

cnsq IS THE OFFICIAL NEWSMAGAZINE OF THE CONGRESS OF NEUROLOGICAL SURGEONS

CongressQuarterly

SUMMER 2018



MISSION: NEUROSURGERY



CNS

2018 ANNUAL
MEETING

HOUSTON, TEXAS
OCTOBER 6-10, 2018



Congress of
Neurological
Surgeons

10 Surgical Robotics
Symposium: Engineering to
Bedside

20 Making the Neurosurgery
Oral Board Exam Less
Intimidating

EDITOR:

Martina Stippler, MD

EDITORIAL BOARD:

Ron L. Alterman, MD

Erica F. Bisson, MD

Nicholas M. Boulis, MD

Rimal Dossani, MD

Emad N. Eskandar, MD

Gerald A. Grant, MD

Sanjeet S. Grewel, MD

Kunal Gupta, MD

James S. Harrop, MD

Todd Charles Hollon, MD

Jeremy Hosein, MD

Michael T. Lawton, MD

John Pollina, MD

Farhan Mirza, MD

Stephen Reintjes, MD

Andrew J. Ringer, MD

Tyler Schmidt, MD

Edward R. Smith, MD

Rafael A. Vega, MD

MANAGING EDITOR:

Michele Hilgart

DESIGNER:

CameronRush, Inc.

CONGRESS OF NEUROLOGICAL SURGEONS**2017-2018 OFFICERS****PRESIDENT:**

Ashwini D. Sharan, MD

PRESIDENT ELECT:

Ganesh Rao, MD

VICE-PRESIDENT:

James S. Harrop, MD

SECRETARY:

Steven N. Kalkanis, MD

TREASURER:

Praveen V. Mummaneni, MD

PAST-PRESIDENT:

Alan M. Scarrow, MD, JD

CEO

Regina Shupak

CONGRESS OF NEUROLOGICAL SURGEONS MISSION STATEMENT:

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

Congress Quarterly is the official newsmagazine of the Congress of Neurological Surgeons, located at 10 North Martingale Road, Suite 190, Schaumburg, IL 60173. Members of the Congress of Neurological Surgeons may call 847.240.2500 with inquiries regarding their subscription to *Congress Quarterly*.

© 2018 by the Congress of Neurological Surgeons. No part of this publication may be reproduced in any form or language without written permission from the publisher. Published free of charge for the Congress membership with additional distribution. Send address changes to Congress Quarterly, 10 N. Martingale Road, Suite 109, Schaumburg, IL 60173.



Congress of
Neurological
Surgeons

EDITOR'S NOTE

**Martina Stippler, MD**

2018 Editor,

Congress Quarterly

It is a pleasure to introduce this issue. As you might be planning your summer activities, the CNS volunteers and staff have been tirelessly planning the Annual Meeting this October in Houston.

Doctors Brian L. Hoh, Alex Khalessi, and Nader Pouratian were charged by President Ashwini Sharan to create a meeting around the idea of *Mission: Neurosurgery*. A mission is an important assignment carried out for a purpose. I remember one of my chief residents saying preparing for a surgery is like preparing for a mission to Mars and it stuck with me. So many things we do on a day-to-day basis—working up patients with complex conditions, leading a team through an operation, changing the field of neurosurgery with research—is our mission.

One of the Core Missions of the CNS has been education, from medical students to established neurosurgeons. With this mission in mind, we focused on making the education at our Annual Meeting in Houston interactive, case based and relevant for all neurosurgeons at any stage of their career and in any practice setting.

We have learned from your feedback that case-based discussions are an effective way to learn and improve practice. To take it one step further, we are offering 27 weekend practical courses in Houston. Please see page 8 for more information on what to expect. I also want to draw the attention of young neurosurgeons to the CNS Oral Board Exam Preparation Review Course, which is led by Drs. Costas Hadjipanayis and Robert Spinner and has been receiving outstanding reviews.

The robust CNS guidelines infrastructure is driven by another mission – to promote evidence-based, value-driven, and standardized care. During this year's annual meeting we will have Guidelines Session each morning.

Our president and scientific planning committee did an exceptional job in selecting an array of outstanding speakers, each with their own mission. From Hugh Herr, a double amputee named the "Leader of the Bionic Age" whose mission is to provide more sophisticated bionic limbs to those with physical disabilities, to Dr. Smith Johnston, the lead physician for the International Space Station.

Once again, the CNS will present Live Surgery in the CNS Xperience Lounge, allowing attendees to learn by observing surgeons in real time on real patients. Mission Neurosurgery in action!

We also invite our colleagues to join us just prior to the big event for the Tumor Section Satellite Symposium, delivering tremendous science and education with an emphasis immunotherapy and big data automation.

I came across a book with the title "Operative Surgery of the Brain". The special aspect of this book was that it was written in 1885. It was about 5 mm thick. How far we have come! It has been the Mission of all the neurosurgeons that came before us to learn, educate, investigate and innovate over the last 133 years, bringing us to where we stand today. We have to carry on this Mission of neurosurgery to learn, teach, and innovate. So please enjoy this issue of CNS Q and join the Mission of Neurosurgery in Houston 2018.

CONTENTS



Editor's Note

Martina Stippler

President's Message

Ashwini D. Sharan

2018 CNS ANNUAL MEETING

4 A Preview of the 2018 Annual Meeting

Brian L. Hoh, Alex Khalessi, Nader Pouratian, Ashwini Sharan, April Martin, Deanne Starr

8 You Asked, We Answered: Practical Courses Offer More Subspecialty Clinical Content

Lola Chambless

9 Neurovascular Symposium – A Practical, Evidence-based Update for the General Neurosurgeon

Peter Kan

10 Surgical Robotics Symposium: Engineering to Bedside

Nader Pouratian, Chen Wu



12 Keeping Abreast of Crucial Guidelines: Up-to-Date Research Provides Insight

Brian Hoh, Alex Khalessi, Nader Pouratian, Trish Rehring, Mary Bodach

14 Case-based Sessions: Lively Discussions, Practical Advice, and New Points of View

Jennifer Sweet

15 CNS Xperience Lounge: Your Hub for Connection

Alex Khalessi

17 The CNS Exhibit Hall – Launching Pad for New Technology

Elad Levy, Daniel Hoh, Sydney Manola

18 NEUROSURGERY Publications

Nelson M. Oyesiku, Elad Levy, Brandon Fiedor

20 Making the Neurosurgery Oral Board Exam Less Intimidating

Costas G. Hadjipanayis, Robert J. Spinner



22 Update on 13th Biennial AANS/CNS Joint Section on Tumors Satellite Symposium

Manish Aghi, Jeffrey Weinberg, Isaac Yang

SECTION NEWS

24 2018 Spine Summit – Restoring Alignment in an Era of Global Change

Daniel J. Hoh

INSIDE THE CNS

26 Washington Update:

Katie Orrico, Alison Dye

CNSQ INSIDE BACK COVER

Images in Neurosurgery

PRESIDENT'S MESSAGE



Mission: Neurosurgery



Ashwini D. Sharan, MD
President, Congress of
Neurological Surgeons

Dear Colleagues,

I am excited and proud to share this preview of the outstanding 2018 CNS Annual Meeting program that awaits you in Houston this October. I am especially proud of the 2018 Annual Meeting Committee, led by Annual Meeting Chair, Brian Hoh, Scientific Program Chair, Alex Khalessi and Vice-SPC, Nader Pouratian.

This team has worked tirelessly, along with hundreds of volunteer committee members and faculty, to pack this five-day program with relevant, high quality programming geared toward your needs.

Each year after the meeting, we pore over attendee evaluations to better understand why you attend the meeting and identify ways to make your experience even better. You have made it clear that what makes the meeting most impactful is content that is clinically relevant to your practice and opportunities to connect with your colleagues and experts in each subspecialty. As you read this issue, I'm confident you'll see that each aspect of the meeting has been carefully planned with those goals in mind.

As the President, I have the great honor and responsibility of selecting both the Annual Meeting theme and the 2018 Honored Guest. *Mission: Neurosurgery* was inspired not only by Houston's esteemed space program, but also by the parallels between that industry and our own. President John F. Kennedy once said, "We choose to go to the moon, not because it's easy, but because it is hard." Neurosurgery, like manned space travel, was utterly unattainable for the great vast majority of human history. Our predecessors didn't begin to explore the brain because it was easy. *Mission: Neurosurgery* reminds us that we would not be where we are without insightful scientific study, the determination of the medical community, and dedicated teams around us.

Our Honored Guest, Dr. Robert Rosenwasser is the Jewell L. Osterholm, MD, Professor and Chair of the Department of Neurological Surgery at Thomas Jefferson University, and President of the Vickie and Jack Farber Institute for Neuroscience. He is also a great mentor and friend and I am grateful for his contributions to this meeting. Dr. Rosenwasser is recognized as one of the world leaders and pioneers as both a cerebrovascular neurosurgeon and endovascular neurosurgeon. He is a prolific researcher, having published over 450 peer-reviewed publications, abstracts and book chapters and has co-edited four textbooks on cerebral ischemia, Cerebral AVM's, and Interventional Neuroradiology/Endovascular Neurosurgery. I am confident that you find Dr. Rosenwasser's insights—both clinical and non-clinical—to be extremely valuable.

> MISSION: NEUROSURGERY REMINDS US THAT WE WOULD NOT BE WHERE WE ARE WITHOUT INSIGHTFUL SCIENTIFIC STUDY, THE DETERMINATION OF THE MEDICAL COMMUNITY, AND DEDICATED TEAMS AROUND US.<

> OUR GENERAL SESSIONS, DAILY BREAKOUTS AND TICKETED COURSES HAVE BEEN UPDATED AND IMPROVED TO EMPHASIZE INNOVATION AND THE IMPACT OF MEDICAL TECHNOLOGY ON OUR FIELD. <

I am also excited to welcome our International Partner Society, the Brazilian Society of Neurosurgery, to Houston. President, Ron Farias, and his delegation of more than 20 expert faculty have contributed tremendously to this Annual Meeting program and have collaborated with CNS on other complimentary educational offerings this year.




The Annual Meeting Committee has put together a tremendous program around this theme, with an incredible lineup of innovative and engaging keynote speakers like NASA Medical Director Smith L. Johnston III, water-sport pioneer Laird Hamilton, and John Herr, the revolutionary engineer and biophysicist who is changing the field of bionics. Our general sessions, daily breakouts and ticketed courses have been updated and improved to emphasize innovation and the impact of medical technology on our field.

Starting with our weekend offerings, you'll find 27 Practical Courses on clinical topics critical to your practice. Each course has been carefully vetted and, in some cases, revised by subspecialty experts from the joint sections to ensure that the content is relevant to today's neurosurgical practice and of the highest quality. We've supplemented this rich catalog with two full-day symposia that combine powerful didactic content led by experts with hands-on breakout sessions that let you experience the technologies that are driving practice in the field. The new Robotics Symposium on Sunday partners neurosurgeons with engineers to foster collaboration that will move our specialty forward.

We continue this approach into our weekday breakouts, starting with the morning Guidelines Sessions, which present the latest evidence-based practice guidelines in spinal trauma, cerebrovascular disease and skull base tumors. Our afternoon breakouts give you an opportunity to drive the content by submitting your own cases in advance of the meeting for discussion in one of 14 subspecialty topics. If selected, your case will be presented and discussed with a panel of subspecialty experts as well as your colleagues. Even our evening dinner seminars have been retooled to focus on critical clinical topics in spine, functional and cerebrovascular neurosurgery, as well as a non-clinical offering on coding, MIPS and bundling.

