
The 7D Surgical System lets you harness the full potential of image guidance with the first and only Machine-vision Image Guided Surgery (MvIGS) platform—using only visible light to acquire thousands of virtual fiducials for nearly instantaneous cranial registrations in any position.

Discover a new kind of vision for cranial navigation at booth 831.
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The purpose of the 2019 Annual Meeting of the Congress of Neurological Surgeons is to provide continuing medical education for practicing neurosurgeons, neurosurgical residents in training, and postgraduate neurosurgical fellows, as well as advanced practice providers including nurses, physician assistants, and clinical specialists.

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The CNS is pleased to provide complimentary WiFi!  
Moscone West Convention Center:  
Network: CNS19  
Password: sanfran19  
San Francisco Marriott Marquis:  
Network: CNS19  
Password: sanfran19
ROBOTIC PRECISION. POWERED BY YOU.

Stealth Autoguide™ Cranial Robotic Guidance Platform

STEALTH™ + ROBOTICS

Stealth Autoguide™ cranial robotic guidance platform is engineered to provide stereotactic positioning and trajectory guidance. Continuous real-time monitoring, feedback, and robotically assisted movement allows you to quickly and accurately align to your surgical plans for cranial procedures.

Seamlessly integrating with your StealthStation™ system and Midas Rex™ MR7 drill technology, the innovative Stealth Autoguide™ improves your workflow efficiency with a minimal footprint in your OR.

Visualase™

Stealth Autoguide™ aligns the bone anchor to a planned trajectory. A flexible Visualase™ laser catheter is passed through the bone anchor to the target area.

Depth Electrodes

Stealth Autoguide™ assists in the placement of sEEG bolts to enable the placement of depth electrodes. Allowing you to place multiple sEEG bolts quickly and efficiently.

Biopsy

Stealth Autoguide™ easily and precisely aligns to your surgical plan to place the biopsy needle. This solution enables accurate location of lesion with direct depth stop calculation and confirmation of biopsy location with biopsy needle navigation.
Thank you for joining us for the 2019 Congress of Neurological Surgeons Annual Meeting. This year’s meeting is taking controversy head on. Think you know the right thing to do for a patient with a low-grade glioma? How about advising an athlete about Chronic Traumatic Encephalopathy? Is a randomized controlled trial the most ethical way to decide whether or not a treatment is effective? In keeping with this year’s meeting theme, “The Age of Reason for Neurosurgery,” you’ll be presented with the latest evidence on either side of these issues to help you determine the best way to help your patients.

The Scientific Program Committee, led by Alexander Khalessi, Nader Pouratian, and Brian Nahed, has put together an outstanding program with exciting speakers and relevant content. We are featuring specialty-specific, all-day symposia on Saturday and Sunday at a lower price. We’re also introducing three International Symposia featuring neurosurgeons from around the world and providing more opportunities to present original science. For the first time, we included an abstract category on operative technique in order to highlight novel surgical strategies for treating neurological disease across all disciplines.

In addition to top-line neurosurgical content, we have special speakers who will provide you with a unique perspective on a variety of topics. There are also many social events for you to enjoy.

On behalf of the Congress of Neurological Surgeons’ Executive Committee, the Scientific Program Committee, and the 2019 Honored Guest Raymond Sawaya, I welcome you to this year’s CNS Annual Meeting in San Francisco, California.

Sincerely,

Ganesh Rao, MD
CNS President

THE CNS WELCOMES YOU TO SAN FRANCISCO

The Moscone Center is in the trendy SoMa neighborhood of San Francisco. After coming into prominence as a high-tech hub in the 1990s, SoMa—short for South of Market—is one of the coolest neighborhoods in the city, packed with shops, museums, art galleries, and restaurants.
HONORED GUEST

Raymond Sawaya, MD
Professor and Founding Chair of the Department of Neurosurgery, and the Anne C. Brooks & Anthony D. Bullock III Distinguished Chair in Neurosurgery at The University of Texas MD Anderson Cancer Center

Raymond Sawaya, MD, was the founding chair of Neurosurgery at The University of Texas MD Anderson Cancer Center, as well as an advisor to the leaders of the Glioblastoma Multiforme (GBM) Moon Shot™. He also served as director of the Brain Tumor Center and is currently holder of the Anne C. Brooks & Anthony D. Bullock III Distinguished Chair in Neurosurgery. Dr. Sawaya was the chairman of the Department of Neurosurgery at Baylor College of Medicine from 2005 to 2015.

Dr. Sawaya earned his medical degree from St. Joseph University of Beirut, Lebanon, and completed a surgical internship at Beekman Downtown Hospital in New York City. Multiple residencies followed: in general surgery at Upstate Medical Center State University of New York, in pediatric neurosurgery at Children’s Hospital Medical Center in Cincinnati, and in neurosurgery at the University of Cincinnati College of Medicine. In 1980, he accepted the position of chief resident in neurosurgery at Johns Hopkins Hospital and then held a fellowship at the National Institutes of Health (NIH) as a Fogerty International fellow. At NIH, he found his career focus: brain tumors and, in particular, glioblastomas. He was recruited back to the University of Cincinnati in 1982, where he spent eight years building that institution’s brain tumor program.

Dr. Sawaya has influenced the field of neurosurgical oncology in several major ways. Ever since he was recruited in 1990 to establish a newly formed Department of Neurosurgery at MD Anderson, he has built the most comprehensive and best recognized neurosurgical oncology program in the country (Neurosurgery 56: 841-50, 2005). Dr. Sawaya was also residency program director at Baylor College of Medicine for several years during his term as chairman. He continues to contribute his expertise to one of the largest residency programs in the United States.

Dr. Sawaya is an internationally recognized leader in neurosurgery, with particular expertise in primary and metastatic brain tumors. His laboratory work helped identify molecular determinates of brain tumor invasiveness, and in particular, the role of serine proteases and their roles in glioma oncogenesis (over 60 publications). On the clinical side, he has helped identify brain metastases as a major threat to the well-being of cancer patients, and was the first to promote the treatment of patients with multiple brain metastases (J Neurosurg 79: 210-6, 1993; 368 citations). Dr. Sawaya is renowned for his great strides in enhancing the accessibility and safety of brain tumor surgery. This can best be demonstrated in his landmark paper on the importance of extent of resection on the survival of glioblastoma patients (J Neurosurg 95: 190-8, 2001; 1440 citations). He has also conducted the first prospective trial on the use of intraoperative MRI to maximize the extent of resection (Neurosurgery 64: 1073-81, 2009; 105 citations).

Dr. Sawaya has published more than 300 articles and book chapters and has served as both reviewer and editor for a number of peer-reviewed journals. He is the past president of the American Radium Society, the past president of the Houston Neurological Society and past chair of the American Association of Neurological Surgeons/Congress of Neurological Surgeons Section on Tumors. He is in demand as a lecturer across the nation and around the world and has received a number of awards in recognition of his expertise.

Dr. Sawaya is a “triple threat” who has excelled as a surgeon, researcher, and teacher and has been very successful as a leader and an advocate for the field. Dr. Sawaya considers his greatest achievement the building and maintaining of MD Anderson’s comprehensive brain tumor program, which has allowed him to touch the lives of many patients.

Look for Dr. Sawaya at the following sessions:

MONDAY, OCTOBER 21

General Scientific Session II
9:13–9:40 am
Honored Guest Presentation: Role of Resection for Glioblastoma: Can Technology Overcome Biology?

Meet Dr. Sawaya in the CNS Xperience Lounge inside the Exhibit Hall immediately following his General Scientific Session presentation.

TUESDAY, OCTOBER 22

General Scientific Session III
8:51–9:13 am
Honored Guest Presentation: Evidence-based Medicine Through Development of Homegrown Databases

WEDNESDAY, OCTOBER 23

General Scientific Session IV
8:50–9:12 am
Honored Guest Presentation: The Evolving Landscape and Management of Brain Metastases
FEATURED SPEAKERS

Lucy Kalanithi, MD
A Conversation with Lucy Kalanithi
SUNDAY, OCTOBER 20
General Scientific Session I
5:56–6:30 pm
Lucy Kalanithi will be signing copies of “When Breath Becomes Air” immediately following the conclusion of her lecture in the 3rd floor foyer of Moscone West Convention Center.

Lucy Kalanithi, MD, is the widow of the late Dr. Paul Kalanithi, author of The New York Times #1 bestselling memoir “When Breath Becomes Air” for which she wrote the epilogue. An internal medicine physician and faculty member at the Stanford School of Medicine in Palo Alto, California, Dr. Kalanithi completed her medical degree at Yale, where she was inducted into the Alpha Omega Alpha national medical honor society, her residency at the University of California-San Francisco, and a postdoctoral fellowship training in healthcare delivery innovation at Stanford’s Clinical Excellence Research Center. At the cross-section of her career as a medical professional and her personal experience standing alongside her husband during his life, diagnosis, treatment, and death, Dr. Kalanithi has special interests in healthcare value, meaning in medicine, patient-centered care, and end-of-life care. She has appeared on “PBS NewsHour,” “NPR Morning Edition,” and “Yahoo News with Katie Couric,” and been interviewed for People, NPR, and The New York Times. She lives in the San Francisco Bay Area with her daughter, Elizabeth Acadia.

CNS MICHAEL L. J. APUZZO LECTURER ON CREATIVITY AND INNOVATION
Shankar Vedantam
Hidden Brain
MONDAY, OCTOBER 21
General Scientific Session II
8:48–9:13 am
Shankar Vedantam will be signing copies of his book, “The Hidden Brain” in the CNS Xperience Lounge during the morning beverage break.

Shankar Vedantam is the host of NPR’s “Hidden Brain” podcast and radio show. His goal is to help people think about the world in new and interesting ways. He is endlessly fascinated by research in fields ranging from psychology and history to sociology and economics.

Before joining NPR in 2011, Vedantam spent 10 years as a reporter at The Washington Post. From 2007 to 2009, he was also a columnist, and wrote the “Department of Human Behavior” column for the Post.


In 2009–2010, Vedantam served as a fellow at the Nieman Foundation for Journalism at Harvard University.

“Hidden Brain” is among the most popular podcasts in the world, with over two million downloads per week. The “Hidden Brain” radio show is featured on more than 250 public radio stations across the United States.

Vedantam and “Hidden Brain” have been recognized with the Edward R. Murrow Award, and honors from the American Association for the Advancement of Science, the Webby Awards, and others.

Vedantam has served as a part-time lecturer at Harvard University and Columbia University. He has also served as a senior scholar at the Woodrow Wilson International Center in Washington.
FEATURED SPEAKERS

WALTER E. DANDY ORATOR

Doris Kearns Goodwin
Leadership in Turbulent Times
MONDAY, OCTOBER 21
General Scientific Session II
11:23 am–12:10 pm

Doris Kearns Goodwin will be signing copies of her book, “Leadership: In Turbulent Times,” in the CNS Xperience Lounge immediately following the conclusion of this session.

Doris Kearns Goodwin is a world-renowned presidential historian, public speaker, and Pulitzer Prize-winning New York Times #1 best-selling author. Her career as a presidential historian and author was inspired when, as a 24-year-old graduate student at Harvard, she was selected to join the White House Fellows, one of America’s most prestigious programs for leadership and public service. Goodwin worked with Lyndon Johnson in the White House and later assisted him in the writing of his memoirs. She then wrote “Lyndon Johnson and the American Dream,” which became a national bestseller and achieved critical acclaim.

Goodwin was awarded the Pulitzer Prize for “No Ordinary Time: Franklin and Eleanor Roosevelt—The Home Front in World War II.” Her sixth book, “The Bully Pulpit: Theodore Roosevelt, William Howard Taft, and the Golden Age of Journalism,” won the Carnegie Medal and is being developed into a film.

Goodwin’s “Team of Rivals: The Political Genius of Abraham Lincoln” served as the basis for Steven Spielberg’s hit film “Lincoln,” and was awarded the prestigious Lincoln Prize, the inaugural Book Prize for American History, and the Lincoln Leadership Prize.

Goodwin is frequently seen in documentaries including Ken Burns’ “The History of Baseball” and “The Roosevelts: An Intimate History,” on news and cable networks, and shows including “Meet the Press” and “The Late Show with Stephen Colbert.”

Goodwin graduated magna cum laude from Colby College. She earned a doctorate degree in Government from Harvard University, where she taught Government, including a course on the American Presidency.

Among her many honors and awards, Goodwin was awarded the Charles Frankel Prize, the Sarah Josepha Hale Medal, the New England Book Award, as well as the Carl Sandburg Literary Award.

Goodwin lives in Concord, Massachusetts. She was the first woman to enter the Boston Red Sox locker room in 1979, and is a devoted fan of the World Series-winning team.

Carl Zimmer
A Journey to the Center of the Brain
TUESDAY, OCTOBER 22
General Scientific Session III
9:13 am–9:40 am

Carl Zimmer will be signing copies of his book, “She Has Her Mother’s Laugh: The Powers, Perversions, and Potential of Heredity,” in the CNS Xperience Lounge during the morning beverage break.


Zimmer’s writing has earned a number of awards, including the 2016 Stephen Jay Gould Prize, awarded by the Society for the Study of Evolution to recognize individuals whose sustained efforts have advanced public understanding of evolutionary science. In 2017, he won an Online Journalism Award for his series of articles in which he explored his genome. “She Has Her Mother’s Laugh” was named a Notable Book of the Year by The New York Times Book Review. It was also selected for Publisher’s Weekly Best 10 Books of 2018 and the 2018 shortlist for Baillie-Gifford Prize for Nonfiction. The Guardian named it the best science book of 2018.

Zimmer created the podcast “What Is Life?” and is a familiar voice on other programs such as Radiolab. A professor adjunct at Yale University, he lives in Connecticut with his wife Grace and their children, Charlotte and Veronica. He is, to his knowledge, the only writer after whom a species of tapeworm has been named. For more information on Carl Zimmer please visit www.prhspeakers.com.
Bret Stephens
U.S. Foreign Policy and the World
TUESDAY, OCTOBER 22
General Scientific Session III
11:41 am–12:10 pm

Bret Stephens will be signing copies of his book, “America in Retreat,” in the CNS Xperience Lounge immediately following the conclusion of this session.

Bret Stephens became an op-ed columnist and associate editor for The New York Times in April 2017. Before that, he spent 11 years as the author of “Global View,” the foreign-affairs column of the Wall Street Journal, for which he was awarded the Pulitzer Prize for distinguished commentary in 2013. He also served eight years as the Journal’s deputy editorial-page editor, responsible for the newspaper’s global opinion section, as well as a member of the editorial board.

Stephens began his career at The Wall Street Journal in 1998 as an editor in New York, and later wrote editorials and articles for the newspaper from Brussels. In January 2002, he was named editor-in-chief of The Jerusalem Post, a position he assumed at age 28. At the Post, he was responsible for the newspaper’s news, editorial, digital, and international editions, and also wrote a weekly column.

Stephens returned to the Journal in late 2004. He has reported stories from around the world, including Pakistan, Afghanistan, Iraq, Lebanon, Gaza, and interviewed dozens of world leaders. In June 2017 he became a regular political analyst for MSNBC.

Stephens has twice been chairman of Pulitzer Prize juries and is a national judge of the prestigious Livingston Awards. He holds two honorary doctorates. In 2014 he was awarded the Professional Achievement Prize by the University of Chicago, a distinction he shares with composer Philip Glass, astronomer Carl Sagan, and Nobel laureate Gary Becker.


Stephens was born in New York and raised in Mexico City. He holds a BA with honors from the University of Chicago and an MSc from the London School of Economics. He lives with his wife Corinna, a classical music and opera critic for The New York Times, and their three children. The family divides its time between New York City and Hamburg, Germany.

JOHN THOMPSON HISTORY OF MEDICINE LECTURE
Rebecca Skloot
WEDNESDAY, OCTOBER 23
General Scientific Session IV
9:12–9:40 am

Rebecca Skloot will be signing copies of her book, “The Immortal Life of Henrietta Lacks,” in the CNS Xperience Lounge during the morning beverage break.

Bestselling author Rebecca Skloot spent more than 10 years doggedly uncovering the truth about the life, death, and ultimate “immortality” of a poor Black tobacco farmer named Henrietta Lacks. Her phenomenal book, “The Immortal Life of Henrietta Lacks,” has sold nearly 3 million copies to date.

In “The Immortal Life,” Skloot tells the story of a young Black woman who died of cervical cancer in 1951—and left behind an inexplicably immortal line of cells known as HeLa. Henrietta’s cells—harvested without her knowledge or consent—contributed to scientific advancements as varied as the polio vaccine, treatments for cancers and viruses, in-vitro fertilization, and the impact of space travel on human cells.

Recognizable for its engaging, straightforward language, Skloot’s writing—both in “The Immortal Life” and her many feature articles for major publications—has charmed readers around the world. More than 250 communities, schools, and universities have chosen “The Immortal Life” for their common read programs.

“The Immortal Life” was selected as a best book of 2010 by over 60 media outlets. It spent more than four years on The New York Times bestseller list, was named one of Amazon’s 100 Books to Read in a Lifetime, and has been translated into more than 25 languages. Skloot was named One of Five Surprising Leaders of 2010 by The Washington Post. “The Immortal Life of Henrietta Lacks” was also made into an HBO film produced by Oprah Winfrey and Alan Ball.

Rebecca Skloot has a BS in biological sciences and an MFA in creative nonfiction. She has taught creative writing and science journalism at the University of Memphis, the University of Pittsburgh, and New York University. She is the founder and president of the Henrietta Lacks Foundation, which strives to provide financial assistance to needy individuals who have made important contributions to scientific research without their knowledge or consent. Skloot remains in close contact with the Lacks family.
Aaron Carroll
Healthcare in the U.S.
WEDNESDAY, OCTOBER 23
General Scientific Session IV
11:31 am–12:10 pm
Meet Aaron Carroll in the CNS Xperience Lounge immediately following the conclusion of this session.

Aaron Carroll, MD, is a Professor of Pediatrics, Associate Dean for Research Mentoring, and the Director of the Center for Health Policy and Professionalism Research at the Indiana University School of Medicine. His research focuses on health care financing reform; the study of information technology to improve pediatric care; and areas of health policy including physician malpractice and the pharmaceutical industry/physician relationship. Dr. Carroll also serves as Regenstrief Institute’s Vice President for Faculty Development where he leads Regenstrief’s faculty development strategy and implementation efforts.

He was one of the first to study the use of mobile devices in actual care and has written numerous publications on the subject. Dr. Carroll has held millions of dollars in various government agency grants to explore the use of information technology in health care and is one of the leading pediatric informaticists in the U.S. He has also served in this capacity in committees for the American Academy of Pediatrics and is the co-founder of Medical Data Solutions, one of the first software companies to create programs for health professionals for mobile devices.

Dr. Carroll is the web and social media editor at JAMA Pediatrics, co-editor of The Incidental Economist and host of “Healthcare Triage,” a YouTube channel that received the National Institute of Health Care Management Digital Media Award. He is a regular contributor to The New York Times’ “The Upshot,” as well as other media outlets, and he has appeared on “Good Morning America,” the “CBS Evening News,” “ABC News,” and “The Colbert Report.” Dr. Carroll’s latest book, “Bad Food Bible,” joins the three books he co-authored on medical myths.

Dr. Carroll earned a BA in chemistry from Amherst College, an MD from the University of Pennsylvania School of Medicine, and an MS in health services research from the University of Washington, where he was also a Robert Wood Johnson Clinical Scholar.

The Congress of Neurological Surgeons Welcomes
2019 International Partner
The Japanese Congress of Neurological Surgeons

Yukihiro Sonoda
Japanese CNS President


The CNS provides relevant learning experiences for today’s practice challenges, with informative, world-class education. Discover more at cns.org.

CNS Education Courses*
Innovative live courses that move our specialty forward and foster collaboration and growth in our community.

| CNS | Tumor Complications | January 25–26, 2020 | Las Vegas, Nevada | cns.org/TCC |
| CNS | Spine Complications Course | February 7–9, 2020 | Park City, Utah | cns.org/SCC |
| CNS | Oral Boards Review Course | February 22–23, 2020 | Houston, Texas |
| CNS | SANS Written Boards Course | February 22–23, 2020 | Houston, Texas |

| CNS | Minimally Invasive Cranial Course | March 2020 | San Diego, California |

| CNS | 2020 CNS Annual Meeting | September 12–16, 2020 | Miami, Florida |

| CNS | Leadership Institute | May 2020 | Rosemont, Illinois |

| CNS | 2020 Skull Base Course | August 27-28 | 2020 Cleveland, OH |

Jointly Provided Courses

| Spine Summit 2020 | March 5–8, 2020 | Las Vegas, Nevada | cns.org/spine |

| Pain Section 2020 Annual Meeting | March 5–7, 2020 | Las Vegas, Nevada | cns.org/pain |

| ASSFN Biennial Meeting | June 20–23, 2020 | Boston, Massachusetts | www.assfn.org/biennial.html |

| Tumor Section Satellite Symposium | September 11–12, 2020 | Miami, Florida |

* Schedule subject to change
### 2019 SCHEDULE OF EVENTS

All events will be held at Moscone West Convention Center unless otherwise indicated.

#### Saturday, October 19

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<th>Time</th>
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<tr>
<td>7:00 am–6:00 pm</td>
<td>CNS Oral Boards Review Course</td>
<td>Golden Gate C2-C3 San Francisco Marriott Marquis</td>
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<tr>
<td>7:00 am–4:30 pm</td>
<td>Speaker Ready Room</td>
<td>3000</td>
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<tr>
<td>7:00 am–4:30 pm</td>
<td>Sergeant-at-Arms Office</td>
<td>2022 Overlook</td>
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<tr>
<td>7:00 am–5:30 pm</td>
<td>Registration and CNS Central</td>
<td>Level 1 Lobby</td>
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<tr>
<td>7:30–9:00 am</td>
<td>CSNS/CNS Caucus</td>
<td>Pacific I San Francisco Marriott Marquis</td>
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<tr>
<td>8:00 am–4:15 pm</td>
<td>SYM1: Spine Trauma and Spinal Cord Injury Symposium</td>
<td>3022</td>
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<tr>
<td>8:00 am–4:15 pm</td>
<td>SYM2: Functional Neurosurgery Update: Emerging Concepts</td>
<td>2016</td>
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<tr>
<td>8:00 am–4:15 pm</td>
<td>SYM3: Maximizing Your Neurosurgical Employment Opportunities (Non-CME)</td>
<td>2011</td>
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<tr>
<td>8:00 am–4:15 pm</td>
<td>SYM4: Cerebrovascular Symposia: Stenting and Bypasses Bundle</td>
<td>2001</td>
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<tr>
<td>8:00 am–12:00 pm</td>
<td>SYM4A: New Era in Stenting</td>
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<tr>
<td>12:45–4:15 pm</td>
<td>SYM4B: Bypass Techniques in Cerebrovascular Surgery</td>
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<tr>
<td>8:00 am–4:15 pm</td>
<td>SYM5: Advanced Topics in Spinal Operative Techniques Bundle</td>
<td>2008</td>
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<tr>
<td>8:00 am–12:00 pm</td>
<td>SYM5A: Advanced Minimally Invasive Spine Surgery—Operative Nuances, Indications, and Complication Avoidance</td>
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<tr>
<td>12:45–4:15 pm</td>
<td>SYM5B: Cervical Spine Case Management: When to Preserve Motion and When Not To—The Evidence in the Age of Reason</td>
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<td>8:00 am–4:15 pm</td>
<td>SYM6: Brain Tumor Update Bundle</td>
<td>2004</td>
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<tr>
<td>8:00 am–12:00 pm</td>
<td>SYM6A: Brain Tumor Update: Advanced and Minimally Invasive Techniques for Resection of Malignant Brain Tumors (Breakout Session with NX Development from 10–10:30 am in Room 2006.)</td>
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<tr>
<td>12:45–4:15 pm</td>
<td>SYM6B: Brain Tumor Update: Benign Brain Tumors</td>
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<td>8:00 am–12:00 pm</td>
<td>SYM7: Morbidity and Mortality</td>
<td>2007</td>
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<td>9:15 am–12:00 pm</td>
<td>CSNS Plenary Session</td>
<td>Golden Gate B San Francisco Marriott Marquis</td>
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<td>12:00–1:00 pm</td>
<td>CSNS Luncheon</td>
<td>Golden Gate A San Francisco Marriott Marquis</td>
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<tr>
<td>12:15–4:15 pm</td>
<td>SYM8: Residency Program Update &amp; Training the Trainers</td>
<td>2007</td>
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<tr>
<td>1:00–3:00 pm</td>
<td>CNS Education Committee Meeting</td>
<td>Yerba Buena Salons 1-2 San Francisco Marriott Marquis</td>
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<td>3:00–4:00 pm</td>
<td>CNS Ad Hoc Committee on Wellness</td>
<td>Laurel San Francisco Marriott Marquis</td>
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<td>3:00–4:00 pm</td>
<td>CNS Nexus Committee Meeting</td>
<td>Yerba Buena Salons 1-2 San Francisco Marriott Marquis</td>
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<td>3:30–4:30 pm</td>
<td>Joint Communications and Public Relations Meeting</td>
<td>Pacific I San Francisco Marriott Marquis</td>
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<td>4:00–5:00 pm</td>
<td>CNS Ad Hoc Data Science Committee Meeting</td>
<td>Laurel San Francisco Marriott Marquis</td>
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<td>4:00–5:00 pm</td>
<td>CNS SANS Committee Meeting</td>
<td>Yerba Buena Salons 1-2 San Francisco Marriott Marquis</td>
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<td>4:15–5:45 pm</td>
<td>CNS Resident Social and CSNS Young Neurosurgeons Reception</td>
<td>2000</td>
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<tr>
<td>Time</td>
<td>Event</td>
<td>Location</td>
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<tr>
<td>4:30–5:30 pm</td>
<td>Neurosurgery PAC Board Meeting</td>
<td>Pacific H San Francisco Marriott Marquis</td>
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<tr>
<td>5:30–7:00 pm</td>
<td>CNS International Reception</td>
<td>Yerba Buena Ballroom Salon 7 San Francisco Marriott Marquis</td>
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<tr>
<td>6:30–8:30 pm</td>
<td>DiNT: How Do I Avoid Getting Penalized—ICD-10, CPTs, MACRA, ACOs, and APMs?</td>
<td>Boulevard 1 Mission Street, San Francisco</td>
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**Sunday, October 20**

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<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:00–8:30 am</td>
<td>CNS Leadership Institute Meeting</td>
<td>Yerba Buena Salon 8 San Francisco Marriott Marquis</td>
</tr>
<tr>
<td>7:00–11:00 am</td>
<td>CNS Oral Boards Review Course Spine Breakout</td>
<td>Golden Gate C2 San Francisco Marriott Marquis</td>
</tr>
<tr>
<td>7:00–11:00 am</td>
<td>CNS Oral Boards Review Course Core Topics Breakout</td>
<td>Golden Gate C1 San Francisco Marriott Marquis</td>
</tr>
<tr>
<td>7:00–11:00 am</td>
<td>CNS Oral Boards Review Course Specialty Breakout</td>
<td>Golden Gate C3 San Francisco Marriott Marquis</td>
</tr>
<tr>
<td>7:00 am–6:30 pm</td>
<td>Speaker Ready Room</td>
<td>3000</td>
</tr>
<tr>
<td>7:00 am–4:30 pm</td>
<td>Sergeant-at-Arms Office</td>
<td>2022 Overlook</td>
</tr>
<tr>
<td>7:00 am–7:30 pm</td>
<td>Registration and CNS Central</td>
<td>Level 1 Lobby</td>
</tr>
<tr>
<td>8:00 am–4:15 pm</td>
<td>Association of Neurosurgical Physician Assistants (ANSPA) Fall 2019 CME Meeting Presented in Collaboration with Congress of Neurological Surgeons</td>
<td>3014</td>
</tr>
<tr>
<td>8:00 am–4:15 pm</td>
<td>SYM10: Acute Stroke Care: Guidelines Review and Future Directions (Breakout Session with Penumbra from 2:00–2:30 pm in Room 3016.)</td>
<td>3018</td>
</tr>
<tr>
<td>8:00 am–4:15 pm</td>
<td>SYM11: Neurotrauma Update (Breakout Session with Natus Neurology from 9:00–9:30 am in Room 3024.)</td>
<td>3022</td>
</tr>
<tr>
<td>8:00 am–4:15 pm</td>
<td>SYM12: A Comprehensive and Evidence-based Guidelines Review for the Treatment of Intracranial Aneurysms</td>
<td>2016</td>
</tr>
<tr>
<td>8:00 am–4:15 pm</td>
<td>SYM13: Spine Biomechanics and Deformity Symposium Bundle</td>
<td>2011</td>
</tr>
<tr>
<td>8:00 am–12:00 pm</td>
<td>SYM13A: Spinal Biomechanics for the Practicing Neurosurgeon: What I Need to Know for My Practice</td>
<td>2004</td>
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<tr>
<td>12:45–4:15 pm</td>
<td>SYM13B: Thoracolumbar Spinal Deformity for the Non-deformity Spine Surgeon</td>
<td>2004</td>
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<tr>
<td>8:00 am–4:15 pm</td>
<td>SYM14: Advanced Functional Mapping and 3D Anatomy for the Neurosurgeon Bundle</td>
<td>2003</td>
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<tr>
<td>8:00 am–12:00 pm</td>
<td>SYM14A: Surgical Management of Eloquent Area Tumors: Functional Mapping and/or Navigation</td>
<td>2014</td>
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<tr>
<td>12:45–4:15 pm</td>
<td>SYM14B: 3D Surgical Neuroanatomy</td>
<td>2004</td>
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<tr>
<td>8:00 am–4:15 pm</td>
<td>SYM15: Emerging Technologies in Neurosurgery Bundle</td>
<td>2008</td>
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<tr>
<td>8:00 am–12:00 pm</td>
<td>SYM15A: Intraoperative Technological Adjuncts: Indications and Techniques for Laser Therapy, Robotics, and Exoscopes</td>
<td>2004</td>
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<tr>
<td>12:45–4:15 pm</td>
<td>SYM15B: Virtual and Augmented Reality: Science and Clinical Applications</td>
<td>2007</td>
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<tr>
<td>8:00 am–4:15 pm</td>
<td>SYM16: Pain and Peripheral Nerve Symposium Bundle</td>
<td>3003</td>
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<tr>
<td>8:00 am–12:00 pm</td>
<td>SYM16A: Non-spinal Targets for Pain: Nerve, DRG, and Brain</td>
<td>2014</td>
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<tr>
<td>12:45–4:15 pm</td>
<td>SYM16B: Peripheral Nerve Surgery: Techniques and Exposure</td>
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<td>8:00 am–4:15 pm</td>
<td>SYM17: Quality Summit Bundle</td>
<td>2014</td>
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<tr>
<td>8:00 am–12:00 pm</td>
<td>SYM17A: QI: Implementation and Results</td>
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<td>12:45–4:15 pm</td>
<td>SYM17B: Using Big Data to Help Neurosurgeons and Their Patients</td>
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<tr>
<td>8:00 am–12:00 pm</td>
<td>SYM18: Morbidity and Mortality</td>
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<tr>
<td>8:30 am–12:00 pm</td>
<td>SNS Summit</td>
<td>Yerba Buena Salons 11-12 San Francisco Marriott Marquis</td>
</tr>
<tr>
<td>Time</td>
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<tr>
<td>9:00–10:00 am</td>
<td>CNS Resident Committee Meeting</td>
<td>Yerba Buena Salons 3-4</td>
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<td>San Francisco Marriott Marquis</td>
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<tr>
<td>9:00–10:00 am</td>
<td>Joint Guidelines Committee Meeting</td>
<td>Yerba Buena Salons 1-2</td>
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<td>San Francisco Marriott Marquis</td>
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<tr>
<td>10:00–10:30 am</td>
<td>CNS Quarterly Editorial Board Meeting</td>
<td>Yerba Buena Salon 5</td>
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<td>San Francisco Marriott Marquis</td>
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<tr>
<td>10:00–10:45 am</td>
<td>ThinkFirst Executive Committee Meeting</td>
<td>Yerba Buena Salon 14-15</td>
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<td>San Francisco Marriott Marquis</td>
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<tr>
<td>10:30–11:30 am</td>
<td>CNS Guidelines Committee Meeting</td>
<td>Yerba Buena Salons 1-2</td>
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<td>San Francisco Marriott Marquis</td>
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<tr>
<td>11:00–12:15 pm</td>
<td>ThinkFirst Board of Directors Meeting</td>
<td>Yerba Buena Salons 14-15</td>
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<td>San Francisco Marriott Marquis</td>
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<tr>
<td>10:00–10:30 am</td>
<td>Joint Section on Disorders of the Spine and Peripheral Nerve Editorial Program Committee Meeting</td>
<td>Golden Gate B</td>
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<td>San Francisco Marriott Marquis</td>
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<tr>
<td>11:00 am–1:00 pm</td>
<td>Joint Section on Women in Neurosurgery Executive Committee Meeting</td>
<td>Yerba Buena Salon 10</td>
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<td>San Francisco Marriott Marquis</td>
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<td>11:00 am–1:00 pm</td>
<td>Neurosurgery Quality Council</td>
<td>Yerba Buena Salon 6</td>
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<td>San Francisco Marriott Marquis</td>
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<tr>
<td>11:30 am–1:00 pm</td>
<td>Joint Section on Tumors Executive Committee Meeting</td>
<td>Golden Gate A</td>
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<td>San Francisco Marriott Marquis</td>
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<tr>
<td>12:30–2:00 pm</td>
<td>ThinkFirst Reception</td>
<td>Yerba Buena Salon 14-15</td>
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<td>San Francisco Marriott Marquis</td>
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<tr>
<td>12:30–3:00 pm</td>
<td>Joint Section on Disorders of the Spine and Peripheral Nerve Executive Committee Meeting</td>
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<td>San Francisco Marriott Marquis</td>
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<tr>
<td>12:30–4:30 pm</td>
<td>American Society for Stereotactic and Functional Neurosurgery Executive Committee Meeting</td>
<td>Yerba Buena Salon 13</td>
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<td>San Francisco Marriott Marquis</td>
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<tr>
<td>12:45–4:15 pm</td>
<td>SYM19: My Worst Spinal Complication: Lessons Learned</td>
<td>2022</td>
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<td>12:45–4:15 pm</td>
<td>SYM20: Modern Approaches to SRS</td>
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<tr>
<td>1:00–3:00 pm</td>
<td>Resident SANS Challenge Preliminary Round</td>
<td>2018</td>
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<tr>
<td>2:00–4:00 pm</td>
<td>Joint Section on Cerebrovascular Surgery Executive Committee Meeting</td>
<td>Golden Gate A</td>
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<td>San Francisco Marriott Marquis</td>
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<tr>
<td>2:30–4:30 pm</td>
<td>Joint Section on Pain Executive Committee Meeting</td>
<td>Yerba Buena Salon 10</td>
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<td>San Francisco Marriott Marquis</td>
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<tr>
<td>4:30–6:30 pm</td>
<td>GENERAL SCIENTIFIC SESSION I</td>
<td>Ballroom</td>
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<tr>
<td>5:03–5:47 pm</td>
<td>CONTROVERSY: Chronic Traumatic Encephalopathy</td>
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<tr>
<td>5:59–6:30 pm</td>
<td>FEATURED SPEAKER A Conversation with Lucy Kalanithi</td>
<td>Lucy Kalanithi</td>
</tr>
<tr>
<td>6:30–8:30 pm</td>
<td>Opening Reception</td>
<td>Level 2 Lobby</td>
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</table>

