Bossardi, MD<sup>F</sup>  
 Jeffrey Bost, MD<sup>F</sup>  
 Stephanie Bost, BS<sup>F</sup>  
 Katie L. Boucher, BS<sup>F</sup>  
 Alexandros Bouras, MD<sup>F</sup>  
 Frank J. Bova, MD<sup>F</sup>  
 Cammi Bowman, RN, MSN<sup>F</sup>  
 John A. Braca, MD, MMS<sup>F</sup>  
 Nicholas James Brandmeir, MD,  
 MS<sup>F</sup>  
 Maria Sol Brassesco, MD<sup>F</sup>  
 Priscilla Brastianos, MD<sup>F</sup>  
 Daniel Brat, MD<sup>F</sup>  
 Henry Brem, MD<sup>F</sup>  
 Cameron Brennan, MD<sup>F</sup>  
 Danielle Brewington, MD<sup>F</sup>  
 Veronika Brezova, MD<sup>F</sup>  
 Douglas L. Brockmeyer, MD<sup>F</sup>  
 Giovanni Broggi, MD<sup>F</sup>  
 Morgan Broggi, MD<sup>F</sup>  
 B. Brooks, PhD<sup>F</sup>  
 Samuel Robert Browd, MD, PhD<sup>P</sup>  
 Frederick D. Brown, MD<sup>F</sup>  
 Patrick Brown, MD<sup>F</sup>  
 Jeffrey N. Bruce, MD<sup>F</sup>  
 Samuel S. Bruce, BA<sup>F</sup>  
 Alison L. Brzoska, MD<sup>F</sup>  
 Niels Buchmann, MD<sup>F</sup>  
 Juan Bulacio, MD<sup>F</sup>  
 Carli Bullis, BA<sup>F</sup>  
 Ketan R. Bulsara, MD<sup>F</sup>  
 Robertas Bunevicius, MD<sup>F</sup>  
 Kim J. Burchiel, MD<sup>F</sup>  
 Richard Burgess, MD<sup>F</sup>  
 Jordan B. Burghardt<sup>P</sup>  
 Allan M. Burke, MD<sup>F</sup>  
 John Burke, MD<sup>F</sup>  
 Jan-Karl Burkhardt, MD<sup>F</sup>  
 Anthony Michael Burrows, MD<sup>F</sup>  
 Nicholas Butowski, MD<sup>F</sup>  
 Lisa H. Butterfield, PhD<sup>F</sup>  
 David W. Cadotte, MSc, MD<sup>F</sup>  
 Ahmet Okay Caglayan, MD<sup>F</sup>  
 Mingqing Cai, MD<sup>F</sup>  
 Gloria Caldito, MD<sup>F</sup>  
 Peter Campbell, MD<sup>F</sup>  
 Ali Tuncay Canbolat, MD<sup>F</sup>  
 Marie-Andree Cantin, MD<sup>F</sup>  
 Anthony J. Caputy, MD<sup>F</sup>  
 Carmine Carapella, MD<sup>F</sup>  
 Javier Cardenas, MD<sup>F</sup>  
 Christine Carico, MD<sup>F</sup>  
 Andrew P. Carlson, MD, MSCRF<sup>F</sup>  
 Bob S. Carter, MD, PhD<sup>F</sup>  
 Steven Casha, MD, PhD<sup>F</sup>  
 Fabio Cattani, MD<sup>F</sup>  
 Halit Çavusoglu, MD<sup>F</sup>  
 C. Michael Cawley, MD, FACS<sup>F</sup>  
 Miguel Celis-Lopez, MD<sup>F</sup>  
 Francesco Certo, MD<sup>F</sup>  
 Ari G. Chacko, MD<sup>F</sup>  
 Kaisorn Chaichana, MD<sup>F</sup>  
 Shamik Chakraborty, BS<sup>F</sup>  
 Sue M. Challinor, MD<sup>F</sup>  
 Nohra Chalouhi, MD<sup>F</sup>  
 Steven D. Chang, MD<sup>F</sup>  
 Edward F. Chang, MD<sup>F</sup>  
 Han Soo Chang, MD<sup>F</sup>  
 Yue-Fang Chang, PhD<sup>F</sup>  
 Jason Jer Jia Chang, MD<sup>F</sup>  
 Yuefang Chang, PhD<sup>F</sup>  
 Samuel T. Chao, MD<sup>F</sup>  
 Talia Chapman, MD<sup>F</sup>  
 Nauman Shaukat Chaudhry, BS<sup>F</sup>  
 Huma Chaudry, BS<sup>F</sup>  
 Sangeeta Chavan, MD<sup>F</sup>  
 Chun Siang Chen, MD<sup>P</sup>  
 Peng R. Chen, MD<sup>F</sup>  
 Mike Yue Chen, MD<sup>F</sup>  
 Clark C. Chen, MD, PhD<sup>F</sup>  
 Hua Chen, MD<sup>F</sup>  
 Zhenrui Chen, MD<sup>F</sup>  
 Joseph S. Cheng, MD, MS<sup>P, F</sup>  
 Jacob Cherian, MD<sup>F</sup>  
 Deepa V. Cherla, BS<sup>F</sup>  
 Randall M. Chesnut, MD, FCCM,  
 FACS<sup>F</sup>  
 John Chi, MD, MPH<sup>F</sup>  
 E. Antonio Chiocca, MD<sup>F</sup>  
 Rohan Chitale, MD<sup>F</sup>  
 Prashant Chittiboina, MD, MPH<sup>P, F</sup>  
 Gopalakrishnan Chittur  
 Viswanathan, MD<sup>F</sup>  
 Muhammad Omar Chohan, MD<sup>F</sup>  
 Jonathan Choi, MD<sup>F</sup>  
 Bryan D. Choi, AB<sup>F</sup>  
 Michael Chopp, PhD<sup>F</sup>  
 Osamah J. Choudhry, MD, BS<sup>F</sup>  
 Winward Choy, BA<sup>F</sup>  
 Robert Christopherson, MD<sup>F</sup>  
 Daniel Ciampi, MD<sup>F</sup>  
 Ivan S. Ciric, MD<sup>F</sup>  
 Jennifer L. Clarke, MD<sup>F</sup>  
 Morgan Clond, MD<sup>F</sup>  
 Alan R. Cohen, MD<sup>P, F</sup>

