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See brief summary on page 155.

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The Congress of Neurological Surgeons exists to enhance health and improve lives worldwide through the advancement of neurosurgical education and scientific exchange.
Welcome to San Francisco! On behalf of the Congress of Neurological Surgeons Executive Committee, the Scientific Program Committee, and our 2013 CNS Honored Guests Dr. L. Nelson Hopkins, Dr. Johannes Schramm, and Dr. Andrew Kaye, we welcome you to this outstanding city for the 2013 Annual Meeting!

This year’s theme, *Evolution of Neurosurgery*, focuses on exploring the past, present, and future of neurosurgery and takes an in-depth look at how far we have come, and where we are going. Our daily General Scientific Sessions have been restructured, delivering a more dynamic format that features anatomy lessons, platform debates on controversial topics, and talks by authors of some of the top papers published in *Neurosurgery®* in the past year. We will also be recognizing the contributions and achievements of our three honored guests, in addition to enjoying presentations by our phenomenal lineup of featured speakers.

While here, be certain to reconnect and share knowledge with colleagues and friends from around the world, including our colleagues from the Chinese Neurosurgical Society, our 2013 international partner organization. Through our Original Science Program, General Scientific Sessions, and *Innovation & Technology Symposia*, as well as our exceptional social events including the Opening Reception and the Wine & Cheese Reception, there are plenty of opportunities to make new connections, enhance your skill set, learn scientific advances, help your practice, and improve patient care.

We thank you for joining us and are excited to have you here as we explore the most significant breakthroughs, clinical research, innovative advances and developments in neurosurgery.

Sincerely,

Ali R. Rezai, MD  
CNS President

Alan M. Scarrow, MD, JD  
Annual Meeting Chair

Ashwini D. Sharan, MD  
Scientific Program Chair

Elad I. Levy, MD, MBA  
Vice Scientific Program Chairman
L. Nelson Hopkins, MD
Sunday, October 20, 5:00 PM
Breaking Down the Silos of Medicine: The Future of Vascular Neurosurgery

L. Nelson Hopkins, MD, is the Professor and Chairman of Neurosurgery, Professor of Radiology, and Director of the Toshiba Stroke Research Center at the University at Buffalo, State University of New York. He fostered the creation of the Toshiba Stroke Research Center, bringing together physicists, chemists, aerospace engineers, neurosurgeons, cardiologists, and radiologists to study neurovascular circulation and develop innovative technologies and approaches for the diagnosis, treatment, and prevention of neurovascular diseases.

Johannes Schramm, MD
Monday, October 21, 10:03 AM
Epilepsy Surgery and the Evolution of Clinical and Translational Science

Johannes Schramm, MD, is a Professor of Neurosurgery at the University of Bonn, Bonn, Germany and retired Chairman Department of Neurosurgery. Dr. Schramm's clinical interests range from glioma surgery to AVMs and epilepsy surgery, as well as spine. His CV lists over 400 publications and over 50 book chapters. He currently is the editor of the book series Advances and Technical Standards in Neurosurgery.

Andrew Kaye, MD
Tuesday, October 22, 10:05 AM
Continuing Evolution: The Biology and Treatment of Gliomas

Andrew Kaye, MD, is the Director of Neurosurgery at The University of Melbourne, The Royal Melbourne Hospital in Australia and the President of the Asian Australasian Society of Neurological Surgeons. His main clinical and research interest involves neuro-oncology and cerebrovascular disease. In 2011, he was awarded the Medal of Honour from the World Federation of Neurosurgical Societies for “outstanding contribution to neurosurgery.”
CHARLES ELACHI, PhD
Sunday, October 20, 5:23 PM
Evolution of Space Discovery
Charles Elachi, PhD, has been the Director of the Jet Propulsion Laboratory since May 2001. He has been a principal investigator on a number of NASA-sponsored studies and flight projects, including the Shuttle Imaging Radar series (Science Team Leader), the Magellan Imaging Radar (Team Member), and the Cassini Titan Radar (Team Leader). He is the author of over 230 publications in the fields of active microwave remote sensing and electromagnetic theory, and he holds several patents in those fields.

ALLAN I. BASBAUM, PhD, FRS
Sunday, October 20, 5:47 PM
Evolving Science of Pain: Transplants
Allan I. Basbaum, PhD, FRS, is Professor and Chairman of the Department of Anatomy at the University of California, San Francisco (UCSF). Dr. Basbaum’s research concerns the transmission and control of pain messages, and the molecular mechanisms that underlie the development of persistent pain after tissue or nerve injury. Dr. Basbaum is a Fellow of the American Association for the Advancement of Science and of the Royal Society in the United Kingdom.

STEVEN JOHNSON
Sunday, October 20, 6:10 PM
Where Good Ideas Come From
Steven Johnson is the leading light of today’s interdisciplinary, collaborative, open-minded approach to innovation. He unites a deep understanding of scientific progress with a sharp sensitivity to contemporary online trends. Together, those traits give him an unmatched insight into how ideas emerge and spread and how they affect the world today.

6:30 – 7:30 PM • Book Signing • Steven Johnson
Lobby of Yerba Buena Salons 8-15
ITZHAK PERLMAN

Monday, October 21, 10:54 AM  
Featured Speaker

Itzhak Perlman, undeniably the reigning virtuoso of the violin, is beloved for his charm and humanity as well as his talent. A major presence in the performing arts on television, Itzhak Perlman has been honored with four Emmy Awards. His recordings regularly appear on the best-seller charts and have garnered fifteen Grammy Awards. His presence on stage, on camera and in personal appearances of all kinds speaks eloquently on behalf of the disabled, and his devotion to their cause is an integral part of Mr. Perlman’s life.

CLAY MARSH, MD

Tuesday, October 22, 10:30 AM  
From the Blue Zones to the Lab: Secrets to Living Long and Living Well

Clay Marsh, MD, is the Executive Director of the Center for the new IDeA Studio (Innovation, Design and Application) and the first Chief Innovation Officer at The Ohio State University Wexner Medical Center. In the IDeA Studio, he and his team will focus on the discovery and delivery of solutions that will be implemented in the P4 (predictive, preventive, personalized and participatory) medicine program, which he also leads.

DAVID BROOKS

Tuesday, October 22, 10:55 AM  
Featured Speaker

David Brooks has a gift for bringing audiences face to face with the spirit of our times with humor, insight and quiet passion. He is a keen observer of the American way of life and a savvy analyst of present-day politics and foreign affairs. He holds prestigious positions as a commentator including the Op-Ed columnist for The New York Times and is an analyst on PBS NewsHour and NPR’s All Things Considered.

11:30 AM–12:30 PM • Book Signing • David Brooks  
CNS Member Services Booth #1309
BENJAMIN C. WARF, MD

Wednesday, October 23, 7:07 AM

Three Steps Forward and Two Steps Back: The Echternach Procession Towards Optimal Hydrocephalus Treatment

Benjamin C. Warf, MD is an Associate Professor of Surgery at Harvard Medical School and Director of Neonatal and Congenital Anomalies Neurosurgery at Boston Children’s Hospital. From 2000 to 2006, he and his wife, Cindy, and their six children lived in Uganda, where they helped found the CURE Children’s Hospital of Uganda, a pediatric neurosurgery specialty hospital. In 2007, Dr. Warf received the Humanitarian Award from the AANS, and in 2012 he was named a MacArthur Fellow.

SUSAN HOCKFIELD, PhD

Wednesday, October 23, 10:35 AM

The 21st Century’s Technology Story: The Convergence of Biology and Engineering

Susan Hockfield, PhD is a noted neuroscientist whose research has focused on the development of the brain. She was the first life scientist to serve as President of the Massachusetts Institute of Technology, where she holds a faculty appointment as Professor of Neuroscience in the Department of Brain and Cognitive Sciences. She serves as a director of the General Electric Company and Qualcomm Incorporated, a trustee of the Carnegie Corporation of New York, and an overseer of the Boston Symphony Orchestra.

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John D. Rolston

**CNS VASCULAR FELLOWSHIP**  
Douglas J. Cook

**CSNS/CNS MEDICAL STUDENT SUMMER FELLOWSHIP**  
Travis R. Ladner

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**Practical Course Moderators**

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<td>Charles A. Sansur</td>
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<td>Nathaniel P. Brooks</td>
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<td>Gregory J. Murad</td>
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<td>Holly Gilmer</td>
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<td>Patricia B. Raksin</td>
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<td>Stavropoula I. Tjoumakaris</td>
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Not pictured: Anil Nanda, Daniel M. Prevedello, Krystal L. Tomei, Michael Y. Wang

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<td>Speaker Ready Room</td>
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<td>7:00 AM</td>
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<td>Association of Neurosurgical Physician Assistants 7th Annual CME Meeting</td>
<td>Golden Gate C1-C2 San Francisco Marriott Marquis</td>
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<td>PC02: Brain Tumor Update</td>
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<td>PC03: Minimally Invasive Spinal Surgery (Cadaver Course)</td>
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<td>PC07: Open Aneurysm Surgery: A 3-D Practical Course</td>
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<td>PC08: Neurosurgical Approaches to the Pain Patient: Patient Selection, Techniques, and Complication Avoidance</td>
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<td>PC13: RRC Next Accreditation System, Milestones, and the Neurosurgery Matrix</td>
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<td>ASSFN Board Meeting</td>
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<td>CNS Publications Committee Meeting</td>
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<td>DIN1: Brain Metastases Guidelines</td>
<td>Farallon Restaurant 450 Post St. Business Casual</td>
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<td>DIN2: Working with Your Hospital</td>
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<td>SYM03: Neuromodulation 2013: What Every Neurosurgeon Needs to Know</td>
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<td>3:00 PM</td>
<td>CNS Education Meeting</td>
<td>Pacific I San Francisco Marriott Marquis</td>
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<tr>
<td>1:00 PM</td>
<td>3:00 PM</td>
<td>CNS Resident SANS Challenge Preliminary Rounds</td>
<td>3020 Moscone West Convention Center</td>
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<td>3:00 PM</td>
<td>CNS Resident SANS Challenge Green Room</td>
<td>3022 Moscone West Convention Center</td>
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<td>Section on Disorders of the Spine and Peripheral Nerves Scientific Program Committee Meeting</td>
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<td>AANS/CNS Section on Pain Executive Committee Meeting</td>
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<td>3:00 PM</td>
<td>SNS Resident Courses Meeting</td>
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<tr>
<td>2:30 PM</td>
<td>4:00 PM</td>
<td>Multidisciplinary Oral Presentations I Moderators: Amir R. Dehdashti, Bharat Guthikonda</td>
<td>3014 Moscone West Convention Center</td>
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<tr>
<td>3:00 PM</td>
<td>4:00 PM</td>
<td>SNS CoRE Meeting</td>
<td>Sierra C San Francisco Marriott Marquis</td>
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<td>3:00 PM</td>
<td>5:00 PM</td>
<td>SNS CAST Committee Meeting</td>
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<td>4:00 PM</td>
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<td>AANS/CNS Cerebrovascular Section Executive Committee Meeting</td>
<td>Pacific J San Francisco Marriott Marquis</td>
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SUNDAY, OCTOBER 20
SCHEDULE OF EVENTS

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<tr>
<th>START</th>
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<th>EVENT</th>
<th>LOCATION</th>
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<tbody>
<tr>
<td>4:30 PM</td>
<td>6:30 PM</td>
<td><strong>General Scientific Session I</strong></td>
<td>Yerba Buena Salons 1-7</td>
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<tr>
<td></td>
<td></td>
<td><strong>Presiding Officer:</strong> Alan M. Scarrow</td>
<td>San Francisco Marriott Marquis</td>
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<td></td>
<td></td>
<td><strong>Moderators:</strong> Alan M. Scarrow, Ashwini D. Sharan</td>
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<tr>
<td>5:00 PM</td>
<td>5:20 PM</td>
<td><strong>HONORED GUEST</strong></td>
<td>Yerba Buena Salons 1-7</td>
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<tr>
<td></td>
<td></td>
<td><strong>Breaking Down the Silos of Medicine: The Future</strong></td>
<td>San Francisco Marriott Marquis</td>
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<td><strong>of Vascular Neurosurgery</strong></td>
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<td>L. Nelson Hopkins, III</td>
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<tr>
<td>5:23 PM</td>
<td>5:44 PM</td>
<td><strong>SPECIAL LECTURE</strong></td>
<td>Yerba Buena Salons 1-7</td>
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<td></td>
<td></td>
<td><strong>Evolution of Space Discovery</strong></td>
<td>San Francisco Marriott Marquis</td>
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<td></td>
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<td>Charles Elachi, Director, Jet Propulsion Lab</td>
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<tr>
<td>5:47 PM</td>
<td>6:07 PM</td>
<td><strong>SPECIAL LECTURE</strong></td>
<td>Yerba Buena Salons 1-7</td>
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<tr>
<td></td>
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<td><strong>Evolving Science of Pain: Transplants</strong></td>
<td>San Francisco Marriott Marquis</td>
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<td></td>
<td></td>
<td>Allan Basbaum, Professor and Chairman of the Department of</td>
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<td></td>
<td></td>
<td>Anatomy at UCSF</td>
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<tr>
<td>6:10 PM</td>
<td>6:30 PM</td>
<td><strong>FEATURED SPEAKER</strong></td>
<td>Yerba Buena Salons 1-7</td>
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<td></td>
<td></td>
<td><strong>Where Good Ideas Come From</strong></td>
<td>San Francisco Marriott Marquis</td>
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<td></td>
<td>Steven Johnson</td>
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<tr>
<td>6:30 PM</td>
<td>7:30 PM</td>
<td><strong>Book Signing</strong></td>
<td>Yerba Buena Salons 8-15 Lobby</td>
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<td><strong>Steven Johnson</strong></td>
<td>San Francisco Marriott Marquis</td>
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<tr>
<td>6:30 PM</td>
<td>8:30 PM</td>
<td><strong>Opening Reception</strong></td>
<td>Yerba Buena Salons 8-15 Lobby</td>
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<td>San Francisco Marriott Marquis</td>
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Opening Reception

Sunday, October 20
6:30 – 8:30 PM

Live music, entertainment and a delicious spread of food and beverages await you at the 2013 CNS Opening Reception. Mingle with colleagues while enjoying a relaxed and festive evening at the San Francisco Marriott Marquis.

VISIT REGISTRATION to purchase tickets for optional courses including the Innovation and Technology Symposia, Practical Courses, Luncheon Seminars and Dinner Seminars.
<table>
<thead>
<tr>
<th>Start Time</th>
<th>End Time</th>
<th>Event</th>
<th>Location</th>
</tr>
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<tbody>
<tr>
<td>6:00 AM</td>
<td>3:00 PM</td>
<td>Speaker Ready Room</td>
<td>3000 Moscone West Convention Center</td>
</tr>
<tr>
<td>6:30 AM</td>
<td>4:30 PM</td>
<td>Registration</td>
<td>Lobby Moscone West Convention Center</td>
</tr>
</tbody>
</table>
| 7:00 AM   | 11:30 AM | General Scientific Session II  
Presiding Officer: Daniel K. Resnick  
Moderators: Michael P. Steinmetz, Michael Y. Wang | Ballroom Moscone West Convention Center |
| 7:00 AM   | 5:00 PM  | CNS Press Room    | 3014 Overlook Moscone West Convention Center |
| 8:00 AM   | 10:30 AM | CNS Spouse Hospitality Suite | Walnut San Francisco Marriott Marquis |
| 9:00 AM   | 10:00 AM | Demo Theater and Beverage Break with Exhibitors | Exhibit Hall Moscone West Convention Center |
| 9:00 AM   | 3:30 PM  | Exhibit Hall Open | Exhibit Hall Moscone West Convention Center |
| 10:00 AM  | 2:30 PM  | Sergeant-At-Arms | 2024 Overlook Moscone West Convention Center |
| 10:03 AM  | 10:23 AM | HONORED GUEST  
Epilepsy Surgery and the Evolution of Clinical and Translational Science  
Johannes Schramm | Ballroom Moscone West Convention Center |
| 10:26 AM  | 10:51 AM | Presidential Address  
Ali R. Rezai | Ballroom Moscone West Convention Center |
| 10:54 AM  | 11:30 AM | FEATURED SPEAKER  
Reigning Virtuoso of the Violin  
Itzhak Perlman | Ballroom Moscone West Convention Center |
<p>| 11:30 AM  | 12:30 PM | Demo Theater and Break with Exhibitors | Exhibit Hall Moscone West Convention Center |
| 12:30 PM  | 2:00 PM  | M01: Honored Guest Luncheon | 2002 Moscone West Convention Center |
| 12:30 PM  | 2:00 PM  | M02: Cervical Arthroplasty and Lumbar Motion Preservation Technologies | 2000 Moscone West Convention Center |
| 12:30 PM  | 2:00 PM  | M03: Radiosurgery in Vestibular Schwannoma Management | 2004 Moscone West Convention Center |
| 12:30 PM  | 2:00 PM  | M04: Innovations in the Management of Intracerebral Hemorrhage | 2005 Moscone West Convention Center |
| 12:30 PM  | 2:00 PM  | M05: Managing Long-term Complications of Cervical and Lumbar Spine Surgery | 2006 Moscone West Convention Center |
| 12:30 PM  | 2:00 PM  | M06: Managing Pediatric Neurovascular Diseases | 2007 Moscone West Convention Center |</p>
<table>
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<tr>
<th>START END</th>
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<th>LOCATION</th>
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<tr>
<td>12:30 PM</td>
<td>M07: Peripheral Nerve Board Review</td>
<td>2008 Moscone West Convention Center</td>
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<td>2:00 PM</td>
<td>M08: Strategies to Reduce Risk in Surgical Management of Tumors in Eloquent Regions</td>
<td>2009 Moscone West Convention Center</td>
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<tr>
<td>12:30 PM</td>
<td>M09: Neurosurgical Emergencies: An Update for Allied Health Care Professionals</td>
<td>2010 Moscone West Convention Center</td>
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<tr>
<td>2:00 PM</td>
<td>M10: Guidelines for Diagnosis and Treatment of Degenerative Lumbar Spinal Disease</td>
<td>2011 Moscone West Convention Center</td>
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<tr>
<td>12:30 PM</td>
<td>M11: Surgical Management of Meningiomas</td>
<td>2012 Moscone West Convention Center</td>
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<tr>
<td>2:00 PM</td>
<td>M12: New Technologies and Innovations In Spinal Neurosurgery</td>
<td>2016 Moscone West Convention Center</td>
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<td>12:30 PM</td>
<td>M13: Multidisciplinary Management of Subarachnoid Hemorrhage and Vasospasm</td>
<td>2018 Moscone West Convention Center</td>
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<td>2:00 PM</td>
<td>M14: Management of Complex and Refractory Chiari Malformations and Syringomyelia</td>
<td>2020 Moscone West Convention Center</td>
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<tr>
<td>12:30 PM</td>
<td>M15: Evidence-Based Management of Brain Metastases</td>
<td>2022 Moscone West Convention Center</td>
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<td>2:00 PM</td>
<td>Consensus Session I: Management of Cerebral Gliomas: Building Consensus from Controversy</td>
<td>2001/2003 Moscone West Convention Center</td>
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<td>3:30 PM</td>
<td>Oral Presentations: Council of State Neurosurgical Societies</td>
<td>2003 Moscone West Convention Center</td>
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<tr>
<td>2:00 PM</td>
<td>Oral Presentations: Section on Pediatric Neurological Surgery</td>
<td>2001 Moscone West Convention Center</td>
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<tr>
<td>3:30 PM</td>
<td>Oral Presentations: Stereotactic &amp; Functional Neurosurgery</td>
<td>2002 Moscone West Convention Center</td>
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<tr>
<td>2:00 PM</td>
<td>Oral Presentations: Section on Tumors</td>
<td>2002 Moscone West Convention Center</td>
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<tr>
<td>3:30 PM</td>
<td>Special Course I: Neurosciences Center and the Neurosurgeon: An Evolving Practice Landscape</td>
<td>2014 Moscone West Convention Center</td>
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<td>3:30 PM</td>
<td>3-D Operative Neurosurgery I: Techniques to Advance Safety and Efficacy in Microneurosurgery</td>
<td>Ballroom Moscone West Convention Center</td>
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<tr>
<td>5:00 PM</td>
<td>Neurosurgical Forum</td>
<td>3014-3020 Moscone West Convention Center</td>
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<tr>
<td>5:00 PM</td>
<td>AANS/CNS Joint Military Committee</td>
<td>Yerba Buena Salon 2 San Francisco Marriott Marquis</td>
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<td>5:00 PM</td>
<td>AASAN Meeting</td>
<td>Yerba Buena Salon 1 San Francisco Marriott Marquis</td>
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<tr>
<td>5:00 PM</td>
<td>International Reception</td>
<td>Yerba Buena Salon 7 San Francisco Marriott Marquis</td>
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<tr>
<td>5:00 PM</td>
<td>Jannetta Society</td>
<td>Nob Hill B San Francisco Marriott Marquis</td>
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<tr>
<td>5:00 PM</td>
<td>OHSU Neurosurgery Alumni Reception</td>
<td>Sierra B San Francisco Marriott Marquis</td>
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<tr>
<td>5:30 PM</td>
<td>University of Utah Neurosurgery Resident Reception</td>
<td>Pacific F San Francisco Marriott Marquis</td>
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<tr>
<td>5:30 PM</td>
<td>Jefferson Neurosurgery Alumni Reception</td>
<td>Pacific E San Francisco Marriott Marquis</td>
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<td>6:00 PM</td>
<td>CANS-CNS Reception</td>
<td>Sierra I San Francisco Marriott Marquis</td>
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<tr>
<td>6:00 PM</td>
<td>Mayo Clinic Alumni Association Reception</td>
<td>Sierra E San Francisco Marriott Marquis</td>
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<tr>
<td>6:00 PM</td>
<td>DIN3: Beyond ‘Through the Tube’ – When and When Not to Use MIS</td>
<td>One Market Restaurant 1 Market St. Dress Code: Business Casual</td>
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<tr>
<td>6:00 PM</td>
<td>DIN4: Evolution of the Endovascular Revolution</td>
<td>Epic Roasthouse 369 The Embarcadero Dress Code: Business Casual</td>
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<tr>
<td>6:30 PM</td>
<td>USC Neurosurgery Alumni Reception</td>
<td>Nob Hill A San Francisco Marriott Marquis</td>
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<tr>
<td>7:00 PM</td>
<td>University of Wisconsin Neurosurgery Dinner</td>
<td>Sierra D San Francisco Marriott Marquis</td>
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</tbody>
</table>