We also realize that groundbreaking science and educational sessions are only one of the reasons you come to the CNS Annual Meeting, and we've worked hard to expand and improve the networking opportunities in Houston as well. From our Saturday International Reception and the Sunday Opening Reception to the expanded CNS Xperience Lounge, the CNS offers you more ways to connect with your colleagues and make new connections. Be sure to visit the Xperience Lounge during meet and greet sessions with Dr. Rosenwasser, our CEO panel and other keynote speakers, and make time to grab a drink with your colleagues in the networking lounge.

All these sessions and more are detailed in the pages of this issue. I hope you will take time to read them, plan out your schedule for Houston, and let us know if there are other topics you'd like to see us address. I look forward to welcoming you to Houston! 



A Preview of the 2018 Annual Meeting



THE CNS ANNUAL MEETING COMMITTEE IS PROUD TO PROVIDE THIS PREVIEW OF THE 2018 CNS ANNUAL MEETING IN HOUSTON, TEXAS, OCTOBER 6-10. OUR THEME, MISSION: NEUROSURGERY. CELEBRATES THE ACCOMPLISHMENTS OF THE TEAMS WHO WORK DILIGENTLY TO ACHIEVE MEANINGFUL BREAKTHROUGHS IN NEUROSURGERY.

This year's meeting has been reworked to further emphasize innovation, which you'll see throughout our keynote lectures and in our new Robotics Symposium highlighted on page 10. Additionally, in response to your feedback, we designed the meeting to provide greater clinical insights with more interactive, case-based, and guidelines-based sessions, and programming is arranged to highlight specific neurosurgical pathways—including tumor, spine, vascular, etc.—allowing you to better tailor your meeting experience to your practice.

The 2018 CNS Annual Meeting also offers many of the trusted educational sessions and networking opportunities you've come to expect from the CNS. Catch up on the latest breaking new science with daily Oral Presentations and Rapid-exchange Oral Presentations, stay up-to-date with clinical trials and clinical guidelines, and observe surgical techniques in action via telemedicine and simulated surgical scenarios. We're once again highlighting the most impactful papers in NEUROSURGERY from select subspecialties to promote discussion and improve patient care. And the CNS Xperience Lounge has been expanded and enhanced for better networking with your colleagues and experts in the field.

Honored Guest Robert Rosenwasser

We are proud to welcome Dr. Robert Rosenwasser as our 2018 Honored Guest. Dr. Rosenwasser is the Jewell L. Osterholm, MD, Professor and Chair of the Department of Neurological Surgery at Thomas Jefferson University, and President of the Vickie and Jack Farber Institute for Neuroscience. Dr. Rosenwasser is recognized as

one of the world leaders and pioneers in unique specialization as both a cerebrovascular neurosurgeon trained by Drs. Charles Drake and Skip Peerless, as well as an interventional neuroradiologist trained by Dr. Alex Berenstein.

Dr. Rosenwasser specializes in the treatment of neurovascular illness, including both open surgical and endovascular techniques. These include AVMs, aneurysms, carotid stenosis, and stroke, among others. He is a member of the Congress of Neurological Surgeons, American Association of Neurological Surgeons, the American Academy of Neurological Surgery and the American College of Surgeons, Past President of the Society of University Neurosurgeons and Past Chair of the Joint Cerebrovascular Section. He has published over 450 peer-reviewed publications, abstracts and book chapters and has co-edited four textbooks on cerebral ischemia, Cerebral AVM's, and Interventional Neuroradiology/Endovascular Neurosurgery.



Honored Guest, Robert Rosenwasser

Join us Monday as Dr. Rosenwasser presents an honored guest lecture titled "The Neurosurgeon as a Stroke Specialist" and again Tuesday for his lecture, "The Evolution of Neurovascular Surgery: Procedural or Disease Oriented?" Be sure to stop by the CNS Xperience Lounge Monday, following the lecture, for a meet and greet.



Brian L. Hoh, MD



Alex Khalessi, MD



Nader Pouratian, MD



April Martin



Deanne Starr



Ashwini Sharan MD

PARTNER SOCIETIES

The CNS is proud to welcome the Brazilian Society of Neurosurgery as our international partner for 2018. We are thrilled to host several leaders of BSN at this year's meeting, and we hope you will attend their presentations. Throughout the meeting, speakers from BSN

will discuss how neurosurgical issues familiar to all of us affect their practices in Brazil, likely drawing some parallels and highlighting some interesting and unique differences.

We also are pleased to continue our collaboration with the Association of

Neurological Physician Assistants (ANSPA) this year, with their Annual Fall CME Meeting hosted in partnership with the CNS as a full-day course on Sunday, October 7. We'd like to thank the ANSPA for helping us make this collaboration seamless.

FEATURED SPEAKERS

Each year, the Annual Meeting Committee works hard to select keynote speakers that will illuminate the meeting's theme with insights from industries outside of neurosurgery and challenge attendees to evaluate their practice in new ways. This year's lineup has been selected for their experience both inside and outside of medicine. Like the earliest pioneers of both neurosurgery and space exploration, many of these keynote speakers have achieved tremendous success by choosing to do what others thought impossible. We hope you will find their talks both inspiring and insightful.

Smith L. Johnston III, MD, MS

Dr. Smith Johnston is the medical director of NASA-JSC Aerospace and Occupational Medicine Clinics and has spent most of his career as a medical officer and flight surgeon for NASA Medical Operations Branch at the NASA Johnson Space Center in Houston. Johnston has been the lead physician for the International Space Station (ISS) Emergency Medical System and Crew Return Vehicle development, and has supported two Expedition ISS missions and over 25 shuttle missions. His Sunday special lecture, "Space Medicine, Terrestrial Applications for Human Health, Performance, and Longevity" will address how innovations discovered from the US and International Space Programs benefit not only the lives of the astronauts and cosmonauts, but also his earth-bound patients.



Al Unser, Jr.

Al Unser, Jr. was born into a legendary racing family and carries on the tradition and legacy of success that comes with the Unser name. In an astounding 19 starts at the Indianapolis 500, Unser has stood atop the podium twice, finished in the top-five seven times and finished in the top-ten 10 times.

One of the sport's most versatile champion drivers, Al Jr. is currently executive consultant and driver coach for Harding Racing competing in the Verizon IndyCar Series. Join us during the Sunday Opening Session for "A Conversation with Al Unser Jr.: The Nervous System at 220 MPH!"



Laird Hamilton

Walter E. Dandy Orator:

Laird Hamilton is best known as an American big-wave surfer and pioneer in the world of action water sports—a renowned innovator and guiding genius of crossover board sports including tow-in-surfing, stand-up paddle boarding, and hydrofoil boarding. In addition to his affinity for the water, Laird is an inventor, author, stunt man, producer, TV host, fitness and nutrition expert, husband, father, and adrenaline junkie who continuously pushes the limits of human possibility. Join us Monday, October 8 for "A Conversation with Laird Hamilton: Risk, Reward, and Overcoming Fear." Afterward, Hamilton will be signing copies of his book, *Force of Nature*, in the CNS Xperience Lounge.





David Eagleman

David Eagleman is a neuroscientist and a *New York Times* bestselling author, known for his work on sensory substitution, time perception, brain plasticity, synesthesia and neurolaw. Eagleman is the writer and presenter of the international PBS series, *The Brain with David Eagleman*, and the author of the companion book, *The Brain: The Story of You*. Beyond his 100+ academic publications, he has published many popular books, including *Incognito: The Secret Lives of the Brain*, which explores the neuroscience “under the hood” of the conscious mind. Join us Wednesday, October 10 for his talk, “Can We Create New Senses for Humans?” followed by a book signing in the CNS Xperience Lounge.



Hugh Herr, PhD

John Thompson History of Medicine Lecture

TIME Magazine coined American engineer and biophysicist, Hugh Herr the “Leader of the Bionic Age” because of his revolutionary work in the emerging field of Biomechatronics—technology that marries human physiology with electromechanics. A double amputee, Herr is responsible for breakthrough advances in bionic limbs that provide greater mobility and new hope to those with physical disabilities. He is a professor of media arts and sciences at the MIT Media Lab, co-director of the MIT Center for Extreme Bionics and the founder of BionX Inc., a company that commercializes the EmPower Ankle-Foot Prosthesis, allowing amputees to walk with normal levels of speed and metabolism. Herr will deliver the John Thompson History of Medicine Lecture, “The New Era of Extreme Bionics” on Wednesday, October 10, followed by a meet and greet in the CNS Xperience Lounge.

Graham Allison

CNS Michael L. J. Apuzzo Lecture on Creativity and Innovation

Graham T. Allison is an American political scientist and Douglas Dillon Professor of Government at the Harvard Kennedy School. He is a best-selling author and leading analyst of US national security and defense policy with a special interest in nuclear weapons, terrorism, and decision-making. He currently serves on the advisory boards of the Secretary of State, Secretary of Defense, and the Director of the CIA. While serving as the Assistant Secretary of Defense during the Clinton Administration, Allison received the Defense Department’s highest civilian award, the Defense Medal for Distinguished Public Service, for “reshaping relations with Russia, Ukraine, Belarus, and Kazakhstan to reduce the former Soviet nuclear arsenal.” Following his delivery of the Apuzzo Lecture on Tuesday, October 9, Dr. Allison will be signing copies of his books in the CNS Xperience Lounge.



This year’s meeting is full of can’t-miss content and opportunities to enrich your practice. We hope you’ll take the time to read more about each session throughout this issue and use it to begin planning your time in Houston. We also hope you’ll bring your family for a front-seat lesson in aeronautics and space history and innovation. There are many opportunities to learn, explore, and network in Mission: Neurosurgery.

THE 2ND ANNUAL PAPER OF THE YEAR AWARDS

TOP PAPER
OF THE
YEAR

PAPER OF THE
YEAR, SELECT
SUBSPECIALTIES*

The CNS and NEUROSURGERY® Publications honor the
most impactful papers published in *Neurosurgery*
from July 2017–June 2018.

Join us to celebrate leading papers
exploring new frontiers in science.

2018 CNS Annual Meeting
MISSION: NEUROSURGERY
October 6–10, 2018

Visit cns.org/2018 to
learn more and register

 #CNS2018

*Cerebrovascular, Neurotrauma & Critical Care, Pain, Pediatrics, Socioeconomics,
Health, Policy, & Law, Spine & Peripheral Nerve, Stereotactic & Functional, and Tumor.



**2018 ANNUAL
MEETING**

**HOUSTON, TEXAS
OCTOBER 6–10, 2018**





Lola B. Chambless, MD

You Asked, We Answered: Practical Courses Offer More Subspecialty Content



With a busy scientific program full of diverse content, how do you make the most of your time at the Annual Meeting? For many attendees, it means identifying the courses that offer the most in-depth educational content on subspecialty topics.

Pre-meeting Practical Courses allow attendees to use the weekend ahead of the main meeting to focus on key topics that are highly relevant to their practice. This year, section leaders were tasked with evaluating past successes and failures to ensure that the course catalog continued to evolve.


"Using feedback and data from previous meetings gave us a sense of where to look and what to avoid since we had an idea of what experiments failed to attract members in the past," said Clemens Schirmer on the design of the socioeconomic content. "Going forward we used knowledge gaps identified by our members to build new content around the expressed desires of the membership and in combination crafted a balanced program that meets the needs of our attendees."