## NOTHING TO DISCLOSE

Wendy Cohen, MD<sup>F</sup>  
Aaron Afshin Cohen-Gadol, MD<sup>P, F</sup>  
Elisabeth Colacino, RN<sup>F</sup>  
Geoffrey P. Colby, MD, PhD<sup>F</sup>  
Rivka R. Colen, MD<sup>F</sup>  
Sean P. Collins, MD, PhD<sup>F</sup>  
Robert A. Collins, MD<sup>F</sup>  
Quincy Conley, MD<sup>F</sup>  
E. Sander Connolly, MD<sup>P, F</sup>  
David E. Connor, DO<sup>F</sup>  
Elizabeth A. Corteen, MD<sup>F</sup>  
Francesco Costa, MD<sup>F</sup>  
William T. Couldwell, MD<sup>F</sup>  
Brett Cox, MD<sup>F</sup>  
C.J. Creighton, MD<sup>F</sup>  
Walter E. Cromer, PhD<sup>F</sup>  
Katharine Cronk-Bendett, MD,  
PhD<sup>F</sup>  
R. Webster Crowley, MD<sup>P, F</sup>  
Ronald Crystal, MD<sup>F</sup>  
Paul Cullis, MD<sup>F</sup>  
Marcelo Cunha, MD<sup>F</sup>  
Jill Curran, MS<sup>F</sup>  
William T. Curry, MD<sup>P</sup>  
Michael Cusimano, MD<sup>F</sup>  
Leodante B. Da Costa, MD<sup>F</sup>  
Ralph G. Dacey, MD<sup>F</sup>  
Richard Dalyai, MD<sup>F</sup>  
Roy Thomas Daniel, MCh<sup>F</sup>  
Massimo D'Apuzzo, MD<sup>F</sup>  
Felix Darvas, PhD<sup>F</sup>  
Michael Datto, MD<sup>F</sup>  
Cheryl A. Davidson<sup>P</sup>  
Jason Davies, MD, PhD<sup>F</sup>  
Jeannette E. Davies, PhD<sup>F</sup>  
Dawn M. Davis<sup>P</sup>  
Bruno De Luca, MD<sup>F</sup>  
Ricardo Santos de Oliveira, MD,  
PhD<sup>F</sup>  
Abby Deans, MD<sup>F</sup>  
Michael G. DeCuypere, MD<sup>F</sup>  
Helton Defino, MD<sup>F</sup>  
Amir R. Dehdashti, MD<sup>F</sup>  
Arthur Raymond DeLance, BS<sup>F</sup>  
Johnny B. Delashaw, MD<sup>F</sup>  
Vytenis Deltuva, MD<sup>F</sup>  
Gulden Demirci, MD<sup>F</sup>  
Franco DeMonte, MD<sup>F</sup>  
Benjamin Deneen, PhD<sup>F</sup>  
Pamela L. Derstine, PhD, MHPE<sup>F</sup>  
Atman Desai, MD<sup>F</sup>  
Vivek Deshmukh, MD<sup>F</sup>  
Bertrand Devaux, MD<sup>F</sup>  
Edouard Dezamis, MD<sup>F</sup>  
Amit Dhakoji, MS, MCh<sup>F</sup>  
Matthew Diehl, PA-C<sup>F</sup>  
Dale Ding, MD P, <sup>F</sup>  
Yuchuan Ding, MD, PhD<sup>F</sup>  
Sue Ditmyer, MD<sup>F</sup>  
Anton E. Dmitriev, MSc<sup>F</sup>  
Huy M. Do, MD<sup>F</sup>  
Robert L. Dodd, MD<sup>F</sup>  
Carolyn Dohn<sup>F</sup>  
Donald F. Dohn, MD<sup>F</sup>  
Yazdan Dokht Ghafari M., MD<sup>F</sup>  
R. Dominguez-Vidana, MD<sup>F</sup>  
Bernadine Donahue, MD<sup>F</sup>  
Eleanor M. Donnelly, MD<sup>F</sup>  
Andrea F. Douglas, MD, BA<sup>F</sup>  
Daniel Downes, BS<sup>F</sup>  
Doniel Drazin, MD, MA<sup>F</sup>  
Rose Du, MD, PhD<sup>F</sup>  
Adam Dubrowski, MD<sup>F</sup>  
Yuval Duchin, MD<sup>F</sup>  
Andrew F. Ducruet, MD<sup>F</sup>  
Roy W.R. Dudley, MD<sup>F</sup>  
Pedro Duenisch, MD<sup>F</sup>  
Hugues Duffau, MD, PhD<sup>F</sup>  
Ann-Christine Duhaim, MD<sup>F</sup>  
Aaron S. Dumont, MD<sup>F</sup>  
Travis Michael Dumont, MD<sup>F</sup>  
Jim Dunham, MD<sup>F</sup>  
Ian F. Dunn, MD<sup>F</sup>  
Robert Dunne, MD<sup>F</sup>  
Christopher S. Eddleman, MD,  
PhD<sup>F</sup>  
Steve Edwards, MD<sup>F</sup>  
Kurt M. Eichholz, MD<sup>F</sup>  
Sedeek El Moursi, MD<sup>F</sup>  
James Bradley Elder, MD<sup>P, F</sup>  
Mohamed E. El-Fiki, MBBCh, MS,  
DNCh, MD<sup>F</sup>  
Sam Eljamel, MBBS, MD, FRCS<sup>P</sup>  
S.J. Elledge, MD<sup>F</sup>  
Richard G. Ellenbogen, MD, FACS <sup>F</sup>  
Jorge Luis Eller, MD<sup>F</sup>  
Jean Anderson Eloy, MD<sup>F</sup>  
Adam Elramsisy, MD<sup>F</sup>  
Ahmed Mohamed Elsayaf, MD,  
PhD<sup>F</sup>  
Khaled Mohamed El-Sayed, MD <sup>F</sup>  
Rei Enatsu, MD<sup>F</sup>  
Johnathan A. Engh, MD<sup>F</sup>  
Kate Ericsson, MD<sup>F</sup>  
Yusuf Erol, MD<sup>F</sup>  
Emad N. Eskandar, MD<sup>P, F</sup>  
John Evans, MD<sup>F</sup>  
Alexander Evins, MD<sup>F</sup>  
Christian Ewald, MD<sup>F</sup>  
Matthew G. Ewend, MD<sup>F</sup>  
Masayuki Ezura, MD<sup>F</sup>  
Asdrubal Falavigna, PhD<sup>F</sup>  
Elana Farace, PhD<sup>F</sup>  
Arash Farahvar, MD, PhD<sup>F</sup>  
Kyle Michael Fargen, MD, MPH<sup>F</sup>  
Francis Farhadi, MD<sup>P</sup>  
Jean-Pierre Farmer, MD<sup>F</sup>  
Ali Farooqui, MD<sup>F</sup>  
Forough Farrokhyar, MD<sup>F</sup>  
Daniel R. Fassett, MD<sup>F</sup>  
Thais Federici, PhD<sup>F</sup>  
Vernard S. Fennell, MD<sup>F</sup>  
Adriano Yacubian Fernandes, MD<sup>F</sup>  
Fabio Eduardo Fernandes, MD<sup>F</sup>  
Juan Carlos Fernandez-Miranda,  
MD<sup>F</sup>  
Paolo Ferroli, MD<sup>F</sup>  
Richard Donald Fessler, MD<sup>F</sup>  
Joel Finkelstein, MD<sup>F</sup>  
Brian Flaherty, MD<sup>F</sup>  
Neil Fleming, MD<sup>F</sup>  
John Flickinger, MD<sup>F</sup>  
Ramón Florensa Brichs, MD<sup>F</sup>  
Louis Fogg, MD<sup>F</sup>

Conor Foley, MD<sup>F</sup>  
 Vanessa Folkerts, BA<sup>F</sup>  
 Mari Folvik, MD<sup>F</sup>  
 Brendan Manuel Fong, MD<sup>F</sup>  
 Erich T. Fonoff, MD, PhD<sup>F</sup>  
 Kelly D. Foote, MD<sup>F</sup>  
 Mina Foroohar, MD<sup>F</sup>  
 Daryl R. Fourney, MD<sup>P, F</sup>  
 W. Christopher Fox, MD<sup>P</sup>  
 Paul H. Frankel, MD<sup>F</sup>  
 Robbi Lyle Franklin, MD<sup>F</sup>  
 Angelo Franzini, MD<sup>F</sup>  
 Andrew Frederickson, BS<sup>F</sup>  
 Allan H. Friedman, MD<sup>F</sup>  
 William A. Friedman, MD<sup>F</sup>  
 Seth Friedman, PhD<sup>F</sup>  
 David M. Frim, MD<sup>F</sup>  
 Kai-Ming G. Fu, MD, PhD<sup>F</sup>  
 Miki Fujimura, MD, PhD<sup>F</sup>  
 Daniel H. Fulkerson, MD<sup>F</sup>  
 Gregory N. Fuller, MD, PhD<sup>P</sup>  
 Christian Fung, MD<sup>F</sup>  
 Luciano Furlanetti, MD<sup>F</sup>  
 Kamran Gaba, MD<sup>F</sup>  
 Nancy Gaba, MD<sup>F</sup>  
 Patrik Gabikian, MD<sup>P</sup>  
 Kyle Gabrick, BS<sup>F</sup>  
 Filippo Gagliardi, MD<sup>F</sup>  
 Bruno Gagnon, MD<sup>F</sup>  
 Miroslav Galanda<sup>F</sup>  
 Gary L. Gallia, MD<sup>F</sup>  
 Jill Galvao, MD<sup>F</sup>  
 Chirag D. Gandhi, MD<sup>F</sup>  
 Aruna Ganju, MD<sup>F</sup>  
 Vijay Ganta, MD<sup>F</sup>  
 Paul Garcia, MD<sup>F</sup>  
 Heather Garcia, MD<sup>F</sup>  
 Paul A. Gardner, MD<sup>F</sup>  
 Hugh Garton, MD<sup>P</sup>  
 Tomas Garzon-Muvdi, MD, MS<sup>F</sup>  
 Jaime Gasco-Tamarit, MD<sup>P</sup>  
 Sarah J. Gaskill, MD<sup>P</sup>  
 Marcus J. Gates, MD<sup>F</sup>  
 Rachel Gaume, BS<sup>F</sup>  
 Fred Gentili, MD<sup>F</sup>  
 Timothy M George, MD<sup>F</sup>  
 Gad Getz, PhD<sup>F</sup>  
 Basavaraj Ghodke, MD<sup>F</sup>  
 Zoher Ghogawala, MD, FACS<sup>P, F</sup>  
 Ian Ghosh, MD<sup>F</sup>  
 Holly Gilmer, MD<sup>P</sup>  
 Stacey Glasgow, PhD<sup>F</sup>  
 Wayne Gluf, MD<sup>F</sup>  
 John L. Go, MD<sup>F</sup>  
 Y. Pierre Gobin, MD<sup>F</sup>  
 Saniya S. Godil, MD<sup>F</sup>  
 Steven J. Goetsch, PhD<sup>F</sup>  
 Ziya L. Gokaslan, MD<sup>F</sup>  
 Alexandra J. Golby, MD<sup>F</sup>  
 I. Golding, MD<sup>F</sup>  
 Juan Luis Gomez Amador, MD<sup>F</sup>  
 David D. Gonda, MD<sup>F</sup>  
 Jie Gong, MD<sup>F</sup>  
 Fernando Gonzalez, MD<sup>F</sup>  
 L. Fernando Gonzalez, MD<sup>F</sup>  
 Jorge Alvaro Gonzalez-Martinez,  
 MD, PhD<sup>F</sup>