**Monday, October 21**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
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<tbody>
<tr>
<td>6:00–7:00 am</td>
<td>Joint Drugs &amp; Devices Committee Meeting</td>
<td>Pacific J</td>
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<td>San Francisco Marriott Marquis</td>
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<tr>
<td>6:30 am–6:30 pm</td>
<td>Speaker Ready Room</td>
<td>3000</td>
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<tr>
<td>6:30 am–6:30 pm</td>
<td>Registration and CNS Central</td>
<td>Level 1 Lobby</td>
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<tr>
<td>8:00–10:30 am</td>
<td>Spouse Hospitality</td>
<td>2nd Floor Atrium</td>
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<td>San Francisco Marriott Marquis</td>
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<tr>
<td>7:00–8:30 am</td>
<td>Sunrise Science and Late-breaking Abstract Session (Tumor)</td>
<td>3014</td>
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<tr>
<td>7:00–8:30 am</td>
<td>Sunrise Science and Late-breaking Abstract Session (Cerebrovascular)</td>
<td>2014</td>
</tr>
<tr>
<td>7:00–8:30 am</td>
<td>Guidelines for the Management of Metastatic Disease to the Spine: The Evidence</td>
<td>2016</td>
</tr>
<tr>
<td>Time</td>
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<tr>
<td>7:00–8:30 am</td>
<td>Guidelines for DBS for Parkinson’s Disease and Neuroablation for Pain</td>
<td>3020</td>
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<tr>
<td>7:00–8:30 am</td>
<td>Neurotrauma Debates</td>
<td>3020</td>
</tr>
<tr>
<td>8:40 am–12:10 pm</td>
<td><strong>GENERAL SCIENTIFIC SESSION II</strong>&lt;br&gt;Presiding Officer: Steven N. Kalkanis&lt;br&gt;Moderators: Nader Pouratian, Martina Stippler</td>
<td>Ballroom</td>
</tr>
<tr>
<td>8:51–9:13 am</td>
<td>FEATURED SPEAKER&lt;br&gt;Hidden Brain&lt;br&gt;Shankar Vedantam</td>
<td></td>
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<tr>
<td>9:18–9:40 am</td>
<td>HONORED GUEST PRESENTATION&lt;br&gt;Role of Resection for Glioblastoma: Can Technology Overcome Biology?&lt;br&gt;Raymond Sawaya</td>
<td></td>
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<tr>
<td>10:48–10:55 am</td>
<td>JAPANESE CNS PRESIDENTIAL ADDRESS&lt;br&gt;Yukihiko Sonoda</td>
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<tr>
<td>10:55–11:00 am</td>
<td>2019 CNS RESIDENT AWARD PRESENTATION&lt;br&gt;Ambulation on POD#0 is Associated with Decreased Adverse Events After Elective Lumbar Spine Surgery: Analysis of the Michigan Spine Surgery Improvement Collaborative (MSSIC)&lt;br&gt;Hesham M. Zakaria</td>
<td></td>
</tr>
<tr>
<td>11:03–11:23 am</td>
<td>PRESIDENTIAL ADDRESS&lt;br&gt;The Age of Reason for Neurosurgery&lt;br&gt;Ganesh Rao</td>
<td></td>
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<tr>
<td>11:26 am–12:10 pm</td>
<td>WALTER E. DANDY ORATION&lt;br&gt;Leadership in Turbulent Times&lt;br&gt;Doris Kearns Goodwin</td>
<td></td>
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<tr>
<td>9:30 am–4:00 pm</td>
<td>Exhibit Hall Open – Visit the CNS Xperience Lounge!</td>
<td>Exhibit Hall</td>
</tr>
<tr>
<td>9:40–10:40 am</td>
<td>Morning Beverage Break – Visit the Exhibit Hall and enjoy a complimentary cup of coffee!</td>
<td>Exhibit Hall</td>
</tr>
<tr>
<td>10:00–10:30 am</td>
<td>Live Tumor Surgery in 3D using Synaptive’s Robotic Digital Microscope (Presented by Synaptive)</td>
<td>CNS Xperience Lounge Exhibit Hall</td>
</tr>
<tr>
<td>10:30 am–2:30 pm</td>
<td>Sergeant-at-Arms Office</td>
<td>2022 Overlook</td>
</tr>
<tr>
<td>12:15–1:45 pm</td>
<td>M2: So You’ve Been Sued... Medical Practice 2019 Update</td>
<td>2012</td>
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<tr>
<td>12:15–1:45 pm</td>
<td>M3: Is Intracerebral Hemorrhage a Surgical Disease?</td>
<td>2003</td>
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<tr>
<td>12:15–1:45 pm</td>
<td>M4: Cervical Spondylotic Myelopathy—Anterior Versus Posterior</td>
<td>2005</td>
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<tr>
<td>12:15–1:45 pm</td>
<td>M5: Spinal Tumor Surgery: Case-based Management</td>
<td>2007</td>
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<tr>
<td>12:15–1:45 pm</td>
<td>M6: Peripheral Nerve Entrapment Syndromes: Diagnosis and Management</td>
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<tr>
<td>12:15–1:45 pm</td>
<td>M7: Neurocritical Care: A Multidisciplinary Collaboration</td>
<td>2009</td>
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<tr>
<td>12:15–1:45 pm</td>
<td>M8: Pediatric Concussion</td>
<td>2000</td>
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<tr>
<td>12:15–1:45 pm</td>
<td>M9: Acoustic Neuromas: Current Management Strategies</td>
<td>2010</td>
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<tr>
<td>12:15–1:45 pm</td>
<td>M10: Harnessing the Immune System to Treat Brain Tumors</td>
<td>2011</td>
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<tr>
<td>12:15–1:45 pm</td>
<td>Non-CME Sponsored Luncheon Session: Stealth Autoguide™ Robotic Navigation</td>
<td>2002</td>
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<tr>
<td>12:15–1:45 pm</td>
<td>Non-CME Sponsored Luncheon Session: See Addendum for details</td>
<td>2004</td>
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<tr>
<td>12:15–1:45 pm</td>
<td>Non-CME Sponsored Luncheon Session: See Addendum for details</td>
<td>2006</td>
</tr>
<tr>
<td>12:15–1:45 pm</td>
<td>Joint Section on Neurotrauma &amp; Critical Care Executive Committee Meeting</td>
<td>Yerba Buena Salons 5-6 San Francisco Marriott Marquis</td>
</tr>
<tr>
<td>1:45–2:45 pm</td>
<td>Afternoon Beverage Break – Visit the Exhibit Hall!</td>
<td>Exhibit Hall</td>
</tr>
<tr>
<td>1:45–2:45 pm</td>
<td>Special Session: The FDA: Investigational Device Exemptions, Regulatory Process, and Moving Medical Devices to Patients (Non-CME)</td>
<td>3001</td>
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<tr>
<td>1:45–2:45 pm</td>
<td>Special Session: ABNS Case Log Course</td>
<td>3003</td>
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<tr>
<td>2:45–4:15 pm</td>
<td>Council of State Neurosurgical Societies Achieving High Quality</td>
<td>3016</td>
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<tr>
<td>2:45–4:15 pm</td>
<td>Section on Cerebrovascular Surgery Artificial Intelligence in Cerebrovascular Neurosurgery</td>
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<td>2:45–4:15 pm</td>
<td>Section on Disorders of the Spine and Peripheral Nerves Spine Section Update</td>
<td>2016</td>
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<tr>
<td>2:45–4:15 pm</td>
<td>Section on Neurotrauma and Critical Care</td>
<td>3022</td>
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<tr>
<td>2:45–4:15 pm</td>
<td>Section on Pain Complex Facial Pain: When to Use What</td>
<td>3024</td>
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<tr>
<td>2:45–4:15 pm</td>
<td>Section on Pediatric Neurological Surgery Pediatric Brain Tumors: Advancements in Molecular Diagnosis and Update on Clinical Trials</td>
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<td>2:45–4:15 pm</td>
<td>Section on Peripheral Nerves Peripheral Nerve Task Force</td>
<td>2018</td>
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<tr>
<td>2:45–4:15 pm</td>
<td>Section on Stereotactic and Functional Neurosurgery The Future of Preoperative Functional Mapping</td>
<td>3020</td>
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<tr>
<td>2:45–4:15 pm</td>
<td>Section on Tumors Complications in Tumor Surgery: Navigating the Unexpected</td>
<td>3014</td>
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<td>4:15–5:45 pm</td>
<td>Operative Techniques and Case-based Discussion Session CSNS: How to Build a Spine Center</td>
<td>3016</td>
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<tr>
<td>4:15–5:45 pm</td>
<td>Challenging Skull Based Tumors: Operative Techniques and Case-based Discussions</td>
<td>3014</td>
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<tr>
<td>4:15–5:45 pm</td>
<td>Treating Cerebral Vascular Malformations: Operative Techniques and Case-based Discussions</td>
<td>2014</td>
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<tr>
<td>4:15–5:45 pm</td>
<td>Spinal Deformity and MIS Surgery: Operative Techniques and Case-based Discussions</td>
<td>2016</td>
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<tr>
<td>4:15–5:45 pm</td>
<td>Challenging Cases in ICP Management: Operative Techniques and Case-based Discussions</td>
<td>3022</td>
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<tr>
<td>4:15–5:45 pm</td>
<td>The Case Against Spinal Cord Stimulation: Operative Techniques and Case-based Discussion</td>
<td>3024</td>
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<tr>
<td>4:15–5:45 pm</td>
<td>Recurrent Disease in Pediatric Brain Tumors Patients: Case-based Discussions and Operative Techniques</td>
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<td>4:15–5:45 pm</td>
<td>Challenging Cases in Epilepsy Surgery: Operative Techniques and Case-based Discussions</td>
<td>3020</td>
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<tr>
<td>4:15–5:45 pm</td>
<td>Peripheral Nerve: Operative Techniques and Case-based Discussions</td>
<td>2018</td>
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<tr>
<td>5:45–7:15 pm</td>
<td>The International Masters Symposium on Brain Tumor Surgery</td>
<td>3001</td>
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<tr>
<td>5:45–7:15 pm</td>
<td>The International Cerebrovascular Symposium</td>
<td>3003</td>
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<tr>
<td>5:45–7:15 pm</td>
<td>The International Functional Neurosurgery Symposium</td>
<td>3002</td>
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<tr>
<td>6:30–8:15 pm</td>
<td>Joint Military Committee</td>
<td>Pacific I San Francisco Marriott Marquis</td>
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<tr>
<td>6:30–7:30 pm</td>
<td>BNI Reception</td>
<td>Nob Hill D San Francisco Marriott Marquis</td>
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<tr>
<td>6:30–7:30 pm</td>
<td>USC Neurosurgery Reception</td>
<td>Yerba Buena Salon 4 San Francisco Marriott Marquis</td>
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<tr>
<td>7:30–9:30 pm</td>
<td>DIN2: Multi-modality AVM Treatment in the Past, Present, and Future</td>
<td>Prospect 300 Spear Street, San Francisco</td>
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<tr>
<td>7:30–9:30 pm</td>
<td>DIN3: Navigation and Robotics: Fad or Future?</td>
<td>Morton’s 400 Post Street, San Francisco</td>
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<td>6:30 am–6:30 pm</td>
<td>Registration and CNS Central</td>
<td>Level 1 Lobby</td>
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<td>6:30 am–5:30 pm</td>
<td>Speaker Ready Room</td>
<td>3000</td>
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<tr>
<td>7:00–8:30 am</td>
<td>Sunrise Science and Late-breaking Abstract Session (Spine)</td>
<td>2016</td>
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<tr>
<td>7:00–8:30 am</td>
<td>Sunrise Science and Late-breaking Abstract Session (Socioeconomic)</td>
<td>3016</td>
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<tr>
<td>7:00–8:30 am</td>
<td>Guidelines on Management on Brain Metastases Update</td>
<td>3014</td>
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<tr>
<td>7:00–8:30 am</td>
<td>The Voice of Reason in Brain Death: From Bedside to the News</td>
<td>3022</td>
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<tr>
<td>8:00–10:30 am</td>
<td>Spouse Hospitality</td>
<td>2nd Floor Atrium</td>
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<td>San Francisco Marriott Marquis</td>
<td>San Francisco Marriott Marquis</td>
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<td></td>
<td><strong>GENERAL SCIENTIFIC SESSION III</strong></td>
<td>Ballroom</td>
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<td></td>
<td>Presiding Officer: Brian L. Hoh</td>
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<td></td>
<td>Moderators: Ashok R. Asthagiri, Jennifer A. Sweet</td>
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<td></td>
<td><strong>HONORED GUEST PRESENTATION</strong></td>
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<td></td>
<td>Evidence-based Medicine Through Development of Home-grown Databases</td>
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<td></td>
<td>Raymond Sawaya</td>
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<td></td>
<td><strong>FEATURED SPEAKER</strong></td>
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<tr>
<td></td>
<td>A Journey to the Center of the Brain</td>
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<tr>
<td></td>
<td>Carl Zimmer</td>
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<td></td>
<td>Controversy: Clinical Trials, Ethics, and Stem Cells: Are RCTs Necessary to Validate a Novel Therapy?</td>
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<td><strong>FEATURED SPEAKER</strong></td>
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<td>U.S. Foreign Policy and the World</td>
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<tr>
<td></td>
<td>Bret Stephens</td>
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<tr>
<td>9:30 am–3:00 pm</td>
<td>Exhibit Hall Open – Visit the CNS Xperience Lounge!</td>
<td>Exhibit Hall</td>
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<tr>
<td>9:40–10:40 am</td>
<td>Morning Beverage Break – Visit the Exhibit Hall and enjoy a complimentary cup of coffee!</td>
<td>Exhibit Hall</td>
</tr>
<tr>
<td>10:00–10:30 am</td>
<td>Live Surgery in the Exhibit Hall (Presented by Cerenovus)</td>
<td>CNS Xperience Lounge</td>
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<td></td>
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<td>Exhibit Hall</td>
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<tr>
<td>10:30 am–2:30 pm</td>
<td>Sergeant-at-Arms Office</td>
<td>2022 Overlook</td>
</tr>
<tr>
<td>12:15–1:45 pm</td>
<td>T12: Carotid Artery Disease: Symptomatic/Asymptomatic/Stent/CEA</td>
<td>2003</td>
</tr>
<tr>
<td>12:15–1:45 pm</td>
<td>T13: Peak Performance: Optimizing the Spine Surgical Patient from Pre-op to Post-op</td>
<td>2005</td>
</tr>
<tr>
<td>12:15–1:45 pm</td>
<td>T14: Controversies in Spinal Deformity Surgery</td>
<td>2007</td>
</tr>
<tr>
<td>12:15–1:45 pm</td>
<td>T15: Is There an Outcome Worse than Death? Outcomes, Palliative Care, and Ethical Considerations in Neurosurgical Care</td>
<td>2008</td>
</tr>
<tr>
<td>12:15–1:45 pm</td>
<td>T16: Patient Specific Goal-directed Therapy in TBI</td>
<td>2009</td>
</tr>
<tr>
<td>12:15–1:45 pm</td>
<td>T17: Clinical Trials in Movement Disorder Surgery</td>
<td>2010</td>
</tr>
<tr>
<td>12:15–1:45 pm</td>
<td>T18: Management of Pituitary Adenomas and Parasellar Pathology</td>
<td>2012</td>
</tr>
<tr>
<td>12:15–1:45 pm</td>
<td>T19: Malignant Gliomas: Advances in Surgery and Adjuvant Therapy</td>
<td>2011</td>
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<tr>
<td>12:15–1:45 pm</td>
<td>T20: Beating Press Ganey</td>
<td>2000</td>
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<tr>
<td>12:15–1:45 pm</td>
<td>Non-CME Sponsored Luncheon Session: See Addendum for details</td>
<td>2004</td>
</tr>
<tr>
<td>Time</td>
<td>Event</td>
<td>Location</td>
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<tr>
<td>1:00–2:00 pm</td>
<td>NEUROSURGERY® Publications: Meet the Editors</td>
<td>3002</td>
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<tr>
<td>1:45–2:45 pm</td>
<td>Afternoon Beverage Break – CNS Wellness Afternoon. Enjoy a fresh fruit</td>
<td>Exhibit Hall</td>
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<tr>
<td></td>
<td>smoothie in the Xperience Lounge and listen to Voices of Neurosurgery</td>
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<tr>
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<td>stories. Also see presentations from our corporate partners at the</td>
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<td>Device Innovation Showcase.</td>
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<tr>
<td>1:45–2:45 pm</td>
<td>Resident SANS Challenge Championship Round</td>
<td>2018</td>
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<tr>
<td>2:00–2:45 pm</td>
<td>CNS Annual Business Meeting</td>
<td>3001</td>
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<tr>
<td>2:45–4:15 pm</td>
<td>Council of State Neurosurgical Societies</td>
<td>3016</td>
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<tr>
<td>2:45–4:15 pm</td>
<td>Section on Cerebrovascular Surgery</td>
<td>2014</td>
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<tr>
<td></td>
<td>Future Training of the Cerebrovascular Surgeon</td>
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<tr>
<td>2:45–4:15 pm</td>
<td>Section on Disorders of the Spine and Peripheral Nerves</td>
<td>2016</td>
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<tr>
<td></td>
<td>Spine Update: The Evidence</td>
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<tr>
<td>2:45–4:15 pm</td>
<td>Section on Neurotrauma and Critical Care</td>
<td>3022</td>
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<tr>
<td></td>
<td>Neuromodulation for Spinal Cord Injury</td>
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<tr>
<td>2:45–4:15 pm</td>
<td>Section on Pain</td>
<td>3024</td>
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<tr>
<td></td>
<td>Targets Outside the Dorsal Columns for Pain</td>
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<tr>
<td>2:45–4:15 pm</td>
<td>Section on Pediatric Neurological Surgery</td>
<td>3018</td>
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<tr>
<td></td>
<td>Post-hemorrhagic Hydrocephalus in Premature Infants: Time for a</td>
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<td>Paradigm Shift?</td>
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<tr>
<td>2:45–4:15 pm</td>
<td>Section on Stereotactic and Functional Neurosurgery</td>
<td>3020</td>
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<tr>
<td></td>
<td>Stereotactic and Functional Neurosurgery Update</td>
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<tr>
<td>2:45–4:15 pm</td>
<td>Section on Tumors</td>
<td>3014</td>
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<tr>
<td></td>
<td>Emerging Concepts in the Management of Brain Metastases</td>
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<tr>
<td>4:15–5:45 pm</td>
<td>Operative Techniques and Case-based Discussion Session</td>
<td>3016</td>
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<td></td>
<td>CSNS: Patient Safety in Neurosurgical Practice</td>
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<tr>
<td>4:15–5:45 pm</td>
<td>Challenging Intrinsic Brain Tumors: Operative Techniques and</td>
<td>3014</td>
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<td>Case-based Discussions</td>
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<tr>
<td>4:15–5:45 pm</td>
<td>Treating Cerebral Aneurysms: Operative Techniques and Case-based</td>
<td>2014</td>
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<td></td>
<td>Discussions</td>
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<td>4:15–5:45 pm</td>
<td>Cervical and Thoracolumbar Trauma: Operative Techniques and</td>
<td>2016</td>
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<td></td>
<td>Case-based Discussions</td>
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<tr>
<td>4:15–5:45 pm</td>
<td>Timing of Spinal Trauma Surgery: Operative Techniques and</td>
<td>3022</td>
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<tr>
<td></td>
<td>Case-based Discussions</td>
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<tr>
<td>4:15–5:45 pm</td>
<td>Neurosurgery for Pain: Operative Techniques and Case-based</td>
<td>3024</td>
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<td></td>
<td>Discussions</td>
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<tr>
<td>4:15–5:45 pm</td>
<td>Challenges in Recurrent Pediatric Epilepsy: Operative Techniques and</td>
<td>3018</td>
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<td></td>
<td>Case-based Discussions</td>
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<tr>
<td>5:45–7:15 pm</td>
<td>Interactive Multimedia Research Presentation Session</td>
<td>Level 2 Lobby</td>
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<tr>
<td>6:30–8:30 pm</td>
<td>Tumor Section Young Neurosurgeon’s Reception</td>
<td>Nob Hill AB</td>
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<td>San Francisco Marriott Marquis</td>
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<td>6:30–8:30 pm</td>
<td>Women in Neurosurgery Reception</td>
<td>Foothill C</td>
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<td>San Francisco Marriott Marquis</td>
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<td>7:15–8:15 pm</td>
<td>Duke University Alumni Reception</td>
<td>Yerba Buena Salon 1</td>
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<td>San Francisco Marriott Marquis</td>
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<td>7:15–8:15 pm</td>
<td>Brigham &amp; Women’s Hospital Alumni Reception</td>
<td>Yerba Buena Salon 2</td>
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<td>San Francisco Marriott Marquis</td>
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<tr>
<td>7:15–8:15 pm</td>
<td>Weill Cornell Medicine Alumni Reception</td>
<td>Yerba Buena Salon 3</td>
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<td>San Francisco Marriott Marquis</td>
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<tr>
<td>7:30–9:30 pm</td>
<td>DIN4: Advances in LITT</td>
<td>Harris’ Steakhouse</td>
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<td>2100 Van Ness Avenue</td>
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<td>San Francisco</td>
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### Wednesday, October 23

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<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
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<tbody>
<tr>
<td>6:30 am–3:15 pm</td>
<td>Registration and CNS Central</td>
<td>Level 1 Lobby</td>
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<tr>
<td>6:30 am–3:30 pm</td>
<td>Speaker Ready Room</td>
<td>3000</td>
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<tr>
<td>7:00–8:30 am</td>
<td>Sunrise Science and Late-breaking Abstract Session (Stereotactic and</td>
<td>3020</td>
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<td></td>
<td>Functional)</td>
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<tr>
<td>7:00–8:30 am</td>
<td>Sunrise Science and Late-breaking Abstract Session (Pain)</td>
<td>3024</td>
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<tr>
<td>7:00–8:30 am</td>
<td>Cerebrovascular Guidelines: Aneurysms, Arteriovenous Malformations,</td>
<td>2014</td>
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<tr>
<td></td>
<td>and Acute Ischemic Stroke</td>
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<tr>
<td>7:00–8:30 am</td>
<td>Guidelines for Management of Glioblastoma</td>
<td>3014</td>
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<tr>
<td>7:00–8:30 am</td>
<td>Brain and Spine Trauma Guidelines—What You Need to Know</td>
<td>2016</td>
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<tr>
<td>8:00–10:30 am</td>
<td>Spouse Hospitality</td>
<td>2nd Floor Atrium San Francisco</td>
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<td>Marriott Marquis</td>
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<tr>
<td>8:40 am–12:10 pm</td>
<td>GENERAL SCIENTIFIC SESSION IV</td>
<td>Ballroom</td>
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<td>Presiding Officer: Elad I. Levy</td>
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<td></td>
<td>Moderators: Maya A. Babu, Praveen V. Mummaneni</td>
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<tr>
<td>8:50–9:12 am</td>
<td>HONORED GUEST PRESENTATION</td>
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<tr>
<td></td>
<td>The Evolving Landscape and Management of Brain Metastases</td>
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<td></td>
<td>Raymond Sawaya</td>
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<tr>
<td>9:15–9:40 am</td>
<td>JOHN THOMPSON HISTORY OF MEDICINE LECTURE</td>
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<td></td>
<td>Rebecca Skloot</td>
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<tr>
<td>9:30 am–2:00 pm</td>
<td>Exhibit Hall Open – Visit the CNS Xperience Lounge!</td>
<td>Exhibit Hall</td>
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<tr>
<td>9:40–10:40 am</td>
<td>Morning Beverage Break – Visit the Exhibit Hall and enjoy a</td>
<td>Exhibit Hall</td>
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<td></td>
<td>complimentary cup of coffee!</td>
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<tr>
<td>10:00–10:30 am</td>
<td>Live Surgery in the Exhibit Hall (see page 20 for details)</td>
<td>CNS Xperience Lounge</td>
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<td>Exhibit Hall</td>
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<td>10:30 am–2:30 pm</td>
<td>Sergeant-at-Arms Office</td>
<td>2022 Overlook</td>
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<tr>
<td>12:15–1:45 pm</td>
<td>W21: Middle Meningeal Artery Embolization for Subdural Hematoma</td>
<td>2001</td>
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<td>Treatment</td>
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<td>Cerebral Vasospasm (Delayed Cerebral Ischemia)</td>
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<td>12:15–1:45 pm</td>
<td>W23: Novel Techniques for Management of Lumbar Spondylolisthesis</td>
<td>2010</td>
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<td>12:15–1:45 pm</td>
<td>W24: TBI in the Elderly</td>
<td>2011</td>
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<td>12:15–1:45 pm</td>
<td>W25: Neurosurgeon Entrepreneur</td>
<td>2005</td>
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<tr>
<td>12:15–1:45 pm</td>
<td>W26: Chiari Malformations</td>
<td>2012</td>
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<tr>
<td>12:15–1:45 pm</td>
<td>W27: Clinical Trials in Epilepsy Surgery</td>
<td>2007</td>
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<tr>
<td>12:15–1:45 pm</td>
<td>W28: Update on Diagnosis and Management of Low Grade Gliomas</td>
<td>2008</td>
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<tr>
<td>12:15–1:45 pm</td>
<td>W29: Advanced Imaging in Brain Tumors</td>
<td>2009</td>
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<tr>
<td>12:15–1:45 pm</td>
<td>W30: Branding and Social Media in your Practice</td>
<td>2000</td>
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<tr>
<td>1:45–3:15 pm</td>
<td>Cranial Abstract Session</td>
<td>3020</td>
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<tr>
<td>1:45–3:15 pm</td>
<td>Spine Abstract Session</td>
<td>2016</td>
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<td>1:45–3:15 pm</td>
<td>Late-breaking Abstract Session</td>
<td>3024</td>
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<tr>
<td>1:45–4:45 pm</td>
<td>Advanced Endoscopic and Exoscopic Neurosurgery Seminar</td>
<td>2014</td>
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</tbody>
</table>
CONGRATULATIONS TO THE 2019 CNS ABSTRACT AWARD RECIPIENTS!

Each year, merit-based abstract awards at the CNS Annual Meeting are granted to acknowledge the achievements of residents, fellows, and attending neurosurgeons in various categories.

INTERNATIONAL ABSTRACT WINNERS

- **Best International Basic Science:** Museung Park
  South Korea

- **Best International Clinical Research:** Naokado Ikeda
  Japan

- **Best International Operative Technique:** Toshiki Endo
  Japan

**ABSTRACT AWARD RECIPIENTS**

- **Hesham M. Zakaria**
  CNS Resident Award

- **Clark C. Chen**
  Preuss Research Award

- **Michael Honey**
  Ronald R. Tasker Young Investigator Award

- **Bledi C. Brahimaj**
  Joint Tumor Section Skull Base Surgery Award

- **Daniel A. Orringer**
  Rosenblum-Mahaley Clinical Research Award

- **Karam P. Asmaro**
  Integra Foundation Award

- **Ching-Jen Chen**
  Galbraith Award

- **Matthew M. Grabowksi**
  Journal of Neuro-Oncology Award

- **Tej D. Azad**
  Julius Goodman Resident Award

- **Matthew Shepard**
  Leksell Radiosurgery Award

- **Hao Chen**
  BrainLab Neurosurgery Award

- **Jack P. Rock**
  ThinkFirst Injury Prevention Research Award

- **Bryan D. Choi**
  American Brain Tumor Association Young Investigator Award

- **Connor Liu**
  Joint Tumor Section Neuro-Oncology Trainee Award

- **Zachary A. Medress**
  Samuel Hassenbusch Young Neurosurgeon Award

- **Conor Grady**
  Best Data Science Award

- **Jignesh Tailor**
  Columbia Softball Pediatric Brain Tumor Award

- **Courtney Pendleton**
  Sherry Apple Resident Travel Scholarship

- **Iahn Cajigas**
  Stereotactic and Functional Neurosurgery Resident Award
IMMERSE YOURSELF IN THE CNS XPERIENCE LOUNGE

RELAX and connect with your colleagues. Grab a drink at the CNS Espresso Bar and see what’s next on your agenda. On Tuesday, please attend our Wellness Afternoon, where we’ll have a CNS sweatpants giveaway (limited quantity) as well as a bike blender to create your own smoothie.

MEET and interact with our Featured Speakers, and don’t miss a chance to get their books signed. Also, experience live surgery via telemedicine technology, Educational Update Sessions, Innovator of the Year finalists, digital posters, NVIDIA: Artificial Intelligence for Neurosurgeons—a Hands-on Demo, and more!

COME pick up the latest copy of NEUROSURGERY® Publications, watch demos of the Surgeon’s Armamentarium, listen to Neurosurgery Speaks! or chat with journal staff. Also, ask any membership questions you may have and get answers from the CNS team. We’re here to help!

MONDAY
9:40 am
Book Signing: Shankar Vedantam, “The Hidden Brain”

Special Presentation: Executive Presence and a Glimpse into the CNS Leadership Institute: Alan Scarrow

Meet and Greet: Honored Guest, Raymond Sawaya

12:15 pm

2:00 pm
Special Presentation: Innovator of the Year Finalists

- Harnessing AI and Smartphones to Develop the Next Generation of TBI Diagnostics
  Lynn McGrath
- Microangioscopy for Endovascular Neurosurgery
  Peter Kan
- Live Machine Learning Centered Architecture System to optimize Lumbar Stenosis Surgical Outcome
  Ghaith Habboub

TUESDAY
9:40 am

Special Presentation: NVIDIA: Artificial Intelligence for Neurosurgeons – A Hands-on Demo

12:15 pm
Book Signing: Bret Stephens, “America in Retreat”

1:45 pm
CNS Wellness Afternoon: Join us to receive CNS sweatpants (limited quantity), and take a ride on our smoothie blender bike.

Special Presentation: Voices of Neurosurgery: The Unforgettable Moments

2:30 pm
Book Signing: Gary Simonds, “The Thriving Physician: How to Avoid Burnout by Choosing Resilience Throughout Your Medical Career”

WEDNESDAY
9:40 am
Book Signing: Rebecca Skloot, “The Immortal Life of Henrietta Lacks”

9:40 am
Meet and Greet: Gary Simonds

12:15 pm
Meet and Greet: Aaron Carroll

HOURS:
MONDAY 9:30 am–4:00 pm
TUESDAY 9:30 am–3:00 pm
WEDNESDAY 9:30 am–2:00 pm
INDUSTRY INTERACTION HIGHLIGHTS

Come visit the CNS Exhibit Hall to discover cutting-edge technology to enhance your skills and your practice. Check out a variety of in-booth demonstrations with subspecialty experts and gain hands-on experience with the latest devices—all brought to you by more than 130 of our industry partners. For a complete list of exhibitors, see page 115.

Join Us in the Exhibit Hall

DAILY LIVE SURGERY PRESENTATIONS
Monday–Wednesday | 10:00–10:30 am
Join us in our Presentation Theater in the Xperience Lounge where surgeons from top institutions in the United States operate live via telemedicine, giving you the chance to observe and ask questions of the operating surgeon.
- Synaptive: Monday 10:00–10:30 am
  Live Tumor Surgery in 3D using Synaptive’s Robotic Digital Microscope | Moderator: Dr. Brian Nahed
  Surgeon: Dr. Costas Hadjipanayis from Mount Sinai
- Tuesday 10:00–10:30 am | See Addendum for details.
- Wednesday 10:00–10:30 am | See Addendum for details.

DEVICE INNOVATION SHOWCASE
See the newest products, services and technologies from our corporate partners with these live demonstrations from our technology theater during the afternoon break on Tuesday.
- 7D Surgical

IN-BOOTH DEMONSTRATIONS
- Synaptive Medical: Booth 318
  Live Tumor Surgery in 3D using Synaptive’s Robotic Digital Microscope | Tuesday 9:50–10:20 am

EXHIBIT HALL BEVERAGE BREAKS
Monday–Wednesday Morning Break: 9:40–10:40 am
Monday and Tuesday Afternoon Break: 1:45–2:45 pm

EXHIBIT HALL HOURS:
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<tr>
<td>MONDAY</td>
<td>9:30 am–4:00 pm</td>
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<tr>
<td>TUESDAY</td>
<td>9:30 am–3:00 pm</td>
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<tr>
<td>WEDNESDAY</td>
<td>9:30 am–2:00 pm</td>
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Interact Outside of the Exhibit Hall

INDUSTRY-SPONSORED LUNCH SYMPOSIA
(CME is NOT offered for these sessions)
Monday–Tuesday | 12:15–1:45 pm
Monday
- Medtronic: Stealth Autoguide™ Robotic Navigation | Robotic Precision | Powered by You Development and Clinical Experience by Dr. Stefan Wolfsberger | Room 2002
- Sponsored Lunch with Olympus | Room 2006
Tuesday
- Medtronic: OLIF360SM Single-Position Surgery: OLIF and Posterior Fixation “Without the Flip” Faculty: Ernest Braxton, MD | Room 2002
- Sponsored Lunch with Cerenumus | Room 2004
- Portola: Reversal of Specific Direct Oral Anticoagulants In Patients Experiencing Life-Threatening Bleeds: Review of Clinical Evidence and Practical Recommendations for Patient Management Faculty: Shakeel Chowdhry | Room 2006

BREAKOUT SESSIONS DURING SYMPOSIA
During the full-day symposia on Saturday and Sunday, gain hands-on experience, training, and see demonstrations of the most advanced equipment and techniques during these 30-minute, non-CME breakout sessions. These will be held in individual rooms upstairs.

HANDS-ON CADAVER SESSION
New this year! These educational surgical cadaver suites located in the convention center give you the opportunity to gain hands-on experience with the latest and greatest neurosurgical technology. This is brought to you by our industry sponsors.
- Medtronic: Monday and Tuesday all day
- Xoran Technologies: Tuesday | 10:30 am–12:30 pm

Please reach out to companies directly to attend.
Thank You

The Congress of Neurological Surgeons gratefully acknowledges our Industry Allies Council Partners for their continued support.

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Join the evolution of neurosurgery at booth #127, Oct 21 & 22, 2019

10:00 AM - Human Pilot study of NaoTrac
02:00 PM - Crossed-arm neurosurgery workshop
Share your first impression, idea, and become our partner!

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SUBSPECIALTY SESSION HIGHLIGHTS

**SPINE**

**SATURDAY**
8:00 am–4:15 pm
- SYM1: Spine Trauma and Spinal Cord Injury Symposium
- SYM5: Advanced Topics in Spinal Operative Techniques

**SUNDAY**
8:00 am–4:15 pm
- SYM13: Spine Biomechanics and Deformity Symposium
- SYM19: My Worst Spinal Complication: Lessons Learned

**MONDAY**
7:00–8:30 am
- Guidelines for the Management of Metastatic Disease to the Spine: The Evidence
- Neurotrauma Debates
- M4: Cervical Spondylotic Myelopathy—Anterior Versus Posterior
- M5: Spinal Tumor Surgery: Case-based Management
- Section on Disorders of the Spine and Peripheral Nerve: Spine Section Update
- Spinal Deformity and MIS Surgery: Operative Techniques and Case-based Discussions
- DIN3: Navigation and Robotics: Fad or Future?

**TUESDAY**
7:00–8:00 am
- Sunrise Science and Late Breaking Abstract Session
- M3: Is Intracerebral Hemorrhage a Surgical Disease?
- M12: Advanced Techniques in Assessment and Treatment of Intracranial Aneurysms

**CEREBROVASCULAR**

**SATURDAY**
8:00 am–4:15 pm
- SYM4: Cerebrovascular Symposia: Stenting and Bypass

**SUNDAY**
8:00 am–4:15 pm
- SYM10: Acute Stroke Care: Guidelines Review and Future Directions
- SYM12: Advanced Techniques in Assessment and Treatment of Intracranial Aneurysms

**MONDAY**
7:00–8:30 am
- Sunrise Science and Late Breaking Abstract Session
- M3: Is Intracerebral Hemorrhage a Surgical Disease?
- M12: Advanced Techniques in Assessment and Treatment of Intracranial Aneurysms

**TUESDAY**
12:15–1:45 pm
- T12: Carotid Artery Disease: Symptomatic/Asymptomatic/Stent/CEA
- The FDA: Investigational Device Exemptions, Regulatory Process, and Moving Medical Devices to Patients (Non-CME)
- Section on Cerebrovascular Surgery—Artificial Intelligence in Cerebrovascular Neurosurgery
- Treating Cerebral Aneurysms: Operative Techniques and Case-based Discussion

**WEDNESDAY**
7:00–8:30 am
- Cerebrovascular Guidelines: Aneurysms, Arteriovenous Malformations, and Acute Ischemic Stroke
- W21: Middle Meningeal Artery Embolization for Subdural Hematoma Treatment
- W22: Contemporary and Practical Management of and Enigmatic Process: Cerebral Vasospasm (Delayed Cerebral Ischemia)

**WEDNESDAY**
7:00–8:30 am
- Brain and Spine Trauma Guidelines—What You Need to Know
- W23: Novel Techniques for Management of Lumbar Spondylolisthesis
- W24: Spine Oral Abstract Presentation Session
- Advanced Endoscopic and Exoscopic Neurosurgery Seminar
SUBSPECIALTY SESSION HIGHLIGHTS

STEREOTACTIC AND FUNCTIONAL

SATURDAY
8:00 am–4:15 pm
- SYM2: Functional Neurosurgery Update: Emerging Concepts

SUNDAY
8:00 am–4:15 pm
- SYM15: Emerging Technologies in Neurosurgery

MONDAY
7:00–8:30 am
- Guidelines for DBS for Parkinson’s Disease and Neuroablation for Pain
- Section on Stereotactic and Functional Neurosurgery: The Future of Preoperative Functional Mapping

5:45–7:15 pm
- The International Functional Neurosurgery Symposium

TUESDAY
12:15–1:45 pm
- T17: Clinical Trials in Movement Disorder Surgery
- The FDA: Investigational Device Exemptions, Regulatory Process, and Moving Medical Devices to Patients (Non-CME)

1:45–2:45 pm
- Section on Stereotactic and Functional Neurosurgery: Stereotactic and Functional Neurosurgery Update
- Interactive Multimedia Research Presentation Session

5:45–7:15 pm
- ABNS Candidate Case Log: POST (Non-CME)

SOCIOECONOMIC

SATURDAY
12:45–4:15 pm
- SYM9: Appropriate Coding, ICD, and CPT 2019 Update

6:30–8:30 pm
- DIN1: How Do I Avoid Getting Penalized—ICD-10, CPTs, MACRA, ACOs, and APMs?

MONDAY
12:15–1:45 pm
- M2: So You’ve Been Sued... Medical Practice 2019 Update
- Council of State Neurosurgical Societies: Achieving High Quality

2:45–4:15 pm
- Council of State Neurosurgical Societies—What is Value
- CSNS: Patient Safety in Neurosurgical Practice

5:45–7:15 pm
- Interactive Multimedia Research Presentation Session

RESIDENT

SATURDAY
8:00 am–4:15 pm
- SYM3: Maximizing Your Neurosurgical Employment Opportunities

SUNDAY
8:00 am–4:15 pm
- SYM17: Quality Summit Bundle

MONDAY
7:00–8:30 am
- Guidelines for the Management of Metastatic Disease to the Spine: The Evidence
- Guidelines for DBS and for Parkinson’s Disease

TUESDAY
2:45–4:15 pm
- Council of State Neurosurgical Societies—What is Value
- CSNS: Patient Safety in Neurosurgical Practice

WEDNESDAY
7:00–8:30 am
- Sunrise Science and Late Breaking Abstract Session
- CSNS: How to Build a Spine Center
- Interactive Multimedia Research Presentation Session

WEDNESDAY
7:00–8:30 am
- Cerebrovascular Guidelines: Aneurysms, Arteriovenous Malformations, and Acute Ischemic Stroke

7:00–8:30 am
- Guidelines for Management of Glioblastoma

7:00–8:30 am
- Brain and Spine Trauma Guidelines - What you Need to Know
### TUMOR

**SATURDAY**
- 8:00 am–4:15 pm  
  - **SYM6**: Brain Tumor Update

**SUNDAY**
- 8:00 am–4:15 pm  
  - **SYM14**: Advanced Functional Mapping and 3D Anatomy for the Neurosurgeon  
  - **SYM15**: Emerging Technologies in Neurosurgery  
  - 12:45–4:15 pm  
    - **SYM20**: Modern Approaches to SRS

**MONDAY**
- 7:00–8:30 am
  - Sunrise Science and Late Breaking Abstract Session
- 12:15–1:45 pm
  - **M5**: Spinal Tumor Surgery: Case-based Management
  - **M9**: Acoustic Neuromas: Current Management Strategies
  - **M10**: Harness the Immune System to Treat Brain Tumors
- 2:45–4:15 pm
  - Section on Tumors—Complications in Tumor Surgery: Navigating the Unexpected
  - Challenging Skull Base Tumors: Operative Techniques and Case-based Discussions
- 4:15–5:45 pm
  - The International Masters Symposium on Brain Tumor Surgery

**TUESDAY**
- 7:00–8:30 am
  - Guidelines on Management on Brain Metastases Update
- 12:15–1:45 pm
  - **T18**: Management of Pituitary Adenomas and Parasellar Pathology
  - **T19**: Malignant Gliomas: Advances in Surgery and Adjuvant Therapy
- 2:45–4:15 pm
  - Section on Tumors—Emerging Concepts in the Management of Brain Metastases
- 4:15–5:45 pm
  - Challenging Intrinsic Brain Tumors: Operative Techniques and Case-based Discussions
- 7:30–9:30 pm
  - **DIN4**: Advances in LITT
- 5:45–7:15 pm
  - Interactive Multimedia Research Presentation Session

### ADVANCED PRACTICE PROVIDER

**SATURDAY**
- 8:00 am–4:15 pm
  - **SYM1**: Spine Trauma and Spinal Cord Injury Symposium

**SUNDAY**
- 8:00 am–4:15 pm
  - **ANSPA Fall 2019 CME Meeting in Collaboration with Congress of Neurological Surgeons**
  - **SYM17**: Quality Summit Bundle

**MONDAY**
- 5:45–7:15 pm
  - All International Symposia

### NEUROTRAUMA

**SUNDAY**
- 8:00 am–4:15 pm
  - **SYM11**: Neurotrauma Update

**MONDAY**
- 7:00–8:30 am
  - Neurotrauma Debates
- 12:15–1:45 pm
  - **M6**: Peripheral Nerve Entrapment Syndromes: Diagnosis and Management
- 2:45–4:15 pm
  - Section on Neurotrauma and Critical Care Session
- 4:15–5:45 pm
  - Challenging Cases in ICP Management: Operative Techniques and Case-based Discussions

**TUESDAY**
- 7:00–8:30 am
  - The Voice of Reason in Brain Death: From Bedside to the News
- 12:15–1:45 pm
  - **T15**: Is There an Outcome Worse than Death: Outcome, Palliative Care, and Ethical Considerations in Neurosurgical Care
- 12:15–1:45 pm
  - **T16**: Patient Specific Goal-directed Therapy in TBI
- 2:45–4:15 pm
  - Section on Neurotrauma and Critical Care Session—Neuromodulation for Spinal Cord Injury
- 4:15–5:45 pm
  - Timing of Spinal Trauma Surgery: Operative Techniques and Case-based Discussions

**WEDNESDAY**
- 7:00–8:30 am
  - Guidelines for Management of Glioblastoma
- 12:15–1:45 pm
  - **W28**: Update on Diagnosis and Management of Low-grade Gliomas
- 12:15–1:45 pm
  - **W29**: Advanced Imaging in Brain Tumors
- 1:45–3:15 pm
  - Cranial Oral Abstract Presentation Session
- 1:45–4:45 pm
  - Advanced Endoscopic and Exoscopic Neurosurgery Seminar
SUBSPECIALTY SESSION HIGHLIGHTS

**PAIN**

**SUNDAY**
8:00 am–4:15 pm
- SYM16: Pain and Peripheral Nerve Symposium

**MONDAY**
2:45–4:15 pm
- Section on Pain Session—When to Use What
4:15–5:45 pm
- The Case Against Spinal Cord Stimulation: Operative Techniques and Case-based Discussion
5:45–7:15 pm
- The International Functional Neurosurgery Symposium

**TUESDAY**
12:15–1:45 pm
- T11: Perioperative Pain Management: Opioids, Non-opioids, and Neurosurgery Advocacy
2:45–4:15 pm
- Section on Pain Session—Targets Outside the Dorsal Columns for Pain
4:15–5:45 pm
- Neurosurgery for Pain: Operative Techniques and Case-based Discussions
5:45–7:15 pm
- Interactive Multimedia Research Presentation Session

**WEDNESDAY**
7:00–8:30 am
- Sunrise Science and Late Breaking Abstract Session

**PEDIATRIC**

**SUNDAY**
8:00 am–4:15 pm
- SYM15: Emerging Technologies in Neurosurgery

**MONDAY**
12:15–1:45 pm
- M8: Pediatric Concussion
2:45–4:15 pm
- Section on Pediatric Neurological Surgery—Pediatric Brain Tumors: Advancements in Molecular Diagnosis and Updated on Clinical Trials
4:15–5:45 pm
- Recurrent Disease in Pediatric Brain Tumors Patients: Case-based Discussions and Operative Techniques

**TUESDAY**
7:00–8:00 am
- Sunrise Science and Late Breaking Abstract Session
2:45–4:15 pm
- Post-hemorrhagic Hydrocephalus in Premature Infantants: Time for a Paradigm Shift?
4:15–5:45 pm
- Challenges in Recurrent Pediatric Epilepsy: Operative Techniques and Case-based Discussions
5:45–7:15 pm
- Interactive Multimedia Research Presentation Session

**WEDNESDAY**
12:15–1:45 pm
- W26: Chiari Malformations

Visit the New CNS Pop-up Shop!
We’ll feature the latest trends in CNS swag—including t-shirts, jackets, umbrellas, and accessories.
PERIPHERAL NERVES

SUNDAY
8:00 am–4:15 pm
SYM16: Pain and Peripheral Nerve Symposium

MONDAY
12:15–1:45 pm
M6: Peripheral Nerve Entrapment Syndromes: Diagnosis and Management
2:45–4:15 pm
Section on Peripheral Nerve—Peripheral Nerve Task Force
4:15–5:45 pm
Peripheral Nerve: Operative Techniques and Case-based Discussions

TUESDAY
5:45–7:15 pm
Interactive Multimedia Research Presentation Session

SYM8: Training the Trainers
SYM17: Quality Summit Bundle
All International Symposia
Interactive Multimedia Research Presentation Session
Branding and Social Media in your Practice

SUBSPECIALTY SESSION HIGHLIGHTS KEY

AP ADVANCED PRACTICE PROVIDER
CV CEREBROVASCULAR
TR NEUROTRAUMA
PA PAIN
PE PEDIATRIC
PN PERIPHERAL NERVES
RE RESIDENT
SE SOCIOECONOMIC
SP SPINE
SF STEREOTACTIC AND FUNCTIONAL
TU TUMOR
WINS
SYM1: Spine Trauma and Spinal Cord Injury Symposium

Course Directors: Sanjay S. Dhall, Michael G. Fehlings, James S. Harrop, Eve C. Tsai

Agenda Highlights
- Research updates in spinal cord injury
- Top 3 management considerations for acute spinal cord injury and unstable fractures
- Rehabilitation and neuromodulation after spinal cord injury
- Spinal cord injury case management face-offs
- Case-based discussion of central cord injury, geriatric odontoid fracture, cervical facet dislocation and unstable thoracic spinal columns fractures
- Non-operative and operative management to maximize outcomes, including timing, hemodynamics, and prognostication
- Timing of surgery for spinal trauma and spinal cord injury

SYM2: Functional Neurosurgery Update: Emerging Concepts

Course Directors: Ellen L. Air, Casey H. Halpern, John D. Rolston
Faculty: Raag Airan, Nicholas M. Barbaro, Edward F. Chang, Shabbar F. Danish, Robert S. Fisher, Kelly D. Foote, Wayne Goodman, Ryder P. Gwinn, Douglas Kondziolka, Vibhor Krishna, Jean-Philippe Langevin, Paul S. Larson, Kai J. Miller, Francisco A. Ponce, Robert M. Richardson, Sameer A. Sheth, Peter A. Tass, David P. Vansickle

Agenda Highlights
- Update on electrode implantation techniques
- Emerging concepts in movement disorders surgery
- Non-motor brain stimulation
- Emerging concepts in stereotactic lesioning
- New versus established techniques in epilepsy surgery
- Emerging concepts in restorative neurosurgery

SYM3: Maximizing Your Neurosurgical Employment Opportunities Non-CME

Note: $400 Physician; $50 Nurse/PA; $50 Fellow/Resident/Medical Student

Course Directors: Mohamad Bydon, Lola B. Chambless, Jennifer A. Sweet
Faculty: John A. Braca, Andrew R. Conger, Timothy H. Lucas, Michael W. McDermott, Brian V. Nahed, Joseph S. Neimat, Judith Rosman, Justin A. Singer, Anand Veeravagu

Agenda Highlights
- Critical insights and perspectives on starting your neurosurgery practice
- Advantages and considerations of distinct practice settings and models
- Valuing yourself as a neurosurgeon in the job search and in negotiations
- Do’s and don’ts during job interviews
- Chair and Program Director’s perspectives on establishing a new neurosurgery career
- Leadership insights and pathways

SYM4: Cerebrovascular Symposia: Stenting and Bypasses Bundle

Comprised of 2 sessions: SYM4A & SYM4B. Select this option to take both at a discounted rate.