In 2018, the course catalog will feature 27 practical courses across two days. Some courses, like the Brain Tumor Updates, provide attendees with a comprehensive review of the latest scientific evidence presented in a way that is immediately translatable to members' practices. Others, including the hands-on course in endoscopic craniostomy repair, offer proctored instruction in a

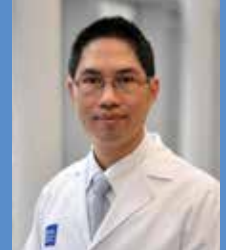
specific surgical technique. Additional courses offer neurosurgeons an introduction into cutting edge technologies of the future, like Big Data analytics.

Courses that feature honest discussion of complications are often popular, and this year Drs. Dan Resnick and Luis Tumialan will host a group of preeminent spine surgeons in "My Worst Spinal Complication: What I Learned." This offering, as well as courses on 3D intracranial anatomy and peripheral nerve exposures, may hold particular interest to neurosurgical trainees, who are able to attend any practical course at a steeply discounted registration rate. Nurses and advanced care practitioners are also welcome to attend these courses. On Sunday, Oct 7, the CNS will cohost the Association of Neurosurgical Physician Assistants CME meeting as an all-day practical course which is free of charge and open to all registered ANSPA members, nurses and physician assistants.

The faculty for the 2018 Practical Courses represent a diverse group of well-known educators and thought leaders from within neurosurgery and beyond. Attending these courses lets members get to know these neurosurgical leaders in a workshop format, helping to build collaborations and facilitate mentorship. The interactive design means that attendees can enhance the discussion with their own experiences and learn from each other as well. As always, Practical Courses also represent an excellent opportunity to fulfill CME requirements.

A core part of the CNS mission is innovation in neurosurgical education, and the content offered through courses will continue to evolve to meet member needs. Member engagement is critical to ensuring that this content remains highly relevant to neurosurgeons, trainees, and allied professionals and your feedback has shaped a curriculum for the coming meeting that promises to offer the highest quality educational programming the CNS has produced. 

To review the full list of Practical Course offerings at the 2018 Annual Meeting, visit <https://www.cns.org/annual-meeting-2018/program/practical-courses>.



Peter Kan, MD

Neurovascular Symposium – A Practical, Evidence-based Update for the General Neurosurgeon



CNS Members and Annual Meeting attendees have made it clear that one of the most important factors in their decision to attend is to obtain high-quality clinical content that is relevant to their practice. For busy general neurosurgeons who want to stay current on relevant topics and controversies in cerebrovascular surgery, the Neurovascular Symposium on Saturday, October 6, provides a concise update in an interactive and engaging format.

This one-day forum allows attendees to obtain the latest information on cerebrovascular surgery, endovascular neurosurgery, and management of ischemic and hemorrhagic stroke from a panel of national experts. Throughout the course, we

will review recent literature regarding patient selection and outcomes for endovascular treatment of acute ischemic stroke as well as emerging technologies such as mobile stroke units.

The course is made up of seven didactic sessions, detailed below. In between sessions, attendees will join some of CNS' top industry partners for three hands-on breakout sessions with the technologies that are driving neurovascular surgical care in these areas.


The course begins with a review on recent literature regarding patient selection and outcomes for endovascular treatment of acute ischemic stroke followed by emerging topics such as techniques of revascularization and management of

venous strokes. Cutting edge topics feature neuroprotective strategies and stem cell therapy in acute ischemic stroke.

In our second session, we'll discuss the management of intracranial atherosclerotic and vaso-occlusive disease. Areas covered include surgical revascularization (EC-IC bypass) Moya Moya disease and the use of advanced imaging to define flow criteria for revascularization. Based on current evidence and guidelines, we then move to a discussion on endovascular and surgical revascularization (CAS versus CEA) for extracranial atherosclerotic diseases with a focus on new trials in our third session.

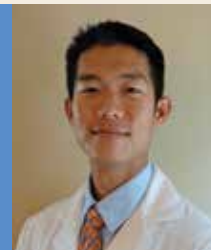
The fourth and fifth sessions cover optimal treatment of intracranial aneurysms including surgery (clip reconstruction and bypass), traditional endovascular techniques (primary and assisted-coil embolization), flow-diversion, and other new technologies such as intrasaccular devices and novel stents and coils, followed by a lecture on current management of cerebral vasospasm.

Our final sessions offer comprehensive panel discussion on multimodal treatment options (surgery, embolization, and radiosurgery) for intracranial arteriovenous malformations and will conclude with evidence-based management and emerging minimally invasive surgical techniques on the management of intracerebral hemorrhage.

The depth and breadth of this content, along with the hands-on opportunities to engage with the latest technology in the field, have made this one of the most popular optional courses at the Annual Meeting. 



Nader Pouratian, MD



Chen Wu, MD

Surgical Robotics Symposium: Engineering to Bedside

Robotic technologies have revolutionized several industries, most notably the manufacturing and automotive industries. Many have argued that robotics (in addition to artificial intelligence) will be the basis of the next industrial revolution. Just like other industries, the practice and science of medicine is continually evolving and stands to benefit from the automation and precision of robotics technologies. When integrated with advanced imaging, surgical robotics has the potential to reduce human- and user-related variability, decrease duration of surgery, increase surgical precision, and potentially improve the safety of surgical procedures.

While robotics has been integrated into other surgical practices such as general, colorectal, urological, and gynecological surgery, neurosurgical robotics is a nascent field. The difference in temporal evolution in large part can be attributed to the unique challenges related to the brain and spine, including smaller access corridors and defining a valuable and practical need for robotics. In our current era of healthcare evolution, defining value is of even greater importance.

Defining the path forward requires a multidisciplinary effort — for neurosurgeons and engineers to understand needs and opportunities to forge the most efficient, productive, and useful path. To address these needs, the CNS Annual Meeting will feature a full day pre-meeting symposium on “Surgical Robotics: Engineering to Bedside.” This non-CME symposium on Sunday, October 7, has been developed jointly by key opinion leaders across neurosurgical subspecialties (including spine, cranial, and stereotactic neurosurgery) and Cambridge Consultants, who specialize in disruptive innovations and revolutionizing medical therapies through groundbreaking surgical devices.

The symposium will include five segments, each supplemented by a series of breakout sessions where participants can interact firsthand with the current robotic systems and discuss usage with surgeons who have used the systems in clinical practice. In the first segment, speakers will survey the evolution of surgical tools and surgical robotics, to begin to define the needs and opportunities for neurosurgical robotics that supersede current image-guided surgical technologies. The second session will focus on robotics and spine surgery, including applications in training, challenges unique to spinal robotic surgery, the accuracy and precision of robotic spinal instrumentation, and opportunities to impact the field of spinal neurosurgery. The third session will survey cranial robotic surgery, including applications in deep brain stimulation and epilepsy surgery as well as endoscopic surgery, concluding with an interactive discussion of the added-value of robotics and the future state of robotics in cranial neurosurgery. The fourth session will focus on evaluation and assessment of current technology, including efficiency and accuracy tradeoffs, workflows, and clinical needs and engineering tradeoffs. Finally, the fifth session will evaluate future directions, including potential integration of artificial intelligence for preoperative planning and intraoperative support, next-generation user interfaces, and key emerging technologies for robot enhanced neurosurgery.

By bringing industry leaders, engineers, key opinion leaders, and users in one forum, this groundbreaking symposium aims not only to review the current state and evidence supporting current neurosurgical robotics, but to stimulate discussion and an understanding of key technology features that will enable development and assessment of future robotic systems. ■

> Robots are already augmenting neurosurgical performance in the brain and the spine. This field is adding precision to electrode and screw placement and it's simply the next evolution of navigation technologies.<

> The potential to transform neurosurgical performance in the OR is just beginning. By partnering neurosurgeons with engineers in this symposium, we hope to help them learn the nuances of Robotic technologies and give them an opportunity to help shape the future of this technology.<

Ashwini D. Sharan, MD, President, Congress of Neurological Surgeons

SYMPOSIUM OVERVIEW

Session 1: Background/History of Surgical Robotics

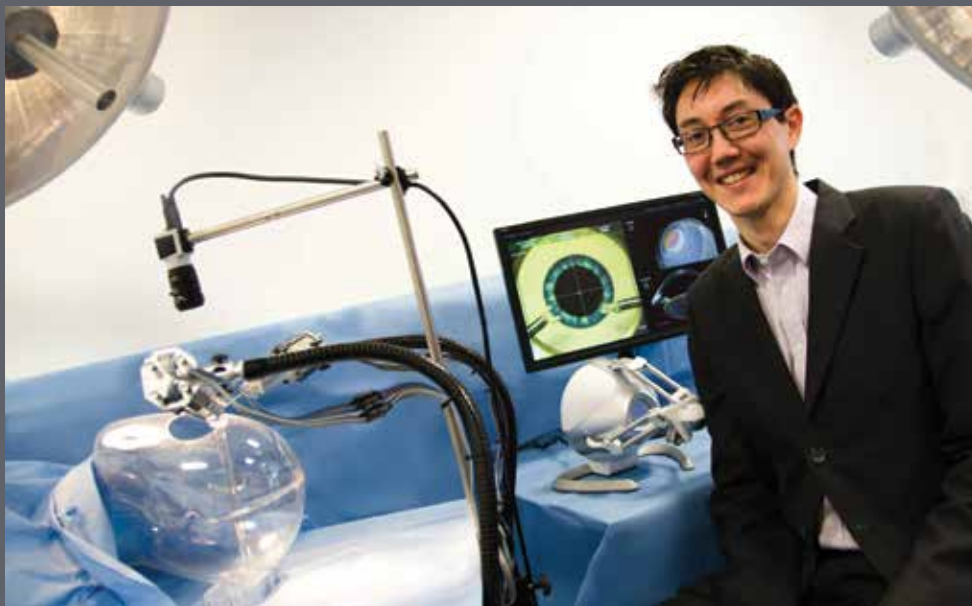
- **Image-guided Robotics for Neurosurgery**
Garnette Sutherland
- **Minimally Invasive Surgical Robotics: Past and Future**
Amy Kerdok
- **Historical Trends in Surgical Tools: From Manual to Robotic**
Panel Discussion

Session 2: Spine Applications of Robotics

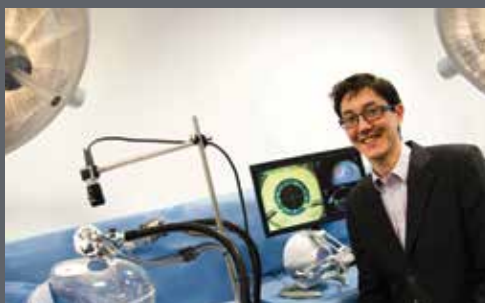
- **Applications of Robotics in Spine Surgery and Spine Surgery Training**
Michael Y. Wang
- **Robotic Development to Fit the Unique Needs of Spine Surgery**
Nicholas Theodore
- **Screw Placement Accuracy Using Robotic Assistance and Intraoperative Fluoroscopy**
Louis Chenin
- **Current and Future State of Robotics in Spine Surgery**
Panel Discussion

Session 3: Cranial Neurosurgery Applications of Robotics

- **Robotic Applications in Deep Brain Stimulation**
David P. Vansickle
- **Robotic Applications in Epilepsy**
Jorge A. Gonzalez-Martinez
- **Endoscopy and Robotics**
Sarat P. Chandra
- **The Current and Future State of Robotics in Cranial Neurosurgery**
Panel Discussion



Chris Wagner heads the surgical robotics team at Cambridge Consultants



Example of a surgical robotic system incorporating in body articulation; developed by Cambridge Consultants

Session 4: Evaluation and Assessment of Current Technology

- **Efficiency and Accuracy Trade-offs in Current Robotic Systems**
Christopher R. Wagner
- **Pre-operative Setup and Intraoperative Workflow Considerations for Current Robotic Systems**
Melanie Turieo
- **Clinical Needs and Engineering Trade-offs in Today's Cranial and Spine Robots**
Panel Discussion

Session 5: Future Directions

- **Advances in Minimally Invasive Robotics for Neurosurgery**
Robert Webster III
- **Artificial Intelligence for Pre-operative Planning Support and Postoperative Analysis**
Joe Corrigan
- **Next Generation User Interfaces for Spine Surgery**
Serge Roux
- **Key Emerging Technology for Robot Enhanced Neurosurgery**
Panel Discussion

Join us between sessions for hands-on breakout sessions with industry leaders in neurosurgical robotics.