James T. Goodrich, MD<sup>F</sup>  
 Vickie Gordon, NP-C, PhD<sup>F</sup>  
 Alessandra A. Gorgulho, MD<sup>F</sup>  
 Carlos R. Goulart, MD<sup>F</sup>  
 Liliana Goumnerova, MD<sup>F</sup>  
 Cristian Gagnaniello, MD<sup>F</sup>  
 Ramesh Grandhi, MD<sup>F</sup>  
 Gerald A. Grant, MD<sup>P, F</sup>  
 Giovanni Grasso, MD, PhD<sup>F</sup>  
 Francesca Graziano, MD<sup>F</sup>  
 Barth A. Green, MD<sup>F</sup>  
 Alexander L. Green, MBBS, BSc<sup>F</sup>  
 Larrie Greenberg, MD<sup>F</sup>  
 Stephanie Greene, MD<sup>F</sup>  
 Loyola V. Gressot, BS<sup>F</sup>  
 Stephen E. Griffith, MD<sup>F</sup>  
 Adam Grose, BSc (hons), MBChB<sup>F</sup>  
 Daniel James Guillaume, MD<sup>P, F</sup>  
 Murat Gunel, MD<sup>F</sup>  
 Demirkan B. Gursel, PhD<sup>F</sup>  
 Murali Guthikonda, MD, FACS<sup>F</sup>  
 Philip H. Gutin, MD<sup>F</sup>  
 Richard F. Haase, PhD<sup>F</sup>  
 Neil Hackett, MD<sup>F</sup>  
 Hiromu Hadeishi, MD, PhD<sup>F</sup>  
 W.J. Hader, MD, MSc, FRCSC<sup>F</sup>  
 William Hahn, MD, PhD<sup>F</sup>  
 Stephen J. Haines, MD, FACS<sup>F</sup>  
 Anthony John John Hall, MD<sup>F</sup>  
 Mark Hallett, MD<sup>F</sup>  
 Casey H. Halpern, MD<sup>F</sup>  
 D. Kojo Hamilton, MD<sup>P, F</sup>  
 Yuxia Han, MD<sup>F</sup>  
 Kerr y Han, PhD<sup>F</sup>  
 Xuezhe Han, MD, PhD<sup>F</sup>  
 Brian Hanak, MD<sup>F</sup>  
 Akira Handa, MD, PhD<sup>F</sup>  
 Ricardo A. Hanel, MD, PhD<sup>F</sup>  
 Chunhua Hang, MD, PhD<sup>F</sup>  
 Todd C. Hankinson, MD<sup>P</sup>  
 Ake Hansasuta, MD<sup>F</sup>  
 Liu Hao, MD, PhD<sup>F</sup>  
 Noam Harel, PhD<sup>F</sup>  
 Odette Harris, MD<sup>P, F</sup>  
 Anthony Harris, MD, PhD<sup>F</sup>  
 Gillian Harrison, MD<sup>F</sup>  
 Blaine Hart, MD<sup>F</sup>  
 Roger Hartl, MD<sup>F</sup>  
 David M. Hasan, MD<sup>F</sup>  
 Mitsuhiro Hasegawa, MD<sup>F</sup>  
 Takuro Hayashi, MD, PhD<sup>F</sup>  
 Yizheng He, MD<sup>F</sup>  
 Michele D. Heaphy<sup>P</sup>  
 Ryan Matthew Hebert, MD<sup>F</sup>  
 Daniel M. Heiferman, MD<sup>F</sup>  
 John D. Heiss, MD<sup>F</sup>  
 Eirik Helseth, MD, PhD<sup>F</sup>  
 Tom M. Heneghan<sup>P</sup>  
 Diego Hermann, MD<sup>F</sup>  
 Jason Heth, MD<sup>P</sup>  
 Robert Hetz, MD<sup>F</sup>  
 Michelle Hickey, MD<sup>F</sup>  
 Zachary Lee Hickman, MD<sup>F</sup>  
 Tetsuhiro Higashida, MD<sup>F</sup>  
 Brian W. Hill, MD<sup>F</sup>  
 Daniel Hill, MD<sup>F</sup>  
 S.G. Hilsenbeck, MD<sup>F</sup>



## NOTHING TO DISCLOSE

Yuichi Hirose, MD, DSc<sup>F</sup>  
Bradley Hiser, MD<sup>F</sup>  
Patrick W. Hitchon, MD<sup>F</sup>  
Sandra Ho, BA, MHS<sup>F</sup>  
Jonathan E. Hodes, MD<sup>F</sup>  
David W. Hodgens, MD<sup>F</sup>  
Alan S. Hoffer, MD<sup>F</sup>  
Riane B. Hoffman, BA<sup>F</sup>  
Brian Lim Hoh, MD<sup>P, F</sup>  
Daniel J. Hoh, MD<sup>F</sup>  
Kathryn L. Holloway, MD<sup>F</sup>  
Alice Holohean, PhD<sup>F</sup>  
Kazuhiro Hongo, MD<sup>F</sup>  
Kristopher Gray Hooten, MD<sup>P, F</sup>  
Toru Horikoshi, MD<sup>F</sup>  
Tetsuyoshi Horiuchi, MD<sup>F</sup>  
Karl Horning, MD<sup>F</sup>  
Peleg M. Horowitz, MD<sup>F</sup>  
Koji Hosaka, PhD<sup>F</sup>  
T. Hsu, MD<sup>F</sup>  
Yin C. Hu, MD<sup>F</sup>  
Jethro Hu, MD<sup>F</sup>  
Xioaping Hu, MD<sup>F</sup>  
Ya Hua, MD<sup>F</sup>  
Jason H. Huang, MD<sup>F</sup>  
Judy Huang, MD<sup>F</sup>  
Clark Huang, MD<sup>F</sup>  
Mary I. Huang, MD<sup>F</sup>  
Paul P. Huang, MD<sup>F</sup>  
Peter J. Hutchinson, PhD, FRCS  
(SN)<sup>F</sup>  
Maik Hüttemann, MD<sup>F</sup>  
Steven Wei-Hung Hwang, MD<sup>F</sup>  
Domenico Gerardo Iacopino,  
Prof, MD<sup>F</sup>  
Rebecca N. Ichord, MD<sup>F</sup>  
Sian C. Ingham, MD<sup>F</sup>  
Takashi Inoue, MD<sup>F</sup>  
Bryan Iorgulescu, MD<sup>F</sup>  
Alexander Ivanov, MD<sup>F</sup>  
Aditya K. Iyer, BA MEng<sup>F</sup>  
Pascal Jabbour, MD<sup>F</sup>  
Christopher Mitchell Jackson, MD<sup>F</sup>  
Joshua J. Jacobs, MD<sup>F</sup>  
Manoel Jacobsen Teixeira, MD<sup>F</sup>  
Line Jacques, MD<sup>F</sup>  
Jafar J. Jafar, MD<sup>F</sup>  
Regina Jakacki, MD<sup>F</sup>  
George I. Jallo, MD, FACS<sup>F</sup>  
Jack Jallo, MD, PhD, FACS<sup>F</sup>  
Jeremy James, MD<sup>F</sup>  
John A. Jane, MD, PhD, FRCS(C)<sup>F</sup>  
John A. Jane, BA, MD<sup>F</sup>  
Jae-Won Jang, MD<sup>F</sup>  
Brian T. Jankowitz, MD<sup>F</sup>  
Insa Janssen, MD<sup>F</sup>  
Jacob Januszewski, MD<sup>F</sup>  
Paul Jarvis, MD<sup>F</sup>  
Kyle Jasper, MD<sup>F</sup>  
Shazia Javed, MB, ChB, MRCS<sup>F</sup>  
Andrew Jea, MD<sup>F</sup>  
Katie A. Jenkins<sup>P</sup>  
Walter Jermakowicz, MD, PhD<sup>F</sup>  
Sunil Jeswani, MD<sup>F</sup>  
Pinakin Rameshchandra  
Jethwa, MD<sup>F</sup>  
Xiangjun Ji, MD<sup>F</sup>  
Yang Jian, MD<sup>F</sup>  
David F. Jimenez, MD, FACS<sup>F</sup>  
Fernando Jimenez, MD<sup>F</sup>  
Michael Jirjis, BS<sup>F</sup>  
Kwang Wook Jo, MD<sup>F</sup>  
Tom B. Johannesen, MD, PhD<sup>F</sup>  
Michele M. Johnson, MD<sup>F</sup>  
Michelle H. Johnson, MD<sup>F</sup>  
Voncille Johnson, BSc<sup>F</sup>  
Robert Jones, MD<sup>F</sup>  
Sarah C. Jost, MD<sup>P</sup>  
Benjamin L. Judson, MD<sup>F</sup>  
Michael J. Kahana, PhD<sup>F</sup>  
Kristopher Thomas Kahle, MD,  
PhD<sup>F</sup>  
Okan Kahyaoglu, MD<sup>F</sup>  
Michael G. Kaiser, MD<sup>F</sup>  
Yosuke Kakisaka, MD<sup>F</sup>  
M. Yashar S. Kalani, BS, MS, MD,  
PhD<sup>F</sup>  
Samuel Kalb, MD<sup>F</sup>  
Shashank Sharad Kale, MBBS,  
MS, MCh, MD<sup>F</sup>  
Rolf Kalff, Prof. MD<sup>F</sup>  
Rolff Kalff, MD<sup>F</sup>  
Steven N. Kalkanis, MD<sup>P, F</sup>  
Andrew Kalnin, MD<sup>F</sup>  
Milota Kaluzova, MD<sup>F</sup>  
Ashwin Kamath, MD<sup>F</sup>  
Binita Kamath, MBChir<sup>F</sup>  
Peter Kan, MD, MPH, FRCSC<sup>F</sup>  
Daniel Gene Kang, MD<sup>F</sup>  
Matthew Kang, MD<sup>F</sup>  
Hideyuki Kano, MD, PhD<sup>F</sup>  
Adam S. Kanter, MD<sup>F</sup>  
Spyridon Karadimas, MD<sup>F</sup>  
Isaac Karikari, MD<sup>F</sup>  
Anne Karlovitz, MD<sup>F</sup>  
Manish K. Kasliwal, MD, MCh<sup>F</sup>  
Jeffrey Katz, MD<sup>F</sup>  
Rajwant Kaur, MD<sup>F</sup>  
Gurvinder Kaur, BS<sup>F</sup>  
Hande Kaymakcalan-Celebiler,  
MD<sup>F</sup>  
Robert W. Keane, PhD<sup>F</sup>  
Richard Keep, MD<sup>F</sup>  
Craig R. Kelman, MD<sup>F</sup>  
Dawn Kernagis, MD<sup>F</sup>  
Thomas Kerwin, PhD<sup>F</sup>  
Kartik Kesavabhotla, MD<sup>F</sup>  
J.D. Kessler, MD<sup>F</sup>  
Sadaquate Khan, MD<sup>F</sup>  
Imad S. Khan, MD<sup>F</sup>  
Adam Khan, MD<sup>F</sup>  
Lars Kihlstrom, MD<sup>F</sup>  
Soo-Han Kim, MD<sup>F</sup>  
Louis J. Kim, MD<sup>F</sup>  
Young Woo Kim, MD<sup>F</sup>  
Hoon Kim, MD<sup>F</sup>  
Joseph Kim, BS<sup>F</sup>  
Sang-Deok Kim, MD<sup>F</sup>  
Teddy E. Kim, BS, MS<sup>F</sup>  
Matthew Michael Kimball, MD<sup>F</sup>  
Brent Young Kimball, MD<sup>F</sup>  
Sherri Kimes, MD<sup>F</sup>  
Hiroyuki Kinouchi, MD, PhD<sup>F</sup>  
Peter J. Kirkpatrick, FRCS<sup>F</sup>