**International Reception**

Monday, October 21, 5:00 – 6:30 PM.
San Francisco Marriott Marquis, Yerba Buena Salon 7

Enjoy cocktails and hor d’oeuvres while you network with colleagues from across the globe.

All international attendees and their guests are invited to attend.

Thank you to Medtronic for their support of this event!
<table>
<thead>
<tr>
<th>START</th>
<th>EVENT</th>
<th>LOCATION</th>
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<tbody>
<tr>
<td>6:00 AM</td>
<td>AANS/CNS Drugs and Devices Committee Meeting</td>
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<td>6:00 AM</td>
<td>Speaker Ready Room</td>
<td>3000 Moscone West Convention Center</td>
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<tr>
<td>6:30 AM</td>
<td>Registration</td>
<td>Lobby Moscone West Convention Center</td>
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<td>7:00 AM</td>
<td>CNS Press Room</td>
<td>3014 Overlook Moscone West Convention Center</td>
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<td>7:00 AM</td>
<td>General Scientific Session III Presiding Officer: Jamie S. Ullman</td>
<td>Ballroom Moscone West Convention Center</td>
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<td>8:00 AM</td>
<td>CNS Spouse Hospitality Suite</td>
<td>Walnut San Francisco Marriott Marquis</td>
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<tr>
<td>9:00 AM</td>
<td>Demo Theater and Beer Break with Exhibitors</td>
<td>Exhibit Hall Moscone West Convention Center</td>
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<td>9:00 AM</td>
<td>Exhibit Hall Open</td>
<td>Exhibit Hall Moscone West Convention Center</td>
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<tr>
<td>10:00 AM</td>
<td>Sergeant-At-Arms</td>
<td>2024 Overlook Moscone West Convention Center</td>
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<td>10:05 AM</td>
<td>HONORED GUEST</td>
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<td>SPECIAL LECTURE</td>
<td>Ballroom Moscone West Convention Center</td>
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<tr>
<td>10:55 AM</td>
<td>FEATURED SPEAKER</td>
<td>Ballroom Moscone West Convention Center</td>
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<td>11:30 AM</td>
<td>Book Signing</td>
<td>CNS Booth #1309 Moscone West Convention Center</td>
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<td>11:30 AM</td>
<td>Cervical Spondylotic Investigator</td>
<td>Yerba Buena Salon 5 San Francisco Marriott Marquis</td>
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<td>11:30 AM</td>
<td>Demo Theater and Break with Exhibitors</td>
<td>Exhibit Hall Moscone West Convention Center</td>
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<td>12:30 PM</td>
<td>2014 CNS Annual Meeting Scientific Program Committee</td>
<td>2003 Moscone West Convention Center</td>
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<td>12:30 PM</td>
<td>T16: Honored Guest Luncheon</td>
<td>2002 Moscone West Convention Center</td>
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<td>12:30 PM</td>
<td>T17: Surgical Management of Cervical Degenerative Disease</td>
<td>2000 Moscone West Convention Center</td>
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<td>12:30 PM</td>
<td>T18: Skull Base Endoscopy: Utility and Limitations</td>
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<td>12:30 PM</td>
<td>2:00 PM</td>
<td>T19: Multimodal Management of Intracranial Arteriovenous Malformations</td>
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<td>12:30 PM</td>
<td>2:00 PM</td>
<td>T20: The Aging Spine: Considerations in Surgical Management</td>
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<tr>
<td>12:30 PM</td>
<td>2:00 PM</td>
<td>T21: Guidelines for the Management of Acute Cervical Spine and Spinal Cord Injuries</td>
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<tr>
<td>12:30 PM</td>
<td>2:00 PM</td>
<td>T22: Pituitary Adenomas: Operative Nuances and Management Considerations</td>
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<td>12:30 PM</td>
<td>2:00 PM</td>
<td>T23: Advances in the Management of Trigeminal Neuralgia and Facial Pain</td>
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<td>12:30 PM</td>
<td>2:00 PM</td>
<td>T24: Multidisciplinary Management Strategies for Unruptured Aneurysms</td>
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<td>12:30 PM</td>
<td>2:00 PM</td>
<td>T25: Managing Complications In Spinal Surgery</td>
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<td>12:30 PM</td>
<td>2:00 PM</td>
<td>T26: Guidelines for Neurocritical Care Management for Patients with Severe Traumatic Brain Injury</td>
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<td>12:30 PM</td>
<td>2:00 PM</td>
<td>T27: Controversies in Management of Low Grade Gliomas</td>
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<td>12:30 PM</td>
<td>2:00 PM</td>
<td>T28: Complication Avoidance and Advanced MIS Applications</td>
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<td>12:30 PM</td>
<td>2:00 PM</td>
<td>T29: Peripheral Nerve Entrapment Syndromes: Diagnosis and Management</td>
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<td>2:00 PM</td>
<td>3:30 PM</td>
<td>Council of State Neurosurgical Societies: Enhancing Patient Experience: Impact on Your Practice</td>
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<td>2:00 PM</td>
<td>3:30 PM</td>
<td>Oral Presentations: Disorders of the Spine and Peripheral Nerves</td>
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<td>3:30 PM</td>
<td>Oral Presentations: Section on Neurotrauma and Critical Care</td>
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<td>3:30 PM</td>
<td>Oral Presentations: Section on Pain</td>
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<td>Oral Presentations: Section on Cerebrovascular Surgery</td>
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<td>2:00 PM</td>
<td>3:30 PM</td>
<td>Section on Pediatrics: Tackling Difficult Shunt Problems: Headaches, Slit Ventrices and Their Management Strategies</td>
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<td>3:30 PM</td>
<td>Section on Stereotactic &amp; Functional Neurosurgery: Advances in Epilepsy Surgery</td>
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<td>2:00 PM</td>
<td>3:30 PM</td>
<td>Section on Tumors: Novel Imaging in Brain Tumor Surgery</td>
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<td>2:00 PM</td>
<td>3:30 PM</td>
<td>Special Course II: Out of Balance: How Can We Improve Outcomes from Spine Surgery?</td>
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<tr>
<td>3:30 PM</td>
<td>Annual Business Meeting</td>
<td>2001 Moscone West Convention Center</td>
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<tr>
<td>3:30 PM</td>
<td>3-D Operative Neurosurgery II: Intraoperative Complication Avoidance and Management</td>
<td>Ballroom Moscone West Convention Center</td>
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<tr>
<td>5:00 PM</td>
<td>Wine and Cheese Reception</td>
<td>Exhibit Hall Moscone West Convention Center</td>
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<tr>
<td>5:00 PM</td>
<td>Resident SANS Challenge Championship Round “Are You Smarter Than...?”</td>
<td>Demo Theater in the Exhibit Hall</td>
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<tr>
<td>6:00 PM</td>
<td>WINS Reception</td>
<td>Nob Hill A San Francisco Marriott Marquis</td>
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<td>6:00 PM</td>
<td>DINS5: Placing Sports Under the Microscope: Head Injury and CTE</td>
<td>Waterbar Restaurant 399 The Embarcadero South Dress Code: Business Casual</td>
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<tr>
<td>6:30 PM</td>
<td>Resident Recruitment Social</td>
<td>Level 2 Lobby Moscone West Convention Center</td>
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</table>

EARN additional CME with the SANS Annual Meeting Supplemental Exams!

Purchase one or all – these exams provide one hour of CME credit for $15 each. Attendance at the live course is not mandatory.

Practical Courses:
- PC02: Brain Tumor Update
- PC09: Using Evidence-Based Medicine to Manage Spinal Disorders
- PC27: Cranial Neurosurgery: Complication Avoidance and Management

Luncheon Seminars:
- M03: Radiosurgery in Vestibular Schwannoma Management
- M04: Innovations in the Management of Intracerebral Hemorrhage
- M05: Managing Long-term Complications of Cervical and Lumbar Spine Surgery
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<tbody>
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<td>6:00 AM</td>
<td>3:00 PM</td>
<td><strong>Speaker Ready Room</strong></td>
<td>3000 Moscone West Convention Center</td>
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<tr>
<td>6:30 AM</td>
<td>3:00 PM</td>
<td><strong>Registration</strong></td>
<td>Lobby Moscone West Convention Center</td>
</tr>
<tr>
<td>7:00 AM</td>
<td>11:30 AM</td>
<td><strong>General Scientific Session IV</strong></td>
<td>Ballroom Moscone West Convention Center</td>
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<tr>
<td></td>
<td></td>
<td>Presiding Officer: Russell R. Loenser</td>
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<td></td>
<td>Moderators: Elad I. Levy, Nathan R. Selden</td>
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<tr>
<td>7:00 AM</td>
<td>3:30 PM</td>
<td><strong>CNS Press Room</strong></td>
<td>3014 Overlook Moscone West Convention Center</td>
</tr>
<tr>
<td>7:07 AM</td>
<td>7:27 AM</td>
<td><strong>SPECIAL LECTURE</strong></td>
<td>Ballroom Moscone West Convention Center</td>
</tr>
<tr>
<td>8:00 AM</td>
<td>10:30 AM</td>
<td><strong>CNS Spouse Hospitality Suite</strong></td>
<td>Walnut San Francisco Marriott Marquis</td>
</tr>
<tr>
<td>9:00 AM</td>
<td>10:00 AM</td>
<td><strong>Demo Theater and Beverage Break with Exhibitors</strong></td>
<td>Exhibit Hall Moscone West Convention Center</td>
</tr>
<tr>
<td>9:00 AM</td>
<td>2:00 PM</td>
<td><strong>Exhibit Hall Open</strong></td>
<td>Exhibit Hall Moscone West Convention Center</td>
</tr>
<tr>
<td>10:00 AM</td>
<td>2:30 PM</td>
<td><strong>Sergeant-At-Arms</strong></td>
<td>2024 Overlook Moscone West Convention Center</td>
</tr>
<tr>
<td>10:02 AM</td>
<td>10:17 AM</td>
<td><strong>International Lecture</strong></td>
<td>Ballroom Moscone West Convention Center</td>
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<tr>
<td>10:35 AM</td>
<td>10:55 AM</td>
<td><strong>SPECIAL LECTURE</strong></td>
<td>Ballroom Moscone West Convention Center</td>
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<td></td>
<td></td>
<td>The 21st Century’s Technology Story: The Convergence of Biology and Engineering</td>
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<td>Susan Hockfield, President Emerita Massachusetts Institute of Technology</td>
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<tr>
<td>10:55 AM</td>
<td>11:30 AM</td>
<td><strong>Investing in Neurosurgery Innovations</strong></td>
<td>Ballroom Moscone West Convention Center</td>
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<tr>
<td></td>
<td></td>
<td>Faculty: L. Nelson Hopkins, Fred Khosravi, Hank Plain, Paul York</td>
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<tr>
<td>11:30 AM</td>
<td>12:30 PM</td>
<td><strong>Demo Theater and Break with Exhibitors</strong></td>
<td>Exhibit Hall Moscone West Convention Center</td>
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<tr>
<td>12:30 PM</td>
<td>2:00 PM</td>
<td><strong>2013-2014 CNS Executive Committee Meeting</strong></td>
<td>3018 Moscone West Convention Center</td>
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<tr>
<td>12:30 PM</td>
<td>2:00 PM</td>
<td><strong>W30: Honored Guest Luncheon</strong></td>
<td>2002 Moscone West Convention Center</td>
</tr>
<tr>
<td>12:30 PM</td>
<td>2:00 PM</td>
<td><strong>W31: Recurrent, Thoracic and Far Lateral Lumbar Disc Herniations</strong></td>
<td>2000 Moscone West Convention Center</td>
</tr>
<tr>
<td>12:30 PM</td>
<td>2:00 PM</td>
<td><strong>W32: Complication Avoidance and Management in Skull Base Surgery</strong></td>
<td>2004 Moscone West Convention Center</td>
</tr>
<tr>
<td>12:30 PM</td>
<td>2:00 PM</td>
<td><strong>W33: Update on Movement Disorders: Novel Targets, Indications, and Approaches</strong></td>
<td>2005 Moscone West Convention Center</td>
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<tr>
<td>START</td>
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<tr>
<td>12:30 PM</td>
<td>2:00 PM</td>
<td>W34: Malignant Glioma: Where Are We Now?</td>
<td>2006 Moscone West Convention Center</td>
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<tr>
<td>12:30 PM</td>
<td>2:00 PM</td>
<td>W35: Lessons Learned: Avoidance and Management of Complications of Aneurysm Surgery</td>
<td>2007 Moscone West Convention Center</td>
</tr>
<tr>
<td>12:30 PM</td>
<td>2:00 PM</td>
<td>W36: Sagittal Balance in Spine Surgery</td>
<td>2008 Moscone West Convention Center</td>
</tr>
<tr>
<td>12:30 PM</td>
<td>2:00 PM</td>
<td>W37: Strategies for Maximizing Compensation for Your Neurosurgical Practice</td>
<td>2009 Moscone West Convention Center</td>
</tr>
<tr>
<td>12:30 PM</td>
<td>2:00 PM</td>
<td>W38: Athletic Head Injuries: Return To Play</td>
<td>2010 Moscone West Convention Center</td>
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<tr>
<td>12:30 PM</td>
<td>2:00 PM</td>
<td>W39: Quality and Value in Health Care</td>
<td>2011 Moscone West Convention Center</td>
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<tr>
<td>12:30 PM</td>
<td>2:00 PM</td>
<td>W40: Hematology and Coagulation for Neurosurgeons: Dangers and Solutions</td>
<td>2012 Moscone West Convention Center</td>
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<tr>
<td>12:30 PM</td>
<td>2:00 PM</td>
<td>W41: Managing Metastasis to the Spine</td>
<td>2016 Moscone West Convention Center</td>
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<tr>
<td>12:30 PM</td>
<td>2:00 PM</td>
<td>W42: Open Skull Base Surgery: When is the Traditional Approach Necessary?</td>
<td>2018 Moscone West Convention Center</td>
</tr>
<tr>
<td>12:30 PM</td>
<td>2:00 PM</td>
<td>W43: Cellular Therapies In Neurosurgery</td>
<td>2020 Moscone West Convention Center</td>
</tr>
<tr>
<td>12:30 PM</td>
<td>2:00 PM</td>
<td>W44: New Technologies and Innovations in Cranial Neurosurgery</td>
<td>2022 Moscone West Convention Center</td>
</tr>
<tr>
<td>2:00 PM</td>
<td>3:30 PM</td>
<td>Consensus Session II: Acute Cervical Spine and Spinal Cord Trauma: The Medical Evidence and Controversies of Top-flight Care</td>
<td>2001/2003 Moscone West Convention Center</td>
</tr>
<tr>
<td>2:00 PM</td>
<td>3:30 PM</td>
<td>Multidisciplinary Oral Presentations II Moderators: Michael R. Chicoine, Kee Kim</td>
<td>3022 Moscone West Convention Center</td>
</tr>
<tr>
<td>2:00 PM</td>
<td>3:30 PM</td>
<td>Section on Cerebrovascular Surgery: The Evolution of Neurosurgery</td>
<td>3001 Moscone West Convention Center</td>
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<tr>
<td>2:00 PM</td>
<td>3:30 PM</td>
<td>Section on Disorders of the Spine and Peripheral Nerves: Cervical Spine Surgery: Where We Come From, Where We Are, Where We Are Going</td>
<td>3003 Moscone West Convention Center</td>
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<tr>
<td>2:00 PM</td>
<td>3:30 PM</td>
<td>Section on Neurotrauma and Critical Care: Evolution of Neurosurgery – Translational Research to Clinical Trial</td>
<td>3002 Moscone West Convention Center</td>
</tr>
<tr>
<td>2:00 PM</td>
<td>3:30 PM</td>
<td>Section on Pain: The Evolution of Pain Neurosurgery</td>
<td>3016 Moscone West Convention Center</td>
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</tbody>
</table>
KEEP IT LOCAL

VISIT BOOTH 1431 TO FIND OUT HOW
INNOVATION & TECHNOLOGY SYMPOSIUM

8:00 AM–5:00 PM  Room 2009, Moscone West Convention Center

**SYM01: NEUROSURGERY INNOVATIONS**

CME not offered for this course.