Brian Hoh, MD



Alex Khalessi, MD



Nader Pouratian, MD



Trish Rehring



Mary Bodach

Keeping Abreast of Critical Guidelines: Up-to-date Research Provides Insight

Healthcare delivery is rapidly evolving, with an intensifying emphasis on evidence-based, value-driven, and standardized care. With an ever-expanding number of clinical studies, it is not only difficult to stay abreast of all key clinical trials but increasingly challenging to judge the quality and value of each study and how it should impact your clinical practice. To address this critical need, the CNS Guidelines Committee develops clinical practice guidelines to comprehensively evaluate the published literature and produce evidence-based recommendations on the most important and relevant topics in neurosurgery that are key to clinical practice.

The CNS has published over 13 guidelines, ranging from cervical degenerative disease to plagiocephaly to the most recently published guideline on deep brain stimulation for Parkinson disease. An additional nine guidelines are currently in development. Guidelines identify, evaluate, and summarize the highest quality evidence, inform clinical judgement and experience of practitioners, reduce variability and standardize care, promote safety, enhance quality, and increase values. Through these aims, **CNS Guidelines** have become a critical tool to confront the rapidly changing healthcare environment.

Guidelines are only valuable, however, when their content can be effectively disseminated and the CNS has taken a multi-faceted approach to sharing these critical resources, publishing all guidelines in peer-reviewed journals, on the [CNS website](#) and in the new [CNS Guidelines app](#). Guidelines are also used by payers and other governing institutions to make policy decisions.

In Houston, the 2018 Annual Meeting will feature a Guidelines Session each morning from 7:00-8:30 am, allowing for more effective public presentation and discussion of guidelines and the potential to make even greater impact. On Monday, guidelines for the acute cervical and thoracolumbar spine trauma will be critically assessed. On Tuesday, cerebrovascular experts will review guidelines on the management of aneurysms, arteriovenous malformations, and ischemic stroke. On Wednesday, guidelines on skull base tumors will be discussed, including vestibular schwannomas, chordomas, and malignant skull base tumors. These sessions, led by members of the Guidelines Committee and the work groups who developed the guidelines, have been among the most well attended events at the annual meeting. The standing room only crowds and lively discussions attest to their value and success. 📌



Guidelines sessions are led by subspecialty experts and members of the CNS Guidelines Committee and guidelines work groups.



CNS
Foundation

Donate to the
CNS Foundation
today to support
critical practice
guidelines
development.

Resources

- 1 Brooks et al. The Impact of Guidelines on Clinical Practice Survey of the Use of Methylprednisolone for Acute Spinal Cord Injury. *Neurosurgery*. 2016 Sep;79(3):E516-20. doi: 10.1227/NEU.0000000000001341.

The CNS Guidelines: Creating Awareness and Changing Practice

Each CNS Guideline is developed by an expert panel of peers—often including experts from allied fields—using very specific and robust methodology to ensure consistency and reliability. Each guideline has been peer-reviewed by the Joint Guidelines Review Committee, with representative from the CNS and AANS and external partners to ensure methods, interpretations, and recommendations are methodologically sound and accurate. This resource-intensive effort requires thousands of volunteer hours annually.

The positive impact of published guidelines on clinical practice has been well documented in the literature. Brooks et al¹ conducted a survey, evaluating the impact of guidelines on clinical practice in neurosurgery, which showed CNS guidelines “do have an impact on physician practice, as evidenced by a high level of awareness, a self-reported impact on physician practice, and self-reported steroid use literature that is consistent with more recently published reports.” These results inspire continued significant financial investment by the CNS Foundation and contributing sections.



Guidelines sessions draw standing room only crowds to hear the latest evidence-based updates.



UPDATES ON CURRENT PRACTICE GUIDELINES

Great new things cannot be accomplished without great new information.

Guidelines for Acute Cervical and Thoracolumbar Spine Trauma

Monday | 7:00 am – 8:30 am

Bizhan Aarabi, Paul M. Arnold, John H. Chi, Sanjay S. Dhall, Daniel J. Hoh, R. John Hurlbert, John E. O'Toole, Patricia B. Raksin, Nicholas Theodore

Cerebrovascular Guidelines: Aneurysms, Arteriovenous Malformations, and Acute Ischemic Stroke

Tuesday | 7:00 am – 8:30 am

Alejandro Berenstein, E. Sander Connolly, Kyle M. Fargen, Brian L. Hoh, Christopher P. Kellner, Adnan H. Siddiqui, Babu G. Welch

Guidelines on Skull Base Update

Wednesday | 7:00 am – 8:30 am

Franco DeMonte, Paul A. Gardner, Jeffrey J. Olson, Chirag G. Patil, Gelareh Zadeh



CNS | 2018 ANNUAL MEETING



Jennifer Sweet, MD

Case Based Sessions: Lively Discussions, Practical Advice and new Points of View




Visit cns.org before July 31 and submit your case for any of these submission categories:

- Outpatient Neurosurgery: From Office to ASC—Optional or Necessary?
- Cervical and Thoracolumbar Trauma
- Management of Pediatric Spine Trauma
- STN vs. GPI: Key Clinical Trials
- Brain Metastases
- Treatment of Cerebral Aneurysms
- Spinal Deformity and MIS Surgery
- Ethical Controversies in Neurotrauma
- Surgical Techniques in Trigeminal Neuralgia
- Myelomeningocele and Associated Pathologies: Variable Practice Management
- The Changing Face of Epilepsy Surgery
- Challenging Tumors
- Multi-Modality Treatment of Cerebral AVMs
- Challenging Cases: TBI

Then join us in Houston and be a part of the discussion.

As the Annual Meeting Committee strives to make meeting content even more relevant to clinical practice, case-based discussions have proven to be a popular and effective way to help attendees assess and improve their current practice. The 2018 CNS Annual Meeting will feature interactive case-based panel discussions on Monday and Tuesday afternoon, based on attendee case submissions across 14 different topics. The two-hour sessions will be completely interactive and participants will return to their practices with valuable, relevant knowledge that will immediately impact their patients.

Attendees can submit their own cases through July 31 via the CNS website. A panel of topic experts will discuss relevant management and surgical approaches for each case, and audience members will have opportunities to weigh in via electronic polling or participate in the discussion. It's the perfect opportunity to hear and see alternative or even opposing treatment strategies relevant to your practice, and offer insights of your own. 



Elad Levy, MD



Daniel Hoh, MD



Sydney Manola

The CNS Exhibit Hall – Launching Pad for New Technology

From advances in imaging to robotic-assisted surgeries, technology drives neurosurgery forward. While the Annual Meeting highlights new technologies throughout a number of clinical sessions, there is no more efficient place to learn about all the latest technological advances than in the CNS Exhibit Hall. More than 150 companies will be in Houston, including more than 23 new exhibitors, making it easy to find and compare devices and other technologies for your neurosurgical practice.

There are several great ways to experience these technologies and learn how they can be incorporated into your practice. Be sure to add these to your schedule in Houston;

- **Educational Update Sessions** – Grab a latte and catch up on the latest developments in your subspecialty with these quick 10 minute presentations by CNS' valued corporate partners. From technology updates to pearls, these sessions offer practical information to take back to your practice. Educational Update Sessions are scheduled Monday and Tuesday afternoon in the CNS Xperience Lounge.



- **Live Surgery** – Join us daily in the CNS Xperience Lounge for live surgical presentations via telemedicine technology. Monday and Wednesday sessions feature Canon Medical's imaging systems, while the Tuesday session spotlights technology from Stryker, KLS Martin and Karl Storz.

MONDAY

New 4D CT Technology

Sponsored by Canon Medical
Operating Surgeon, Adnan Siddiqui
Moderator, Elad Levy

TUESDAY

Practical Application and Value of ICG Fluorescence Endoscopy in Skull Base Surgery

Sponsored by Stryker, KLS Martin and Karl Storz
Operating surgeon, Paul Gardner
Moderator, Daniel Prevedello

WEDNESDAY

New 4D CT Technology

Sponsored by Canon Medical
Operating Surgeon, Kenneth Snyder
Moderator, Elad Levy

- **Sponsored Lunches** – Join some of our top corporate partners each day for complimentary lunch and learn sessions in the exhibit hall. Led by neurosurgeon faculty, these educational presentations cover important clinical topics, surgical approaches and technological advances.

- **In booth demonstrations** – Visit exhibitor booths during break hours to see how leading subspecialty experts utilize that technology in their practice, and try new devices out for yourself.




The Exhibit Hall will also host the annual CNS Foundation Silent Auction. Stop by to bid on authentic autographed items and help support the Foundation's efforts to equip and prepare neurosurgeons to advance innovation, quality and accessibility of neurosurgical care. And be sure to visit the CNS Xperience Lounge for daily refreshments—including gourmet coffee in the mornings and beer and wine in the afternoon—innovation presentations, network and more. 

EXHIBIT HALL HOURS

MONDAY 9:30 AM- 4 PM

TUESDAY 9:30 AM- 3 PM

WEDNESDAY 9:30 AM -2 PM

BEST TIMES TO VISIT THE HALL

MORNING BREAK (9:45 – 10:45 AM)

LIVE SURGERY (10 – 10:30 AM)

LUNCH (12:15 – 1:45 PM)

AFTERNOON BREAK (1:45-2:45)



Alexander Khalessi, MD
CNS Scientific Program
Chair

The CNS Xperience Lounge – Your Hub for Connection



For many Annual Meeting attendees, the ability to reconnect with colleagues and network with other experts in the field is a major benefit of the CNS. We listened to the tremendous member enthusiasm for our initial effort and expanded the popular CNS Xperience Lounge in Houston to offer more space and even greater opportunities to connect.

Located at the center of the Exhibit Hall, the CNS Xperience Lounge lets you get up close and personal with this year's awardees, connect with your colleagues and mentors, and learn more about new technologies featured throughout the meeting.

Author meet and greet sessions will be held throughout the daily

breaks, giving you a chance to meet Honored Guest, Robert Rosenwasser and select keynote speakers, including Laird Hamilton, David Eagleman, and Graham Allison.