SYM4A: New Era in Stenting

Course Director: Andrew W. Grande

Agenda Highlights
- Introduction and review of next generation low profile intracranial stents Indications for placement of next generation stents
- Technical tips for placement of next generation stents
- Hands on exposure and experience with new stents with simulators

SYM4B: Bypass Techniques in Cerebrovascular Surgery

Course Director: Sepideh Amin-Hanjani
Faculty: Adib A. Abla, Amir R. Dehdashti, Michael T. Lawton, Leonardo Rangel-Castilla, Jonathan Russin, Laligam N. Sekhar, Gregory J. Zipfel

Agenda Highlights
- EC-IC bypass for complex aneurysms
- STA-MCA bypass for ischemia – indications and technique
- STA-MCA bypass for moyamoya – indications and technique
- Posterior Circulation bypass for ischemia
- Posterior Circulation bypass for aneurysms
- Alternative donors: Imax, STA stump
- IC-IC bypass options for complex aneurysms
SYM5: Advanced Topics in Spinal Operative Techniques Bundle
Comprised of 2 sessions: SYM5A & SYM5B. Select this option to take both at a discounted rate.

SYM5A: Advanced Minimally Invasive Spine Surgery—Operative Nuances, Indications, and Complication Avoidance
Course Directors: Adam S. Kanter, Praveen V. Mummaneni
Faculty: Aaron J. Clark, Kevin T. Foley, Langston T. Holly, Catherine Miller-Simington, John Pollina, Khoi D. Than, Juan S. Uribe

Agenda Highlights
- Member-submitted case-based discussion of minimally invasive techniques and approaches to management of spinal disease
- Choosing between minimally invasive and open spine surgery
- Review of indications
- Patient selection in minimally invasive spine surgery
- Selecting the right approach for lumbar fusion: minimally invasive TLIF versus trans-psoas versus ALIF
- Complication avoidance and management in minimally invasive spine surgery

SYM5B: Cervical Spine Case Management: When to Preserve Motion and When Not To—The Evidence in the Age of Reason
Course Directors: Andrew T. Dailey, Charles A. Sansur

Agenda Highlights
- Member-submitted case-based discussion of management options and approaches of degenerative cervical spine disease
- Review of indications: Knowing when to operate
- Surgical approach: Anterior versus Posterior
- Surgical approach: Fusion versus Motion preservation
- Complication avoidance and management in cervical spine surgery

SYM6: Brain Tumor Update Bundle
Comprised of 2 sessions: SYM6A & SYM6B. Select this option to take both at a discounted rate.

SYM6A: Brain Tumor Update: Advanced and Minimally Invasive Techniques for Resection of Malignant Brain Tumors
Course Directors: Manish K. Aghi, Andrew E. Sloan
Faculty: Kaisorn L. Chaichana, Nader Sanai, Jason P. Sheehan, Michael A. Vogelbaum, Jeffrey S. Weinberg

Agenda Highlights
- Awake Craniotomy with Motor and Language Mapping
- Intra-Operative MRI (MRI) to optimize Tumor Resection
- Fluorescent-Guided Microsurgery using 5-ALA and other fluorophores
- Minimally Invasive approaches using Exoscopes and Tubular Retractors
- Laser Interstitial Thermotherapy/Stereotactic Laser Ablation (LITT/SLA)
- Convection Enhanced Delivery (CED) (Breakout Session with NX Development from 10–10:30 am in Room 2006.)
- Stereotactic Radiosurgery

SYM6B: Brain Tumor Update: Benign Brain Tumors
Course Directors: Ian F. Dunn, Koji Yoshimoto

Agenda Highlights
- The role of microsurgery and endoscopy in the management of benign tumors
- Contemporary management of specific tumor histologies, including skull base meningiomas, pituitary adenomas, acoustic neuromas, chordomas, peripheral nerve tumors, and pediatric tumors
- Stereotactic Radiosurgery for benign tumors

SYM7: Morbidity and Mortality
Space is limited, check at registration for availability
Course Director: Mark E. Shaffrey
Faculty: Won Kim, Philipp Taussky, G. Edward Vates

Agenda Highlights
- Satisfy ABNS MOC requirement for quarterly participation in morbidity and mortality
- Case-based discussion of member submitted complications
- Identify opportunity to surgical technique and systems of care improvement
- Implementing improvements in clinical care
- Creating a no-blame environment for case review

SYM8: Residency Program Update & Training the Trainers
This program is designed for Program Directors and Program Coordinators.
Course Director: Sarah Woodrow

Agenda Highlights
- Overview of new ABNS milestones
- Adult learning theory
- Teaching to millennials/ diversity
- Different models of feedback
- Intra-operative teaching
- Incorporating structured teaching into rounds
- Teaching “soft” skills (communication, giving bad news, collaboration with other services)
- How to identify learning gaps and learning styles
- Giving feedback to a learner
SYM9: Appropriate Coding, ICD, and CPT—2019 Update

Course Directors: Mark E. Oppenlander, Clemens M. Schirmer

Agenda Highlights
- Medicare update modifiers
- Evaluation and management coding
- CD-10 coding and hospital coding for surgeons
- Revenue cycle optimization to ensure payment, PA/NP billing

CNS RESIDENT SOCIAL AND CSNS YOUNG NEUROSURGEONS RECEPTION

All residents are invited to attend and network with their peers. Recruiters will be available to assist with your future job search. Beer, wine, and appetizers will be served.

INTERNATIONAL RECEPTION
Saturday, October 19 | 5:30–7:00 pm
San Francisco Marriott Marquis | Yerba Buena Salon 7

Join your colleagues from around the world at the CNS International Reception. Enjoy hors d’oeuvres and cocktails while chatting with some of the top international professionals in the field of neurological surgery. All international registered attendees and their registered guests are invited to attend.

DINNER SEMINAR 1 | SATURDAY, OCTOBER 19 | 6:30–8:30 PM

$190 (includes three-course dinner and beverages)

SE D11: How Do I Avoid Getting Penalized—ICD-10, CPTs, MACRA, ACOs, and APMs?

Moderator: John K. Ratliff
Faculty: Atman Desai, Rachel Groman, Kim Pollock, Cheerag D. Upadhyaya

BOULEVARD

This high-end San Francisco landmark showcasing the culinary vision of Nancy Oakes continues to excel thanks to the robust flavors of its mind-blowing, market-driven American cuisine paired with a terrific wine list and served with the ultimate professionalism amid spectacular Bay Bridge views.

Boulevard is recognized on Zagat’s “Most Popular” and “Best Business Dinners” lists in San Francisco.

Complimentary shuttle service will depart from the San Francisco Marriott Marquis at 6:15 pm.
SYM10: Acute Stroke Care: Guidelines Review and Future Directions
Course Directors: Mohammad A. Aziz-Sultan, Mandy J. Binning, R. Webster Crowley
Agenda Highlights
- Guidelines for the Pre-hospital Triage of Patients with Acute Stroke (Breakout Session with Penumbra from 2:00–2:30 pm in Room 3016.)
- Management of Emergent Large Vessel Occlusion: Medical and Interventional Management
- Stroke Systems of Care
- New Technology and Artificial Intelligence for the Pre-hospital Triage of Acute Stroke
- Surgical Options for Stroke: Decompressive craniectomy, stenting, and bypass
- Thrombectomy Tools and Techniques
- The Management of Tandem Lesions
- Surgical Management of Intracerebral Hemorrhage: Minimally invasive and endoscopic approaches
- Translational Science in Acute Stroke

SYM11: Neurotrauma Update
Course Directors: Gregory W.J. Hawryluk, Shelly D. Timmons
Faculty: Randy S. Bell, Tene A. Cage, Rodrigo M. Faleiro, Ramesh Grandhi, Alan S. Hoffer, Ryan S. Kitagawa, Laura B. Ngwenya, Richard B. Rodgers, Uzma Samadani, Emily P. Sieg, Martina Stippi, Jamie S. Ullman
Agenda Highlights
- Severe TBI and Advanced Neuromonitoring

SYM12: A Comprehensive and Evidenced-based Guidelines Review for the Treatment of Intracranial Aneurysms
Course Directors: Peter Kan, Stacey Q. Wolfe
Agenda Highlights
- Guidelines for the Management of Unruptured and Ruptured Intracranial Aneurysms
- Imaging Guidelines for Small Unruptured Intracranial Aneurysms
- An Evidence Based Approach to Clip versus Coil for Unruptured and Ruptured Aneurysms
- New Horizons in the Treatment of Cerebral Vasospasm: Devices and Drugs
- Bifurcation aneurysms
- Treatment strategies for internal carotid aneurysms
- Guidelines for the Outpatient Management of Dual Anti-platelet Agents
- Endovascular Management of Basilar Apex Aneurysms–Management Strategies for Vertebral, Vertebrobasilar and Mid-Basilar Aneurysms

SYM13: Spine Biomechanics and Deformity Symposium
Comprised of 2 sessions: SYM13A & SYM13B. Select this option to take both at a discounted rate.

SYM13A: Spinal Biomechanics for the Practicing Neurosurgeon: What I Need to Know for My Practice
Course Directors: Joseph S. Cheng, Tyler R. Koski
Agenda Highlights
- Relevance of biomechanics in the management of degenerative, traumatic, and deformity-related spine disease
SYM13B: Thoracolumbar Spinal Deformity for the Non-defoformity Spine Surgeon

Course Directors: Dean Chou, Christopher I. Shaffrey
Faculty: Kai-Ming G. Fu, D. Kojo Hamilton, Paul Park, Rod J. Oskouian, John H. Shin, Justin S. Smith, Lee A. Tan
Agenda Highlights
- Case-based review of thoracolumbar deformity management
- Indications for larger spinal constructs versus minimal approaches
- Measures for diagnosis and classification of thoracolumbar deformity
- Techniques for correction of thoracolumbar spinal deformity
- Complication avoidance and management based of thoracolumbar deformity

SYM14: Advanced Functional Mapping and 3D Anatomy for the Neurosurgeon

Comprised of 2 sessions: SYM14A & SYM14B. Select this option to take both at a discounted rate.

SYM14A: Surgical Management of Eloquent Area Tumors: Functional Mapping and/or Navigation

Course Directors: Mitchel S. Berger, Sunit Das
Faculty: Lorenzo Bello, Richard W. Byrne, Edward F. Chang, Hugues Duffau, Shawn L. Hervey-Jumper, Jason Heth, Eric C. Leuthardt, George Samandouras, Michael E. Sughrue, Phiroz E. Tarapore
Agenda Highlights
- Preoperative assessment using structural and functional imaging
- Novel preoperative functional mapping techniques
- Intraoperative mapping: Surgical and anesthetic considerations
- Adjuncts to define and direct resection: Costas Hadjapanayis
- Case-based discussion

SYM14B: 3D Surgical Neuroanatomy

Course Director: Juan C. Fernandez-Miranda
Faculty: Mustafa K. Baskaya, Vladimir Benes, Spiros L. Blackburn, Aaron A. Cohen-Gadol, Paul A. Gardner, Jeffrey M. Sorenson, Necmettin Tanriover, Ugur Ture
Agenda Highlights
- Review relevant surgical neuroanatomy using 3D stereoscopic projection and high-definition fiber tractography (HDFT), including cortical and white matter anatomy, cerebello-pontine angle, clival and petroclival region, jugular foramen, and foramen magnum

SYM15: Emerging Technologies in Neurosurgery

Comprised of 2 sessions: SYM15A & SYM15B. Select this option to take both at a discounted rate.

SYM15A: Intraoperative Technological Adjuncts: Indications and Techniques for Laser Therapy, Robotics, and Exoscopes

Course Director: Daniel Curry
Faculty: David D. Gonda, Jeffrey S. Raskin, Mitesh V. Shah, Scellig S. D. Stone, Jon T. Willie
Agenda Highlights
- Survey of current robotic technologies and applications across neurosurgical specialties
- Laser technology options, indications, limitations, and complication avoidance and management
- Exoscope technologies, including visualization advantages, indications, and limitations
- Assessment of published outcomes using various new intraoperative adjunctive technologies, with a focus on specific advantages of each
- Complication avoidance and management with each adjunct
- Hands on experience with relevant technologies

SYM15B: Virtual and Augmented Reality: Science and Clinical Applications

Course Directors: Walter C. Jean, Cameron C. McIntyre
Faculty: Harith Akram, Joshua B. Bederson, Raphael Guzman, Alfred M.C. Iloreta, Paul S. Larson, Robert G. Louis, Nader Pouratian
Agenda Highlights
- Virtual Reality: Utility in surgical rehearsal, teaching and patient engagement
- Augmented Reality: Microscopes, endoscopies, and holography
- Image rendering: Novel MR sequences and analyses, tractography, and segmentation to guide surgical procedures

SYM16: Pain and Peripheral Nerve Symposium

Comprised of 2 sessions: SYM16A & SYM16B. Select this option to take both at a discounted rate.

SYM16A: Non-spinal Targets for Pain: Nerve, DRG, and Brain

Course Directors: Sean J. Nagel, Jennifer A. Sweet
Faculty: Steven M. Falowski, Brian H. Kopell, Jean-Philippe Langevin, Andre Machado, Julie G. Pilitsis, Ahmed M.T. Raslan

**SYM17: Quality Summit Bundle**
Comprised of 2 sessions: SYM17A & SYM17B. Select this option to take both

8:00 am–12:00 pm

**SYM17A: QI: Implementation and Results**
Course Directors: Mohamad Bydon, Robert J. Spinner
Faculty: Erica F. Bisson, Zoher Ghogawala, Michael Glantz, Elizabeth B. Habermann, John J. Knightly, Mark E. Shaffrey, Jonathan Slotkin

**SYM17B: Using Big Data to Help Neurosurgeons and Their Patients**
Course Directors: Katie Link, Eric K. Oermann
Faculty: Lola B. Chambless, Jason Davies, Mona Flores, Elizabeth B. Habermann, Andry Myronenko

**SYM18: Morbidity and Mortality**
Course Directors: Mark E. Shaffrey
Faculty: Judy Huang, Won Kim, Philip V. Theodosopoulos

**SYM19: My Worst Spinal Complication: Lessons Learned**
Course Directors: Daniel K. Resnick, Luis M. Tumialan
Faculty: Mark H. Bilsky, Richard G. Fessler, Michael W. Groff, Shekar N. Kurpad, Gerald E. Rodts, Hesham M. Soliman, Michael P. Steinmetz, Michael Y. Wang

**SYM20: Modern Approaches to SRS**
Course Directors: Gordon Li, Jason P. Sheehan
Faculty: John R. Adler, Iris C. Gibbs, Douglas Kondziolka, David Mathieu, Michael W. McDermott, Hirofumi Nakatomi, Manjul Tripathi, Masaaki Yamamoto

Join us to Watch the Riveting Live SANS Challenge!

**Preliminary Rounds:** Sunday, October 20, 1:00–3:00 pm Room 2018
**Championship Round:** Tuesday, October 22, 1:45–2:45 pm Room 2018
4:30–4:41 pm
Welcome to the 2019 CNS Annual Meeting
Ganesh Rao

4:41–4:49 pm
Neurosurgery Update: Cutting Edge in Neuro-oncology
Mitchel S. Berger

4:49–4:57 pm
Neurosurgery Update: Cutting Edge in Spinal Surgery – Prospective Studies versus Registries in the Age of Reason
Zoher Ghogawala

4:57–5:03 pm
Operative Technique Demonstration
Michael T. Lawton

5:03–5:07 pm
Introduction of Controversy: Chronic Traumatic Encephalopathy (CTE)
Joseph C. Maroon

5:07–5:25 pm
Controversies: The Evidence for CTE is Compelling
Julian E. Bailes

5:25–5:43 pm
Controversies: The Evidence for CTE is Underwhelming
Peter Cummings

5:43–5:47 pm
Controversies: Discussion and Outcomes
Joseph C. Maroon

5:47–5:49 pm
Introduction of Brain Tumor Guha Award
Manish K. Aghi

5:49–5:56 pm
Brain Tumor Guha Award Presentation
David H. Gutmann

5:56–5:59 pm
Introduction of Lucy Kalanithi
Anil Nanda and Julie G. Pilitsis

5:59–6:30 pm
FEATURED SPEAKER
A Conversation with Lucy Kalanithi
Lucy Kalanithi

 Lucy Kalanithi will be signing copies of the book “When Breath Becomes Air” immediately following the conclusion of her lecture.

JOIN US AT THE OPENING RECEPTION
6:30–8:30 pm
Moscone West Convention Center – Level 2 Lobby
MONDAY, OCTOBER 21

GUIDELINES AND SUNRISE SCIENCE

7:00–8:30 am  Room: 3014

TUMOR SUNRISE SCIENCE AND LATE-BREAKING ABSTRACT SESSION

Moderators: Maryam Rahman, Nader Sanai

For a listing of Sunrise Science and Late-breaking Oral Presentations, please see page 61.

7:00–8:30 am  Room: 2014

CEREBROVASCULAR SUNRISE SCIENCE AND LATE-BREAKING ABSTRACT SESSION

Moderators: Jan-Karl Burkhardt, Rohan V. Chitale

For a listing of Sunrise Science and Late-breaking Oral Presentations, please see pages 60-61.

Guidelines for the Management of Metastatic Disease to the Spine: The Evidence

Moderators: Sanjay S. Dhall, John E. O’Toole

Speakers: Kurt M. Eichholz, Benjamin D. Elder, Langston T. Holly, Todd D. McCall, Timothy C. Ryken, Daniel M. Scuibba, Nicholas J. Szerlip

7:00–7:06 am

Introduction
Timothy C. Ryken

7:06–7:20 am

Role of Radiotherapy and Radiosurgery in the Treatment of Patients with Metastatic Spine Disease
Nicholas J. Szerlip

7:20–7:34 am

Role of Combination Surgery and Radiotherapy in the Treatment of Patients with Symptomatic/Asymptomatic Metastatic Spinal Cord Compression
Langston T. Holly

7:34–7:48 am

Pre-Operative Embolization for the Management of Patients with Metastatic Spinal Disease
Kurt M. Eichholz

7:48–8:02 am

Spinal Instability and Risk of Pathological Fracture for Patients with Metastatic Spine Disease
Benjamin D. Elder

8:02–8:16 am

Non-chemotherapeutic Medical Treatment for the Management of Patients with Metastatic Spinal Disease
Daniel M. Scuibba

8:16–8:30 am

Role of Vertebral Augmentation in Patients with Metastatic Spine Disease
Todd D. McCall

Guidelines for DBS for Parkinson’s Disease

Moderators: Clement Hamani, Ahmed M.T. Raslan

Speakers: Kelly D. Foote, Julie G. Pilitsis, Anand I. Rughani, Jason M. Schwalb

7:00–7:17 am

STN Versus GPi Efficacy in Treating Motor Symptoms of PD
Jason M. Schwalb

7:17–7:34 am

STN Versus GPi for Reduction of Dopaminergic Meds, How to Assess This in Your Clinical Practice
Kelly D. Foote

7:34–7:51 am

STN Versus GPi for Dyskinesias and Quality of Life
Clement Hamani

7:51–8:08 am

STN Versus GPi for Concern of Cognitive Decline, Depression, and Quality of Life
Julie G. Pilitsis

8:08–8:25 am

STN Versus GPi in Risk of Surgical Adverse Events
Anand I. Rughani

8:25–8:30 am

Questions and Discussion

Neurotrauma Debates

Moderators: Odette Harris, David O. Okonkwo

Speakers: Bizhan Aarabi, Ryan S. Kitagawa, Patricia B. Raksin, Christian B. Ricks, Jamie S. Ullman

7:00–7:30 am

An MRI is Necessary In Acute Management of SCI

7:00–7:10 am

Yes
Bizhan Aarabi

7:10–7:20 am

No
Christian B. Ricks

7:20–7:25 am
Rebuttal Supporting the Notion
Bizhan Aarabi
7:25–7:30 am
Rebuttal Opposing the Notion
Christian B. Ricks
7:30–8:00 am
Decompressive Hemicraniectomy Is Here to Stay
7:30–7:40 am
Yes
Jamie S. Ullman
7:40–7:50 am
No
Ryan S. Kitagawa
7:50–7:55 am
Rebuttal Supporting the Notion
Jamie S. Ullman
7:55–8:00 am
Rebuttal Opposing the Notion
Ryan S. Kitagawa
8:00–8:30 am
Hypothermia Is Dead
8:00–8:10 am
Yes
Patricia B. Raksin
8:10–8:20 am
No
Ryan S. Kitagawa
8:20–8:25 am
Rebuttal Supporting the Notion
Patricia B. Raksin
8:25–8:30 am
Rebuttal Opposing the Notion
Ryan S. Kitagawa

Welcome Spouses & Guests!
Please plan to join us for complimentary breakfast Monday, Tuesday, and Wednesday morning from 8:00–10:30 in the 2nd Floor Atrium at the San Francisco Marriott Marquis Hotel.

And don’t miss all of the exciting speakers during the General Scientific Sessions each day and the events happening in the CNS Xperience Lounge.

We’re glad you are here!

Subspecialty Session Highlights Key

| AP | ADVANCED PRACTICE PROVIDER |
| EV | CEREBROVASCULAR |
| TR | NEUROTRAUMA |
| PA | PAIN |
| PB | PEDIATRIC |
| PE | PERIPHERAL NERVES |
| PR | RESIDENT |
| SE | SOCIOECONOMIC |
| SP | SPINE |
| SF | STEREOTACTIC AND FUNCTIONAL |
| TU | TUMOR |
| W | WINS |
GENERAL SCIENTIFIC SESSION II

Presiding Officer: Steven N. Kalkanis
Moderators: Nader Pouratian, Martina Stippler

8:40–8:48 am
GSS II Kickoff
Steven N. Kalkanis

8:48–8:51 am
Introduction of Shankar Vedantam
Akash J. Patel

8:51–9:13 am
FEATURED SPEAKER
Hidden Brain
Shankar Vedantam
Shankar Vedantam will be signing copies of his book, “The Hidden Brain” in the CNS Xperience Lounge during the morning beverage break.

9:13–9:18 am
Introduction of Honored Guest
Frederick F. Lang

9:18–9:40 am
Honored Guest Presentation:
Role of Resection for Glioblastoma:
Can Technology Overcome Biology?
Raymond Sawaya

9:40–10:40 am
MORNING BEVERAGE BREAK
Visit the Exhibit Hall and enjoy a complimentary cup of coffee!

10:00–10:30 am
LIVE SURGERY IN THE EXHIBIT HALL
See page 20 for details.

10:40–10:46 am
Operative Neurosurgery Highlight
Laurence D. Rhines

10:46–10:48 am
CNS Foundation Update
Elad I. Levy

10:48–10:55 am
Japanese CNS Presidential Address
Yukihiko Sonoda

10:55–11:01 am
CNS Resident Award Presentation
Ambulation on POD#0 is Associated with Decreased Adverse Events After Elective Lumbar Spine Surgery: Analysis of the Michigan Spine Surgery Improvement Collaborative (MSSIC)
Hesham M. Zakaria

11:01–11:03 am
Introduction of CNS President
Adam S. Arthur

11:03–11:23 am
Presidential Address:
The Age of Reason for Neurosurgery
Ganesh Rao

11:23–11:26 am
Introduction of Doris Kearns Goodwin
Daniel J. Hoh

11:26 am–12:10 pm
WALTER E. DANDY ORATOR
Leadership in Turbulent Times
Doris Kearns Goodwin

Doris Kearns Goodwin will be signing copies of her book, “Leadership: In Turbulent Times,” in the CNS Xperience Lounge immediately following the conclusion of this session.
LUNCHEON SEMINARS

All Luncheon Seminars include a plated lunch served in the seminar room.
Luncheon Seminar fee is $95 each ($75 for residents, fellows, graduate students/post-doctoral scholars, medical students, and advance practice providers). Add a Luncheon Seminar to your profile at registration.

Room: 2001

RE M1: Honored Guest Luncheon: Leadership Engagements
Complimentary advanced registration recommended
Speaker: Raymond Sawaya

Room: 2012

SP M2: So You’ve Been Sued... Medical Practice 2019 Update
Moderators: Bharat Guthikonda, Rishi K. Wadhwa
Faculty: Deborah L. Benzil, Lawrence M. Shuer, James T. Tran, Richard N. Wohns

Room: 2003

CV M3: Is Intracerebral Hemorrhage a Surgical Disease?
Moderator: J D. Mocco
Faculty: Mark D. Bain, Abel P. Huang, Christopher P. Kellner, Gustavo Pradilla, Lauren Sansing, Alejandro M. Spiotta

Room: 2005

CNS SANS Lifelong Learning
SP M4: Cervical Spondylotic Myelopathy—Anterior Versus Posterior
Moderator: Zoher Ghogawala
Faculty: Erica F. Bisson, Perry P.S. Dhaliwal, Asdrubal Falavigna, Iain H. Kalfas, Vincent C. Traynelis, Luis M. Tumialan, Christopher E. Wolff, Takao Yasuhara

Room: 2007

CNS SANS Lifelong Learning
TU M5: Spinal Tumor Surgery: Case-based Management
Moderators: Joseph S. Cheng, Ziya L. Gokaslan
Faculty: Mark H. Bilsky, Dean Chou, Michelle J. Clarke, Charles Fisher, Ilya Laufer, Paul C. McCormick, Laurence D. Rhines

Room: 2008

CNS SANS Lifelong Learning
TP M6: Peripheral Nerve Entrapment Syndromes: Diagnosis and Management
Moderator: Line G. Jacques
Faculty: Jason H. Huang, Mark A. Mahan, Gabriel C. Tender, Christopher J. Winfree, Lynda J. Yang

Room: 2009

TR M7: Neurocritical Care: A Multidisciplinary Collaboration
Moderator: Joshua E. Medow
Faculty: Nicholas J. Brandmeir, Kristine O’Phelan, Lori Shutter

Room: 2000

PE M8: Pediatric Concussion
Moderator: Susan R. Durham
Faculty: Robert J. Bollo, Meeryo C. Choe, Michael L. Levy, Carolyn Quinsey, Christina M. Sayama

Room: 2010

TU M9: Acoustic Neuromas: Current Management Strategies
Moderators: William T. Couldwell, Steven L. Giannotta
Faculty: Frederick G. Barker, Lola B. Chambless, John G. Goflnos, Michael J. Link, Jacques J. Morcos, Marc S. Schwartz

Room: 2011

TU M10: Harnessing the Immune System to Treat Brain Tumors
Moderators: Hideho Okada, E. Antonia Chiocca
Faculty: Gavin P. Dunn, Peter Fecci, Amy B. Heimberger, Michael Lim, Yoshitaka Narita

1:45–2:45 pm
AFTERNOON BEVERAGE BREAK
Visit the Exhibit Hall and enjoy a complimentary beverage. Coffee will be served throughout the Exhibit Hall and beer, wine, and snacks will be served in the CNS Xperience Lounge!

Give to the Future of Neurosurgery

Please visit the CNS Foundation booth and silent auction across from registration on Level 1 of Moscone West. Donate today!

The CNS Foundation’s philanthropic mission is to improve worldwide patient health by supporting innovative programs that allow neurosurgeons to collaborate globally as researchers, learners, educators, and caregivers. Visit cns.org/Foundation to help us achieve our goals.
Special Session: The FDA: Investigational Device Exemptions, Regulatory Process, and Moving Medical Devices to Patients (Non-CME)
Speakers: Carlos Pena, Mohamad Bydon

The United States (U.S.) Food and Drug Administration (FDA) ensures that patients in the U.S. have access to safe and effective medical devices. The Division of Neurological and Physical Medicine Devices reviews medical devices that interface with the nervous system. This presentation will assist attendees in how to navigate the FDA’s regulatory landscape to successfully move medical devices to patients.

- Agency Overview and Organization
- Neurological Medical Device Review and Oversight
- Clinical Overview and Perspectives
- Broader Engagement and Best Practices for FDA Engagement

Special Session: ABNS Candidate Case Log: POST (Non-CME)
Course Directors: John J. Knightly, Elad I. Levy
Speakers: Carl Heilman, John J. Knightly, Betsy Koehnen, Elad I. Levy
Session Description: Case reviews are a critical part of the certification process for the ABNS. In this high yield seminar, ABNS officers will provide a detailed yet focused review of how to use ABNS POST, the integrated platform for case submission. Officers will review what case information should be entered, what ABNS officers assess for each case that is submitted, and expectations for the “Cases” part of the oral certification exam.

Getting Set Up in ABNS POST to Start Entering Cases
Betsy Koehnen
1:55–2:10 pm

What Case Information Should Be Entered into POST?
Elad I. Levy
2:10–2:25 pm

How an ABNS Director Reviews a POST Case Log
John J. Knightly
2:25–2:40 pm

The “Cases” Section of the Oral Exam
Carl Heilman
2:40–2:45 pm

Questions and Discussion

Join Us for a Special Presentation by Dr. Alan Scarrow:

Executive Presence and a Glimpse into the CNS Leadership Institute


Monday, October 21, at 9:40 am in the Xperience Lounge!
AFTERNOON SESSIONS

SECTION SESSIONS

**SE 2:45–4:15 pm**

**COUNCIL OF STATE NEUROSURGICAL SOCIETIES**

**Achieving High Quality**

**Moderators:** Darlene A. Mayo, Paul L. Penar

**Speakers:** Anthony L. Asher, Rachel Groman, John J. Knightly, Ahilan Sivaganesan

2:45–2:59 pm

Data to Drive Quality Improvement

Anthony L. Asher

3:00–3:14 pm

How Do I Implement Quality?

John J. Knightly

3:15–3:24 pm

What Does the Government and CMS Think?

Rachel Groman

3:25–3:27 pm

Questions and Discussion

3:27–3:33 pm

**Neurosurgery Socioeconomics, Health Policy, and Law Paper of the Year: Drivers of Variability in 90-day Cost for Elective Laminectomy and Fusion for Lumbar Degenerative Disease**

Ahilan Sivaganesan

3:33–4:15 pm

**Oral Abstract Presentations**

*For a listing of Oral Presentations, see page 62.*

**SP 2:45–4:15 pm**

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

**Spine Section Update**

**Moderators:** Domagoj Coric, Michael P. Steinmetz

**Speakers:** Regis W. Haid, Paul K. Kim, Paul Park, Kevin M. Walsh, Michael Y. Wang

2:45–2:53 pm

Outpatient Degenerative Spine Surgery: Patient Outcomes, Realities, and Finances

Paul K. Kim

2:54–3:02 pm

Pushing the Envelope of Spine Surgery: Update on ERAS, Outpatient Surgery, and Awake TLIFs

Michael Y. Wang

3:03–3:11 pm

Cervical Stenosis Without Myelopathy in Lumbar Pathology Patients: Do We Really Always Need to Decompress the Cervical Spine Before Lumbar Surgery?

Paul Park

3:12–3:20 pm

Cervical Laminectomy and Fusion: Should We Always Go to T1 or is Stopping at C7 Just as Good?

Kevin M. Walsh

3:21–3:28 pm

**Interbody Surface Technology Update: Is it Worth the Additional Cost? The Evidence**

Regis W. Haid

3:29–4:15 pm

**Oral Abstract Presentations**

*For a listing of Oral Presentations, see pages 62-63.*

**TR 2:45–4:15 pm**

**SECTION ON NEUROTRAUMA AND CRITICAL CARE**

**Charles Tator Lecture – Bench to Bedside to Bench: A Physician-scientists 30-Year Journey in the World of Spinal Cord Injury**

Richard G. Fessler

3:05–3:25 pm

Edema in Traumatic Brain Injury

J. Marc Simard

3:25–3:31 pm

**Neurosurgery Neurotrauma and Critical Care Paper of the Year: The Intracerebral Hemorrhage Score: A Self-Fulfilling Prophecy?**

D. Jay McCracken

3:31–4:15 pm

**Oral Abstract Presentations**

*For a listing of Oral Presentations, see page 63.*
2:45–4:15 pm  Room: 3024
SECTION ON PAIN
Complex Facial Pain: When to Use What
Moderators: Sean J. Nagel, Ahmed M.T. Raslan
Speakers: Sharona Ben-Haim, Sean J. Nagel, Julie G. Pilitsis, Konstantin V. Slavin, Doris D. Wang
2:45–2:55 pm
Characterization of Complex Facial Pain Syndromes
Sharona Ben-Haim
2:56–3:06 pm
Neuromodulation Options for Complex Facial Pain
Konstantin V. Slavin
3:07–3:17 pm
Management of Recurrent TN/Revision MVD
Doris D. Wang
3:18–3:28 pm
When to Use What: Lesioning Versus Decompression Versus Neuromodulation for Complex Facial Pain
Sean J. Nagel
3:28–3:34 pm
Neurosurgery Pain Paper of the Year: Spinal Cord Stimulation for the Treatment of Chronic Pain Reduces Opioid Use and Results in Superior Clinical Outcomes When Used Without Opioids
Julie G. Pilitsis
3:34–4:15 pm
Oral Abstract Presentations
For a listing of Oral Presentations, see pages 63-64.

2:45–4:15 pm  Room: 3018
SECTION ON PEDIATRIC NEUROLOGICAL SURGERY
Pediatric Brain Tumors: Advancements in Molecular Diagnosis and Update on Clinical Trials
Moderators: Toba Niazi, Amanda Muhs Saratsis
Speakers: Paul Klimo, Alyssa Reddy
2:45–3:02 pm
Discussion and Update on Advancements in Pediatric Brain Tumors, the Molecular Basis of Diagnosis, Current and Upcoming Clinical Trials, and Personalized Medicine
Alyssa Reddy
3:03–3:27 pm
Questions and Discussion
3:27–3:33 pm
Neurosurgery Pediatrics Paper of the Year: The Preventable Shunt Revision Rate: A Multicenter Evaluation
Paul Klimo, Jr.
3:33–4:15 pm
Oral Abstract Presentations
For a listing of Oral Presentations, see page 64.

2:45–4:15 pm  Room: 2018
SECTION ON PERIPHERAL NERVES
Peripheral Nerve Task Force
Moderators: Lukas G. Rasulic, Lynda J. Yang
Speakers: B. Indira Devi, Mark A. Mahan, Wilson Z. Ray
2:45–3:02 pm
Nerve Transfers for Spinal Cord Injury: Results of a Prospective Trial
Wilson Z. Ray
3:03–3:20 pm
Targeted Muscle Reinnervation: Ready for Prime Time?
Mark A. Mahan
3:20–3:26 pm
B. Indira Devi
3:26–4:15 pm
Oral Abstract Presentations
For a listing of Oral Presentations, see pages 64-65.
3:28–3:34 pm  
**Neurosurgery** Tumor Paper of the Year: Phase I Trial of Radiosurgery Dose Escalation Plus Bevacizumab in Patients With Recurrent/Progressive Glioblastoma  
Michael A. Vogelbaum

3:34–4:15 pm  
**Oral Abstract Presentations**  
For a listing of Oral Presentations, see page 65.

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**OPERATIVE TECHNIQUES AND CASE-BASED DISCUSSION SESSIONS**

**SE 4:15–5:45 pm  Room: 3016**  
**CSNS: How to Build a Spine Center**  
Moderators: James S. Harrop, Anand Veeravagu  
Speakers: Khalid M. Abed, James S. Harrop, Richard N. Wohns  
4:16–4:30 pm  
Lessons Learned from Working with our Orthopedic Colleagues  
James S. Harrop  
4:31–4:45 pm  
Building a Regional Network  
Khalid M. Abed  
4:46–5:00 pm  
Lessons on ASCs and Outpatient Surgery  
Richard N. Wohns  
5:01–5:15 pm  
Questions and Discussion  
5:16–5:40 pm  
**Abstract Presentations**  
For a listing of Oral Presentations, see page 66.

**TU 4:15–5:45 pm  Room: 3014**  
**Challenging Skull Based Tumors: Operative Techniques and Case-based Discussions**  
Moderator: Jacques J. Morcos  
Case Discussants: Lola B. Chambless, John G. Golfinos, Anil Nanda, Nelson M. Oyesiku, Marc S. Schwartz  
Speakers: Juan C. Fernandez-Miranda, Akihide Kondo, Soichi Oya  
4:16–4:25 pm  
Surgeries for Optic Nerve Tumors  
Akihide Kondo  
4:26–4:35 pm  
Extended Middle Fossa Approach with Anterior Petrosectomy and Anterior Ciloidectomy for Resection of Sphenofacial-Tentorial Meningioma: The Hakuba-Kawase-Dolenc Approach: 3-Dimensional Operative Video  
Juan C. Fernandez-Miranda  
4:36–4:45 pm  
Ultra-Early Optic Nerve Decompression for the Resection of Anterior Ciloidal Meningioma  
Soichi Oya  
4:46–4:59 pm  
**Abstract Presentations**  
For a listing of Oral Presentations, see pages 67-68.