**SYMPOSIUM DIRECTORS:** Brian L. Hoh, Steven N. Kalkanis


8:10 – 10:00 AM

**Cerebrovascular Neurosurgery Technology and Innovation**

10:00 – 12:00 PM

**Spine Neurosurgery Technology and Innovation**

12:15 – 1:15 PM

**Lunch**

Please join Symposia Sponsor, Medtronic, for special lunch presentations:

- “Emerging Translational Tools for the Exploration of Neurological Disease” by Tim Denison, Ph.D., Director of Neural Engineering and Technical Fellow, Medtronic.
- “The Future of Brain Targeted Drug Delivery” by Lisa Shafer, Ph.D., Director of Neuromodulation Global Research, Medtronic.

1:15 – 4:00 PM

**Brain Tumor Technology and Innovation**

4:00 PM

**Closing Remarks and Questions**

Special Thanks to **Medtronic** for providing financial support for SYM01: Neurosurgery Innovations
INNOVATION & TECHNOLOGY SYMPOSIUM

8:00 AM–5:00 PM Room 2003, Moscone West Convention Center

SYM02: TRAUMATIC HEAD INJURY

SYMPOSIUM DIRECTORS: Raj K. Narayan, Jack Jallo

COURSE FACULTY: Julian E. Bailes Jr., Randall M. Chesnut, Jamshid Ghajar, Ramona Hicks, Mathew Joseph, Geoffrey T. Manley, Andrew I. Maas, John Povlishock, Andres M. Rubiano, Guy Rosenthal, Lori A. Shutter, Shelly D. Timmons, Jack E. Wilberger, David W. Wright

8:00–10:00 AM

Hot Topics

10:00–10:40 AM

Industry Innovation Session with Integra

10:40 AM–12:00 PM

Controversies In Traumatic Brain Injury

12:00–1:00 PM

Lunch

1:00–2:20 PM

Controversies In Traumatic Brain Injury

2:20–2:50 PM

Industry Innovation Session with Codman

2:50–4:10 PM

Controversies In Traumatic Brain Injury

4:10 PM

Closing Remarks and Questions

Supported in part by:

PRACTICAL COURSES AND DINNER SEMINARS

8:00 AM–4:00 PM Room 3014

PC01: NINDS/CNS Workshop on Grant Writing and Career Development

COURSE DIRECTORS: Steven J. Korn, Russell R. Lonser


8:00 AM–4:00 PM Room 2008

PC02: Brain Tumor Update

COURSE DIRECTORS: Andrew T. Parsa, Jason P. Sheehan

COURSE FACULTY: Manish K. Aghi, Nicholas C. Bambakidis, Frederick G. Barker, John A. Boockvar, Franco DeMonte, Michael Lim, Russell R. Lonser, Mark E. Shaffrey, Michael E. Sughrue, Charles Teo, Philip V. Theodosopoulos, Isaac Yang

Stay connected with the CNS Annual Meeting Guide at http://m.cns.org
PC03: Minimally Invasive Spinal Surgery (Cadaver Course)
COURSE DIRECTORS: Richard G. Fessler, John C. Liu
COURSE FACULTY: Nader S. Dahdaleh, Kurt M. Eichholz, Langston T. Holly, Robert E. Isaacs, Bong-Soo Kim, John E. O’Toole, Alfred T. Ogden, Avelino Parajon, Mick J. Perez-Cruet, Faheem A. Sandhu, Zachary Adam Smith, Trent Lane Tredway, Jean-Marc Voyadzis
8:00 – 11:30 AM

PC04: So, You Want to be a Neurosurgeon?
COURSE DIRECTORS: Aviva Abosch, Stavropoula I. Tjoumakaris
COURSE FACULTY: Frederick A. Boop, Susan Chang, Daniel Robert Fassett, Daniel A. Lim, Neil A. Martin, Praveen V. Mummaneni, Nathan R. Selden, Krystal L. Tomei
8:00 – 11:30 AM

PC05: Neurosurgery Oral Board Review
COURSE DIRECTORS: Allan D. Levi
COURSE FACULTY: James S. Harrop, Thomas J. Leipzig, Alfredo Quinones-Hinojosa, Robert J. Spinner
8:00 – 11:30 AM

PC06: Cervical Spondylotic Myelopathy and Radiculopathy: Treatment Approaches and Options
COURSE DIRECTORS: Regis W. Haid, Jr., Michael G. Kaiser
COURSE FACULTY: Kurt M. Eichholz, James S. Harrop, Langston T. Holly, John E. O’Toole
8:00 – 11:30 AM

PC07: Open Aneurysm Surgery: A 3-D Practical Course
COURSE DIRECTORS: Michael T. Lawton, Byron Gregory Thompson, Jr.
8:00 – 11:30 AM

PC08: Neurosurgical Approaches to the Pain Patient: Patient Selection, Techniques, and Complication Avoidance
COURSE DIRECTORS: Julie G. Pilitsis, Joshua M. Rosenow
8:00 – 11:30 AM

PC09: Using Evidence-Based Medicine to Manage Spinal Disorders
COURSE DIRECTORS: Peter D. Angevine, John E. O’Toole
COURSE FACULTY: Mark H. Bilsky, Andrew T. Dailey, Daniel J. Hoh, Michael G. Kaiser
12:30 – 4:00 PM
12:30 – 4:00 PM  Room 3003

**PC10:** Trauma Update: Spinal Cord Injury Guidelines and Best Practices  
**COURSE DIRECTORS:** Michael G. Fehlings, James S. Harrop  
**COURSE FACULTY:** Bizhan Aarabi, Sean Peter Barry, Steven Casha, Rajesh Reddy, Christopher I. Shaffrey, Mohammed F. Shamji

12:30 – 4:00 PM  Room 3002

**PC11:** Masters of Cranial Neuroendoscopy  
**COURSE DIRECTORS:** Alan R. Cohen, James M. Drake  
**COURSE FACULTY:** Daniel J. Guillaume, Costas George Hadjipanayis, Nakamasa Hayashi, John Anthony Jane, David F. Jimenez, David D. Limbrick, Charles Teo

12:30 – 4:00 PM  Room 3022

**PC12:** Implementing Quality Improvement in Neurosurgery: Raising Quality, Lowering Cost, and Maximizing Compensation  
**COURSE DIRECTORS:** William A. Friedman, Stephen J. Haines, Neil A. Martin, Nader Pouratian  
**COURSE FACULTY:** Anthony Asher, Dong H. Kim, Nancy McLaughlin

12:30 – 4:00 PM  Room 2024

**PC13:** RRC Next Accreditation System, Milestones, and the Neurosurgery Matrix  
**COURSE DIRECTORS:** H. Hunt Batjer, Nathan R. Selden  
**COURSE FACULTY:** Pamela L. Derstine, Ann Dohn, Heidi Waldo

12:30 – 4:00 PM  Room 3001

**PC14:** 3-D Anatomy (Supratentorial)  
**COURSE DIRECTORS:** Juan Carlos Fernandez-Miranda  
**COURSE FACULTY:** Evandro De Oliveria, Antonio Mussi, Jeffrey M. Sorenson

5:30 – 8:00 PM  Farallon Restaurant

**DINNER SEMINAR 1**  
**Brain Metastases Guidelines**  
**MODERATOR:** Steven N. Kalkanis  
**FACULTY:** David W. Andrews, Clark C. Chen, Timothy C. Ryken  
*Pre-Dinner Reception hosted by Arbor Pharmaceuticals  
Supported by an Educational Grant from BrainLab*

5:30 – 8:00 PM  Boulevard Restaurant

**DINNER SEMINAR 2**  
**Working with Your Hospital**  
**MODERATOR:** Alex B. Valadka  
**FACULTY:** Deborah L. Benzil, Robert E. Harbaugh, Edie E. Zusman
INNOVATION & TECHNOLOGY SYMPOSIUM

7:00 AM–4:00 PM  Golden Gate B, Marriott Marquis

SYM03: NEUROMODULATION 2013: WHAT EVERY NEUROSURGEON NEEDS TO KNOW

SYMPOSIUM DIRECTORS: Michael G. Kaplitt, Parag G. Patil

7:00—9:15 AM
What Every Neurosurgeon Needs to Know About Pain Neuromodulation

9:15—9:55 AM
Industry Innovation Session with Medtronic Neuromodulation

9:55—11:10 AM
What Every Neurosurgeon Needs to Know about Deep Brain Stimulation

11:10 AM—12:00 PM
Lunch

12:00—12:45 PM
International Session: Ablation Around the World

12:45—1:25 PM
Industry Innovation Session with Boston Scientific

1:25—4:00 PM
What Every Neurosurgeon Needs to Know for the Future

2:45—3:25 PM
Breakout Industry Innovation Session

3:25 PM
Closing Remarks and Questions

Supported in part by: Medtronic  Boston Scientific
SUNDAY, OCTOBER 20

INNOVATION & TECHNOLOGY SYMPOSIUM

7:00 AM–4:00 PM  Room 2001, Moscone West Convention Center

NEW SYM04: STROKE 2014

SYMPOSIUM DIRECTORS: Peter Kan, Adnan H. Siddiqui

7:00 – 7:40 AM
Medical Therapy for Stroke: What is the Evidence?

7:40 – 8:40 AM
Interventional Therapy for Stroke: What is the Evidence?

8:40 – 9:20 AM
Industry Innovation Session with Covidien

9:20 – 11:00 AM
Patient Selection and Advance Imaging for Acute Stroke Intervention

9:50 – 10:30 AM
Industry Innovation Session with Microvention

11:00 AM – 12:00 PM
Lunch Break

12:00 – 12:15 PM
EC-IC Bypass: What is the Evidence?

12:15 – 12:55 PM
Industry Innovation Session with Penumbra

12:55 – 1:55 PM
Optimal Treatment of Intracranial Aneurysms

1:55 – 2:40 PM
Flow Diversion in the Treatment of Intracranial Aneurysms: When Should We Use It?

2:40 – 2:55 PM
Critical Care Management of Aneurysmal Subarachnoid Hemorrhage

2:55 – 3:35 PM
Closing Remarks and Questions

Supported in part by:

Stay connected with the CNS Annual Meeting Guide at http://m.cns.org
SUNDAY, OCTOBER 20

PRACTICAL COURSES

8:00 AM – 4:00 PM
Room 2018-2020

**PC15: Endoscopic and Keyhole Approaches to the Anterior Skull Base (Cadaver Course)**

COURSE DIRECTORS: Zachary N. Litvack, Charles Teo

8:00 AM – 4:00 PM
Room 2002

**PC16: Simulation Based Neurosurgical Training**

COURSE DIRECTORS: James S. Harrop, Darlene A. Lobel

Supported in part by Educational Grants from KLS Martin and Biomet Microfixation

8:00 – 11:30 AM
Room 2008

**PC17: 2013 CPT Coding Update**

COURSE DIRECTORS: Alexander Mason, John K. Ratliff
COURSE FACULTY: Kim Pollock, Karin R. Swartz, Luis M. Tumialan

8:00 – 11:30 AM
Room 2024

**PC18: Practical Spine Biomechanics for Clinical Practice**

COURSE DIRECTORS: Edward C. Benzel, Tyler R. Koski
COURSE FACULTY: Zoher Ghogawala, Langston T. Holly, John H. Shin

8:00 – 11:30 AM
Room 3001

**PC19: 3-D Anatomy (Infratentorial)**

COURSE DIRECTORS: Juan Carlos Fernandez-Miranda
COURSE FACULTY: Evandro De Oliveira, Antonio Mussi

8:00 – 11:30 AM
Room 2022

**PC20: Surgical Management of Tumors in Eloquent Regions**

COURSE DIRECTORS: Andrew H. Kaye, Guy M. McKhann
COURSE FACULTY: Giuseppe Barbagallo, Edward F. Chang, Jorge A. Gonzalez-Martinez, Andrew Morokoff

8:00 – 11:30 AM
Room 3016

**PC21: Building a Neurosciences Program**

COURSE DIRECTORS: Steven A. Toms
COURSE FACULTY: P. David Adelson, Megan Brosious, James M. Ecklund, Robert M. Friedlander, John B. Pracyk, Gary K. Steinberg
<table>
<thead>
<tr>
<th>Time</th>
<th>Location</th>
<th>Course Title</th>
<th>Course Directors</th>
<th>Course Faculty</th>
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</thead>
<tbody>
<tr>
<td>8:00 – 11:30 AM</td>
<td>Room 3003</td>
<td><strong>PC22</strong>: Negotiation Tactics from the Experts - Getting the best Deal (Hospital Negotiations)</td>
<td>Deborah L. Benzil, Alex B. Valadka</td>
<td>James M. Ecklund, Anne McCune, Troy D. Payner, Lawrence H. Pitts, James T. Rutka, Edie E. Zusman</td>
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<tr>
<td>12:30 – 4:00 PM</td>
<td>Room 2016</td>
<td><strong>PC25</strong>: Neurocritical Care and Neurosurgical Emergencies Update</td>
<td>Jack Jallo, Christopher J. Madden</td>
<td>Kamran Athar, Ian E. McCutcheon, John K. Ratliff, Jonathan A. White</td>
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<tr>
<td>12:30 – 4:00 PM</td>
<td>Room 2014</td>
<td><strong>PC28</strong>: Cranial and Spinal Radiosurgery Update</td>
<td>Randy L. Jensen, Andrew E. Sloan</td>
<td>Steven D. Chang, Michael W. McDermott, Alexander Muacevic, Jason P. Sheehan</td>
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2:30 – 4:00 PM | Room 3014, MOSCONE WEST CONVENTION CENTER | **MULTIDISCIPLINARY ORAL PRESENTATIONS I** | Amir R. Dehdashti, Bharat Guthikonda | For a listing of Oral Presentations see pages 54-55.
SUNDAY, OCTOBER 20
GENERAL SCIENTIFIC SESSION I
4:30 – 6:30 PM ▶ San Francisco Marriott Marquis
Yerba Buena Salons 1-7

PRESIDING OFFICER: Alan M. Scarrow
MODERATORS: Alan M. Scarrow, Ashwini D. Sharan

4:30 – 4:35 PM
Introduction – Ali R. Rezai

4:35 – 4:55 PM
The Evolution of Functional Anatomy, the Face as Paradigm – Dennis Spencer

4:55 – 5:00 PM
Introduction of Honored Guest – Robert F. Spetzler

5:00 – 5:20 PM
HONORED GUEST LECTURE
Breaking Down the Silos of Medicine: The Future of Vascular Neurosurgery
L. Nelson Hopkins, III

5:20 – 5:23 PM
Introduction of Special Lecture – Bernard R. Bendok

5:23 – 5:44 PM
FEATURED SPEAKER
Evolution of Space Discovery
Charles Elachi
Director, Jet Propulsion Lab

5:44 – 5:47 PM
Introduction of Special Lecture – Julie G. Pilitsis

5:47 – 6:07 PM
FEATURED SPEAKER
Evolving Science of Pain: Transplants
Allan Basbaum, PhD, FRS
Professor and Chairman of the Department of Anatomy at UCSF
SUNDAY, OCTOBER 20
GENERAL SCIENTIFIC SESSION I
4:30 – 6:30 PM ▶ San Francisco Marriott Marquis
Yerba Buena Salons 1-7

6:07 – 6:10 PM
Introduction of Featured Speaker – Alan M. Scarrow

6:10 – 6:30 PM
FEATURED SPEAKER
Where Good Ideas Come From
Steven Johnson
Best-Selling Author

6:30 – 7:30 PM
Book Signing
Yerba Buena Salons 8-15 Lobby Marriott Marquis

6:10 – 6:30 PM
Sunday, October 20
6:30 – 8:30 PM
Live music, entertainment and a delicious spread of food and beverages await you at the 2013 CNS Opening Reception. Mingle with colleagues while enjoying a relaxed and festive evening at the San Francisco Marriott Marquis.

Opening Reception
MONDAY, OCTOBER 21
GENERAL SCIENTIFIC SESSION II
7:00 – 11:30 AM  Moscone West Convention Center
Ballroom

PRESIDING OFFICER: Daniel K. Resnick
MODERATORS: Michael P. Steinmetz, Michael Y. Wang

7:00 – 7:04 AM
CNS Foundation – Richard W. Byrne

7:04 – 7:18 AM
Spinal Vascular Malformations Dural AVF – How, When & Why – Cameron G. McDougall

7:18 – 7:32 AM
Outcomes Research and Patient Access to Spine Care: Lessons Learned and Implications for the Future of Spine Surgery – John K. Ratliff

7:32 – 7:46 AM
Spinal Oncology: from XRT, Surgery, Radiosurgery – Peter C. Gerszten

7:46 – 8:00 AM
Spinal Technologies Not in the USA – Domagoj Coric

8:00 – 8:23 AM
Controversy: Spinal Cord Injury and Steroids: Reality, Data, Guidelines – Now What?
Moderator: James S. Harrop
R. John Hurlbert versus Michael G. Fehlings

8:23 – 8:33 AM
Editor’s Choice Spine Paper – Daniel K. Resnick
Cancer After Spinal Fusion: The Role of BMP

8:33 – 8:47 AM
Operative Pearls: Tackling Challenges in Aneurysm and AVM Surgery – Aaron Cohen-Gadol

8:47 – 9:00 AM
Introduction of CNS Resident Award and CNS Getch Fellowship Award to HAI SUN – Steven N. Kalkanis
CNS Resident Award: Electrophysiological Evidence of the Efference Copy in Human Voluntary Movements
CNS Getch Fellowship Award: Characterization of Interactions Between Supplementary Motor Area (SMA) and Primary Motor Cortex (M1) During Human Movement Using Electroctorigraphy (ECoG)

9:00–10:00 AM  EXHIBIT HALL BEVERAGE BREAK
10:00 – 10:03 AM  
**Introduction of Honored Guest** – George A. Ojemann

10:03 – 10:23 AM  
**HONORED GUEST**  
**Epilepsy Surgery and the Evolution of Clinical and Translational Science**  
Johannes Schramm

10:23 – 10:26 AM  
**Introduction of CNS President** – P. David Adelson

10:26 – 10:51 AM  
**PRESIDENTIAL ADDRESS**  
Ali R. Rezai

10:51 – 10:54 AM  
**Introduction of Featured Speaker** – Michael L.J. Apuzzo

10:54 – 11:30 AM  
**FEATURED SPEAKER**  
*Itzhak Perlman*  
Reigning Virtuoso of the Violin

11:30 AM – 12:30 PM  
**EXHIBIT HALL BREAK**
LUNCHEON SEMINARS

**M01: Honored Guest Luncheon**  
Complimentary to CNS Resident Members!  
FACULTY: Johannes Schramm

**M02: Cervical Arthroplasty and Lumbar Motion Preservation Technologies**  
MODERATOR: Regis W. Haid, Jr.  
FACULTY: Richard G. Fessler, Praveen V. Mummaneni, Michael Y. Wang