Leena Kivipelto, MD, PhD<sup>F</sup>  
 Michael Klagsbrun, PhD<sup>F</sup>  
 Paul Klimo, MD<sup>F</sup>  
 David G. Kline, MD<sup>F</sup>  
 John J. Knightly, MD<sup>F</sup>  
 Jared Knopman, MD<sup>F</sup>  
 Michael V. Knopp, MD<sup>F</sup>  
 Andrew Lin Ko, MD<sup>F</sup>  
 Ryan Benjamin Kochanski, BS<sup>F</sup>  
 Angelos G. Koliass, MSc, MRCS<sup>F</sup>  
 Ricardo Jorge Komotar, MD<sup>P</sup>  
 Deniz Konya, MD<sup>F</sup>  
 Brian H. Kopell, MD<sup>F</sup>  
 Lisa Kornse, BSN, RN<sup>F</sup>  
 Renee Korol, PhD<sup>F</sup>  
 McKenzie Koss, MD<sup>F</sup>  
 Masaomi Koyanagi, MD<sup>F</sup>  
 Matthias Krammer, MD<sup>F</sup>  
 Marie-Adele S. Kress, MD<sup>F</sup>  
 Mark D. Krieger, MD<sup>P, F</sup>  
 Ajit A. Krishnaney, MD<sup>P</sup>  
 Ali F. Krisht, MD<sup>F</sup>  
 Carol Kruse, MD<sup>F</sup>  
 Chien-Tsun Kuan, PhD<sup>F</sup>  
 Yuichi Kubota, MD<sup>F</sup>  
 Rustam Kudyakov, MPH, MD<sup>F</sup>  
 Charles Glen Kulwin, MD<sup>F</sup>  
 Kathryn Kunigelis, MD<sup>F</sup>  
 Sandeep Kunwar, MD<sup>F</sup>  
 John S. Kuo, MD, PhD<sup>P</sup>  
 Shekar N. Kurpad, MD, PhD<sup>P, F</sup>  
 Kenneth Kutner, MD<sup>F</sup>  
 Kjell Arne Kvistad, MD, PhD<sup>F</sup>  
 O-Ki Kwon, MD<sup>F</sup>  
 Churl-Su Kwon, MD, MPH<sup>F</sup>  
 Kwaku A. Kyere, MD<sup>F</sup>  
 Simon F. Lacey, MD<sup>F</sup>  
 Maureen Lacy, PhD<sup>F</sup>  
 Shivanand P. Lad, MD, PhD<sup>F</sup>  
 Sandi Karen Lam, MD<sup>F</sup>  
 Arthur M. Lam, MD<sup>F</sup>  
 Jason J. Lamanna, BS<sup>F</sup>  
 Frederick F. Lang, MD<sup>P, F</sup>  
 Shih-Shan Lang, MD<sup>F</sup>  
 Benjamin Lassen, MD<sup>F</sup>  
 Darryl Lau, MD<sup>F</sup>  
 Johnathan E. Lawrence, PhD<sup>F</sup>  
 Edward R. Laws, MD, FACS<sup>F</sup>  
 Matthew R. Leach, BA<sup>F</sup>  
 Kendall H. Lee, MD, PhD<sup>F</sup>  
 Joung H. Lee, MD<sup>F</sup>  
 John Y.K. Lee, MD<sup>F</sup>  
 Bong-Seop Lee, PhD<sup>F</sup>  
 Jung-Kil Lee, MD<sup>F</sup>  
 Sang H. Lee, MD<sup>F</sup>  
 Icksoo Lee, MD<sup>F</sup>  
 Young M. Lee, MD<sup>F</sup>  
 Richard Donald Lefevre, MD<sup>F</sup>  
 Bradley Lega, MD<sup>F</sup>  
 Martin Lehecka, MD<sup>F</sup>  
 Ronald A. Lehman, MD<sup>F</sup>  
 Thomas J. Leipzig, MD<sup>F</sup>  
 Gregory P. Lekovic, MD, PhD<sup>F</sup>  
 Michele L. Lengerman<sup>P</sup>  
 Jeffrey R. Leonard, MD<sup>P</sup>  
 Darren LePere, BS<sup>F</sup>  
 Maciej S. Lesniak, MD<sup>F</sup>  
 Daniel Letourneau, PhD<sup>F</sup>  
 Michael Robert Levitt, MD<sup>F</sup>  
 David Levy<sup>F</sup>  
 Laura Lewis-Mason, ANP-C<sup>F</sup>  
 Eric Ley, MD<sup>F</sup>  
 Wei Li, MD<sup>F</sup>  
 Wai Ho Li, BEng PhD<sup>F</sup>  
 Xingang Li<sup>F</sup>  
 A.C. Liang<sup>F</sup>  
 Imran Liaquat<sup>F</sup>  
 Linda M. Liao, MD, PhD<sup>F</sup>  
 Robert E. Lieberon, MD, FACS<sup>F</sup>  
 Keith L. Ligon, MD, PhD<sup>F</sup>  
 Michael Lim, MD<sup>F</sup>  
 Chris Lim<sup>F</sup>  
 Shinn-Zong (John) Lin, MD, PhD<sup>F</sup>  
 Julian Lin, MD<sup>F</sup>  
 Chia-Ying Lin, PhD<sup>F</sup>  
 Li-Mei Lin, MD<sup>F</sup>  
 Breton G. Line, BSME<sup>F</sup>  
 Haiping Ling<sup>F</sup>  
 Mark E. Linskey, MD<sup>P, F</sup>  
 Eric Lis<sup>F</sup>  
 Dominique Lisiero, BS<sup>F</sup>  
 J. Richard Lister, MD<sup>F</sup>  
 N. Scott Litofsky, MD<sup>F</sup>  
 Zachary N. Litvack, MD, MCR<sup>F</sup>  
 Yuguang Liu, MD<sup>F</sup>  
 Kenneth C. Liu, MD<sup>F</sup>  
 Huandong Liu<sup>F</sup>  
 Demeral Liu<sup>F</sup>  
 Darlene A. Lobel, MD<sup>F</sup>  
 Dennis T. Lockney, BS<sup>F</sup>  
 Ken Lofland, PhD<sup>F</sup>  
 Russell R. Lonser, MD<sup>P, F</sup>  
 Raul Lopez Serna, MD<sup>F</sup>  
 Angeliki Louvi<sup>F</sup>  
 Arthur James Lowery, BSc, PhD,  
 FIEEE, FIET<sup>F</sup>  
 Joshua J. Loya, BA<sup>F</sup>  
 Yi Lu, MD, PhD<sup>F</sup>  
 Zaijun Lu<sup>F</sup>  
 Timothy H. Lucas, MD<sup>F</sup>  
 Christiano B. Lumenta, MD, PhD<sup>F</sup>  
 J. Luo<sup>F</sup>  
 Jon Lurie, MD<sup>F</sup>  
 Neal Luther, MD, BS, BA<sup>F</sup>  
 Patrick Lyden<sup>F</sup>  
 Ali M. Elhadi M., MD<sup>F</sup>  
 Helio Rubens Machado<sup>F</sup>  
 Christopher J. Madden, MD<sup>F</sup>  
 Peter J. Madsen, BS<sup>F</sup>  
 Hidetsugu Maekawa, MD<sup>F</sup>  
 Riti Mahadevia, BA<sup>F</sup>  
 Cormac O.Maher, MD<sup>F</sup>  
 Sadhan Majumder<sup>F</sup>  
 Ajay Malhotra, MD<sup>F</sup>  
 Mitchell Gil Maltenfort, PhD<sup>F</sup>  
 Mauricio Mandel<sup>F</sup>  
 Daniel M. Mandell, MD<sup>F</sup>  
 Allen H. Maniker, MD<sup>P, F</sup>  
 Marc Christopher Manix, MD<sup>F</sup>  
 Mary Marcellus, RN<sup>F</sup>  
 Kim M. Marcuccilli<sup>P</sup>  
 Nicholas Frank Marko, MD<sup>P</sup>  
 Michael P. Marks, MD<sup>F</sup>  
 Joseph C. Maroon, MD<sup>F</sup>

