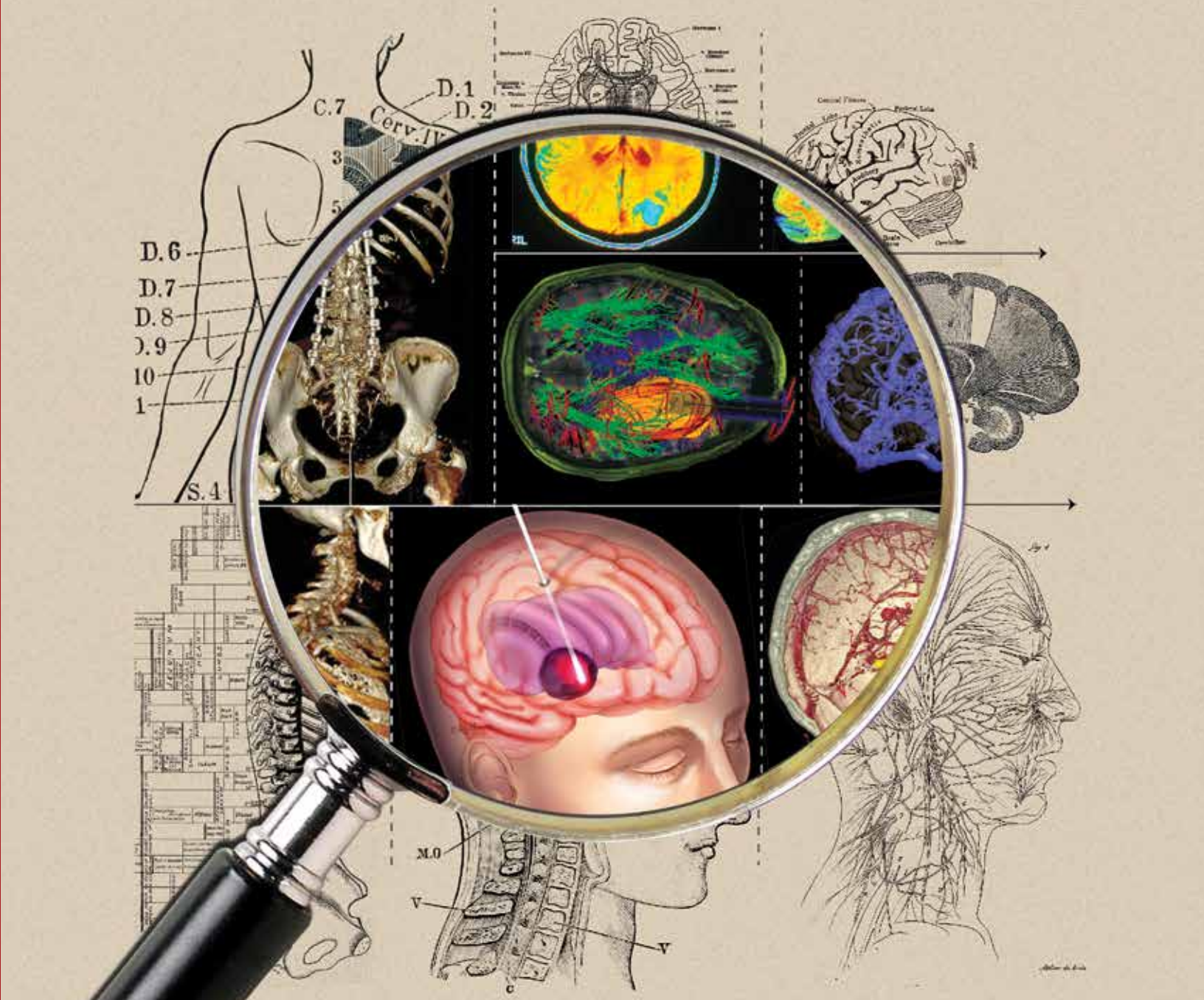
FREE REGISTRATION FOR CNS MEMBERS UNTIL SEPTEMBER 15

2021 CNS ANNUAL MEETING

CNS

NEUROSURGERY

VISION FOR THE FUTURE



OCTOBER 16–20, 2021 | AUSTIN, TEXAS

PRELIMINARY PROGRAM

ADVANCE REGISTRATION DEADLINE: SEPTEMBER 15, 2021

REGISTER AT CNS.ORG/2021!

2021 MEETING HIGHLIGHTS

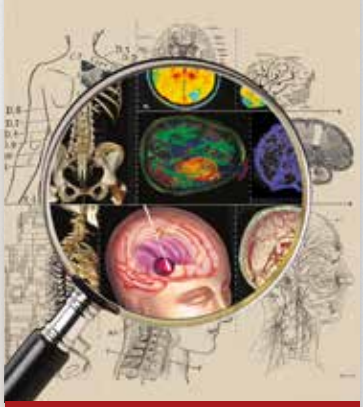
Don’t miss these new and popular features at the CNS Annual Meeting that keep attendees coming back every year!



THE CNS WELCOMES YOU TO AUSTIN

When you visit Austin, you’ll soon understand why it’s beloved for its quirky character and welcoming, creative vibe. Known as the Live Music Capital of the World, it also offers world-class dining, art, museums, shopping, and more. The Austin Convention Center is upgrading its facilities daily, aiming to set the standard for cleanliness and safety in order to protect staff and future guests.





VISION FOR THE FUTURE

Dear Colleagues,

It is with great anticipation and excitement that we announce our plans for this year's 2021 Annual Meeting on October 16–20 in Austin, Texas. We hope that this year will not only celebrate the innovation and bright future of our profession, but also each other, with a renewed opportunity to finally meet again in person after a difficult year. The meeting may look and feel a bit different, but guidelines and safety measures will be in place. To show our gratitude for your support and sacrifices this past year, **we are waiving registration fees for our loyal members until September 15!**

In keeping with our theme, "Vision for the Future," we will look ahead at the care in each specialty involving surgical advances and new technology, essentially imagining where neurosurgery will be 25 years from now.

We are providing you with an overview of what we have planned for the Annual Meeting—and in more detail on our Annual Meeting site: cns.org/2021. Join other leaders in neurosurgery to discover cutting-edge science and the latest technologies. We're bringing back live surgery and the Interactive Multimedia Presentation Session, as well as many other popular events in our Xperience Lounge.

In order to provide attendees with the perfect opportunity to network and obtain the most CME at the best value, we are pleased to offer specialty-specific, full-day symposia bundles on Saturday and Sunday at a lower price. We're also featuring International Symposia with neurosurgeons from around the world, more chances to present original science, and case-based sessions.



On behalf of the Congress of Neurological Surgeons' Executive Committee; Scientific Program Committee; Honored Guests William A. Friedman, Bob S. Carter, and Mark L. Rosenblum; we invite you to attend this year's Annual Meeting—LIVE, in Austin!

Sincerely,

Brian L. Hoh
2021 CNS President

Steven N. Kalkanis
2020 CNS President



The purpose of the 2021 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.

Who should attend: Neurological surgeons, neurosurgery nurses, nurse practioners, physician assistants, orthopedic surgeons, primary care physicians, gerontologists, radiologists, hospital administrators, oncologists, neurologists, pediatricians, psychiatrists, and infectious disease specialists are welcome and encouraged to attend the 2021 CNS Annual Meeting.

2021 INTERNATIONAL PARTNER SOCIETIES

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2021 AT-A-GLANCE

All sessions are held at the convention center unless otherwise indicated.

SATURDAY, OCTOBER 16

8:00 am–4:15 pm	**Symposia (SYM1–SYM10)**
5:00–6:30 pm	**International Reception** **JW Marriott Austin**
6:30–8:30 pm	**Dinner Seminar** **III Forks Austin**

SUNDAY, OCTOBER 17

6:00–7:00 am	**CNS Foundation Fun-Raiser Fitness Event: Who Is the Fittest?**
8:00 am–4:15 pm	**Symposia (SYM11–SYM23)**
8:00 am–4:15 pm	**ANSPA Fall 2021 CME Meeting**
8:00 am–12:00 pm	**CNS/ARANS/SNS Neurosurgical Program Administrators Track**
1:00–3:00 pm	**CNS Resident SANS Challenge Preliminary Rounds**
4:30–6:30 pm	**General Scientific Session I** **JW Marriott Austin**
6:30–8:30 pm	**Opening Reception** **JW Marriott Austin**
8:30–10:00 pm	**WINS Anniversary Celebration** **JW Marriott Austin**

SNS Meeting Precedes CNS Annual Meeting

The Society of Neurological Surgeons will be hosting their annual meeting at the JW Marriott Austin on Friday, October 15, from 8:00 am–5:00 pm and Saturday, October 16, from 8:00 am–4:00 pm. SNS members are welcome to register at societyns.org.

MONDAY, OCTOBER 18

6:00–7:00 am	**CNS Foundation Fun-Raiser Fitness Event: Who Is the Fittest?**
7:00–8:30 am	**Guidelines Sessions**
7:00–8:30 am	**Sunrise Science Abstracts Sessions**
8:40–9:40 am	**General Scientific Session II**
9:30 am–4:00 pm	**Exhibit Hall Open**
9:40–10:40 am	**Beverage Break in the Exhibit Hall**
10:00–10:30 am	**Live Surgery in the Exhibit Hall**
10:40 am–12:10 pm	**General Scientific Session II, *cont.***
12:15–1:45 pm	**Luncheon Seminars**
12:15–1:45 pm	**Industry-sponsored Lunch Symposia**
1:45–2:45 pm	**Beverage Break in the Exhibit Hall**
1:45–2:45 pm	**ABNS Special Session: Guidelines for Boards Preparation and MOC (*Non-CME*)**
2:45–4:15 pm	**Section Sessions/Oral Abstract Presentations**
4:15–5:45 pm	**Operative Techniques and Case-based Discussion Sessions**
5:45–7:15 pm	**International Symposia**
5:45–7:45 pm	**Neurosurgery Residency Fair**
7:30–9:30 pm	**Dinner Seminar** **Truluck's – Downtown Austin**



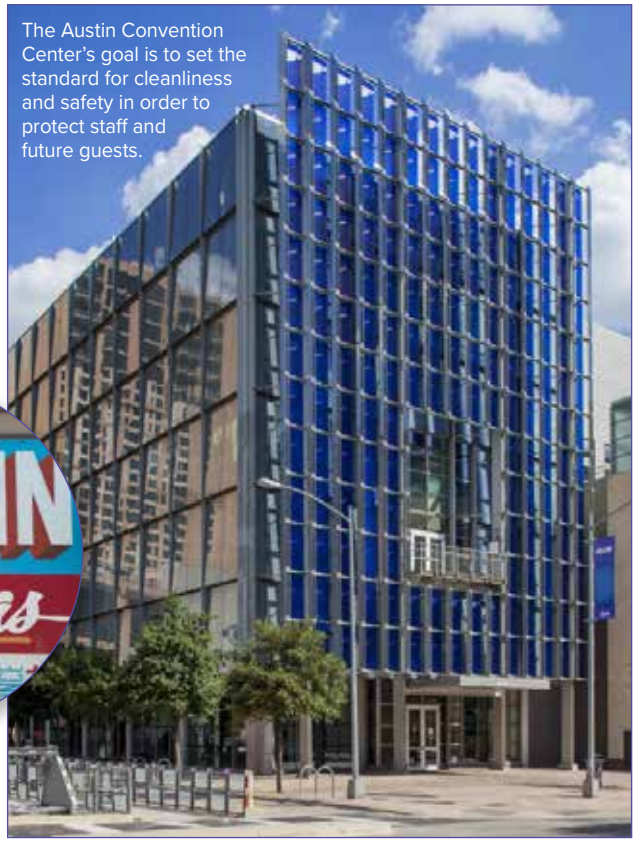
TUESDAY, OCTOBER 19

7:00–8:30 am	**Guidelines Sessions**
7:00–8:30 am	**Sunrise Science Abstracts Sessions**
8:40–9:40 am	**General Scientific Session III**
9:30 am–3:00 pm	**Exhibit Hall Open**
9:40–10:40 am	**Beverage Break in the Exhibit Hall**
10:00–10:30 am	**Live Surgery in the Exhibit Hall**
10:40 am–12:10 pm	**General Scientific Session III, *cont.***
12:15–1:45 pm	**Luncheon Seminars**
12:15–1:45 pm	**Industry-sponsored Lunch Symposia**
1:00–2:45 pm	**NEUROSURGERY® Publications Editorial Roundtable**
1:45–2:45 pm	**CNS Resident SANS Challenge Championship Round**
1:45–2:45 pm	**Beverage Break in the Exhibit Hall**
2:00–2:45 pm	**Annual Business Meeting**
2:45–4:15 pm	**Section Sessions and Oral Abstract Presentations**
4:15–5:45 pm	**Operative Techniques and Case-based Discussion Sessions**
5:45–7:15 pm	**Interactive Multimedia Research Presentation Session**
7:30–9:00 pm	**Resident Social JW Marriott Austin**

WEDNESDAY, OCTOBER 20

7:00–8:30 am	**Guidelines Session**
7:00–8:30 am	**Sunrise Science Abstracts Sessions**
8:40–9:40 am	**General Scientific Session IV**
9:30 am–2:00 pm	**Exhibit Hall Open**
9:40–10:40 am	**Beverage Break in the Exhibit Hall**
10:00–10:30 am	**Live Surgery in the Exhibit Hall**
10:40 am–12:10 pm	**General Scientific Session IV, *cont.***
12:15–1:45 pm	**Luncheon Seminars**
1:45–4:45 pm	**Afternoon Special Seminars**

Don't Miss All the Exciting Symposia!
We are providing the most value for your attendance by offering specialized, intensive half- and full-day symposia bundles, which include industry-sponsored breakout sessions and lunch.
See details starting on page 22.


The Austin Convention Center's goal is to set the standard for cleanliness and safety in order to protect staff and future guests.



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2021 CNS HONORED GUEST



William A. Friedman, MD

Professor and Chairman Emeritus
Department of Neurosurgery University of Florida

Dr. William Alan Friedman was born in Dayton, Ohio, on April 25, 1953. He attended high school in Cincinnati, Ohio, graduating in 1970 as a National Merit Scholar. At Oberlin College, he was elected to Phi Beta Kappa before moving on to the Ohio State University College of Medicine. Before graduating summa cum laude from medical school in 1976, he was elected to the Alpha Omega Alpha honor society and received the Maurice B. Rusoff Award for excellence in medicine.

In 1976, Dr. Friedman moved to the University of Florida in Gainesville, Florida. He performed a surgical internship and a neurosurgical residency, from which he graduated in 1982. During residency training, he did basic neurophysiology research as an NIH postdoctoral fellow (1 F32 NS0682-02). In 1982, he joined the faculty of the Department of Neurosurgery, as an Assistant Professor. He received an NIH Teacher Investigator Award (NS 00682-02) from July 1982–July 1987, which funded further research into the basic neurophysiology of spinal cord injuries. In addition, this award supported the development of one of the first intraoperative neurophysiology monitoring laboratories, subsequently used to monitor thousands of neurosurgical and orthopedic surgical cases. Dr. Friedman served as Medical Director of the Intraoperative Neurophysiology Service from 1982–1992.

Dr. Friedman was promoted to Associate Professor and received tenure in August 1987. In August 1991, he was promoted to Professor. In 1999, he became Chairman of the Department of Neurosurgery. He is the author of more than 300 articles and book chapters and has written a book on radiosurgery. He is a member of numerous professional organizations. Most notably, he is a Past President of the Congress of Neurological Surgeons, Past President of the Florida Neurosurgical Society, and Past President of the International Stereotactic Radiosurgery Society. He served as the Founding Editor of Neurosurgery On Call, the Internet homepage of organized neurosurgery. He served as a member of the Shands Hospital Board of Directors for two terms. Dr. Friedman led the Level I Trauma task force, which resulted in the establishment of a trauma center at UF Health. He was also the first ACGME Designated Institutional Official (DIO) at UF.

In 1986, Dr. Friedman began collaborative work with Dr. Frank Bova, which led to the development of the University of Florida radiosurgery system. This system was subsequently patented by the University of Florida and licensed to Philips, then Sofamor-Danek, then Varian. The commercial version of the system became one of the most popular radiosurgical systems worldwide. Drs. Friedman and Bova received the 1990 UF College of Medicine Clinical Research Prize in recognition of this accomplishment. Dr. Friedman is the leader of a multidisciplinary radiosurgery team which has treated over 4,900 patients, published more than 150 papers and chapters, produced many international meetings, and educated hundreds of visiting physicians. Drs. Bova and Friedman received NIH R01 funding to support their research efforts.