**M03: Radiosurgery in Vestibular Schwannoma Management**  
MODERATOR: Steven L. Giannotta, Douglas Kondziolka  
FACULTY: Antonio DeSalles, Jean M. Regis, Pierre-Hughes Roche

**M04: Innovations in the Management of Intracerebral Hemorrhage**  
MODERATOR: Issam A. Awad  
FACULTY: E. Sander Connolly, Neil A. Martin, Mario Zuccarello

**M05: Managing Long-term Complications of Cervical and Lumbar Spine Surgery**  
MODERATOR: William C. Welch  
FACULTY: Bong-Soo Kim, Michael Y. Wang, Timothy Witham

**M06: Managing Pediatric Neurovascular Diseases**  
MODERATOR: Edward R. Smith  
FACULTY: Peter B. Dirks, Cormac O. Maher, Darren Orbach

**M07: Peripheral Nerve Board Review**  
MODERATOR: Lynda Jun San Yang  
FACULTY: Allen H. Maniker, Rajiv Midha, Robert J. Spinner

**M08: Strategies to Reduce Risk in Surgical Management of Tumors in Eloquent Regions**  
MODERATOR: Jeffrey S. Weinberg  
FACULTY: Edward F. Chang, Florian Ringel, Martin Smrcka
MONDAY, OCTOBER 21
12:30 – 2:00 PM

M09: Neurosurgical Emergencies: An Update for Allied Health Care Professionals
MODERATOR: Michael P. Steinmetz, Erol Veznedaroglu
FACULTY: Ajit A. Krishnaneey, Brian T. Ragel, Andrea L. Strayer

M10: Guidelines for Diagnosis and Treatment of Degenerative Lumbar Spinal Disease
MODERATOR: Praveen V. Mummaneni
FACULTY: Sanjay S. Dhall, Zoher Ghogawala, Daniel K. Resnick

M11: Surgical Management of Meningiomas
MODERATOR: Philip H. Gutin
FACULTY: Aaron A. Cohen-Gadol, Michael W. McDermott, Daniel M. Prevedello

M12: New Technologies and Innovations In Spinal Neurosurgery
MODERATOR: John C. Liu, John E. O’Toole
FACULTY: John Adler, Nicholas M. Boulis, Allan D. Levi

M13: Multidisciplinary Management of Subarachnoid Hemorrhage and Vasospasm
MODERATOR: Robert H. Rosenwasser
FACULTY: C. Michael Cawley, E. Sander Connolly, Luca Regli, Daniel L. Surdell

M14: Management of Complex and Refractory Chiari Malformations and Syringomyelia
MODERATOR: Richard G. Ellenbogen
FACULTY: Arthur J. DiPatri, David M. Frim, Matthew J. McGirt

M15: Evidence-Based Management of Brain Metastases
MODERATOR: Raymond E. Sawaya
FACULTY: David W. Andrews, Philippe Metellus, Robert J. Weil
AFTERNOON SESSIONS

2:00 – 3:30 PM

SPECIAL COURSE I
Neurosciences Center and the Neurosurgeon:
An Evolving Practice Landscape
MODERATORS: Alexander A. Khalessi, P. David Adelson
FACULTY: Nicholas M. Barbaro, Bob S. Carter, Brendan Kremer,
Marc R. Mayberg, Jayme Zage

2:00 – 3:30 PM

CONSENSUS SESSION I
Management of Cerebral Gliomas:
Building Consensus from Controversy
MODERATOR: Mitchel S. Berger
FACULTY: Susan Chang, E. Antonio Chiocca,
Andrew E. Sloan, Ying Mao

2:00 – 3:30 PM

CNS ORIGINAL SCIENCE 1 – ORAL PRESENTATIONS

Council of State Neurosurgical Societies
MODERATORS: Clement Hamani, Gregory R. Trost
For a listing of Oral Presentations see pages 55-57.

Section on Pediatric Neurological Surgery
MODERATORS: Richard Anderson, Jeffrey R. Leonard
For a listing of Oral Presentations see pages 57-58.

Stereotactic & Functional Neurosurgery
MODERATORS: Robert E. Gross, Michael Gordon Kaplitt
For a listing of Oral Presentations see pages 58-60.

Section on Tumors
MODERATORS: Frederick G. Barker, Ian F. Parney
For a listing of Oral Presentations see pages 60-62.

3:30 – 5:00 PM

CNS NEUROSURGICAL FORUM

Council of State Neurosurgical Societies
MODERATORS: Ajit A. Krishnaney, Gregory R. Trost
For a listing of posters see pages 70-71.

Section on Cerebrovascular Neurosurgery
MODERATORS: Eric Sauvageau, Andrew W. Grande
For a listing of posters see pages 71-76.
Section on Disorders of the Spine and Peripheral Nerves
MODERATORS: Patrick Hsieh, Adam Kanter
For a listing of posters see pages 77-83.

Section on Neurotrauma and Critical Care
MODERATOR: Steven Casha
For a listing of posters see pages 83-85.

Section on Pain
MODERATOR: Andre Machado
For a listing of posters see pages 85-86.

Section on Pediatric Neurological Surgery
MODERATORS: Richard Anderson, Jeffrey R. Leonard
For a listing of posters see pages 86-88.

Section on Stereotactic and Functional Neurosurgery
MODERATORS: Clement Hamani, Peter Konrad
For a listing of posters see pages 88-91.

Section on Tumors
MODERATORS: Frederick G. Barker, Ian Parney
For a listing of posters see pages 91-96.

International Forum
MODERATORS: Shekar N. Kurpad, Charles Y. Liu, Daniel M. Prevedello
For a listing of posters see pages 98-99.

3:30 – 5:00 PM Ballroom, Moscone West Convention Center
3-D OPERATIVE NEUROSURGERY I
Techniques to Advance Safety and Efficacy in Microneurosurgery

MODERATORS: Aaron A. Cohen-Gadol, Aaron S. Dumont
FACULTY: Bernard R. Bendok, William T. Couldwell, Steven L. Giannotta, Robert A. Solomon, Robert F. Spetzler, Harry R. Van Loveren
INTERNATIONAL RECEPTION AND DINNER SEMINARS

5:00 – 6:30 PM
Yerba Buena Salon 7, Marriott Marquis

INTERNATIONAL RECEPTION
Co-Sponsored by Medtronic and the CNS

6:00 – 8:30 PM
One Market Restaurant

DINNER SEMINAR 3
Beyond ‘Through the Tube’—
When and When Not to Use MIS
MODERATOR: Michael Y. Wang
FACULTY: Richard G. Fessler, Robert F. Heary, Larry T. Khoo, Praveen V. Mummaneni

6:00 – 8:30 PM
Epic Roasthouse

DINNER SEMINAR 4
Evolution of the Endovascular Revolution
MODERATOR: Pascal Jabbour
FACULTY: David M. Hasan, Elad I. Levy, Cameron G. McDougall, J D. Mocco

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TUESDAY, OCTOBER 22
GENERAL SCIENTIFIC SESSION III
7:00 – 11:30 AM  Moscone West Convention Center
Ballroom

PRESIDING OFFICER: Jamie S. Ullman
MODERATORS: Steven N. Kalkanis, Ganesh Rao

7:00 – 7:05 AM
Introduction of CNS International Division – Anil Nanda

7:05 – 7:19 AM
How Radiosurgery Changed Neurosurgery and the Changes that Lie Ahead – Douglas Kondziolka

7:19 – 7:33 AM
MRI Safety and Neurosurgery: Brain and Spine Implants – Frank G. Shellock

7:33 – 7:47 AM
Evolution of Brain Tumor Treatment: From Chemo to Vaccines to Viruses – E. Antonio Chiocca

7:47 – 7:57 AM
Editor’s Choice Tumor Paper – Philip V. Theodosopoulos
Conservative Management of Bilateral Acoustic Neuromas

7:57 – 8:15 AM
Controversy: Open versus Endoscopic: When to Use Which
Moderator: William T. Couldwell
Laligam N. Sekhar versus Theodore H. Schwartz

8:15 – 8:29 AM
Operative Pearls: Expanding Operative Corridor for Difficult-to-Reach Tumors – Aaron A. Cohen-Gadol

8:29 – 8:33 AM
Introduction – Charles Y. Liu

8:33 – 8:47 AM
INTERNATIONAL LECTURE
Status of Neurosurgery in China
Professor Bai-nan Xu

8:47 – 9:00 AM
Awards Presentations – Christopher E. Wolfla

8:47 – 8:48 AM
Introduction of Fellowship Award Winners – Aviva Abosch

8:48 – 8:51 AM
Fellowship Award Winners

8:51 – 8:54 AM
Neurosurgical Forum Winners – Ashwini D. Sharan
8:54 – 8:57 AM  
**Presentation of Distinguished Service Award to Regina Shupak** – Gerald E. Rodts, Jr.

8:57 – 9:00 AM  
**Presentation of CNS Founder’s Laurel to Arthur Day** – Christopher E. Wolfla

### 9:00–10:00 AM  
**EXHIBIT HALL BEVERAGE BREAK**

10:00 – 10:05 AM  
**Introduction of Honored Guest** – Edward R. Laws, Jr.

10:05 – 10:25 AM  
**HONORED GUEST LECTURE**  
*Continuing Evolution: The Biology and Treatment of Gliomas*  
Andrew H. Kaye

10:25 – 10:30 AM  
**Introduction of Special Lecturer** – Ali R. Rezai

10:30 – 10:50 AM  
**SPECIAL LECTURE**  
*From the Blue Zones to the Lab: Secrets to Living Long and Living Well*  
Clay B. Marsh

10:50 – 10:55 AM  
**Introduction of Featured Speaker** – Alan M. Scarrow

10:55 – 11:30 AM  
**FEATURED SPEAKER**  
*David Brooks*

11:30 AM – 12:30 PM  
**EXHIBIT HALL BREAK**

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LUNCHEON SEMINARS

T16: Honored Guest Luncheon
Complimentary to CNS Resident Members!
FACULTY: Andrew H. Kaye

T17: Surgical Management of Cervical Degenerative Disease
MODERATOR: Michael P. Steinmetz
FACULTY: Ajit A. Krishnaney, Daniel Refai, Gregory R. Trost,

T18: Skull Base Endoscopy: Utility and Limitations
MODERATOR: Paul A. Gardner, Charles Teo
FACULTY: Juan Carlos Fernandez-Miranda, Fred Gentili, Daniel R. Peiper

T19: Multimodal Management of Intracranial Arteriovenous Malformations
MODERATOR: Michael T. Lawton
FACULTY: Daniel Barrow, Vladimir Benes, Giuseppe Lanzino, Cameron G. McDougall

T20: The Aging Spine: Considerations in Surgical Management
MODERATOR: Christopher P. Ames, Gerald E. Rodts, Jr.
FACULTY: Michael W. Groff, Michael Y. Wang

T21: Guidelines for the Management of Acute Cervical Spine and Spinal Cord Injuries
MODERATOR: R. John Hurlbert
FACULTY: Sanjay S. Dhall, Mark N. Hadley, Beverly C. Walters

T22: Pituitary Adenomas: Operative Nuances and Management Considerations
MODERATOR: James J. Evans, Edward R. Laws, Jr.
FACULTY: Manish K. Aghi, James P. Chandler, Fred Gentili

T23: Advances in the Management of Trigeminal Neuralgia and Facial Pain
MODERATOR: Kim J. Burchiel
FACULTY: Douglas Kondziolka, Jonathan Miller, Konstantin V. Slavin
TUESDAY, OCTOBER 22
12:30 – 2:00 PM

Room 2010

**T24:** Multidisciplinary Management Strategies for Unruptured Aneurysms  
**MODERATOR:** Robert A. Solomon  
**FACULTY:** Robert M. Friedlander, J D. Mocco, Gregory J. Zipfel

Room 2011

**T25:** Managing Complications in Spinal Surgery  
**MODERATOR:** Edward C. Benzel  
**FACULTY:** Daniel J. Hoh, Christopher I. Shaffrey, Gregory R. Trost

Room 2018

**T26:** Guidelines for Neurocritical Care Management for Patients with Severe Traumatic Brain Injury  
**MODERATOR:** Shelly D. Timmons  
**FACULTY:** Joshua E. Medow, Patricia B. Raksin, Joseph Christopher Zacko

Room 2008

**T27:** Controversies in Management of Low Grade Gliomas  
**MODERATOR:** Michael W. McDermott  
**FACULTY:** Gene Barnett, Steven N. Kalkanis, Nader Sanai

Room 2012

**T28:** Complication Avoidance and Advanced MIS Applications  
**MODERATOR:** Richard G. Fessler  
**FACULTY:** Larry T. Khoo, Faheem A. Sandhu, Trent L. Tredway

Room 2020

**T29:** Peripheral Nerve Entrapment Syndromes: Diagnosis and Management  
**MODERATOR:** Eric L. Zager  
**FACULTY:** Jason H. Huang, Robert J. Spinner, Lynda J. Yang

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AFTERNOON SESSIONS

2:00 – 3:30 PM Room 2014, Moscone West Convention Center

SPECIAL COURSE II
Out of Balance: How Can We Improve Outcomes from Spine Surgery?
MODERATORS: Edward C. Benzel, Zoher Ghogawala
FACULTY: Domagoj Coric, Praveen V. Mummaneni, Christopher I. Shaffrey

2:00 – 3:30 PM Moscone West Convention Center

CNS ORIGINAL SCIENCE II – ORAL PRESENTATIONS

Section on Neurotrauma and Critical Care
MODERATORS: Steven Casha
For a listing of Oral Presentations see pages 63-65.

Section on Pain
MODERATORS: Andre Machado
For a listing of Oral Presentations see pages 65-66.

Section on Spine and Peripheral Nerves
MODERATORS: Bradley Jacobs, Mohammed F. Shamji
For a listing of Oral Presentations see pages 62-63.

Section on Cerebrovascular Surgery
MODERATORS: Andrew W. Grande, Eric Sauvageau
For a listing of Oral Presentations see pages 66-68.

2:00 – 3:30 PM Room 3003, Moscone West Convention Center

COUNCIL OF STATE NEUROSURGICAL SOCIETIES
Enhancing Patient Experience: Impact on Your Practice
MODERATORS: Darlene A. Lobel, Gregory R. Trost
SPEAKERS: Edward C. Benzel, Adrienne Boissy, Jeff Grossman

2:00 – 3:30 PM Room 3022, Moscone West Convention Center

SECTION ON PEDIATRIC NEUROLOGICAL SURGERY
Tackling Difficult Shunt Problems: Headaches, Slit Ventricles and Their Management Strategies
MODERATOR: Greg Olavarria
SPEAKERS: Rick Abbott, Abhaya V. Kulkarni, Harold L. Rekate

2:00 – 3:30 PM Room 2022, Moscone West Convention Center

SECTION ON STEREOTACTIC & FUNCTIONAL NEUROSURGERY
Advances in Epilepsy Surgery
MODERATORS: Aviva Abosch, Michael G. Kaplitt
SPEAKERS: Gordon H. Baltuch, Matthew During, Emad N. Eskandar, David W. Roberts
TUESDAY, OCTOBER 22
2:00 – 8:30 PM

SECTION ON TUMORS
Novel Imaging in Brain Tumor Surgery
MODERATORS: Frederick G. Barker, Ian F. Parmey

3:30 – 5:00 PM
3-D OPERATIVE NEUROSURGERY II
Intraoperative Complication Avoidance and Management

MODERATORS: Aaron A. Cohen-Gadol, Paul Gardner
FACULTY: Daniel L. Barrow, Ketan R. Bulsara, Richard G. Fessler, Michael T. Lawton, Jacques J. Morcos, Laligham N. Sekhar

EVENING EVENTS AND DINNER SEMINARS

5:00 – 6:30 PM
RESIDENT SANS CHALLENGE CHAMPIONSHIP ROUND

5:00 – 6:30 PM
WINE AND CHEESE RECEPTION
Co-Sponsored by Arbor and the CNS

6:00 – 8:30 PM
DINNER SEMINAR 5
Placing Sports Under the Microscope: Head Injury and CTE
MODERATOR: Richard G. Ellenbogen
FACULTY: Michael L. Levy, Russell R. Lonser

6:00 – 8:30 PM
DINNER SEMINAR 6
The Burden of Proof: Quality Improvement Initiatives
MODERATOR: Anthony L. Asher
FACULTY: Kate Chenok, Robert E. Harbaugh, Matthew J. McGirt, Katie O. Orrico, Michael J. Schlosser

6:30 – 7:30 PM
RESIDENT RECRUITMENT SOCIAL

Stay connected with the CNS Annual Meeting Guide at http://m.cns.org
PRESIDING OFFICER: Russell R. Lonser
MODERATORS: Elad I. Levy, Nathan R. Selden

7:00 – 7:05 AM
Introduction of CNS Education Committee – Zoher Ghogawala

7:05 – 7:07 AM
Introduction Special Lecturer – Nathan R. Selden

7:07 – 7:27 AM
FEATURED SPEAKER
Three Steps Forward and Two Steps Back: The Echternach Procession Towards Optimal Hydrocephalus Treatment

Benjamin C. Warf
MacArthur Fellows Award Winner

7:27 – 7:37 AM
Editor’s Choice Vascular Paper – E. Sander Connolly, Jr.
Multi-center Study of Stent-assisted Coiling for Aneurysms

7:37 – 8:07 AM
LIVE! In the OR – Revascularization of the Carotid: Clinical Equipoise – L. Nelson Hopkins, III, Elad I. Levy
Supported by an Educational Grant from COVIDIEN

8:07 – 8:22 AM
Endovascular Neurosurgery in Evolution – Flow Divergence – Ajay K. Wakhloo

8:22 – 8:42 AM
Controversy: Open versus Endovascular Approach to Aneurysms
Moderator: H. Hunt Batjer
Robert F. Spetzler versus Robert H. Rosenwasser

8:42 – 8:45 AM
Introduction – Russell O. Pieper

8:45 – 8:55 AM
Japanese Congress of Neurological Surgeons Presidential Address
Yuichi Hirose

8:55 – 9:00 AM
AANS President – William T. Couldwell

9:00–10:00 AM EXHIBIT HALL BEVERAGE BREAK

10:00 – 10:02 AM
Introduction – Russell R. Lonser
10:02 – 10:17 AM

INTERNATIONAL LECTURE
Reconsideration of Cavernous Sinus Surgery After 30 Years’ Experience
Ying Mao
Chinese Neurosurgical Society

10:17 – 10:32 AM

The Evolution of Clinical Trials – Richard E. Kuntz, Senior VP/Chief Scientific, Clinical/Regulatory Officer, Medtronic, Inc

10:32 – 10:35 AM

Introduction of Special Lecture – Zoher Ghogawala

10:35 – 10:55 AM

SPECIAL LECTURE
The 21st Century’s Technology Story: The Convergence of Biology and Engineering
Susan Hockfield
President Emerita
Massachusetts Institute of Technology

10:55 – 11:30 AM


Innovation has been and will continue to be the fuel behind the growth and advancement of Neurosurgery and Neurointervention. But innovation is not just about creative ideas and solutions – that’s only the tip of the iceberg. What make innovations real and present in our day to day work and practices, is the complex web of product development, regulatory challenges, legal considerations, financing obstacles, and people! The success and failure of every innovation, like everything else we do, has more to do with the caliber and quality of the people than anything else. This Plenary session features three of the most renowned Silicon Valley medical-device entrepreneurs in a round-table discussion about challenges and obstacles of technology development process and views on how to navigate and evolve ideas into real products that eventually touch patients by hundreds of thousands. The panelist will be; Paul Yock, who is a world renowned physician, a most impactful innovator in the field of cardiovascular intervention, and founder of the Stanford Biodesign Program; Hank Plain who is the quintessential entrepreneur, turned respected business leader and venture capitalist; and Fred Khosravi who is a respected serial entrepreneur with his innovative impact going back to the early days of stenting & angioplasty over two decades ago. This will be a lively and hopefully enriching window into the mind-set of entrepreneurs and what motivates them to innovate.