Authors of the year's Top Papers in Neurosurgery® will host meet and greet sessions allowing you to ask questions about their work, and the Innovator of the Year award finalists will each give a brief presentation



Xperience Lounge Highlights:

Meet & Greet Sessions

Robert Rosenwasser, Honored Guest – Monday, October 8

Book Signings:

Laird Hamilton - Monday, October 8

Graham Allison – Tuesday, October 9

David Eagleman – Wednesday, October 10

FDA panel session

Monday, October 8, 2018 from 1:45 - 2:45 pm

Live Surgery

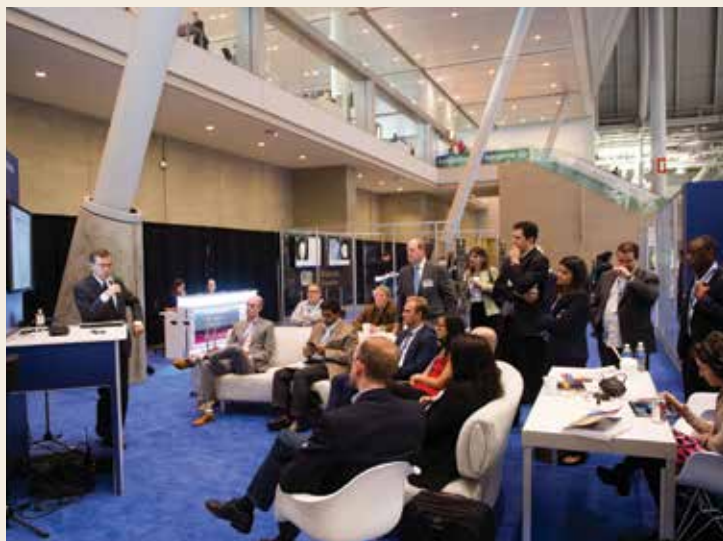
Daily from 10 – 10:30 am

Innovator of the Year Presentations

Monday, October 8, 2018

Educational Update Sessions

Afternoons from 1:45–2:45 pm




on Tuesday to talk about their new technologies that are changing neurosurgical practice and care. (Note: For more information on the Innovator of the Year award or to submit your Neurosurgical innovation for consideration, visit cns.org. Applications are due July 31, 2018.)

This year, we've added continuing conversations by CEOs of some of the country's most prominent hospitals, allowing you to dive deep into the impact of the changing macro-economic environment on health systems and neurosurgical care delivery. We will additionally feature an FDA Panel on fostering innovation and device approval for neurosurgical practice.

The Xperience Lounge is also home to the Presentation Theater, featuring Live Surgery presentations each morning, educational update sessions from CNS' top corporate partners in the afternoon and a special FDA panel session Monday, October 8, 2018 from 1:45 pm to 2:45 pm.

You can also browse digital posters or check in with the editorial staff of Neurosurgery and Operative Neurosurgery to learn more about developments in CNS publications.

Be sure to set aside some time to join us at the heart of the CNS Xperience Lounge, where the CNS will set up a comfortable, casual networking lounge to help you connect with colleagues and friends. Grab a latte or a beer and catch up with friends from training, snag some dedicated time with your mentor, or make one-on-one appointments with industry partners whose technologies you need to see. The Xperience Lounge helps make the most of your time at the Annual Meeting. See you in Houston for Mission: Neurosurgery! 



Brandon J. Fiedor, MA

Nelson M. Oyesiku, MD,
PhD, FACS

NEUROSURGERY® Publications at the 2018 CNS Annual Meeting



The 2018 CNS Annual Meeting will provide ample opportunity for those visitors who are interested in NEUROSURGERY® Publications to glean the latest news and developments from the editorial office, and witness the journals' impact first-hand through a variety of exciting events.

Editor-in-Chief, Nelson M. Oyesiku, MD, PhD, FACS, will address the meeting during General Scientific Session on Tuesday, October 9. During his address, Dr. Oyesiku will discuss current journal initiatives as well as review NEUROSURGERY® Publications' progress and accomplishments from over the past year.

In the CNS Xperience Lounge, attendees will have the opportunity to sample journal copies, interact with digital journal products and features, review and discuss current journal initiatives with leadership and staff, and learn the latest about our entire family of publications which include *Neurosurgery*, *Operative Neurosurgery*, *Clinical Neurosurgery*, and *The Surgeon's Armamentarium*.

Xperience Lounge Highlights

- Copies of the most recent issues of *Neurosurgery*, *Operative Neurosurgery*, and *Clinical Neurosurgery* will be on display and available free of charge. *Clinical Neurosurgery* promotional pieces are printed once yearly and are a popular item. Be sure to claim your copy before they're gone!
- Our audio-abstract series, *Neurosurgery Speaks*, which has now been expanded to *Operative Neurosurgery*, will be featured for those interested in listening to select journal article abstracts in one of our 10 languages.
- The Surgeon's Armamentarium will be on display and demonstrations will be provided upon request. Visitors interested in learning more about the incredible power of this digital platform and its many features are encouraged to stop by. The Surgeon's Armamentarium is available exclusively to CNS members and non-member journal subscribers.
- Journal staff and representatives will be available throughout the meeting and are interested in hearing suggestions visitors may have on any journal related topics from thoughts on how we can improve our submission process to suggestions for supplements and review series. Please bring your thoughts and ideas to the Xperience Lounge!

Returning this year, the **Editor-in-Chief Roundtable** is a dedicated session to give visitors a chance to hear from journal editorial board members on issues from content evaluation to "hot" topics in neurosurgery and sub-specialties. The roundtable also gives visitors the opportunity to pose questions to the Editor-in-Chief and panel. The roundtable will take place on Tuesday, October 9th from 1:00 – 2:00 pm in Room 350 D/E at the George R. Brown Convention Center in Houston, Texas. Please join us!

Also returning this year, **Neurosurgery Paper of the Year** will recognize the most impactful papers published in *Neurosurgery* from July 2017 to June 2018. Preferred papers are those that challenge dogma, create a paradigm shift, propose new approaches to patient care, or analyze and interpret big data and trial results. Awards will be given for Top Paper of the Year and Paper of the Year: Section Level (chosen from select subspecialties). Recipients of the Top Paper of the Year and Paper of the Year: Section Level will be invited to present their paper during the General Scientific Sessions, Sunday through Wednesday. 📌



Great accomplishments come from teams that work to further scientific research.

EDITOR-IN-CHIEF ROUNDTABLE

George R. Brown Convention Center
Tuesday, October 9 | 1:00–2:00 pm



Panel members will provide insight into the evaluation and publication process and share their perspective on various subspecialties within neurosurgery. Following the discussion, stay for a Q&A moderated by Editor-in-Chief Dr. Nelson M. Oyesiku, MD, PhD, FACS.

Attendees are highly encouraged to submit questions ahead of time. Address your questions to Managing Editor, Brandon J. Fiedor, at bfiedor@cns.org.



CNS

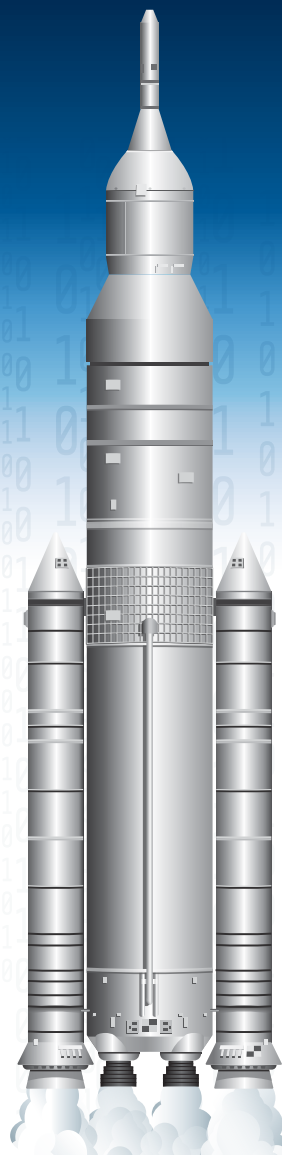
2018 ANNUAL MEETING

HOUSTON, TEXAS
OCTOBER 6–10, 2018

Discover more about the CNS Annual Meeting and register today. **[CNS.ORG/2018](https://cns.org/2018)**

Advance registration deadline: September 6

 **#2018CNS**





Costas G. Hadjipanayis,
MD, PhD



Robert J. Spinner, MD

Making the Neurosurgery Oral Board Exam Less Intimidating

Preparation for the American Board of Neurological Surgeons (ABNS) Oral Exam may be one of the biggest challenges neurosurgeons face during their careers. It is a necessary rite of passage for safe, practicing neurosurgeons in our country. The new exam format, now instituted for over a year, permits neurosurgeons to focus on a neurosurgery subspecialty of their choosing for one of the test sessions. The new format also requires neurosurgeons to present their own cases with complications, selected by the ABNS, to the examiners. Board-eligible candidates are asked to discuss why they elected to operate, what operation they chose and how they performed it. Candidates' ability to discuss their own patients and cases is now an important part of the exam.

So, what is the best way to prepare for this exam that will define your ability to practice neurosurgery at most hospitals in the US? Self-study has traditionally been an important method for preparation. Board-eligible candidates approach their partners or mentors to review neurosurgical cases and complication management. Attendance at multidisciplinary conferences (tumor, cerebrovascular, spine, functional, etc.)

can permit a better understanding of the management of neurosurgical disorders. Attendance of the AANS Goodman Oral Board Preparation Course has also been a reliable and effective method for neurosurgeons' final exam preparation for over two decades. But new challenges also call for new preparation strategies.

The CNS Oral Board Exam Preparation Review Course is now entering its 6th year of existence. The course, intended to be complementary to the Goodman course, has grown in attendance now permitting two courses a year. One course is held immediately preceding the annual CNS meeting and a winter course has been added in February, each scheduled to offer candidates an early preparation course and help them identify areas for continued study prior to the exam. The CNS Oral Board Review Course has closely aligned to the new ABNS exam format to provide neurosurgeons the confidence needed to pass the exam. Outstanding faculty from all over the country have tirelessly participated, now twice each year, to provide registrants the didactic and case-based presentations needed for each subspecialty. Small-group case discussions presented by expert faculty

further define important management of neurosurgical disorders. Participants have also had the chance to present their own cases to discuss the management of their patients and complications. This has become an important component of the course where neurosurgeons can receive confidential feedback not only on their presentation styles but also the management of their cases and complications.

We have been happy to direct this course and are grateful to the faculty who have been vital to its success. We believe we have created a course that truly addresses the needs of registrants—to take the exam with confidence and experience, to pass it, and to succeed in their neurosurgical practice. We look forward to continually refining the course as needed by board-eligible neurosurgeons and we hope to see some of you this October in Houston. ■

2018 CNS Oral Boards Review Course

October 6-7 in Houston, TX

"This course is extremely useful to get started and give you an idea how to prepare."

Raqeeb Haque

"A good early course to introduce you to the exam mindset"

Bethwel Raore

"It is a very precise review for the Oral Boards."