Dr. Friedman is the Co-Director of the Preston Wells Center for Brain Tumor Therapy at the University of Florida. During his tenure as Chair of the Department of Neurosurgery, he grew the department's endowed funds to greater than $55 million, much of which is focused on finding a cure for malignant brain tumors. In recent years, Dr. Friedman has also worked hard to elevate the quality metrics of the department and has become a frequent national neurosurgical speaker on quality improvement. In 2016, He received the University College of Medicine Lifetime Award. In 2018, he was inducted into the University of Florida College of Medicine Wall of Fame.

After almost 20 years in his position, Dr. Friedman stepped down as Chair on July 1, 2018, but continues to run a very busy neurosurgical practice. He recently published a memoir entitled, "Something Awesome: A Life in Neurosurgery."

Look for Dr. Friedman at the following sessions:

MONDAY, OCTOBER 18

9:10–9:40 am | General Scientific Session II | Honored Guest Presentation

12:15–1:45 pm | Honored Guest Luncheon Seminar | U.S. Health Care: The Good, the Bad, and the Ugly
Advanced registration recommended.

TUESDAY, OCTOBER 19

9:10–9:40 am | General Scientific Session III | Honored Guest Presentation

Meet Dr. Friedman in the CNS Xperience Lounge in the Exhibit Hall immediately following his General Scientific Session presentation where he will be signing copies of his book, "Something Awesome: A Life in Neurosurgery."

2020 CNS HONORED GUEST



Bob S. Carter, MD, PhD

Chair of the Department of Neurosurgery at Mass General, the William and Elizabeth Sweet Professor of Neurosurgery at Harvard Medical School, and Co-founder of Mass General Neuroscience

Bob S. Carter, MD, PhD, is the Chair of the Department of Neurosurgery at Mass General Hospital (MGH) and the William and Elizabeth Sweet Professor of Neurosurgery at Harvard Medical School. Dr. Carter is also co-founder of Mass General Neuroscience, a unique collaborative of over 2,000 faculty and clinical and research staff at MGH. One of the nation's leading clinical neurosurgeons, Dr. Carter co-leads Massachusetts General Hospital's brain tumor program, which is focused on brain tumor clinical care, research, and education.

As a prolific researcher, Dr. Carter's scientific work has included the development of EGFRvIII directed CAR T-cell therapy, the first characterizations of exosomes in glioblastoma, and the clinical development of novel iPS derived stem cell therapy for neurologic disorders. He has served as a principal investigator participating in the NIH-funded Extracellular RNA Communication Consortium and the NCI Liquid Biopsy Consortium. Dr. Carter leads a team of clinician scientists who have developed the role of "big data" in characterizing outcomes in oncologic and vascular neurosurgery.

Dr. Carter is extensively published, and he lectures internationally on neurosurgery topics. He has co-chaired the editorial board for the Journal of Neurosurgery and served as editorial advisory board member for Neurosurgery. Dr. Carter is known for his interest in professional mentorship, and career development of resident and faculty colleagues, including several faculty who have gone on to serve as current Chairs of Departments of Neurosurgery.

Prior to joining Mass General, Dr. Carter served as Professor and Chair of Neurosurgery at the UC San Diego School of Medicine. He earned his MD and PhD degrees at Johns Hopkins University and his BA degree in Chemistry at Brigham Young University.

Consistently elected to America's Top Doctors®, Dr. Carter is an active member of the Congress of Neurological Surgeons, the American Academy of Neurological Surgery, and the Society for Neurological Surgeons, as well as a fellow of the American Association of Neurological Surgeons. He has served on the program committee for the American Stroke Association's International Stroke Conference and has served on the executive boards of the Joint Cerebrovascular Section and the New England Neurosurgical Society.

Look for Dr. Carter at the following sessions:

SUNDAY, OCTOBER 17
4:44–5:09 pm | General Scientific Session I | Honored Guest Presentation

TUESDAY, OCTOBER 19
12:15–1:45 pm | Honored Guest Luncheon Seminar | *Advanced registration recommended.*

Top 10 Reasons to Visit Austin—the Live Music Capital of the World!

- World-class restaurants serving BBQ, Tex-Mex, and more
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- Breweries, wineries, distilleries and unique coffee shops
- Lake adventures, ziplining, and boat cruises
- Historic homes, museums, and ballet
- Sculpture gardens
- The CNS Annual Meeting!



2020 CNS HONORED GUEST



Mark L. Rosenblum, MD

Chairman Emeritus of the Department of Neurosurgery in the Henry Ford Health System

Dr. Rosenblum currently is Chairman Emeritus of the Department of Neurosurgery in the Henry Ford Health System (HFHS). The primary focus of his 50-year career at NIH, UCSF, and HFHS has been in neuro-oncology. In 1984, he founded and for 7 years chaired the Section on Tumors of the American Association of Neurological Surgeons (AANS) and Congress of Neurological Surgeons (CNS), a Section that has grown remarkably over 37 years as a major contributor for our field. He has received many awards for his research and clinical work, including the first Charles B. Wilson Award from the AANS and CNS for life-long contributions to neuro-oncology, as well as awards from the American Cancer Society, his medical school, HFHS, and others.

Dr. Rosenblum obtained his B.S. at Rensselaer Polytechnic Institute (1965); M.D. at New York Medical College (1969); Medical Internship at the University of Michigan (1970); Staff Associate at the National Cancer Institute (NCI) (1972); Surgical Residency at the University of California, Los Angeles (1973); and Neurosurgery Residency at the University of California, San Francisco (UCSF) (1979). At UCSF he helped develop its world-leading Brain Tumor Research Center, became Professor of Neurosurgery, and was continuously funded by the NCI and American Cancer Society for early research on cancer stem cells. While at UCSF, he is also credited for defining the modern management of brain abscesses and the effects of AIDS on the nervous system.

During his tenure at HFHS, Dr. Rosenblum developed nationally recognized research and helped provide the system national recognition for clinical excellence. He also founded and served as a Co-director of the Hermelin Brain Tumor Center and HFHS Neurosciences Institute, as well as founding the Michigan Spine Surgery Improvement Collaborative—a statewide quality improvement program with Blue Cross-Blue Shield of Michigan. He also was one of four leaders who developed a new novel, patient-focused Henry Ford West Bloomfield Hospital, where he served as Vice President of Clinical Programs and Director of its Center for Health Services Transformation.

Dr. Rosenblum has published seven books, 240 articles and chapters, trained 63 neurosurgeons, and raised $45 Million in philanthropy for Neurosciences. Over the years he has also developed special experience with the value of integrated specialty care, including the development of Centers and Institutes, and developing innovative delivery processes “through the eyes of the patient.”

Look for Dr. Rosenblum at the following sessions:

SUNDAY, OCTOBER 17

5:30–5:55 pm | General Scientific Session I | Honored Guest Presentation: Neurosurgery’s Impact on Neuro-Oncology – “Can We Do Better?” – Lessons Learned Over 50 Years

WEDNESDAY, OCTOBER 20

12:15–1:45 pm | Honored Guest Luncheon: Our Non-Surgical Responsibilities to Brain Tumor Patients – The “Stuff” that Makes a Huge Difference to Them and Your Practice | *Advanced registration recommended*

Don’t Miss These Exciting NEUROSURGERY® Publications Events

EDITORIAL ROUNDTABLE
Tuesday, October 19
1:00–2:45 pm

Join NEUROSURGERY® Publications and the Editors-in-Chief of several leading subspecialty journals for a discussion of the current scholarly publishing landscape with a particular focus on Open Access and Plan S, multimedia functions and novel content delivery, preprint archives, and predatory publishing.

THE FIFTH ANNUAL PAPER-OF-THE-YEAR AWARDS

The CNS and NEUROSURGERY® Publications honor the most impactful papers published in *Neurosurgery* from June 2020–May 2021. Top Paper will be presented during Tuesday GSS, and Top Subspecialty papers will be presented during section sessions.

LUNCHEON SEMINAR
Perspectives: Editorial Process for International Neurosurgical Manuscripts
Monday, October 18
12:15–1:45 pm

This first ever NEUROSURGERY® Publications Luncheon Seminar will provide an overview of the editorial process of the NEUROSURGERY® Publications portfolio, address common pitfalls and best practices for optimizing submissions generally, and will feature subspecialty perspectives in Spine and Vascular.

INTERNATIONAL SYMPOSIA
Monday, October 18
5:45–7:15 pm

Each International Symposium will feature a *Neurosurgery* paper selected as the best international paper in that given subspecialty. Attendees will be treated to presentations by the authors as well as follow-up discussion led by a member of the *Neurosurgery* Editorial Review Board.

FEATURED SPEAKERS



Alex Honnold

SUNDAY, OCTOBER 17

6:00–6:30 pm | General Scientific Session I | **Free Solo with Alex Honnold**

Alex Honnold will be signing copies of his book immediately following the conclusion of his lecture at the JW Marriott Austin.

Alex Honnold is a professional rock climber whose audacious free-solo ascents of America's biggest cliffs have made him one of the most recognized and followed climbers in the world. A gifted but hard-working athlete, Honnold is distinguished for his uncanny ability to control his fear while scaling cliffs of dizzying heights without a rope to protect him if he falls.

His humble, self-effacing attitude toward such extreme risk has earned him the nickname Alex "No Big Deal" Honnold.

This Sacramento, California, native's most celebrated achievements include the first and only free-solos of the Moonlight Buttress (5.12d, 1,200 feet) in Zion National Park, Utah; and the Northwest Face (5.12a) of Half Dome (2,200 feet), Yosemite, California. In 2012, he achieved Yosemite's first "Triple Solo": climbing, in succession, the National Park's three largest faces—Mt. Watkins, Half Dome, and El Capitan—alone, and in under 24 hours. In 2017, Alex completed the first and only free-solo of El Capitan's "Freerider" route (5.13a, 3,000 feet), a historic accomplishment which has been hailed by many as one of the greatest sporting achievements of our time. This achievement was captured in the Oscar-winning film "Free Solo."

Whether climbing with a rope or without, Honnold believes climbing is a fantastic vehicle for adventure—an opportunity to seek out those high-test moments with uncertain outcomes in which you're forced to push through to survive.

Though Honnold often downplays his achievements, his rope-less climbs have attracted the attention of a broad and stunned audience. He has been profiled by "60 Minutes" and The New York Times, featured on the cover of National Geographic, appeared in international television commercials, and starred in numerous adventure films including the Emmy nominated "Alone on the Wall."



WALTER E. DANDY ORATOR

Malcolm Gladwell

MONDAY, OCTOBER 18

11:40 am–12:10 pm | General Scientific Session II | **Catalysts for Changing Human Behavior: How Science and Technology have Changed Post-pandemic Behaviors and Attitudes for the Better. Looking into the Future of Neurosurgery.**

Malcolm Gladwell will be signing copies of his books immediately following the conclusion of his lecture at the CNS Xperience Lounge.

Malcolm Gladwell is the author of five New York Times bestsellers—"The Tipping Point," "Blink," "Outliers," "What the Dog Saw," and "David and Goliath: Underdogs, Misfits and the Art of Battling Giants." He has been named one of the 100 most influential people by TIME magazine and one of the Foreign Policy's Top Global Thinkers.

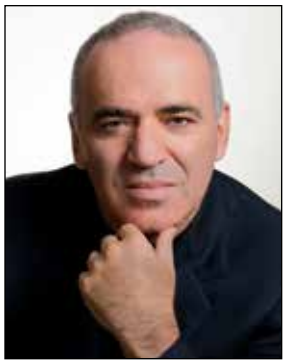
Gladwell's new book, "Talking to Strangers: What We Should Know About the People We Don't Know," offers a powerful examination of our interactions with strangers and why they often go wrong. Through a series of encounters and misunderstandings—from history, psychology, and infamous legal cases—Malcolm Gladwell takes us on an intellectual adventure and challenges our assumptions on human nature and strategies we use to make sense of strangers. He explains why we act the way we do, and how we all might know a little more about those we don't.

He has explored how ideas spread in "The Tipping Point," decision making in "Blink," and the roots of success in "Outliers." With "David and Goliath," he examines our understanding of advantages of disadvantages, arguing that we have underestimated the value of adversity and overestimated the value of privilege. His next book, "The Bomber Mafia," which explores the relationship between technology and ideology, will be available on April 27.

Gladwell is the host of a 10-part podcast, "Revisionist History," now in its fourth season. In the weekly podcast, Malcolm re-examines an overlooked or misunderstood aspect of past events. He has been a staff writer for The New Yorker since 1996. He has won a national magazine award and been honored by the American Psychological Society and the American Sociological Society. He was previously a reporter for The Washington Post.

CNS Members join us for free in Austin! Register at cns.org/2021 by September 15!

FEATURED SPEAKERS



CNS MICHAEL L. J. APUZZO LECTURER ON CREATIVITY AND INNOVATION

Garry Kasparov

TUESDAY, OCTOBER 19

11:40 am–12:10 pm | General Scientific Session III | **The Future of Augmented Intelligence: How Smarter Machines Can Boost Human Creativity, Satisfaction, and Performance**

Meet Garry Kasparov in the CNS Xperience Lounge immediately following the conclusion of his lecture.

Garry Kasparov became the under-18 chess champion of the USSR at the age of 12 and the world under-20 champion at 17. He came to international fame at the age of 22 as the youngest world chess champion in history in 1985.

Kasparov's famous matches against the IBM super-computer Deep Blue in 1996-97 were key to bringing artificial intelligence, and chess, into the mainstream. They also sparked Kasparov's passionate interest in the human relationship with our increasingly intelligent machines, a theme he has investigated for decades beginning with the invention of "Advanced Chess" in 1998.

In 1990, he and his family escaped ethnic violence in his native Baku as the USSR collapsed. In 2005, Kasparov, in his 20th year as the world's top-rated player, retired from professional chess to join the vanguard of the Russian pro-democracy movement. In 2012, Kasparov was named chairman of the New York-based Human Rights Foundation (HRF).

Since 1990, Kasparov has been a regular contributor on politics to many major publications, including The Wall Street Journal, The Washington Post, and The New York Daily News. Kasparov speaks frequently to business audiences around the world on strategy, decision-making, and artificial intelligence.

Kasparov's book "How Life Imitates Chess" on strategy and decision-making is available in over 20 languages. He is the author of two acclaimed series of chess books, "My Great Predecessors" and "Modern Chess." Kasparov's prescient 2015 book, "Winter Is Coming: Why Vladimir Putin and the Enemies of the Free World Must Be Stopped," is a blend of history, memoir, and analysis of the threats to the modern world order. Kasparov's latest book is "Deep Thinking: Where Machine Intelligence Ends and Human Creativity Begins" (2017). It reveals the full story of his matches against Deep Blue and his optimistic and pragmatic analysis of our future with intelligent machines.

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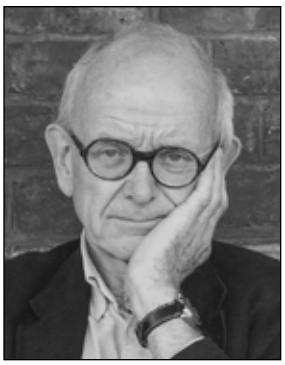
The CNS Foundation's philanthropic mission is to improve worldwide patient health by supporting innovative programs that allow neurosurgeons to collaborate globally as researchers, learners, educators, and caregivers.

Donate today at foundation.cns.org.

DONATE!

CNS Foundation

FEATURED SPEAKERS



Henry Marsh

WEDNESDAY, OCTOBER 20
10:43–11:13 am | General Scientific Session IV | **Painful Lessons from 40 Years of Neurosurgery**

Meet Henry Marsh in the CNS Xperience Lounge immediately following the conclusion of his lecture.

Henry Marsh is one of the UK's most eminent neurosurgeons. After graduating cum laude in politics, philosophy, and economics at the University of Oxford, he studied medicine in London, graduating with honors in 1973. He subsequently trained as a neurosurgeon.

Dr. Marsh's work has been the subject of two major BBC documentaries: "Your Life in Their Hands" in 2003 and "The English Surgeon" in 2009 about his work in Ukraine over the last 29 years, which has won many awards including an Emmy. It was described in The New York Times as "enthralling, astonishing … agonizingly human," and in the London Times as "the most moving and honest film about surgery I have ever seen."

His first memoir, "Do No Harm," has been an international best seller with 37 foreign editions and translations. The book was short-listed for eight major UK literary prizes and won both the Sky Arts South Bank Show 2015 Award for Literature and the PEN Ackerley Prize. In December 2015, a major profile about Marsh and his work in Albania by Karl Ove Knausgaard—with photographs by the award-winning Magnum photographer Paolo Pellegrin—appeared in The New York Times magazine. In 2017, he published a second book, "Admissions," which became a Sunday Times No. 1 best seller in the UK.