11:30 AM – 12:30 PM

EXHIBIT HALL BREAK
WEDNESDAY, OCTOBER 23
12:30 – 2:00 PM

LUNCHEON SEMINARS

W30: Honored Guest Luncheon
Complimentary to CNS Resident Members!
FACULTY: L. Nelson Hopkins

W31: Recurrent, Thoracic and Far Lateral Lumbar Disc Herniations
MODERATOR: J. Patrick Johnson
FACULTY: John C. Liu, Paul Park, Zachary A. Smith

W32: Complication Avoidance and Management in Skull Base Surgery
MODERATOR: Juan Carlos Fernandez-Miranda
FACULTY: John G. Golfinos, Carl B. Heilman, Michael J. Link

W33: Update on Movement Disorders: Novel Targets, Indications, and Approaches
MODERATOR: Robert E. Gross
FACULTY: W. Jeffrey Elias, Michael Gordon Kaplitt, Zelma Kiss

W34: Malignant Glioma: Where Are We Now?
MODERATOR: Jeffrey N. Bruce
FACULTY: E. Antonio Chiocca, Randy L. Jensen, Andrew T. Parsa

W35: Lessons Learned: Avoidance and Management of Complications of Aneurysm Surgery
MODERATOR: Giuseppe Lanzino
FACULTY: Ali F. Krisht, Michael T. Lawton, Andreas Raabe

W36: Sagittal Balance in Spine Surgery
MODERATOR: Regis W. Haid, Jr.
FACULTY: Tyler R. Koski, Juan S. Uribe

W37: Strategies for Maximizing Compensation for Your Neurosurgical Practice
MODERATOR: Donald M. Whiting
FACULTY: Hooman Azmi, Fernando G. Diaz, Gregory J. Przybylski
WEDNESDAY, OCTOBER 23
12:30 – 2:00 PM

W38: Athletic Head Injuries: Return To Play
MODERATOR: H. Hunt Batjer
FACULTY: Julian E. Bailes, James M. Johnston, Russell R. Lonser, Geoffrey T. Manley

W39: Quality and Value in Health Care
MODERATORS: Zoher Ghogawala, Daniel K. Resnick
FACULTY: Sigurd Berven, E. Sander Connolly, Matthew J. McGirt

W40: Hematology and Coagulation for Neurosurgeons: Dangers and Solutions
MODERATOR: Issam A. Awad
FACULTY: Alan S. Hoffer, Maciej S. Lesniak, R. Loch Macdonald

W41: Managing Metastasis to the Spine
MODERATOR: Laurence D. Rhines
FACULTY: Mark H. Bilsky, Ziya L. Gokaslan, Daniel M. Sciubba

W42: Open Skull Base Surgery: When is the Traditional Approach Necessary?
MODERATORS: William T. Couldwell, Ricardo J. Komotar
FACULTY: James J. Evans, Jacques J. Morcos, Theodore H. Schwartz, Harry R. Van Loveren

W43: Cellular Therapies in Neurosurgery
MODERATOR: Nicholas M. Boulis
FACULTY: Nalin Gupta, Gary K. Steinberg, Michael Y. Wang

W44: New Technologies and Innovations in Cranial Neurosurgery
MODERATOR: Neil A. Martin
FACULTY: Vladimir Benes, David J. Langer, Elad I. Levy, Luca Regli, Gregory J. Zipfel
AFTERNOON SESSIONS
2:00 – 3:30 PM
Room 2001/2003, Moscone West Convention Center

CONSENSUS SESSION II

Acute Cervical Spine and Spinal Cord Trauma: The Medical Evidence and Controversies of Top-flight Care
MODERATOR: Mark N. Hadley
FACULTY: Sanjay S. Dhall, R. John Hurlbert, Curtis J. Rozzelle, Nicholas Theodore, Beverly C. Walters

2:00 – 3:30 PM
Room 3022, Moscone West Convention Center

MULTIDISCIPLINARY ORAL PRESENTATIONS II
MODERATORS: Michael R. Chicoine, Kee Kim

For a listing of Oral Presentations see pages 68-70.

2:00 – 3:30 PM
Room 3003, Moscone West Convention Center

SECTION ON DISORDERS OF THE SPINE AND PERIPHERAL NERVES
Cervical Spine Surgery: Where We Come From, Where We Are, Where We Are Going
MODERATOR: Michael G. Fehlings
SPEAKERS: Edward C. Benzel, Domagoj Coric, Praveen V. Mummaneni, Paul Park, Daniel M. Sciubba, Michael Y. Wang

2:00 – 3:30 PM
Room 3002, Moscone West Convention Center

SECTION ON NEUROTRAUMA AND CRITICAL CARE
Evolution of Neurosurgery – Translational Research to Clinical Trial
MODERATORS: Odette Harris, David Okonkwo
SPEAKERS: Randall M. Chesnut, Graham Creasey, Geoffrey T. Manley, Eve Tsai

2:00 – 3:30 PM
Room 3016, Moscone West Convention Center

SECTION ON PAIN
The Evolution of Pain Neurosurgery
MODERATORS: Andre Machado, Julie Pilitsis
SPEAKERS: Alon Y. Mogilner, Parag G. Patil, Konstantin V. Slavin, Raymond F. Sekula

2:00 – 3:30 PM
Room 3001, Moscone West Convention Center

SECTION ON CEREBROVASCULAR SURGERY
The Evolution of Neurosurgery
MODERATORS: J D. Mocco, Peter Nakaji
SPEAKERS: Robert M. Friedlander, L. Dade Lunsford, Yuichi Murayama, Gary K. Steinberg, Bryon Gregory Thompson, Raymond D. Turner, IV
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MULTIDISCIPLINARY SESSION I
Room 3014, Moscone West Convention Center
Moderators: Guthikonda Bharat, Amir R. Dehdashti

2:30–2:37 PM

100 Utility of Hematologic Labs Following Lumbar Fusion
Andrew Y. Yew, Haydn Hoffman, Charles Li, Daniel C. Lu

2:37–2:44 PM

101 Clinical Course after Percutaneous Epidural Neuroplasty
According to the Type of Single Level Herniated Lumbar Disc with 12 Months Follow-up
Ji Gyu Yeul, Oh Chang Hyun, Lee Junho, Kim Jung Hoon, Shin Dong Ah

2:44–2:51 PM

102 Validation and Modification of a Predictive Model of Post-resection Hydrocephalus in Pediatric Patients with Posterior Fossa Tumors
Paul Foreman, Samuel McCluggage, Robert Partlow Naftel, Christoph Johannes Griessenauer, Benjamin J. Ditty, Bonita Agee, Jay Riva-Cambrin, John C. Wellons, III

2:51–2:58 PM

103 Evaluation of the Immediate Role of Decompressive Craniectomy in the Treatment of Refractory ICP in Cases of Traumatic Brain Injury. Experience of a Tertiary Care Trauma Center in Alexandria, Egypt
Mohamed E. El-Fiki

2:58–3:05 PM

104 Risk Factors and Long-term Survival in Adult Patients with Primary Malignant Spinal Cord Astrocytomas
Albert Wong, Rishi R. Lall, Nader S. Dahdaleh, Richard G. Fessler, Zachary A Smith, Sandi Lam

3:05–3:12 PM

105 DBS Lead Proximity to DTI-based Sensory Thalamus Correlates with Pain Relief
Won Kim, Jason Scott Hauptman, Nader Pouratian
3:12–3:19 PM

106

ProvenCare® Lumbar Spine: Re-engineering Care Delivery for Elective Lumbar Spine Fusion (LSF) Surgery
Jonathan Slotkin, Mauricio Campos-Benitez, Greg F. Burke, David A. Andreychik, W. Fred Hess, Karen E. McKinley, Michel Lacroix, Steven A. Toms

3:19–3:26 PM

107

Dose-finding and Safety Study of an Oncolytic Polio/Rhinovirus Recombinant Against Recurrent Glioblastoma
John H. Sampson, Annick Desjardins, Katherine B. Peters, Tulika Ranjan, Gordana Vlahovic, Denise Lally-Goss, Stevie Threatt, James Herndon, Allan H. Friedman, Henry Friedman, Darell Bigner, Matthias Gromeier

3:26–3:33 PM

108

Human Electrocorticography-based Stimulation
David Keisho Su, Jeremiah D. Wander, Lise Johnson, Devapratim Sarma, Eberhard E. Fetz, Jeffrey G. Ojemann

3:33–3:40 PM

109

Submaximal Angioplasty Prospective Registry: Preliminary Report
Travis Michael Dumont, Maxim Mokin, Jorge Luis Eller, Grant C. Sorkin, Kenneth V. Snyder, L. Nelson Hopkins, III, Adnan Hussain Siddiqui, Elad I. Levy

3:40–3:47 PM

110

A Novel 6-item Outcome Instrument (VNI-6) for Assessing the Effectiveness of Cervical Surgery in Registry Efforts
Saniya S. Godil, Matthew J. McGirt

3:47–3:54 PM

111

Surgical Outcomes in a Modern Series of Low-grade Gliomas Undergoing Surgical Resection
Josiah N. Orina, Shanna Fang, Fredric B. Meyer, Ian F. Parney

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MON 21 OCT

COUNCIL OF STATE NEUROSURGICAL SOCIETIES
Room 3003, Moscone West Convention Center

2:00–2:09 PM

112

Development of a Novel Quality of Life Utility Index Using NDI and VAS in Patients with Multilevel Cervical Spondylosis
Jared D. Ament, Zhuo Yang, Kee Duk Kim
JULIUS GOODMAN RESIDENT AWARD
2:09–2:18 PM

113
Cost-effectiveness of CT Angiography in Screening for Aneurysm in Spontaneous Subarachnoid Hemorrhage
Pinakin Rameshchandra Jethwa, Ennis J. Duffis, Chirag D. Gandhi, Charles J. Prestigiacomo

2:18–2:27 PM

114
A Novel 6-item Outcome Instrument (VBI-6) for Assessing the Effectiveness of Lumbar Surgery in Registry Efforts
Saniya S. Godil, Matthew J. McGirt

2:27–2:36 PM

115
Utility of Post-operative CT Following Ventricular Catheter Placement: A Prevalence and Cost-effectiveness Analysis
Vinayak Nikam, Luke Macyszyn, Robert L. Bailey, Michael Sean Grady, Sherman C. Stein

2:36–2:45 PM

116
Mechanical versus Chemical Prophylaxis for Deep Venous Thrombosis in Patients Undergoing Lumbar Spinal Fusion: Comparative Effectiveness and Cost-benefit
Saniya S. Godil, Michael C. Dewan, Scott L. Parker, Matthew J. McGirt

2:45–2:54 PM

117
Accurately Dead or Alive: A Neurosurgical Review of Quality Patient Care and Outcomes. The Importance of Data Fidelity in Calculating Quality Metrics Utilizing University Health System Consortium (UHC) Clinical Administrative Database
John J. Knightly, Scott A. Meyer, Bonnie B. Weiss, Rami Bustami, John J. Halperin, Stuart Fox, Mark Diamond

2:54–3:03 PM

118
Impact of Improved Documentation on an Academic Neurosurgical Practice
Omar Akram Zalatimo, Robert E. Harbaugh, Mark Iantosca

3:03–3:12 PM

119
Cost-utility Analysis of Anterior Cervical Discectomy and Fusion with Plating (ACDFP) versus Posterior Cervical Foraminotomy (PCF) for Patients with Single-level Cervical Radiculopathy
Matthew D. Alvin, Daniel Lubelski, Kalil G. Abdullah, Robert G. Whitmore, Edward C. Benzel, Thomas E. Mroz
3:12–3:21 PM  
**120**  
Follow-up on a National Survey: Neurosurgery Resident Opinions on the 2011 ACGME Implemented Duty Hours  
Kyle Michael Fargen, Jamie Dow, Krystal Lynne Tomei, William A. Friedman

**SAM HASSENBUSCH YOUNG NEUROSURGEON AWARD**  
3:21–3:30 PM  
**121**  
Cost-consequence Analysis of Antibiotic-impregnated Shunts and External Ventricular Drains (EVDs) in Hydrocephalus  
Scott L. Parker, Saniya S. Godil, Natalie Edwards, Luella Engelhart, Matthew J. McGirt

**SECTION ON PEDIATRIC NEUROLOGICAL SURGERY**  
Room 3001, Moscone West Convention Center  
MON 21 OCT

2:00–2:09 PM  
**122**  
Pediatric Radiation-associated Meningiomas: Distinct Clinical, Pathological and Cytogenetic Characteristics  
Samer K. Elbabaa, Murat Gokden, John Crawford, Santosh Kesari, Ali G. Saad

2:09–2:18 PM  
**123**  
Time to First Blood in Craniosynostosis Surgery  
Ruth E. Bristol, Davinder Singh, Nicole Hooft, Richard Cotugno, Stephen Beals, Edward Joganic, Celia Maneri

2:18–2:27 PM  
**124**  
Symptomatic Recurrence Following the Open Surgical Repair of Nonsyndromic Craniosynostosis: A Sixteen Year Experience  
Corey M. Mossop, Gary Rogers, Michael Boyajian, John S. Myseros, Robert F. Keating

2:27–2:36 PM  
**125**  
Vein Number and Drainage Pattern Predicts Hemorrhage Risk and Outcome in Pediatric Arteriovenous Malformations  
Michael Maurice McDowell, Christopher P. Kellner, Michelle Q. Phan, E. Sander Connolly, Sean D. Lavine, Phillip M. Meyers, Daniel Sahlein, Neil Feldstein, Richard C. E. Anderson
2:36–2:45 PM

126
CNS Stem Cell Transplantation for Neuronal Ceroid Lipofuscinosis: Summary of Long Term Follow-up Study Results
Nathan R. Selden, Amira Al-Uzri, Robert Steiner, Stephen L. Huhn

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127
Assessment of the Impact of Comorbidities on Perioperative Complications in Pediatric Neurosurgery
Akash J. Patel, Ahilan Sivaganesan, Alison Brayton, Robert John Bollo, Andrew Jea

2:54–3:03 PM

128
Neoplastic Presentation of the von Hippel-Lindau (VHL) Disease in the Pediatric Population
Jose M. De Campos, Maria Elena Kusak, Daniel Aguirre, Pablo De Andrés, Julia Montoya, Iñigo Jimenez-Alfaro, Jose F. Fabregat

3:03–3:12 PM

129
Urinary Biomarkers Predict the Onset and Progression of Medulloblastoma in a Spontaneous Murine Model
Edward R. Smith, Rajarshi Majumder, Xuezhe Han, Brendan McNeish, Ayesha Dholakia, Michael Robert Raber

3:12–3:21 PM

130
Risk of Secondary Malignancy from Computerized Tomography (CT) Scanning in Very Young (< 1 year old) Neurosurgical Patients: A Retrospective Cohort Study with a Minimum of 10-year Follow-up
Ian Kainoa White, Kashif Ajaz Shaikh, Daniel H. Fulkerson, Carli Bullis

3:21–3:30 PM

131
Pediatric Skull Lesions
Yasser Jeelani, Stephanie L. Da Silva, Grace J. Young, Mark D. Krieger, J. Gordon McComb

SECTION ON STEREOTACTIC AND FUNCTIONAL NEUROSURGERY
Room 3002, Moscone West Convention Center

2:00–2:09 PM

132
Cortical-spinal Neural Prosthesis for Restoring Volitional Limb Movement in a Paralyzed Primate Avatar
Ziv Williams
STEREOTACTIC AND FUNCTIONAL NEUROSURGERY
RESIDENT AWARD
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133
Encoding of Reward Size and Reward Delay by Individual
Neurons in the Ventral Striatum in the Non-human Primate
Engaged in an Intertemporal Choice Task
David Weintraub, Barry Richmond

2:18–2:27 PM
134
Deep Brain Stimulation of the Medial Septal Nucleus Improves
Spatial Working Memory Following Pilocarpine-induced Status
Epilepticus
Darrin J. Lee, Gene G. Gurkoff, Ali Izadi, Arne D. Ekstrom,
Jan Muizelaar Muizelaar, Bruce G. Lyeth, Kiarash Shahlaie

CNS RESIDENT AWARD
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135
Electrophysiological Evidence of the Efference Copy in Human
Voluntary Movements
Hai Sun, Tim Blakely, Felix Darvas, Jeremiah D. Wander, Lise Johnson,
Kai Miller, Jeffery Ojemann

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136
Reinstatement of Oscillatory Power and Synchrony During
Successful Memory Encoding and Recall
Kareem A. Zaghloul, Robert Yaffe, Matthew Kerr

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137
Cortical Beta Suppression is Spatially Linked to Beta Coherence
Modulation
Andrew B. O’Keeffe, Christos Tsikos, Nader Pouratian

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138
Beta Suppression in EEG over the Motor Cortex and
Simultaneous Tremor Attenuation in Arm EMG after STN Deep
Brain Stimulation for Parkinson’s Tremor
Jayant P. Menon, Makato Mikakoshi, Scott Makeig

3:03–3:12 PM
139
Brain Extracellular Branched-chain Amino Acids in Medically
Refractory Localization-related Epilepsy
Caroline Ong, Elyyemisi Damisah, Clayton Haldeman, Tore Eid,
Dennis Spencer
3:12–3:21 PM
140
Cognitive Deficits After Traumatic Brain Injury are Associated with Decreased Hippocampal Bursting and Improved with Burst Stimulation of the Fornix
Jennifer A. Sweet, Jonathan P. Miller

3:21–3:30 PM
141
How Context Influences the Physiology of Perception: The Sub-second Dynamics of Repetition Suppression in Inferior Temporal Cortex
Kai Miller, Kalanit Grill-Spector, Adam Olding Hebb, Dora Hermes, Rajesh Rao, Jeffrey G. Ojemann
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<td><strong>INTEGRA FOUNDATION AWARD</strong></td>
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<td>146</td>
<td>Rate and Course of Improvement in Endocrine Function After Over 1000 Pituitary Operations</td>
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<td>2:45–2:54 PM</td>
<td>Gamma Knife Treatment Results for Multiple Brain Metastases: A Multi-institutional Prospective Study in Japan (Abbreviation, JLGK0901, UMIN ID, 00001812)</td>
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<td><strong>ORIGINAL SCIENCE PROGRAM</strong></td>
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<td>3:03–3:12 PM</td>
<td>Continuous Dynamic Mapping of the Corticospinal Tract During Surgery of Motor Eloquent Brain Tumors: A Prospective Study</td>
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Effect Of Pretreatment Lymphopenia On Survival In Patients With Recurrent Glioblastoma Receiving Immunotherapy