Rafael Cardona-Duran



CNS

Oral Boards Review Course

October 6–7, 2018 | Houston, TX

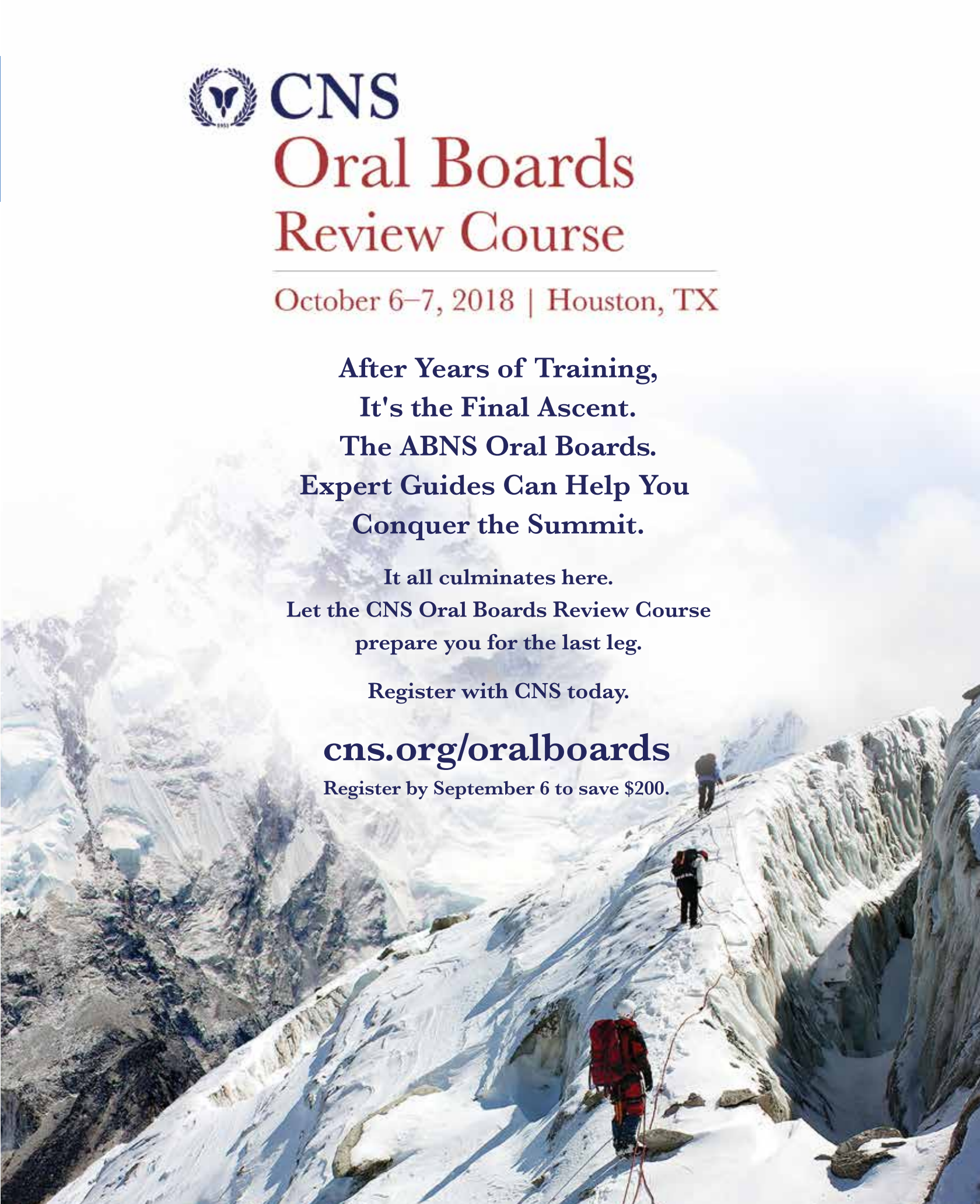
**After Years of Training,
It's the Final Ascent.
The ABNS Oral Boards.
Expert Guides Can Help You
Conquer the Summit.**

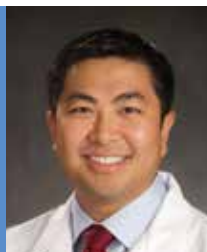
**It all culminates here.
Let the CNS Oral Boards Review Course
prepare you for the last leg.**

Register with CNS today.

cns.org/oralboards

Register by September 6 to save \$200.





Isaac Yang, MD
Scientific Program
Chair

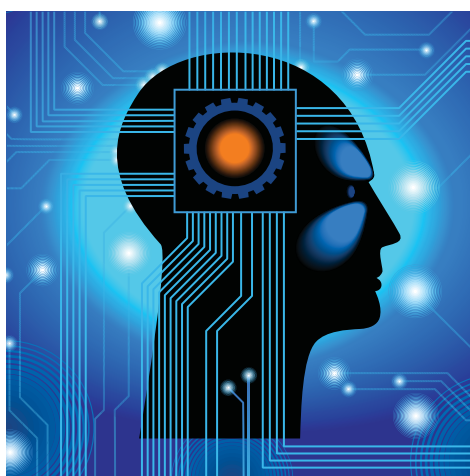


Jeff Weinberg, MD
Scientific Program
Chair



Manish K. Aghi, MD
Tumor Section Chair

Update on 13th Biennial Joint Section on Tumors Satellite Symposium



October 5-6, 2018
Houston Marriott Marquis
Houston, Texas

The Joint Section on Tumors is thrilled to be holding its 13th Biennial Tumor Satellite Symposium immediately before the 2018 CNS Annual Meeting on October 5-6, 2018, at the Houston Marriott Marquis (the headquarters hotel of the main CNS meeting) in Houston, Texas.


The tumor satellite symposium gathers hundreds of attendees from all disciplines of neuro-oncology to hear exciting presentations revolving around the central meeting theme of leveraging technology to improve the care of patients with central nervous system tumors. The presentations will be focused around three specific thematic areas: (1) the latest advancements and technology developments in brain tumor treatments; (2) immunotherapy; and (3) big data automation. Neurosurgeons, neuro-oncologists, radiation oncologists, skull base surgeons, residents of all disciplines, nurse

clinicians and physicians assistants with an interest in brain tumors are invited to attend this biennial event. Participants will have the opportunity to attend scientific sessions, browse through exhibits, and network with neurosurgical colleagues. Event highlights include:

- A comprehensive symposium on the wide-ranging aspects of brain tumor technologies kicks off the program on Friday, October 5, with neuro navigation, laser interstitial therapy and tractography topics.
- Peer-reviewed oral and poster presentations throughout the meeting cover the therapy and science of brain tumors with molecular, clinical, and therapy updates.
- NASA astronaut Gregory Reid Wiseman delivers a keynote lecture on the technology and communication advancements needed in exploring space on Saturday, October 6.
- On Friday evening October 5, three breakout sessions offer a primer for younger attendees on the basics of starting clinical trials; advice on starting a basic science lab as a neurosurgeon; and guidance in transitioning from residency to a job.
- A tumor section gala on Friday, October 5, offers dinner and award presentations at the Four Seasons Hotel in Houston. Tickets to the gala will be purchased separately from the main meeting registration.
- Following lunch on Saturday October 6, the meeting will transition into a symposium honoring the career of Dr. Ray Sawaya, who chaired the neurosurgery department at MD Anderson from its establishment in 1990 until this year.



This portion of the symposia will offer a chance to hear about the core principles by which Dr. Sawaya established the neurosurgery department at MD Anderson and how these principles are vital to the practice of neurosurgical oncology today.

Registration for this meeting is open at <https://www.cns.org/meetings/2018-tumor-section-satellite-symposium>. Register soon to take advantage of early-bird registration and hotel discounts! Sign up for the CNS and the tumor satellite symposium jointly to save \$100 on your registration. The deadline to secure accommodations at the special event rate is September 6. Visit [cns.org/meetings/2018-tumor-section-satellite-symposium](https://www.cns.org/meetings/2018-tumor-section-satellite-symposium) for registration details and for more information. 



Illuminate Your Reading.

Introducing CNS Spotlight – highlighting content in *Neurosurgery* with curated, relevant content from the CNS web of knowledge.

Each month one key *Neurosurgery* article is the launch point for a self-guided journey of discovery. Readers get easy access to related content from CNS and NEUROSURGERY® Publications on the CNS Spotlight gallery.

For an augmented, focused learning experience, look for the CNS Spotlight icon in every issue of *Neurosurgery*.

Find the full list of related content and direct links at

www.cns.org/spotlight

All readers enjoy free access to CNS guidelines. CNS members and non-member subscribers receive complimentary access to The Surgeon's Armamentarium and journal content. CNS members receive reduced rates on SANS and webinars.

SECTION NEWS

2018 Spine Summit – Restoring Alignment in an Era of Global Change



Daniel J. Hoh, MD



2018 DSPN Chair Marjorie Wang addresses attendees about the importance of neurosurgery advocacy



John McGillicuddy is presented the Meritorious Member Peripheral Nerve Award by Holly Gilmer

> “THE 2018 SPINE SUMMIT -- ANNUAL MEETING OF THE JOINT SECTION OF DISORDERS OF SPINE AND PERIPHERAL NERVES -- WAS A HUGE SUCCESS, WITH RECORD SETTING RESIDENT ABSTRACT SUBMISSIONS AND ATTENDEES. PARTICIPANTS HAD AN EXCELLENT OPPORTUNITY TO HEAR FANTASTIC INVITED TALKS, DISCUSS CONTROVERSIAL CASES, AND NETWORK WITH NEW AND OLD COLLEAGUES IN A WONDERFUL VENUE.” <

Daniel Hoh, Annual Meeting Chair

The 2018 meeting of the Section on Disorders of the Spine and Peripheral Nerves (DSPN) took place March 14 – 17th in Orlando, Florida with a record number of 550 surgeons in attendance. The annual *Spine Summit* brings together members of the DSPN, as well as, notable leaders from various guest societies. This year the DSPN meeting welcomed leadership and members from Women in Neurosurgery (WINS) and the international partner, the Brazilian Society of Neurosurgery. In addition, special sessions and courses were co-branded with the Scoliosis Research Society and AOSpine. Together, we celebrated the meeting theme of *Restoring Alignment* in an Era of Global Change by reflecting on current changes that are shaping the field of spine surgery today.

The scientific program began on Wednesday with four special pre-meeting courses. The “MIS/ Navigation and Robotics Procedural Solutions” and the “Essentials of Spinal Deformity Required for all Spinal Surgeons” courses provided participants with a combination of case discussions, lectures, and interactive learning. “Spinal Tumor Pathology Made Easy” with AOSpine

offered insight into advanced surgical, radiation and other adjunct treatment strategies for primary and metastatic spinal tumors through a series of controversial debates. The DSPN collaborated with the Brazilian Society of Neurosurgery to offer a special course on the global perspective of spinal trauma and spinal cord injury. Wednesday afternoon also hosted a special roundtable, “*Return to Productivity after Spinal Surgery*” led by Zohar Ghogawala, Jack Knightly, and Marjorie Wang. Special invited stakeholders to the discussion included Elise Berliner (Agency of Healthcare Research and Quality), Laura Esmail (Patient-Centered Outcomes Research Institute), Ruth Coleman (Health Design Plus), Samuel Young (Blue Cross Blue Shield – Florida), and Sandy Schwartz (Univ. of Pennsylvania Wharton School of Business).

Later in the evening, the opening reception treated attendees to food, drinks, and luau-themed entertainment including live music and performers. Thursday morning’s scientific program began with an introduction and welcome by scientific program chair, Juan Uribe. The morning’s

plenary session was devoted to this year's top abstract awardees for the J.A.N.E. award, and the Mayfield Basic Science and Clinical awards. DSPN chair Marjorie Wang gave an outstanding address on the role we play as neurosurgeons in advocating for our patients, colleagues, community and profession. Honored guests Vincent Traynelis, Rick Sasso, Paul McCormick and John McGillicuddy shared personal accounts of their meritorious professional and personal lives.

Special invited speaker Jerome Bettis gave an inspiring account of his life from humble beginnings to professional football player, Superbowl champion, and Hall of Fame inductee. In an engaging discussion with DSPN members Regis Haid and Joseph Maroon, Mr. Bettis gave his perspective on the importance of giving back to the community, and his experience being a spine surgical patient. Also in the session were informative talks on recent advances in spinal cord injury research, and evidence-based criteria for return-to-play after spinal surgery.