Dr. Marsh was made a Commander of the Order of the British Empire by HM the Queen in 2010. He retired from the UK's National Health Service in 2019.



JOHN THOMPSON HISTORY OF MEDICINE LECTURE

Siddhartha Mukherjee

WEDNESDAY, OCTOBER 20
11:40 am–12:10 pm | General Scientific Session IV | **Thinking Outside the Medical Box: Three Themes for the Future of Medicine**

Siddhartha Mukherjee will be signing copies of his books immediately following the conclusion of his lecture at the CNS Xperience Lounge.

Siddhartha Mukherjee is a pioneering physician, oncologist, and author who has redefined our public discourse on human health, medicine, and science. A profoundly influential voice in the scientific community, he is best known for his books, "The Emperor of All Maladies: A Biography of Cancer," which earned him the 2011 Pulitzer Prize; and "The Gene: An Intimate History," which won international awards and was recognized by The Washington Post and The New York Times as one of the most influential books of 2016. He is also the author of a TED Original book, "The Laws of Medicine: Field Notes from an Uncertain Science." His published works exhibit an outstanding literary skill that has left an indelible mark on our culture, as "The Emperor of All Maladies" has been adapted into a documentary by filmmaker Ken Burns, and was included among Time magazine's 100 best nonfiction books of the past century.

Dr. Mukherjee's achievements as a writer and educator build upon his career as a renowned medical scholar. His groundbreaking studies into the composition and behavior of cancer cells have pushed the boundaries of modern medicine. His innovative research signals a paradigm shift in cancer pathology, and has enabled the development of treatments that reach beyond current pharmaceutical models toward new biological and cellular therapies. Serving as an assistant professor of medicine at Columbia University and as a staff cancer physician at the university's medical center, Dr. Mukherjee generates hope for countless patients and families around the world, while revolutionizing our blueprint for healing. He writes for The New Yorker, The New York Times Magazine and many other publications; has received numerous awards for his scientific work; and has published his original research and opinions in journals such Nature, Cell, and the New England Journal of Medicine. He lives in New York City with his wife and daughters.

CNS Members join us for free in Austin! Register at cns.org/2021 by September 15!

ANNUAL MEETING LEADERSHIP



2021 PRESIDENT

Brian L. Hoh, MD, MBA

Brian L. Hoh is the Chair and James & Brigitte Marino Family Professor of the Lillian S. Wells Department of Neurosurgery at the University of Florida. He earned his BAS from Stanford University, his MD with Alpha Omega Alpha honors from Columbia University College of Physicians & Surgeons, and his neurosurgical residency training and fellowship in interventional neuroradiology at Massachusetts General Hospital. He earned his executive MBA from the Hough Graduate School of Business at the University of Florida Warrington College of Business Administration with Beta Gamma Sigma honors.

Dr. Hoh served the CNS Executive Committee as Member-at-Large, Scientific Program Chair, Annual Meeting Chair, Chair of the CNS Guidelines Committee, Vice President, President-Elect, and this year as President. He served the AANS/CNS Joint Cerebrovascular Section as Member-at-Large, Treasurer, and Chair. He served as co-chair and member of the editorial board of the Journal of Neurosurgery.

Dr. Hoh's clinical and surgical interests are centered on the microsurgical and endovascular treatment of cerebrovascular diseases and conditions. He is an NIH-funded principal investigator of basic science research, investigating the biologic mechanisms of cerebral aneurysm formation and rupture, as well as innovative tissue engineering technology to improve the treatment of cerebral aneurysms.

He is also a leader in neurosurgical education at the University of Florida, where he is a past-program director of the neurosurgery residency and past-fellowship director of the endovascular surgical neuroradiology fellowship.

Dr. Hoh is married to Melissa, an ICU nurse, and they have three children: Jacqueline, Brandon, and Vivienne.



2020 PRESIDENT

Steven N. Kalkanis, MD

In March 2020, Steven Kalkanis was named Chief Executive Officer of the Henry Ford Medical Group, with over 2,000 physicians and researchers; and Chief Academic Officer and Senior Vice President of Henry Ford Health System, a $7B enterprise with over 33,000 employees and five acute care hospitals in southeast Michigan. Dr. Kalkanis helped lead his system's response to the COVID-19 pandemic, while also spearheading several virtual educational opportunities in neurosurgery as President of the CNS.

Before being named CEO, Dr. Kalkanis served as professor and Chair of the Department of Neurosurgery, and Co-director of the Neuroscience Institute at Henry Ford in Detroit. He is also the founding Medical Director of the Henry Ford Cancer Institute (HFCI), which treats more than 10,000 new cancer patients each year with a novel comprehensive precision medicine program. Since becoming Chair in 2014, the Department has grown to 33 faculty with two residents per year, with eight NIH R01 grants, and is regularly listed in the US News and World Report national honor roll.

Dr. Kalkanis joined Henry Ford in 2004 after completing his neurosurgical training at Massachusetts General Hospital. He graduated with highest honors from Harvard University with the John Harvard Award, and then Harvard Medical School, where he served as Class Marshal and received the Linnane Prize for highest academic achievement.

In 2009, Dr. Kalkanis led a multidisciplinary team of experts to publish the largest set of guidelines to date on the treatment of metastatic brain tumors. He was the founding chair of the CNS Guidelines Committee where he helped to spearhead 10 clinical practice guidelines in a myriad of topics, and he is the current Chair of the AANS/CNS Joint Guidelines Review Committee. He also is a past president of the Michigan Association of Neurological Surgeons.

Dr. Kalkanis served as Chair of the AANS/CNS Section on Tumors from 2016–2018. In 2018, he was named a Director of the American Board of Neurological Surgery. Elected to the CNS Executive Committee in 2009, Dr. Kalkanis has served in numerous leadership roles, including Scientific Program Chair, Secretary, President, and now Past-President.

With the goal of refining personalized medicine treatment protocols, and as the Mark Rosenblum Endowed Chair in Neurosurgery, Dr. Kalkanis runs an NIH-funded translational research laboratory investigating molecular genetic differences between short- and long-term glioma survivors. Specializing in brain tumor surgery, he has been involved in numerous clinical trials and has authored more than 175 peer-reviewed publications.

Steve and his wife, Laurel, enjoy traveling with and cheering on their three children, Nicholas (17), Connor (15) and Grace (11), in multiple sporting, scouting, and musical activities.



PRESIDENT-ELECT

Nicholas C. Bambakidis, MD

Nicholas C. Bambakidis is the Vice President and Director of the Department of Neurological Surgery at University Hospitals Cleveland Medical Center (UH) and Professor of Neurological Surgery at Case Western Reserve University (CWRU) in Cleveland, Ohio.

Dr. Bambakidis is internationally recognized as a leader in the management of cerebrovascular and skull base surgery. He has edited three major textbooks on skull base and cranio-cervical spinal surgery and has published extensively in prestigious medical journals on an array of topics in his field of expertise.

In 2008, following his residency at CWRU and fellowship training at the Barrow Neurological Institute, Dr. Bambakidis was recruited to UH. He has been Director of Cerebrovascular and Skull Base Surgery as well as Program Director of the Neurosurgery Residency Program since 2011. He was appointed as Director and Vice President of the Neurological Institute at UH in 2016.

A native of Fairborn, Ohio, Dr. Bambakidis and his wife, Kim, prize their time with family and put that sentiment into action with family sailing trips to Greece and the Caribbean each year. This past year, their daughter, Eva, was captain of the sailing team at Northwestern University. She is majoring in Art History, preparing to apply to medical school, and plays piano. Their son, Peter, has completed his senior high school year at University School. Beginning in the fall of 2021, he will play varsity baseball at St. Olaf College in Minnesota, where he will also study medicine.



2020 ANNUAL MEETING CHAIR

Nader Pouratian, MD, PhD

Nader Pouratian is Professor and Chair of Neurological Surgery at the University of Texas Southwestern. He holds a secondary appointment as Professor in the Peter O'Donnell Jr. Brain Institute.

Dr. Pouratian attended medical school at the David Geffen School of Medicine at UCLA where he completed the Medical Scientist Training Program, earning his PhD in neuroscience in addition to his MD. He completed his neurosurgery residency under the mentorship of John Jane Sr., MD, training with neurosurgical leaders such as Edward Laws, MD, Edward Oldfield, MD, and Chris Shaffrey, MD. During his residency, he completed an enfolded fellowship in functional neurosurgery with Jeff Elias, MD. After completing residency in 2009, he joined the faculty of the UCLA Department of Neurosurgery. In 2021, he was appointed as the Lois C. A. and Darwin E. Smith Distinguished Chair in Neurological Surgery at UT Southwestern. His clinical practice focuses on functional and stereotactic, pain, and peripheral nerve surgery.

In addition to his clinical practice, Dr. Pouratian has an active NIH-funded laboratory with numerous active grants. His research and academic interest integrate advanced imaging and invasive brain mapping techniques to investigate the human physiology of motor control, pathophysiological mechanisms underlying Parkinson disease and treatment-resistant depression, and neuroprosthetic development for the blind. All work is aimed at developing next generation brain-computer interface therapeutics.

Dr. Pouratian and his wife Talia live in Dallas, Texas, with their children: Lylah (12), Noa (10), and Ari (8).



HEALTH AND SAFETY

We are working closely with the hotels and Austin Convention Center to provide a healthy, safe environment for attendees. The CNS will follow all necessary guidelines. Watch for Annual Meeting updates on social distancing and mask mandates.

ANNUAL MEETING LEADERSHIP



2021 ANNUAL MEETING CHAIR

Brian V. Nahed, MD

Brian V. Nahed is Professor of Neurosurgery at the Massachusetts General Hospital / Harvard Medical School where he specializes in brain tumors and brain mapping using advanced techniques in cortical and subcortical stimulation.

Born in New York, Dr. Nahed attended UCLA where he majored in Neuroscience, graduating Phi Beta Kappa and with the Neuroscience's Highest Honors. He attended the Yale School of Medicine where he was awarded the Doris Duke Clinical Research Fellowship to study the genetics of intracranial aneurysms, and he graduated with honors. Dr. Nahed completed his internship and neurosurgery residency at the Massachusetts General Hospital, where he also completed a post-doctorate fellowship with Drs. Daniel Haber and Shyamala Maheswaran in the MGH Cancer Center.

Dr. Nahed was recruited to the faculty at the MGH Department of Neurosurgery and Brain Tumor Center in 2011. His research focuses on developing the first blood test to diagnose and monitor brain tumors. In collaboration with Dr. Shannon Stott, Dr. Nahed published the first evidence of circulating tumor cells in the blood of patients with glioma and continues to lead in the field of liquid biopsy for brain tumors. As an NIH-funded research, Dr. Nahed hopes to provide patients a minimally invasive test to diagnose, monitor, and guide therapy of brain tumors. In addition, he has been a leader in intraoperative imaging and technology to augment surgical skill.

Dr. Nahed serves as the Associate Director of the MGH Neurosurgery Residency Program. He is an ex-officio member of the Executive Committee of the Congress of Neurological Surgeons and Executive Committee Member of the CNS/AANS Section on Tumors. He serves as Co-chair of the CNS Leadership Institute. He is an active member of the American Association of Neurological Surgeons and Council State Neurological Societies. Dr. Nahed is focused on education and socioeconomic issues in neurosurgery.



SCIENTIFIC PROGRAM CHAIR

Ashok R. Asthagiri, MD

Ashok Asthagiri was born in Chennai, Tamil Nadu, India, and immigrated to the United States in 1982. He grew up in Ohio, where he completed his undergraduate education at the University of Akron and received his medical degree from Northeastern Ohio Medical University. After graduating from medical school in 2001, Dr. Asthagiri completed a general surgical internship and neurosurgical residency at UVA. During his residency, he completed enfolded fellowships at Auckland City Hospital in Auckland, New Zealand, and neuropathology at UVA.

After completing residency training, Dr. Asthagiri joined the Surgical Neurology Branch in the National Institute of Neurological Disorders and Stroke (NINDS) at the National Institutes of Health (NIH) in Bethesda, Maryland. During his six years at the NIH, he focused his clinical and research efforts on reducing the burden of disease in patients with multiple neoplasia syndromes, such as NF1, NF2 and VHL. The AANS/CNS Joint Section on Tumors recognized his efforts with the Tumor Young Investigator Award in 2011.

In 2013, Dr. Asthagiri rejoined the UVA Department of Neurosurgery, where he is now director of the surgical neuro-oncology and skull base programs. He leads a multidisciplinary effort to treat neurocutaneous disorders, contributes to the basic and clinical research program in the Department of Neurosurgery, and is actively involved in resident physician and medical student education, serving at the director level for both programs. In addition, he is the director of the Microsurgical Anatomy and Skull Base Laboratory at UVA.

Dr. Asthagiri is a recognized leader in organized neurosurgery. He has been on the Executive Committee of the Congress of Neurological Surgeons (CNS) since 2010. In supporting the educational mission of the CNS, Dr. Asthagiri has served as the Chair of the Research Committee, Editor-in-Chief of Self-Assessment in Neurological Surgery (SANS), and Chair of the Education Division.

Dr. Asthagiri married Heather Asthagiri, MD, of Columbia, Tennessee, in 2010. She is a physical medicine and rehabilitation physician at UVA. They are the proud parents of Avani Lynn and Arjun James.



VICE SCIENTIFIC PROGRAM CHAIR

Lola B. Chambless

Lola B. Chambless is Associate Professor of Neurological Surgery and the Neurosurgery Residency Program Director at Vanderbilt University Medical Center. Born in Birmingham, AL, she grew up between Boston, MA, and Nashville, TN, before earning her B.S. at Stanford University. She graduated with her MD with Alpha Omega Alpha honors from Vanderbilt University School of Medicine in 2005, and completed residency in Neurological Surgery and fellowship in Neurosurgical Oncology at Vanderbilt as well. After a fellowship in Minimally Invasive Neurosurgery at Prince of Wales Hospital in Sydney, Australia, she joined the faculty at Vanderbilt in 2013.

Dr. Chambless has a busy clinical practice in brain tumor and skull base surgery and is the surgical director of the Vanderbilt Pituitary and Radiosurgery centers. She is an expert in endonasal and keyhole approaches to cranial pathology. Her diverse research interests include risk stratification of tumor cells in glioblastoma, computer-based modeling of intraoperative brain shift, and the use of machine learning techniques to predict outcomes in brain tumor surgery. Much of her energy is devoted to advancing neurosurgical education both locally, as Neurosurgery Program Director, and nationally, through organized neurosurgery and her own educational research.

In 2017, Dr. Chambless joined the Executive Committee of the CNS as the inaugural Chair of the CNS Data Science Committee. Since then, she has also served as Chair of the Resident Committee, Vice-Chair of the Education Division, and Co-Chair of the CNS Leadership Institute. Also a member of the Society of Neurological Surgeons (SNS) and its medical student committee, she led development of collaborative CNS/SNS programming to guide medical students through the complexities of becoming neurosurgeons during the COVID-19 pandemic. She is focused on improving access to mentorship for future neurosurgeons and removing barriers to promote equity and inclusion within the field. She is also the proud mother of two daughters, Harper (9) and Sims (7), who are her partners in adventures around the world.

Bring Your Family to the 2021 CNS Annual Meeting!

Spouse/guest registration is complimentary before September 15, and there is so much to enjoy! See featured speakers Malcolm Gladwell, Alex Honnold, Garry Kasparov, and more at the General Scientific Sessions. There will also be the exciting Opening Reception, complimentary beverages in the CNS Xperience Lounge, daily breakfast in the hospitality suite, a fun Austin City Tour, plus all that Austin—the Live Music Capital of the World—has to offer!