Orin Bloch, Yelena S. Fuks, Manish Kumar Aghi, Michael William McDermott, Mitchel S. Berger, Andrew E. Sloan, Jeffrey N. Bruce, Andrew T. Parsa

Minimally Invasive versus Open Posterior Interbody Lumbar Fusion: A Propensity-matched Analysis of Quality Measures

Matthew J. McGirt, Scott L. Parker, Jason Lerner, Chris Kozma, Terra Slaton

Cost-utility and Comparative Effectiveness Analyses of Surgery versus Comprehensive Medical Management for Lumbar Spondylosis in Elderly

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

Outcomes After ALIF versus TLIF For Treatment of Symtomatic LS-51 Spondylolisthesis: A Prospective, Multi-institutional Comparative Effectiveness Study

Owoicho Adogwa, Paul Thompson, Terence Verla, Kemp Knott, Ulysses Null, Kevin T. Huang, Joseph S. Cheng, Robert E. Isaacs

The Implantation of Facet Bone Dowels May Not Provide Adequate Fixation for Fusion

Stephen M. Pirris, Ronald Reimer, Hugh Gordon Deen, Robert E. Wharen, Eric W. Nottmeier

Adult Deformity Surgery (ASD) Patients Recall Fewer than 50% of the Risks Discussed in the Informed Consent Process Preoperatively and the Recall Rate Worsens Significantly in the Postoperative Period

2:45–2:54 PM

157
Increased Incidence of Pseudoarthrosis After Unilateral Instrumented Transforaminal Lumbar Interbody Fusion in Patients with Lumbar Spondylosis
Yakov Gologorsky, Branko Skovrlj, Jeremy Steinberger, Marc Arginteanu, Frank M. Moore, Alfred A. Steinberger

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158
Dexamethasone’s Effect in Multiple-level Anterior Cervical Discectomy and Fusion
Shiveindra Jeyamohan, Tyler James Kenning, Paul Feustel, Karen Petronis, Darryl J. Dirisio

3:03–3:12 PM

159
A Blinded, Multi-center Clinical and Radiological Study to Evaluate the Use of OsteoAMP versus rhBMP-2 in TLIF/LLIF Procedures
Christopher Yeung, Justin Field, Jeffrey Roh

3:12–3:21 PM

160
Failure of Indirect Decompression with the Extreme Lateral Interbody (XLIF) Approach: A Study of Radiographic Factors
Isaac Karikari, Owoicho Adogwa, Timothy Ryan Owens, Paul Thompson, Robert E. Isaacs

3:21–3:30 PM

161
Pain and Functional Outcomes After Incidental Durotomy in Lumbar Spine Surgery: A Propensity Matched Prospective, Multi-institutional Longitudinal Study of 1,741 Patients
Owoicho Adogwa, Paul Thompson, Terence Verla, Ulysses Null, Kemp Knott, Kevin T. Huang, Joseph S. Cheng, Robert E. Isaacs

SECTION ON NEUROTRAUMA AND CRITICAL CARE
Room 3016, Moscone West Convention Center

DEPUY SYNTHES SPINE AWARD FOR RESIDENT RESEARCH ON SPINAL CORD AND SPINAL COLUMN INJURY
2:00–2:09 PM

162
Clinical Correlates of High Cervical Fractional Anisotropy in Acute Cervical Spinal Cord Injury
Aditya Vedantam, Gerald Eckardt, Marjorie C. Wang, Brian Schmit, Shekar N. Kurpad
2:09–2:18 PM

163

Enhancement of Adult Hippocampal Neurogenesis by a Neurotrophic Peptide in Traumatic Brain Injury

Muhammad Omar Chohan, Khalid Iqbal, Howard Yonas, Edwin Nemoto

2:18–2:27 PM

164

Reversal of Pre-morbid Oral Anti-platelet Therapy is Not Associated with a Decrease in Radiographic Progression of Intracranial Injury

Joshua S. Bauer, David Michael Panczykowski, Benjamin Zusman, Ramesh Grandhi, Yuefang Chang, Ava Puccio, David O. Okonkwo

2:27–2:36 PM

165

A Randomized Placebo Controlled Trial of Progesterone With or Without Hypothermia in Patients with Severe Traumatic Brain Injury—Analysis of Preliminary Data


2:36–2:45 PM

166

The Role of NgR1 Function in Vivo After Spinal Cord Injury

Vassilios Georgios Dimopoulos, Henry N. Kesler, Jason H. Huang

2:45–2:54 PM

167

Diffusion Tensor Imaging as a Predictor of Experimental Spinal Cord Injury Severity and Recovery

Brian Joseph Kelley, Noam Harel, Chang-Yoen Kim, Xing Xing Wang, Omar Hasan, Adam Kauffman, Ronin Globinsky, Lawrence Staib, Xenophon Papademetris, Stephen Strittmatter

DEPUY SYNTHES CMF AWARD FOR RESIDENT RESEARCH ON BRAIN AND CRANIOFACIAL INJURY

2:54–3:03 PM

168

Predictive Value of Somatosensory Evoked Potentials for Patients with Severe Traumatic Brain Injury

Yirui Sun

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169

Pressure is Only Part of the Story in Traumatic Brain Injured Patients, Focal Cerebral Blood Flow Goes to Zero in Some Patients with Adequate Cerebral Perfusion Pressure

George Chovanes, Rafael M. Richards
3:12–3:21 PM
170
Myelination and Diffusion Tensor Imaging Findings in Mild Traumatic Brain Injury
Heather Spader, Anna Ellermeier, Lindsay Walker, Jeffrey Rogg, Rees Cosgrove, Sean Deoni

3:21–3:30 PM
171
Application of the CRASH Score When Using Intracranial Multimodality Monitoring
Syed O. Shah, Artin Minaeian, Michael F. Stiefel

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**SECTION ON PAIN**
Room 2024, Moscone West Convention Center
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172
Use of Intraoperative Collision Testing versus Electromyography for Predicting Postoperative Foot Paresthesias During Spinal Cord Stimulation
Vidya Bhalodia, Anthony K. Sestokas, David Glassman, William Loftus, Steven Levin, Joanne Contratti, Richard W. Vogel, Ashwini D. Sharan

2:09–2:18 PM
173
Nerve Injury Pain: It’s All About Glutamate in Peripheral (not CNS) Neurons
Luc Dupont Jasmin, Kerui Gong, Ling-Hsuan Kung, Peter O’Hara, Aditi Bhargava

2:18–2:27 PM
174
Association Between Posterior Cranial Fossa Volumetry and CSF Flow Dynamics in Chiari Malformations Type I
Noam Alperin, Sang H. Lee, Ahmet Bagci, Raymond F. Sekula, Barth A. Green

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**RONALD R. TASKER YOUNG INVESTIGATOR AWARD**
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176
Deep Brain Stimulation of the Anterior Cingulate Cortex: Targeting the Affective Component of Chronic Pain
Erlick A.C. Pereira, Sandra G. J. Boccard, Liz Moir, James J. Fitzgerald, Alexander L. Green, Tipu Z. Aziz
2:45–2:54 PM

**177**

Microstructural Neural Changes Due to Neurovascular Compression in Trigeminal Neuralgia Detected by Diffusion Tensor Imaging (DTI: Correlation with Intra-operative Findings and Possible Clinical Implications)

Jan H. Mehrkens, Niklas Thon, Jennifer Linn, Hartmut Brückmann, Joerg-Christian Tonn, Jürgen Lutz

2:54–3:03 PM

**178**

Postoperative Intravenous Ketorolac Following Intracranial Surgery: A Retrospective Case Series

Patrick R. Maloney, Ravi Kumar, Ross Puffer, Giuseppe Lanzino, Nicholas Michael Wetjen

3:03–3:12 PM

**179**

Brief Pain Inventory Facial: Calculation of the Minimal Clinically Important Difference in Trigeminal Neuralgia

Casey H. Halpern, Sukhmeet Sandhu, Venus B. S. Vakhshori, Keyvan Mirsaedi-Farahani, Marie Kerr, John Y.K. Lee

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**180**

Long Term Outcomes of Dorsal Root Rhizotomy for Refractory Occipital Neuralgia

Abhiram Gande, John Jefferson Moossy, Michael B. Horowitz, William E. Rothfus, Paul A. Gardner

3:21–3:30 PM

**181**

Percutaneous Dorsal Root Ganglion Lysis with Phenol for Treatment of Thoracic Compression Fracture

Chun-Hsien Lin, Chun-Yu Cheng, Kuo-tai Chen, Martin Hsiu Chu Lin, Ting-Chung Wang, Jen-Tsung Yang

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**SECTION ON CEREBROVASCULAR NEURSURGERY**

Room 3001, Moscone West Convention Center

2:00–2:09 PM

**182**

Do Ischemic Stroke Patients Treated at Hospitals That Offer Endovascular Therapy Fair Better at Discharge?

Eric M. Deshaies, Mark R. Villwock, David James Padalino, Amit Singla
2:09–2:18 PM

183  
Spinal Cerebrospinal Fluid Drainage for Prevention of Vasospasm in Aneurysmal Subarachnoid Haemorrhage: A Prospective Randomized Controlled Study
Sachin A. Borkar

2:18–2:27 PM

184  
Infliximab Suppresses TNF-alpha Induced Inflammatory Phenotype in Cerebral Vascular Smooth Muscle Cells: Implications for Cerebral Aneurysm Formation
Muhammad S. Ali, Robert M. Starke, Pascal Jabbour, Stavropoula I. Tjoumakaris, L. Fernando Gonzalez, Robert H. Rosenwasser, Aaron S. Dumont

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185  
Post-conditioning with Isoflurane Reduces SAH-induced Vasospasm and Microthrombosis via Hypoxia-inducible Factor 1 and Nitric Oxide Synthase
Eric Milner, Michael D. Harries, Ananth Kesav Vellimana, Jeffrey M. Gidday, Byung Hee Han, Gregory J. Zipfel

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186  
The THERAPY Trial: A Prospective, Randomized, Concurrent Controlled Trial to Evaluate the Role of Mechanical Embolectomy as Adjunctive Treatment to IV rtPA for Acute Ischemic Stroke
J D. Mocco, Sophia Kuo, Pooja Khatri, Osama O. Zaidat

DEPUY SYNTHES CMF CEREBROVASCULAR AWARD

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187  
A Novel Virtual Reality Simulation for Hemostasis in a Brain Surgical Cavity: Perceived Utility for Visuomotor Skills in Current and Aspiring Neurosurgery Residents
Achal Patel, Cristian Luciano, Thomas Jefferson Holbrook, Silvio Rizzi, Patrick Kania, Sohum K. Desai, Dan Branch, Adrian Mzee Smith, P. Pat Banerjee, Ben Z. Roitberg, Jaime Gasco-Tamarit

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188  
Role of Hyperhomocysteinemia in the Development of Intracranial Aneurysms
Masaaki Kohrai, David Kung, Keiko T. Kitazato, Nobuhsa Matsushita, Yoshiteru Tada, Kenji Yagi, Kenji Shimada, Yasuhisa Kanematsu, Junichiro Satomi, Shinji Nagahiro
Utility of Monitoring Cerebral Autoregulation After Subarachnoid Hemorrhage. Results from a Prospective Observational Study
Karol P. Budohoski, Marek Czosnyka, Peter Smielewski, Magdalena Kasprzowicz, Adel Helmy, Diederik Bulters, Miroslaw Zabek, John Douglas Pickard, Peter J. Kirkpatrick

Critical Role of TNF-alpha in Cerebral Aneurysm Formation and Rupture

Heme Induces Microglial CXCL2 Release—A Mechanism of Neutrophil-mediated Injury After Intracerebral Hemorrhage
David B. Kurland, Volodymyr Gerzanich, J. Marc Simard

Pediatric Head Injury During Operations Iraqi Freedom and Enduring Freedom
Paul Klimo, Jr., Brian T. Ragel, Rocco Armonda, Shalece Kofford, Randall R. McCafferty

Optogenetic Stimulation of Motor Cortex Neurons Promotes Functional Recovery After Stroke
Michelle Cheng, Wyatt J. Woodson, Eric Wang, Stephanie Wang, GuoHua Sun, Alex G. Lee, Ahmet Arac, Lief Fenno, Karl Deisseroth, Gary K. Steinberg

High Performance Computer Cursor Control Using Neuronal Ensemble Recordings From the Motor Cortex of a Person with ALS
Jaimie M. Henderson, Vikash Gilja, Chethan Pandarinath, Christine Blabe, Leigh R. Hochberg, Krishna V. Shenoy
2:21 – 2:28 PM

195

What is the Current Practice of Restarting Oral Anticoagulant in Patients with Subdural Haemorrhage?
Fahad A. Alkherayf, Philip Wells, Charles B. Agbi, Harrison Westwick

2:28 – 2:35 PM

196

Human Neural Stem Cell Transplantation in Chronic SCI: Interim Results of a Phase I/II Trial
Raphael Guzman, Martin Schubert, Dagmar Keller-Lang, Stephen L. Huhn, Armin Curt

2:35 – 2:42 PM

197

C2 Nerve Root Transection During C1 Lateral Mass Screw Fixation: Does it affect Functionality and Quality of Life?
Michael C. Dewan, Saniya S. Godil, Matthew J. McGirt

PREUSS AWARD

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198

Of Mice and Men: Matched Observations of Lymphopenia, Splenic Retraction, and the Bone Marrow as Harbor for Lost T-cells in Mice and Patients with Glioblastoma
Peter Fecci, Christina Chen, Shohei Koyama, Glenn Dranoff, Robert L. Martuza, William T. Curry, Jr.

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199

Comparison of Plaintiff and Defendant Expert Witness Qualification in Malpractice Litigation in Neurological Surgery
James K. Liu, Jean Anderson Eloy, Peter Svider, Adam J. Folbe, William T. Couldwell

SHERRY APPLE RESIDENT TRAVEL SCHOLARSHIP (WINS)

3:01 – 3:08 PM

200

LMP Knockout Mice Have Reduced Spine Trabecular Bone Density on Micro-computed Tomography Due to Decreased BMP Responsiveness
Matthew Frank Gary, Manjula Viggeswarapu, Colleen Oliver, Maggie Bargouti, Mesfin Teklemariam, Sree Sangadala, Louisa Titus, Scott Boden

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201

Meningeal Mast Cell-dependent Exacerbation of Brain Injury After Stroke in Mice
Ahmet Arac, Michele Grimbaldeston, Andrew Nepomuceno, Oluwatobi Olayiwola, Marta P. Pereira, Yasuhiro Nishiyama, Hannes Vogel, Mindy Tsai, Stephen Galli, Tonya Bliss, Gary K. Steinberg
Rapid Assessment of Platelet Dysfunction in the Traumatic Brain Injury Patient: Application of Point of Care Assays
Yair Gozal, Christopher Patrick Carroll, Norberto O. Andaluz

Application Accuracy of a Second Generation Interventional MRI Stereotactic Platform: Initial Experience in 101 DBS Electrode Implantations
Paul Larson, Philip A. Starr, Jill L. Ostrem, Nicholas Galifianakis, Marta San Luciano Palenzuela, Alastair Martin

Cost-utility Analysis of One and Two-level Dorsal Lumbar Fusions With and Without Recombinant Human Bone Morphogenic Protein-2
Matthew D. Alvin, Adeeb Derakhshan, Daniel Lubelski, Kalil G. Abdullah, Robert G. Whitmore, Edward C. Benzel, Thomas E. Mroz

Validation Strategies for Neurosurgical Simulation Technologies
James Bradley Elder, Clemens M. Schirmer, Darlene Angela Lobel

The Impact of Comorbidity on Length of Hospital Stays Following Elective Lumbar Decompression and Fusion
Mazen Sanoufa, Joe Sam Robinson, Jr.

Neurosurgery Simulation in Residency Training: Feasibility, Cost and Educational Benefit
Thomas Jefferson Holbrook, Jaime Gasco-Tamarit, Dan Branch, Achal Patel, Juan R. Ortega-Barnett, David Paul Paulson, James Alan Muns, Adrian Mzee Smith, Sohuk M. Desai, Marc Daniel Moisi, Yong-Fan Kuo, Joel T. Patterson
305
Interactive Virtual Skull Base Surgery Training: Translating the Simulation of Procedural Drilling Techniques
Daniel M. Prevedello, James Bradley Elder, Don Stredney, Thomas Kerwin, Leo F.S. Ditzel Filho, Ali R. Rezai

306
The Effect of Duty Hour Restrictions on Outcomes of Neurologic Surgery in Training Hospitals in the United States
Kiersten Norby, Farhan Siddiq, Malik Adil, Stephen J. Haines

307
Implementation of Smart-phone Based Neurosurgical Resident Surgical Competency Evaluation
Nathaniel P. Brooks, Christopher Nickele

308
Fragmentation of Vare and the Utilization of Computed Tomography (CT) in Ischemic Stroke Among Medicare Patients
Kimon Bekelis, David W. Roberts, Weiping Zhou, Jonathan Skinner

SECTION ON CEREBROVASCULAR NEUROSURGERY
Moderators: Eric Sauvageau, Andrew W. Grande

310
Treatment of IVH with Alteplase (rtPA) According to the Copenhagen Protocol Preliminary Results of a Danish Multicenter Trial
Jiri Bartek, Joergen Degn, Tina Obbekjaer, Benedicte Dahlerup, Jane Linnet, Helga Gulisano, Walter Fischer, Bertil Romner

312
Synaptic Remodeling in the Ischemic Brain is Enhanced by Stem Cell Treatment
Takeshi Hiu, Tonya Bliss, Nathan Manley, Eric Wang, Gordon Wang, Kristina D. Micheva, Andrew Olson, Jack Berry, Yasuhiro Nishiyama, Stephen Smith, Gary K. Steinberg

313
The Role of Changes in Neurophysiologic Monitoring as a Predictor of Neurologic Deficit or Procedural Complication During the Endovascular Treatment of Cerebral Aneurysms
Jeffrey Balzer, William J. Ares, Amy He, Nathan Winek, Ramesh Grandhi, Brian T. Jankowitz, Tudor Jovin, Michael B. Horowitz, Miguel Habeych, Donald Crammond, Parthasarathy D. Thirumala
314 Differing Blood Flow Patterns in Patients With Transient Neurological Deficits After EC IC Bypass: The Role of Local Hypoperfusion
Douglas J. Cook, Yaroslav Gelfand, Nitin Mukerji, Gary K. Steinberg

316 Predicting Inpatient Complications During Cerebral Aneurysm Clipping: The National Inpatient Sample 2005-2009
Kimon Bekelis, Symeon Missios, Atman Desai, Todd MacKenzie, Adina Fischer, Nicos Labropoulos, David W. Roberts

317 Evidence that Ly6Clow Macrophages Contribute to Spontaneous Recovery After Stroke
Yasuhiro Nishiyama, Ahmet Arac, Takeshi Hiu, Tonya Bliss, Gary K. Steinberg

318 Ischemic Postconditioning Facilitates Brain Recovery After Stroke by Promoting mTOR Activity
Rong Xie, Peng Wang, Wei Xu, Weimin Bao

319 The Implication of Persistent Fetal-type Circulation for the Treatment of Intracranial Aneurysms Using the Pipeline Embolization Device

320 Intraoperative Angiography Does Not Lead to Increased Rates of Infectious Complications.
William Stetler, Thomas J. Wilson, Wajd Al-Holou, Byron Gregory Thompson, Jr., Aditya S. Pandey

322 Intraoperative Rupture During Surgical Resection of Arteriovenous Malformations
Ramón Torné, Ana Rodriguez-Hernandez, Michael T. Lawton

323 Long-term Angiographic Follow-up of Pediatric Patients with Cerebral Aneurysms
Päivi Koroknay-Pál, Mika Niemelä, Hanna Lehto, Riku Kivisaari, Jussi Numminen, Aki Laakso, Juha Antero Hernesniemi

324 A New Revascularization Technique for Treatment of Complex Skull Base Lesions Using a Minimally-invasive Keyhole Approach
Firas M.G. Hammadi, Philippe Dodier, Ali Ayyad, Emad T. Aboud
Outcome Predictors of Brainstem Cavernous Malformations
Roxanna Garcia, Michael Ivan, Michael T. Lawton

A Pilot Study to Assess Microsurgical Skills And Validate An Objective Assessment Tool: The Northwestern Objective Microanastomosis Assessment Tool (NOMAT)
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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.