## NOTHING TO DISCLOSE

Gary Marshall<sup>F</sup>  
Maria da Graça Martins<sup>F</sup>  
Justin Robert Mascitelli, MD<sup>F</sup>  
Matthew B. Maserati, MD<sup>F</sup>  
Eric M. Massicotte, MD<sup>F</sup>  
Laura Masucci, MD<sup>F</sup>  
Javier Mata, MD<sup>F</sup>  
Michael J. Mathis, MA<sup>F</sup>  
Charles Christian Matouk, MD<sup>F</sup>  
Toru Matsui<sup>F</sup>  
Tobias Alecio Mattei, MD<sup>F</sup>  
Amgad El-said Matter, MD, PhD<sup>F</sup>  
Todd A. Maugans, MD<sup>F</sup>  
Rosario Maugeri<sup>F</sup>  
Paul K. Maurer, MD<sup>F</sup>  
Catherine A. Mazzola, MD<sup>P</sup>  
Fiona McBryde<sup>F</sup>  
Shirley McCartney<sup>F</sup>  
Megan McCarty, BS<sup>F</sup>  
Paul C. McCormick, MD<sup>F</sup>  
Michael William McDermott, MD<sup>F</sup>  
Chamiza McIndoe, MD<sup>F</sup>  
James McInerney, MD<sup>F</sup>  
Guy M. McKhann, MD<sup>F</sup>  
Roger McLendon, MD<sup>F</sup>  
Brendan McNeish<sup>F</sup>  
Ryan A. McTaggart, MD<sup>F</sup>  
Jean-François Meder<sup>F</sup>  
Joshua E. Medow, MD<sup>F</sup>  
K.L. Meerbrey<sup>F</sup>  
Gautam U. Mehta, MD<sup>P</sup>  
Vivek Mehta, MD<sup>F</sup>  
Ashesh Mehta, MD<sup>F</sup>  
Torstein Ragnar Meling, MD, PhD<sup>F</sup>  
Stephen Mendenhall, BS<sup>F</sup>  
Arnold H. Menezes, MD<sup>F</sup>  
Richard Menger, MD<sup>F</sup>  
Girish Ramachandran Menon<sup>F</sup>  
David K. Menon, MBBS, MD,  
PhD, FRCP<sup>F</sup>  
Robert A. Mericle, MD<sup>F</sup>  
Maxwell B. Merkow, MD<sup>F</sup>  
Peter Mews<sup>F</sup>  
Bernhard Meyer, MD<sup>F</sup>  
Daniel B. Michael, MD<sup>F</sup>  
Rajiv Midha, MD<sup>F</sup>  
Arráez Miguel Angel<sup>F</sup>  
David J. Mikulis, MD<sup>F</sup>  
Jeffrey W. Miller, MD<sup>F</sup>  
Robert Austin Miller, BS, MD<sup>F</sup>  
Andrew Miller<sup>F</sup>  
Frank J. Minja, MD<sup>F</sup>  
Kenneth Mino<sup>F</sup>  
Sohail Mirza<sup>F</sup>  
Bartley Mitchell, MD, PhD<sup>F</sup>  
Bertrand Moal, MS<sup>F</sup>  
Kent Gøran Moen, MD<sup>F</sup>  
Alireza Mohammad  
Mohammadi, MD<sup>F</sup>  
Aaron Mohanty, MD<sup>F</sup>  
Annette Molinaro, MA, PhD<sup>F</sup>  
H. Dennis Mollman, MD<sup>F</sup>  
Derek Monette<sup>F</sup>  
Kathleen Monpetit<sup>F</sup>  
Eva Montané<sup>F</sup>  
Stephen J. Monteith, MD<sup>P</sup>  
Hyung-Sik Moon<sup>F</sup>  
Eun Su Moon<sup>F</sup>  
Michael Mooney<sup>F</sup>  
Enzo Morace<sup>F</sup>  
Osmar Moraes, MD<sup>F</sup>  
Jacques J. Morcos, MD,  
FRCS(Eng), FRCS(Ed)<sup>F</sup>  
Frank Morganti, DC<sup>F</sup>  
Takashi Morishita, MD, PhD<sup>F</sup>  
Akio Morita, MD, PhD<sup>F</sup>  
David Morris<sup>F</sup>  
Shaghaygh Mortezaei, BA<sup>F</sup>  
Pietro Mortini, MD<sup>F</sup>  
Ryan Patrick Morton, MD<sup>F</sup>  
John Mosher<sup>F</sup>  
Henry Moyle<sup>F</sup>  
Wade M. Mueller, MD<sup>F</sup>  
Carrie R. Muh, MD, MSP<sup>F</sup>  
Debraj Mukherjee, MD, MPH<sup>F</sup>  
Srinivasan Mukundan, Jr., MD<sup>F</sup>  
Jeffrey Paul Mullin, MD, MBA<sup>F</sup>  
Gregory J. Murad, MD<sup>P, F</sup>  
René Müri<sup>F</sup>  
Rory K.J. Murphy<sup>F</sup>  
Tenneti Venkata Ramakrishna  
Murty, MD<sup>F</sup>  
Naresh Murty<sup>F</sup>  
Ahmet Müslüman<sup>F</sup>  
Natarajan Muthukumar, MCh,  
FACS, FICS<sup>F</sup>  
Remi Nader, MD<sup>F</sup>  
Shinya Nagahisa, MD, PhD<sup>F</sup>  
Daniel Tetsuji Nagasawa, MD<sup>F</sup>  
Brian V. Nahed, MD<sup>F</sup>  
Dileep Nair, MD<sup>F</sup>  
Suresh Nair, MBBS<sup>F</sup>  
Anil Nanda, MD, FACS<sup>P, F</sup>  
Raj K. Narayan, MD, FACS<sup>F</sup>  
Ashwatha Narayana, MD<sup>F</sup>  
Osamu Narumi, MD, PhD<sup>F</sup>  
Dan Neal, MS<sup>F</sup>  
Jonathan Neal, BS<sup>F</sup>  
Peter K. Nelson, MD<sup>F</sup>  
Edwin Nemoto, PhD<sup>F</sup>  
Gennady Neyman, PhD<sup>F</sup>  
Dederia H. Nicholas<sup>F</sup>  
Mika Risto Niemela, MD, PhD<sup>P</sup>  
Shahid Mehdi Nimjee, MD, PhD<sup>F</sup>  
Liping Ning<sup>F</sup>  
Sumit Niogi, MD<sup>F</sup>  
Ajay Niranjan, MD, MBA<sup>F</sup>  
Yoshihisa Nishiyama<sup>F</sup>  
Junpei Nitta<sup>F</sup>  
Jennifer Noeller, ARNP<sup>F</sup>  
Kristen Nosova, MBA<sup>F</sup>  
Kamil Nowicki, BS<sup>F</sup>  
Natalia Nugaeva<sup>F</sup>  
Miriam Nuno, PhD<sup>F</sup>  
Thomas Nyffeler<sup>F</sup>  
Lisa J. O'Brien<sup>P</sup>  
Timothy O'Connor<sup>F</sup>  
Tim O'Connor, BS<sup>F</sup>  
Mitchell Odom<sup>F</sup>  
Eric K. Oermann, BS<sup>F</sup>  
Alfred T. Ogden, MD<sup>F</sup>  
Alan Ogden, BS<sup>F</sup>  
Christopher S. Ogilvy, MD<sup>F</sup>  
Gerald Ogola, MS<sup>F</sup>