THANK YOU



Raheel Ahmed
Section on Pediatric Neurological Surgery



Ellen L. Air
Women in Neurosurgery



Garni Barkhoudarian
Luncheon Seminars Captain



Sharona Ben-Haim
Women in Neurosurgery



Erica F. Bisson
Section on Disorders of the Spine and Peripheral Nerves



Justin M. Brown
Peripheral Nerves



Lola B. Chambless
Guidelines/Sunrise Sessions Captain



Dean Chou
Section on Disorders of the Spine and Peripheral Nerves



Ramesh Grandhi
Section on *Neurotrauma & Critical Care*



Bharat Guthikonda
Council of State Neurological Socities



Todd C. Hankinson
Section on Pediatric Neurological Surgery



Daniel J. Hoh
Section on Disorders of the Spine and Peripheral Nerves



Michael E. Ivan
Section on Tumors



Line G. Jacques
Peripheral Nerves



Christopher P. Kellner
Section on Cerebrovascular Surgery



Ryan Kitagawa
Section on Neurotrauma & Critical Care



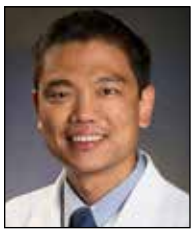
Mark Krieger
Section on Pediatric Neurological Surgery – Chair



Michael J. Lang
Section on Cerebrovascular Surgery



Amy Lee
Section on Pediatric Neurological Surgery



Yi Lu
Section on Disorders of the Spine and Peripheral Nerves



Mark A. Mahan
Peripheral Nerves



Justin R. Mascitelli
Section on Cerebrovascular Surgery



Guy M. McKhann II
Section on Stereotactic and Functional Neurosurgery



Scott A. Meyer
Section on Disorders of the Spine and Peripheral Nerves



Zaman Mirzadeh
Section on Pain



Robert P. Naftel
Section on Pediatric Neurological Surgery



Sean J. Nagel
Section on Pain



Edjah Ndoum
Section on Tumors



Joseph S. Neimat
Section on Stereotactic and Functional Neurosurgery – Chair



David O. Okonkwo
Section on Neurotrauma & Critical Care – Chair

TO OUR SCIENTIFIC PROGRAM COMMITTEE CONTRIBUTORS



Akash Patel
Dinner Seminars Captain



Maryam Rahman
Symposia Captain Section on Tumors



Gazanfar Rahmathulla
Section on Neurotrauma & Critical Care



Analiz Rodriguez
Council of State Neurological Socities



William S. Rosenberg
Section on Pain – Chair



Charles Sansur
Section on Disorders of the Spine and Peripheral Nerves



Clemens Schirmer
International Captain & Chair, Section on Cerebrovascular Surgery, Council of State Neurological Socities



Jason P. Sheehan
Section on Tumors – Chair



Jonathan H. Sherman
Section on Tumors



Sameer A. Sheth
Section on Stereotactic and Functional Neurosurgery



Adnan Siddiqui
Section on Cerebrovascular Surgery – Chair



Dimitri Sigounas
Section on Cerebrovascular Surgery



Hesham M. Soliman
Section on Disorders of the Spine and Peripheral Nerves



Jeremy Steinberger
Section on Disorders of the Spine and Peripheral Nerves



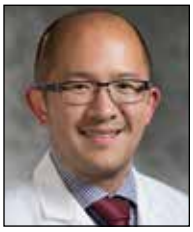
Michael P. Steinmetz
Council of State Neurological Socities – Chair, Section on Disorders of the Spine and Peripheral Nerves – Chair



Martina Stippler
Diversity and Engagement Captain Women in Neurosurgery – Chair International – Chair



Jennifer A. Sweet
Dinner Seminars Captain Section on Pain



Khoi D. Than
Section on Disorders of the Spine and Peripheral Nerves



Luis M. Tumialan
Section on Disorders of the Spine and Peripheral Nerves



Anand Veeravagu
Social Media Captain
Council of State Neurological Societies



Ben Waldau
Section on Cerebrovascular Surgery



Sarah Woodrow
Section on Neurotrauma & Critical Care Women in Neurosurgery



Chengyuan Wu
Section on Stereotactic and Functional Neurosurgery



Brad E. Zacharia
Section on Tumors

CNS Members join us for free in Austin! Register at cns.org/2021 by September 15!

INDUSTRY ENGAGEMENT HIGHLIGHTS

The **CNS Exhibit Hall** is the best place to discover the cutting-edge technology to enhance your practice. Check out in-booth demonstrations with subspecialty experts and gain personal experience with the latest devices—all brought to you by our industry partners. For a complete list of exhibitors, see page 72 or visit cns.org/2021.

EXHIBIT HALL HOURS	
Monday	9:30 am–4:00 pm
Tuesday	9:30 am–3:00 pm
Wednesday	9:30 am–2:00 pm

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

Don't Miss These Events in the Exhibit Hall!

LIVE SURGERY PRESENTATIONS

Join us Monday through Wednesday from 10:00–10:30 am in the CNS Xperience Lounge during your morning break. Surgeons from top institutions will operate live via telemedicine, and you will have the opportunity to observe and ask questions of the operating surgeon.





DEVICE INNOVATION SHOWCASE

These 10-minute sessions will feature an expert showcasing the latest technology from our industry leaders. Learn more during your afternoon break on Monday and Tuesday in the CNS Xperience Lounge.

Interact Outside of the Exhibit Hall!

SPONSORED LUNCH SYMPOSIA WITH INDUSTRY LEADERS

Choose one out of three complimentary lunch-and-learn sessions covering important clinical topics on Monday and Tuesday from 12:15–1:45 pm.

CADAVER EXPERIENCE

These educational surgical cadaver suites located in the convention center give you the opportunity to enhance your experience with the latest and greatest neurosurgical technology. (*Brought to you by our industry sponsors.*)





BREAKOUT SESSIONS DURING SYMPOSIA

These 30-minute, non-CME breakout sessions will be held during the full-day symposia on Saturday and Sunday. Take advantage of this opportunity to gain personal experience and see demonstrations of the most advanced equipment and techniques.

IMMERSE YOURSELF IN THE CNS XPERIENCE LOUNGE

JOIN US in the Exhibit Hall at the CNS Xperience Lounge and relax on one of our comfortable chairs to connect with your colleagues. Take a few minutes to see what's next on your agenda and network with your peers.







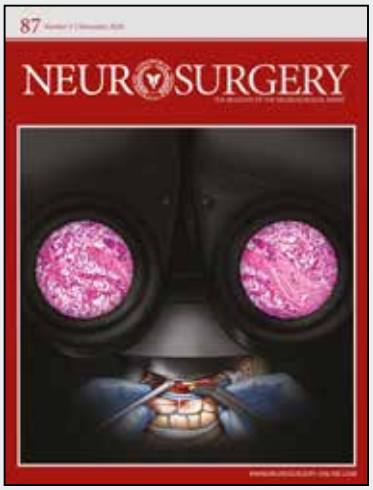


MEET and interact with featured speakers and Honored Guests. William A. Friedman will be signing copies of his book, "Something Awesome: A Life in Neurosurgery." Award-winning books by two of our Featured Speakers, Malcolm Gladwell and Siddhartha Mukherjee, will be available for purchase, so don't miss a chance to get yours signed.

SEE presentations from the Innovator-of-the-Year finalists, and stop by any time to view digital posters. Also, look for educational update sessions and more on the Presentation Stage!



EXPERIENCE our Wellness and Resilience offerings, and learn how to better balance work and home life. Attend special courses geared toward wellness and other pertinent topics. Listen to neurosurgeons' personal stories in our Voices of Neurosurgery talks.



Cover image © 2020, Jared Travnicek

ASK any membership questions you might have and get answers from our staff members. We would love to hear what's on your mind!

NEUROSURGERY® Publications will be in the Xperience Lounge! Stop by to pick up the latest copy of *Neurosurgery* and *Operative Neurosurgery,* and chat with journal staff about the latest developments from the Editorial Office.

Join us in Austin and register at cns.org/2021.

SUBSPECIALTY SESSION HIGHLIGHTS

SE SOCIOECONOMIC

SATURDAY
8:00 am–12:00 pm
- **SYM10A: 2021 Coding and CPT Update**

SUNDAY
12:45–4:15 pm
- **SYM21B: So You've Been Sued**

MONDAY
12:15–1:45 pm
- **M6: Safety, Quality, and Value in Neurosurgery**

2:45–4:15 pm
- **Council of State Neurosurgical Societies: The Medical Legal Environment in 2021**

4:15–5:45 pm
- **Financial Planning for Young Neurosurgeons**

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

TUESDAY
12:15–1:45 pm
- **T17: Neurosurgical Contracts—How to Get What You Want**

2:45–4:15 pm
- **Council of State Neurosurgical Societies: Cutting Costs and Maximizing Quality**

4:15–5:45 pm
- **CSNS: Neurosurgery as Authors—Alternate Career?**

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

WEDNESDAY
7:00–8:30 am
- **Sunrise Science Abstract Session VI**

CV CEREBROVASCULAR

SATURDAY
8:00 am–4:15 pm
- **SYM2: Vascular Symposia Bundle: Stenting and Bypass**

SUNDAY
8:00 am–4:15 pm
- **SYM14: Cerebrovascular Symposia Bundle: Stroke and Guidelines**

MONDAY
7:00–8:30 am
- **Sunrise Science Abstract Session I**

12:15–1:45 pm
- **M2: Minimally Invasive Surgical Evacuation of Intracerebral Hemorrhage**
- **M9: Artificial Intelligence in Cerebrovascular Neurosurgery**

2:45–4:15 pm
- **Section on Cerebrovascular Surgery: Neuroprotection in Cerebrovascular Disease—The Next Wave of Ischemic and Hemorrhagic Stroke Treatments**

4:15–5:45 pm
- **Multimodality AVM Treatment: Operative Techniques and Case-based Discussions**

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

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

12:15–1:45 pm
- **T21: Robotic Approaches in Endovascular Neurosurgery**
- **T23: Virtual and Augmented Reality in Neurosurgery**
- **T24: Social Media Use in Neurosurgical Practice: Showboating or Real Value**

2:45–4:15 pm
- **Section on Cerebrovascular Surgery: Advanced Aneurysm Treatment Techniques**

4:15–5:45 pm
- **Aneurysm Treatment: Operative Techniques and Case-based Discussions**

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

WEDNESDAY
12:15–1:45 pm
- **W33: Middle Meningeal Artery Embolization in the Treatment of Chronic Subdural Hematomas**

TR NEUROTRAUMA

SATURDAY
8:00 am–4:15 pm
- **SYM6: Neurotrauma Symposia Bundle: Global Neurotrauma and Cutting-edge Treatments**

SUNDAY
8:00 am–4:15 pm
- **SYM12: Neurotrauma Update**

MONDAY
7:00–8:00 am
- **Guidelines for Neurotrauma/Brain Injury**

12:15–1:45 pm
- **M5: Neurovascular Care in Neurotrauma**

2:45–4:15 pm
- **Section on Neurotrauma and Critical Care: Global Neurotrauma Surgery**

4:15–5:45 pm
- **Crossfire Debates in Neurotrauma: Operative Techniques and Case-based Discussions**

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

TUESDAY
7:00–8:30 am
- **Sunrise Science Abstract Session III**

12:15–1:45 pm
- **T16: Global Neurosurgery Update Experience and How to Get Involved**

2:45–4:15 pm
- **Section on Neurotrauma and Critical Care**

4:15–5:45 pm
- **My Worst Complication: Perspectives in Caring for Neurotrauma Patients**

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

WEDNESDAY

12:15–1:45 pm
- **W27: Anticoagulation/Antithrombotic Agents Before and After Traumatic Brain Injury**

PA PAIN

SATURDAY

8:00 am–4:15 pm
- **SYM1: Pain Symposia Bundle**

MONDAY

2:45–4:15 pm
- **Section on Pain: Trigeminal Neuralgia for Residents/Fellows Video 3D**

4:15–5:45 pm
- **Spinal Cord Stimulation: Operative Techniques and Case-based Discussions**

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

TUESDAY

2:45–4:15 pm
- **Section on Pain: Off-label Therapies for Atypical Facial Pain**

4:15–5:45 pm
- **Neurosurgery Cases for Pain: Alternative Therapies to Spinal Cord Stimulation and Case-based Discussions**

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

WEDNESDAY

7:00–8:30 am
- **Sunrise Science Abstract Session VII**

12:15–1:45 pm
- **W31: Lesioning for Pain/Neuroablation Guidelines**

PE PEDIATRIC

SATURDAY

8:00 am–4:15 pm
- **SYM9: Pediatric Symposia Bundle**

MONDAY

12:15–1:45 pm
- **M7: Development of International Relationships in Pediatric Neurosurgery**

2:45–4:15 pm
- **Section on Pediatric Neurological Surgery: Pediatric Practice Response to the COVID-19 Pandemic**

4:15–5:45 pm
- **Stereotactic EEG: Operative Techniques and Case-based Discussions**

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

TUESDAY

12:15–1:45 pm
- **T18: Transnasal Endoscopic Neurosurgery in Pediatric Patients**

2:45–4:15 pm
- **Section on Pediatric Neurological Surgery: Transition of Care for Young Adults and Adolescents with Pediatric Neurosurgical Conditions**

4:15–5:45 pm
- **Shunt Infection Management: Do All Shunts Still Need to be Explanted?: Operative Techniques and Case-based Discussions**

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

WEDNESDAY

7:00–8:30 am
- **Sunrise Science Abstract Session VIII**

12:15–1:45 pm
- **W32: Neurosurgical Management of Spasticity**

PN PERIPHERAL NERVES

SATURDAY

8:00 am–4:15 pm
- **SYM3: Spine and Peripheral Nerves Symposia Bundle**

MONDAY

7:00–8:30 am
- **Sunrise Science Abstract Session II**

12:15–1:45 pm
- **M8: Peripheral Nerve Entrapment Versus Radiculopathy**

2:45–4:15 pm
- **Section on Peripheral Nerves: Recovering Function: Future Perspective**

4:15–5:45 pm
- **Peripheral Nerves: Operative Techniques and Case-based Discussions**

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

TUESDAY

2:45–4:15 pm
- **Section on Disorders of the Spine and Peripheral Nerves: Didactics**

4:15–5:45 pm
- **Peripheral Nerves Task Force—Evidence on Procedures**

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

WEDNESDAY

12:15–1:45 pm
- **W32: Neurosurgical Management of Spasticity**

SP SPINE

SATURDAY

8:00 am–4:15 pm
- **SYM3: Spine and Peripheral Nerves Symposia Bundle**
- **SYM5: Spinal Biomechanics and Thoracolumbar Deformity Symposia Bundle**

SUBSPECIALTY SESSION HIGHLIGHTS

SUNDAY
8:00 am–4:15 pm
- **SYM16: MIS and Cervical Spine Symposia Bundle**
- **SYM19: TLIF and Spinal Complication Symposia Bundle**
- **SYM22: Cervical Deformity and Anterior Column Release Symposia Bundle**

MONDAY
7:00–8:30 am
- **Sunrise Science Abstract Session II**

12:15–1:45 pm
- **M3: Cervical Spondylotic Myelopathy—Anterior Versus Posterior**
- **M10: Spinal Tumor Surgery—Case-based Management**

2:45–4:15 pm
- **Section on Disorders of the Spine and Peripheral Nerves: Past Presidents Spine Section Update**

4:15–5:45 pm
- **Spinal Deformity and MIS Surgery: Operative Techniques and Case-based Discussions**

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

7:30–9:30 pm
- **DIN2: Navigation and Robotics: Fad or Future?**

TUESDAY
7:00–8:30 am
- **Lumbar Fusion Guidelines**

12:15–1:45 pm
- **T19: SI Joint Fusion: Indications, Technique, and Outcomes**
- **T20: Peak Performance: Optimizing the Spine Surgical Patient from Pre-op to Post-op**

2:45–4:15 pm
- **Section on Disorders of the Spine and Peripheral Nerves: Didactics**

4:15–5:45 pm
- **Management of Osteomyelitis and Discitis: Operative Techniques and Case-based Discussions**

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

WEDNESDAY
12:15–1:45 pm
- **W28: Ambulatory Surgery Center: Why to Have It and How to Start It**

SF STEREOTACTIC AND FUNCTIONAL

SATURDAY
8:00 am–4:15 pm
- **SYM7: Stereotactic and Functional Symposia Bundle**

6:30–8:30 pm
- **DIN1: High-intensity Focused Ultrasound (HIFU) Applications in Neurosurgery**

SUNDAY
8:00 am–4:15 pm
- **SYM11: Functional Neurosurgery Update: Emerging Concepts**

MONDAY
7:00–8:00 am
- **Guidelines for DBS for OCD**

12:15–1:45 pm
- **M12: DBS for Emerging Indications**

2:45–4:15 pm
- **Section on Stereotactic and Functional Neurosurgery: Current Topics in Movement Disorder DBS**

4:15–5:45 pm
- **Epilepsy Operative Techniques and Case-based Discussions**

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

TUESDAY
7:00–8:30 am
- **Sunrise Science Abstract Session IV**

2:45–4:15 pm
- **Section on Stereotactic and Functional Neurosurgery: Neuromodulation in Epilepsy**