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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.
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James J. Evans, MD
Royalty – Depuy (6), Medtronic (6), Stryker (6) Consulting Agreement – Lanx (2); Ownership Interest – In Queue Innovations (8)

Kevin T. Foley, MD, FACS
Intellectual Fees – Arthrocare (6); Consulting Agreement – Arthrocare (2), Medtronic (2), NuVasive (2); Ownership Interest – Discgenics (3), TrueVision (3); Royalty – Medtronic (6)

Don Frei, MD
Consulting Agreement – Reverse Medical (6); Honoraria – Abbott (2); Ownership Interest – Penumbra (8)

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

Robert M. Friedlander, MD
Other – Journal of Neuroscience and Neurosurgery (4)

Kai-Ming G. Fu, MD, PhD
Consulting Agreement – Medtronic (2)

Douglas Gabbay
Ownership Interest – Advanced O.R. Technologies (1); Salary – IMRIS (3)

Steven D. Glassman, MD
Royalty – Medtronic (2); Salary – Norton Health Care (5); Other – Nuvasive-funds to data base (6), SRS-President-Elect (7), Medtronic (6)
Ziya L. Gokaslan, MD
Honoraria – AANS; AO Foundation (6); Other – AO North America, DePuy and NREF fellowship funding (6); Ownership Interest – US Spine Stock: Spinal Kinetics (8)

John G. Golfinos, MD
Honoraria – Medtronic (2); Ownership Interest – Viewray (6)

Andrew W. Grande, MD, FACS
Consulting Agreement – Covidien (2); Other – Haag-Streit (6), Integra (2)

Jeremy D. Greenlee, MD
Other – Aesculap, Inc. (2)

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

Robert E. Gross, MD, PhD
Consulting Agreement – Boston Scientific (2), Medtronic/Lilly (2), Neurpace (2), St. Jukes Medical (2), Visualase (2)

James D. Guest, MD, PhD
Consulting Agreement – Consultant to FDA (2)

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

Costas George Hadjipanayis, MD PhD
Royalty – Meditech (2); Intellectual Fees – Nx Development (6)

Regis W. Haid, MD
Consulting Agreement – Globus Medical (2), Piedmont Health Care (2); Royalty – Medtronic (6); Ownership Interest – Spine Universe (4); Other Financial or Material Support – Globus Medical (6), Medtronic Sofamor Danek (6); Other – Nuvasive (6)

Clement Hamani, MD
Consulting Agreement – St Jude Medical (2)

Ricardo A. Hanel, MD, PhD
Other – Covidien (6), MicroVention (6)

James S. Harrop, MD, FACS
Other – Axiomed (6); Consulting Agreement – DePuy Spine (2), ICON (2); Honoraria – Ethicon (6)

Robert Hart, MD
Consulting Agreement – DePuy Spine (6), Medtronic (6); Honoraria – DePuy Synthes Spine (6), Medtronic (6); Royalty – DePuy Synthes Spine (6), Seaspine (6); Other – Medtronic (6), NREF (6), Spine Connect (6), DePuy Spine (6)

Roger Hartl, MD
Consulting Agreement – BrainLab (2), Depuy Synthes (2), Lanx (2), SpineWave (2)

Robert F. Heary, MD, FACS
Royalty – DePuy Spine (6), Thieme Medical Publishers (6), ZimmerSpine (6)

Fraser Henderson, MD
Ownership Interest – Computational Biodynamics, LLC. (8), Polaris Biotechnology Inc. (6)

Jaimie M. Henderson, MD
Other – Circuit Therapeutics (7), Nevro Corp (7), Proteus Biomedical (6)

Mojgan Hodaie, MD MSc FRCS
Honoraria – Medtronic (6); Other – St Jude’s (6), Elekta (6)

Langston T. Holly, MD
Consulting Agreement – Medtronic (6);

L. Nelson Hopkins, MD
Consulting Agreement – Abbott Vascular (2), Bocade Medical (2), Boston Scientific (2), Cordis (2), Micrus (2), Silk Road (2); Other – Toshiba (6)

Richard A. Hostin, MD
Consulting Agreement – DePuy Spine (6); Other – DJO (6)

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

Stephen L. Huhn, MD
Salary – StemCells Inc (5)

Mir Hussain, BS
Salary – Globus Medical Inc. (5)

Robert E. Isaacs, MD
Other – Nuvasive (2); Ownership Interest – Safery Spine LLC (8), Safewire (8)
Pascal Jabbour, MDp, f
Consulting Agreement – CNV (2), EV3 (2)

Michael Janssen, MDf
Other – AOSNA (6)

Randy L. Jensen, MDf
Consulting Agreement – Medtronic (6), Pharma Kinesis (2)

J. Patrick Johnson, MDf
Consulting Agreement – Alphatec Spine, Inc. (2), Spinewave (2);
Ownership Interest – Pioneer Surgical Technology (2)

Iain Kalfas, MD F
Royalty – Mako Surgical (6); Honoria – DePuy Synthes Spine (6), Stryker Spine (6)

Steven N. Kalkanis, MDf, f
Honoraria – Biomet Spine (6); Consulting Agreement – Ethicon (2)

Patrick Kania, MDf
 Salary – ImmersiveTouch (5)

Adam S. Kanter, MDf
Royalty – Lanx (2); Other – NuVasive, Inc. (6)

Katada Kazuhiro, MDf
Other – THOSIBA Medical Systems (2)

Khaled Kebaish, MDf
Consulting Agreement – DePuy Spine (2), K2M (2)

Daniel F. Kelly, MDf
Royalty – Mizuho (2)

Alexander A. Khaleessi, MDf
Consulting Agreement – Covidien-ev3 (2), Stryker Neurovascular (2), Valor Medical (First Degree Relative) (8)

Pooja Khatri, MDf
Consulting Agreement – Penumbra Inc. (6)

Larry T. Kho, MDf
Consulting Agreement – Aesculap Spine (2), Depuy Spine (6), Globus Medical (6), Trasn1 (6), Zimmer Spine (6)

Kee Duk Kim, MDf
Royalty – LDR Spine (2)

Zelma H. Kiss, MDf
Other – Medtronic (have received grant funding in the past) (6)

Eric Klineberg, MDf
Honoraria – AO (6), DePuy Spine (6)

Peter Konrad, MD, PhDf
Consulting Agreement – Medtronic (2); Ownership Interest – Neurotargeting (7)

Branko Kopjar, MDf
Consulting Agreement – Cerapedics (2), Smith & Nephew (2)

Tyler R. Koski, MDf
Consulting Agreement – Globus (2), MB Innovations/Spinewave (2), Medtronic (2), Nuvasive (2)

Krishna Kumar, MDf
Honoraria – Boston Scientific (2); Consulting Agreement – Medtronic Inc. (2)

Charles Kuntz, MDf
Ownership Interest – Mayfield Clinic (8), Precision Radiotherapy (8), Priority Consult (8), The Christ Hospital Spine Surgery Center (8);
Salary – University of Cincinnati (5);
Other – Synthes/DePuy – Research/Education (6), Neurosurgery (4)

Richard E. Kuntz, MDf
Other – Medtronic Inc. (5)

Sophia Kuo, PhDf
Salary – Penumbra Inc. (5)

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

Aki Laakso, MD, PhDf
Consulting Agreement – Orion Pharma, Espoo, Finland (6)

Virginie Lafage, PhDf
Honoraria – DePuy Spine (6), K2M (6); Consulting Agreement – Medtronic Sofamor Danek (6);
Ownership Interest – Nemaris (8)

Frank LaMarca, MDf
Consulting Agreement – Biomet (2), Globus (2); Royalty – Globus (6), Stryker (6); Other – Globus (6), Lanx (2), NIH (6), NREF (6), DePuy Synthes Spine (6)

Frederick F. Lang, MDf, f
Other – DNAtrix, Inc. (6)

Giuseppe Lanzino, MDf
Consulting Agreement – ev3/ Covidien (2)

Paul Larson, MDf
Ownership Interest – Cranial Medical Systems (8); Honoraria – Medtronic (6); Other – MRI Interventions (6)
Michael T. Lawton, MD
Royalty – Mizuho (2); Consulting Agreement – Stryker (2)

Thomas Leipzig, MD
Other – Lanx (6)

Lawrence Lenke, MD
Other – Axial Biotech (6), DePuy Spine (6); Royalty – Medtronic (6), Quality Medical Publishing (6)

Jason Lerner, MD
Salary – Depuy Synthes Spine (5)

Eric C. Leuthardt, MD
Intellectual Fees – Allied Minds (6); Ownership Interest – General Sensing (8), Neurolizations (8); Consulting Agreement – Intellectual Ventures (2), Moniteris (2)

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

Elad I. Levy, MD, FACS, FAHA
Honoraria – Boston Scientific (6); Consulting Agreement – Blockade Medical (2), Codman & Shurtleff, Inc. (2), ev3 (2), TheraSyn Sensors (2); Ownership Interest – Intratech Medical Ltd. (8), Mynx/Access Closure (8); Other – Abbott Vascular (6)

Michael Levy, MD
Consulting Agreement – NFL (2), NFLPA (2)

Michael Lim, MD
Consulting Agreement – Stryker CMF (2)

Zachary N. Litvack, MD, MCR
Other – Integra LifeSciences Corp (6); Gifts – Medtronic Navigation (6), Stryker CMF (6)

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

Darlene A. Lobel, MD
Consulting Agreement – St Jude Medical (2)

Russell R. Lonser, MD
Consulting Agreement – Medical Advisory Board GE/NFL (2)

Demetrius K. Lopes, MD
Consulting Agreement – Covidien (2), Stryker (2); Ownership Interest – Penumbra (2)

Timothy H. Lucas, MD
Other – Karl Storz (6)

Cristian Luciano, MD
Salary – ImmersiveTouch, Inc. (2)

L. Dade Lunsford, MD
Other – AB Elekta (2)

R. Loch Macdonald, MD, PhD
Consulting Agreement – Actelion Pharmaceuticals (2); Ownership Interest – Edge Therapeutics, Inc. (7)

André Machado, MD PhD
Ownership Interest – ATI (6), Cardionomics (6), Intellect (6); Consulting Agreement – IntElect Medical (2), Monitoris (2)

Adel M. Malek, MD, PhD
Consulting Agreement – Codman Neurovascular (2), Stryker Neurovascular (2)

Alastair Martin, PhD
Other – Nuvasive (6)

Ian McCarthy, PhD
Consulting Agreement – Cvidian (2), Cvidian (6)

Matthew J. McGirt, MD
Consulting Agreement – Codman (6), Depuy-Synthes (6), Trans1 (6)

John H. Mehrkens, MD
Honoraria – Medtronic Inc. (2)

J D. Mocco, MD
Consulting Agreement – Actelion (2), Concentric (2), Edge Therapeutics (2), Endeaver Endovascular (2), Nfocus (2); Other – Blockade Medical (6); FEAT – Stryker (6), Lazarus Effect (7), THERAPY-Penumbra (6)

Alon Y. Mogilner, MD
Honoraria – Intelect Medical (6); Consulting Agreement – Medtronic Neurological (2)

Mark Moldavsky, BS
Salary – Globus Medical (5)

Christopher J. Moran, MD
Consulting Agreement – EV3 (2)

Thomas E. Mroz, MD
Honoraria – AO Spine (6); Consulting Agreement – Globus Medical (2); Ownership Interest – ParelDiver Inc (6)

Praveen V. Mummaneni, MD
Royalty – 2N LLC (Royalty from DePuy Spine and QMP publishers and Thieme medical publishing) (8); Honoraria – Depuy Spine (6), Globus Medical (6)
DISCLOSURE INFORMATION

Gregory Mundis, MD
Honoraria – DePuy Spine (6); Royalty – K2M (6); Consulting Agreement – Nuvasive (6)

Yuichi Murayama
Consulting Agreement – Brain Lab (2), Fuji Film (2), Penumbra (2); Royalty – Stryker (2)

Peter Nakaji, MD
Consulting Agreement – Aesculap (2); Royalty – AlloSource (2); Consulting Agreement – Medtronic Navigation (2)

Joseph S. Neimat, MD
Consulting Agreement – Medtronic (2)

Eric W. Nottmeier, MD
Honoraria – BrainLab (2); Consulting Agreement – DePuy/Synthes (2); Royalty – Globus (2); Other – K2M (4), Medtronic Navigation (4)

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

Jeffrey J. Olson, MD
Consulting Agreement – American Cancer Society (6); Other – Genentech (6), Merck (6), Millenium (6)

Jill L. Ostrem, MD
Consulting Agreement – Allergan (6); Grants – Ceregene (6), Medtronic (6), St Jude Medical (6), Surgivision (6)

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

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

Parag G. Patil, MD, PhD
Consulting Agreement – Medtronic (2), Neuralstem (2); Other – St Jude Neurological (6)

Troy D. Payner, MD
Royalty – Stryker (6)

Mick J. Perez-Cruet, MD, MS

Daniel R. Pieper, MD
Ownership Interest – Greater Michigan Gamma Knife (8); Consulting Agreement – Storz (2), Stryker (2)

Julie G. Pilitis, MD PhD
Consulting Agreement – Medtronic (2)

Nader Pouratian, MD PhD
Other – Medtronic (6)

John B. Pracyk, MD, PhD
Other – Marshall Steele-Stryker Performance Solutions (6); Consulting Agreement – VegaHealthcare (2)

Srinivasa Prasad, MD
Honoraria – Depuy-Synthes Spine (6), Medtronic (6); Consulting Agreement – Stryker Spine (6)

Charles J. Prestigiacomo, MD
Consulting Agreement – Edge Therapeutix (2); Other – International Brain Research Foundation (7), Thermopeutix (2)

Themistocles Prototsalidis, MD
Other – K2M (6), Nemaris (6)

Stephen R. Ramee, MD, FSCAI, FACC, FSCAI
Other – Abbott (6), Access Closure (6), Boston Scientific (6), Edwards LifeSciences (6), Medtronic (6), Northwind Medical (6); Honoraria – Gore Medical (6); Ownership Interest – Hot Spar/Teleflex (6), Large Bore, LLC (6), Lazarus Effect (6); Consulting Agreement – Maya Medical (6), Neurointerventions (2)

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

Wilson Z. Ray, MD
Consulting Agreement – Depuy (2), Ulrich (2)

Jean Regis, MD
Other Financial or Material Support – Accuray, BrainLab, Elekta, Tomotherapy (6)

Harold L. Rekate, MD
Consulting Agreement – Advisor to Codman for shunt design (2)

Ali R. Rezai, MD
Consulting Agreement – Autonomic Technologies (6); Ownership Interest – Autonomic Technologies (3), MRI Interventions (6)

Laurence D. Rhines, MD
Honoraria – Stryker (2)
Howard A. Riina, MD<sup>F</sup>, MD<sup>F</sup>
Ownership Interest – eVisio Medical Systems (6), Reach Bionics (8);
Consulting Agreement – New York Presbyterian Hospital Research Grant (2); Other – Tomorrow Foundation Grant (6)

Andrew J. Ringer, MD<sup>D</sup>
Consulting Agreement – eV3 / Covidien (2), Microvention (2), Stryker (2)

David W. Roberts, MD<sup>E</sup>, MD<sup>F</sup>
Consulting Agreement – Medtronic (6); Other – Dusa Pharmaceuticals (6), Medtronic (6), Zeiss (6)

Gerald E. Rodts, MD<sup>E</sup>, MD<sup>F</sup>
Consulting Agreement – Globus Medical, Inc. (2), Medtronic (2), Orthofix, Inc. (2); Other – SpineUniverse.com (3); Royalty – Globus Medical, Inc. (2)

William S. Rosenberg, MD<sup>F</sup>
Consulting Agreement – Medtronic, Inc (2), S1-Bone (2), St. Jude Medical (2); Ownership Interest – Spine Wave (6)

Joshua M. Rosenow, MD, FACS<sup>E</sup>
Consulting Agreement – Boston Scientific Neuromodulation (2), Boston Scientific Neuromodulation (2)

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

Arjun Sahgal, MD<sup>F</sup>
Consulting Agreement – Medtronics Kyphoplasty (6)

John H. Sampson, MD, PhD, MHSc<sup>C</sup>
Consulting Agreement – Cellix (6)

Charles A. Sansur, MD MHSc<sup>C</sup>, MD<sup>E</sup>
Honoraria – DepuySynthes (2); Consulting Agreement – Medtronic (2)

Rick Sasso, MD<sup>E</sup>
Other – Cerapdics (6); Royalty – Medtronic (6)

Michael J. Schlosser, MD<sup>B</sup>
Consulting Agreement – HCA (3)

Frank Schwab, MD, PhD<sup>D</sup>
Consulting Agreement – DePuy Spine (2), Medtronic (2); Honoraria – DePuy Spine (6), Medtronic (6); Royalty – Medtronic (6); Ownership Interest – Nemaris (8); Other – DePuy Spine (6);

Daniel M. Scibbba, BS, MD<sup>D</sup>
Consulting Agreement – Depuy (2); Honoraria – Medtronic (6)

Laligam N. Sekhar, MD, FACS<sup>F</sup>
Ownership Interest – SpiSurgical Inc (8), Viket Medical Inc (6)

Nathan R. Selden, MD PhD<sup>D</sup>, MD<sup>F</sup>
Other – Committee Chair – Society of Neurological Surgeons (3), NeuroPoint Alliance (3); Salary – Regulatory & Clinical Research Institute (Study CEC Chair) (5); Consulting Agreement – Shire (2)