3:34–4:15 pm  
**Oral Abstract Presentations**  
For a listing of Oral Presentations, see page 65.

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**CV 4:15–5:45 pm  Room: 2014**  
**Treating Cerebral Vascular Malformations: Operative Techniques and Case-based Discussions**  
Moderator: Joshua W. Osbun  
Case Discussants: Daniel L. Barrow, C. Michael Cawley, Andrew F. Ducruet, Michael R. Levitt, Min S. Park, Jonathan Russin, Linda Xu, Gregory J. Zipfel  
Speakers: Joshua B. Bederson, Jan-Karl Burkhardt  
4:16–4:25 pm  
A Virtual-reality, 360-degree Fly-through of an Arteriovenous Malformation Resection: 2-dimensional Operative Video  
Joshua B. Bederson  
4:26–4:35 pm  
Combination Superficial Temporal Artery-Middle Cerebral Artery Bypass and M2–M2 Reanastomosis With Trapping of a Stented Distal Middle Cerebral Artery Aneurysm: 3-Dimensional Operative Video  
Jan-Karl Burkhardt  
4:36–5:00 pm  
**Abstract Presentations**  
For a listing of Oral Presentations, see page 66.

**SP 4:15–5:45 pm  Room: 2016**  
**Spinal Deformity and MIS Surgery: Operative Techniques and Case-based Discussions**  
Moderators: Yi Lu, Alfred T. Ogden  
Case Discussants: Ali A. Baaj, Tyler R. Koski, Catherine Miller-Simington, Ron I. Riesenburger, Alexander E. Ropper, Charles A. Sansur  
Speakers: Rajiv Iyer, Joshua W. Lucas  
4:16–4:25 pm  
Minimally Invasive Extraminral Discectomy Operative Neurosurgery Video  
Joshua W. Lucas  
4:26–4:35 pm  
Use of an Articulating Hinge to Facilitate Cervicothoracic Deformity Correction During Vertebral Column Resection Operative Neurosurgery Video  
Rajiv Iyer  
4:36–5:00 pm  
**Abstract Presentations**  
For a listing of Oral Presentations, see page 66.

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4:16–4:25 pm  
**Case-based Discussion**

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4:26–4:35 pm  
**Case-based Discussion**
TR 4:15–5:45 pm   Room: 3022
TBI and AI: Operative Techniques and Case-based Discussions
Moderators: Gregory J. Murad, Martina Stippler
Case Discussants: Samuel R. Browd, Ramesh Grandhi, Emily P. Sieg, Eve C. Tsai

4:15–4:39 pm
Abstract Presentations
For a listing of Oral Presentations, see pages 66-67.

4:40–5:45 pm
Case-based Discussion

PA 4:15–5:45 pm   Room: 3024
The Case Against Spinal Cord Stimulation: Operative Techniques and Case-based Discussion
Moderators: Gaddum D. Reddy, Jason M. Schwalb
Speakers and Case Discussants: Steven M. Falowski, Wendall B. Lake, Jason M. Schwalb, Konstantin V. Slavin, Christopher J. Winfree

4:17–4:26 pm
Review the Literature that Shows Poor Outcomes/Poor Responders/Placebo Effect
Steven M. Falowski

4:27–4:36 pm
Why Does SCS Fail Long Term
Wendall B. Lake

4:37–4:46 pm
Complications and Patient Complaints
Konstantin V. Slavin

4:47–4:56 pm
Cost Analysis
Jason M. Schwalb

4:57–5:06 pm
Alternatives-revision Spine Surgery: Medications and Marijuana
Christopher J. Winfree

5:06–5:15 pm
Oral Abstract Presentations

5:15–5:45 pm
Case-based Discussion

SF 4:15–5:45 pm   Room: 3020
Challenging Cases in Epilepsy Surgery: Operative Techniques and Case-based Discussions
Moderator: Joseph S. Neimat
Case Discussants: Ausaf A. Bari, Sharona Ben-Haim, Robert A. McGovern
Speakers: N. U. Farrukh Hameed, Jorge A. Gonzalez-Martinez

4:16–4:25 pm
sEEG Implant Strategies: Operative Neurosurgery Video
Jorge A. Gonzalez-Martinez

4:26–4:35 pm
Perioperative Multimodal Evaluation and Surgical Tactics of Tumor-Related Epilepsy: 2-Dimensional Operative Neurosurgery Video
N. U. Farrukh Hameed

4:36–5:00 pm
Abstract Presentations
For a listing of Oral Presentations, see page 67.

5:00–5:45 pm
Case-based Discussion

PN 4:15–5:45 pm   Room: 3018
Peripheral Nerve: Operative Techniques and Case-based Discussions
Moderators: Rajiv Midha, Robert J. Spinner, Gabriel C. Tender, Eric L. Zager
Discussants: Zarina S. Ali, Justin M. Brown, Amgad S. Hanna, Line G. Jacques, Mark A. Mahan, Shaun T. O’Leary, Christopher J. Winfree

4:15–4:35 pm
Technical Nuances and Cases: Benign Peripheral Nerve Tumors
Moderator: Robert J. Spinner
Discussants: Zarina S. Ali, Line G. Jacques

4:35–4:55 pm
Technical Nuances and Cases: Carpal Tunnel Release (Endoscopic Versus Open)
Moderator: Gabriel C. Tender
Discussants: Mark A. Mahan, Christopher J. Winfree

4:55–5:15 pm
Technical Nuances and Cases: Ulnar Nerve Decompression (Anterior Transposition Versus in Situ)
Moderator: Rajiv Midha
Discussants: Justin M. Brown, Shaun T. O’Leary

5:15–5:35 pm
Technical Nuances and Cases: Meralgia Paresthetica (Neurectomy Versus Decompression)
Moderator: Eric L. Zager
Discussants: Amgad S. Hanna, Line G. Jacques

5:35–5:45 pm
Questions on the Case Discussion
Line G. Jacques, Robert J. Spinner
INTERNATIONAL SYMPOSIA
NEW to the 2019 Scientific Program are three International Symposia, which feature world-renowned neurosurgeons sharing their insights on these cutting-edge topics.

TU 5:45–7:15 pm  Room: 3001
THE INTERNATIONAL MASTERS SYMPOSIUM ON BRAIN TUMOR SURGERY
Moderators: Mitchel S. Berger, George Samandouras
Speakers: Mitchel S. Berger, Fred Gentili, Takeshi Kawase, George Samandouras, Theodore H. Schwartz
5:45–6:02 pm
USA—Mapping Techniques for Low-grade Gliomas
Mitchel S. Berger
6:03–6:20 pm
Japan—Surgery in the Cavernous Sinus
Takeshi Kawase
6:21–6:38 pm
Canada—Skull Base Meningioma Surgery
Fred Gentili
5:45–6:56 pm
Endoscopic Pituitary Surgery
Theodore H. Schwartz
6:57–7:14 pm
UK—Surgery for Insular Gliomas
George Samandouras
7:14–7:15 pm
Questions and Discussion

CV 5:45–7:15 pm  Room: 3003
THE INTERNATIONAL CEREBROVASCULAR SYMPOSIUM
Moderators: Miki Fujimura, Clemens M. Schirmer
Speakers: Tomohito Hishikawa, Ichiro Nakagawa, Philipp Taussky
5:45–5:55 pm
Natural History and Management Strategy for Intracranial Aneurysms
Tomohito Hishikawa
5:56–6:10 pm
Endovascular Management of Complex Intracranial Aneurysms
Philipp Taussky
5:45–6:17 pm
Endovascular Treatment of Intracranial Aneurysms
Philipp Taussky
6:18–6:32 pm
Endovascular Treatment of Intracranial Aneurysms
Philipp Taussky
6:33–6:38 pm
Questions and Discussion
6:39–7:15 pm
International Oral Abstract Presentations
For a listing of Oral Presentations, see page 68.

SF 5:45–7:15 pm  Room: 3002
THE INTERNATIONAL FUNCTIONAL NEUROSURGERY SYMPOSIUM
Moderators: Jorge A. Gonzalez-Martinez, Makoto Taniguchi
Speakers: Masaki Iwasaki, Hui Ming Khoo, Takaomi Taira
5:45–6:00 pm
Current Status and Future Perspective of Epilepsy Surgery in Japan
Masaki Iwasaki
6:01–6:16 pm
Recent Advance in Epilepsy Research
Hui Ming Khoo
6:17–6:32 pm
Stereotactic Lesioning for Dystonia and Movement Disorders
Takaomi Taira
6:33–6:38 pm
Questions and Discussion
6:39–7:15 pm
International Oral Abstract Presentations
For a listing of Oral Presentations, see page 68.

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■ Review all courses, speakers, exhibitors, and events
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■ Keep notes and activity logs in real time, in one place
THANK YOU
INDUSTRY AMBASSADOR

FOR YOUR
VALUABLE SUPPORT!
DINNER SEMINAR 2 | MONDAY, OCTOBER 21 | 7:30–9:30 PM

$190 (includes three-course dinner and beverages)

CV D1N2: Multi-modality AVM Treatment in the Past, Present, and Future
Moderator: E. Sander Connolly
Faculty: Kevin M. Cockroft, Jason Davies, Iris C. Gibbs, Douglas Kondziolka, Babu G. Welch

PROSPECT
Prospect hosts a warm and modern urban environment, with high service standards and exceptional cuisine. The restaurant offers local sustainable, organic ingredients staying consistent with what you would expect from this San Francisco gem.

On Zagat’s Best Restaurant and Best Craft Cocktails lists in SoMa (South of Market neighborhood).

Complimentary shuttle service will depart from the San Francisco Marriott Marquis at 7:15 pm.

DINNER SEMINAR 3 | MONDAY, OCTOBER 21 | 7:30–9:30 PM

$190 (includes three-course dinner and beverages)

SP D1N3: Navigation and Robotics: Fad or Future?
Moderators: Paul Park, Mark E. Shaffrey
Faculty: Victor W. Chang, Domagoj Coric, Laura A. Snyder, Nicholas Theodore, Juan S. Uribe, Michael Y. Wang

MORTON’S
Enjoy a classic steakhouse experience with perfectly cooked chops and welcoming service at Morton’s. This high-end restaurant is newly renovated and offers an award-winning wine list.

Morton’s Steakhouse is the top-scoring Fine-dining Chain in National Restaurant News’ Consumer Picks of 2016.

Complimentary shuttle service will depart from the San Francisco Marriott Marquis at 7:15 pm.

Visit the CNS Xperience Lounge in the Exhibit Hall

Connect with colleagues, grab a beverage, and see what’s next on your agenda!

- Connect with the CNS Membership Team
- Innovator of the Year Finalists
- Digital Posters
- Book signings with Featured Speakers
- Meet Honored Guest, Raymond Sawaya, MD
- Alan Scarrow Presentation and Book Signing
- Voices of Neurosurgery: The Unforgettable Moments
- Gary Simonds Presentation and Book Signing
- NVIDIA: Artificial Intelligence for Neurosurgeons – A Hands-on Demo
- Wellness Afternoon: Tuesday at 1:45–2:45 pm

For a complete schedule check the CNS Meeting App!
TUESDAY, OCTOBER 22

GUIDELINES AND SUNRISE SCIENCE

7:00–8:30 am Room: 2016
SPINE SUNRISE SCIENCE AND LATE-BREAKING ABSTRACT SESSION
Moderators: Nathaniel P. Brooks, Kevin M. Walsh
For a listing of Sunrise Science and Late-breaking Oral Presentations, please see page 70.

7:00–8:30 am Room: 3018
PEDIATRIC SUNRISE SCIENCE AND LATE-BREAKING ABSTRACT SESSION
Moderators: Stephanie Greene, David S. Hong
For a listing of Sunrise Science and Late-breaking Oral Presentations, please see page 71.

7:00–8:30 am Room: 3016
COUNCIL OF STATE NEUROSURGICAL SOCIETIES SUNRISE SCIENCE AND LATE-BREAKING ABSTRACT SESSION
Moderators: Kristopher T. Kimmell, Analiz Rodriguez
For a listing of Sunrise Science and Late-breaking Oral Presentations, please see page 69.

TU 7:00–8:30 am Room: 3014
Guidelines on Management on Brain Metastases Update
Moderators: Melanie H. Gephart, Jonathan H. Sherman
Speakers: James B. Elder, Ricardo J. Komotar, Michael A. Vogelbaum, Y. Josh Yamada
7:00–7:05 am
Introduction
7:05–7:25 am
Treatment Strategies for Single Versus Multiple Metastases
Ricardo J. Komotar
7:25–7:45 am
The Tipping Point: When to use SRS Versus WBRT
Y. Josh Yamada
7:45–8:05 am
The Role of Emerging Therapies Including LITT and Brachytherapy: The Need for Clinical Trials
James B. Elder
8:05–8:25 am
Brain Metastasis Guidelines: A Critical Overview
Michael A. Vogelbaum
8:25–8:30 am
Questions and Discussion

TR 7:00–8:30 am Room: 3022
The Voice of Reason in Brain Death: From Bedside to the News
Moderators: Kathryn M. Beauchamp, Jamie S. Ullman
Speakers: Justin Davanzo, Flora Hammond, Shaun D. Rodgers, Uzma Samadani
7:00–7:20 am
Status Quo of Brain Death: Guidelines and Protocols
Justin Davanzo
7:20–7:50 am
Behavioral Recovery and Early Decision-making in Disorders of Consciousness
Flora Hammond
7:50–8:10 am
Brain Death in the Media
Uzma Samadani
8:10–8:30 am
Mastering Pediatric Brain Death Determination
Shaun D. Rodgers

SUBSPECIALTY SESSION HIGHLIGHTS KEY

AP ADVANCED PRACTICE PROVIDER  PB PEDIATRIC  SP SPINE
CV CEREBROVASCULAR  PN PERIPHERAL NERVES  SF STEREOTACTIC AND FUNCTIONAL
TR NEUROTRAUMA  RE RESIDENT  TU TUMOR
PA PAIN  SE SOCIOECONOMIC  WINS
GENERAL SCIENTIFIC SESSION III

Presiding Officer: Brian L. Hoh
Moderators: Ashok R. Asthagiri, Jennifer A. Sweet

8:40–8:42 am
Introduction and Disclosures
Brian L. Hoh

8:42–8:45 am
NEUROSURGERY® Publications Update
Nelson M. Oyesiku

8:45–8:51 am
Neurosurgery Top and Spine Paper of the Year: Symptomatic Adjacent Level Disease Requiring Surgery: Analysis of 10-Year Results From a Prospective, Randomized, Clinical Trial Comparing Cervical Disc Arthroplasty to Anterior Cervical Fusion
Allan D. Levi

8:51–9:13 am
Honored Guest Presentation: Evidence-based Medicine Through Development of Home-grown Databases
Raymond Sawaya

9:13–9:15 am
Introduction of Carl Zimmer
Garni Barkhoudarian

9:15–9:40 am
FEATURED SPEAKER
Journey to the Center of the Brain
Carl Zimmer

9:40–9:50 am
MORNING BEVERAGE BREAK
Visit the Exhibit Hall and enjoy a complimentary cup of coffee!

10:00–10:30 am
LIVE SURGERY IN THE EXHIBIT HALL
See page 20 for details.

10:40–10:44 am
AANS President
Christopher I. Shaffrey

10:44–10:49 am
Washington Committee
Ann R. Stroink

10:49–10:59 am
Controversies: RCTs Are Not Necessary and Might Not Be Ethical
Richard G. Fessler

10:59–11:07 am
Controversies: RCTs Are Always Necessary for New Therapies
Gary K. Steinberg

11:07–11:12 am
Controversies: Discussion and Outcomes
Robert E. Gross

11:12–11:20 am
Neurosurgery Update: Cutting Edge in NeuroTrauma: Severe TBI Algorithm
Randall M. Chesnut

11:20–11:28 am
Neurosurgery Update: Cutting Edge in Cerebrovascular Surgery
Adnan H. Siddiqui

11:28–11:30 am
Educator of the Year Award Presentation
Neil E. Roundy
Presented by Ganesh Rao

11:30–11:33 am
Distinguished Service Award Presentation
David C. Berg
Presented by Ashwini D. Sharan

11:33–11:36 am
Founder’s Laurel Award Presentation
Daniel L. Barrow
Presented by Ashwini D. Sharan

11:36–11:41 am
SNS Update
Karin M. Muraszko

11:41–11:43 am
Introduction of Bret Stephens
Nicholas C. Bambakidis

11:43–12:10 pm
FEATURED SPEAKER
U.S. Foreign Policy and the World
Bret Stephens

Bret Stephens will be signing copies of his book, “America in Retreat,” in the CNS Xperience Lounge immediately following the conclusion of this session.

Carl Zimmer will be signing copies of his book, “She Has Her Mother’s Laugh: The Powers, Perversions, and Potential of Heredity,” in the CNS Xperience Lounge during the morning beverage break.

Bret Stephens

Karin M. Muraszko

Nicholas C. Bambakidis

Carol Zimmer

Bret Stephens
LUNCHEON SEMINARS

All Luncheon Seminars include a plated lunch served in the seminar room. Luncheon Seminar fee is $95 each ($75 for residents, fellows, graduate students/post-doctoral scholars, medical students, and advance practice providers). Add a Luncheon Seminar to your profile at registration.

**Room: 2001**

**T11:** Perioperative Pain Management: Opioids, Non-opioids, and Neurosurgery Advocacy

Moderators: Robert F. Heary, Christopher J. Winfree
Faculty: Victor W. Chang, Joshua M. Rosenow, Jason M. Schwalb, Jennifer A. Sweet

**Room: 2003**

**T12:** Carotid Artery Disease: Symptomatic/Asymptomatic/Stent/CEA

Moderator: Stacey Q. Wolfe
Faculty: Mark R. Harrigan, Brian T. Jankowitz, Adnan H. Siddiqui, Justin A. Singer, John A. Wilson

**Room: 2005**

**T13:** Peak Performance: Optimizing the Spine Surgical Patient from Pre-op to Post-op

Moderators: Scott A. Meyer, Laura A. Snyder, Marjorie C. Wang
Faculty: Christopher M. Holland, Luke Macyszyn, Hesham M. Soliman, Michael S. Virk, Robert G. Whitmore

**Room: 2007**

**T14:** Controversies in Spinal Deformity Surgery

Moderator: Christopher P. Ames
Faculty: Richard G. Fessler, Kai-Ming G. Fu, Robert F. Heary, Justin S. Smith, Jay D. Turner, Juan S. Uribe

**Room: 2008**

**T15:** Is There an Outcome Worse than Death: Outcome, Palliative Care, and Ethical Considerations in Neurosurgical Care

Moderator: Martina Stippler
Faculty: Nicholas J. Brandmeir, Flora Hammond, Kimberly P. Kicielniski

**Room: 2009**

**T16:** Patient Specific Goal-directed Therapy in TBI

Moderator: Julian E. Bailes Jr.
Faculty: Randall M. Chesnut, Gregory W.J. Hawryluk, Laura B. Ngwenya, Eiichi Suehiro, Lori Shutter

**Room: 2010**

**T17:** Clinical Trials in Movement Disorder Surgery

Moderators: Sharona Ben-Haim, Ashwin Viswanathan
Faculty: H. Isaac Chen, John D. Rolston

**Room: 2012**

**T18:** Management of Pituitary Adenomas and Parasellar Pathology

Moderators: Daniel F. Kelly, Pamela S. Jones
Faculty: Paul A. Gardner, Anand V. Germanwala, Nelson M. Oyesiku, Dimitris G. Placantonakis, Daniel M. Prevedello, Gabriel Zada

**Room: 2011**

**T19:** Malignant Gliomas: Advances in Surgery and Adjuvant Therapy

Moderators: Jeffrey N. Bruce, James B. Elder
Faculty: E. Antonio Chiocca, Gavin P. Dunn, Constantinos G. Hadjipanayis, Melanie Hayden Gephart

**Room: 2000**

**T20:** Beating Press Ganey

Moderator: Ellen L. Air
Faculty: Sharona Ben-Haim, Sheri Dewan, Lauren Ostling

1:00–2:00 pm Room 3002

**NEUROSURGERY® PUBLICATIONS: MEET THE EDITORS**

Hear from leading voices in scholarly publishing! The NEUROSURGERY® Publications: Meet the Editors Session is open to all attendees free of charge. Attendees will hear from the following editors of leading neurosurgical journals:

- **Edward C. Benzel, MD**
  Editor-in-Chief, *World Neurosurgery*

- **Nancy E. Epstein, MD, FACS**
  Editor-in-Chief, *Surgical Neurology International*

- **Tiit Mathiesen, MD, PhD**
  Editor-in-Chief, *Acta Neurochirurgica*

- **Nelson M. Oyesiku, MD, PhD, FACS**
  Editor-in-Chief, NEUROSURGERY® Publications

- **James T. Rutka, MD, PhD**
  Editor-in-Chief, Journal of Neurosurgery Publishing Group

- **Peter C. Warnke, MD, Dr.med., FRCS**
  Associate Editor, *Journal of Neurology, Neurosurgery and Psychiatry*
TUESDAY, OCTOBER 22

AFTERNOON SESSIONS

SECTION SESSIONS

SE 2:45–4:15 pm  Room: 3016
COUNCIL OF STATE NEUROSURGICAL SOCIETIES
What Is Value
Moderators: Joseph S. Cheng, Deborah L. Benzil
Speakers: Deborah L. Benzil, John K. Ratliff
2:45–3:03 pm
Value—An Easily Defined Concept
Deborah L. Benzil
3:04–3:22 pm
Value-based Care
John K. Ratliff
3:23–3:27 pm
Questions and Discussion
3:27–4:15 pm
Oral Abstract Presentations
For a listing of Oral Presentations, see page 72.

CN 2:45–4:15 pm  Room: 2016
SECTION ON CEREBROVASCULAR SURGERY
Future Training of the Cerebrovascular Surgeon
Moderators: Judy Huang, Murat Gunel
Speakers: Daniel L. Barrow, C. Michael Cawley, Brian L. Hoh, Louis J. Kim, Elad I. Levy
2:45–2:55 pm
Modern Open Cerebrovascular Training
Daniel L. Barrow
2:55–3:05 pm
Modern Endovascular Training
Elad I. Levy
3:05–3:15 pm
Simultaneous Combined Training
C. Michael Cawley
3:15–3:27 pm
Questions for the Panel
3:27–4:15 pm
Oral Abstract Presentations
For a listing of Oral Presentations, see pages 72-73.

PN 2:45–4:15 pm  Room: 2016
SECTION ON DISORDERS OF THE SPINE AND PERIPHERAL NERVES
Spine Update: The Evidence
Moderators: Erica F. Bisson, John H. Chi, Eric A. Potts, John H. Shin
Speakers: Dean Chou, Zoher Ghogawala, Praveen V. Mummaneni, William R. Taylor, Juan S. Uribe
2:45–2:53 pm
Lateral Stand-alone Corrects Stenosis and Does Not Subside: The Evidence
William R. Taylor
2:54–3:02 pm
Lateral Stand-alone Subsides and Fails to Correct Stenosis: The Evidence
Juan S. Uribe
3:03–3:11 pm
Discussant: Lateral Stand-alone Versus with Posterior Fixation: The Final Analysis
Dean Chou
3:12–3:20 pm
Degenerative Adult Scoliosis: Is MIS Ready for Prime Time or Should We Really Just Do These Open?
Praveen V. Mummaneni
3:21–3:29 pm
L4-5 Degenerative Spondylolisthesis with Stenosis: Decompression Only—Are we Just Avoiding the Inevitable Fusion Later?
Zoher Ghogawala
3:29–4:15 pm
Oral Abstract Presentations
For a listing of Oral Presentations, see page 73.
**SECTION ON NEUROTRAUMA AND CRITICAL CARE**

Neuromodulation for Spinal Cord Injury  
Moderators: Ann M. Parr, Craig H. Rabb  
Speaker: V. Reggie Edgerton  
2:45–3:14 pm  
Epidural Stimulation in Patients with Spinal Cord Injury  
V. Reggie Edgerton  
3:15–3:27 pm  
Questions and Discussion  
3:28–4:15 pm  
Oral Abstract Presentations  
For a listing of Oral Presentations, see pages 73–74.

**SECTION ON PAIN**

Targets Outside the Dorsal Columns for Pain  
Moderators: Nicholas Au Yong, Ashwin Viswanathan  
Speakers: Ausaf A. Bari, Nicholas M. Bouls, Sameer A. Sheth, Ido Strauss, Ashwin Viswanathan  
2:45–2:53 pm  
Cingulotomy & Capsulotomy for Pain  
Sameer A. Sheth  
2:54–3:02 pm  
DBS for Pain  
Ausaf A. Bari  
3:03–3:11 pm  
DRG Stimulation for Pain  
Ashwin Viswanathan  
3:12–3:20 pm  
Peripheral Nerve Stimulation  
Nicholas M. Bouls  
3:21–3:29 pm  
Future Therapies for Pain  
Ido Strauss  
3:29–4:15 pm  
Oral Abstract Presentations  
For a listing of Oral Presentations, see page 74.

**SECTION ON PEDIATRIC NEUROLOGICAL SURGERY**

Post-hemorrhagic Hydrocephalus in Premature Infants: Time for a Paradigm Shift?  
Moderators: Sandi Lam, Brandon G. Rocque  
Speakers: Edward S. Ahn, Samuel R. Browd  
2:45–3:02 pm  
Post-hemorrhagic Hydrocephalus in Premature Infants: Time for a Paradigm Shift?  
Samuel R. Browd  
3:03–3:20 pm  
Edward S. Ahn  
3:21–3:27 pm  
Questions and Discussion  
3:28–4:15 pm  
Oral Abstract Presentations  
For a listing of Oral Presentations, see pages 74–75.

**SECTION ON STEREOTACTIC AND FUNCTIONAL NEUROSURGERY**

Stereotactic and Functional Neurosurgery Update  
Moderators: Guy M. McKhann, Doris D. Wang  
2:45–3:27 pm  
Didactic Session is combined with the Neurotrauma and Critical Care Session in Room 3022  
3:27–4:15 pm  
Oral Abstract Presentations  
For a listing of Oral Presentation, see page 75.

**SECTION ON TUMORS**

Emerging Concepts in the Management of Brain Metastases  
Moderators: Albert H. Kim, Gelareh Zadeh  
Speakers: Manmeet Ahluwalia, Steven N. Kalkanis, Teddy Kim, Jennifer A. Moliterno Gunel  
2:45–2:59 pm  
Surgical Management of Mets: Surgery, SRS, WBRT, Evidence, and Case-based Talk  
Steven N. Kalkanis  
3:00–3:13 pm  
Treatment of Recurrent/Refractory Mets and Radiation Necrosis: Redo RT or SRS?  
Jennifer A. Moliterno Gunel  
3:14–3:27 pm  
How Precision Medicine and Immunotherapy are Changing the Management of Mets  
Manmeet Ahluwalia  
3:28–3:33 pm  
Andrew T. Parsa Research Fellowship Presentation: VSV-LASV as Oncolytic Virus Therapy for Glioblastoma  
Teddy Kim  
3:33–4:15 pm  
Oral Abstract Presentations  
For a listing of Oral Presentation, see pages 75–76.

**OPERATIVE TECHNIQUES AND CASE-BASED DISCUSSION SESSIONS**

**CSNS: Patient Safety in Neurosurgical Practice**  
Moderators: Zarina S. Ali, Kristopher T. Kimmel  
Speakers: Kristopher T. Kimmel, Brad E. Zacharia  
4:16–4:27 pm  
Anti-coagulation Protocols  
Kristopher T. Kimmel  
4:28 pm–4:39 pm  
Wrong Side, Wrong Level Protocols  
Brad E. Zacharia  
4:40–4:51 pm  
Safety in Practice  
Kristopher T. Kimmel  
4:51–5:15 pm  
Oral Abstract Presentations  
For a listing of Oral Presentation, see page 76.  
5:16–5:45 pm  
Case Presentations and Discussion
4:15–5:45 pm  Room: 3014
Challenging Brain Tumors: Operative Techniques and Case-based Discussions
Moderator: Manish K. Aghi
Case Discussants: Mitchel S. Berger, William T. Curry, Frederick F. Lang, Marie Roguski
Speakers: Akihide Kondo, James K. Liu, Ugur Ture
4:16–4:25 pm
Ugur Türe
4:26–4:35 pm
Operative Nuances for Complex Tumors of the Skull Base: Operative Neurosurgery Video
James K. Liu
4:36–4:45 pm
Reconsideration of the Dolenc Approach
Akihide Kondo
4:45–5:03 pm
Oral Abstract Presentations
For a listing of Oral Presentation, see page 77.
5:04–5:45 pm
Case Presentations and Discussion

4:15–5:45 pm  Room: 2014
Treating Cerebral Aneurysms: Operative Techniques and Case-based Discussions
Moderator: Scott D. Simon
Case Discussants: Sepideh Amin-Hanjani, Geoffrey P. Colby, Sean D. Lavine, Stavropoulou I. Tjoumakaris, Erol Veznedaroglu
Speakers: Elad I. Levy, Leonardo Rangel-Castilla
4:16–4:25 pm
Novel Endovascular Neck Reconstruction and Coiling Technique for the Treatment of a Large Wide-necked Basilar Apex Aneurysm Through a Radial Artery Approach: 2-Dimensional Operative Neurosurgery Video
Leonardo Rangel-Castilla
4:26–4:43 pm
Novel Endovascular Treatment of a Large Basilar Apex Aneurysm with Neck Reconstruction (Barrel Stent) and Coiling Technique: 2-Dimensional Operative Neurosurgery Video
Elad I. Levy
4:44–5:02 pm
Oral Abstract Presentations
For a listing of Oral Presentation, see page 76.
5:03–5:45 pm
Case Presentations and Discussion

4:15–5:45 pm  Room: 3018
Challenges in Recurrent Pediatric Epilepsy: Operative Techniques and Case-based Discussions
Moderator: Gary W. Mathern
Case Discussants: David F. Bauer, Daniel Curry, David D. Gonda, Jeffrey S. Raskin
4:15–4:39 pm
Oral Abstract Presentations
For a listing of Oral Presentation, see page 77.
4:40–5:45 pm
Case Presentations and Discussion
INTERACTIVE MULTIMEDIA RESEARCH PRESENTATION SESSION


The Interactive Multimedia Research Presentation Session aims to invigorate scientific presentation and discussion and engage attendees with presenters in exciting and compelling conversations. Enjoy a glass of wine and cheese during this interactive session consisting of both mini-oral presentations and posters.

There will be four podium presentation stages integrated throughout the poster area, and selected poster authors will present “mini-podium talks” during the Interactive Multimedia Research Presentation session, highlighting key advances in neurosurgery. Don’t miss this exciting new session!

For a listing of Mini-Podium Oral Presentations, see pages 77-84.
For a listing of Poster Presentations, see pages 92-108.

DINNER SEMINAR 4 | TUESDAY, OCTOBER 22 | 7:30–9:30 PM

$190 (includes three-course dinner and beverages)

SF TU DIN4: Advances in LITT

Moderators: Gene H. Barnett, Shabbar F. Danish

Faculty: Robert E. Gross, Jonathan R. Jagid, Alireza M. Mohammadi, Dimitris G. Placantonakis

HARRIS’ THE SAN FRANCISCO STEAKHOUSE

Celebrating their 35th year, Harris’ continues the rich tradition of luxurious dining in a warm, comfortable, sophisticated environment. Harris’ Steakhouse has become a household name in the Bay Area. Their commitment to the classic traditions of an elegant atmosphere, exceptional service, and extraordinary cuisine have made them the San Francisco Steakhouse.

In 2019, Eater San Francisco recognized Harris’ as one of the Top 14 Steakhouses in San Francisco. The San Francisco Chronicle recognized Harris’ as one of the most beautiful restaurants in San Francisco in 2018.

Complimentary shuttle service will depart from the San Francisco Marriott Marquis at 7:15 pm.

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- Review all courses, speakers, exhibitors, and events
- View all meeting abstracts
- Create your own preferred schedule each day
- Keep notes and activity logs in real time, in one place
GUIDELINES AND SUNRISE SCIENCE

WEDNESDAY, OCTOBER 23

Cerebrovascular Guidelines: Aneurysms, Arteriovenous Malformations, and Acute Ischemic Stroke
Moderators: Scott D. Simon, Stavropoula I. Tjoumakaris
Speakers: Sepideh Amin-Hanjani, Mark D. Bain, Kevin M. Cockroft, Aaron S. Dumont, J D. Mocco, Clemens M. Schirmer, Babu G. Welch, Stacey Q. Wolfe

Guidelines for the Treatment of Cerebral Arteriovenous Malformations
7:00–7:10 am
Natural History and Management of Unruptured AVMs
Sepideh Amin-Hanjani
7:10–7:20 am
Management of Ruptured AVMs
Clemens M. Schirmer
7:20–7:30 am
Management of Dural AVFs
Stacey Q. Wolfe

Guidelines for the Treatment of Cerebral Aneurysms
7:30–7:40 am
Screening, Natural History, and Medical Management
Aaron S. Dumont
7:40–7:50 am
Indications and Outcomes of Surgery for Cerebral Aneurysms
Kevin M. Cockroft
7:50–8:00 am
Indications and Outcomes of Endovascular Surgery for Cerebral Aneurysms
Babu G. Welch

Guidelines for the Neurosurgical Treatment of Acute Ischemic Stroke: Update on Trials
J D. Mocco

Guidelines for the Neurosurgical Treatment of Spontaneous Intraparenchymal Hemorrhage: Update on Trials
Mark D. Bain

Guidelines for Management of Glioblastoma
Moderators: S. Kathleen Bandt, Ricardo J. Komotar
Speakers: Mitchel S. Berger, Susan M. Chang, Ali Jalali, Eric C. Leuthardt, Taiichi Saito, Adam M. Sonabend

Active Surgical Clinical Trials
Adam M. Sonabend

Surgical Update on Glioblastoma Genetics
Ali Jalali

Re-evaluating the Evidence for Extent of Resection in Glioblastoma
Mitchel S. Berger

Recommended Practices for Neuro-monitoring in Glioblastoma
Taiichi Saito

Evidence for LITT in Glioblastoma
Eric C. Leuthardt

Personalized Medicine and Chemotherapy in the Management of Glioblastoma
Susan M. Chang

Brain and Spine Trauma Guidelines—What you Need to Know
Moderators: Paul M. Arnold, Patricia B. Raksin
Speakers: Randall M. Chesnut, John H. Chi, Sanjay S. Dhall, R. John Hurlbert, Daniel M. Scuibba, Emily P. Sieg, Michael F. Stiefel, Eve C. Tsai

BTF Guidelines 4: Are They Still Useful? Next steps
Randall M. Chesnut

ICP and Decompressive Craniectomy According to the 4th Edition Guidelines
Emily P. Sieg
7:20–7:30 am
Guideline for Reversal of Antithrombotics in Intracranial Hemorrhage
Michael F. Stiefel

7:30–7:40 am
Update on NOACs Not in the Guidelines
Eve C. Tsai

7:40–7:50 am
Thoracolumbar Spine Trauma Operative Versus Nonoperative Treatment
Daniel M. Sciuubba

7:50–8:00 am
Timing of Surgical Intervention in Spine Trauma
John H. Chi

8:00–8:10 am
Hemodynamics and Spinal Cord Perfusion in SC
Sanjay S. Dhall

8:10–8:20 am
Pharmacologic Treatment of Acute Spinal Cord Injury
R. John Hurlbert

8:20–8:30 am
Questions and Discussion
THANK YOU
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GENERAL SCIENTIFIC SESSION IV

Presiding Officer: Elad I. Levy
Moderators: Maya A. Babu, Praveen V. Mummaneni

8:40–8:43 am
Introduction and Disclosures
Elad I. Levy

8:43–8:50 am
Operative Neurosurgery Highlight:
The Role of Endoscopic Endonasal Approaches for the Surgical Management of Anterior Skull Base Meningiomas
Daniel M. Prevedello

8:50–9:12 am
Honored Guest Presentation:
The Evolving Landscape and Management of Brain Metastases
Raymond Sawaya

9:12–9:15 am
Introduction of Rebecca Skloot
Brian V. Nahed

9:15–9:40 am
JOHN THOMPSON HISTORY OF MEDICINE LECTURE
Rebecca Skloot
Rebecca Skloot will be signing copies of the book, “The Immortal Life of Henrietta Lacks,” in the CNS Xperience Lounge during the morning beverage break.

9:40–10:00 am
MORNING BEVERAGE BREAK
Visit the Exhibit Hall and enjoy a complimentary cup of coffee!

10:00–10:30 am
LIVE SURGERY IN THE EXHIBIT HALL
See page 20 for details.

10:40–10:43 am
Announcement of SANS Challenge Winners, Top Posters, and Residency Program Abstract Competition Winners
Maya A. Babu

10:43–10:46 am
Announcement of Innovator of the Year
Lola B. Chambless

10:46–10:49 am
Preview of 2020 CNS Annual Meeting in Miami
Steven N. Kalkanis

10:49–10:51 am
Introduction of Controversy:
Low-grade Glioma Management
Manish K. Aghi

10:51–10:59 am
Controversies: Supramaximal Resection
Hugues Duffau

10:59–11:07 am
Controversies: A Conservative Approach to Low-grade Gliomas
Gelareh Zadeh

11:07–11:11 am
Controversies: Discussion and Outcomes
Manish K. Aghi

11:11–11:19 am
Neurosurgery Update: Cutting Edge in Stereotactic and Functional:
Dramatic Clinical Improvement on Children Affected by AADC Mutation after MR-guided AAV2-AADC Gene Therapy into the Midbrain
Krystof S. Bankiewicz

11:19–11:26 am
Central Atlantoaxial Instability – Changing Paradigm in Craniovertebral Junction Surgery
Atul H. Goel

11:26–11:31 am
Update from the ABNS
Carl B. Heilman

11:31–11:33 am
Introduction of Aaron Carroll
Mohamad Bydon

11:33 am–12:10 pm
FEATURED SPEAKER
Healthcare in the U.S.
Aaron Carroll
Meet Aaron Carroll in the CNS Xperience Lounge immediately following the conclusion of this session!
LUNCHEON SEMINARS

All Luncheon Seminars include a plated lunch served in the seminar room. Luncheon Seminar fee is $95 each ($75 for residents, fellows, graduate students/post-doctoral scholars, medical students, and advance practice providers). Add a Luncheon Seminar to your profile at registration.