4:15–5:45 pm
- **Cases of DBS for Psychiatric Disorders: Operative Techniques and Case-based Discussions**

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

TU TUMOR

SATURDAY
8:00 am–4:15 pm
- **SYM4: Brain Tumor Update Bundle**

SUNDAY
8:00 am–4:15 pm
- **SYM13: Intraoperative Imaging Symposia Bundle: New and Evolving Techniques**
- **SYM17: Surgical Anatomy Symposia Bundle**
- **SYM20: Immunotherapy/Recurrent Glioblastoma Symposia Bundle**

MONDAY
7:00–8:30 am
- **Guidelines for the Management of Brain Metastases**

12:15–1:45 pm
- **M4: Acoustic Neuromas: Impact on Extension of Resection and Stereotactic Radiosurgery**
- **M11: Immunotherapy: Practical Guidelines for Daily Practice**

2:45–4:15 pm
- **Section on Tumors: Innovations in Adjuvant Therapy for Primary and Metastatic Brain Tumors**

4:15–5:45 pm
- **Progression Versus Pseudo Progression in GBM: Operative Techniques and Case-based Discussions**

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

TUESDAY
7:00–8:30 am
- **Sunrise Science Abstract Session V**

12:15–1:45 pm
- **T15: Management of Sellar and Parasellar Lesions: Unexpected Pathologies and Treatment Strategies**
- **T22: Modern Management of Low-grade Gliomas**

2:45–4:15 pm
- **Section on Tumors: Improving Outcomes in Patients with Brain Tumors**

4:15–5:45 pm
- **Recurrent Meningioma Management: Operative Techniques and Case-based Discussions**

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

WEDNESDAY
7:00–8:30 am
- **Guidelines on the Management of Glioblastoma**

12:15–1:45 pm
- **W29: Complex Intracranial Approaches**
- **W30: New Concepts in Tumor Fluorescence**

WOMEN IN NEUROSURGERY

SATURDAY
12:45–4:15 pm
- **SYM8B: Performance Workshop: How to Be on Top of Your Game at Work and at Home**

SUNDAY
8:00 am–4:15 pm
- **SYM15: WINS Career Symposia Bundle**

8:30–10:00 pm
- **WINS Anniversary Celebration**

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

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

WEDNESDAY
12:15–1:45 pm
- **W26: Residency Challenges in 2021: It's Not Like It Used to Be**

RESIDENT

SATURDAY
8:00 am–4:15 pm
- **SYM8: Training Symposia Bundle**

SUNDAY
8:00 am–4:15 pm
- **SYM15: WINS Career Symposia Bundle**
- **SYM23: Quality/Big Data Symposia Bundle**

MONDAY
12:15–1:45 pm
- **M1: Honored Guest Luncheon: William A. Friedman**

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

TUESDAY
12:15–1:45 pm
- **T14: Honored Guest Luncheon: Bob S. Carter**

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

WEDNESDAY
12:15–1:45 pm
- **W25: Honored Guest Luncheon: Mark L. Rosenblum**

ADVANCED PRACTICE PROVIDER

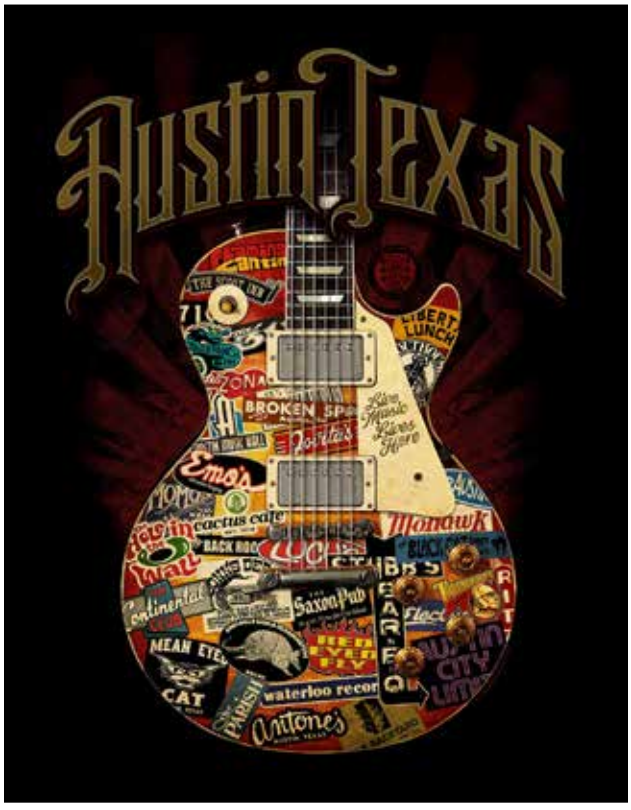
SUNDAY
8:00 am–4:15 pm
- **ANSPA Fall 2021 CME meeting in collaboration with the Congress of Neurological Surgeons**

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

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

First Time in Austin?

Take a tour! Tickets available for the Austin City Tour on Sunday afternoon when you register. Join us!



SYMPOSIA

SATURDAY, OCTOBER 16

Full Day Discounted Bundles (includes lunch):
Physician $400; Nurse/NP/PA $300; Resident/Medical Student $175
Half Day: Physician $250; Nurse/NP/PA $200; Resident/Medical Student $125

PA 8:00 am–4:15 pm

SYM1: Pain Bundle

Composed of two sessions: SYM1A & SYM1B. Select this option to attend both at a discounted rate.

NEW! 8:00 am–12:00 pm

SYM1A: Types of SCS Devices: When to Use What

Course Directors: Zaman Mirzadeh, Parag G. Patil
Faculty: Sharona Ben-Haim, Albert S. Lee, Erika A. Petersen, Joshua M. Rosenow, Konstantin V. Slavin
Course Description: With the explosion of new spinal cord stimulation paradigms, it is difficult to know which therapy to choose. This session will discuss the scientific and clinical evidence supporting different types of spinal cord stimulation and provide guidance for how to apply them to individual patients.
Learning Objectives:
- Identify the breadth of device and stimulation parameters available
- Identify which device and stimulation parameters to use for various clinical scenarios

12:45–4:15 pm

SYM1B: Pain Symposium: Non-Spinal Targets for Pain: Nerve, DRG, and Brain

CNS | SANS Lifelong Learning

Course Directors: Rushna Ali, Ashwin Viswanathan
Faculty: Brian H. Kopell, Jean-Philippe Langevin, Andre Machado, Ahmed M.T. Raslan, Christopher J. Winfree
Course Description: From the deep gray matter of the brain, extending distally to the peripheral nerves, the anatomy of pain will be covered in this comprehensive review of surgical targets, beyond the spinal cord, for the treatment of chronic pain. Associated emerging technologies will also be discussed.
Learning Objectives:
- Describe the anatomy of pain pathways from the peripheral nerves, to the DRG, to the spinal pathways, to the brain
- Identify the brain and peripheral targets for chronic pain and data surrounding these targets

CV 8:00 am–4:15 pm

SYM2: Vascular Bundle

Composed of two sessions: SYM2A & SYM2B. Select this option to attend both at a discounted rate.

8:00 am–12:00 pm

SYM2A: New Era in Stenting

Course Directors: Andrew W. Grande, Brian T. Jankowitz
Faculty: Johanna Fifi, Grahame C.D. Gould, Babak S. Jahromi, Demetrius K. Lopes, Boris L. Pabon Guerreo, Ajit S. Puri, Justin G. Santarelli, Henry H. Woo
Course Description: The next generation of intra-cranial stents continue to increase the number, shape, and type of cerebral aneurysms that can be treated endovascularly. This course will introduce neurosurgeons to the latest approved devices and allow them to practice deploying them.
Learning Objectives:
- Identify the indications for placement of low-profile and next-generation stents
- Identify the technical tips for placement of low-profile and next-generation stents
- Practice deploying stents on simulators

12:45–4:15 pm

SYM2B: Bypass and Complex Vascular Lesions

Course Directors: Sepideh Amin-Hanjani, Babu G. Welch
Faculty: Adib A. Abla, Amir R. Dehdashti, Christoph J. Griessenauer, Michael J. Lang, Michael T. Lawton, Leonardo Rangel-Castilla, Jonathan Russin, Laligam N. Sekhar, Gregory J. Zipfel
Course Description: Hear the latest indications and techniques for Extra-Cranial to Intra-Cranial Bypass. Practice anastomosis on turkey wings.
Learning Objectives:
- Identify the most current data on treating symptomatic and asymptomatic disease including review of literature
- Review the status of the most current trials and registries
- Obtain practical experience on cadavers and flow models

SP PN 8:00 am–4:15 pm

SYM3: Spine and Peripheral Nerves Bundle

Composed of two sessions: SYM3A & SYM3B. Select this option to attend both at a discounted rate.

8:00 am–12:00 pm

SYM3A: My Worst Spinal Complication: Lessons Learned

Course Directors: Daniel K. Resnick, Luis M. Tumialán
Faculty: Mark H. Bilsky, Richard G. Fessler, Michael W. Groff, Michele M. Johnson, Shekar N. Kurpad, Gerald E. Rodts, Michael P. Steinmetz, Michael Y. Wang, Christopher E. Wolfla
Course Description: This symposium will have speakers present and discuss some of their most recent complications and the management of those complications to provide insights into advanced clinical care of patients with spinal disorders.
Learning Objectives:
- Identify and avoid complications commonly encountered in spine surgery
- Discuss the role of complication avoidance in the delivery of quality health care
- Incorporate technique of complication avoidance into clinical practice

CNS | SANS Lifelong Learning — *Look for this image for a SANS exam that accompanies this course and can be purchased on the Annual Meeting registration site.*

12:45–4:15 pm

SYM3B: Peripheral Nerve Surgery: Techniques and Exposure

CNS | SANS Lifelong Learning

Course Directors: Rajiv Midha, Robert J. Spinner
Faculty: Amgad S. Hanna, Line G. Jaques, Shaun T. O'Leary, Elias B. Rizk, Mariano Socolovsky, Thomas J. Wilson, Christopher J. Winfree, Eric L. Zager
Course Description: Using a combination of didactic lectures and case-based discussion, the faculty will provide learners with fundamental knowledge in peripheral nerve evaluation, surgical exposure and management of common surgical nerve conditions.
Learning Objectives:

- Describe surgical exposures and techniques for common peripheral nerve pathologies
- Determine appropriate diagnostic workup and diagnosis of patients with peripheral nerve entrapment
- Identify and avoid common complications associated with peripheral nerve surgery

TU 8:00 am–4:15 pm

SYM4: Brain Tumor Update Bundle

Composed of two sessions: SYM4A & SYM4B. Select this option to attend both at a discounted rate.

8:00 am–12:00 pm

SYM4A: Brain Tumor Update—Management of Malignant Brain Tumors

Course Directors: Manish K. Aghi, Andrew E. Sloan
Faculty: John A. Boockvar, Daniel J. Brat, Kaisorn L. Chaichana, Tiffany R. Hodges, Edjah K. Nduom, Jason P. Sheehan, Jeffrey S. Weinberg
Course Description: The course provides an update on malignant brain tumor management. In addition, a review of the current guidelines techniques aiding in the management of malignant brain tumors will be discussed. Following the individual presentations, the faculty will discuss the appropriate use of each of the respective techniques in the setting of case presentations from the moderator.
Learning Objectives:

- Identify updates to the 2017 classification of brain tumors
- Demonstrate understanding of advanced techniques aiding in the surgical resection of malignant brain tumors
- Compare outcomes of traditional surgical resection approaches to those incorporating novel techniques
- Evaluate the appropriate use of advanced techniques based on goals of care and patient diagnosis

12:45–4:15 pm

SYM4B: Brain Tumor Update—Management of Benign Brain Tumors

Course Directors: Ian F. Dunn, Gelareh Zadeh
Faculty: Andrew S. Little, Russell R. Lonser, Jacques J. Morcos, Susan C. Pannullo, Akash J. Patel, Walavan Sivakumr
Course Description: This course will discuss surgical and radiosurgical techniques for a variety of central nervous system tumors.
Learning Objectives:

- Discuss contemporary management of benign tumors by microsurgery and endoscopy
- Review contemporary management of benign tumors by radiosurgery
- Identify contemporary management of specific tumor histology, including skull base meningiomas, pituitary adenomas, acoustic neuromas, chordomas, peripheral nerve tumors, and pediatric tumors
- Apply these treatment strategies or refer appropriate patients in their practice for surgery or radiosurgery therapy

SP 8:00 am–4:15 pm

SYM5: Spinal Biomechanics and Thoracolumbar Deformity Bundle

Composed of two sessions: SYM5A & SYM5B. Select this option to attend both at a discounted rate.

8:00 am–12:00 pm

SYM5A: Spinal Bio-mechanics for the Practicing Neurosurgeon: What I Need to Know for My Practice

Course Directors: Joseph S. Cheng, Tyler R. Koski
Faculty: Benjamin D. Elder, Aruna Ganju, Ajit A. Krishnaney, Christopher M. Maulucci, Zachary A. Smith, Michael S. Virk, Rishi K. Wadhwa
Course Description: Evaluate the impact of bio-mechanics on spine surgery ranging from degenerative to trauma to deformity.
Learning Objectives:

- Incorporate bio-mechanics into surgical planning for cases ranging from degenerative to trauma to deformity
- Discuss the application of bio-mechanical principles to various spinal constructs
- Identify and avoid common complications associated with a failure to understand the role of bio-mechanics in spinal constructs

12:45–4:15 pm

SYM5B: Thoracolumbar Spinal Deformity for the Non-Deformity Spine Surgeon

Course Directors: Dean Chou, Frank La Marca
Faculty: Ian G. Dorward, D. Kojo Hamilton, Justin S. Smith, Lee A. Tan, Corinna C. Zygourakis
Course Description: This course will use case-based learning to describe the diagnosis and treatment of thoracolumbar deformity, including pearls for complication avoidance.
Learning Objectives:

- Describe appropriate measures for diagnosis and

SUBSPECIALTY SESSION HIGHLIGHTS KEY

AP ADVANCED PRACTICE PROVIDER	PN PERIPHERAL NERVES	TR NEUROTRAUMA
CV CEREBROVASCULAR	RE RESIDENT	TU TUMOR
GE GENERAL	SE SOCIOECONOMIC	WI WOMEN IN NEUROSURGERY
PA PAIN	SF STEREOTACTIC AND FUNCTIONAL	
PE PEDIATRIC	SP SPINE	

classification of thoracolumbar spinal deformity
- Describe surgical approaches and techniques for correction of thoracolumbar spinal deformity
- Discuss common complications and management strategies for thoracolumbar deformity surgery

TR 8:00 am–4:15 pm

SYM6: Neurotrauma Bundle

Composed of two sessions: SYM6A & SYM6B. Select this option to attend both at a discounted rate.

NEW! 8:00 am–12:00 pm

SYM6A: Global Neurotrauma

Course Directors: Christopher M. Bonfield, Jogi V. Pattisapu
Faculty: Rodrigo M. Faleiro, Roxanna Garcia, Michael M. Haglund, Peter J. Hutchinson, Michael T. Lawton, Peter Nakaji, Gail L. Rosseau, Franco Servadei, Sarah Woodrow
Course Description: Thirty percent of the global disease burden is caused by surgically treatable disease. Death from traumatic brain injury in low- to middle-income countries is one of the greatest health care disparities between high- and low- to middle-income countries. With raising rates of motorization in these countries, the problem is going to get worse. This course will highlight global neurotrauma disease burden.
Learning Objectives:
- Apply newly gained knowledge to start their own global neurotrauma program
- Identify the pitfalls of global neurosurgery initiatives
- Improve access to neurotrauma care globally

NEW! 12:45–4:15 pm

SYM6B: Cutting-edge Treatments in Neurotrauma

Course Directors: Richard B. Rodgers, Emily P. Sieg
Faculty: Randy S. Bell, Randall M. Chesnut, Ramesh Grandhi, Zachary L. Hickman, Jack Jallo, Ryan S. Kitagawa, Brian K. Kwon, Laura B. Ngwenya, David O. Okonkwo, Marios C. Papadopoulos
Course Description: This course is intended to further discuss advancements in surgical techniques for traumatic brain injury and spinal cord injury. Management of patients with neurotrauma has become increasingly complex with more attention paid to highly focused therapy targeting neurophysiologic principles.
Learning Objectives:
- Implement novel surgical techniques for patients with TBI and SCI
- Apply damage control surgical techniques
- Identify how to avoid complications of TBI
- Identify neurophysiology underlying secondary injury
- Apply new technologies to treatment of TBI and spinal cord injury

SF 8:00 am–4:15 pm

SYM7: Functional and Stereotactic Bundle

Composed of two sessions: SYM7A & SYM7B. Select this option to attend both at a discounted rate.