Chang Wan Oh, MD, PhD<sup>F</sup>  
 Michael Oh, MD<sup>F</sup>  
 Gerald Oh, MD<sup>F</sup>  
 Massako Okada<sup>F</sup>  
 Shuichi Okubo, MD, PhD<sup>F</sup>  
 Michael S.Okun, MD<sup>F</sup>  
 Greg Olavarria, MD<sup>F</sup>  
 Edward H. Oldfield, MD<sup>F</sup>  
 William C. Olivero<sup>F</sup>  
 Alessandro Olivi, MD<sup>F</sup>  
 Adam Olszewski<sup>F</sup>  
 Chima Oluigbo, MD<sup>F</sup>  
 Sacit Bulent Omay<sup>F</sup>  
 Yinn Cher Ooi, MD<sup>F</sup>  
 Michael Opoku-Darko<sup>F</sup>  
 Catherine Oppenheim<sup>F</sup>  
 Piero Andrea Oppido, MD, PhD<sup>F</sup>  
 Diaz M. Orlando, MD<sup>F</sup>  
 C.K. Osborne<sup>F</sup>  
 Joshua William Osbun, MD<sup>F</sup>  
 John N. Oshinski<sup>F</sup>  
 Kenneth Ott, MD<sup>F</sup>  
 Soichi Oya, MD, PhD<sup>F</sup>  
 Nelson M. Oyesiku, MD, PhD,  
 FACS<sup>P, F</sup>  
 Koray Ozduman<sup>F</sup>  
 Serdar Ozgen<sup>F</sup>  
 Ali Kemal Ozturk, MD<sup>F</sup>  
 Philippe Page<sup>F</sup>  
 Haines Paik, MD<sup>F</sup>  
 Emanuele Palescandolo<sup>F</sup>  
 Alessandro Paluzzi, MD<sup>F</sup>  
 Necmettin Pamir<sup>F</sup>  
 Dachling Pang, MD<sup>F</sup>  
 Avelino Parajon, MD<sup>F</sup>  
 Jamie Pardini, MD<sup>F</sup>  
 John K. Park, MD, PhD<sup>F</sup>  
 Kyung-Jae Park, MD<sup>F</sup>  
 Scott L.Parker, MD<sup>F</sup>  
 Michele Parolin<sup>F</sup>  
 Phillip Parry, MD<sup>F</sup>  
 Andrew T. Parsa, MD, PhD<sup>F</sup>  
 Syed Ameer Basha Paspala<sup>F</sup>  
 Nikunj K. Patel, Bsc, MD, FRCS  
 (SN)<sup>F</sup>  
 Neal Balvant Patel, MD<sup>F</sup>  
 Vishal C. Patel, BS<sup>F</sup>  
 Nikhil Kanti Patel, MD<sup>F</sup>  
 Akash J. Patel, MD<sup>F</sup>  
 Tapan Patel<sup>F</sup>  
 Aanand Patel<sup>F</sup>  
 Parag G. Patil, MD, PhD<sup>F</sup>  
 Arun-Angelo Patil, MD<sup>F</sup>  
 Chirag G. Patil, MD, MS<sup>F</sup>  
 Julian Paton<sup>F</sup>  
 Samit A.Patrawala, BS<sup>F</sup>  
 Alexandra Paul, MD, BS<sup>F</sup>  
 Troy D. Payner, MD<sup>F</sup>  
 Changya Peng, MS<sup>F</sup>  
 Ed Pennigton<sup>F</sup>  
 Luis Perez-Orribo<sup>F</sup>  
 Eric C. Peterson, MD, MS<sup>F</sup>  
 Patrick Pezeshkian, MD<sup>F</sup>  
 Zhe Piao<sup>F</sup>  
 David Piccoli, MD<sup>F</sup>  
 John Douglas Pickard<sup>F</sup>  
 Tony Pickering<sup>F</sup>  
 Mark P. Piedra, MD<sup>F</sup>  
 Joseph M. Piepmeier, MD<sup>F</sup>  
 Renee Pilbeam<sup>F</sup>  
 Alejandro Pino<sup>F</sup>  
 Ian Piper<sup>F</sup>  
 Stephen M. Pirris, MD<sup>F</sup>  
 Dimitris G. Placantonakis, MD,  
 PhD<sup>F</sup>  
 Sandy Poliachik, PhD<sup>F</sup>  
 Andrew Poliakov, PhD<sup>F</sup>  
 Ian F. Pollack, MD<sup>F</sup>  
 Kimberley Pollock, MD<sup>F</sup>  
 Bruce E. Pollock, MD<sup>F</sup>  
 David W. Polly, MD<sup>F</sup>  
 Maritsa Polykarpou<sup>F</sup>  
 Jana Portnow, MD<sup>F</sup>  
 Chantal Poulin<sup>F</sup>  
 Nader Pouratian, MD, PhD<sup>P, F</sup>  
 Suzanne Powell, MD<sup>P</sup>  
 Ciaran J. Powers, MD, PhD<sup>P</sup>  
 Gustavo Pradilla, MD<sup>F</sup>  
 Michael Prados, MD<sup>F</sup>  
 J. Adair Prall, MD<sup>F</sup>  
 Daniel M. Prevedello, MD<sup>P, F</sup>  
 Katie Pricola<sup>F</sup>  
 G. Lee Pride, MD<sup>F</sup>  
 Robert M. Prins, PhD<sup>F</sup>  
 Aina Puce, PhD<sup>F</sup>  
 Vineet Punia<sup>F</sup>  
 Omar M. Qahwash, DO<sup>F</sup>  
 Matthew R. Quigley, MD<sup>F</sup>  
 Alfredo Quinones-Hinojosa, MD<sup>F</sup>  
 Stacey Charlene Quintero Wolfe,  
 MD<sup>P</sup>  
 Andreas Raabe, MD<sup>F</sup>  
 Craig H.Rabb, MD<sup>P, F</sup>  
 Ahmed Rabie<sup>F</sup>  
 Brian T. Ragel, MD<sup>P, F</sup>  
 John Ragheb, MD, FACS, FAAP<sup>F</sup>  
 Shayan Rahman, MD<sup>F</sup>  
 Ramesh Rajan, BSc, PhD<sup>F</sup>  
 Richard A. Rak, MD<sup>F</sup>  
 Patricia B. Raksin, MD<sup>P</sup>  
 Pedro Miguel Ramirez, MD<sup>F</sup>  
 Miguel Ramos-Peek<sup>F</sup>  
 Arun Ranganathan, MD<sup>F</sup>  
 Leonardo Rangel-Castilla, MD<sup>F</sup>  
 Ganesh Rao, MD<sup>P</sup>  
 Ahmed M. Raslan, MBBS, MCh<sup>F</sup>  
 Laura Raymond<sup>P</sup>  
 Steven Raymond<sup>F</sup>  
 John F. Reavey-Cantwell, MD<sup>F</sup>  
 Pablo F. Recinos, MD<sup>F</sup>  
 Kesava Reddy, MD<sup>F</sup>  
 Gaddum Reddy, MD<sup>F</sup>  
 Vishruth K. Reddy, BA<sup>F</sup>  
 Luca Regli<sup>F</sup>  
 Rupert Reichart<sup>F</sup>  
 Michael Reinert<sup>F</sup>  
 Enrique Rentería-Palomo<sup>F</sup>  
 Daniel K. Resnick, MD<sup>P, F</sup>  
 Adam C. Resnick<sup>F</sup>  
 Phillip M. Reyes, BSE<sup>F</sup>  
 Michael Rhee, MD<sup>F</sup>  
 Albert L. Rhoton, MD<sup>F</sup>  
 Paul Richard, MD<sup>F</sup>  
 Boyd Richards<sup>F</sup>

## NOTHING TO DISCLOSE

Kathleen Richter, MS<sup>F</sup>  
Daniele Rigamonti, MD<sup>F</sup>  
Orlando Righesso<sup>F</sup>  
Florian Ringel, MD<sup>F</sup>  
Andrew J. Ringer, MD<sup>F</sup>  
Jon H. Robertson, MD<sup>F</sup>  
Joe S. Robinson, MD<sup>F</sup>  
Bruce D. Rod<sup>P</sup>  
Scott Rodeo<sup>F</sup>  
Roberto Rodríguez-Della  
Vecchia<sup>F</sup>  
Ben Z. Roitberg, MD<sup>F</sup>  
Leonard Rome<sup>F</sup>  
Pål A. Rønning, MD<sup>F</sup>  
Marcello Rosa, BSc, MSc, PhD<sup>F</sup>  
Robert H. Rosenwasser, MD,  
FACS, FAHA<sup>F</sup>  
Michael K. Rosner, MD<sup>F</sup>  
Gail L. Rosseau, MD<sup>F</sup>  
William E. Rothfus<sup>F</sup>  
François-Xavier Roux<sup>F</sup>  
Richard A. Rovin, MD<sup>F</sup>  
Nathan Christopher Rowland,  
MD, PhD<sup>F</sup>  
David Rubin, MD<sup>F</sup>  
Ilan Rubinfeld, MD, MBA<sup>F</sup>  
Joanne Ruck<sup>F</sup>  
Jeremy D. Rudnick, BS, MD<sup>F</sup>  
Jacqueline Ruiz-Granados, MD<sup>F</sup>  
Stephen Rush, MD<sup>F</sup>  
Stuart Russell<sup>F</sup>  
Jacob James Ruzevick<sup>F</sup>  
Jana Rydland<sup>F</sup>  
Felippe Saad<sup>F</sup>  
Keith Z. Sabin, BS<sup>F</sup>  
Nobutake Sadamasa, MD, PhD<sup>F</sup>  
Michael Safae<sup>F</sup>  
Oren Sagher, MD, BA<sup>P</sup>  
Yüksel Sahin<sup>F</sup>  
Rajiv Saigal, MD, PhD<sup>F</sup>  
Rajeet Singh Saluja, MD<sup>F</sup>  
Martin Sames, MD<sup>P, F</sup>  
John H. Sampson, MD, PhD, MHSc<sup>F</sup>  
Duke S. Samson, MD<sup>F</sup>  
Owen B. Samuels, MD<sup>F</sup>  
Nader Sanai, MD<sup>P, F</sup>  
José Juan Sánchez-Rodríguez<sup>F</sup>  
David I. Sandberg, MD<sup>F</sup>  
Sukhmeet Sandhu, BA<sup>F</sup>  
Justin Santagata, MD, PhD<sup>F</sup>  
Justin G. Santarelli, MD<sup>F</sup>  
Alejandro Santillan, MD<sup>F</sup>  
Guillermo Sapiro<sup>F</sup>  
Alexander Sarkisian<sup>F</sup>  
Banu Satana, MD<sup>F</sup>  
Pratheesh Sathyan<sup>F</sup>  
Satyanarayana Satish<sup>F</sup>  
Susumu Sato<sup>F</sup>  
Tsukasa Sato<sup>F</sup>  
Dwight Saulle, MD<sup>F</sup>  
Eric Sauvageau, MD<sup>P</sup>  
Anna Sawa, MS<sup>F</sup>  
Raymond Sawaya, MD<sup>F</sup>  
Alan M. Scarrow, MD, JD<sup>P, F</sup>  
Massimo Scerrati, MD<sup>F</sup>  
William Schairer, BA<sup>F</sup>  
Justin K. Scheer<sup>F</sup>  
R. Schiff<sup>F</sup>  
Frederic Schils, MD<sup>F</sup>  
Michael Schiraldi, MD, PhD<sup>F</sup>  
Clemens M. Schirmer, MD<sup>P, F</sup>  
M.R. Schlabach<sup>F</sup>  
Richard P. Schlenk, MD<sup>P, F</sup>  
Peter Schmidt<sup>F</sup>  
Brian Schmit, PhD<sup>F</sup>  
E.M. Schmitt<sup>F</sup>  
Ulf Schneider<sup>F</sup>  
Alan Schroeder, MD<sup>F</sup>  
David Baruch Schul, MD<sup>F</sup>  
Jason M. Schwalb, MD<sup>P, F</sup>  
Theodore H. Schwartz, MD, FACS<sup>F</sup>  
Marc S. Schwartz, MD<sup>F</sup>  
Daniel Sciubba, BS, MD<sup>F</sup>  
R. Michael Scott, MD<sup>F</sup>  
Edward W. Scott, PhD<sup>F</sup>  
Cara Sedney, MD<sup>P</sup>  
Kevin Seex, MB, ChB, FRACS<sup>F</sup>  
Raymond F. Sekula, MD<sup>F</sup>  
Michael T. Selch<sup>F</sup>  
Naomi Sell<sup>F</sup>  
Chandra N. Sen, MD<sup>F</sup>  
Nobuo Senbokuya, MD<sup>F</sup>  
Fahir Sencan, MD<sup>F</sup>  
Bo-Ra Seo, MD<sup>F</sup>  
Donald M. Seyfried, MD<sup>F</sup>  
Mark E. Shaffrey, MD<sup>F</sup>  
Shinil Shah<sup>F</sup>  
Kashif Ajaz Shaikh, MD<sup>F</sup>  
Sophia Shakur, MD<sup>F</sup>  
Ashwini Dayal Sharan, MD<sup>F</sup>  
David Shau, BS<sup>F</sup>  
C.A. Shaw<sup>F</sup>  
Dennis Shaw, MD<sup>F</sup>  
Jonas Sheehan, MD, FACS<sup>P</sup>  
Jason P. Sheehan, MD, PhD,  
FACS<sup>P, F</sup>  
Muhammad Sheikh<sup>F</sup>  
Jingjing Shen, MD<sup>F</sup>  
Jonathan H. Sherman, MD<sup>P</sup>  
Sameer A. Sheth, MD, PhD<sup>P, F</sup>  
Teena Shetty<sup>F</sup>  
Jixin Shi, MD, PhD<sup>F</sup>  
Weiwei Shi<sup>F</sup>  
Ehab Shiban, MD<sup>F</sup>  
Carol Shields<sup>F</sup>  
Hyunsuk Shim<sup>F</sup>  
Mohamad Shimia<sup>F</sup>  
Hiroaki Shimizu<sup>F</sup>  
Susan Shimon<sup>F</sup>  
John H. Shin, MD<sup>P, F</sup>  
Samuel S. Shin, PhD<sup>F</sup>  
Pratik A. Shukla, BA<sup>F</sup>  
Regina Shupak<sup>P</sup>  
Woei-Cherng Shyu, MD, PhD<sup>F</sup>  
Michelle Siao<sup>F</sup>  
Emily P. Sieg, MD<sup>F</sup>  
Angela J. Sievert, MD, MPH<sup>F</sup>  
Allen K. Sills, MD<sup>F</sup>  
Scott Douglas Simon, MD<sup>F</sup>  
Pankaj K. Singh, MBBS, MS,  
MRCS, MD<sup>F</sup>  
Amit Singla, MBBS<sup>F</sup>  
Tej Prakash Sinha<sup>F</sup>  
Alan Siu, MD<sup>F</sup>