Christopher I. Shaffrey, MD, FACS<sup>F</sup>
Consulting Agreement – Biomet (6), Medtronic (6), Nuvasive (6); Intellectual Fees – Biomet (6), Medtronic (6), Nuvasive (6); Royalty – Biomet (6), Medtronic (6), Nuvasive (6); Honoraria – Globus (6), Stryker (6), Other – AOSPINE North America (6), Department of Defense (6), Depuy (6), NACTN (6), NIH (6), NREF (6)

Ashwini Dayal Sharan, MD<sup>D</sup>, MD<sup>F</sup>
Ownership Interest – ICP (8), ICVRx (8); Consulting Agreement – Medtronic (2), St. Jude Medical (2); Royalty – Zimmer (6)

Frank G. Shellok, PhD<sup>D</sup>
Other – Codman (6), Medtronic (2), W.L. Gore (6); Consulting Agreement – Stimwave (2)

Jonathan D. Sherman, MD<sup>D</sup>
Consulting Agreement – Medtronic (2), Spine Wave (2)

Adnan Hussain Siddiqui, MD, PhD<sup>D</sup>, MD<sup>F</sup>
Consulting Agreement – Codman & Shurtleff, Inc. (2), Concentric Medical (2), ev3/Covidien Vascular Therapies (2), Guidepoint Global Consulting (2), Penumbra (2), Pulsar Vascular (2), Stryker Neurovascular (2); Honoraria – American Association of Neurological Surgeons’ courses (6), Annual Peripheral Angioplasty and All That Jazz Course (6), Codman – Trainer of Other neurointerventionists (6), Codman Speaker’s Bureau (6); Ownership Interest – Blockade Medical (6), Hotspur (6), Intratech Medical (6), Stimosx (6), Valor Medical (6); Other – Abbott Vascular for training Other neurointerventionists (6), Codman Advisory Board (6), National Institutes of Health (6), University at Buffalo (6)
Konstantin V. Slavin, MD
Consulting Agreement – Greatbatch (2), Medtronic (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
Consulting Agreement – Monteris Medical (2), Nanofiber Solutions (2), RealBio (2), Surgical Theatre (2); Ownership Interest – Rubicon Genomics (2); Other – Genentech (6), National Cancer Institute (2), Roche Pharmaceuticals, Inc (6)

Jonathan Slotkin, MD
Consulting Agreement – InVivo Therapeutics (2), Stryker Spine (2)

Peter Smielewski, MD
Ownership Interest – 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)

Justin S. Smith, MD PhD
Consulting Agreement – Biomet (2), DePuy Spine (6), Medtronic Sofamor Danek (2); Honoraria – DePuy Spine (6); Other – DePuy Spine (6)

Kenneth V. Snyder, MD, PhD
Honoraria – Toshiba (6)

Teck Mun Soo, MD
Intellectual Fees – Dr. Soo designed the Aleutian cervical and thoracolumbar vertebral interbody spacer for K2M and received compensation of about $30 K over the last 12 months for intellectual property fee. (1)

Robert F. Spetzler, MD
Ownership Interest – Boston Scientific (6), DicomGrid (6), EmergeMD (6), iCo Therapeutics (6), Katalyst/Kogent (6), RS8 Spine (6), Stereotaxis (6), Synergistics (6); Consulting Agreement – Zeiss (6); Royalty – Codman (6), Stryker (6)

Philip A. Starr, MD, PhD
Consulting Agreement – Boston Scientific (6); Grants – Sugivision, Inc. (6)

Gary K. Steinberg, MD, PhD
Honoraria – Medtronic (2)

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

Peter Syre, MD
Other – St. Jude Neuromodulation-Grant Support (6)

Charles Teo, MD
Consulting Agreement – Aesculap (2)

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

Lucie Thibault
Salary – Microvention Inc (5)

Shelly D. Timmons, MD PhD
Honoraria – Synthes (6)

Stavropoula I. Tjomakaris, MD
Consulting Agreement – Stryker (2)

Steven A. Toms, MD, FACS
Consulting Agreement – Medtronic (2), Novocure (2), Stryker (2)

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

Trent L. Tredway, MD
Honoraria – Aesculap (6), Synthes (6)

Eve C. Tsai, MD, PhD, FRSC, CIPF
Other – Synthes/Depuy (6)

Luis M. Tumialan, MD
Consulting Agreement – Medtronic (2)

Aquila Turk, MD
Consulting Agreement – Codman (2), Lazarus Effect (2), Microvention (2), Penumbra (2), Stryker (2)

Raymond D. Turner, MD
Consulting Agreement – Blockade Medical (2), Codman (2), Covidien (2), Microvention (2)

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

Alexander R. Vaccaro, MD
Consulting Agreement – Gerson Lehman Group (2), Guidepoint Global (2), Medacorp (2); Ownership Interest – Advanced Spinal Intellectual Properties (6), Bonovo Orthopaedics (6), Computational Biodynamics (6), Cross Current (6), Crytonics (6), Disc Motion Technology (6), Electrolux (6), Flagship Surgical (6), Flow Pharma (6), Gamma Spine (6), Globus Medical (6), In Vivo (6), K2 Medical (6), Location Based Intelligence (6), Neucore (6), Orthovita (6),
Paradigm Spine (6), Progressive Spinal Technologies (6), R.I.S (6), Replication Medica (6), Small Bone Innovations (6), Spine Medica (6), SpinoMed (6), Stout Medical (6), Syndicom (6), Vertiflex (6); Royalty – Stryker Spine (6), Nuvasive (6), K-2 Medical (6), Globus Medical (6), DePuy (6), Aesculap (6), Biomet (6)

Erol Veznedaroglu, MDP, F Consulting Agreement – Codman (2), Cordis (2)

Michael A. Vogelbaum, MD PhD Ownership Interest – Infuseon Therapeutics, Inc. (7); Honoraria – Merck (6); Consulting Agreement – Neuralstem (2), Pharmacokinesis (2)

Ajay K. Wakhloo, MD, PhD Consulting Agreement – Boston Biomedical Associates (2), Stryker Neurovascular (2); Honoraria – Harvard Postgraduate Course (6); Other – Philips Medical (6)

Michael Y. Wang, MD FACSF Consulting Agreement – Aesculap Spine (2), Depuy Spine (2), Globus (2)

Gwen Watanabe Salary – Teleflex, Inc. (5)

Clarence B. Watridge, MDF Other – Medical Education & Research Institute (7), Medtronic (6), NIH;NINDS (6), Spinal Motion (6)

Jeffrey S. Weinberg, MDF Ownership Interest – AiCure (6)

William C. Welch, MD, FACS, FICS Consulting Agreement – Best Doctors (2); Ownership Interest – Welch Research and Development (8)

Robert E. Wharen, MD Other – Participating Investigator in RNS Trial (6)

Donald M. Whiting, MD Consulting Agreement – Aesculap (2), Medtronic (2); Ownership Interest – Innovative Performance Technologies (8)

Beth A. Winkelstein, PhDF Other – St. Jude Neuromodulation-Grant Support (6)

Timothy F. Witham, MD, BSF Other – Ely Lilly, Research Support (6)

Henry H. Woo, MDF Royalty – Codman and Shurtleff (2); Consulting Agreement – ev3 Neurovascular (2); Other – Siemens (6); Ownership Interest – Vascular Simulations LLC (3)

Eric J. Woodard, MDF Ownership Interest – In Vivo Therapeutics (3)

Osama O. Zaidat, MDF Consulting Agreement – Penumbra, Inc. (6); Honoraria – Penumbra, Inc. (2)
The following individuals have disclosed that they do not have a relationship with commercial companies whose products may have a relevance to their participation in the Annual Meeting. Planners are designated by P and Faculty by F.

Beverly Aagaard-Kienitz, MD F
Bizhan Aarabi, MD F
Mohamed Abbass, MD F
Rick Abbott, MD F
Osama Abdelaziz, MD F
Kalil G. Abdullah, MD F
Ramzi Abdulrahman, MD F
Adib Adnan Abla, MD F
Emad T. Aboud, MD F
John M. Abrahams, MD F
Achal Singh Acrol, MD F
Bektas Acikgoz, MD F
Serefden Açikgöz, MD F
Frank L. Acosta, MD F
Bertrand Actor, MD F
Kazuhide Adachi, MD F
Matthew Armand Adamo, MD F
P . David Adelson, MD, FACS, FAAP P, F
Malik Adil, MD F
Owoicho Adogwa, MD, MPH F
Nitin Agarwal, BS F
Nutan Agarwal, MD F
Pankaj Kumar Agarwalla, AB, MSt F
Charles B. Agbi, MD, FRCS F
Bonita Agee, MD F
Manish Kumar Aghi, MD, PhD P, F
Abhishek Agrawal, MD F
Daniel Aguirre, MD F
Osama I. Ahmed, MD P
Michele Renee Aizenberg, MD P
Johnny Akers, MD F
Noori Akhtar-Danesh, PhD F
Alessio Albanese, MD F
Felipe Albuquerque, MD F
Kenneth D. Aldape, MD F
Wajid Al-Holou, MD F
Muhammad S. Ali, MD F
Kari Alitalo, MD, PhD F
Nabil Alkayed, MD F
Fahad A. Alkherayf, MD, MSc, CIP, FRCS F
Kaitin Almeyta, MD F
Ossama Al-Mefty, MD F
Susan Alpert, MD F
Amira Al-Uzri, MD F
Manuel Alvarado, MD F
Juan Alvarez-Linera, MD F
Mario Ammirati, MD F
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Annual Meeting Guide
The CNS offers an Annual Meeting Guide designed to put everything you need in the palm of your hand. This electronic supplement to the Pocket Guide provides you a convenient way to search for meetings, events, faculty members, abstracts, exhibitors and more. Use your Smartphone or laptop to visit http://m.cns.org and take advantage of this user-friendly guide throughout the CNS Annual Meeting! iPod Touch®, iPhone®, and iPad® users may also download the app at the Apple App Store®.

Attire
Professional attire is appropriate at the Annual Meeting and the Exhibit Hall. Some San Francisco 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 attendees including CNS Members and Non-members
- **GRAY**: Medical Students, Allied Health, Nurses
- **ORANGE**: Non-Member Corporate Representatives
- **CLEAR**: Guests and Spouses
- **GREEN**: Symposia Only Attendees
- **YELLOW**: Exhibitors
- **RED**: Staff

Children
Children over the age of 12 may be registered as a guest. (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.

Course Agendas and Faculty
Agendas are 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.

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<tr>
<td>MONDAY, OCTOBER 21</td>
<td>9:00 AM – 3:30 PM</td>
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<tr>
<td>TUESDAY, OCTOBER 22</td>
<td>9:00 AM – 6:30 PM</td>
</tr>
<tr>
<td>WEDNESDAY, OCTOBER 23</td>
<td>9:00 AM – 2:00 PM</td>
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Admittance to the Exhibit Hall is by CNS name badge only. Children under the age of 18 are not allowed in the CNS Exhibit Hall.

**Breaks and Demonstration Theater in the Exhibit Hall**

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

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<tr>
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<th>Time</th>
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<tbody>
<tr>
<td>MONDAY, OCTOBER 21</td>
<td><strong>Beverage Break</strong> 9:00 – 10:00 AM 11:30 AM – 12:30 PM</td>
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<tr>
<td>TUESDAY, OCTOBER 22</td>
<td><strong>Beverage Break</strong> 9:00 – 10:00 AM 11:30 AM – 12:30 PM</td>
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<tr>
<td>WINE &amp; CHEESE RECEPTION</td>
<td>5:00 – 6:30 PM</td>
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<tr>
<td>RESIDENT SANS CHALLENGE CHAMPIONSHIP ROUND</td>
<td>5:00 – 6:30 PM</td>
</tr>
<tr>
<td>WEDNESDAY, OCTOBER 23</td>
<td><strong>Beverage Break</strong> 9:00 – 10:00 AM 11:30 AM – 12:30 PM</td>
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**Member Services Booth**

Be sure to stop and visit the CNS Member Services staff in Booth 1309 for demos of our most popular products, or to answer any of your questions about the CNS, your *Neurosurgery®* subscription and your CNS membership.
**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 Rooms 3014-3020 on Level 3 of Moscone Convention Center West. Digital Posters will be displayed electronically, Monday – Wednesday in the Exhibit Hall, and can be searched by author, topic or keyword.

**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.

**Registration**
Registration is located in Moscone West Convention Center, Level 1.

**Restaurant Reservations**
A Restaurant and Tour desk will be available for your convenience in the lobby of Moscone West Convention Center.

**Shuttle**
Shuttle service to Moscone West Convention Center will be available from the Palace Hotel, Westin St. Francis and Courtyard by Marriott. The shuttle service pick up location for Grand Hyatt and JW Marriott is located at the Westin St. Francis on Post Street, as both hotels are in walking distance to the Westin St. Francis. All other hotels are within walking distance from the convention center. A shuttle schedule will be posted at the hotels and convention center.

**SATURDAY, OCTOBER 19**
7:00 AM – 5:30 PM
**SUNDAY, OCTOBER 20**
7:00 AM – 7:30 PM
**MONDAY, OCTOBER 21**
6:30 AM – 4:30 PM
**TUESDAY, OCTOBER 22**
6:30 AM – 4:30 PM
**WEDNESDAY, OCTOBER 23**
6:30 AM – 3:00 PM

**SATURDAY, OCTOBER 19**
7:00 AM – 5:30 PM
**SUNDAY, OCTOBER 20**
6:00 AM – 9:00 PM
**MONDAY, OCTOBER 21**
6:00 AM – 5:30 PM
**TUESDAY, OCTOBER 22**
6:00 AM – 8:00 PM
**WEDNESDAY, OCTOBER 23**
6:00 AM – 4:00 PM
Speaker Ready Room
All speakers and abstract presenters should visit the Speaker Ready Room, which is located in Room 3000 at Moscone Convention Center West prior to their presentations.

SATURDAY, OCTOBER 19  7:00 AM – 5:30 PM
SUNDAY, OCTOBER 20   6:00 AM – 6:00 PM
MONDAY, OCTOBER 21   6:00 AM – 3:00 PM
TUESDAY, OCTOBER 22   6:00 AM – 3:00 PM
WEDNESDAY, OCTOBER 23  6:00 AM – 3:00 PM

Spouse Hospitality Suite
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 the Walnut Room on the B2 Level at the San Francisco Marriott Marquis.

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# PRODUCT AND SERVICE GUIDE

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- Advanced Biologics
- BioD, LLC
- Innovasis, Inc.
- Providence Medical Technology, Inc.
- RTI Surgical
- Southern Spine LLC
- Spineology Inc.
- VG Innovations, LLC

## Aneurysm Clips and Accessories
- Medprin Biotech GmbH
- Mizuho America, Inc.
- Scanlan International, Inc.

## Bone Growth Stimulators
- Biomet Spine / Microfixation

## Bone Substitute
- Advanced Biologics
- Innovasis, Inc.
- Integra LifeSciences Corporation
- NovaBone Products LLC
- Osteo Symbionics
- RTI Surgical

## Business Management Solutions
- NeuroPoint Alliance (NPA)
- Residency Select, LLC

## Cervical Collars
- PMT Corporation

## Computer Hardware
- SpotOn Surgical
- Surgical Theater

## Computer Software for Surgical Applications
- Medtech Surgical
- Monteris Medical
- Oncology Data Systems
- Renishaw, Inc.
- SpotOn Surgical
- Surgical Theater
- Varian Medical Systems, Inc.

## Continuing Medical Education Courses
- American Association of Neurological Surgeons
- Congress of Neurological Surgeons
- Karl Storz
- Residency Select, LLC
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### SURGICAL INSTRUMENTS / SUPPLIES

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### ULTRASOUND EQUIPMENT

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Luncheon Seminars
Sergeant-at-Arms (2024 Overlook)
CNS Annual Business Meeting (2001)
Resident Recruitment Social
► General Scientific Sessions
► Neurosurgical Forum (3014-3020)
► Oral Presentations
► 3-D Operative Neurosurgery I & II
► Section Sessions
► Practical Courses
► Luncheon Seminars
► Exhibits
► CNS Resident SANS Challenge Preliminary Rounds (3020)
► Speaker Ready Room (3000)
General Scientific Session I  
Yerba Buena Salon 1-7  

Opening Reception  
Yerba Buena Salon 8-15  

SYM03: Neuromodulation 2013  
Golden Gate Ballroom  

CNS Spouse Hospitality Suite  
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INFUSE® BONE GRAFT/MT-CAGE® LUMBAR TAPERED FUSION DEVICE,
INFUSE® BONE GRAFT/INTER FIX™ THREADED FUSION DEVICE, INFUSE®
BONE GRAFT/INTER FIX® RP THREADED FUSION DEVICE

The INFUSE® Bone Graft/Medtronic Titanium Threaded Interbody Fusion Device is indicated for spinal fusion procedures in skeletally mature patients with degenerative disc disease (DDD) at one level from L2–S1, who may also have up to Grade I spondylolisthesis or Grade I retrolisthesis at the involved level. The INFUSE® Bone Graft/MT-CAGE® Lumber Tapered Fusion Device is to be implanted via an anterior open or an anterior laparoscopic approach. INFUSE® Bone Graft with either the INTER FIX™ or INTER FIX® RP Threaded Fusion Device is to be implanted via an anterior open approach.

The INFUSE® Bone Graft/Medtronic Titanium Threaded Interbody Fusion Device consists of two components containing three parts—a metallic spinal fusion cage, a recombinant human bone morphogenetic protein and a carrier/scaffold for the bone morphogenetic protein and resulting bone. These components must be used as a system for the prescribed indication described above. The bone morphogenetic protein solution component must not be used without the carrier/scaffold component or with a carrier/scaffold component different from the one described in this document. The INFUSE® Bone Graft component must not be used without the Medtronic Titanium Threaded Interbody Fusion Device component.

NOTE: The INTER FIX™ Threaded Fusion Device and the INTER FIX® RP Threaded Fusion Device may be used together to treat a spinal level. MT-CAGE® Lumbar Tapered Fusion Device implants are not to be used in conjunction with either the INTER FIX™ or INTER FIX® RP implants to treat a spinal level.

The INFUSE® Bone Graft/Medtronic Titanium Threaded Interbody Fusion Device is contraindicated for patients with a known hypersensitivity to recombinant human Bone Morphogenetic Protein-2, bovine Type I collagen or to other components of the formulation and should not be used in the vicinity of a resected or extirpated tumor; in patients with any active malignancy or patients undergoing treatment for a malignancy; in patients who are skeletally immature; in pregnant women; or in patients with an active infection at the operative site or with an allergy to titanium or titanium alloy.

There are no adequate and well-controlled studies in human pregnant women. In an experimental rabbit study, MBMP-2 has been shown to elicit antibodies that are capable of crossing the placenta. Women of childbearing potential should be advised to avoid becoming pregnant for one year following treatment with this device.

Please see the package insert for the complete list of indications, warnings, precautions, adverse events, clinical results, definition of DDD, and other important medical information. The package insert also matches the sizes of these devices that are indicated for use with the appropriate INFUSE® Bone Graft kit.

CAUTION: Federal (USA) law restricts this device to sale by or on the order of a physician with appropriate training or experience.
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YELLOW 560™ image obtained with drug being investigated for new intended use. 
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