NEW! 8:00 am–12:00 pm

SYM7A: Movement Disorder DBS

Course Directors: Kathryn L. Holloway, John D. Rolston
Faculty: Sharona Ben-Haim, Kim J. Burchiel, Shiro Horisawa, Andrew L. Ko, Joseph S. Neimat, Vishad V. Sukul
Course Description: This course will provide a summary of the current state of the art in DBS surgery. Didactic lectures center on the most relevant current topics, and the hands-on session allows participants to get personal experience with DBS planning considerations.
Learning Objectives:
- Evaluate contemporary issues related to DBS surgery
- Apply cutting-edge approach to their DBS practice
- Compare available technology in planning DBS cases

NEW! 12:45–4:15 pm

SYM7B: Stereotactic Techniques in Epilepsy Surgery

Course Directors: Jorge A. Gonzalez-Martinez, Sameer A. Sheth
Faculty: Gerald A. Grant, Robert E. Gross, Andrew L. Ko, Guy M. McKhann, Kristen O. Riley, Jon T. Willie
Course Description: This symposium is aimed to reinforce basic concepts, clinical nuances, and practice related to most common epilepsy surgery procedures involving stereotaxis. The symposium will be divided into three parts: Part 1: Talks, to highlight basic concepts and the technical aspects; Part 2: Case Discussion, to promote discussion and public participation; Part 3: Lab, to demonstrate, in practice, the concepts related to the novel stereotactic methods.
Learning Objectives:
- Reinforce basic concepts, clinical nuances, and practice related to most common epilepsy surgery procedures involving stereotaxis
- Participate more actively in case presentations, illustrating the advantages and disadvantages of specific techniques
- Demonstrate basic concepts and technical nuances for planning stereotactic procedures related to epilepsy surgery

GE RE WI 8:00 am–4:15 pm

SYM8: Training Bundle

Composed of two sessions: SYM8A & SYM8B. Select this option to attend both at a discounted rate.

NEW! 8:00 am–12:00 pm

SYM8A: Neurosurgery Guidelines: Process, Clinical Impact, and Dissemination

Course Directors: Sepideh Amin-Hanjani, John E. O'Toole
Faculty: David F. Bauer, Mohamad Bydon, Sanjay S. Dhall, John P. Olson, Nader Pouratian, Patricia B. Raksin, Ahmed M.T. Raslan, Joshua M. Rosenow, Jennifer A. Sweet
Course Description: Highlighting the Guidelines process, but also the key take homes of the most recent guidelines. We also want to use this as an opportunity to conduct a focus group-like session to learn more about the best way to communicate guidelines to residents.
Learning Objectives:
- Identify the guidelines development process and its evidence basis
- Integrate key guidelines into regular clinical practice
- Communicate the impact of guidelines

NEW! 12:45–4:15 pm

SYM8B: Performance Workshop: How to be on Top of Your Game at Work and at Home

CNS Wellness and Resilience

Course Directors: Gary R. Simonds, Martina Stippler

Faculty: John A. Boockvar, Renée M. Reynolds, Sarah Woodrow
Course Description: In partnership with the J&J Human Performance Institute, this course will provide you the tools and insight you need to boost your performance at home and at work. There are two parties in the doctor-patient relationship. If the doctor is not well, he/she cannot provide the care the patient needs. Learn to improve your performance so you are well and can be the best surgeon for your patients, while also having an enjoyable, fulfilling private life. Let's start thriving again; surviving is not enough.
Learning Objectives:
- Appraise how burnout affects your life and work
- Apply performance improvement techniques to our daily routine
- Analyze current practices that lead to emotional exhaustion

PE 8:00 am–4:15 pm
SYM9: Pediatric Bundle
Composed of two sessions: SYM9A & SYM9B. Select this option to attend both at a discounted rate.

NEW! 8:00 am–12:00 pm
SYM9A: Pediatric Applications of Laser Interstitial Thermal Therapy
Course Director: Daniel Curry
Faculty: Jason S. Hauptman, Sean M. Lew, David D. Limbrick, Brent R. O'Neill, Carolina Sandoval-Garcia, Zulma S. Tovar-Spinoza
Course Description: This symposium will consist of an introduction and discussion of indications for LITT as well as the infrastructure, hardware, and logistics associated with the use of this operative technology.
Learning Objectives:
- Demonstrate understanding of clinical scenarios in which LITT may be a therapeutic option
- Evaluate the advantages and disadvantages of LITT, and the available systems to perform these procedures

NEW! 12:45–4:15 pm
SYM9B: Pediatric Scoliosis Assessment and Surgery
Course Director: Andrew H. Jea
Faculty: Richard C.E. Anderson, Christopher M. Bonfield, Mari L. Groves, Alexander K. Powers, Luis F. Rodriguez
Course Description: This symposium will highlight and discuss the pediatric scoliosis population and the unique neurologically relevant aspects of these patients, as well as their care. It will review different practice structures that can be used to successfully care for children with scoliosis.
Learning Objectives:
- Assess children with scoliosis
- Evaluate various methods for the treatment of scoliosis
- Recognize when non-operative methods may be most appropriate

SE GE 8:00 am–4:15 pm
SYM10: Socioeconomic Bundle
Composed of two sessions: SYM10A & SYM10B. Select this option to attend both at a discounted rate.

8:00 am–12:00 pm
SYM10A: 2021 Coding and CPT Update
Course Directors: Clemens M. Schirmer, Karin R. Swartz
Faculty: Kristopher T. Kimmell, Scott A. Meyer, Mark E. Oppenlander, Kim Pollock, Khoi D. Than, Luis M. Tumialán, Anand Veeravagu
Course Description: This symposium will provide a comprehensive overview that highlights what is new and what is the same in spinal, cranial, and E & M coding. It will enhance your practice's ability to maximize revenue for the work that you have done.
Learning Objectives:
- Evaluate changes in spinal surgery and E & M coding for 2021
- Evaluate changes in cranial surgery and E & M coding for 2021
- Evaluate new rules of compliance for 2021

NEW! 12:45–4:15 pm
SYM10B: Entrepreneurial Neurosurgeons
CNS Wellness and Resilience
Course Directors: Samuel R. Browd, Eric C. Peterson
Faculty: John R. Adler, Joshua B. Bederson, Arani Bose, Antony B. Costa, Kevin T. Foley, Amy B. Heimberger, J D. Mocco, Thomas Oxley, Randall W. Porter, Adnan H. Siddiqui, Jonathan Slotkin, Richard N. Wohns
Course Description: Innovation is a commonly seen trait among neurosurgeons. This course will outline how to parlay a novel idea into a finished business/product/company. We will feature speakers who have a variety of experience in translating a series of neurosurgical ideas into patents, products, and companies. The course will relay how to optimize an idea, collaborate with industry, mitigate risk, and be successful in an area outside of neurosurgical practice.
Learning Objectives:
- Outline the device development pathway
- Describe the key negotiations necessary to bring an idea from ideation to first in human implantation
- Describe the major roadblocks between a physician and successful development of an idea

Host Your Event at the CNS Annual Meeting

The CNS Annual Meeting is THE place to network and reunite with friends and colleagues and make the most of your time in Austin. While you're there, we hope you'll consider hosting your group's meeting, reception, or reunion.

To secure space for a meeting or social function at the JW Marriott Austin during the CNS Annual Meeting, complete a Function Space Request form at cns.org/function-space-request-2021 by **July 16!** For more details, contact Karen Garrett at kgarrett@cns.org or 847-805-4494.

CNS Wellness and Resilience — *Look for this image to find sessions on CNS' new Wellness and Resilience initiative.*

INTERNATIONAL RECEPTION

Outdoor Pool Deck at the JW Marriott Austin
Saturday, October 16 | 5:00–6:30 pm

Join your colleagues from around the world at the 2021 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. The CNS Foundation is pleased to partner with the CNS in celebrating our International guests at the International Reception.



DINNER SEMINAR I | SATURDAY, OCTOBER 16 | 6:30–8:30 pm

$225 (includes three-course dinner and beverages) | Advance registration recommended

NEW! SF **High-Intensity Focused Ultrasound (HIFU) Applications in Neurosurgery**

Moderators: Aviva Abosch, Michael G. Kaplitt

Speakers: Ausaf A. Bari, W. Jeffrey Elias, Nir Lipsman, Alon Y. Mogilner, Nader Sanai

Seminar Description: This seminar will cover HIFU applications in functional neurosurgery, including ablative procedures for movement disorders such as essential tremor and Parkinson's disease, as well as blood brain barrier opening applications for neuro-oncology. Faculty will also discuss practical aspects of setting up a HIFU program.

Learning Objectives:

- Demonstrate knowledge of HIFU applications in movement disorders
- Evaluate the applicability of blood brain barrier opening approaches in your practice
- Evaluate opportunities for and hurdles opposing the creation of a HIFU program

6:30–6:49 pm
Current Results and Upcoming Trials of HIFU Ablation for Movement Disorders
W. Jeffrey Elias

6:50–7:09 pm
HIFU for Blood Brain Barrier Opening
Nader Sanai

7:10–7:29 pm
Financial Realities of Establishing a HIFU Program
Alon Y. Mogilner

7:30–7:49 pm
Research
Ausaf A. Bari

7:50–8:09 pm
Tumor Versus Emerging Technique
Nir Lipsman

8:10–8:30 pm
Questions and Discussion



III Forks Austin | 111 Lavaca Street, Austin, TX
III Forks Steakhouse brings to Austin a sophisticated club-like ambiance with an elegant bar and lounge. The luxurious black mahogany trimmed triple-crown molding and Michelangelo Italian marble surroundings are simple and elegant. III Forks Austin is a contemporary realization of the classic steakhouse, specializing in USDA Prime steaks and fresh fish.
Complimentary shuttle service will depart from the JW Marriott Austin at 6:15 pm.

The Congress of Neurological Surgeons
Welcomes
2021 International Partner Societies

Brazilian Society of Neurosurgery
Neurological Society of India
The Japanese Congress of Neurological Surgeons

SBN
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THE JAPANESE CONGRESS OF NEUROLOGICAL SURGEONS
SANCORA IMPARO
1981
日本脳神経外科コングレス

NEUROLOGICAL SOCIETY OF INDIA
IN SERVICE OF MANKIND
Established : 1951
Premier Society of Neurosurgeons, Neurologists and Allied Neuroscientists

Association of Neurosurgical Physician Assistants
ANSPA

CNS
1951

ANSPA ANNUAL FALL CME MEETING
Presented in Collaboration with the CNS

Sunday, October 17 | 8:00 am–4:15 pm

The ANSPA Annual CME Meeting is created specifically for PAs and NPs working in, or interested in, neurosurgery. This session is complimentary with your meeting registration and will automatically be added to your Annual Meeting registration when you register as a Nurse/PA.

SYMPOSIA

SUNDAY, OCTOBER 17

Full Day Discounted Bundles (includes lunch):
Physician $400; Nurse/NP/PA $300; Resident/Medical Student $175
Half Day: Physician $250; Nurse/NP/PA $200; Resident/Medical Student $125

SF 8:00 am–4:15 pm

SYM11: Functional Neurosurgery Update: Emerging Concepts

Course Directors: Ellen L. Air, Casey H. Halpern, John D. Rolston
Faculty: Nicholas Au Yong, Oguz Cataltepe, Jennifer Durphy, Dario J. Englot, Kelly D. Foote, Wayne Goodman, Nathan C. Rowland, Doris D. Wang
Course Description: Technological developments have led to a rapid evolution of functional neurosurgery applications with potential treatments for a wide variety of disorders. This symposium will be a forum in which participants can obtain information about recent ideas that impact delivery of current therapies and development of new approaches. The course will cover the latest developments in stereotactic targeting, electrode implantation, surgical treatment of movement disorders and epilepsy, the renaissance of stereotactic lesions, and the frontier of restorative neurosurgery for a variety of disorders that have no other therapeutic options. In a series of breakout sessions, participants will have an opportunity to learn about cutting-edge technical developments.
Learning Objectives:
- Explain the difference in outcome for each target used for deep brain stimulation and identify the appropriate targets for clinical indications that are amenable to this treatment
- List the advantages, drawbacks, and limitations of the various strategies for intracranial electrode placement, including awake versus “asleep” deep brain stimulator implantation
- Describe the role of therapeutic lesions, including MR guided focused ultrasound, in the management of movement and other disorders
- Review recent developments in the surgical treatment of epilepsy, including minimally invasive approaches

TR 8:00 am–4:15 pm

SYM12: Neurotrauma Update

CNS | SANS Lifelong Learning

Course Directors: Anthony M. DiGiorgio, Shelly D. Timmons
Faculty: Randy S. Bell, Tene A. Cage, Rodrigo M. Faleiro, Ramesh Grandhi, Alan S. Hoffer, Ryan S. Kitagawa, Laura B. Ngwenya, Gazanfar Rahmathulla, Richard B. Rodgers, Uzma Samadani, Martina Stippler
Course Description: This course is intended to further discuss advancements in surgical and techniques for traumatic brain injury and spinal cord injury as well as neurocritical care management of patients with these complex pathologies. In addition, lessons learned through the lens of neurocritical care of patients with COVID-19 will be discussed.
Learning Objectives:
- Identify emerging trends in multimodality monitoring
- Improve practical aspects of caring for neurotrauma patients
- Identify evidence-based guidelines in neurotrauma

TU 8:00 am–4:15 pm

SYM13: Tumor Bundle

Composed of two sessions: SYM13A & SYM13B. Select this option to attend both at a discounted rate.

8:00 am–12:00 pm

SYM13A: International Ultrasound Symposium

Course Directors: Francesco DiMeco, Vikram C. Prabhu, Geirmund Unsgård
Faculty: Aliasgar V. Moiyadi, Brian V. Nahed, Llewellyn Padayachy, Alessandro Perin, Francesco Prada
Course Description: Intraoperative ultrasound (IOUS) is an extremely useful, yet under-utilized intraoperative imaging tool in Neurosurgery. Ease-of-use, availability and low-cost make IOUS a very attractive armamentarium. There is increasing awareness and adoption of it into routine neurosurgical practice. However, lack of adequate training has hampered its widespread implementation. The symposium on IOUS at CNS will teach how to use both 2D US and navigated 3D US in daily clinical practice and will also give insights into contrast enhanced US and US elastography. An integrated simulation workshop will challenge the participants to Interpret US images and a hands-on part will give the participants the ability to become familiar with ultrasound machines by the use on phantoms.
Learning Objectives:
- Identify different anatomical structures and pathology in US images
- Distinguish artifacts in US images acquired during surgery and learn different ways to cope with them.
- Practice with the ultrasound machine and controls as well as understanding essential steps to acquire a basic ultrasound image
- Describe the potential role and limitations of different US modalities: B-mode, doppler, CEUS and elastography

NEW! 12:45–4:15 pm

SYM13B: Management of Intracranial Complications

Course Directors: Maryam Rahman, Brad E. Zacharia
Faculty: Jeffrey N. Bruce, Lola B. Chambless, Frederick F. Lang, Jacques J. Morcos, Gabriel Zada
Course Description: This symposium will discuss general complications accompanying intracranial tumor surgery, including brain edema, postoperative hemorrhage, wound problems, as well as neurological deficits. Topics include glioma surgery, brain metastases, open skull-base tumors, intraventricular tumors/cysts, endoscopic endonasal approaches for skull base tumors, and technology-related complications.
Learning Objectives:
- Recognize factors that lead to complications and poor outcomes when treating intracranial tumors
- Discuss new and different strategies for how to best resolve intracranial complications should they arise
- Discuss current research and developments in diagnostic

CNS | SANS Lifelong Learning — *Look for this image for a SANS exam that accompanies this course and can be purchased on the Annual Meeting registration site.*

techniques, methods of therapy, and treatment alternatives for the management of intracranial tumors

CV 8:00 am–4:15 pm

SYM14: Cerebrovascular Bundle

Composed of two sessions: SYM14A & SYM14B. Select this option to attend both at a discounted rate.