Room: 2001

▲ W21: Middle Meningeal Artery Embolization for Subdural Hematoma Treatment
Moderator: Christopher P. Kellner
Faculty: Bradley N. Bohnstedt, Peter Kan, Jared Knopman, Adnan H. Siddiqui

Room: 2003

▲ W22: Contemporary and Practical Management of an Enigmatic Process: Cerebral Vasospasm (Delayed Cerebral Ischemia)
Moderator: Brian M. Howard
Faculty: Spiros L. Blackburn, Peng R. Chen, R. Loch Macdonald, Matthew Reynolds, Edgar Samaniego

Room: 2010

SP W23: Novel Techniques for Management of Lumbar Spondylolisthesis
Moderators: Noojan Kazemi, Randy Kritzer
Faculty: Deb A. Bhowmick, Nathaniel P. Brooks, John H. Chi, John H. Shin

Room: 2011

TR W24: TBI in the Elderly
Moderator: Daniel B. Michael
Faculty: Gary Abrams, Jack Jallo, Emily P. Sieg, Eve C. Tsai

Room: 2012

PE W26: Chiari Malformations
Moderator: David D. Limbrick
Faculty: Ulrich Batzdorf, David M. Frim, Jeffrey R. Leonard, Karin M. Muraszk

Room: 2007

SF W27: Clinical Trials in Epilepsy Surgery
Moderator: Aviva Abosch
Faculty: Jorge A. Gonzalez-Martinez, Robert E. Gross, Timothy H. Lucas

Room: 2008

TU W28: Update on Diagnosis and Management of Low Grade Gliomas
Moderators: Susan M. Chang, Viviane S. Taber
Faculty: Cameron W. Brennan, Daniel P. Cahill, Jennifer A. Moliterno Gunel, Daniel A. Orringer

Room: 2009

TU W29: Advanced Imaging in Brain Tumors
Moderator: Shawn L. Hervey-Jumper
Faculty: S. Kathleen Bandt, Sunit Das, Alexandre J. Golby, Javier E. Villanueva-Meyer, Masahiko Wanibuchi

Room: 2000

W30: Branding and Social Media in your Practice
Moderator: Isaac Yang
Faculty: Christopher S. Graffeo, Michael E. Ivan, Carrie R. Muh, Faith C. Robertson, Linda Xu

The Defining Work in Neurosurgery

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1:45–3:15 pm  Room: 2016
**SPINE AFTERNOON SCIENCE ABSTRACT SESSION**
**Moderators:** Yi Lu, Laura A. Snyder
*For a listing of Oral Presentations, please see pages 87-88.*

1:45–3:15 pm  Room: 3020
**CRANIAL AFTERNOON SCIENCE ABSTRACT SESSION**
**Moderators:** Isabelle M. Germano, Sean D. Lavine
*For a listing of Oral Presentations, please see pages 86-87.*

1:45–3:15 pm  Room: 3022
**NEUROTRAUMA AFTERNOON SCIENCE ABSTRACT SESSION**
**Moderators:** Ronald A. Torres, Sarah Woodrow
*For a listing of Oral Presentations, please see pages 88-89.*

1:45–3:15 pm  Room: 3024
**LATE-BREAKING ABSTRACT SESSION**
**Moderators:** Orin Bloch, Michael S. Virk
*For a listing of Oral Presentations, please see pages 89-90.*

1:45–4:45 pm  Room: 2014
**ADVANCED ENDOSCOPIC AND EXOSCOPIC NEUROSURGERY SEMINAR**
**Course Directors:** William T. Curry, Brian V. Nahed
**Faculty:** John A. Boockvar, Christopher J. Farrell, Juan C. Fernandez-Miranda, Paul A. Gardner, Constantinos G. Hadjipanayis, Peter Nakaji, Shaan M. Raza

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ORAL ABSTRACT PRESENTATIONS
MONDAY, OCTOBER 21

**CV**

**SUNRISE SCIENCE ORAL PRESENTATIONS SESSION**
Room 2014

7:00–7:06 am

**300 Wall Enhancement in Evolving Cerebral Aneurysms on MR Vessel Wall Imaging**
Shunsuke Omodaka, Hidenori Endo, Kuniyasu Nizuma, Miki Fujimura, Takashi Inoue, Toshihiko Endo, Teiji Tominaga

7:06–7:12 am

**301 Lessons Learned from the Initial Experience with Pedicled Temporoparietal Fascial Flap for Combined Revascularization in Moyamoya Angiopathy: A Case Series**
Kristine Ravina, Paul Kim, Robert Rennert, Erik M. Wolfsinkel, Ben A. Strickland, Joseph Carey, Jonathan Russin

7:12–7:18 am

**302 Cost-Effectiveness Analysis of Active Surveillance for Small Asymptomatic Intracranial Aneurysms**
David M. Panczykowski, Clark Veet, Natasha Parekh, Spiros L. Blackburn

7:18–7:24 am

**303 Identification of PPIL4 as a Disease Causing Gene in Intracranial Aneurysms and its Role in Vertebrate CNS Specific Angiogenesis**
Tanyeri Barak, Adife Gulhan Ercan Sencicek, Danielle F. Miyagishima, Octavian Henegariu, Ketu Mishra Gorur, Kaya Bilguvar, Murat Gunel

7:24–7:30 am

**304 Decreased Time to Evacuation Improves Long-term Functional Outcome in Minimally Invasive Endoscopic Intracerebral Hemorrhage Evacuation**
Christopher P. Kellner, Rui Song, Dominic A. Nistal, Ian T. McNell, Hasitha M. Samarage, Jacopo Scaggiante, Neha S. Dangayach, Joshua B. Bederson, J D. Mocco

7:30–7:36 am

**305 Metabolite Profiling the Cerebral Spinal Fluid in Subarachnoid Hemorrhage: Insights into Patient Outcomes.**
Matthew J. Koch, Zsuzsanna Ament, Christina Hansen, Matthew Bevers, Christopher J. Stapleton, Aman B. Patel, W. Taylor Kimberly

7:36–7:42 am

**306 The R2eD AVM Score: A Novel Predictive Tool for Arteriovenous Malformation Presentation with Hemorrhage.**
James Feghali, Wuyang Yang, Risheng Xu, Jason Liew, Cameron G. McDougall, Justin M. Caplan, Rafael J. Tamargo, Judy Huang

7:42–7:48 am

**307 Frailty Predicts Decreased Survival, More Complications, and Higher Hunt & Hess and Fisher Scores following an Aneurysmal Subarachnoid Hemorrhage**
Matthew McIntyre, Vikas Patel, Andrew Long, Alex Vonhoof, Boyi Li, Adil Afridi, Mohamed Halabi, Fawaz Al-Mufti, Chirag D. Gandhi, Justin G. Santarelli, Meic H. Schmidt, Chad D. Cole, Christian A. Bowers

7:48–7:54 am

**308 The Efficacy and Safety of Middle Meningeal Artery Embolization in the Management of Chronic Subdural Hematomas: Systematic Review and Meta-analysis**
Fareed Jumah, Muhammad Osama, Abdurrahman Islim, Ammar Jumah, Devi Prasad Patra, Vinatak Narayan, Rimal Hanif H. Hanif

8:00–8:06 am

**900 Increasing the Utility of Administrative Databases for Clinical Research of Stroke Patients Treated with a Mechanical Thrombectomy**
Pious D. Patel, Sanjana Salwi, Campbell Liles, Aksh itkumar Mistry, Eva Mistry, Rohan V. Chitaile, Matthew Fusco, Chevis N. Shannon

8:06–8:12 am

**901 Middle Meningeal Artery Embolization for Chronic Subdural Hematoma: A Multi-center Experience of 160 Consecutive Embolizations**

8:12–8:18 am

**902 Stereotactic Direct-coiling of Intracranial Aneurysms**
Arun-Angelo Patil, Sidharta Kumar, Megha Jacob
8:24–8:30 am
904 The Flow Redirection Intraluminal Device (FRED) for Cerebral Aneurysms of the Posterior Circulation: A Subgroup Analysis of the EuFRED Registry
Christoph J. Griessenauer, Markus Möhlenbruch, Philipp Hendrix, Christian Ulfert, Naci Kocer, Civan Islak, Michael Sonnberger, Tobias Engelhorn, Erasmia Müller-Thies-Broussalis, Thomas Finkenzeller, Markus Holtmannspötter, Jan-Hendrik Buht, Wolfgang Reith, Andreas Simgen, Hendrik Janssen, Monika Killer-Oberpfalzer

7:42–7:48 am
317 Multiplatform Molecular Profiling of Vestibular Schwannoma Reveals 2 Subgroups of Tumors with Distinct Radiographic Features and a Methylation-based Predictor of Local Recurrence

7:48–7:54 am
BEST DATA SCIENCE AWARD
318 Predicting Growth Trajectory in Vestibular Schwannoma from Radiomic Data Using Supervised Machine Learning Techniques
Conor Grady, Hesheng Wang, Zane Schnurman, Tanxia Qu, Douglas Kondziolka

8:00–8:06 am
905 The Natural Growth Rate of Metastatic Cancer to the Brain
Andrew J. Kobets, Phillip C. Cezyaril, Ryan Holland, Rose Fluss, Reid Backus, Patrick A. Lasala

8:06–8:12 am
906 Precision Targeting Therapy of Malignant Brain Tumor by a Local Interstitial Delivery System Loading with a Small Molecule Drug—First in Human Trial

8:12–8:18 am
907 Brain Tumor Organoid (BTO) Platform as a Unique Tool in Discovery of Novel Therapy Approaches and Stratifying Treatment Regimens
Dorota Lubanska, Swati Kulkarni, Mohamed A.R. Soliman, Abdalla Shamisa, Ana DeCarvalho, Alexander Rodzinka, Adit Nyayachavadi, Simon Rondeau-Gagné, Lisa Porter

8:18–8:24 pm
908 Mini Beam Radiation Treatment- Final Report of a Randomized Phase III Study of Treating Canine De-novo Brain Tumors - New Kid on the Block
Vijayananda Kundapur, Monique Mayer, Andrew Alexander, Sheldon Wiebe, Narinder Sidhu, Gavin C. Sargison, Susan L. Kraft

8:24–8:30 am
909 The CREB-binding Protein Inhibitor ICG-001 Underlying a Promising Therapeutic Strategy in NF2-associated Meningiomas
Hongda Zhu, Jiaojiao Deng, Lingyang Hua, Shuchen Sun, Ye Gong
**ORAL ABSTRACT PRESENTATIONS**

**GENERAL SCIENTIFIC SESSION II**

**Ballroom**

10:53–11:00 am

**CNS RESIDENT AWARD**

100 Ambulation on POD#0 is Associated with Decreased Adverse Events After Elective Lumbar Spine Surgery: Analysis of the Michigan Spine Surgery Improvement Collaborative (MSSIC)

Hesham M. Zakaria, Rachel J. Hunt, Theresa A. Elder, Michael Bazydlo, Lonni Schultz, Muwaffak Abdulhak, David Nerenz, Victor W. Chang, Jason M. Schwalb

**COUNCIL OF STATE NEUROSURGICAL SOCIETIES ORAL PRESENTATIONS**

**Room 3016**

3:33–3:39 pm

101 Patterns of Opioid and Benzodiazepine Use in Opioid-Naïve Patients With Newly Diagnosed Low Back and Lower Extremity Pain

Tej D. Azad, Yi J. Zhang, Martin N. Stienen, Daniel Vail, Jason Bentley, Allen L. Ho, Paras Fatemi, Lily H. Kim, Anand Veeravagu, John K. Ratliff

3:39–3:45 pm

102 Enhanced Peri-operative Care Decreases Cost after Major Spinal Surgery

Daniel A. Carr, Rajiv Saigal, Armagan Dagal

3:45–3:51 pm

103 The Impact of Hospital Safety-Net Burden on Outcomes for Primary Supratentorial Brain Tumor Surgery

Oliver Y. Tang, Anna Kimata, Steven A. Toms

3:51–3:57 pm

104 Medico-legal Implications of Video Recording Patient-provider Communication

Komal Naeeem, Malika Bhargava, Randall W. Porter

3:57–4:03 pm

105 Regional Variation in 90-day Postoperative Costs Among Patients Undergoing Posterior Lumbar Fusion (PLF): Insights from the OPTUM Labs Data Warehouse (OLDW)

Panagiotis Kerezoudis, Mohammed A. Alvi, Anshit Goyal, Yagiz U. Yolcu, Stephanie Payne, Lindsey Sangaralingham, Molly Jeffery, Mohamad Bydon

4:03–4:09 pm

106 Impact of CMS Non-Reimbursement on Hospital-Acquired Conditions Following Spine Procedures

Layton Lamsam, Michael Zhang, Marc Carmichael, Hriday Bhambani, Ian D. Connolly, Tina Hernandez-Boussard, Anand Veeravagu, John K. Ratliff

**SECTION ON CEREBROVASCULAR SURGERY ORAL PRESENTATIONS**

**Room 2014**

3:33–3:39 pm

**GALBRAITH AWARD**

107 Stereotactic Radiosurgery for Pediatric Brain Arteriovenous Malformations: Long-Term Outcomes

Ching-Jen Chen, Cheng-Chia Lee, Kathryn N. Kearns, Dale Ding, Douglas Kondziolka, L. Dade Lunsford, Jason P. Sheehan

3:39–3:45 pm

108 Blockade of the Platelet-driven CXCL7-CXCR1/2 Pathway Prevents Cerebral Aneurysm Formation

Kamil W. Nowicki, Michael P. D’Angelo, Wendy Fellows-Mayle, Michael M. McDowell, Robert M. Friedlander

3:45–3:51 pm

109 Inflammation in Murine Aneurysm Healing: The Role of CXCL1

Devan Patel, Kartik Motwani, Koji Hosaka, Brian L. Hoh

3:51–3:57 pm

110 Treatment of Acutely Ruptured Cerebral Aneurysms with the Woven EndoBridge (WEB) Flow Disruptor: A Multicenter Experience

Fadi Al Saiegh, David M. Hasan, Nikolaos Mouchtouris, Mario Zanaty, Nohra Chalouhi, Ritam Ghosh, Ahmad Sweid, Stavropoula I. Tjoumakaris, M. Reid Gooc, Robert H. Rosenwasser, Pascal Jabbour

3:57–4:03 pm

111 Preventing Microthrombi Formation Improves Function After Subarachnoid Hemorrhage in Mice

Hussein Zeineddine, Spiros L. Blackburn, Remya Veettil, Kanako Matsumura, Devin McBride

4:03–4:09 pm

112 Small Aneurysms with Low Rupture Risk Account for a Majority of Subarachnoid Hemorrhage

Caleb Rutledge, Soren Jonzzon, Ethan A. Winkler, Kunal P. Raygor, Michael T. Lawton, Adib A. Abla

**SECTION ON DISORDERS OF THE SPINE ORAL PRESENTATIONS**

**Room 2016**

3:29–3:35 pm

113 Addition of Fusion to Decompression for Grade I Degenerative Lumbar Spondylolisthesis is Associated with Greater Patient-Reported Outcome Improvements at 24-Month Follow-Up: A Multicenter Study Using the Quality Outcomes Database

3:35–3:41 pm

**Trends in Spine Surgery Training During Neurological and Orthopedic Surgery Residency: A Ten-Year Analysis of ACGME Case Log Data**

Martin H. Pham, Andre M. Jakoi, Arvin R. Wall, Lawrence Lenke

3:41–3:47 pm

**Towards Opioid-Free Elective Spine Surgery: A Prospective Cohort Study**

Ahilan Sivaganesan, Amanda Wright, Regis W. Haid, Jr., Praveen V. Mummaneni, Richard Berkman

3:47–3:53 pm

**The Impact of Preoperative Mindfulness-Based Stress Reduction on Postoperative Patient-Reported Pain, Disability, Quality of Life, and Prescription Opioid Use in Lumbar Spine Degenerative Disease: 3- and 12-Month Results**

Juneyoung L. Chavez, Christina A. Porucznik, Lisa H. Green, Jian Guan, Evan Joyce, Darrel S. Brodke, Andrew T. Dailey, Mark A. Mahan, Robert S. Hood, Brandon Lawrence, William R. Spiker, Nicholas T. Spina, Erica F. Bisson

3:53–3:59 pm

**Changes in the Operative Corridor in Oblique Lumbar Interbody Fusion Between Pre-operative Imaging and Intraoperative Cone-beam Computed Tomography Using Morphometric Analysis**

Aqib Zehri, Hector E. Soriano-Baron, Wesley Hsu, Matthew Neal, Jonathan L. Wilson

3:59–4:05 pm

**Sexual Dysfunction: Prevalence and Prognosis in Patients Operated for Degenerative Lumbar Spondylolisthesis**


4:05–4:11 pm

**Complications of Robotic Spine Surgery**

Daniel Myers, Gordon Mao, Alexander K. Yu, Donald M. Whiting

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**SECTION ON NEUROTRAUMA AND CRITICAL CARE ORAL PRESENTATIONS**
Room 3022

3:34–3:40 pm

**Defining the Somatotopy of the Human Spinthalamic Tract: CT Guided Mapping and Physiologic Responses in Patients Undergoing Awake Percutaneous Cervical Cordotomy**

Michael Honey, Zurab Ivanishvili, Christopher Honey, Manraj S. Heran

3:40–3:46 pm

**Randomized, Double-Blind Trial of Evoked Compound Action Potential (ECAP)-Controlled Closed-Loop Spinal Cord Stimulation for Patients with Chronic Trunk and/or Limb Pain**

Steven M. Falowski

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**SECTION ON PAIN ORAL PRESENTATIONS**
Room 3024

3:37–3:43 pm

**Brain Derived Neurotrophic Factor (BDNF) Val66Met Single Nucleotide Polymorphism (rs6265) is Associated with Decreased Functional Outcome After Traumatic Brain Injury: A Multicenter Cohort Study**


3:43–3:49 pm

**Early Versus Late Surgical Decompression for Acute Spinal Cord Injury: An Individual Patient Data Meta-Analysis of 1,548 Patients**

Jetan H. Badhiwala, Christopher D. Witw, Jeffrey R. Wilson, Michael G. Fehlings

3:49–3:55 pm

**MRI Tracking of iPS Cells-Induced Neural Stem Cells in Traumatic Brain Injury Rats**

Hailiang Tang

3:55–4:01 pm

**The Hematoma Evacuation Score: Reducing 30-day Postoperative Mortality in Intracranial Subdural and Epidural Hematomas**

Andrew K. Rock, Nora T. Poulos, Matthew T. Carr, Alper Dincer, Charles F. Opalak, William C. Broaddus

4:01–4:07 pm

**Traumatic Brain Injury as a Risk Factor for Dementia: An 18-Year, Two Institution Clinical Experience**

Elisabetta Mezzalira, Brittany M. Stopa, Ajaz Khawaja, Saef Izzy, William B. Gormley

4:07–4:13 pm

**THINKFIRST INJURY PREVENTION RESEARCH AWARD**

**Developing an Adjunct to an Electronic Medical Records System in a Developing Country: Establishing the First Electronic Traumatic Brain Injury Database in Yangon, Myanmar**

3:46–3:52 pm  
**129** The Impact of Preventative Multimodal Analgesia on Postoperative Opioid Requirement and Pain Control in Patients Undergoing Lumbar Fusions  
Sharad Rajpal, Steven L. Hobbs, Ewell L. Nelson, Alan T. Villavicencio, Christopher Zielenski, Kara D. Beasley, Vinod Kantha, Jamie Mesenbrink, Sigita Burneikiene

3:52–3:58 pm  
**130** Prescriber Aimed Intervention to Optimize Opioid Prescribing Patterns After Intracranial Surgery: Addressing the Nation’s Opioid Epidemic and Decreasing the Neurosurgeon’s Narcotic Footprint  

3:58–4:04 pm  
**131** Trends in Utilization and Cost of Spinal Cord Stimulation Surgery: Insights from the National Inpatient Sample Database, 2008 to 2014  
Anshit Goyal, Archis Bhandarkar, Mohammed A. Alvi, Yagiz U. Yolcu, Mohammad Bydon

4:04–4:10 pm  
**132** Radiosurgery to the Spinal Dorsal Root Ganglion Induces Fibrosis and Inhibits Peripheral Glial Cell Activation While Preserving Axonal Neurotransmission  
Ezequiel Goldschmidt, Wendy Fellows-Mayle, Ajay Niranjan, John Flickinger, L. Dade Lunsford, Peter C. Gerszten

3:33–3:39 pm  
**133** Intraoperative Detection of Pediatric Brain Tumor Margins Using Raman Spectroscopy.  
Rashad Jabarkheel, Jonathon J. Parker, Chi-Sing Ho, Travis Shaffer, Sanjiv Gambhir, Gerald A. Grant, Derek W. Yecies

3:39–3:45 pm  
**134** Exome Sequencing Implicates SWI/SNF Chromatin Remodeling Genes in Human Congenital Hydrocephalus.  
August A. Allocco, Sheng C. Jin, Weilai Dong, Xue Zeng, Sierra B. Conine, Charuta G. Furey, Priya P. Date, Jonathan Gaillac, Carol Nelson-Williams, Ashley Dunbar, Tyrone DeSpenza, Jr., Engin Deniz, Mustafa K. Khokha, Richard P. Lifton, Kristopher T. Kahle

3:45–3:51 pm  
**135** Intraventricular Hemorrhage Induces Rapid Calcium Signaling and Transcriptional Changes in the Developing Choroid Plexus  
Cameron Sadegh, Huixin Xu, Frederick Shipley, Neil Dani, Maria K. Lehtinen

3:51–3:57 pm  
**136** Risk of Subsequent Primary Cancers After External Beam Radiotherapy Treatment of Pediatric Low Grade Gliomas: A SEER Analysis 1973-2015  
Adrian Rodrigues, Michael C. Jin, Adela Wu, Gordon Li, Gerald A. Grant

3:57–4:03 pm  
**137** The Effectiveness of Medical and Surgical Treatment for Children with Refractory Epilepsy  
Melissa LoPresti, Iwen Pan, Dave Clarke, Sandi Lam

4:03–4:09 pm  
**138** Pediatric Firearm-related Traumatic Brain Injury in United States Trauma Centers  
Hansen Deng, John K. Yue, Ethan A. Winkler, Sanjay S. Dhall, Geoffrey T. Manley, Phiroz E. Tarapore

3:26–3:32 pm  
**139** Integrated Multi-Omics Characterization of Neurofibromatosis Type 1 Related Peripheral Nerve Sheath Tumors Identifies Two Distinct Malignant Peripheral Nerve Sheath Tumors Subtypes with SHH or WNT Pathway Activation  
Suganth Suppiah, Jeff Liu, Qingxia Wei, Yasin Mamatjan, Pardeep Heir, Farshad Nassiri, Sheila Mansouri, Kenneth Aldape, Gelareh Zadeh

3:32–3:38 pm  
**140** Mineral Coated Microparticle Sutures Impregnated with GDNF (Gial Derived Neurotrophic Factor) and NGF (Nerve Growth Factor) Improve Axonal Growth and Functional Recovery in Rat Sciatic Nerve Injuries  
Clayton Haldeman, Amgard S. Hanna

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Suganth Suppiah, Jeff Liu, Qingxia Wei, Yasin Mamatjan, Pardeep Heir, Farshad Nassiri, Sheila Mansouri, Kenneth Aldape, Gelareh Zadeh

3:32–3:38 pm  
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Clayton Haldeman, Amgard S. Hanna

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3:39–3:45 pm  
**134** Exome Sequencing Implicates SWI/SNF Chromatin Remodeling Genes in Human Congenital Hydrocephalus.  
August A. Allocco, Sheng C. Jin, Weilai Dong, Xue Zeng, Sierra B. Conine, Charuta G. Furey, Priya P. Date, Jonathan Gaillac, Carol Nelson-Williams, Ashley Dunbar, Tyrone DeSpenza, Jr., Engin Deniz, Mustafa K. Khokha, Richard P. Lifton, Kristopher T. Kahle

3:45–3:51 pm  
**135** Intraventricular Hemorrhage Induces Rapid Calcium Signaling and Transcriptional Changes in the Developing Choroid Plexus  
Cameron Sadegh, Huixin Xu, Frederick Shipley, Neil Dani, Maria K. Lehtinen

3:51–3:57 pm  
**136** Risk of Subsequent Primary Cancers After External Beam Radiotherapy Treatment of Pediatric Low Grade Gliomas: A SEER Analysis 1973-2015  
Adrian Rodrigues, Michael C. Jin, Adela Wu, Gordon Li, Gerald A. Grant

3:57–4:03 pm  
**137** The Effectiveness of Medical and Surgical Treatment for Children with Refractory Epilepsy  
Melissa LoPresti, Iwen Pan, Dave Clarke, Sandi Lam

4:03–4:09 pm  
**138** Pediatric Firearm-related Traumatic Brain Injury in United States Trauma Centers  
Hansen Deng, John K. Yue, Ethan A. Winkler, Sanjay S. Dhall, Geoffrey T. Manley, Phiroz E. Tarapore
65 ▼ ORAL ABSTRACT PRESENTATIONS

4:08–4:14 pm
146 Functional Recovery via Preregenerated Nerve Graft in Rat Sciatic Nerve Injury Model
Umang Khandpur, Ying Yan, Wilson Z. Ray, Matthew R. MacEwan

SECTION IN STEREOTACTIC AND FUNCTIONAL NEUROSURGERY ORAL PRESENTATIONS
Room 3020

3:34–3:40 pm
147 Early Feasibility Study of a Neurostimulator to Create Artificial Vision
Nader Pouratian, Daniel Yoshor, Soroush Niketeghad, Jessy Dorn, Robert Greenberg

3:40–3:46 pm
148 Distributed Global Functional Connectivity Networks Predict Responsiveness to L-DOPA and Subthalamic Deep Brain Stimulation
Chengyuan Wu, Thomas Foiltynie, Patricia Limousin, Ludvic Zrinzo, Harith Akram

3:46–3:52 pm
STEREOTACTIC AND FUNCTIONAL NEUROSURGERY RESIDENT AWARD
149 A Fully Implantable Brain Machine Interface for Volitional Hand Grasp Restoration in Cervical Quadriplegia
Iahn Cajigas, Noeline W. Prins, Sebastian Gallo, Jasim A. Naeeem, Santiago Guerra, Brandon Parks, Anne Palermo, Audrey Wilson, Letitia Fisher, Steven Vanni, Michael E. Ivan, Abhishek Prasad, Jonathan R. Jagid

3:52–3:58 pm
150 Tackling Big Data in Human Intracranial EEG Recordings
Patrick J. Karas, John F. Magnotti, Zhengjia Wang, Daniel Yoshor, Michael S. Beauchamp

3:58–4:04 pm
151 Thalamic Arousal Network Disturbances in Temporal Lobe Epilepsy and Improvement After Surgery
Dario J. Englot, Srijata Chakravorti

4:04–4:10 pm
152 Sphenopalatine Ganglion Stimulation Upregulates Transport of Intra-arterial Temozolomide Across the Blood-Brain Barrier
Thana N. Theofanis, Ankit Rochani, Richard F. Schmidt, Michael J. Lang, Geoffrey Stricsek, Gagan Kaushal, Lorraine Iacovitti, Ashwini D. Sharan, Robert H. Rosenwasser

SECTION ON TUMORS ORAL PRESENTATIONS
Room 3014

3:34–3:40 pm
ROSENBLUM/MAHALEY CLINICAL RESEARCH AWARD
153 First in Human Phase I Trial of Dual Vector (HSV1-TK, Fit3L) Immunotherapy for the Treatment of Newly Diagnosed High-Grade Glioma: Initial Results

3:40–3:46 pm
JOINT SECTION ON TUMOR NEURO-ONCOLOGY TRAINEE AWARD
154 Combination Immune Treatment of a Highly Aggressive Orthotopic Murine Glioblastoma with Checkpoint Blockade Inhibition and Neoantigen Vaccination
Connor Liu, Maximilian Schaefttler, Jay Bowman-Kirigin, Diane Bender, Dale K. Kobayashi, Chris A. Miller, Tanner M. Johanns, Gavin P. Dunn

3:46–3:52 pm
AMERICAN BRAIN TUMOR ASSOCIATION YOUNG INVESTIGATOR AWARD
155 BiTE-armored CAR T Cells Overcome Antigen Escape from EGFRvIII-Targeted Therapy for Glioblastoma
Bryan D. Choi, Xiaoling Yu, Ana P. Castano, Amanda A. Bouffard, Andrea Schmidts, Rebecca C. Larson, Stefanie R. Bailey, Angela C. Bouroughs, Matthew J. Frigault, Mark B. Leick, Irene Scarfo, Curtis L. Cetrulo, Shadmehr Demehri, Brian V. Nahed, Daniel P. Cahill, Hiroaki Wakimoto, William T. Curry, Bob S. Carter, Marcela V. Maus

3:52–3:58 pm
PREUSS RESEARCH AWARD
156 Immuno-stimulatory Effects of Mechanical and Thermal High Intensity Focused Ultrasound
James Wang, Chih-Hsin Huang, Oscar H. Echeagaray, Siamak Amirfakhri, Sarah L. Blair, William C. Trogler, Andrew C. Kummel, Clark C. Chen

3:58–4:04 pm
JOINT SECTION SKULL BASE SURGERY AWARD
157 Dural Venous Sinus Thrombosis After Vestibular Schwannoma Surgery: The Anticoagulation Dilemma

4:04–4:10 pm
INTEGRA FOUNDATION AWARD
158 Candidate Regulatory Elements in Coding and Noncoding Regions are Associated with Invasive Behavior in Pituitary Tumors
**CSNS CASE-BASED DISCUSSION ORAL PRESENTATIONS**

Room 3016

5:16–5:22 pm

**400** Disparities in Patient Outcomes After Elective Lumbar Fusions in Single-Level Lumbar Disc Pathologies
Abhinav K. Reddy, Philip B. Ostrov, James S. Ryoo, Soobin Kim, Ankit Indravadan Mehta

5:22–5:28 pm

**401** A Multidisciplinary Spine Clinic Model Significantly Reduces Lead Times for Appropriate Specialist Visit and Appropriate Intervention in an Underserved Population: A Case Control Pilot Study
Michael Longo, Yaroslav J. Gelfand, Andrew I. Gitkind, Reza Yassari, Vijay Yanamadala

5:28–5:34 pm

**402** The Potential Effect of Racial Disparities on Outcomes After Spine Surgery: A Michigan Spine Surgery Improvement Collaborative (MSSIC) Study
Mohamed Macki, Michael Bazydlo, Hesham M. Zakaria, Lonni Shultz, Jad Khalil, Mick J. Perez-Cruet, Ilyas Alieem, Paul Park, David Nerenz, Jason M. Schwalb, Muwaffak Abdulhak, Victor W. Chang

5:34–5:40 pm

**403** Cervical Spine Surgery: Improved Surgical Outcomes Using Enhanced Recovery After Surgery (ERAS) Pathways
Ryan P. Monaghan, Mary K. Robertson, Scott C. Robertson

**CEREBROVASCULAR OPERATIVE TECHNIQUES AND CASE-BASED DISCUSSION ORAL PRESENTATIONS**

Room 2014

4:36–4:42 pm

**404** Use of Virtual Reality Platforms in the Preoperative Planning and Intraoperative Navigation of Deep-seated Cavernomas
Carolina Gesteira-Benjamin, Omar Tanweer, Monica Mureb, Keiji Drysdale, Timothy M. Shepherd, John G. Golfinos, Howard A. Riina

4:42–4:48 pm

**405** Direct Access Embolization of Intracranial Vascular Pathology: Preliminary Experience and Technical Notes
Min S. Park, Daniel Raper, Stepan Capek, Jeffrey Hakim, David Asuzu, M. Yashar S. Kalani

4:48–4:54 pm

**406** Morphometric Comparison of the Pterional Trans-sylvian and the Pretemporal Trans-clinoidal Approaches to Posterior Communicating Artery Aneurysms: Anatomical Study

4:54–5:00 pm

**407** Accessing the Medial Surface of the Paraclinoid Internal Carotid Artery via the Contralateral Inter-optic Trajectory: An Anatomical Study
Xiaochun Zhao, Ali Tayebi-Meybodi, Mohamed Labib, Evgenii Belykh, Leandro Borba Moreira, Sirin Gandhi, Peter Nakajii, Mark C. Preul, Michael T. Lawton

**SPINE OPERATIVE TECHNIQUES AND CASE-BASED DISCUSSION ORAL PRESENTATIONS**

Room 2016

4:36–4:42 pm

**408** Outcomes of Surgical Treatment for 138 Patients with Severe Sagittal Deformity at a Minimum 2-Year Follow Up
Justin K. Scheer, Lawrence Lenke, Justin S. Smith, Peter G. Passias, Han Jo Kim, Shay Bess, Themistocles Protopsaltis, Douglas C. Burton, Eric Klineberg, Virginie Lafage, Frank Schwab, Christopher I. Shaffrey, Sr., Christopher P. Ames

4:42–4:48 pm

**409** C2 versus C3 as the Upper Instrumented Vertebra for Cervicothoracic Posterior Laminctomy and Fusion Demonstrate Equivalent Postoperative Outcomes
Ryan K. Badiee, Andrew Kai-Hong Chan, Joshua Rivera, Chih-Chang Chang, Dean Chou, Praveen V. Mummaneni, Lee A. Tan

4:48–4:54 pm

**410** Preoperative SPECT Imaging as a Tool for Surgical Planning in Patients with Axial Neck and Back Pain
G. Damian Brusko, Roberto Perez-Roman, Harold Tampano, Michael Y. Wang

4:54–5:00 pm

**411** A Comparison of Minimally Invasive and Open Transforaminal Lumbar Interbody Fusion for Grade 1 Degenerative Lumbar Spondylolisthesis: An Analysis of the Prospective Quality Outcomes Database

**NEUROTRAUMA OPERATIVE TECHNIQUES AND CASE-BASED DISCUSSION ORAL PRESENTATIONS**

Room 3022

4:15–4:21 pm

**412** Important Predictors of In-hospital Mortality in Patients with Acute Subdural Hematomas using Machine Learning
Aaron McPheters, Andrew Donovan, Nicolas K. Khattar, Jacob R. Shpilberg, Kevin John, Quan H. Do, Daniella Patton, Emily P. Sieg
**PAIN OPERATIVE TECHNIQUES AND CASE-BASED DISCUSSION ORAL PRESENTATIONS**

**Room 3024**

5:06–5:12 pm  
**416** Flat Panel Fluoroscopy (O-arm) Guided Percutaneous Radiofrequency Anterolateral Cordotomy.  
Zaid Aljuboori, Joseph Samir Neimat

5:12–5:18 pm  
**417** Bi-Plane Fluoroscopic-Guided Balloon Rhizotomy for Trigeminal Neuralgia: A Technical Note  

5:18–5:24 pm  
**418** Complex Regional Pain Syndrome and Failed Back Surgery Syndrome with Failed High-Frequency Spinal Cord Stimulation Salvaged with Arthrodesis Revision Surgery and Burst Therapy.  
Erin McCormack, Mansour H. Mathkour, Lora Wallis-Kahn, Maged Guirguis, Gassan Chaiban, Reda Tolba, Daniel Denis

5:24–5:30 pm  
**419** Onyiuke Grading Scale: A Clinical Classification System for the Diagnosis and Management of Bertolotti Syndrome  
Joshua Knopf, Subin Lee, Ketan R. Bulsara, Hilyar C. Onyiuke, David B. Choi, Isaac Moss

**PEDIATRICS OPERATIVE TECHNIQUES AND CASE-BASED DISCUSSION ORAL PRESENTATIONS**

**Room 3018**

4:36–4:42 pm  
**420** True FISP Cardiac Gated CSF Flow Dynamic Imaging of Chiari Malformation  
Alon Kashanian, Moise Danielpour
4:57–5:03 pm

**430 Step-wise Algorithm for Skull Base Reconstruction in Endoscopic Endonasal Surgery: From the Simple to the Complex**
Maria Belen Vega, Philippe Lavigne, Vanessa Hernandez-Hernandez, Aldo Egiluz-Menendez, Eric Wang, Carl H. Snyderman, Paul A. Gardner

5:03–5:09 pm

**431 Surgical Nuances of Endoscopic Endonasal Upper Clivectomy for Radical Resection of Central Skull Base Tumors: 2-Dimensional Operative Videos**
Alhusain Nagm, Takeo Goto, Kenji Ohata

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**THE INTERNATIONAL CEREBROVASCULAR SYMPOSIUM ORAL PRESENTATIONS**
Room 3003

6:39–6:45 pm

**500 Analysis of Gene Expression in Intracranial Aneurysms**
Jia Wang

6:45–6:51 pm

**501 Comparative Effectiveness of Preventive and Treatment Interventions for Cerebral Hyperperfusion Syndrome Following Bypass Surgery**
Georgios P. Skandalakis, Aristotelis Kalyvas, Evgenia Lani, Spyridon Komaitis, Despoina Chatzopoulou, Danai Manolakou, Nikos Pantazis, Georgios A. Zenonos, Constantinos G. Hadjipanayis, George S. Stranjalis, Christos Koutsarnakis

6:51–6:57 pm

**502 Association of SOX17 Gene Polymorphisms and Intracranial Aneurysm: A Case-Control Study and Meta-analysis**
Museung Park, Yong-Jun Cho, Jin Sue Jeon

6:57–7:03 pm

**503 Clinical Significance of Conversion from Computational Fluid Dynamics to Morphology for Risk Evaluation of Aneurysm Recurrence After Coiling**
Kouichi Misaki, Iku Nambu, Takehiro Uno, Akifumi Yoshikawa, Naoyuki Uchiyama, Mitsutoshi Nakada

7:03 –7:09 pm

**504 Application of Intraoperative Electrococtographic in Precise Bypass Surgery of Adult Moyamoya Disease: A Preliminary Study**
Yu Lei

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**THE INTERNATIONAL FUNCTIONAL NEUROSURGERY SYMPOSIUM ORAL PRESENTATIONS**
Room 3002

6:39–6:45 pm

**505 Mesial Temporal Lobe Epilepsy: Role of Reelin Signalling Pathway**
Tulika Gupta, Mandeep Kaur, Navneet Singla, Bishan Radotra, Sunil Kumar Gupta, Daisy Sahni

6:45–6:51 pm

**506 Asymmetric Deep Brain Stimulation Electrodes for Parkinson’s Disease: A Pilot Study of Symptom-tailored Stimulation**
Chencheng Zhang, Linbin Wang, Leonardo Almeida, Bomin Sun, Dianyou Li

6:51–6:57 pm

**507 Sex Difference in Language Processing in Patients with Malignant Brain Tumors**
Shun Yao, Einat Liebenthal, Parikshit Juvekar, Adomas Bunevicius, Matthew Vera, Laura Rigolo, Alexandra J. Golby, Yanmei Tie

6:57–7:03 pm

**508 Multi-modal Presurgical Evaluation of Refractory Localization-related Epilepsy Involving Mesial Temporal Lobe Structures**
Rui Feng, Jie Hu, Chengxin Ma, Zhen Fan, Liqin Lang, Bing Sun, Jinsong Wu, Li Pan

7:03 –7:09 pm

**509 Language Localisation in Multilingual Patients – Evidence from Direct Electrical Stimulation: A Systematic Review and Single Institution Case Series**
Colin Teo Kok Ann, Djaina Satoer, Hui Minn Chan, Marco Rossi, Tseng Tsai Yeo, Yi Ting Emily Guo, Ne Hooi Will Loh, Elke De Witte, Kejia Teo
ORAL ABSTRACT PRESENTATIONS
TUESDAY, OCTOBER 22

SUNRISE SCIENCE ORAL PRESENTATIONS SESSION
Room 3016
7:00–7:06 am
320 Does Hospital For-Profit Status Affect Intracranial Hemorrhage Outcomes and Cost of Care?
Ryan G. Chiu, Blake Murphy, David Rosenberg, Amy Zhu, Ankit I. Mehta

7:06–7:12 am
321 Workplace Violence and Neurosurgical Practice: Insights from the CSNS Workplace Violence Survey
Tyler Schmidt, Samuel Tomlinson, Kristopher T. Kimmell, Joshua M. Rosenow, Jeremy T. Phelps

7:12–7:18 am
322 Factors and Trends Associated with NIH Funding for Neurosurgeons over 25 years
Ankush Chandra, Arman Jahangiri, Patrick M. Flanigan, Maxine Arnush, Jonathan W. Rick, Sarah Choi, Alvin Chou, Mitchel S. Berger, Manish K. Aghi

7:18–7:24 am
323 Variation in 90-day Postoperative Costs Among Patients Undergoing Elective Anterior Cervical Discectomy and Fusion: Insights from the OPTUM Labs Data Warehouse (OLDW)
Panagiotis Kerezoudis, Mohammed A. Alvi, Anshit Goyal, Yagiz U. Yolcu, Stephanie Payne, Lindsey Sangaralingham, Molly Jeffery, Mohamad Bydon

7:24–7:30 am
324 This Is Not Brain Surgery: Increasing Neurosurgical Knowledge and Retention in Medical Students Through Usage of a Video-Based Education Curriculum
Carl Gustaf Stefan Axelsson, William T. Curry, Michael G. Healy, Emil Petrusa, Deborah M. Rooney, Traci Wolbrink, Roy Phitayakorn

7:30–7:36 am
325 Video Recording Patient Visits to Improve Patient Satisfaction and HCAHPS Scores
Malika Bhargava, Komal Naeem, Randall W. Porter

7:36–7:42 am
326 Trends in Neurosurgical Fellowship Training in North America over Two Decades 1997-2016
Ankush Chandra, Michael G. Brandel, John K. Yue, Lauro Avalos, Michael W. McDermott, Mitchel S. Berger, Manish K. Aghi

7:42–7:48 am
327 Surgical Epilepsy Care in a Safety-Net and Private Healthcare System: A Comparative Analysis

7:48–7:54 am
328 Factors Associated with Cost of 30-day and 90-day Readmissions Following Anterior Cervical Discectomy and Fusion: Insights from the Nationwide Readmissions Database
Anshit Goyal, Archis Bhandarkar, Mohammed A. Alvi, Mohamad Bydon

7:54–8:00 am
329 Socioeconomic Impacts of Opioid Dependence on Spinal Decompression and Fusion at Any Level: Analysis of a Nationwide Database
Andrew J. Caras, William K. Miller, Weikai Qu, Jason L. Schroeder, Azedine Medhkour

8:00–8:06 am
330 Health Literacy Among Surgical Subspecialties: Readability of Online Patient Materials for Surgical Procedures
Rosemary Behmer-Hansen, Meeki Lad, Justin L. Gold, Raghav Gupta, Somnath Ganapa, Antonios Mammis

8:06–8:12 am
331 Cost Variability for Four Common Neurosurgical Procedures in the United States
Hammad A. Khan, Konrad Knusel, Joseph E. Tanenbaum, Thomas E. Mroz, Edward C. Benzel, Deborah L. Benzel, Michael P. Steinmetz, Sebastian Salas-Vega

8:12–8:18 am
332 Analysis of Variables Associated with Number of Neurosurgical Residency Interview Invitations using a Survey Database
Anthony Nguyen, Wil Coggins, Elizabeth Nyabuto, Joseph R. McFarland, III, Daniel Branch, Rishi R. Lall

8:18–8:24 pm
333 Reducing Neurosurgery Craniotomy Surgical Site Infections: A Quality Improvement Project
Clifford Crutcher, Adam Podet, Frank Culicchia

8:24–8:30 am
334 Implementation of an Inpatient Neurosurgical Advanced Practice Nursing Role Reduces 30-Day Readmissions and Post-operative Wound Infections
Adam Podet, Kevin D. Morrow, Anthony M. DiGiorgio, Jessica Shields, Taylor Wapshott-Girolamo, Bonnie Koepp, Gabriel C. Tender, Jason D. Wilson
7:06–7:12 am
331 PROMIS-29 Validity and Conversion Equation to Neck Disability Index (NDI) Using a National Sample of Cervical Spine Surgery Patients
Inamullah Khan, Jacquelyn S. Pennings, Claudia Davidson, Mohamad Bydon, Anthony L. Asher, Clinton J. Devin, Kristen Archer-Swygert

7:12–7:18 am
332 Genomic Landscape of Intramedullary Spinal Cord Tumors Suggests Distinct Genetic Origins Compared to Intracranial Histopathologic Counterparts

7:18–7:24 am
333 Surgical Treatment of Cervical Spondylotic Myelopathy Leads to Functional Improvement in Hand Strength and Dexterity: A Prospective Quantitative Study
Tyler S. Cole, Kaith K. Almefty, Jakub Godzik, Randall Hlubek, Jay D. Turner

7:24–7:30 am
334 Neuro-Spinal Scaffold™ Implantation in Patients with Acute Traumatic Thoracic Complete Spinal Cord Injury: Twenty-Four Month Results from the INSPIRE Study
Kee D. Kim, K. Stuart Lee, Jason J. Chang, Richard M. Toselli

7:30–7:36 am
335 Does ACR Result in Greater Morbidity than LLIF Alone When Treating Adult Spinal Deformity?
Adam S. Kanter, Robert Eastlack, Juan S. Uribe, Richard G. Fessler, Khoi D. Than, Stacie Tran, Dean Chou, Kaiming Fu, Paul Park, Michael Y. Wang, David O. Okonkwo, Pierce D. Nunley, Neel Anand, Gregory M. Mundis, Jr., Praveen V. Mummaneni, Dean Chou, Sheeraz Qureshi

7:36–7:42 am
336 Anterior Lumbar Interbody Fusion (ALIF) Versus Oblique Lateral Interbody Fusion (OLIF) at L5-S1: A Comparison of Two Approaches to the Lumbosacral Junction
Zhuo Xi, Shane Burch, Chih-Chang Chang, Hui-bing Ruan, Charles M. Eichler, Praveen V. Mummaneni, Dean Chou

7:42–7:48 am
337 Treatment of Adult Scoliosis Fractional Curve with Minimally Invasive Surgery: Anterior Versus Posterior Approach?