A plenary session partnered with the SRS on adult deformity surgery, both MIS and open, highlighted Thursday afternoon's scientific program. Late afternoon included a dedicated course focused on case-based management of peripheral nerve trauma. In addition, top resident abstract awardees presented scholarly papers with note-worthy commentary by distinguished discussants. The DSPN was proud to award 24 resident research awards, named in honor of past and current mentors, John Jane, Sr., Charles Kuntz IV, and David Kline. Thursday's



Pro Football Hall of Famer and Superbowl champion Jerome Bettis onstage with Regis Haid and Joseph Maroon discussing his life, career and experiences as a spine surgery patient



2018 DSPN scientific program chair Juan Uribe presents a donation on behalf of the DSPN to Mr. Bettis' charitable foundation, The Bus Stops Here.

activities concluded with a special general session featuring light-hearted debates over refreshments. Prominent neurosurgery and orthopedic luminaries such as Jack Knightly, Todd Albert, Alex Vaccaro, Chris Shaffrey, Frank LaMarca, Greg Mundis, Dom Coric, Shay Bess, Dan Resnick and Regis Haid gave competing arguments (both compelling and entertaining) on controversial topics such as the optimal spine practice model (academic versus private), ambulatory surgery centers, and conflict of interest relationships. This year's meeting was enhanced by the addition of audience participation. Through the meeting's mobile phone app, general attendees were able to vote in real time with the debate winner displayed on the overhead screen.

Leading up to the 2017 meeting, there was an enthusiastic response for abstracts with 471 abstract submissions, and > 300 abstracts presented. Friday's activities began with breakout sessions for abstract presentations divided into sub-specialties such as minimally invasive, deformity, trauma, tumor, peripheral nerve and basic science. Friday's plenary session focused on current healthcare trends with relevant topics such as the rise of the narrow network, risk vs. benefit of a spine bundle,

hospital efficiencies and bending the cost curve, and single vendor models.

Friday afternoon included several exciting special courses covering topics related to incorporating MIS in your practice, optimizing surgical outcomes and clinical pathways, cadaver course, a WINS leadership seminar with special guest Gae Walters, and a special complimentary ARNP/ PA seminar. For the first time, the DSPN offered a seminar on mentoring with Ziya Gokaslan, Regis Haid, Alan Scarrow, Langston Holly, Robert Friedlander, Mark Shaffrey, Randall Porter, Shelly Timmons Alex Valadka, Dan Resnick, Allan Levi and Harry R. van Loveren. This was an invite only session with attendance by > 50 residents specially nominated by their program directors. The topics ranged from finding a good mentor, launching your career, and life/work balance. Continuing with a focus on the next generation of neurosurgeons, the DSPN was proud to recognize the scholarly achievements of the next generation of spine leaders at the Young Neurosurgeons dinner.

The Spine Summit concluded on Saturday with the David Cahill Memorial Controversies. Historically, this session features back-and-forth discussion by esteemed panelists over controversial clinical scenarios. The 2017 Cahill debates continued this time-honored tradition with rousing, provocative arguments on topics such as managing neurologically intact burst fractures, multilevel OPLL, freehand versus navigated screw placement, and SI joint fusion.

Overall, the 2018 Spine Summit - Annual Meeting of the DSPN was a great success. It was truly a celebration of spine surgery. Further details of the meeting can be found at the DSPN website: www.spinesection.org. Planning for next year's meeting is already underway. Mark your calendar to join new DSPN chair Michael Wang for Spine Summit 2019 at the Fontainebleau in Miami, Florida, March 14 – 17th. ■

INSIDE THE CNS

Washington Committee Report



Katie O. Orrico

Progress Report on the Washington Committee 2017-18 Legislative and Regulatory Agenda

The Washington Committee is making steady forward progress on our 2017-18 legislative and regulatory agenda. Positive outcomes to date include:

- Legislation expanding funding for the Children's Health Insurance Program (CHIP) for ten years was signed into law ([P.L. 115-120](#)). CHIP provides coverage to nine million children in families who earn too much to qualify for Medicaid but cannot afford private insurance. Neurosurgery has long supported reauthorization of this program to ensure that our nation's children have health insurance coverage.
- Support continues to grow for bills that provide additional Medicare graduate medical education (GME) funding. If enacted, these bills — [H.R. 2267/S. 1301](#), the Resident Physician Shortage Reduction Act — will fund an additional 15,000 slots over a five year period. To ensure an adequate supply of physicians, organized neurosurgery has been on the frontlines advocating to improve the current GME system. The Washington Committee has also helped prevent legislation ([H.R. 2373](#)) that would effectively eliminate the single accreditation system for allopathic and osteopathic residency training from gaining traction.
- Congress repealed the Independent Payment Advisory Board (IPAB) with the passage of the Bipartisan Budget Act of 2018 ([P.L. 115-123](#)). Repealing this unelected, unaccountable board has been a top legislative priority since the passage of the [Affordable Care Act](#) (ACA). Leading the repeal effort, the Washington Committee also aligned with the [Physician IPAB Repeal Coalition](#), the [Alliance of Specialty Medicine](#), and more than [800 health care stakeholder organizations](#) who supported IPAB repeal.
- The House passed comprehensive medical liability reform legislation, and multiple other medical liability reform bills have been introduced. The House passed H.R. 1215, the Protecting Access to Care Act, and most recently, the [House Energy and Commerce Committee](#) passed H.R. 1876, the Good Samaritan Health Professionals Act, out of committee where it now awaits floor action. Bills that have been introduced in the House and Senate include:
 - Sports Medicine Licensure Clarity Act ([S. 808/H.R. 302](#));
 - Protecting Access to Care Act ([H.R. 1215](#));
 - Health Care Safety Net Enhancement Act ([S. 527/H.R. 548](#));
 - Saving Lives, Saving Costs Act ([H.R. 1565](#)); and
 - Good Samaritan Health Professionals Act ([S. 781/H.R. 1876](#)).
- Legislation suspending the medical device tax for an additional two years through 2019 was signed into law ([P.L. 115-120](#)). This excise tax — a 2.3 percent

tax on medical device companies' gross revenue — was initially adopted to help fund the ACA. Repealing the device tax is one of organized neurosurgery's top legislative priorities as it would hinder medical device innovation and reduce incentives for medical device research.

- Improvements to Medicare's [Quality Payment Program](#) (QPP) to reduce the reporting burden and minimize penalties have been made, including:
 - 2018 program rules provide greater flexibility, reduce complexity and reduce the potential for penalties;
 - Bipartisan Budget Act of 2018 ([P.L. 115-123](#)) included additional flexibility for 2012-23 to make it easier for physicians to meet program requirements and eliminate the mandate that electronic health record (EHR) standards become more stringent over time, while also maintaining EHR hardship exemptions.
- Massive changes to global surgery codes will not likely be forthcoming in 2019. Last year, the Centers for Medicare & Medicaid Services (CMS) contracted with RAND to conduct a national survey on global surgery services. Last fall, in the [Surgical Coalition letter](#), the Washington Committee raised significant concerns about the survey, not the least of which is that it is too long and any data collected will be flawed and from too small a sample. RAND made some changes and is currently piloting the survey. Following a meeting earlier this year with CMS, it appears that the agency has received quite a bit of data from the claims-based data collection effort, but the data have not yet been analyzed. The lack of progress on the data collection front means that it seems highly unlikely that CMS will make wholesale changes to the global surgery codes for 2019. The Washington Committee estimates that if implemented, changes to global surgery code values could result in cuts in neurosurgical reimbursement of more than 25 percent.

CMS Unveils “Patients over Paperwork Initiative”

The Centers for Medicare & Medicaid Services (CMS) Administrator Seema Verma launched the [“Patients over Paperwork Initiative,”](#) a crosscutting, collaborative process that evaluates and streamlines regulations with a goal to reduce unnecessary burden, increase efficiencies, and improve the beneficiary experience. The Washington Committee is focusing on a handful of topics for regulatory relief including:

- Medicare’s Quality Payment Program;
- Appropriate use criteria (AUC) for advanced diagnostic imaging;
- Electronic health records;
- Global surgery code data collection;
- Prior authorization; and
- FDA-related topics, such as off-label use, approval of devices and streamlining paperwork requirements for FDA volunteer experts.

Ann R. Stroink, MD, chair of the Washington Committee, and Katie O. Orrico, Esq., director of the Washington Office, have had multiple meetings with high-level U.S. Department of Health and Human Services (HHS) officials. Most recently, as part of this effort, the [House Ways and Means Committee](#) convened a [“Red Tape Relief Roundtable,”](#) to discuss ways in which Congress and CMS can provide regulatory relief for physicians. Ms. Orrico represented the [Alliance for Specialty Medicine](#) at the meeting, which highlighted a wide-variety topics, such as prior authorization reform, E&M documentation guidelines and minimizing the reporting burdens of Medicare’s quality payment programs.

CMS Releases 2018 MIPS Eligibility Tool

Neurosurgeons can now use the updated CMS [MIPS Participation Lookup Tool](#) to check on your 2018 eligibility for the Merit-based Incentive Payment System (MIPS). Just enter your National Provider Identifier, or [NPI](#), to find out whether you need to participate during the 2018 performance year. To reduce the burden on small practices, CMS changed the eligibility threshold for 2018. Clinicians and groups are now excluded from MIPS if they:

- Billed \$90,000 or less in Medicare Part B allowed charges for covered professional services under the Physician Fee Schedule (PFS); or
- Furnished covered professional services under the PFS to 200 or fewer Medicare Part B-enrolled beneficiaries.

This means that to be included in MIPS for the 2018 performance period you need to have billed more than \$90,000 in Medicare Part B allowed charges for covered professional services under the PFS and furnished covered professional services under the PFS to more than 200 Medicare Part B enrolled beneficiaries.

Washington Committee Leads Multi-society Response to Cigna Cervical Fusion Coverage Policy

On May 24, the AANS and CNS sent a [letter](#) to Cigna in response to its updated [cervical fusion coverage policy](#). The policy is scheduled to take effect on June 15. The recommendations for coverage do not comply with standard spine practices or with the literature and will limit patient access to appropriate spine surgery options for Cigna enrollees. Among other things, the policy fails to allow the incorporation of a posterior cervical fusion at the time of initial laminectomy in patients with cervical stenosis but no evidence of kyphosis, cervical degenerative subluxation of over 3.5 mm, or other evidence of preexistent cervical instability.

Neurosurgery Leads Response to Washington State HTA Review of Single Level Laminectomy

Earlier this spring, neurosurgery took the lead in sending a [letter](#) from the AANS, CNS, the [AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves](#), [Washington State Association of Neurological Surgeons](#) (WSANS), [International Society for the Advancement of Spine Surgery](#), [North American Spine Society](#) (NASS) and the [American Academy of Orthopaedic Surgeons](#) (AAOS) to the Washington State HTA program regarding a draft evidence report on surgery for symptomatic lumbar radiculopathy prepared by [RTI International — Evidence-based Practice Center](#). The letter builds on a previous [letter](#) and [statement](#) from the same groups and emphasizes that current literature supports the fact that surgery in patients with symptomatic lumbar radiculopathy secondary to disc herniation or stenosis represents a cost-effective treatment and compares very favorably with other accepted medical and surgical interventions. The HCA HTA Health Technology Clinical Committee met on May 18, to vote on whether and under what circumstances to continue coverage for the procedure. The committee voted to cover (8-1) open decompression with conditions (6 weeks of non-surgical management), and minimally invasive techniques that include laminectomy, laminotomy, foraminotomy and discectomy, with conditions (6 weeks of non-surgical management). The Committee voted for non-coverage of any technique described by a CPT Cat. III or t-code (lasers, thermal, energy ablation, etc.) and chose not to make a determination on reoperations, leaving coverage determinations on reoperations on a case-by-case basis. More information is available [here](#).