NEW! 8:00 am–12:00 pm

SYM14A: Acute Stroke Treatment

CNS | SANS Lifelong Learning

Course Directors: Justin F. Fraser, Stavropoula I. Tjoumakaris
Faculty: Mandy J. Binning, Jan-Karl Burkhardt, Geoffrey P. Colby, Jens Fiehler, W. Christopher Fox, Tudor Jovin, J D. Mocco, Raul G. Nogueira, Christopher S. Ogilvy, Aditya S. Pandey, Scott D. Simon, Osama O. Zaidet
Course Description: Stroke has become a neurosurgical disease. The acute management of ischemic and hemorrhagic stroke is rapidly evolving. Experts in this symposium discuss cutting edge surgical and medical options in the treatment of ischemic and hemorrhagic stroke.
Learning Objectives:

- Discuss guidelines surrounding management of patients with acute ischemic or hemorrhagic stroke
- Compare procedural techniques during thrombectomy
- Discuss technique options during minimally invasive intracerebral hemorrhage evacuation

NEW! 12:45–4:15 pm

SYM14B: A Comprehensive and Evidenced Based Guidelines Review for the Treatment of Intracranial Aneurysms

CNS | SANS Lifelong Learning

Course Directors: Kathleen Dlouhy, Peter Kan
Faculty: Adib A. Alba, Cargill H. Alleyne, Johanna Fifi, Michael T. Lawton, Luca Regli, Carrie L. Shulman, Babu G. Welch, Gregory J. Zipfel
Course Description: Experts in the field review evidence-based guidelines for ruptured and unruptured intracranial aneurysm treatment.
Learning Objectives:

- List the indications for treatment of unruptured aneurysms
- Describe the optimal management of ruptured aneurysms in different scenarios
- Compare clipping, flow diversion, stent assisted coiling, bypass, and other treatment options for wide neck ruptured aneurysms

WI GE RE 8:00 am–4:15 pm

SYM15: WINS Career Bundle

Composed of two sessions: SYM15A & SYM15B. Select this option to attend both at a discounted rate.

NEW! 8:00 am–12:00 pm

SYM15A: Women in Neurosurgery Career Symposium

CNS Wellness and Resilience

Course Directors: Ann M. Parr, Jennifer A. Sweet
Faculty: Ellen L. Air, Maya A. Babu, Deborah L. Benzil, Sheri Dewan, Odette Harris, Le He, Judith Rosman, Jennifer Strahle, Shelly D. Timmons, Hilarie C. Tomasiewicz
Course Description: This professional development program delivers evidence-based strategies, skills development, and education that help women at various stages of their healthcare careers step into and succeed in leadership positions. This event is dedicated to encouraging more women to pursue a career in neurosurgery and to foster the careers of women in neurosurgery. It promotes both personal and professional growth and is designed to foster mentorship as well as a peer network. It also provides a forum to discuss contemporary issues and opportunities for women who have chosen or may choose a career in neurosurgery.
Learning Objectives:

- Possess an understanding of the basic skills and requirements for pursuing leadership positions
- Implement specific coping methods and networking skills to promote a career in a discipline in which men are traditionally predominant
- Acknowledge and help further the goals for the future of women in surgery and be empowered to move toward those goals

12:45–4:15 pm

SYM15B: Maximizing Your Neurosurgical Employment Opportunities: *Non-CME*

Course Directors: Ann M. Parr, Jennifer A. Sweet
Faculty: John A. Braca, Andrew R. Conger, Bharat Guthikonda, Timothy H. Lucas, Joseph S. Neimat, Judith Rosman, Justin A. Singer, Anand Veeravagu, Matthew Vuckovich, Edie E. Zusman
Course Description: This is a symposium for senior neurosurgery residents and graduating fellows who are in the process of interviewing for employment. The symposium will cover topics relevant to job applicants from the perspective of chairmen, program directors, and recruiters. Job applicants will also have an opportunity to have their resumes reviewed and to get interview tips from experts in this area.
Learning Objectives:

- Discuss the basics of different practice settings and reimbursement models
- Identify several negotiation tactics
- Identify basics of how practices (private, hospital, and academic) assess value

SUBSPECIALTY SESSION HIGHLIGHTS KEY

AP ADVANCED PRACTICE PROVIDER	PN PERIPHERAL NERVES	TR NEUROTRAUMA
CV CEREBROVASCULAR	RE RESIDENT	TU TUMOR
GE GENERAL	SE SOCIOECONOMIC	WI WOMEN IN NEUROSURGERY
PA PAIN	SF STEREOTACTIC AND FUNCTIONAL	
PE PEDIATRIC	SP SPINE	

SP 8:00 am–4:15 pm

SYM16: MIS and Cervical Spine Symposia Bundle

Composed of two sessions: SYM16A & SYM16B. Select this option to attend both at a discounted rate.

8:00 am–12:00 pm

SYM16A: Advanced Minimally Invasive Spine Surgery—Operative Nuances, Indications, and Complication Avoidance

Course Directors: Kai-Ming G. Fu, Praveen V. Mummaneni
Faculty: Aaron J. Clark, Kevin T. Foley, Robert Härtl, Langston T. Holly, Catherine Miller-Simington, John Pollina, Khoi D. Than, Juan S. Uribe
Course Description: This course in intended for surgeons with an interest in minimally invasive spinal surgery. Experts in the field will discuss operative nuances, complication avoidance, and patient selection in the context of a case-based course.
Learning Objectives:

- Identify appropriate indications for minimally invasive surgery
- Determine which patients may benefit from minimally invasive surgery and which approach (TLIF, ALIF, transpsoas)
- Discuss strategies for complication avoidance and management of complications once they occur

12:45–4:15 pm

SYM16B: Cervical Spine Case Management: When to Preserve Motion and When Not To

CNS | SANS Lifelong Learning

Course Director: Andrew T. Dailey
Faculty: Kurt M. Eichholz, R. John Hurlbert, Sheng-fu L. Lo, Lara W. Massie, Mark E. Oppenlander, Srinivas K. Prasad, Wilson Z. Ray
Course Description: This course will review the evidence behind motion preservation techniques and present application of these technologies, indications, and outcomes for anterior and posterior approaches in a case-based format.
Learning Objectives:

- Discuss indications for surgical treatment of cervical spine pathologies
- Discuss decision-making strategies for selecting the appropriate surgical approach for cervical spine pathologies
- Identify and avoid common complications associated with cervical spine surgery

TU 8:00 am–4:15 pm

SYM17: Surgical Anatomy Bundle

Composed of two sessions: SYM17A & SYM17B. Select this option to attend both at a discounted rate.

8:00 am–12:00 pm

SYM17A: Surgical Management of Eloquent Area Tumors: Functional Mapping and/or Navigation

Course Directors: Richard W. Byrne, Shawn L. Hervey-Jumper
Faculty: Edward F. Chang, Hugues Duffau, Jason Heth, Alfredo Quiñones-Hinojosa, Kristen O. Riley, George Samandouras, Michael E. Sughrue
Course Description: This course will outline in detail the management strategies for removing tumors in eloquent or functional areas utilizing the technique of functional brain mapping.
Learning Objectives:

- Review decision-making for surgical management of tumors in eloquent regions
- Discuss the use of functional mapping and imaging for removing functional area tumors
- Identify the use of functional mapping to expedite extent of resection and outcome for brain tumors in functional regions

12:45–4:15 pm

SYM17B: 3D Surgical Neuroanatomy

Course Directors: Juan C. Fernandez-Miranda, Nader Sanai
Faculty: Mustafa K. Baskaya, Lola B. Chambless, Aaron A. Cohen-Gadol, Paul A. Gardner, Pablo A. Rubino, Jeffrey M. Sorenson, Necmettin Tanriover, Ugur Ture
Course Description: This course will review relevant surgical neuroanatomy using 3-D stereoscopic projection. The areas to cover will be cortical and white matter anatomy, cerebrovascular, and skull base anatomy. Master surgeons will illustrate the importance of surgical neuroanatomy for clinical practice with surgical cases and HD/3-D video illustrations.
Learning Objectives:

- Review the complex anatomy of the fiber tracts and the application of HDFT in clinical practice
- Identify the key surgical anatomy for accessing the ventricles, basal cisterns, and anterior circulation aneurysms
- Discuss the different routes through the anterior skull base, middle fossa, and cavernous sinus, including endoscopic endonasal and transcranial approaches
- Review the surgical anatomy and approaches to the cerebellum, cerebello-pontine angle, and fourth ventricle
- Identify the key surgical anatomy for navigating the posterior basal cisterns and exposing posterior circulation vessels
- Discuss the different routes to the clival, petroclival and foramen magnum regions, including endoscopic endonasal and transcranial approaches

PE SF 8:00 am–4:15 pm

SYM18: Emerging Technologies Bundle

Composed of two sessions: SYM18A & SYM18B. Select this option to attend both at a discounted rate.

8:00 am–12:00 pm

SYM18A: Emerging Technology in Neurosurgery—Intraoperative Technological Adjuncts: Indications and Techniques for Laser Therapy, Robotics, and Exoscopes

Course Director: Daniel Curry
Faculty: David D. Gonda, W. Christopher Newman, Jeffrey S. Raskin, Mitesh V. Shah, Scellig S. D. Stone, Jon T. Willie, Stefan Wolfsberger
Course Description: The utilization of robotics, exoscopes, and laser ablation is expanding within neurosurgery. This course will review indications, techniques, and barriers for neurosurgeons considering the addition of these adjunct technologies to their practice.
Learning Objectives:

- List the indications for utilization of robotics, laser therapy,

or an exoscope within neurosurgical care
- Describe the barriers and challenges associated with implementing specific technologies into practice
- Apply technological skills required for the safe utilization of robotics, laser therapy, and exoscopes during practice

12:45–4:15 pm

SYM18B: Emerging Technology in Neurosurgery Brain Machine Interface: Virtual and Augmented Reality Applications

Course Directors: Walter C. Jean, Eric C. Leuthardt, Cameron C. McIntyre, Benjamin Rapoport
Faculty: Joshua B. Bederson, Emad N. Eskandar, Raphael Guzman, Leigh R. Hochberg, Alfred MC Iloreta, Robert G. Louis, Timothy H. Lucas, Helen S. Mayberg, Jeffrey A. Ojemann, Thomas Oxley, Nader Pouratian
Course Description: This symposium will provide an in-depth review of technologies and applications of novel and advanced visualization technologies.
Learning Objectives:
- Identify the technologies currently available for preand intraoperative brain anatomy and pathology visualization
- Apply visualization techniques to daily practice
- Identify the science, techniques, and the associated limitations and opportunities of these visualization techniques

SP 8:00 am–4:15 pm

SYM19: Spine Bundle

Composed of two sessions: SYM19A & SYM19B. Select this option to attend both at a discounted rate.

NEW! 8:00 am–12:00 pm

SYM19A: New Ways of Doing TLIF

Course Director: Khoi D. Than
Faculty: Muhammad M. Abd-El-Barr, Mohamad Bydon, Richard G. Fessler, Christoph P. Hofstetter, Catherine Miller-Simington, Gabriel C. Tender, Nicholas Theodore, Michael Y. Wang,
Course Description: This course will review the various strategies of doing a TLIF; including MIS, awake, endoscopic, and robotically assisted.
Learning Objectives:
- Describe several options for doing a TLIF surgery
- Identify which approach is optimal in a specific patient population
- Describe surgical nuance of the different approaches

NEW! 12:45–4:15 pm

SYM3A: Modern Spine Trauma Management

CNS | SANS Lifelong Learning

Course Directors: Daniel J. Hoh, Yi Lu
Faculty: Paul M. Arnold, Asdrubal Falavigna, James S. Harrop, Kristen E. Jones, Charles A. Sansur, Vincent C. Traynelis
Course Description: During this course, participants will learn the latest techniques for management of spine trauma, including cervical, thoracic, and lumbar injuries. Both operative and non-operative treatments will be discussed.
Learning Objectives:
- Describe results of recent clinical trials
- Identify evidence of current surgical strategies
- Define optimal care for the spine-injured patient

TU 8:00 am–4:15 pm

SYM20: Immunotherapy/Recurrent Glioblastoma Bundle

Composed of two sessions: SYM20A & SYM20B. Select this option to attend both at a discounted rate.

NEW! 8:00 am–12:00 pm

SYM20A: Management of Recurrent Glioblastoma

Course Directors: Daniel A. Orringer, Michael A. Vogelbaum
Faculty: Jeffrey N. Bruce, Sunit Das, Isabelle M. Germano, Michael E. Ivan, Ugur Sener, Bogdana Suchorska, Michael E. Sughrue
Course Description: This symposium will define the radiographic and clinical characteristics of recurrent glioblastoma; discuss current controversies surrounding the treatment of GBM recurrence; and provide best practices for the surgical management of recurrent GBM.
Learning Objectives:
- Define the radiographic characteristic of GBM recurrence using MRI, PET, and other advanced imaging techniques
- Compare the seminal studies that inform clinical decision making in GBM
- Implement patient selection strategies for surgical treatment of recurrent GBM based on knowledge gleaned from this symposium

NEW! 12:45–4:15 pm

SYM20B: Immunotherapy for Brain Tumors: New Concepts

Course Directors: E. Antonio Chiocca, Linda M. Liau
Faculty: Nduka M. Amankulor, William T. Curry, Peter E. Fecci, Amy B. Heimberger, Michael Lim, Edjah K. Nduom, Hideho Okada, Ian F. Parney
Course Description: This symposium will provide a brief overview of relevant immunological principles and define discrete immune pathways regulating the initiation and progression of malignant brain tumors. More importantly, cutting-edge immunotherapeutic approaches for the treatment of CNS tumors will be defined.
Learning Objectives:
- Evaluate various immune pathways that contribute to the formation and progression of CNS malignancies
- Compare different immunotherapeutic strategies, including virotherapy, adoptive cellular immunotherapy, and immune checkpoint inhibition
- Compare neoadjuvant and adjuvant immunotherapy strategies

GE SE 8:00 am–4:15 pm

SYM21: CNS/Socioeconomic Bundle

Composed of two sessions: SYM21A & SYM21B. Select this option to attend both at a discounted rate.

8:00 am–12:00 pm

SYM21A: Morbidity and Mortality

Course Director: Mark E. Shaffrey
Faculty: Judy Huang, Won Kim, Philipp Taussky, Philip V. Theodosopoulos
Course Description: This symposium will fulfill the ABNS requirement for quarterly morbidity and mortality requirement. Participants will submit cases and review cases in an anonymized manner to identify opportunities for improvement in practice. The session will focus on

maximizing practice improvement and learning how to critically analyze complications without assigning blame.

Learning Objectives:
- Identify opportunities for practice improvement via review of submitted participant cases
- Recognize the process for critical review and practice improvement
- Discuss optimal complication management to minimize impact on patient outcomes

NEW! 12:45–4:15 pm

SYM21B: So You've Been Sued

CNS Wellness and Resilience

Course Directors: Bharat Guthikonda, Ciara D. Harraher
Faculty: Deborah L. Benzil, Stanley W. Fronczak, Lawrence M. Shuer, Jason D. Stacy, James T. Tran, Richard N. Wohns
Course Description: This symposium will provide an overview of the medical legal climate in neurosurgery in 2021. A thorough review of the medical legal process, going over what to do when you are sued, how to give a deposition, how to manage expert witness testimony, and how to use the medical review panel process in states where it is present will all be reviewed.

Learning Objectives:
- Analyze the current state of the medical legal climate in neurosurgery in 2021
- Apply techniques taught in the course in the event that the student is sued
- Implement changes in their practice that will minimize the risk of litigation

SP 8:00 am–4:15 pm

SYM22: Spine Bundle

Composed of two sessions: SYM22A & SYM22B. Select this option to attend both at a discounted rate.

8:00 am–12:00 pm

SYM22A: Cervical Deformity for the Non-deformity Spine Surgeon

Course Directors: Nathaniel P. Brooks, Langston T. Holly
Faculty: D. Kojo Hamilton, Robert F. Heary, Ajit A. Krishnaney, Catherine Miller-Simington, Alexander E. Ropper, Daniel M. Sciubba, Lee A. Tan, Vincent C. Traynelis, Corinna C. Zygourakis
Course Description: This course will use case-based learning to describe the diagnosis and treatment of cervical deformity, including pearls for complication avoidance.

Learning Objectives:
- Describe appropriate measures for diagnosis and classification of cervical spinal deformity
- Describe surgical approaches and techniques for correction of cervical spinal deformity
- Discuss common complications and management strategies for cervical deformity surgery

12:45–4:15 pm

SYM22B: Anterior Column Release: When Is it Appropriate?

Course Director: Juan S. Uribe
Faculty: Adam S. Kanter, Jean-Christophe A. Leveque, Hani Malone, David O. Okonkwo, John Pollina, Rajiv Saigal, Laura A. Snyder
Course Description: This course will detail patient selection, surgical technique, complications, and case examples of ACR surgery.