8:00–8:06 am
915 Anterior Approach versus Posterior Approach in the Treatment of Cervical Spondylotic Myelopathy: A Prospective, Randomized Study
Nasser M.F. El-Ghandour, Mohamed A.R. Soliman, Ahmed A.M. Ezzat, Amr Ashraf, Mostafa Z. El-Abdeen

8:06–8:12 am
916 Large Increases in Lumbar Fusions Expected in the United States by 2060
Sean N. Neifert, Jeffrey Gilligan, Robert J. Rothrock, Jeffrey H. Zimering, John M. Caridi, Eric K. Oermann

8:12–8:18 am
917 Evaluation of Single Level Cervical Disc Arthroplasty in Advanced Degenerative Disc Disease
Nathan L. Pratt, Charles A. Sansur, Kenneth M. Crandall, George A. Crabill

8:18–8:24 am
918 Key Drivers of Patient Satisfaction in the Outpatient Spine Surgery Setting
Nicholas M. Rabah, Jay M. Levin, Robert Winkelman, Thomas E. Mroz, Michael P. Steinmetz

8:24–8:30 am
919 The Safety and Efficacy of Riluzole in Enhancing Clinical Outcomes in Patients undergoing Surgery for Cervical Spondylotic Myelopathy: Results of the CSM-Protect Double-blinded, Multi-center Randomized Controlled Trial in 300
**SUNRISE SESSION ORAL PRESENTATIONS SESSION**

Room 3018

7:00–7:06 am
340 Firearm Injuries Cause Disproportionate Mortality in Pediatric Traumatic Brain Injury
Saksham Gupta, Blake M. Hauser, Mark M. Zaki, David J. Cote, Saef Izzy, Timothy R. Smith, Ayaz M. Khawaja

7:06–7:12 am
341 Exome Sequencing Defines the Molecular Pathogenesis of Vein of Galen Malformation

7:12–7:18 am
342 Elbow Flexion in Neonatal Brachial Plexus Palsy: A Meta-Analysis of Graft Versus Transfer
Muhibullah S. Tora, Nathan Hardcastle, Pavlos Texakalidis, Jeremy Wetzel, Joshua J. Chern

7:18–7:24 am
343 Prognostic Value of Leucocytosis in Pediatric Traumatic Brain Injury
Soumya Mukherjee, Gnanamurthy Sivakumar, John Goodden, Atul Tyagi, P.D. Chumas

7:24–7:30 am
344 A Comparison of Parent and Child Evaluations of Quality of Life in Pediatric Neurosurgery
Eric Goethe, Melissa LoPresti, Michelle Yifan Zhao, I-Wen Pan, Sandi Lam

7:30–7:36 am
345 Gene Mutations Related to Pathogenesis and Development of Cerebral Arteriovenous Malformations in Pediatric Populations
Rebecca Y. Du, Melissa LoPresti, Vijay Ravindra, Ionela Iacobas, Katie Bergstrom, Eric A. Goethe, Sandi Lam

7:36–7:42 am
346 Traumatic Spinal Injuries Cause Disproportionate Morbidity in Sports-related Pediatric Trauma
Blake M. Hauser, Saksham Gupta, David J. Cote, Mark M. Zaki, Edward Xu, Ayaz M. Khawaja, Yi Lu, Michael W. Groff, Timothy R. Smith, Hasan A. Zaidi

7:42–7:48 am
347 Early Outcome of Endoscopic Third Ventriculostomy with or without Choroid pPexus Cauterization and Ventriculoperitoneal Shunt as Primary Treatment of Hydrocephalus in Infants with Myelomeningocele
Bamidele Oludele Adebayo, Okezie Kanu, Olufemi B. Bankole, Omotayo Ojo

7:48–7:54 am
348 Complications in Children with Ehlers-Danlos Syndrome Following Spine Surgery: Analysis of the Pediatric National Surgery Quality Improvement Program Database
Abhijit V. Matur, Aria Nouri, Shenwen Huang, Nora C. Elson, William J. Jeong, Karin S. Bierbrauer, Francesco T. Mangano, Joseph S. Cheng

7:54–8:00 am
349 Surgical Management of Tumors Involving the Cerebello-Medullary Angle: Anatomical Classification, Technique and Retrospective Analysis of 90 Pediatric Patients
Jaafar Basma, Paul Klimo, Jr.

8:00–8:06 am
920 Developmental Pleiotropy of PTEN in Congenital Hydrocephalus and Autism Spectrum Disorder
Tyrone DeSpenza, Jr., Maryam Zekevat, Stephanie Getz, Sheng C. Jin, Weilai Dong, Carol Nelson-Williams, Duy Phan, Sierra B. Conine, August A. Allocco, Jason K. Karimy, Murat Gunel, Richard P. Lifton, Bryan Luikart, Kristopher T. Kahle

8:06–8:12 am
921 Damaging Mutations in EphrinB2-EphB4-RASA1 Signaling Underlie Vein of Galen Malformation

8:12–8:18 am
922 Challenges in Management of Pediatric Fossa Tutors: Indian Experience
Kamlesh S. Bhalisara

8:18–8:24 am
923 Finite Element Optimization of an Intervertebral Disc Replacement for Treating Scoliosis

8:24–8:30 am
924 Management of Infectious Complications in Pediatric ITB: a Meta-analysis
Mohammed Nuru, Benton Maglinger, Ian S. Mutchnick
COUNCIL OF STATE NEUROLOGICAL SOCIETIES ORAL PRESENTATIONS
Room 3016

3:27–3:33 pm
SAMUEL HASSENBUSCH YOUNG NEUROSURGEON AWARD

159 Simulating Costs for Episode-Based Bundled Payments for Cranial Neurosurgical Procedures
Zachary A. Medress, Beatrice Ugiliweneza, Jonathon J. Parker, Dengzhi Wang, Eric Burton, Shiao Y. Woo, Loren Baker, Maxwell Boakye, Stephen Skirboll

3:33–3:39 pm

160 The Impact of Single-Vendor Procurement of Spinal Implants: An Analysis of Cost Savings and Surgical Quality at an Academic Hospital
Collin Blackburn, Nicolas Thompson, Joseph E. Tanenbaum, Thomas E. Mroz, Michael P. Steinmetz

3:39–3:45 pm

161 Trending Racial and Socioeconomic Inequality in the Surgical Management and Outcome of Traumatic Cervical Spinal Cord Injury With Fracture In the USA from 1998-2009
Alexander Dru, Dan Neal, W. Christopher Fox, Brian L. Hoh, Daniel J. Hoh

3:45–3:51 pm

162 Association Between Interhospital Competition and Hospital Resource Use for Cranial Neurosurgery: Analysis of 513,271 Admissions
Oliver Y. Tang, Krissia M. Rivera-Perla, Steven A. Toms

3:51–3:57 pm

163 Bundle Payment, Health Care Utilization and Outcomes Following Surgery for Anterior, Middle and Posterior Cranial Fossa Skull Base Meningioma: A Market Scan Analysis
Mayur Sharma, Beatrice Ugiliweneza, Maxwell Boakye, Norberto O. Andaluz, Brian J. Williams

3:57–4:03 pm

164 Patient Reported Outcomes Following Surgery for Lumbar Disc Herniation: Comparison of a Universal and Multitier Health Care System
Oliver G.S. Ayling, Tamir T. Ailon, Nicolas Dea, Charles Fisher

4:03–4:09 pm

165 Length of Stay and Disposition of Patients Undergoing Elective Spine Surgery in Maryland: Impact of the Global Budget Revenue Program
Berje H. Shammassian, Andrew Ahn, Debraj Mukherjee

4:09–4:15 pm

166 The Cost-Effectiveness of Epilepsy Surgery and Surgical Evaluation in the United States
Shehryar R. Sheikh, Michael P. Steinmetz, Michael W. Kattan, Mendel Singer, Belinda Udeh, Lara Jehi

SECTION ON CEREBROVASCULAR SURGERY ORAL PRESENTATIONS
Room 2014

3:27–3:33 pm

167 Mechanical Thrombectomy in Acute Ischemic Stroke: A Meta-Analysis of Stent Retrievers Versus Direct Aspiration Versus a Combined Approach
Pavlos Texakalidis, Stefanos Giannopoulos, Theofilos Karasavvidis, Leonardo Rangel-Castilla, Dennis J. Rivet, John F. Reavey-Cantwell

3:33–3:39 pm

168 Percutaneous Trans-carotid Puncture for Mechanical Thrombectomy in Acute Ischemic Stroke Patients is Safe and Effective: A Large, Single-center Case Series
Brandon J. Cord, Anson Wang, Fouad Chouairi, Andrew Koo, Carl Porto, Andrew Silverman, Sreeja Kodali, Sumita Strander, Guido Falcone, Kevin Sheth, Ryan M. Hebert, Lauren Sansing, Joseph Schindler, Nils Petersen, Charles C. Matouk

3:39–3:45 pm

169 A Phase I/II, Prospective Multi-Center Study of the Safety and Preliminary Efficacy of Intravenous Allogeneic Mesenchymal Bone Marrow Cells in Chronic Ischemic Stroke
Michael L. Levy, John Crawford, Nabil Dib, Lev Verkh, Nikolai Tankovich, Steven C. Cramer

3:45–3:51 pm

170 MicroRNA-26b/PTEN Signaling Pathway Mediates Glycine-induced Neuroprotection in SAH Injury
Xingping Qin

3:51–3:57 pm

171 Elucidating a Proteomic Signature for the Detection of Intracerebral Aneurysms
Dominic A. Nistal, Michael L. Martini, Trevor Hardigan, Nicolas Fernandez, Seunghue Kim-Schulze, Rui Song, Natalia Romano-Spica, Julianne Kleitsch, J D. Mocco, Christopher P. Kellner

3:57–4:03 pm

172 Bone Marrow T-cell Sequestration and Lymphopenia Accompanying Ischemic Stroke are Mediated by T-cell S1P1 Loss
Pakawat Chongsathidkiet, Cosette Dechant, Daniel Wilkinson, Haichen Wang, Hanna Kemeny, Xiuyu Cui, Selena Lorrey, Daniel T. Laskowitz, Peter E. Fecci

4:03–4:09 pm

173 Vitamin D: A New Perspective in Treatment of Cerebral Vasospasm After Subarachnoid Hemorrhage
Sepide Kashefiolasl, Matthias Leisegang, Valeska Helfinger, Christoph Schürmann, Beatrice Pflüger-Müller, Voahanginirina Randriamboavonjy, Andrea Estefy-Vasconez, Geert Carmeliet, Klaus Badenhoop, Gudrun Hintereder, Volker Seifert, Katrin Schröder, Juergen Konczalla, Ralf Brandes
SECTION ON DISORDERS OF THE SPINE AND PERIPHERAL NERVES ORAL PRESENTATION

Room 2016

3:29–3:35 pm

175 Stereotactic Radiation Therapy (SBRT) Versus External Beam (EB) Radiation for Metastatic Spine Disease: Comparing Fracture Rates and Local Control
Enrique Vargas, Steve Braunstein, Matthew Susko, Praveen V. Mummaneni, Dean Chou

3:35–3:41 pm

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

3:41–3:47 pm

177 The Safety of Per Os Naloxone and its Efficacy in Resolving Postoperative Ileus in Patients Undergoing Spine Surgery
Karam P. Asmaro, Eric Klomparsen, Jacob A. Pawloski, Sameah A. Haider, Hesham M. Zakaria, Mathew Jones, Beverly C. Walters, Jason M. Schwalb

3:47–3:53 pm

178 Long-term Outcomes of High-dose Single-fraction Radiosurgery for Chordomas of the Spine and Sacrum
Jenny Jin, John Berry-Candelario, Jr., Y. Josh Yamada, Daniel Higgenson, Adam Schmitt, Anne Reiner, Eric Lis, Ori Barzilai, Ilya Lafer, Mark H. Blisky

3:53–3:59 pm

179 The Association of Intraoperative Antibiotic and Surgical Site Infection After Lumbar Spine Surgery: Analysis of the Michigan Spine Surgery Improvement Collaborative

3:59–4:05 pm

180 The Association Between Chronicity of Preoperative Opioid Usage Between Patient Satisfaction, Return to Work, and Achieving ODI MCID up to 2 Years After Lumbar Fusion: Analysis from the Michigan Spine Surgery Improvement Collaborative (MSSIC)

4:05–4:11 pm

181 Is Obtaining a CT Prior to Offering Anterior Cervical Disc Arthroplasty (ACDA) Necessary? The Results of Surgeons Predicting ACDA Candidacy from MRIs and X-Rays Alone

4:11–4:17 pm

182 Effect of Cage Type on Immediate Post-operative Radiographic Outcomes in Single-level Minimally Invasive Transforaminal Lumbar Interbody Fusion (MI-TLIF)
Avani Vaishnav, Joshua Wright-Chisem, Michael Steinhaus, Steven Mcanany, Srvastv Iyer, Todd Albert, Catherine Gang, Sheeraz Qureshi

SECTION ON NEUROTRAUMA AND CRITICAL CARE ORAL PRESENTATIONS

Room 3022

3:28–3:34 pm

183 The Effect of Supplementation of Vitamin D in Neurocritical Care Patients with Hypovitaminosis D: A Randomized Controlled Clinical Trial
Andrea Archambault-Brock, Michael Karsy, Jian Guan, Ilyas Eli, Sarah T. Menacho, Min S. Park

3:34–3:40 pm

184 Effects of ISO-alpha-acids on the Hematoma Volume, Inflammation and Neurological Functions in ICH Rats and its Potential Mechanism
Jian-Lan Zhao, Rong Xie, Jin Hu

3:40–3:46 pm

Jetan H. Badhiwala, Christopher D. Witiw, Jefferson R. Wilson, Michael G. Fehlings

3:46–3:52 pm

186 Same Day Surgical Intervention Dramatically Minimizes Complication Occurrence and Optimizes Perioperative Outcomes for Central Cord Syndrome
Cole Bortz, Avery Brown, Haddy Alas, Katherine Pierce, M. Burhan Janjuha, Paul Park, Dimitrios C. Nikas, Aaron Hockley, Alexandra Soroceanu, Rafael De la Garza-Ramos, Daniel M. Scibba, Anthony K. Frempong-Boadu, Dennis Vasquez-Montes, Bassel G. Diebo, Michael Gerling, Peter G. Passias

3:52–3:58 pm

187 Deviation from Dynamic and Personalized Optimal Blood Pressure Targets is Associated with Worse Functional Outcomes After Aneurysmal Subarachnoid Hemorrhage
Andrew Silverman, Sreeja Kodali, Sumita Strander, Emily Gilmore, Alexandra Kimmel, Anson Wang, Branden J. Cord, Guido Falcone, Ryan M. Hebert, Charles C. Matouk, Kevin Sheth, Nils Petersen
3:58–4:04 pm

**188 PET Imaging of Neurodegeneration with [18F]AV-1451 PET After Repetitive Traumatic Brain Injury**
Matthew Mesley, Ross Puffer, Charles Laymon, Brian Lopresti, Kathryn Edelman, Jane Sharpless, Julia Billigen, Tiffany Wilkins, Ava Puccio, Chet Mathis, James Mountz, David O. Okonkwo

4:04–4:10 pm

**189 Delayed Restart of Antithrombotic Therapy and Rates of Adverse Events in Subdural Hematomas**

**SECTION ON PAIN ORAL PRESENTATIONS**
Room 3024

3:29–3:35 pm

**190 Sex-specific Transcriptomic Differences from Human Dorsal Root Ganglia Associated with Painful Radiculopathy**
Robert Y. North, Yan Li, Pradipta Ray, Laurence D. Rhines, Claudio E. Tatsui, Ganesh Rao, Yeun H. Kim, Bo Zhang, Greg Dusser, Tae H. Kim, Theodore Price, Patrick M. Dougherty

3:35–3:41 pm

**191 Protocolized High-Dose (HD) and Low-Dose (LD) Spinal Cord Stimulation (SCS) Workflow Results in Meaningful Pain and Opiate Reduction.**
Sarah E. Hodges, Shervin Rahimpour, Luis A. Antezana, Abena A. Ansah-Yeboah, Rajeev Dharmapurikar, John Hatheway, Michael Warrick, Scott Berlin, Benjamin Seeman, Shivanand P. Lad

3:41–3:47 pm

**192 Internal Neurolysis With and Without Microvascular Decompression for Trigeminal Neuralgia**
Victor Sabourin, Jacob Mazza, Tomas Garzon-Muvdi, Donald Y. Ye, Anthony Stefanelli, Fadi Al Saiegh, Daniel Tzou, James J. Evans

3:47–3:53 pm

**193 Earlier Radiosurgery Leads to Better Pain Relief and Less Medication Usage for Trigeminal Neuralgia Patients: An International, Multi-center Study**
Monica Mureb, Danielle Golub, Carolina G. Benjamin, Ben A. Strickland, Gabriel Zada, Eric L. Chang, Ronald E. Warnick, Herwin Speckter, Skyler Eastman, Anthony M. Kaufmann, Caleb E. Feliciano, Carlos Carbini, William Leduc, David Mathieu, Yusuke Hori, Sean J. Nagel, Dusan Urgosik, Roman Liscak, Samir Patel, Yi-Chieh Hung, Jason P. Sheehan, Douglas Kondziolka

3:53–3:59 pm

**194 Effects of External Focused Ultrasound on Inflammatory Markers in Neuropathic Pain Caused by Common Peroneal Nerve Injury**
Adithya Srikanthan, Teresa Maitetta, Abigail Hellman, Vraj Patel, Alicia Clum, Paul Neubauer, Emery Williams, Clif Burdette, Jiang Qian, Julie G. Pilitsis

3:59–4:05 pm

**195 Defining the Therapeutic Window (TW) for Spinal Cord Stimulation (SCS) Using Evoked Compound Action Potential (ECAP) Recordings: Results from the Evoke Study**
Robert M. Levy

4:05–4:11 pm

**196 Healthcare Resource Utilization Among Patients with Non-Surgical Refractory Low Back Pain in the United States: A Retrospective Analysis of Health Insurance Claims Data**
Charis Spears, Sarah E. Hodges, Musa Kiyani, Zidanyue Yang, Ryan Edwards, Alexis Musick, Christine Park, Beth Parente, Hui-Jie Lee, Shivandan P. Lad

4:11–4:17 pm

**197 The Neurosurgeons’ Armamentarium for the Management of Refractory Post-Herpetic Neuralgia**
Muhibullah S. Tora, Pavlos Texakalidis, Nicholas M. Bouliu

**SECTION ON PEDIATRIC NEUROLOGICAL SURGERY ORAL PRESENTATIONS**
Room 3018

3:27–3:33 pm

**198 Developmental Pleiotropy of PTEN in Congenital Hydrocephalus and Autism Spectrum Disorder**
Tyrone DeSpenza, Jr.

3:33–3:39 pm

**199 Predictors of Posterior Fossa Syndrome: Results from an International Multicenter Cohort Study of Molecularly Characterized Medulloblastoma Patients**
Rashad Jabarkheel, Nisreen Amayiri, Derek W. Yecies, Yuhao Huang, Sebastian Toescu, Donald Mabbott, Sniya Sudhakar, Prateek Malik, Suzanne Laughlin, Geeta Chacko, Leni Mathew, Paul Fisher, Michael D. Taylor, Stefan Pfister, Kristian Aquilina, Gerald A. Grant, Kshitij Mankad, Kristen Yeom, Vijay Ramaswamy

3:39–3:45 pm

**200 Cost Comparison of Prenatal Myelomeningocele Closure Versus Postnatal Closure for both Mother and Child at 1 year of Life**
Brice A. Kessler, Carolyn Quinsey, William Goodnight, Scott Elton

3:45–3:51 pm

**201 Intraoperative Injection of Intraventricular Antibiotics Is Associated with a Decreased Incidence of Infection and Revision Surgery in Pediatric Hydrocephalus Patients Undergoing Shunt Placement**
Nikita Lakomkin, Constantinos G. Hadjipanayis

3:51–3:57 pm

**202 When Does an Incidental Chiari I Malformation Require Surgery? A 10-Year Prospective Study on the Evolution and Natural History**
Hepzibha Alexander, Deki Tsering, John S. Myseros, Suresh N. Magge, Chima Olugbo, Carlos E. Sanchez, Robert F. Keating
Reduced Fractional Anisotropy of Superior Cerebellar Peduncle Is Associated with Persistent Ataxia in Children Undergoing Resection of Posterior Fossa Tumors
Aditya Vedantam, Katie Stormes, Nisha Gadgil, Stephen F. Kralik, Guillermo Aldave, Sandi Lam

Opioid Prescribing Patterns for Low Back Pain Among Commercially-Insured Children
Tej D. Azad, Michael D. Harries, Daniel Vail, Yi J. Zhang, John K. Ratliff

Pediatric Anoxic Brain Injury – A Possible Locked-In Syndrome
Mariam Ishaque, Crystal G. Franklin, Mary D. Woolsey, Peter T. Fox

Action Observation and Execution Differentially Modulate Basal Ganglia-cortical Activity in Humans
Mahsa Malekmohammadi, Kathryn Cross, Jeongwoo Choi, Nader Pouratian

Resting-state SEEG May Help Localize Epileptogenic Brain Regions

Direct Targeting of the Ventral Intermediate Nucleus Using High-field Proton Density MR Imaging: Functional Outcomes and Comparison to “Indirect” Targeting
Francisco A. Ponce, Margaret Lambert

Blood-Brain Barrier Opening in Alzheimer’s Disease Using MR-guided Focused Ultrasound
Ying Meng, Zahra Shirzadi, Bradley MacIntosh, Chris Heyn, Gwen S. Smith, Isabelle Aubert, Clement Hamani, Sandra Black, Kullervo Hynynen, Nir Lipsman

Neural Control of Individual Finger Movements Using Intracortical Recordings from a Person with Tetraplegia
Ilknur Telkes, Jennifer Durphy, Octavian Adam, Nataly Raviv, Julie G. Pilitsis

Risk Analysis of Hemorrhages in Stereoelectroencephalography Procedures
Robert A. McGovern, III, Paul Ruggieri, Juan Bulacio, Imad Najm, William E. Bingaman, Jorge A. Gonzalez-Martinez

A Novel Computational Approach in MATLAB to Characterize Thermal Damage Estimate in Magnetic Resonance-guided Laser Interstitial Thermal Therapy.
Allison Liang, Sean Munier, Shabbar F. Danish

Decreased Circulating Myeloid Derived Suppressor Cells at First Follow-up Predict Favorable Response to Immunotherapy in a Randomized Trial of Nivolumab and Bevacizumab in Recurrent GBM
Matthew M. Grabowski, Balint Otvos, Tyler J. Alban, Marcella Diaz, Justin D. Lathia, Gene H. Barnett, Manmeet Ahluwalia

Role of CX3CR1 Signaling in Malignant Transformation of Gliomas
Sungho Lee, Khatri Latha, Ganesh Rao

The TRIM26-SOX2 Ubiquitin Signaling Axis Regulates the Maintenance and Tumorigenicity of Glioblastoma Stem-like Cells
Tatenda Mahlokozera, Mounica Paturu, Daniel Hafez, Diane Mao, Albert H. Kim

Recapitulation of Genetic Predisposition to Medulloblastoma in Human Neuroepithelial Stem Cells
Jignesh Tailor, Miller Huang, Austin Smith, William A. Weiss

Stereotactic Radiosurgery With and Without Checkpoint Inhibition for Patients with Metastatic Non-Small Cell Lung Cancer to the Brain: A Matched Cohort Study
Matthew Shepard, Zhiyuan Xu, Joseph Donahue, Thomas E. Mutti, Diogo Codeiro, Leslie Hansen, Nasser Mohammed, Ryan D. Gentzler, James Larner, Camilo Faludi, Jason P. Sheehan

A Brain Penetrating HSP90 Inhibitor NXD30001 Inhibits Glioblastoma as a Monotherapy or in Combination with Radiation
Hao Chen, Jialiang Wang, Hengli Tian
4:09–4:15 pm  
**220 Survival Benefit with Resection of Brain Metastases from Renal Cell Carcinoma in the Setting of Molecular Targeted Therapy and Immune Therapy**  
Mark A. Damante, Jr, Kristin Huntoon, Thomas Olencki, Bradley Elder

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4:57–5:03 pm  
**433 A Safe Transitions Pathway for Post Craniotomy Neurosurgical Surgery Patients: High Value Care that Bypasses the Intensive Care Unit**  

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5:03–5:09 pm  
**434 Reducing Preventable Readmissions in a Neurosurgical Patient Population at an Academic Medical Center**  
Shayan Moosa, Lindsay Bowerman, Ellen Smith, Mindy Bryant, Natalie Krovetz, Melissa Pritchett, Nancy Staton, JoAnne Wilson, Carol Wisinski, Patty Bullock, Kearby Chen, Susan Prather, Lisa Archual, Amy Johnston, Mark E. Shaffrey

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4:56–5:02 pm  
**439 Early Lessons Learned from the WEB Device: Feasibility, Technique and Complications – A Real Life Experience**  
Nikolaos Mouchtouris, David M. Hasan, Fadi Al Saiegh, Ahmad Sweid, Mario Zanaty, Omadiya Khanna, Nohra Chalouhi, Stavropoula I. Tjomakaris, M. Reid Gooch, Robert H. Rosenwasser, Pascal Jabbar

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**ORAL ABSTRACT PRESENTATIONS**

**CSNS CASE-BASED DISCUSSION ORAL PRESENTATIONS**  
Room 3016

4:51–4:57 pm  
**432 Safety and Costs Analysis of a “Fast-track Algorithm for Early Hospital Discharge After Brain Tumor Surgery**  
Danilo Gomes Quadros, Iuri S. Neville, Francisco M. Urena, Davi J. Fontoura Solla, Wellingtons S. Paiva, Manoel Teixeira

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**CSNS CASE-BASED DISCUSSION ORAL PRESENTATIONS**  
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**CEREBROVASCULAR OPERATIVE TECHNIQUES AND CASE-BASED DISCUSSION ORAL PRESENTATIONS**  
Room 3022

4:44–4:50 pm  
**436 Diverse Use of the WEB Device: A Technical Note on WEB Stenting and WEB Coiling of Complex Aneurysms**  
Jorge A. Roa, Mario Zanaty, Sudeepta Dandapat, Edgar Samaniego, Pascal Jabbar, David M. Hasan

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4:50–4:56 pm  
**438 Microcatheter Shaping for Intracranial Aneurysm Coiling Using Artificial Intelligence Assisted Technique**  
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4:15–4:21 pm  
**444 Initial Experience of Spinal Cord Perfusion Pressure Goals in Lieu of Mean Arterial Pressure Goals in Acute Traumatic Spinal Cord Injury at a U.S. Level I Trauma Center: A TRACK-SCI Study**  

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4:42–4:48 pm  
**441 Complication Profile Associated with S1 Pedicle Subtraction Osteotomy Compared To Other Spinal Levels**  
Darryl Lau, Vedat Deviren, Christopher P. Ames

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4:48–5:02 pm  
**Early Lessons Learned from the WEB Device: Feasibility, Technique and Complications – A Real Life Experience**  
Nikolaos Mouchtouris, David M. Hasan, Fadi Al Saiegh, Ahmad Sweid, Mario Zanaty, Omadiya Khanna, Nohra Chalouhi, Stavropoula I. Tjomakaris, M. Reid Gooch, Robert H. Rosenwasser, Pascal Jabbar

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5:03–5:09 pm  
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Shayan Moosa, Lindsay Bowerman, Ellen Smith, Mindy Bryant, Natalie Krovetz, Melissa Pritchett, Nancy Staton, JoAnne Wilson, Carol Wisinski, Patty Bullock, Kearby Chen, Susan Prather, Lisa Archual, Amy Johnston, Mark E. Shaffrey

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5:09–5:15 pm  
**435 A Novel Protocol for Reducing Intensive Care Utilization after Craniotomy**  
Arjun V. Pendharkar, Maryam N. Shahin, Allen L. Ho, Eric S. Sussman, Gordon Li, John K. Ratliff, Melanie Hayden Gephart, Amy Lu

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4:36–4:42 pm  
**BEST INTERNATIONAL OPERATIVE TECHNIQUE**

**440 Convection-enhanced Delivery of Nimustine Hydrochloride for Recurrent Spinal Cord High-grade Glioma**  
Toshiki Endo, Ryuta Saito, Teiji Tominaga

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4:42–4:48 pm  
**441 Complication Profile Associated with S1 Pedicle Subtraction Osteotomy Compared To Other Spinal Levels**  
Darryl Lau, Vedat Deviren, Christopher P. Ames

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4:48–5:04 pm  
**442 4 Year Experience of Robot-Assisted Pedicle Screw Placement: An Australian Prospective Analysis**  
Jordan Cory, Mohammed A. Awad, Richard G. Bittar

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5:04–5:10 pm  
**443 Single Position Lateral Lumbar Fusion Utilizing Robot Guided Screw Placement**  
George V. Huffmon III

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4:15–4:21 pm  
**444 Initial Experience of Spinal Cord Perfusion Pressure Goals in Lieu of Mean Arterial Pressure Goals in Acute Traumatic Spinal Cord Injury at a U.S. Level I Trauma Center: A TRACK-SCI Study**  

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4:21–4:27 pm  
**445 MRI Evidence of Therapeutic Efficacy of Timing of Decompression in AIS Grades A-C Cervical Spinal Cord Injury Patients**  
Joshua R. Olexa, Bizhan Aarabi, Kathirkamanathan Shanmuganathan, Noori Akhtardanesh, Charles A. Sansur, Gary T. Schwartzbauer, Maureen Scarboro, Nick Caffes, Jeffrey Oliver, Stephen Carbine, Mori Kanami

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4:27–4:33 pm  
**446 Surgery Delay Increases Length of Stay in Thoracolumbar Trauma**  
Early Versus Late Surgical Decompression for Central Cord Syndrome: A Propensity Score-Matched Analysis
Jetan H. Badhiwala, Christopher D. Witwi, Jefferson R. Wilson, Michael G. Fehlings

Complications of Endoscope-Assisted Microvascular Decompression for Trigeminal Neuralgia- An Evaluation of 300 Consecutive Patients
Alexandra D. Baker, Melvin Field

C1-C4 Unilateral Dorsal Root Entry Zone Rhizotomy (Drez) for Treatment of Refractory Post-Herpetic Occipital Neuralgia.
Zaid Aljuboori, Joseph S. Neimat

Surgical Outcomes After Microvascular Decompression with Internal Neurolysis and Partial Neurectomy for Patients with Trigeminal Neuralgia and Negative Neurovascular Compression
Amanda Carpenter, James K. Liu

Reduction Cranioplasty Using a Three-dimensional Preoperative Virtual Model for Treatment of Extreme Macrocephaly and Positional Plagiocephaly Secondary to Untreated Hydrocephalus – Case Description and Literature Review
Wilson R. Teixeira, Alexandre Rainha Campos, Mickael Bartikian, Claudia Faria, Lia Lucas-Neto, Maria M. Santos

Moyamoya Disease in Infancy: Application of a Novel Indirect Revascularization Technique for Bihemispheric Cortical Synangiosis
Danielle DeBacker Dang, John V. Dang, Duaa AbdelHameid, Seth Mansingham, Leon E. Moores

Idiopathic Intrasyringal Hemorrhage: A Case Report and Review of the Literature
Shawn S. Rai, Carlos R. Goulart, Mark R. Proctor, R. Michael Scott, Katie P. Fehnel

Endovascular Super-Selective Intra-arterial Chemotherapy for Retinoblastoma: Systematic Review and Institutional Experience
Simon Menaker, Samir Sur, Anil Mahavadi, Stephanie H. Chen, Eric C. Peterson, Robert M. Starke
5:48–5:51 pm
601 Intra-operative 3D Navigation Versus Fluoroscopy: A Comparison of Time Demand, Radiation Exposure and Outcomes in Minimally Invasive Transforaminal Lumbar Interbody Fusion (MI-TLIF)
Avani Vaishnav, Steven Mcanany, Srvatisht Iyer, Todd Albert, Catherine Gang, Sheeraz Qureshi

5:51–5:54 pm
602 Increased Axial Facet Angle Correlates with Poor Percutaneous Pedicle Screw Placement
Guang-Ting Cong, James Dowdell, Avani Vaishnav, Steven Mcanany, Srvatisht Iyer, Todd Albert, Catherine Gang, Sheeraz Qureshi

5:54–5:57 pm
603 Anterior Column Reconstruction Versus Pedicle Subtraction Osteotomy for Severe Sagittal Plane Deformity: Early Clinical and Radiographic Outcomes Using a Hyperlordotic Expandable Lateral Interbody Device
Lara Walsh Massie, Mohamed Macki, Hesham M. Zakaria, Michelle Gilmore, Azam Basheer, Victor W. Chang, Frank La Marca

5:57–6:00 pm
604 Characterizing the Risk and Outcome Profiles of Lumbar Fusion Procedures in Patients with Opioid Use Disorders: A Step Towards Improving Enhanced Recovery Protocols for a Unique Patient Population
Michael L. Martini, Dominic A. Nistal, Brian C. Deutsch, Jeffrey Gilligan, Robert J. Rothrock, Sean N. Neifert, John M. Caridi

6:00–6:03 pm
605 Anterior Cervical Arthrodesis with Polyetheretherketone Spacers: What is the Role of the Grafting Material?
Jeffrey Pollock, Donald A. Ross, Jung U. Yoo, Ningcheng P. Li

6:03–6:06 pm
606 Reoperations Following Lumbar Discectomy are Associated with Worse Clinical Outcomes and Greater Socioeconomic Burden 3 Years after the Primary Procedure
Claudius Thomé, Ali Araghi, Jason Inzana, Jonathan Sieber, Joshua M. Ammerman

6:06–6:09 pm
607 DEXA Versus CT: Comparison of Bone Mineral Density Measurements in Predicting Postoperative Spinal Fusion Outcomes
Avais Vance, Alexander Mazal, Salah G. Aoun, Najib El Tecle, Matthew Thomas Davies, Tarek Youssef El Ahmadieh, Kevin C. Morrill, Carlos A. Bagley, Mazin Al Tamimi

6:09–6:12 pm
608 Perioperative Complications in Obese Patients Undergoing Anterior Lumbar Interbody Fusion: Results from 938 Patients

6:12–6:15 pm
609 Predictors of Patient Satisfaction Following One- or Two-Level Anterior Cervical Discectomy and Fusion: Insights from the Quality Outcomes Database
Panagiotis Kerezoudis, Anthony L. Asher, Clinton J. Devin, Mohammed A. Alvi, Inamullah Khan, Hui Nian, Ahilan Sivaganesan, Frank E. Harell, Kristin Archer, Mohamad Bydon

6:15–6:18 pm
610 Neuroanesthesia Guidelines for Optimizing Transcranial Motor Evoked Potentials Neuromonitoring During Deformity and Complex Spinal Surgery: A Delphi Consensus Study
Corey T. Walker, Han Jo Kim, Paul Park, Lawrence Lenke, Justin S. Smith, Daniel M. Sciubba, Michael Y. Wang, Christopher I. Shaffrey, Sr., Vedat Deviren, Praveen V. Mummaneni, Khoi Duc Than, Robert Eastlack, Gregory M. Mundis, Jr., Adam S. Kanter, David O. Okonkwo, John H. Shin, Tyler R. Koski, Steven D. Glassman, Alan H. Daniels, Jay D. Turner, Juan S. Uribe

6:18–6:21 pm
611 Impact of Dominant Symptom on 12-Month Patient Reported Outcomes for Patients Undergoing Lumbar Spine Surgery: A Quality Outcomes Database Analysis
Clinton J. Devin, Mohamad Bydon, Panagiotis Kerezoudis, Mohammed A. Alvi, Anshit Goyal, Inamullah Khan, Yagiz U. Yoicu, Anthony L. Asher

6:21–6:24 pm
612 Predictors of Non-Routine Discharge Among Patients Undergoing Surgery for Grade I Spondylolisthesis: Insights from the Quality Outcomes Database (QOD)
Mohamad Bydon, Praveen V. Mummaneni, Panagiotis Kerezoudis, Andrew Kai-Hong Chan, Steven D. Glassman, Kevin T. Foley, Jonathan R. Slotkin, Eric A. Potts, Mark E. Shaffrey, Christopher I. Shaffrey, Sr., Domagoj Coric, John J. Knightly, Paul Park, Kai-Ming G. Fu, Clinton J. Devin, Anthony L. Asher, Erica F. Bisson

6:24–6:27 pm
613 Does Positioning of Cervical Disc Arthroplasty Implant Affect Postoperative Outcome?
Yahya Othman, Todd Albert, Russell Huang, Philip York, Avani Vaishnav, Steven Mcanany, Srvatisht Iyer, Catherine Gang, Sheeraz Qureshi

6:27–6:30 pm
614 Implementation of an Enhanced Recovery Pathway in Complex Spine Surgery Patients in a Multidisciplinary Center
Kristen M. Hall, Jessica R. Moreno, Luke Dosselman, Carlos A. Bagley

6:30–6:33 pm
615 SCOUT IDE Investigation: One-year Clinical Findings for a Conforming Porous Polymeric Lumbar Interbody Fusion Device
Yi Lu, Kyle Wu, Martin H. Krag, Stephane Lavoie, Mohamad Bydon, Pierce D. Nunley, John H. Chi

6:33–6:36 pm
616 Effect of Myelopathy on Outcomes After Cervical Disc Replacement: A study of a Local Patient Cohort and a Large National Cohort
Sheeraz Qureshi, Andre Samuel, Steven Mcanany, Srvatisht Iyer, Todd Albert, Catherine Gang
6:36–6:39 pm
617 Radiographic Accuracy of Percutaneous Pedicle Screw Placement in Fluoroscopic Versus CT Navigation-guided Lumbar Spine Instrumentation
Guang-Ting Cong, Avani Vaishnav, Joseph Barbera, Hiroshi Kumagai, James Dowdell, Catherine Gang, Sheeraz Qureshi

6:39–6:42 pm
618 The Impact of NSAID Use after Lumbar Fusion Surgery on Fusion Rate and Complications: A Meta-Analysis
Yahya Othman, Avani Vaishnav, Steven Mcanany, Sraiisht Iyer, Todd Albert, Catherine Gang, Sheeraz Qureshi

6:42–6:45 pm
619 Do We Need Standing Scoliosis Films for One or Two-Level Lumbar Fusions?
Caroline Davidson, Gabriel Craudiuliu Tender

6:45–6:48 pm
620 Surgical Outcomes of Dysphagia Provoked by Diffuse Idiopathic Skeletal Hyperostosis in Cervical Spine
Young Soo Chung, Ho Yeol Zhang, Yoon Ha, Jeong Yoon Park

6:48–6:51 pm
621 Outcomes and Risks with Age in Spondylolisthesis: A Comparison of the Elderly from the Quality Outcomes Database

6:51–6:54 pm
622 Multimodal Analgesia in Lumbar Fusion Surgery: Impact Amidst the Opioid Epidemic
Yi Lu, Erica Bertocnci

6:54–6:57 pm
623 Incidence and Clinical Risk of Cement Extravasation in Adult Patients Undergoing Prophylactic Vertebroplasty During Surgical Spine Reconstruction
Michael Bohl, Jean-Christophe A. Leveque, Raji Sethi

6:57–7:00 pm
624 Factors Associated with 12-month Return to Work Following One-level Posterior Lumbar Fusion for Grade 1 Degenerative Spondylolisthesis: An Analysis of the Quality Outcomes Database
Mohamad Bydon, Praveen V. Mummmaneni, Panagiotis Kerezoudis, Andrew Kai-Hong Chan, Steven D. Glassman, Kevin T. Foley, Jonathan R. Slotkin, Eric A. Potts, Mark E. Shaffrey, Christopher I. Shaffrey, Sr., Domagoj Coric, John J. Knightly, Paul Park, Kai-Ming G. Fu, Clinton J. Devin, Anthony L. Asher, Erica F. Bisson

7:00–7:03 pm
625 Prevalence of Cervical Stenosis and Myelopathy in Patients with Idiopathic Normal Pressure Hydrocephalus
Ryan M. Naylor, Karina Lenartowicz, Jonathan Graff-Radford, Jeremy Cutsforth-Gregory, Benjamin D. Elder

7:03–7:06 pm
626 The Association Between PHQ-2 Screening and Patient Satisfaction and Return to Work up to 2 Years after Lumbar Fusion: Analysis from the Michigan Spine Surgery Improvement Collaborative (MSSIC)

7:06–7:09 pm
627 Postoperative Stereotactic Radiosurgery for Spinal Metastases: Clinical Outcomes, Failures, and Analysis of Local Control
Muhammed Hadzipasic, Laura Van Beaver, Caroline M. Ayinon, Robert Koffie, Brian Winey, Thomas Botticello, Ganeshe Shankar, Joseph H. Schwab, Kevin S. Oh, John H. Shin
5:54–5:57 pm

633 Passive Distribution of Indocyanine-Green via the Enhanced Permeability and Retention Effect Demonstrates Similar Tumor Sensitivity and Specificity Compared to Tumor-Targeting 5-Aminolevulinic Acid in Rodent Allograft and Human Brain Tumors

Steve Sungwon Cho, Saad Sheikh, Joseph F. Georges, Clare W. Teng, Jay F. Dorsey, Sunil Singhal, John Y.K. Lee

5:57–6:00 pm

634 Near Real-time Intraoperative Brain Tumor Diagnosis Using Stimulated Raman Histology and Deep Neural Networks

Todd C. Hollon, Balaji Pandian, Siri Sahib Singh Khalsa, Randy D'Amico, Michael B. Sisti, Jeffrey N. Bruce, Karin M. Muraszko, B. Gregory Thompson, Christian Freudiger, Shawn L. Hervey-Jumper, Guy M. McKhann, II, Sandra Camelo-Piragua, Peter D. Canol

6:00–6:03 pm

635 Laser Therapy Enhances Blood-Brain Barrier and Blood-Tumor Barrier Permeability in a Mouse Model of Glioblastoma

Afshein Salehi, Mounica Paturu, Matthew Caine, Robyn Klein, Albert H. Kim

6:03–6:06 pm

636 Genome Wide DNA Methylation Landscape Reveals Glioblastoma Mediated Epigenetic Modification in Tumor Infiltrating CD4+ T-cells.