Ahilan Sivaganesan, BA<sup>F</sup>  
 Toril Skandsen<sup>F</sup>  
 S.O. Skinner<sup>F</sup>  
 Erin Slaunwhite<sup>F</sup>  
 Edward R. Smith, MD<sup>P, F</sup>  
 Rene' Smith, RN, BSN<sup>F</sup>  
 Timothy R. Smith, MD<sup>F</sup>  
 Philippa Smith<sup>F</sup>  
 Niv Sne<sup>F</sup>  
 Carl Snyderman, MD<sup>F</sup>  
 Matheus S. Soares, MD<sup>F</sup>  
 Keith L. Soctt, MD<sup>F</sup>  
 N.L. Solimini<sup>F</sup>  
 Robert A. Solomon, MD<sup>F</sup>  
 Gary Solomon, PhD<sup>F</sup>  
 Dolan Sondhi<sup>F</sup>  
 Bowei Song<sup>F</sup>  
 Ashish Sonig, MD, MCh<sup>F</sup>  
 Horacio Soto<sup>F</sup>  
 Marko Spasic, MD<sup>F</sup>  
 Nancy B. Spinner, PhD<sup>F</sup>  
 Alejandro M. Spiotta, MD<sup>F</sup>  
 Justin M. Sporrer, MD<sup>F</sup>  
 Aldo Stamm, MD, PhD<sup>F</sup>  
 Anna Starikova<sup>F</sup>  
 Robert M. Starke, MD, MSc<sup>P, F</sup>  
 Deanne L. Starr<sup>P</sup>  
 John F. Stein<sup>F</sup>  
 Kathy J. Stein, RN<sup>F</sup>  
 Gary K. Steinberg, MD, PhD<sup>F</sup>  
 Hugo Sterman<sup>F</sup>  
 Philip E. Stieg, MD, PhD<sup>F</sup>  
 Martina Stippler, MD<sup>F</sup>  
 Shirley I. Stiver, MD, PhD<sup>P, F</sup>  
 David Stockwell, MD<sup>F</sup>  
 Michael Stoffel, MD<sup>F</sup>  
 Phillip B. Storm, MD<sup>F</sup>  
 Carrie Stover, NP-C<sup>F</sup>  
 Jennifer Strahle, MD<sup>F</sup>  
 Sara Stream<sup>F</sup>  
 Ann R. Stroink, MD<sup>F</sup>  
 Patrick Stroman, PhD<sup>F</sup>  
 Pei-Fang Su, PhD<sup>F</sup>  
 Michael Edward Sughrue, MD<sup>F</sup>  
 Peter P. Sun, MD<sup>F</sup>  
 Matthew Sun<sup>F</sup>  
 Halil Ibrahim Sun, MD<sup>F</sup>  
 T. Sun<sup>F</sup>  
 Narayan Sundaesan, MD<sup>F</sup>  
 Daniel L. Surdell, MD<sup>P, F</sup>  
 Leslie N. Sutton, MD<sup>F</sup>  
 Konstantina Svokos, DO<sup>F</sup>  
 Maaz B.J. Syed, MB, ChB<sup>F</sup>  
 Timothy W. Synold, PhD<sup>F</sup>  
 Viviane S. Tabar, MD<sup>F</sup>  
 Steven Takemoto, PhD<sup>F</sup>  
 Rafael J. Tamargo, MD<sup>F</sup>  
 Arimantas Tamasauskas<sup>F</sup>  
 Sarunas Tamasauskas<sup>F</sup>  
 Gamaliel Tan, MD<sup>F</sup>  
 Michihiro Tanaka<sup>F</sup>  
 Masato Tanaka, MD<sup>F</sup>  
 Yong Tang<sup>F</sup>  
 Bahattin Tanrikulu, MD<sup>F</sup>  
 J. Humberto Tapia-Pérez<sup>F</sup>  
 Manel Tardáguila Serrano<sup>F</sup>  
 Farzana Tariq, MD<sup>F</sup>  
 Rabih G. Tawk, MD<sup>F</sup>  
 Angela B. Taylor<sup>P</sup>  
 Michael D. Taylor, MD<sup>F</sup>  
 Collin Tebo<sup>F</sup>  
 Pilar Teixidor<sup>F</sup>  
 Jamie Terran, BS<sup>F</sup>  
 Lindsay Tetreault, Bsc<sup>F</sup>  
 Bart Thaci, MD<sup>F</sup>  
 Jai D. Thakur, MD<sup>F</sup>  
 Khoi Duc Than, MD<sup>F</sup>  
 Philip V. Theodosopoulos, MD<sup>P, F</sup>  
 Thana Theofanis, BA<sup>F</sup>  
 Narasimha Rao Thiriveedhi<sup>F</sup>  
 Santhosh George Thomas, MBBS<sup>F</sup>  
 Chelsea Thomas<sup>F</sup>  
 Byron Gregory Thompson, MD<sup>P, F</sup>  
 William E. Thorell, MD<sup>F</sup>  
 Fang Tie<sup>F</sup>  
 Ivan Timofeev<sup>F</sup>  
 Stavropoula I. Tjoumakaris, MD<sup>F</sup>  
 Chiu To, DO<sup>F</sup>  
 Zafer Orkun Toktas, MD<sup>F</sup>  
 Krystal Lynne Tomei, MD, MPH<sup>F</sup>  
 Teiji Tominaga, MD, PhD<sup>F</sup>  
 Steven A. Toms, MD, FACS<sup>F</sup>  
 Luke Tomycz, MD<sup>F</sup>  
 Matthew J. Tormenti, MD<sup>F</sup>  
 Roland A. Torres, BA, MD<sup>F</sup>  
 Jaime G. Torres-Corzo, MD<sup>F</sup>  
 Tor D. Tosteson, DSc<sup>F</sup>  
 Tomoaki Toyone, MD<sup>F</sup>  
 Rhoda M. Tran<sup>P</sup>  
 Andy Trang<sup>F</sup>  
 Bruce I. Tranmer, MD, FACS,  
 FRCS(C)<sup>F</sup>  
 Giovanni Tringali, MD<sup>F</sup>  
 Eric R. Trumble, MD<sup>F</sup>  
 Eve C Tsai, MD, PhD, FRCSC, CIP<sup>F</sup>  
 Casey Tsai<sup>F</sup>  
 Meng-Ko Tsai<sup>F</sup>  
 Apostolos Tsiouris, MD<sup>F</sup>  
 Tsuchiya Tsukasa<sup>F</sup>  
 Tsung-Hsi Tu, MD<sup>F</sup>  
 Cornelius Tulleken<sup>F</sup>  
 Luis M. Tumialan, MD<sup>P</sup>  
 Osman Türkmenoglu<sup>F</sup>  
 Alan R. Turtz, MD<sup>F</sup>  
 Michael Tymianski, MD, PhD,  
 FRCS(C)<sup>F</sup>  
 Hiroshi Uenohara<sup>F</sup>  
 Beatrice Ugiliweneza, MSPH<sup>F</sup>  
 Jamie Sue Ullman, MD, FACS<sup>P, F</sup>  
 Nicole J. Ullrich<sup>F</sup>  
 John L. Ulmer, MD<sup>F</sup>  
 Faruk Unal, MD<sup>F</sup>  
 Imre M. Usseli, MD<sup>F</sup>  
 Sumeet Vadera, MD<sup>F</sup>  
 Sudhakar Vadivelu, DO<sup>F</sup>  
 Peter Vajkoczy, MD<sup>F</sup>  
 Venus B.S. Vakhshori<sup>F</sup>  
 Alex B. Valadka, MD<sup>F</sup>  
 Erik Van de Kelft, MD, PhD<sup>F</sup>  
 David Van der Planken, MD<sup>F</sup>  
 Bart Van der Zwan<sup>F</sup>  
 Tristan Van Doomaal<sup>F</sup>  
 Paul Van Hummelen<sup>F</sup>  
 Prasad Vannemreddy, MD<sup>F</sup>