FDA Issues Multiple Safety Warnings

Recently, the Food and Drug Administration (FDA) issued three safety notices of interest to neurosurgeons.

- **Magnetic Resonance-guided Laser Interstitial Thermal Therapy (MRgLITT) Devices.** On April 28, the FDA issued a safety [notice](#) with preliminary information concerning magnetic resonance (MR) thermometry reliability with magnetic resonance-guided laser interstitial thermal therapy (MRgLITT) devices. MRgLITT devices are commonly used in neurosurgical procedures for minimally invasive ablation of brain tumors, epileptic foci or radiation necrosis. During these procedures, the tip of a laser probe is stereotactically placed within the tissue to be ablated, and controlled thermal energy is delivered to the target tissue. The FDA is currently evaluating data which suggests that potentially inaccurate MR thermometry information can be displayed during treatment and may have resulted in harm to patients.
- **Monteris Medical NeuroBlate probe.** On March 22, the FDA issued a Class I recall [notice](#) due to the potential for unintended heating and patient injury with use of the Monteris Medical NeuroBlate probe, which is part of the NeuroBlate System. A Class I recall is

issued when the agency believes the use of the device may cause serious injuries or death. Monteris issued three product advisories between Oct. and Dec. 2017, which were part of the Class I recall.

- **Magnetic Resonance Angiography (MRA).** On March 12, the FDA issued a safety [notice](#) due to the potential for increased image artifact associated with Magnetic Resonance Angiography (MRA) imaging for patient follow-up of certain post neurovascular embolization coil procedures. The agency has received reports indicating that when MRA is performed on patients implanted with neurovascular embolization coils containing 304V stainless steel (either as part of the coil implant itself, or left behind as part of the detachment process), the images may contain larger than expected MR artifact, or image voids when compared to other metals. In these cases, the reduced quality of the MRA image from increased artifact can result in inaccurate clinical diagnoses (e.g., occlusion status) and subsequent inappropriate medical decisions.

Neurosurgery Blog Hosts Spine-Focus Awareness Campaign

Throughout March, April and May, [Neurosurgery Blog](#) hosted a [spine-focus awareness campaign](#). To maximize attention

on spine related issues, we planned our efforts around the 2018 Annual Meeting of the AANS/CNS Section on Disorders of the Spine and Peripheral Nerves. Our goal was to shed important light on spine facts, innovation and the role of spine interventions. Misinformation regarding spine care in the U.S. is a significant hindrance to understanding the critical issues surrounding the care of patients with spinal conditions. To this end, we highlighted these issues through patient stories, epidemiology, economics, value, innovation, and advocacy. We invite all neurosurgeons to continue the conversation using the #SpineMonth hashtag so we can grow awareness through social media. Additionally, we encourage you to visit the blog and subscribe to it, as well as connect with us on our various social media platforms. This will allow you to keep up with the many health-policy activities happening in the nation's capital and beyond the Beltway. ■

- [Neurosurgery Blog:](#)
- [More Than Just Brain Surgery](#)
- [Neurosurgery's Twitter Feed: @Neurosurgery](#)
- [Neurosurgery's Facebook Page](#)
- [Neurosurgery's Instagram Page](#)
- [Neurosurgery's LinkedIn Group](#)
- [Neurosurgery's YouTube Channel](#)
- [Neurosurgery's Google+ Page](#)
- [Neurosurgery's Tumblr Page](#)

Washington Office Relocation

Effective Feb. 1, 2018, the CNS and AANS took possession of a new office suite. Located in the building that also houses the American Medical Association, the office is across the street from the American College of Surgeons and is a few blocks from the U.S. Capitol complex. Contact information for the new office is:

CNS/AANS Washington Office

25 Massachusetts Avenue, NW, Suite 610
Washington, DC 20001
Phone: 202-628-2072
Fax: 202-628-5264

IMAGES IN NEUROSURGERY

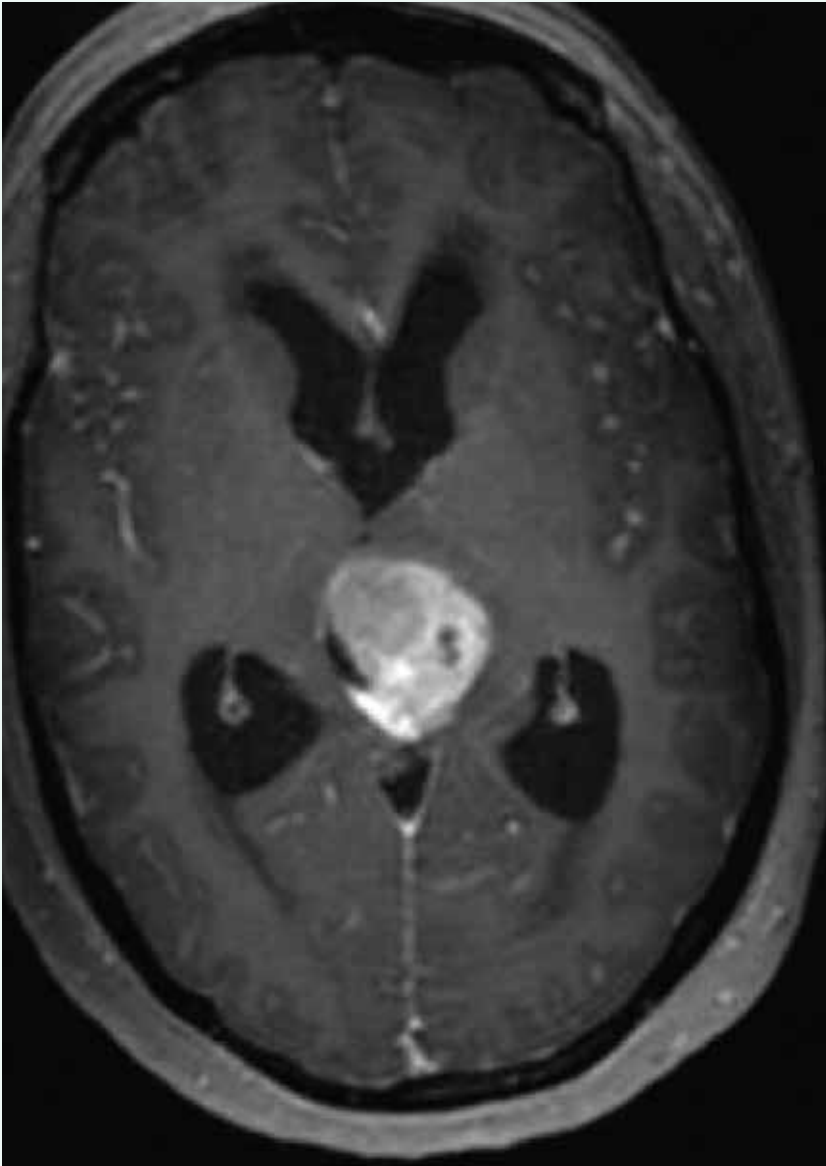


Figure 1A

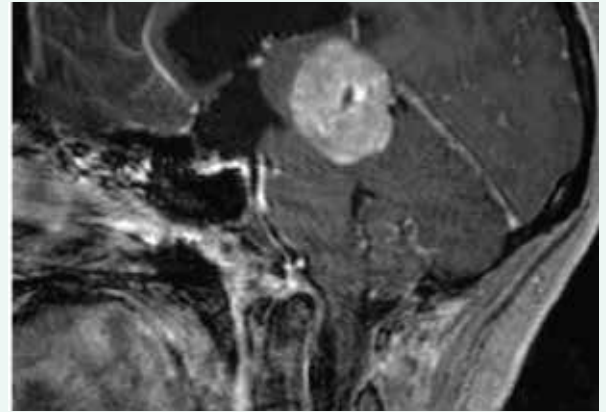


Figure 1B

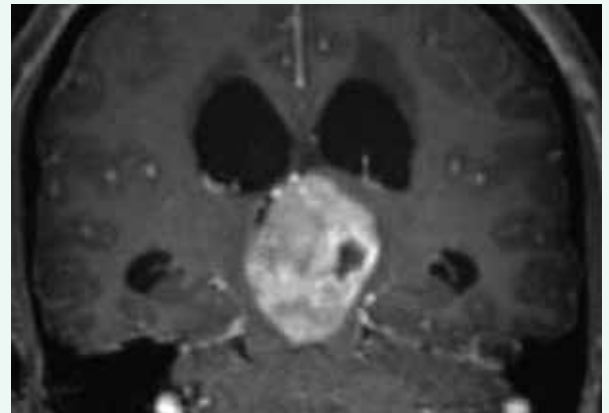


Figure 1C

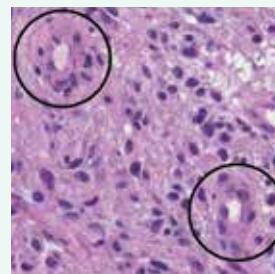


Figure 1D

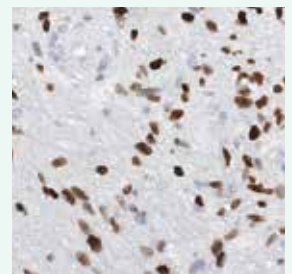



Figure 1E

26 year-old female with h/o migraines presented to ED after episode of lightheadedness and 1 month of worsening headaches, and diplopia. Physical exam was notable for bilateral papilledema and left partial third nerve palsy. Magnetic resonance imaging showed a heterogeneously enhancing pineal region mass (**Figure 1A (axial), 1B (sagittal), 1C (coronal)**), with differential diagnosis including primary pineal and germ cells tumors. Patient underwent an endoscopic third ventriculostomy and biopsy. Intraoperative histopathology was consistent with pineocytoma. Patient had an uncomplicated postoperative course. Unexpectedly, final diagnosis was diffuse midline glioma, WHO IV. Extensive microvascular proliferation (black circles) and cellular atypia was noted on H&E (**Figure 1D**). Immunohistochemistry was positive for H3-K27M mutation (**Figure 1E**). To our knowledge, there has been a single other reported case of a pineal region H3-K27M diffuse midline glioma.¹ 

1 D. A. Solomon, M. D. Wood, T. Tihan, A. W. Bollen, N. Gupta, J. J. Phillips, A. Perry, Diffuse Midline Gliomas with Histone H3-K27M Mutation: A Series of 47 Cases Assessing the Spectrum of Morphologic Variation and Associated Genetic Alterations. *Brain pathology* 26, 569-580 (2016)

Submitted by:

Todd Hollon, Catherine Ziats, Steven E. Sullivan

Affiliations: Department of Neurosurgery, University of Michigan

RETURN TO THE CORE VALUES THAT DRIVE NEUROSURGERY

2018 CNS Annual Meeting

MISSION: NEUROSURGERY

October 6-10, 2018, Houston, Texas



The CNS provides more courses that offer relevant clinical content to help you meet your daily challenges and optimize patient outcomes. Explore how technology is pushing the limits of our field, while dynamic sessions provide opportunities to debate the challenging issues facing the specialty today.

Because there is no end to a life of learning as a neurosurgeon.

REGISTER TODAY
CNS.ORG/2018

Advance registration deadline:
September 6

 **#CNS2018**



CNS

**2018 ANNUAL
MEETING**

**HOUSTON, TEXAS
OCTOBER 6-10, 2018**