Sreenivasulu Chintala, Kaleigh Fetcko, Mario Henriquez, Sheng Liu, Jun Wan, Xiaoling Xuei, Yunlong Liu, Adam T. Leibold, Atique Ahmed, Mahua Dey

6:06–6:09 pm

637 Enhanced B7-H4 Expression in Gliomas with Low PD-L1 Expression Identifies Cold Tumors

Di Chen, Gaopeng Li, Chunxia Ji, Qi Qi Lu, Ying Qi, Chao Tang, Ji Xiong, Jian Hu, Dave S.B. Hoon, Yan Zhang, Yu Yao, Liangfu Zhou

6:09–6:12 pm

638 Identification of Tumor Specific Lymphocytes Cells in a Murine Glioma Model

David Shin, Catherine Flores, Bayli Divita, Brandon Fernandez, Tyler Wildes, Adam Grippin, Kyle Dyson, Duane Mitchell

6:15–6:18 pm

640 A Patient-derived Glioblastoma Organoid Model Maintains Intertumoral and Intratumoral Heterogeneity for Therapeutic Testing

Ryan Salinas, Daniel Zhang, Fadi Jacob, Phuong Nguyen, Saad Sheikh, Stefan Prokop, Jay F. Dorsey, MacLean Nasrallah, Steven Brem, Donald M. O’Rourke, Guo-li Ming, Hongjun Song

6:18–6:21 pm

641 Local Delivery of the PARP-inhibitor Olaparib from a Biodegradable Paste Potentiates Radiotherapy and Prolongs Survival

Riccardo Serra, Stuart J. Smith, Jonathan Rowlinson, Noah L. Gorelick, Garrett J. Veal, Kevin Shakesheff, Richard Grundy, Henry Brem, Ruman Rahman, Betty Tyler

6:21–6:24 pm

642 NRG Oncology CC001 Neurocognitive Final Analysis: A Phase III Trial of Hippocampal Avoidance (HA) in Addition to Whole-brain Radiotherapy (WBRT) Plus Memantine to Preserve Neurocognitive Function (NCF) in Patients with Brain Metastases (BM)


6:24–6:27 pm

643 Intracranial Response of Brain Metastases to Osimertinib With or without Upfront Stereotactic Radiosurgery in TKI-Naïve Non-small Cell Lung Cancer Patients


6:27–6:30 pm

644 Melatonin Disrupts Glioblastoma Metabolism and Enhances Temozolomide Cytotoxic Effects

Beatriz Irene Fernandez Gil, Carla A. Vazquez-Ramos, Paula Schiapparelli, Rachel Sarabia-Estrada, Germaine Escames, Alfredo Quinones-Hinojo

6:30–6:33 pm

645 Stereotactic Radiosurgery Versus Stereotactic Radiotherapy in the Management of Intracranial Meningiomas: A Systematic Review and Meta-analysis

Nida Fatima, Antonio Meola, Erqi Polom, Scott G. Soltsys, Steven D. Chang

6:33–6:36 pm

646 Outcome Analysis Among Meningioma Genomic Subgroups Identifies Decreased Recurrence Free Survival in PI3K Activated Tumors

Mark W. Youngblood, Amar Sheth, Amy Zhao, Julio D. Montejo, Jr., Daniel Duran, Chang Li, Evgeniya Tyrtova, Koray Ozduman, Danielle F. Miyagishima, Julien Boetto, Matthieu Peyre, Sacit Bulent Omay, Michel Kalamardies, Zeynep E. Omay, Murat Gunel, Jennifer A. Moliterno

6:36–6:39 pm

647 Outcomes of Single-institution Retrospective Case Series on Observation Alone Following Atypical Meningioma Resection

Lauren Stone, Hugh D. Moulding, Nimisha Deb, Charles T. Lee

6:39–6:42 pm

648 Tumor Control Rates in Patients Undergoing Stereotactic Radiosurgery for Cystic Vestibular Schwannomas: A Systematic Review and Meta-analysis

Kevin Ding, Edwin Ng, Prasanth Romiyo, Dillon Dejam, Courtney Duong, Matthew Z. Sun, Quinton Gopen, Isaac Yang

6:42–6:45 pm

The International Neurooncology Fellowship at The University of Miami – My Experience

Alexis A. Morell
Trim71 Links an Ancient MicroRNA Pathway to Neural Stem Cell Development and Human Congenital Hydrocephalus
Duy Phan, Daniel Foster, Bettina Jux, Evelyn Lake, Todd Constable, Waldemar Kolanus, Frank Slack, Kristopher Thomas Kahle

Cerebrospinal Fluid Access Devices in Pediatric Diffuse Midline Glioma Patients: Literature Review and Evaluation of Institutional Practices
Daphne Li, Wendy Stellpflug, Amanda Muhs Saratis

Patterns of Care and Age Specific Impact of Resection Extent and Adjuvant Radiotherapy in Pediatric Pineoblastoma
Michael Chuwei Jin, Laura M. Prolo, Adela Wu, Tej D. Azad, Siyu Shi, Adrian Rodrigues, Scott G. Soltys, Erqi Poliom, Gordon Li, Susan Hiniker, Gerald A. Grant

Multimodality Language Mapping Using Cortical Stimulation in Pediatric Patients with Epilepsy
Sneha Sharma, Carrie R. Muh, Sandra Serafini, Naomi D. Chou, Tracy G. Spears, Sarah E. Hodges, Gregory B. Cogan, Jordan Komisarow, Gerald A. Grant

Split Cord Malformation – Spectrum of Associated Anomalies.
Natarajan Muthukumar

Endoscopic Third Ventriculostomy Versus Shunt for Pediatric Hydrocephalus: A Systematic Literature Review and Meta-analysis
Pavlos Texakalidis, Muhibullah S. Tora, Jeremy Wetzel, Joshua J. Chern

Automated Evaluation of Intracranial Vessel Morphology in Normal Versus Pediatric Moyamoya Disease
Jennifer L. Quon, Lily H. Kim, Pauline Mouches, Rashad Jabarkheel, Yi Zhang, Gary K. Steinberg, Gerald A. Grant, Michael S. B. Edwards, Kristen Yeom, Nils Forkert

Global and Intertuberal Epileptic Networks in Tuberous Sclerosis Based on Stereoelectroencephalographic (sEEG) Findings: A Quantitative EEG Analysis in Pediatric Subjects and Surgical Implications

Characteristics and Outcomes of Pediatric Glioblastoma in the Post-Temozolomide Era
Ankush Chandra, Taemin Oh, Harsh Wadhwa, Sumedh Subodh Shah, Nalin Gupta, Michael W. McDermott, Mitchel S. Berger, Manish K. Aghi

Clinical and Imaging Outcomes After Combined Direct and Indirect Bypass for Pediatric Moyamoya Disease: A Single Center Retrospective Series
Ramin A. Morshed, Daniel Murph, Jasmin Dao, Kathleen Colao, Lauro Avalos, Steven Hetts, Adib A. Abla, Christine Fox, Michael T. Lawton, Nalin Gupta

Unruptured Intracranial Aneurysm Initial Treatment and Follow-up Cost Analysis: Pipeline Flow Diversors Versus Coiling
Herschel Wilde, Spencer Twitchell, Michael Karsy, Philipp Taussky, Ramesh Grandhi

Healthcare Resource Utilization of Complications of Intracerebral Hemorrhage
Lefkos T. Charalambous, Syed M. Adil, Zidanyue Yang, Christine Park, Sarah E. Hodges, Laura Zitella Verbick, Aaron McCabe, Beth Parente, Hui-Jie Lee, Shivanand P. Lad

Treatment Trends and Outcome of Aneurysmal Subarachnoid Hemorrhage by Hospital Volume

Persistent Hydrocephalus and Activated Microglia Drive the Spatial Memory Decline after Intraventricular Hemorrhage in Rodents

What Size Cerebral Aneurysms Rupture? A Systematic Review and Meta-analysis of Literature
Maxim Mokin, Muhammad Waqas, Andrew Gong, Felix Chin, Hamid Rai, Kunal Vakaria, Hamidreza Rajabzadeh Oghaz, Kenneth V. Snyder, Jason Davies, Elad I. Levy, Hui Meng, Adnan H. Siddiqui

Location of Intracerebral Hemorrhage Affects Outcome after Minimally Invasive Endoscopic Hematoma Evacuation
Rui Song, Dominic A. Nistal, Jacopo Scaggiante, Alexander G. Chartrain, Natalia Romano Spica, Juliane Kleitsch, John Liang, J D. Mocco, Christopher P. Kellner

Repeat Flow Diversion for Previously Failed Flow Diversion in a Multicenter Cohort
Mohamed M. Salem, Ahmad Swieid, Anna L. Kuhn, Adam A. Dmitryw, Muhammad Waqas, Nimer Adeeb, Peter Kan, Ajit S. Puri, Tom R. Marotta, Elad I. Levy, Justin M. Moore, Christopher S. Ogilvy, Pascal Jabbour, Ajith J. Thomas
6:12–6:15 pm  
**668** Stent-assisted Coiling of Cerebral Aneurysms: A Multi-center Analysis  

6:15–6:18 pm  
**669** Management of Tandem Cervical Internal Carotid Artery Stenosis and Large Vessel Occlusion During Acute Stroke: A Single Institution's Initial Experience  
Nicolas W. Villelli, Andrew DeNardo, John Scott, Daniel Sahlein, Troy D. Payner, Jesse J. Savage, Mitesh Vipin Shah, Charles Glen Kulwin

6:18–6:21 pm  
**670** Implications of Achieving TICI 2b Versus TICI 3 Reperfusion in Patients with Ischemic Stroke: A Cost-Effectiveness Analysis  
Xiao Wu, Dheeraj Gandhi, Charles C. Matouk, Joseph Schindler, Danny Hughes, Howard Forman, Pina C. Sanelli, Ajayy Malhotra

6:21–6:24 pm  
**671** Neurosurgical Management in Left Ventricular Assist Device (LVAD) Patients with Intracerebral Hemorrhage (ICH)  
Kyle Mueller, Matthew R. D’Antuono, David Zhao, Jeffrey C. Mai, Edward F. Auilsi, Daniel Felbaum, Michael Hockstein, Rocco Armonda

6:24–6:27 pm  
**672** Surgical Outcomes in Brainstem AVM: A Systematic Review and Meta-analysis  
Anadjeet Singh Khahera, Oludotun Ogunsola, Justin Sim, Alison Clarke, E. Sander Connolly, Jr.

6:27–6:30 pm  
**673** Managing Anterior Communicating Artery Aneurysms – Are We Doing it Right?  
Lauren Harris, Ciaran S. Hill, Matthew Elliot, Teresa Fitzpatrick, Alejandro Feria, Anthony Ghosh, Raghu Vindlacheruvu

6:30–6:33 pm  
**674** Abdominal Aortic Aneurysm Is an Independent Risk Factor for Subarachnoid Hemorrhage  
D. Andrew Wilkinson, Jeffrey L. Nadel, Neeraj Chaudhary, Joseph J. Gemmete, Byron G. Thompson, Jr., Aditya S. Pandey

6:33–6:36 pm  
**675** Preliminary Experience with Proximal Flow Reversal During Intracranial Balloon Angioplasty and Stenting for Symptomatic, Severe Intracranial Stenosis  
Branden J. Cord, Corrado Santarosa, Nanthiya Sujijantarat, Adam Kundishora, Guido Falcone, Kevin Sheth, Lauren Sansing, Joseph Schindler, Nils Petersen, Charles C. Matouk

6:36–6:39 pm  
**676** Vasa Vasorum Formation Is Associated with Rupture of Intracranial Aneurysms  
Haruka Miyata, Hirokazu Koseki, Kampei Shimizu, Yu Abekura, Mieko Oka, Tomohiro Aoki, Kazuhiko Nozaki

6:39–6:42 pm  
**677** Somatic PDGFRB Activating Variants in Fusiform Cerebral Aneurysms  
Joshua W. Osbun, Yigit Karasoz, Carolina Parada, Tina Busald, Philip Tatman, Luis Gonzalez-Cuyar, Christopher Hale, Diana Alcantra, Mark O’Driscoll, William Dobyns, Mitzi Murray, Louis J. Kim, Peter Byers, Michael Dorschner, Manuel Ferreira

6:42–6:45 pm  
**678** Optical Coherence Tomography Imaging in Acute Ischemic Stroke: Preliminary Animal and Human Results  
Christopher R. Pasarikovski, Leo da Costa, Joel Ramjist, Yuta Dobashi, Victor Xiao Dong Yang

6:45–6:48 pm  
**679** Toward Optimal VTE Prophylaxis in Neurosurgery  
H. Westley Phillips, TJ Florence, Nicholas Macaluso, Diana Babayan, Nader Pouratian, Won Kim

6:48–6:51 pm  
**680** Acute Brain Injury Is Associated with Prolonged Suppression of Cerebral Blood Flow Oscillations  
Ryan M. Jamiołkowski, Wesley Baker, W. Andrew Kofke, Ramani Balu

6:51–6:54 pm  
**681** Higher Volume Predicts Improved Outcomes for Severe Pediatric Traumatic Brain Injury Patients at Level 1 and 2 Trauma Centers  
Anna Kimata, Oliver Young Tang, Wael Asaad

6:54–6:57 pm  
**682** Effect of ACS Level 1 - Trauma Center Designation on Management of Adult Severe TBI Patients  
Matthew Helton, Austin Porter, Kevin Thomas, Jeffrey C. Henson, Mason Sifford, Hayden Scott, Analiz Rodriguez, Kevin Sexton

6:57–7:00 pm  
**683** Methylene Blue Attenuates Significant Shifts in the Gut Microbiome following Traumatic Brain Injury in Rodents  

7:00–7:03 pm  
**684** Self-reported Knowledge Levels of Critical Care Nurses in Managing Neuroemergencies: A Survey Based Study  
Karan Amlani, Sonia Nelson, Elka Riley, Zachary L. Hickman, Christopher P. Kellner, Nirit Weiss, Fawaz Almutfi, Golda Bohaene, Joshua B. Bederson, J D. Mocco, Neha Dangayach

7:03–7:06 pm  
**685** Factors Associated with Worsened Neurologic Outcomes in Traumatic Subarachnoid Hemorrhage  
Risheng Xu, Yuanxuan Xia, Chau D. Vo, Wuyang Yang, Jason A. Liew, Ted Alban, James Feghali, Justin M. Caplan, Rafael J. Tamargo, Judy Huang

7:06–7:09 pm  
**686** The Protective Role of Heme Oxygenase-1 (HO-1) in Chronic Subdural Hematoma  
Hui-Tzung Luh
7:09–7:12 pm
**687 Incidence and Risk Factors for Developing Post Traumatic Hydrocephalus, Analysis of a Prospective Cohort of 402 Patients**
Ezequiel Goldschmidt, Federico Angriman, Ruchira Menka Jha, Benjamin Zusman, Ava Puccio, David O. Okonkwo

7:12–7:15 pm
**688 The Utility of Thromboelastography for Predicting the Risk of Posttraumatic Cerebral Infarction in Traumatic Brain Injury**
Hao Chen, Hengli Tian

**INTERACTIVE MULTIMEDIA RESEARCH PRESENTATION ORAL PRESENTATIONS**
Podium 4, Level 2 Lobby

5:45–5:48 pm
**689 Is Biological Effective Dose (BED) Predictive of Outcomes after Radiosurgery for Cerebral Arteriovenous Malformations?**
Cody L. Nesvick, Christopher S. Graffeo, Michael J. Link, Bruce E. Pollock

5:48–5:51 pm
**690 Pre-operative Epilepsy Network Distribution Correlates with Seizure Recurrence Following Epilepsy Surgery**
Long Di, Elliot G. Neal, Stephanie Maciver, Fernando L. Vale

5:51–5:54 pm
**691 Skull Density Ratio and Treatment Outcomes in Essential Tremor Patients Treated with Transcranial MR-guided Focused Ultrasound Thalamotomy**
Abdul-Kareem Ahmed, Jiachun Zhuo, Howard M. Eisenberg, Timothy R. Miller, Rao Gullapalli, Dheeraj Gandhi

5:54–5:57 pm
**692 Pallidal Thermolesion Unleashes Gamma Oscillations in the Motor Cortex in Parkinson’s Disease**
Doris D. Wang, Coralie de Hemptinne, Svjetlana Micicinovic, Witney Chen, Jill L. Ostrem, Philip A. Starr

5:57–6:00 pm
**693 Glomus Jugulare: Is Gammaknife Radiosurgery the Ideal Treatment?**
Jaskaran Singh, Manmohan Singh

6:00–6:03 pm
**694 Combination Targeting of Subthalamic Nucleus and Ventral Intermediate Thalamic Nucleus in Deep Brain Stimulation for Tremor-dominant Parkinson’s Disease: Experience and Outcomes**
Islam Fayed, Kelsey Diva Cobourn, Gnel Pivazyan, Fernando Pagan, Steven Lo, Yasar Torres-Yaghi, Allen S. Mandir, Christopher G. Kalhorn

6:03–6:06 pm
**695 Audiovisual Speech Enhancement via Cross-modal Suppression of Auditory Association Cortex by Visual Speech**
Patrick J. Karas, John F. Magnotti, Zhengjia Wang, Brian A. Metzger, Daniel Yoshor, Michael S. Beauchamp

6:06–6:09 pm
**696 Use of Functional MRI to Assess How Motor Phenotypes of Parkinson’s Disease Respond to DBS**
Marisa D. DiMarzio, Radhika Madhavan, Suresh Joel, Ileana Hancu, Eric Fiveland, Julia Prusik, Michael Gillogly, Tanweer Rashid, Jeffrey Ashe, Ilknur Telkes, Paul Feustel, Damian Shin, Jennifer Durphy, Roy S. Hwang, Era Hanspal, Julie G. Pillitsis

6:09–6:12 pm
**697 The Positive Allosteric Modulator of Alpha-2/3-Containing GABA A Receptors, KRM-II-81, Is Active in Pharmaco-resistant Models of Epilepsy and in Human Epileptic Tissue**
Jodi L. Smith, Xingie Ping, Xiaoming Jin, Lalit K. Golani, Guanguan Li, Farjana Rashid, Rajwana Jahan, James M. Cook, Jeffrey M. Witkin

6:12–6:15 pm
**698 Interneuron Transplantation Creates New Network States and Rescues Social Behavior Deficits in a Mouse Model of Autism**
Derek Southwell, Helia Seifikar, Ruchi Malik, Karen Lavi, Daniel Vogt, John Rubenstein, Vikaas Sohal

6:15–6:18 pm
**699 The Durability of Pain Relief Following Endoscope-assisted MVD for Trigeminal Neuralgia**
Alexandra D Baker, Melvin Field

6:24–6:27 pm
**702 Management of Non-Surgical Refractory Low Back Pain in the United States: A Retrospective Analysis**
Charis Spears, Sarah E. Hodges, Musa Kyani, Zidanyue Yang, Beth Parente, Hui-Jie Lee, Shivanand P. Lad

6:27–6:30 pm
**703 Central Neuropathic Pain And Complex Regional Pain Syndrome Following Brachial Plexus Injury Treated Successfully with Dorsal Root Entry Zone Lesioning**
Erin McCormack, Mansour M. Mathkour, Lora Wallis Kahn, Reda Tolba, Maged Guirguis, Gassan Chaiban, Daniel Denis

6:30–6:33 pm
**704 Clinical Diagnosis Scale for Pain Lumbar of Facet Origin: Systematic Review of Literature and Pilot Study**
Juan C. Gomez Vega, Juan C. Acevedo Gonzalez

6:36–6:39 pm
**705 The Impact of Pre-Operative Opioids on Outcomes in Craniotomy Patients**
Varun Shah, Nguyen Hoang, Brandon Rodgers, David L. Dornbos Ill, Ryan Eaton, Dante Pezzutti, Erin Hoover, Helen Duenas, Sintino Cua, Shahid Mehd Nimjee

6:39–6:42 pm
**707 20 Years of Opioids Prescriptions in Spine Patients: The Experience of Two Academic Hospitals in Massachusetts**
6:42–6:45 pm
**708 Sex Disparities in Outpatient Management of Post-laminectomy Syndrome**
Amy Zhu, Ryan Guan Chiu, Jeffery Zhao, Ankit Indravadan Mehta

6:45–6:48 pm
**709 Late Week Surgery Is Associated with Longer Length of Stay in Patients Undergoing Laminectomy for Degenerative Lumbar Stenosis**
Robert Winkelman, Vikram Chakravarthy, Matthew M. Grabowski, Ghaith Habboub, Sebastian Salas-Vega, Thomas E. Mroz

6:48–6:51 pm
**710 Disparities in Rates of Fusions in Single-Level Lumbar Disc Pathologies**
Soobin Kim, James S. Ryoo, Philip B. Ostrov, Abhinav K Reddy, Ankit Indravadan Mehta

6:51–6:54 pm
**711 Global Burden of Neurosurgical Disease**
Alex Yacob, Christopher Carr, Cassidy Werner, Aaron S. Dumont

6:54–6:57 pm
**712 Postoperative Admission of Adult Craniotomy Patients to Neuroscience Floor Unit Reduces Cost and Length of Stay**
Matthew Z. Sun, Diana Babayan, Jia-Shu Chen, Maxwell Wang, Priyanka Naik, Kara Reitz, Won Kim

6:57–7:00 pm
**713 Socioeconomic Barriers Affecting Neurologic Recovery Facing the Aneurysmal Subarachnoid Population**
Ben A. Strickland, Kristine Ravina, Alexander G. Chartrain, Robert Rennert, Arun P. Amar, Jonathan Russin, Steven L. Giannotta

7:00–7:03 pm
**714 Analysis of Neurosurgery Resident Operative Experience: Training Tomorrow’s Neurosurgeon**
Shahjehan Ahmad, Bledi C. Brahimaj

7:03–7:06 pm
**715 The Neurosurgeon-Scientists NIH Funding Trends**
Karim ReFaey, Shashwat Tripathi, William D. Freeman, Hugo Guerrero-Cazares, James Meschia, Leonard Petruccelli, Fredric B. Meyer, Alfredo Quinones-Hinojosa

7:06–7:09 pm
**716 A Single-Institution’s Experience with the CMS Non-Cervical Spine Fusion Bundle Payments**
Abraham Schlauderaff, Neel T. Patel, G. Timothy Reiter

7:09–7:12 pm
**717 Neurosurgery Elective for Preclinical Medical Students With and Without a Home Neurosurgery Program**

7:12–7:15 pm
**718 Causes of Hospital Readmissions Within Seven Days from the Neurosurgical Service of a Quaternary Referral Hospital**
Enyinna L. Nwachuku

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**CNS Wellness Afternoon**
Tuesday 1:45–2:45 pm

- Meet Dr. Gary Simonds, author of “The Thriving Physician: How to Avoid Burnout by Choosing Resilience Throughout Your Medical Career”
- Voices of Neurosurgery: The Unforgettable Moments
- CNS sweatpants giveaway (limited quantity)
- Create Your Own Smoothie on the Blender Bike
ORAL ABSTRACT PRESENTATIONS
WEDNESDAY, OCTOBER 23

PA
SUNRISE SCIENCE ORAL PRESENTATIONS SESSION
Room 3024

7:00–7:06 am
350 Evoked Compound Action Potentials to Guide Lead Placement: A Neuromonitoring Technique Case Series
Steven M. Falowski

7:06–7:12 am
351 Development and Validation of a Clinical Prediction Score for Poor Postoperative Pain Control Following Elective Spine Surgery
Michael M.H. Yang, Jay Riva-Cambrin, Jonathan Cunningham, Nathalie Jette, Tolulope T. Sajobi, Steven Casha

7:12–7:18 am
352 Pre-operative Radiological Finding at the Lumbar Spinal Level is a Novel Predictive Factor for Post-operative Outcome After Spinal Cord Stimulation in Patients with Failed Back Surgery Syndrome
Yusuke Hori, Andre Machado, Sean J. Nagel

7:18–7:24 am
353 Spontaneous Intracranial Hypotension and the Durability of Epidural Blood Patch
Ali Hazama, Lori John, Alexander E. Braley, Lawrence S. Chin, Satish Krishnamurthy

7:24–7:30 am
354 Stim Salvage: Case Series Reporting on the Effectiveness of SCS Salvage
Patrick Paullus, Erika A. Petersen

7:30–7:36 am
355 Spinal Cord Stimulation with Non-linear Burst Stimulation Design Improves Psychosocial Function Through the Medial Spinothalamic Tract
Steven M. Falowski

7:36–7:42 am
356 Impact of Predominant Arm Pain Versus Neck Pain on 12-Month Outcomes Following Elective Cervical Spine Surgery: Analysis from the Quality Outcomes Database (QOD)
Clinton J. Devin, Mohamad Bydon, Mohammed A. Alvi, Anshioti Goyal, Panagiotis Kerezoudis, Inamullah Khan, Yagiz U. Yolcu, Anthony L. Asher

7:42–7:48 am
357 Factors Contributing Spinal Cord Stimulator Explantation
Francisco A. Ponce, Dakota Graham, Margaret Lambert, Zaman Mirzadeh

7:48–7:54 am
358 Utility of a Mobile Clinical Decision Support Application in Patients Undergoing Spinal Cord Stimulation
Shervin Rahimpour, Sarah E. Hodges, Luis A. Antezana, Abena A. Ansah-Yeboah, Rajeev Dharmapurikar, John Hathaway, Michael Warrick, Scott Berlin, Benjamin Seeman, Shivanand P. Lad

7:54–8:00 am
359 Direct Anterior Insular Cortex Stimulation Increases Heat Pain Threshold: A Case Report
Chang-Chia Liu, Shayan Moosa, Mark Quigg, W. Jeffrey Elias

8:00–8:06 am
925 Risk Factors for Wound-related Complications after Microvascular Decompression: A Case Control Study
Elizabeth N. Alford, Gustavo Chagoya, Galal Elsayed, Joshua Bernstock, Nicole Bentley, Andrew K. Romeo, Barton L. Guthrie

8:06–8:12 am
926 CT Guided Percutaneous Glycerol Rhizotomy for Trigeminal Neuralgia - A Standardized Protocol to Reduce Radiation Dose and Procedure Time
Bradley T. Schmidt, Conrad Pun, Scott Hetzel, Wendell B. Lake, Daniel K. Resnick

8:12–8:18 am
927 A Retrospective Analysis of High Opioid use Patients undergoing a Preoperative Pain Program Prior to Spine Surgery
Karl Wittnebel, Lindsey Ross, Jeanne Black, Keith Siegel, Terrence T. Kim, Sang D. Kim, Eli M. Baron, Tiffany G. Perry, Alexander Tuchman, Mark Vrahas, J. Patrick Johnson

8:18–8:24 am
928 A Multidisciplinary Spinal Fusion Pathway to Discharge: Improved Standardization of Care Reduces Hospital Length of Stay, Enhances Pain Control and Optimizes Disposition after Lumbar Spine Surgery
Corey T. Walker, Virginia Prendergast, Jakub Godzik, Alex Whiting, Juan S. Uribe, Jay D. Turner, Laura A. Snyder

8:24–8:30 am
929 Minimally Invasive Versus Open Surgical Treatment of Thoracolumbar Metastatic Epidural Spinal Cord Compression (MESCC): Meta-analysis and Systematic Review
Ali R. Tafreshi, Elwood Siagian, Guofang Shen, Wei-Xing Shi
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<tr>
<th>Session</th>
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<td><strong>SUNRISE SCIENCE ORAL PRESENTATIONS SESSION</strong></td>
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<td><strong>Room 3020</strong></td>
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<tr>
<td>7:00–7:06 am</td>
<td><strong>360 Rates of Post Procedure Hemorrhage in Brain Tumor Patients on Therapeutic Anticoagulation Undergoing Gamma Knife Radiosurgery</strong></td>
<td>Carlos R. Goulart, Michelle Dewitt, Gaddum D. Reddy</td>
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<tr>
<td>7:06–7:12 am</td>
<td><strong>361 Real-World Outcomes Using a Novel Directional Lead From a Deep Brain Stimulation Registry for Parkinson's Disease</strong></td>
<td>Jan Vesper, Roshini Jain, Alex Wang, Heleen Scholtjes, Michael T. Barbe, Steffen Paschen, Andrea Kuhn, Jens Volkmann, Monika Potter-Nerger, Günther Deuschl</td>
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<tr>
<td>7:18–7:24 am</td>
<td><strong>363 The Predictive Value of Interictal Scalp EEG Findings in Aiding the Detection of Malformations of Cortical Development in Temporal Lobe Epilepsy</strong></td>
<td>Jeffrey W. Fuchs, Nathan A. Shlobin, Benjamin Hopkins, Zehra Husain, Michael Cloney, Evgeniya Tyrtova, Pue Farooque, Jessica W. Templer, S. Kathleen Bandt</td>
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<tr>
<td>7:24–7:30 am</td>
<td><strong>364 Clinically weighted Probabilistic Tractography Mapping of Therapeutic Thalamic Deep Brain Stimulation for Essential Tremor</strong></td>
<td>Evangelia Tsolaki, Alon Kashanian, Nader Pouratian</td>
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<td>7:30–7:36 am</td>
<td><strong>365 Interstitial Laser Capsulotomy for Refractory Obsessive-Compulsive Disorder – Lesion Size and Energy Deposition Determine Outcome</strong></td>
<td>Peter C. Warnke, Anil Mahavadi, Jon Grant</td>
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<td>7:36–7:42 am</td>
<td><strong>366 A Feedforward Mechanism for Epileptogenesis Regulated by Lactate Dehydrogenase A</strong></td>
<td>Marcelle Altshuler, Alexander Ksendzovsky, Muzanbanu Bachani, Stuart Walbridge, Sara Inati, Islam Fayed, John D. Heiss, Jaideep Kapur, Kareem A. Zaghoul</td>
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<td>7:48–7:54 am</td>
<td><strong>368 Evaluation of Predictive Models of Postoperative Seizure Freedom in Patients with Medically-refractory Epilepsy</strong></td>
<td>Alireza Mansouri, Jerry C. Ku, Shervin Taslimi, James M. Drake, Abhaya Vivek Kulkarni, James T. Rutka, Taufik Valiante</td>
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<td>7:54–8:00 am</td>
<td><strong>369 Cortical Basal Ganglia Network Interactions During Sequence Learning in Parkinson’s Disease</strong></td>
<td>Doris D. Wang, Coralie de Hemptinne, Roeo Gilron, Philip A. Starr</td>
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<td><strong>CRANIAL AFTERNOON ABSTRACT ORAL PRESENTATIONS</strong></td>
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<td><strong>Room 2020</strong></td>
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<td>1:45–1:51 pm</td>
<td><strong>800 Pregnancy after Cerebral Bypass for Moyamoya Disease</strong></td>
<td>Ephraim W. Church, Rabia Qaiser, Theresa E. Bell-Stephens, Eric Chow, Summer Han, Yasser Y. El-Sayed, Gary K. Steinberg</td>
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<td>1:51–1:57 pm</td>
<td><strong>801 Multiplex Profiling of Secreted Factors in the Cerebrospinal Fluid of Moyamoya Disease Patients</strong></td>
<td>Kumar Abhinav, Alex G. Lee, Arjun Vivek Pendharkar, Yael Rosenberg-Hasson, Haruto Uchino, Michelle Cheng, Gary K. Steinberg</td>
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<td>2:09–2:15 pm</td>
<td><strong>804 Seizure Presentation in Patients with Brain Arteriovenous Malformations Treated with Stereotactic Radiosurgery: A Multicenter Study</strong></td>
<td>Ching-Jen Chen, Leah Shabo, Dale Ding, Natasha Ironside, Douglas Kondziolka, L. Dade Lunsford, Jason P. Sheehan</td>
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2:15–2:21 pm
805 Technical Note: Endoscopic Evacuation of Intraventricular Hemorrhage During Minimally Invasive Endoscopic Intracerebral Hemorrhage Evacuation
Jacque J. Lara-Reyna, Rui Song, Dominic A Nistal, Neha S. Dangayach, J D. Mocco, Christopher Paul Kellner

2:21–2:27 pm
806 Dynamic Structural Modeling Revealed that Nilotinib Inhibits Smoothened Signaling
Kirti Kandhwal Chahal, Jie Li, Irina Kufareva, Donald Durden, Robert Wechsler Reya, Ruben Abagyan, Clark C. Chen

2:27–2:33 pm
807 Functional Characterization of Brain Tumor-initiating Cells: Implications for Preclinical Models and Drug Development

2:33–2:39 pm
808 Preoperative MRI-based Predictive Modeling of Brain Tumor Laser Ablation
Anil Mahavadi, Walter J. Jermakowicz, Iahn Cajigas, Lia Dan, Santiago Guerra, Ghulam Farooq, Ashish H. Shah, Michael E. Ivan, Jonathan R. Jagid, Ricardo J. Komotar

2:39–2:45 pm
809 Decorin Expression Is Associated with Diffusion MR Phenotypes in Glioblastoma
Kunal S. Patel, Catalina Raymond, Jingwen Yao, Joseph Tsung, Linda M. Liu, Richard Everson, Timothy F. Cloughesy, Benjamin Ellingson

2:45–2:51 pm
810 Captopril as an Adjuvant to Temozolomide Prolongs Survival in a Rat Intracranial Gliosarcoma Model via Downregulation of Matrix Metalloproteinase-2
Leon Pinheiro, Alexander Perdomo-Pantoja, Joshua Casao, Iddo Paldor, Veronica Vigilar, Antonella Mangraviti, Yuan Wang, Henry Brem, Betty Tyler

2:51–2:57 pm
811 Possibilities of Photodynamic Therapy in the Complex Treatment of Malignant Gliomas
Artmex Y Rynda

2:57–3:03 pm
812 The Luciferase Expressing Glioma-261 Murine Models Elicit an Immune-mediated Anti-tumor Response

3:03–3:09 pm
813 Trends in Management of Cerebrospinal Fluid Leaks Among Pediatric Head Trauma Patients with Skull Base Fractures
Anthony O. Asemota, Eric B. Schneider, Gary L. Gallia

3:09–3:15 pm
814 Volume and Midline Shift as Pre-operative CT Imaging Predictors of Postoperative Chronic Subdural Hematoma Recurrence: Retrospective Review of 345 Patients with 412 Operative Subdural Sides
Laila Malani Mohammad, William H. McKay, Christine Meadows, Jacqueline O’Neill, Howard Yonas, Andrew P. Carlson

1:45–1:51 pm
815 Independent Patient Risk Factors Associated with Increased Length of Hospital Stay, Unplanned Return to OR and 30-Day Readmission Rates After Posterior Cervical Fusion for Cervical Spondylotic Myelopathy
Aladine A. Elsamadicy, Fouad Chouairi, Megan Lee, Andrew B. Koo, Adam Kundishora, Joaquin Q. Camara-Quintana, Luis Kolb, Maxwell S.H. Laurans, Khalid M. Abbed

1:51–1:57 pm
816 Combined Nucleus Pulposus Augmentation and Annulus Fibrosus Repair Prevents Intervertebral Disc Degeneration After Discectomy
Sertac Kirnaz, Stephen Sloan, Christoph Wipplinger, Franziska Anna Schmidt, Roger Hartl, Lawrence J. Bonassar

1:57–2:03 pm
817 The Impact of Obstructive Sleep Apnea on Clinical, Perioperative, and Cost Outcomes in Patients who Underwent Posterior Cervical Discectomy and Fusion: A Single Center Retrospective Analysis from 2008-2016
Alejandro Carrasquilla, Dominic A. Nistal, John M. Caridi

2:03–2:09 pm
818 Intrathecal Riluzole for the Treatment of Patients with Amyotrophic Lateral Sclerosis
Nicholas M. Boulis

2:09–2:15 pm
819 Body Mass Index Greater than 35 is Associated with Increased Major and Radiographic Complications after Minimally Invasive Adult Spinal Deformity Surgery