## NOTHING TO DISCLOSE

Pascale Varlet<sup>F</sup>  
G. Edward Vates, MD, PhD<sup>F</sup>  
Kerry Alexandra Vaughan, BA<sup>F</sup>  
Aditya Vedantam, MD<sup>F</sup>  
Anand Veeravagu, MD<sup>F</sup>  
Gregory J. Velat, MD<sup>F</sup>  
Eduardo A. S. Vellutini, MD, PhD<sup>F</sup>  
Bethany Veo<sup>F</sup>  
Matthew Vibbert, MD<sup>F</sup>  
Anne Vik, MD, PhD<sup>F</sup>  
Gloria Villalba<sup>F</sup>  
Nicholas Villalobos, MS<sup>F</sup>  
Jose Villa-Uribe<sup>F</sup>  
Ashwin Viswanathan, MD<sup>F</sup>  
Michael A. Vogelbaum, MD, PhD<sup>F</sup>  
Alfredo Voloschin<sup>F</sup>  
Marcelo Santos Volpon, MD<sup>F</sup>  
Zoya Voronovich<sup>F</sup>  
Rishi Kumar Wadhwa, MD<sup>F</sup>  
Kevin Douglas Waits<sup>F</sup>  
Stuart Walbridge, BS<sup>F</sup>  
Peter Walker, MD<sup>F</sup>  
M. Christopher Wallace, MD,  
MSc, FRCS(C), FACS<sup>F</sup>  
Sara A. Walsh<sup>P</sup>  
Jan Walter, MD<sup>F</sup>  
Marjorie C. Wang, MD, MPH<sup>P, F</sup>  
Shouyan Wang, PhD<sup>F</sup>  
Huan Wang, MD<sup>F</sup>  
Rong Wang<sup>F</sup>  
Doris D. Wang, MD, PhD<sup>F</sup>  
Lin Wang, MD<sup>F</sup>  
Rui Wang<sup>F</sup>  
Shuo Wang<sup>F</sup>  
Danny J.J. Wang<sup>F</sup>  
Chuanwei Wang, MD<sup>F</sup>  
Hongwei Wang<sup>F</sup>  
Russell Warren<sup>F</sup>  
Albrecht Waschke<sup>F</sup>  
Chad Washington, MD<sup>F</sup>  
Shafik N. Wassef, MD, MBBCh<sup>F</sup>  
Michael F. Waters, MD, PhD<sup>F</sup>  
J. Dawn Waters, MD<sup>F</sup>  
Jason Andrew Weaver, MD<sup>P, F</sup>  
Adam Webb, MD<sup>F</sup>  
Li Wei<sup>F</sup>  
Robert John Weil, MD<sup>F</sup>  
Jon D. Weingart, MD<sup>F</sup>  
James N. Weinstein<sup>F</sup>  
John C. Wellons, MD<sup>F</sup>  
Thomas Westbrook<sup>F</sup>  
Michael Westerveld, PhD<sup>F</sup>  
David A. Westman, MBA, CPA,  
CAE<sup>P</sup>  
Jonathan A. White, MD<sup>F</sup>  
Ian Kainoa White, MD<sup>F</sup>  
G. Zachary White, BS<sup>F</sup>  
Louis Williams, BS<sup>F</sup>  
Erin N. Wilmer<sup>F</sup>  
John A. Wilson, MD, FACS<sup>F</sup>  
Christopher J. Winfree, MD<sup>P, F</sup>  
Robert J. Winn, PhD<sup>F</sup>  
Michael Wolf, MD<sup>F</sup>  
Stefan Wolf, MD<sup>F</sup>  
Christopher E. Wolfla, MD,  
FAANS<sup>P</sup>  
Jean-Paul Wolinsky, MD<sup>F</sup>  
Cyrus Chi-Ho Wong, MD, BSc<sup>F</sup>  
David Wrubel, MD<sup>P</sup>  
Julian K. Wu, MD<sup>F</sup>  
Dali Wu<sup>F</sup>  
Angela Wu<sup>F</sup>  
Jing Wu, MD, PhD<sup>F</sup>  
Guohua Xi<sup>F</sup>  
Zhiyuan Xu, MD<sup>F</sup>  
Q. Xu<sup>F</sup>  
Essa Yacoub<sup>F</sup>  
Yoshiya Josh Yamada, MD, FRCP<sup>F</sup>  
Sen Yamagata, MD, PhD<sup>F</sup>  
Lynda Jun-San Yang, MD, PhD<sup>P, F</sup>  
Isaac Yang, MD<sup>F</sup>  
Dongmei Yang<sup>F</sup>  
Chunzhang Yang, MD, PhD<sup>F</sup>  
Xiangyu Yang, PhD<sup>F</sup>  
Rita Yap<sup>F</sup>  
Blake Yarascavitch, MD<sup>F</sup>  
Katsuhito Yasuno<sup>F</sup>  
Chun-Po Yen, MD<sup>P, F</sup>  
Anthony Yi<sup>F</sup>  
Saliha Yilmaz<sup>F</sup>  
Adem Yilmaz<sup>F</sup>  
Howard Yonas, MD<sup>F</sup>  
Raymund L.M. Yong, MD<sup>F</sup>  
Ali Guven Yorukoglu<sup>F</sup>  
Hideyuki Yoshioka<sup>F</sup>  
Daniel Yoshor, MD<sup>P, F</sup>  
Wanchun You, MD<sup>F</sup>  
William F. Young, MD<sup>F</sup>  
A. Samy K. Youssef, MD, PhD<sup>P</sup>  
John S. Yu, MD<sup>F</sup>  
Songlin Yu<sup>F</sup>  
P. Yu<sup>F</sup>  
J. Yu<sup>F</sup>  
Eugene Yu, MD<sup>F</sup>  
Yasutsugu Yukawa, MD<sup>F</sup>  
Brad E. Zacharia, MD<sup>F</sup>  
Eric L. Zager, MD<sup>F</sup>  
Kareem A. Zaghoul, MD, PhD<sup>F</sup>  
Hanady Zainah<sup>F</sup>  
Nazlee Zebardast<sup>F</sup>  
Yi Jonathan Zhang, MD<sup>F</sup>  
Jianfeng Zhang<sup>F</sup>  
Zhigang Zhang<sup>F</sup>  
Huina Zhang<sup>F</sup>  
Dong Zhang<sup>F</sup>  
Yuanli Zhao<sup>F</sup>  
Jizong Zhao, MD<sup>F</sup>  
Zhenlin Zheng, MD, PhD<sup>F</sup>  
Zhong Zheng<sup>F</sup>  
Qiang Zhou, MD<sup>F</sup>  
Mengliang Zhou<sup>F</sup>  
Shugan Zhu<sup>F</sup>  
Zhengping Zhuang, MD, PhD<sup>F</sup>  
Zong Zhuang<sup>F</sup>  
Mehmet Zileli, MD<sup>F</sup>  
Robert Zimmerman<sup>F</sup>  
Pascal O. Zinn, MD<sup>F</sup>  
Gregory J. Zipfel, MD<sup>F</sup>  
Ali R. Zomorodi, MD<sup>F</sup>  
Mario Zuccarello, MD<sup>F</sup>  
Scott Zuckerman<sup>F</sup>  
Edie E. Zusman, MD<sup>P, F</sup>  
Benjamin M. Zussman, BS<sup>F</sup>