2:15–2:21 pm
820 Complications in Minimally Invasive Versus Open Surgery for Intermediate to High-Grade Spondylolisthesis: A 10-year Retrospective, Multicenter Experience
Asad Mehmood Lak, Abdullah M. Abunimer, Amina Rahimi, Ian Tafel, Hasan Aqdas Zaidi

2:21–2:27 pm
821 Does a Fracture Liaison Service Program Minimize Recurrent Fragility Fractures in the Elderly with Osteoporotic Vertebral Compression Fractures?
Tarik Wasfie, Avery M. Jackson, III
2:27–2:33 pm  
**822 Comparative Effectiveness of Adjustable Lordotic Expandable Versus Static Lateral Lumbar Interbody Fusion Devices: Two-Year Clinical and Radiographic Outcomes**  
Yan M. Li, Richard F. Frisch, Zheng Huang, James Towner, Yan Icy Li, Jessica Riggleman, Charles Ledonio  

2:33–2:39 pm  
**823 Comparing Radiographic Parameters for Single-level L5-S1 Interbody Fusion: Anterior Lumbar (ALIF) Versus Transforaminal Lumbar Interbody Fusion (TLIF)**  
Caleb S. Edwards, Andrew Kai-Hong Chan, Dean Chou, Praveen V. Mummaneni  

2:39–2:45 pm  
**824 Safety of Outpatient Anterior Cervical Discectomy and Fusion: A Systematic Review and Meta-analysis**  
Ketan Yerneni, John F. Burke, K. Daniel Riew, Vincent C. Traynelis, Lee A. Tan  

2:45–2:51 pm  
**825 Choosing Minimally Invasive Versus Open Surgery in the Treatment of Adult Spinal Deformity (ASD): Analysis of a Prospective, Non-randomized Multi-center Study**  

2:51–2:57 pm  
**826 Fusion and Opioid-sparing with the Use of Ketorolac in Posterior Thoracolumbar Spinal Fusions: A Prospective Double-blinded Randomized Placebo-Controlled Trial**  
Evan J. Lytle, Chad F. Claus, Doris Tong, Diana Sigler, Dominick Lago, Matthew Bahoura, Amarpal Dosanjh, Michael H. Lawless, II, Dejan Slavnic, Jacob Jasinski, Robert W. McCabe, Karl Kado, Prashant Sudhir Kelkar, Clifford Michael Houseman, Peter L. Bono, Boyd F. Richards, Teck Mun Soo  

2:57–3:03 pm  
**827 Predictive Model for Length of Stay Among Patients Undergoing Surgery for Grade I Spondylolisthesis: Analysis from the Quality Outcomes Database**  
Praveen V. Mummaneni, Mohamad Bydon, John J. Knightly, Anshit Goyal, Mohammed A. Alvi, Andrew Kai-Hong Chan, Jian Guan, Steven D. Glassman, Kevin T. Foley, Jonathan Slotkin, Eric A. Potts, Mark E. Shaffrey, Christopher I. Shaffrey, Sr., Regis W. Haid, Kai-Ming G. Fu, Michael Y. Wang, Paul Park, Anthony L. Asher, Erica F. Bisson  

3:03–3:09 pm  
**828 Geographic Differences Intraoperative Neuromonitoring During Minimally Invasive Lateral Spine Surgery**  
Sheeraz Qureshi, Luke Ricci, Avani Vaishnav, Steven Mcanany, Srasivsh Iyer, Todd Albert, Catherine Gang  

3:09–3:15 pm  
**829 Acute Exacerbation of Symptoms After Lumbar Decompression Surgery: An Analysis Readmissions and Reoperations in 81,365 patients**  
Andre Samuel, Avani Vaishnav, Steven Mcanany, Srasivsh Iyer, Todd Albert, Catherine Gang, Sheeraz Qureshi  

**NEUROTRAUMA AND CRITICAL CARE ORAL ABSTRACT PRESENTATIONS**  
Room 2022  

1:45–1:51 pm  
**830 Sports-Related Cervical Spine Fracture and Spinal Cord Injury: A Review of Nationwide Pediatric Trends**  
Haddy Alas, Avery Brown, Katherine Pierce, Cole Bortz, Michael Moses, Dennis Vasquez-Montes, Bassel G. Diebo, Carl Paulino, Aaron James Buckland, Michael Gerling, Peter G. Passias  

1:51–1:57 pm  
**831 Micro RNA Profiles of Traumatic Brain Injury Isolated from Plasma Extracellular Vesicles**  
Ross Puffer, Luz Cumba-Garcia, Benjamin T. Himes, David O. Okonkwo, Ian F. Parney  

1:57–2:03 pm  
**832 Meta-Analysis of Functional Outcomes in 5508 Patients Sustaining a Gunshot Wound to the Head**  
Georgios Maragkos, Efstathios Papavassiliou, Martina Stippler, Aristotelis Filippidis  

2:03–2:09 pm  
**833 Pulmonary Embolism in Neurocritical Care – Introduction of a Novel Grading System for Risk Stratification: The Frankfurt AMBOS Score**  
Daniel Dubinski  

2:09–2:15 pm  
**834 Detection of Persisting Concussion Effects on Measures of Neuromechanical Responsiveness**  
Chad J. Prusmack  

2:15–2:21 pm  
**835 Clinical Course of Intracranial Bleeding in Patients Anticoagulated with Factor Xa Inhibitors without the Use of Specific Reversal Agents**  
Emmalin Nleton, Georgios Maragkos, Sven Richter, Aristotelis Filippidis, Martina Stippler  

2:21–2:27 pm  
**836 Lower Mortality and Morbidity with LMWH for VTE Prophylaxis in Spine Trauma**  

2:27–2:33 pm  
**837 Anatomic Factors Affecting Size of Suboccipital Decompression**  
Courtney Pendleton, Lohit Velagapudi, Jack Jallo  

2:33–2:39 pm  
**838 Potential of Human Neural Stem Cell Transplantation to Treat Acute Subdural Hematoma**  
Lee Onn Chiang, Shoji Yokobori, Markus Spurlock, Shyam Gajavelli, Tom Hazel, Karl Johe, M. Ross Bullock
2:39–2:45 pm
**The Accuracy of Glasgow Coma Score Documentation in a Trauma Database: Implications for Patient Care and Performance Metrics**
Anthony M. DiGiorgio, Blake E. Wittenberg, Brooke Kennamer, Clifford Crutcher, Adam Podet, Jason D. Wilson, Clarence S. Greene, Jr., Gabriel C. Tender, Frank Culicchia, John Hunt

2:45–2:51 pm
**Radiological Parameters Predicting Clinical Outcome After Decompressive Hemicraniectomy in Malignant Ischemic Stroke**
Nida Fatima

2:51–2:57 pm
**Multivariate Analysis of Acute Magnetic Resonance Imaging Predicts Neurological Improvements in Patients with Cervical Spinal Cord Injury After Early Surgical Decompression**
Tomoo Inoue, Toshiki Endo, Shinsuke Suzuki, Hiroshi Uenohara, Teiji Tominaga

2:57–3:03 pm
**Minimally Invasive Endoscopy Versus Craniotomy for Acute Subdural Hematomas: A Retrospective Matched Cohort Study**
Enzo Fortuny, Nicolas K. Khattar, Kevin John, Esther Bak, Shawn W. Adams, Kimberly S. Meyer, Emily P. Sieg, Robert F. James, Dale Ding

3:03–3:09 pm
**Monotherapy Aspirin in Minor Traumatic Head Bleeds does not Worsen Outcome**
Nasya Mendoza-Elias, Sandi Mackey, Lisa Jasak, Michael Rosenblatt, Subu N. Magge, Robert G. Whitmore, Zohar Ghogawala

3:09–3:15 pm
**Mobile Digital Pupillometry for Rapid Triage of Patients with Severe Traumatic Brain Injury**
Lynn B. McGrath, Jr., Jessica C. Eaton, Anthony Law, Alex Mariakakis, Shwetak Patel, Michael R. Levitt

**LATE-BREAKING ABSTRACT SESSION**
Room 3024

1:45–1:51 pm
**Repurposing rhDNase to Improve Neurological Outcomes after Traumatic Brain Injury**
Ayobami L. Ward, Molly Braun, Kumar Vaibhav, Krishnan M. Dhandapani

1:51–1:57 pm
**Subdural Drain Versus Subdural Evacuating Port System for the Treatment of Non-acute Subdural Hematomas**
N. Scott Litofsky, Michael J. Ortiz Torres, Patrick Belton, Matthew Burton, Ruben Nginitewe

1:57–2:03 pm
**Mortality Prediction Model for Traumatic Intracranial Hemorrhage: A National Trauma Data Bank Study**
Esther Wu, Siddharth Marthi, Wael Asaad

2:03–2:09 pm
**Neurophysiologic Composition of Fascicles Utilized for Oberlin Transfer: The Rare Presence of the FCU Fascicle**
Brandon W. Smith, Nicholas Chulski, Kate Wan-Chu Chang, Ann Little, Lynda J.S. Yang

2:09–2:15 pm
**Regional Variance in Disability and Quality of Life Outcomes following Surgery for Grade I Degenerative Lumbar Spondylolisthesis: A Quality Outcomes Database Analysis**

2:15–2:21 pm
**Repair of Brachial Plexus Injury using Direct Neurotization of the Spinal Accessory Nerve to the Superior Trunk of the Brachial Plexus: A Case Series**
Sean Himel, Paul R. Clark, J. Mason Shiflett

2:21–2:27 pm
**Anterior (ALIF), Oblique (OLIF), and Transforaminal (TLIF) Lumbar Interbody Fusions: A Comparison of Perioperative Morbidity**
Caleb S. Edwards, Praveen V. Mummaneni, Anthony M. DiGiorgio, Darryl Lau, Dean Chou

2:27–2:33 pm
**The Incidence of Adjacent Segment Degeneration after Lumbar Spine Surgery with Transpedicular Stabilization System and PEEK Rods**
Luis J.L. Ulloa, Socorro Figueroa Rivera

2:33–2:39 pm
**Medial Branch Block versus Vertebroplasty for 1-Level Osteoporotic Vertebral Compression Fracture: 2-Year Retrospective Study**
Hyoung Joon Chun

2:39–2:45 pm
**Anterior Lumbar Interbody Fusion Reduces Thecal Sac Compression in the Setting of Degenerative Spondylolisthesis**
Hammad A. Khan, Nathan J. Stumpf, Kelsey A. Isbester, Samuel C. Overley, Shaleen Vira, Michael P. Steinmetz, Thomas E. Mroz

2:45–2:51 pm
**Ultra-early DVT Prophylaxis in Intracerebral Hemorrhage**
Dimitri Laurent, Olgert Bardhi, Paul Kubilis, Brian M. Corliss, Stephanie Adamczack, Ndi Geh, Katharina Busl, W. Christopher Fox
2:51–2:57 pm

946 Phase 2 Clinical Trial of Encephaloduroarteriosynangiosis (EDAS) Revascularization for Symptomatic Intracranial Atherosclerosis (ERSIAS)
Nestor R. Gonzalez, Hao Jiang, Patrick Lyden, Shlee Song, Konrad Schlick, Oana Dumitrascu, Lucas Restrepo, Neal Rao, Jason Hinman, David S. Liebeskind, Michael J. Alexander, Wouter I. Schievink, Juan F. Toscano, Raymond Liou, Steven Piantadosi, Miguel Quintero-Consuegra, Jeffrey L. Saver

2:57–3:03 pm

947 Traumatic Subarachnoid Hemorrhage as a Risk Factor for Mortality in Moderate and Severe Traumatic Brain Injury Patients. Hospital Central de Maracay, 2015-2016
Sasha J. Antunez, Ivis J. Graterol, Iran J. Briceño

3:03–3:09 pm

948 High Molecular Weight Amyloid-β Oligomers Level in Cerebrospinal Fluid Distinguish Idiopathic Normal Pressure Hydrocephalus from Other Neurodegenerative Diseases
Kaito Kawamura, Madoka Nakajima, Masakazu Miyajima, Chihiro Akiba, Chihiro Kamohara, Jyo Kanpyo, Wei Meng, Ikuko Ogino, Hajime Arai

3:09–3:15 pm

949 Fiber Tract Anatomy of the Hypothalamus
Pelin Kuzucu, Pinar Çeltikçi, Emrah Çeltikçi, Ahmet Memduh Kaymaz, Ahmet Akbas, Serhat S. Baydin, M. Sakir Eksi, Necmettin Pamir, Abuzer Güngör
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TUESDAY, OCTOBER 22
5:45-7:15 pm
Level 2 Lobby

SECTION ON CEREBROVASCULAR SURGERY POSTERS

1000 Intra-aneurysmal Signal Dropout on 3D Time-of-flight MRA is Strongly Associated with Wall Enhancement in Unruptured Cerebral Aneurysms: A Novel Biomarker of Aneurysm Instability
Corrado Santarosa, Branden John Cord, Andrew Koo, Aladine A. Elsamadicy, Xiao Wu, Seyedmehdi Payabvash, Kevin Sheth, Nils Petersen, Guido Falcone, Ajayy Malhotra, Charles C. Matouk

1001 FMS-like Tyrosine Kinase 3 Ligand (FLT3L) Downregulation in Peripheral Blood Serves as a Biomarker for the Presence of Unruptured Intracranial Aneurysms
Dominic A. Nistal, Michael L. Martini, Trevor Hardigan, Nicolas Fernandez, Seunghee Kim-Schulze, Rui Song, J D. Mocco, Christopher P. Kellner
1002 Genome-wide Association Meta-analysis of Over 30,000 Subjects Reveals Novel Intracranial Aneurysm Risk Genes
Tanyeri Barak, Katsuhito Yasuno, Murat Gunel

1003 Transcirculation Approach in the Endovascular Treatment of Acute Ischemic Stroke, Aneurysms, Dural Arteriovenous Fistulas and Arteriovenous Malformations: A Multicenter Study
Jorge A. Roa, Guilherme Dabus, Alberto Maud, Mario Martinez-Galdamez, Diego Paez-Granda, Vladimir Kalousek, Roger Barranco Pons, Ashkan Mowla, Viktor Szeder, Pascal Jabbour, Santiago Ortega-Gutierrez, David M. Hasan, Edgar Samaniego

1004 Revascularization Versus Clipping in High Hunt & Hess Grade Aneurysmal Subarachnoid Hemorrhage Unamenable to Endovascular Treatment
Jordan Lam, Krista Lamorie-Foote, Shivani Rangwala, Kristine Ravina, Jonathan Russin

1005 Predicting Perioperative Coagulopathy Via Machine Learning in Patients Requiring Emergency Neurosurgical Operations
Yirui Sun, Jinli Yu, Pengfei Fu, Hong Huang, Junyan Chen, Ying Mao

1006 The Risk Factors and Outcomes of Patients with Intra-Operative Aneurysm Rupture During Surgical Clipping
Ryan P. Palsma

1007 Evaluation of Disease Severity and Treatment Intensity as Cost Drivers for Ruptured Intracranial Aneurysms
Herschel Wilde, Spencer Twitchell, Jared C. Reese, Michael Karsy, Jian Guan, Ilyas Eli, Philipp Taussky, Ramesh Grandhi, Richard Schmidt, William T. Couldwell

1008 Pharmacogenetic and Clinical Warfarin Dosing Algorithm Assessments with Predictive Bleeding Risk Stratification
Nicholas Dietz, Elliot Antman

1009 Role of Antiplatelet and Statin Therapy in Patients with Cerebral Cavernous Malformations
Santiago Gomez-Paz, Mohamed M. Salem, Georgios Maragkos, Luis C. Ascanio, Alejandro Enriquez-Marulanda, Kimberly Kicielniski, Justin M. Moore, Ajith J. Thomas, Christopher S. Ogilvy

1010 Dandy’s Vein Sacrifice and the Analysis of its Safety Profile in Neurosurgical Procedures
Vinayak Narayan, Amey Savardekar, Lekshmi P. Sateesh, Anil Nanda

1011 A Nationwide Analysis of Unplanned 30- and 90-day Readmissions After Elective Cerebral Aneurysm Clipping: Causes, Predictors, and Trends
Haydn Hoffman, Matthew Protas, Lawrence S. Chin

1012 A Nationwide Analysis of 30- and 90-day Readmissions After Elective Endovascular Embolization of Cerebral Aneurysms: Causes, Predictors, and Trends
Haydn Hoffman, Matthew Protas, Lawrence S. Chin

1013 Laser Interstitial Thermal Therapy for Cerebral Vascular Pathologies
Christopher S. Hong, Branden J. Cord, Charles C. Matouk, Veronica Chiang

1014 Elevated Serum Fibrinogen Degradation Products on Admission Predicts Recurrence of Chronic Subdural Hematoma
Yusuke Hori, Toru Fukuhara

1015 Flow Diversion for the Treatment of Partially Thrombosed Aneurysms: A Multicenter Case Series
Mohamed M. Salem, Paul M. Foreman, Christoph J. Griessenauer, Adam A. Dmytryiw, Nicola Limbucci, Anna L. Kuhn, Ajit S. Puri, Kimberly P. Kicielniski, Alejandro Bugarini, Clemens M. Schirmer, Christopher S. Ogilvy, Ajith J. Thomas

1016 Evaluation of a Pharmacy-mediated Antiplatelet Management Protocol in Stent-assisted Coiling of Cerebral Aneurysms
Mirja Wirtz, Clemens M. Schirmer, Oded Goren, Shamsher Dalal, Gregory Weiner, Paul M. Foreman, Christoph Johannes Griessenauer

1017 A Single Center Medical Quality Evaluation and Factor Analysis of One-staged Hybrid Operation in the Treatment of Brain Arteriovenous Malformations
Mingze Wang, Yong Cao, Shuo Wang, Jizong Zhao
1018 Occlusion Rates of Different Modalities in the Endovascular Treatment of Basilar Tip Aneurysms
Ritam Ghosh, Nikolaos Mouchtouris, Ahmad Sweid, Fadi Al Saiegh, Nohra Chalouhi, M. Reid Gooch, Robert H. Rosenwasser, Pascal Jabbour, Stavropoula I. Tjoumakaris

1019 Rebleeding Drives Poor Outcome in Aneurysmal Subarachnoid Hemorrhage Independent of Delayed Cerebral Ischemia: A Propensity Score Matched Cohort Study

1020 The Impact of Current Generation Anticonvulsant Prophylaxis on Seizure Incidence and Clinical Outcome After Primary Intracerebral Hemorrhage
Neel T. Patel, Carlton W. Christie, Lekhaj C. Daggubati, Erik B. Lehman, Kevin M. Cockroft

1021 Treatment of Cerebral Aneurysms in the Post-ISAT Era: Trends and Outcomes
Evan Luther, David J. McCarthy, Marie-Christine Brunet, Samir Sur, Dileep R. Yavagal, Eric C. Peterson, Robert M. Starke

1022 Quantitative Versus Qualitative Assessment of Aneurysm Wall Enhancement on Magnetic Resonance Vessel Wall Imaging
Corrado Santarosa, Branden J. Cord, Andrew Koo, Aladine A. Elsamadicy, Xiao Wu, Seyedmehdi Payabvash, Kevin Sheth, Nils Petersen, Guido Falcone, Ajayy Malhotra, Charles M. Matouk

1023 Predictors of Complications, Functional Outcome, and Mortality in a Large Cohort Treated with Flow Diversion
Ahmad Sweid, Nabeel Herial, Stavropoula I. Tjoumakaris, Sage Rahm, Michael Gooch, Robert H. Rosenwasser, Pascal Jabbour

1024 Flow Diversion for Small Caliber Vessel Aneurysms, Efficacy, Safety, and Functional Outcome
Ahmad Sweid, Robert M. Starke, Nabeel Herial, Robert H. Rosenwasser, Michael Gooch, Stavropoula I. Tjoumakaris, Pascal Jabbour

1025 Radiosurgical Management of Brainstem Arteriovenous Malformations: Treatment Outcomes and Predictors of Outcome
Anadjeet S. Khahera, Oludotun Ogunsola, Justin Sim, Alison Clarke, E. Sander Connolly, Jr.

1026 Virtual Reality as an Immersive 3D Visualization Technique to Improve Surgeon Understanding of Aneurysm Anatomy
Talia L. Weiss, Christine D. Young, Kevin M. Brennan, Cristian Luciano, Laura Stone-McGuire, Fernanda Herrera, Ali Alaraj

1027 Patients Taking an Antithrombotic Medication Less Frequently Present with Ruptured Aneurysms

1030 Outcomes in Elderly Aneurysmal Subarachnoid Hemorrhage Patients in the Barrow Ruptured Aneurysm Trial (BRAT)
Joshua Catapano, Michael J. Lang, Michael T. Lawton

1031 Variations in the Subventricular Zone Population Overtime in Adult Chronic Communicating Hydrocephalus: Animal Model
Tito G.M. Vivas-Buitrago, Emily Norton, Andres Ramos, Ignacio J. Torres, Pamela Saavedra, Hugo Guerrero-Cazares, Alfredo Quinones-Hinoja, Daniele Rigamonti

1032 Valve Opening Pressure Settings in Relation to The Lumbar Puncture Opening Pressure in Patients with INPH: A Delta Value Correlation to Over-drainage
Tito G.M. Vivas-Buitrago, Johan Heemskerk, Juan P. Herrera, Ricardo Domingo, Sanjeet S. Grewal, Ronald Reimer, Robert E. Wharen, Neil R. Graff-Radford

1033 Causes of Unfavorable Outcome in Good Grade Patients with Aneurysmal Subarachnoid Hemorrhage: Opportunities for Improvement?
Matthew E. Eagles, Madeleine P. de Lotbiniere-Bassett, Oliver Aying, Michael K. Tso, R. Loch Macdonald

1034 Simultaneous Kissing Stent Deployment for Endovascular Treatment of Wide-necked Intracranial Aneurysms: A Case Series of 14 Patients
Kenichi Sato, Miki Fujimura, Teiji Tominaga

1035 The Fragility Index in Cerebrovascular Randomized Controlled Trials: Analysis of Robustness and Proposal of a Classification System
Nimer Adeeb

1036 Urinary Incontinence and Gait Dysfunction in Intraventricular Hemorrhage: The Role of Acute and Long-Term Cerebral Spinal Fluid Diversion

1037 The Effect of Mechanical Thrombectomy and TICI Score on the Incidence of Decompressive Hemicraniectomy in Ischemic Stroke Patients
Fadi Al Saiegh, Nikolaos Mouchtouris, Karim Hafazalla, Nohra Chalouhi, Victor Sabourin, Evan M. Fitchett, Pascal Jabbour, Stavropoula I. Tjoumakaris, M. Reid Gooch, Robert H. Rosenwasser, Fred Rincon

1038 Descending Branch of the Lateral Circumflex Femoral Artery: A Favorable Interposition Graft for Extracranial-to-Intracranial Bypass
Kristine Ravina, Ben A. Strickland, Robert Rennert, Erik M. Wolfsink, Joseph Carey, Jonathan Russin
1040 Maturing Institutional Experience with the Transradial Approach for Diagnostic Cerebral Arteriography: Overcoming the Learning Curve
Benjamin M. Zussman, Daniel Tonetti, Jeremy G. Stone, Bradley A. Gross, Ashutosh Jadhav, Tudor Jovin, Brian T. Jankowitz

1041 The Impact of Leptomeningeal Collaterals in Acute Ischemic Stroke: A Systematic Review and Meta-analysis
Nida Fatima

1042 Arterial Spin Labeling MR Imaging at Short Post-labeling Delay Reflects CBF/CBV Verified by 15O-PET in Cerebrovascular Steno-occlusive Disease
Hiroshi Itagaki, Yasuaki Kokubo, Yukihiko Sonoda

1043 Radial Artery Catheterization for Neuroendovascular Procedures: Clinical Outcomes and Patient Satisfaction Measures
Omaditya Khanna, Ahmad Sweid, Nikolaos Mouchtouris, Geoffrey Stricsek, M. Reid Gooch, Stavropoula I. Tjoumakaris, Robert H. Rosenwasser, Pascal Jabbour

1044 Downregulation of Signaling Components in the NO-PKG Pathway After Subarachnoid Hemorrhage: Why Current Therapeutics are Ineffective at Treating Cerebral Vasospasm?
Peter J. Morone, Colleen M. Brophy, Reid C. Thompson, Mark Does, Daniel Colvin, Joyce Cheung-Flynn

1045 Intra-arterial ICG Fluorescence Video-angiography: A Feasible Method for Intraoperative Neurosurgical Purposes?
Markus Holling, Benjamin Risse, Christof Duhme, Gregory Arnone, Helena M. Yoder, Walter Stummer, Fady T. Charbel

1046 Transradial Approach is Safe and Effective for Anterior and Posterior Circulation Mechanical Thrombectomy
Stephan Munich, Kunal Vakharia, Matthew J. McPheeters, Muhammad Waqas, Michael K. Tso, Kenneth Vincent Snyder, Elad I. Levy, Adnan H. Siddiqui, Jason Davies

1048 Multimodal Laser Angioscopy: A New Imaging Platform to Shine a Light on Structural and Biological Markers of Carotid Plaque Vulnerability
Luis E. Savastano, Reddy Adhitya, Eric Seibel, David Gordon, Thomas Wang, Jie Xu, Jifeng Zhang, Byron Gregory Thompson, Jr., Aditya S. Pandey

1049 tPA Use During Mechanical Thrombectomy: Success and Complication Rates
Risheng Xu, Jason A. Liew, Paul Choi, Sharon Pang, Sasicha Manupitpatpong, Sophie Roh, Yuanxuan Xia, Justin M. Caplan, Monica Pearl, Philippe Gailloud, Cameron G. McDougall, Ferdinand Hui

1051 Risk Factors for Restenosis Following Carotid Revascularization: A Meta-analysis of Hazard Ratios
Pavlos Texakalidis, Andreas Tzoumas, Stefanos Giannopoulos, Pascal Jabbour, Leonardo Rangel-Castilla, Theofilos Machinis, Dennis J. Rivet, John F. Reavey-Cantwell

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SYMPOSIAS
Didactic and hands-on courses with expert neurosurgical educators demonstrating clinical techniques and applications via technology, models, and simulation. Hands-on Symposia provide an opportunity to improve surgical skills by applying and demonstrating learned techniques. Symposia also provide an opportunity to review case-based complex issues and discuss potential solutions.
- Symposia are offered Saturday, October 19, and Sunday, October 20.

GENERAL SCIENTIFIC SESSION, SECTION SESSIONS, GUIDELINE SESSIONS, LUNCHEON SEMINARS, INTERNATIONAL SESSIONS, OPERATIVE TECHNIQUE SESSIONS, INTERACTIVE MULTIMEDIA RESEARCH PRESENTATION SESSION, AND DINNER SEMINARS
Expert lecturers present research, scientific evidence and associated outcomes, and demonstrate clinical techniques and applications. The basics of translational development, clinical trials, guideline review, and updated changes and evaluation of clinical experience, followed by examples of successful application, are presented in various sessions. Basic skills and information that can be applied in daily practice and professional life are also presented.
- General Scientific Sessions, Section Sessions, Guidelines Session, International Sessions, Operative Technique Sessions, and Interactive Multimedia Research Presentation Session are offered Sunday, October 20, through Wednesday, October 23.
- Luncheon Seminars are offered Monday, October 21, through Wednesday, October 23.
- Dinner Seminars are offered on Saturday, October 19; Monday, October 21; and Tuesday, October 22.

OPERATIVE TECHNIQUES AND CASE-BASED DISCUSSION SESSIONS
During these sessions, the faculty presents cases to be examined, discussed, and debated by both the audience and panel. Registered attendees will have the opportunity to submit their own cases prior to the meeting to be presented at these sessions. Don’t miss these interactive sessions designed to encourage participation from everyone.
- Operative Technique and Case-based Discussion Sessions will take place on Monday, October 21, and Tuesday, October 22.
- Live Surgery via telemedicine technology in the Exhibit Hall will take place Monday, October 21, through Wednesday, October 23. CME is not offered for these sessions.

ORIGINAL SCIENCE PROGRAM
- Scientific abstract presentations offer original science, ground-breaking research, and the best clinical and basic neurosurgical science in the CNS Original Science Program, and allows for audience questions and moderated discussions.
- Oral Presentations by subspecialty will be presented on Monday, October 21, Tuesday, October 22, and Wednesday, October 23.
- Interactive Multimedia Research Presentation Session will take place on Tuesday, October 22.
- Sunrise Science Oral Presentations by subspecialty Oral Presentations will be presented on Monday, October 21, Tuesday, October 22, and Wednesday, October 23.
- Late-breaking Abstracts will be presented on Monday, October 21, Tuesday October 22 and Wednesday, October 23.
ACCREDITATION
The Congress of Neurological Surgeons is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

CME CREDIT
The CNS designates this live activity for a maximum of 49.5 AMA PRA Category 1 Credits™. Physicians should only claim credit commensurate with the extent of their participation in the activity.

*A maximum of 26 AMA PRA Category 1 Credits™ may be earned for general sessions only.

Additional CME Credits can be earned by attending the following:

SYMPOSIA
Attendees will receive a maximum of 3.5 AMA PRA Category 1 Credits™ for each Saturday or Sunday half-day Symposia, a maximum of 6 AMA PRA Category 1 Credits™ for each eligible Saturday or Sunday full-day Symposia.

LUNCHEON SEMINARS
Attendees will receive a maximum of one-and-a-half (1.5) AMA PRA Category 1 Credits™ for all eligible Luncheon Seminars. Physicians should only claim credit commensurate with the extent of their participation in the activity.

DINNER SEMINARS
Attendees will receive a maximum of two (2) AMA PRA Category 1 Credits™ for all eligible Dinner Seminars. Physicians should only claim credit commensurate with the extent of their participation in the activity.

INTERACTIVE MULTIMEDIA RESEARCH PRESENTATIONS
Physicians may claim a maximum of five (5) AMA PRA Category 1 Credits™ directly from the AMA for preparing a poster presentation, which is also included in the published abstracts. Physicians may claim them on their AMA PRA certificate application or apply directly to the AMA for an AMA PRA Category 1 Credits™ certificate.

Physicians may claim 1.5 AMA PRA Category Credits™ for viewing scientific posters. Physicians should selfclaim credit on their AMA PRA certificate application form. Please visit the AMA web site for details at www.ama-assn.org.

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

Each attendee may only be awarded a maximum of 49.5 nursing contact hours for this educational event.

CLAIMING CME CREDIT
CME credits can be claimed through the online CME system at www.cns.org. The CME tracking system allows you to create and print a CME certificate immediately following the CNS Annual Meeting while you are still in San Francisco, or from the convenience of your home or office. Upon completion of this process, your CME certificate will be sent to you via email at the email address you provided at registration.

DISCLOSURES
The Accreditation Council for Continuing Medical Education Standards for Commercial Support requires that anyone in a position to control the content of the educational activity has disclosed all financial relationships with any commercial interest. Failure or refusal to disclose or the inability to satisfactorily resolve the identified conflict may result in the withdrawal of the invitation to participate in any of the CNS educational activities. The ACCME defines a “commercial interest” as any entity producing, marketing, reselling, or distributing healthcare goods or services consumed by, or used on, patients. It is also each speaker’s responsibility to include the FDA clearance status of any device or drug requiring FDA approval discussed or described in their presentation or to describe the lack of FDA clearance for any “off label” uses discussed. Speakers from the audience are also required, therefore, to indicate any relevant personal/professional relationships as they discuss a given topic.

See the addendum for listing of all Annual Meeting disclosures.

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

2019 CNS ANNUAL MEETING APP
Download the 2019 CNS Annual Meeting App to access everything you need to know about the Annual Meeting in the palm of your hand. Search for course details, upcoming events, and exhibitors. You can also save your favorite sessions, send and receive messages with colleagues, take notes on sessions, and more!
Download the app by going to https://ativ.me/cns2019.

AMERICANS WITH DISABILITIES ACT
The Moscone West Convention Center and the San Francisco Marriott Marquis are in compliance with the Americans with Disabilities Act (ADA) and prepared to accommodate all visitors. For wheelchair or electric scooter rental, please contact either Scoot Around at 877-484-5482 or www.scootaround.com or Cloud of Goods at 415-621-9757 or www.cloudofgoods.com.

ATTIRE
Professional attire is appropriate at the Annual Meeting and in the Exhibit Hall. Some San Francisco restaurants require coats and ties for men. Please check each restaurant’s policy when making reservations. Business/cocktail attire is appropriate for social events, unless otherwise noted.

BADGES
CNS Annual Meeting badge colors represent the registration category of attendees:
Blue: Medical attendees including CNS Members and Non-members, Associate Members
Gray: Graduate Students/Post-doctoral Scholars, Medical Students, PA/Physician Extenders, Nurses, Nurse Practitioners
Orange: Non Member Corporate Representatives
Clear: Guests and Spouses
Yellow: Exhibitors
Red: Staff

BAGGAGE AND COAT CHECK
Baggage and coat check will be available at Moscone West Convention Center.
Tuesday, October 22 6:30 am–7:30 pm
Wednesday, October 23 6:30 am–5:00 pm

CHILDREN
Children may be registered as guests. (Please note that children under the age of 18 are not allowed in the CNS 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.

CNS CENTRAL
CNS Central is conveniently located adjacent to the CNS Registration Area, in the lobby of the Moscone West Convention Center. Visit CNS Central with your questions on CNS membership, education, or CME. CNS staff will be available to assist you in navigating our new website, review our case-based Nexus product or download any apps on your mobile device. From accessing your favorite learning tools to discovering new ones, the CNS staff is here to help you with your questions about programs, products, and services.

CNS XPERIENCE LOUNGE
Immerse yourself in the best of the CNS Annual Meeting in the CNS Xperience Lounge! Get up close and personal with the featured speakers at their book signings, hear the Innovator of the Year finalists present their innovations, view digital posters, and enjoy the Voices of Neurosurgery presentations by peers while enjoying a fruit smoothie on Tuesday’s Wellness Afternoon. The CNS Xperience Lounge is a great place to connect with your colleagues and mentors and enjoy a beverage – be sure to stop by!

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

DIGITAL POSTERS
Digital Posters are displayed electronically, Monday through Wednesday, in the CNS Xperience Lounge, located in the Exhibit Hall and can be searched by author, topic or keyword.
DISCLAIMER
The material presented at the 2019 Annual Meeting has been made available by the Congress of Neurological Surgeons for educational purposes only. The material is not intended to represent the only, nor necessarily the best, method, procedure or technique appropriate for the medical situations discussed, but rather is intended to present an approach, view, statement, or opinion of the faculty which may be helpful to others who face similar situations. The material is not meant to replace independent judgement by a physician for any given issue. Neither the content (whether written or oral) of any course, seminar, or other presentation in the program, nor the use of a specific product in conjunction therewith, nor the exhibition of any materials by any parties coincident with the program, should be construed as indicating endorsement or approval by the CNS, or by its committees or affiliates of the views presented; methods, procedures and/or techniques described or discussed; the products used; or the materials exhibited. The CNS disclaims any and all liability for injury or other damages resulting to any individual attending the Annual Meeting, and for all claims which may arise out of the use of the material, methods, procedures, and/or techniques demonstrated therein by such individuals, whether these claims shall be asserted by physicians or any other person. No reproductions of any kind, including audiotapes and videotape, may be made of the presentations at the CNS Annual Meeting. The CNS reserves all of its rights to such material, and commercial reproduction is specifically prohibited.

EXHIBIT HALL
Monday, October 21  9:30 am–4:00 pm
Tuesday, October 22  9:30 am–3:00 pm
Wednesday, October 23  9:30 am–2:00 pm
Admittance to the Exhibit Hall is by CNS name badge only. Children under the age of 18 are not allowed in the Exhibit Hall.

FACULTY REGISTRATION
All faculty should register at the Faculty Registration counter at Moscone West Convention Center to receive a special gift.

BREAKS AND LIVE SURGERY IN THE EXHIBIT HALL
Join your colleagues and exhibitors for unopposed networking in the Exhibit Hall. Presentation stage schedules will be posted in the Exhibit Hall.

Monday, October 21
Morning Beverage Break  9:40–10:40 am
Live Surgery in Xperience Lounge  10:00–10:30 am
Afternoon Beverage Break  1:45–2:45 pm
Beer and Wine Social Hour  in Xperience Lounge  1:45–2:45 pm

Tuesday, October 22
Morning Beverage Break  9:40–10:40 am
Live Surgery in Xperience Lounge  10:00–10:30 am
Afternoon Beverage Break  1:45–2:45 pm
Wellness Afternoon  in Xperience Lounge  1:45–2:45 pm

Wednesday, October 23
Morning Beverage Break  9:40–10:40 am
Live Surgery in Xperience Lounge  10:00–10:30 am

FUTURE MEETINGS
2020: Miami, Florida  September 12–16
2021: Austin, Texas  October 16–20

MEMBER SERVICES
Be sure to stop and visit the CNS Member Services staff in CNS Central or the CNS Xperience Lounge for demos of our most popular products, or to answer any of your questions about the CNS, your NEUROSURGERY® Publications subscriptions, and your CNS membership.

POSTERS
The CNS posters will be located on the Level 2 Lobby of the Moscone West Convention Center. Poster viewing and mini podium presentations will take place during the Interactive Multimedia Research Presentation Session on Tuesday, October 22 from 5:45–7:15 pm.

PRESS
All media representatives and journalists attending the Annual Meeting are required to register in advance. Registration, Press Room guidelines and media credentialing policies are available online at cns.org/2019 or by calling 847-240-2500. Once on-site, media are required to check in at the CNS registration area to pick up their press badges and then proceed to the Press Room to pick up their press kits.
REGISTRATION METHODS

REGISTRATION INFORMATION
Items included in registration fee:
- General Scientific Sessions, Sunday through Wednesday
- Scientific Program to include Section Sessions, Oral Abstract Presentations, Sunrise Science/Late-breaking Abstract Sessions, Guideline Sessions, Operative Technique Sessions, International Sessions, Interactive Multimedia Research Presentation Session
- CNS Xperience Lounge
- Live Surgeries
- Exhibit Hall, Monday through Wednesday
- One ticket to the Opening Reception on Sunday, October 20

REGISTRATION HOURS
Registration is located in the Level 1 Lobby of the Moscone West 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–6:30 pm
- Tuesday, October 22: 6:30 am–6:30 pm
- Wednesday, October 23: 6:30 am–3:15 pm

Registration will also be located in the 2nd Level Atrium at the San Francisco Marriott.
- Saturday, October 19: 7:00 am–5:00 pm
- Sunday, October 20: 7:00 am–5:00 pm
- Monday, October 21: 7:00 am–12:00 pm

RESTAURANT RESERVATIONS
Contact your hotel concierge in advance for assistance in securing popular restaurant reservations.

SMOKING
The Moscone West Convention Center and official CNS hotels are non-smoking facilities.

SPEAKER READY ROOM
All speakers and abstract presenters should check in at the Speaker Ready Room, located in Room 3000 at the Moscone West Convention Center, a minimum of one hour prior to the scheduled start time of their session.
- Saturday, October 19: 7:00 am–4:30 pm
- Sunday, October 20: 7:00 am–6:30 pm
- Monday, October 21: 6:30 am–6:30 pm
- Tuesday, October 22: 6:30 am–5:30 pm
- Wednesday, October 23: 6:30 am–3:30 pm

SPOUSE HOSPITALITY
All registered CNS Annual Meeting spouses and guests are invited to visit the spouse hospitality suite, Monday through Wednesday, for daily continental breakfast from 8:00–10:30 am in the 2nd Floor Atrium of the San Francisco Marriott Marquis. (Please note that admittance to spouse hospitality suite is by spouse/guest badge only.) A representative from the San Francisco Convention and Visitors Bureau will be available in the Spouse Hospitality Suite to answer city questions, assist you with dinner reservations, and provide tour and activity recommendations.

WI-FI SERVICE
For your convenience, complimentary Wi-Fi service is provided by the CNS throughout the Moscone West Convention Center and the San Francisco Marriott Marquis wherever CNS events are being held. Please use the CNS19 network at both facilities. The password at the Marriott Marquis is sanfran19.

Hear from leading voices in scholarly publishing!

NEUROSURGERY®
Publications:
Meet the Editors

Tuesday, October 22 | 1:00–2:00 pm
Room 3002 at the Moscone West Convention Center

Attendees will be treated to presentations from the Editors-in-Chief of several leading journals in neurosurgery outlining their experiences with the peer review process. Panelists will share their thoughts on how to most effectively contribute to this process and then stay for a Q&A with the audience.
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<td>LeMaitre Vascular, Inc.</td>
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SECOND LEVEL
- Committee Meetings
- Spouse Hospitality (2nd Floor Atrium)

FOURTH AND FIFTH LEVEL
- Committee Meetings
See you next year!

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