Learning Objectives:
- Define the indications for using anterior release as a surgical option
- Identify the technique of anterior release
- Describe the complications associated with this approach

AP GE RE 8:00 am–4:15 pm

SYM23: Quality/Big Data Symposium Bundle

Composed of two sessions: SYM23A & SYM23B. Select this option to attend both at a discounted rate.

8:00 am–12:00 pm

SYM23A: Improving Quality of Care in Neurosurgical Patients: Driving Safety, Effectiveness, and Reimbursement through QI

Course Directors: Mohamad Bydon, Ann R. Stroink
Faculty: Oren N. Gottfried, Daniel J. Guillaume, Neil A. Martin, David Nerenz, Paul L. Penar
Course Description: This interactive symposium will critically evaluate neurosurgical quality, including shortfalls and opportunities. Speakers will discuss quality metrics, including neurosurgery-relevant quality measures that differentiate excellent care, including from the patient perspective. Registrants will be able to discuss quality initiatives, roadblocks, and successes with panel experts in order to demonstrate opportunities for growth. Discussions will include the role of registries, national bench-marking, and innovative trial designs to measure and implement quality in neurosurgery.

Learning Objectives:
- Define quality care from neurosurgical perspective and differentiate it from traditional quality metrics
- Define the value, utility, and implementation of patient-reported outcomes in assessing quality
- Critically appraise the value of evidence-based medicine, registry participation, national bench-marking, and trial design in improving quality of care
- Identify novel strategies for increasing revenue using quality data
- Apply these data collection methods and quality outcomes assessment in their own practice

SUBSPECIALTY SESSION HIGHLIGHTS KEY

AP ADVANCED PRACTICE PROVIDER	PN PERIPHERAL NERVES	TR NEUROTRAUMA
CV CEREBROVASCULAR	RE RESIDENT	TU TUMOR
GE GENERAL	SE SOCIOECONOMIC	WI WOMEN IN NEUROSURGERY
PA PAIN	SF STEREOTACTIC AND FUNCTIONAL	
PE PEDIATRIC	SP SPINE	

- Identify how to take what was learned in the symposium back to their institution to have a constructive, successful conversation on adopting QI measure

12:45–4:15 pm

SYM23B: Using Big Data to Help Neurosurgeons and Their Patients

Course Directors: Eric K. Oermann, Clemens S. Schirmer
Faculty: Jason Davies, Sandi Lam, Luke Macyszyn, Nicholas F. Marko, Aziz Nazha, Timothy R. Smith, Anand Veeravagu
Course Description: Data science is a rapidly evolving field, which impacts neurosurgeons in every aspect of their careers by changing the way scientific discoveries are made and the way healthcare is delivered. In this course, a diverse group of speakers with backgrounds in neurosurgery, statistics, imaging, and industry will provide a framework to understand how advanced data science techniques can be employed to improve study design, patient outcomes, and practice management.
Learning Objectives:

- Identify common data science strategies, resources, and databases useful for healthcare practitioners
- Define key terms including Natural Language Processing, Machine Learning, Computer Vision, and Artificial Intelligence
- Explore solutions to a problem in a large sample data-set in a workshop format
- Identify how to use pooled neurosurgical practice data to enhance individual practice management
- Identify methods of collaborating with industry and scientific partners to solve neurosurgical research questions using advanced data science techniques

GE 8:00 am–12:00 pm

CNS/ARANS/SNS Neurosurgery Program Administrators Track

This course is designed for Program Directors and Program Administrators
Course Directors: Mary Gallagher, Pamela Lane
Faculty: Nicholas M. Barbaro, Charles L. Branch, Jamie Dow, Jacqueline Hobbs, Betsy Koehnen, Diana Morris, Jamie Stejskal
Course Description: This course is designed to provide detailed information on two relative topics of interest to Neurosurgery Program Administrators to better assist the Program Director with administrative responsibilities for CAST fellowships and the Annual Program Evaluation. CAST has had many changes over the last several years with frequently updated requirements and with oversight now under the ABNS. The Annual Program Evaluation is a requirement of all programs and the responses are a major determining factor in the accreditation status with ACGME. The sessions will address essential elements for the successful administration of CAST fellowships and submitting a favorable APE.
Learning Objectives:

- Identify key component to successfully support CAST fellowships and assist with the Annual Program Evaluation
- Describe new CAST accredited fellowship requirements
- Organize the necessary documents, along with the Program Director, of a CAST application and the annual update based on current CAST requirements
- Identify key areas of importance to assist in formulating responses for the Annual Program Evaluation

1:00–3:00 pm

CNS RESIDENT SANS CHALLENGE PRELIMINARY ROUND



AP 8:00 am–4:15 pm

Association of Neurosurgical Physician Assistants (ANSPA) Fall 2021 CME Meeting Presented in Collaboration with the Congress of Neurological Surgeons (CNS)

Complimentary to registered ANSPA members, Nurse/PA registrants.
Course Director: Alice Edwards
Faculty: Grace H. Bryan, Kara Curley, William Freeman, Lindsay Gietzen, Constantinos G. Hadjipanayis, Jonas Konan, Brian H. Kopell, Joel Kutz
Course Description: This course is specifically designed by the Association of Neurosurgical Physician Assistants for Physician Assistants and Nurse Practitioners that are practicing in, or interested in neurosurgery.
Learning Objectives:

- Identify and discuss diagnoses and treatment options related to neurosurgical pathology
- Conduct patient work-up to diagnose and treat patients with neurosurgery-related conditions
- Demonstrate application of neurosurgical principles in advanced practitioner practice of patient triage and treatment – Contribute to the professional advancement of mid-level practitioners in the field of neurosurgery



Relax and Reconnect in the Sunset Room

Looking for a place to grab a beverage with a colleague? Look no further than the Sunset Room, conveniently located across the street from the Austin Convention Center. We will be featuring live music, beverages, and more!

GENERAL SCIENTIFIC SESSION I

SUNDAY, OCTOBER 17
4:30–6:30 pm

Presiding Officer: Steven N. Kalkanis
Moderators: Brian V. Nahed, Maryam Rahman
Learning Objectives:

- Identify how laboratory-based science has made significant contributions in neurooncolgy
- Summarize the impact of neurosurgery on the field of neurooncology and how it impacts clinical practice
- Describe how persistence and rehearsal can better prepare you for high-test moments



4:30–4:33 pm
Welcome to the 2021 CNS Annual Meeting
Brian L. Hoh

4:34–4:41 pm
2020 CNS Resident Award Presentation: The Pituitary Epigenetic Liquid Biopsy for the Peripheral Detection and Classification of Pituitary Adenomas
Karam Paul Asmaro

4:42–4:45 pm
Introduction of 2020 Honored Guest: Bob S. Carter
Steven N. Kalkanis



4:46–5:11 pm
2020 HONORED GUEST PRESENTATION
Bob S. Carter

5:12–5:16 pm
American Society of Black Neurosurgeons Update
William W. Ashley

5:17–5:18 pm
Introduction to Guha Award Presentation
Jason Sheehan

5:19–5:26 pm
Guha Award Presentation
Gelareh Zadeh

5:27–5:30 pm
Introduction of 2020 Honored Guest: Mark L. Rosenblum
Steven N. Kalkanis



5:31–5:56 pm
2020 HONORED GUEST PRESENTATION: Neurosurgery's Impact on Neuro-oncology – "Can We Do Better?" – Lessons Learned Over 50 Years
Mark L. Rosenblum

5:57–5:59 pm
Introduction of Alex Honnold
Lola B. Chambless



6:00–6:30 pm
Free Solo FEATURED SPEAKER:
Alex Honnold



Thank You

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SUNRISE SCIENCE AND GUIDELINES

MONDAY, OCTOBER 18

CV **Sunrise Science Abstract Session I**
Moderators: Rohan V. Chitale, Peter Kan

SP **Sunrise Science Abstract Session II**
Moderators: Owoicho Adogwa, Ahilan Sivaganesan, Corinna C. Zygourakis

7:00–8:30 am
Learning Objectives:
- Analyze the findings of novel neurosurgical studies, critique the design and methodology
- List important areas for further knowledge development and research
- Identify the most important ongoing clinical trials
- Apply lessons of ongoing research to neurosurgical care of patients

TU 7:00–8:30 am
Guidelines for the Management of Brain Metastases
Moderators: James B. Elder, Jeffrey Olson, Jonathan H. Sherman
Speakers: Veronica Chiang, Christopher P. Cifarelli, Melanie Hayden Gephart, Ricardo J. Komotar
Session Description: This morning guidelines sessions will present a critical overview of evidence-based guidelines for management of brain metastases, including discussions of the role of surgery, radiosurgery, whole brain radiation, and emerging and investigational therapies. The session will feature key thought leaders within neurosurgery and radiation oncology to guide advanced and modern care of patients with brain metastases.
Learning Objectives:
- Develop treatment strategies for single versus multiple mets
- Develop a treatment algorithm in deciding between SRS and WBRT
- Critically assess the new CNS metastatic tumor guidelines

7:00–7:04 am
Introduction
Jeffrey Olson

7:05–7:24 am
The Role of Surgery in Brain Metastases
Veronica Chiang

7:25–7:44 am
The Role of Chemotherapy in Brain Metastases
Melanie Hayden Gephart

7:45–8:04 am
The Tipping Point: When to Use SRS versus WBRT
Christopher P. Cifarelli

8:05–8:24 am
The Role of Emerging Therapies in Brain Metastases
Ricardo J. Komotar

8:25–8:30 am
Discussion and Questions

SF 7:00–8:30 am
Guidelines for DBS for OCD
Moderators: Wael Assad, Sarah K.B. Bick, Michael D. Staudt
Speakers: G. Rees Cosgrove, Clement Hamani, Michael D. Staudt
Session Description: This session will discuss the current state of the art of DBS for OCD, its evidence base, and commonalities between DBS and lesion strategies.
Learning Objectives:
- Evaluate outcomes from previous trials of DBS for OCD
- Determine the level of evidence behind DBS for OCD across brain targets
- Describe the difference between full FDA approval and HDE and how it impacts clinical opportunities for surgery

7:00–7:29 am
Where We Are and Where Are We Going?
Clement Hamani

7:30–7:59 am
Review of a Common Nomenclature
Michael D. Staudt

8:00–8:29 am
Lesions Versus Stimulation
G. Rees Cosgrove

TR 7:00–8:30 am
Guidelines for Neurotrauma/Brain Injury
Moderators: Paul M. Arnold, Nicholas J. Brandmeir
Speakers: Randall M. Chesnut, Jack Jallo, Monica Verduzco-Gutierrez
Session Description: This session will provide an overview of existing TBI guidelines and clinical treatment pathways and how they can be applied to management of TBI. In addition, a closer look at modern rehabilitation techniques and strategies for patients with both TBI and SCI will be discussed.
Learning Objectives:
- Apply TBI guidelines to the management of TBI patients
- Analyze shortcoming of current TBI guidelines
- Refresh knowledge about exciting treatment pathways

7:00–7:19 am
Guidelines for Concussion
Scott Zuckerman

7:20–7:39 am
Shortcomings of Current Guidelines
Jack Jallo

7:40–7:59 am
TBI Pathway
Randall M. Chesnut

8:00–8:19 am
Rehab Guidelines for TBI and SCI
Monica Verduzco-Gutierrez

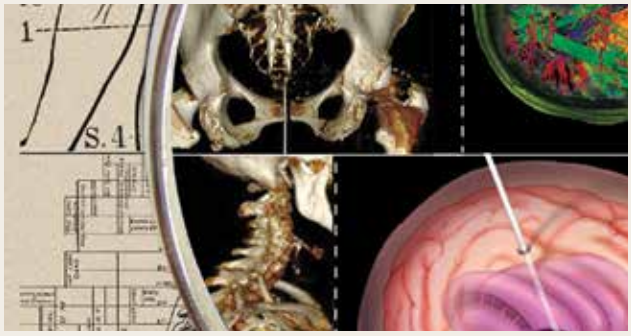
8:20–8:30 am
Questions and Discussion

GENERAL SCIENTIFIC SESSION II

MONDAY, OCTOBER 18
8:40 am–12:10 pm

Presiding Officer: Elad I. Levy
Moderators: Garni Barkhoudarian, Martina Stippler
Learning Objectives:

- Discuss how neurosurgery as a profession can enhance training and educational paradigms to better prepare for the future
- Summarize key evidence-based advances in spinal surgery
- Describe how science and technology will impact the future of neurosurgery in the post-pandemic era



8:40–8:42 am
Introduction of Mae Jemison
Tiffany R. Hodges



8:43–9:05 am
FEATURED SPEAKER:
Mae Jemison

9:06–9:09 am
Introduction of 2021 Honored Guest
Frank J. Bova



9:10–9:40 am
2021 HONORED GUEST PRESENTATION
William A. Friedman

9:40–10:40 am
MORNING BEVERAGE BREAK
Visit the Exhibit Hall

10:00–10:30 am
LIVE SURGERY IN THE EXHIBIT HALL

10:40–10:43 am
CNS Foundation Update
Elad I. Levy

10:44–10:51 am
CNS Resident Award Presentation

10:52–10:59 am
Comparing Ventral and Dorsal Surgery for Cervical Myelopathy – Results of a Randomized Clinical Trial
Zoher Ghogawala

11:00–11:03 am
NEUROSURGERY® Publications Update
Nelson M. Oyesiku



11:04–11:06 am
Distinguished Service Award Presentation
Nelson M. Oyesiku
Presented by:
Steven N. Kalkanis



11:07–11:09 am
Founder's Laurel Award Presentation
Beverly C. Walters
Presented by:
Steven N. Kalkanis

11:10–11:13 am
Introduction of 2020 CNS President
Zoher Ghogawala



11:14–11:36 am
2020 PRESIDENTIAL ADDRESS
Steven N. Kalkanis

11:37–11:39 am
Introduction of Malcolm Gladwell
Nader Pouratian



11:40 am–12:10 pm
WALTER E. DANDY ORATOR
Catalysts for Changing Human Behavior: How Science and Technology have Changed Post-pandemic Behaviors and Attitudes for the Better. Looking into the Future of Neurosurgery.
Malcolm Gladwell

CNS Members join us for free in Austin! Register at cns.org/2021 by September 15!

LUNCHEON SEMINARS

MONDAY, OCTOBER 18 | 12:15–1:45 pm

All Seminars include lunch.
Luncheon Seminar fee is $125 each ($100 for residents, fellows, medical students, and advance practice providers)

RE M1: Honored Guest Luncheon
U.S. Health Care: The Good, the Bad, and the Ugly

**Advanced registration recommended. Complimentary for Resident and International Vista Resident Members!*
Speakers: William A. Friedman
Learning Objectives:
- Distinguish how the U.S. health care system compares, in terms of access and outcomes, to other systems around the world
- Recall the details of the Affordable Care Act and its subsequent modifications by Congress and the Supreme Court
- Recognize a possible path forward to better quality, less expensive, and more widely available health care in the U.S.

NEW! CV M2: Minimally Invasive Surgical Evacuation of Intracerebral Hemorrhage

Moderators: Dimitri Sigounas, Justin A. Singer
Faculty: Mark D. Bain, Christopher P. Kellner, Gustavo Pradilla, Paul Saphier
Seminar Description: ICH is a common neurological disease with no effective treatment. Numerous clinical trials and registries are underway to better elucidate the patient population and effect of minimally invasive ICH evacuation as a viable treatment option.
Learning Objectives:
- Describe the evidence supporting MIS ICH evacuation
- Describe the procedural techniques used to perform minimally invasive ICH evacuation
- Describe the ongoing clinical trials and registries evaluating minimally invasive ICH evacuation

SP M3: Cervical Spondylotic Myelopathy–Anterior Versus Posterior

Moderator: Zoher Ghogawala
Faculty: Erica F. Bisson, Nader S. Dahdaleh, Asdrubal Falavigna, Iain H. Kalfas, Michael L. Smith, Vincent C. Traynelis
Seminar Description: This seminar will explore current concepts regarding various surgical approaches for cervical spine disorders. Using a case-based format, faculty will discuss indications, techniques, and outcomes.
Learning Objectives:
- Determine which patients would benefit from anterior versus posterior approaches to treat cervical radiculopathy
- Describe common complications associated with anterior and posterior cervical spine approaches
- Identify strengths and weaknesses of anterior cervical discectomy and fusion/arthroplasty versus posterior minimally invasive laminoforaminotomy versus laminoplasty

TU M4: Acoustic Neuromas: Impact on Extension of Resection and Stereotactic Radiosurgery

Moderators: William C. Broaddus, William T. Couldwell
Faculty: Frederick G. Barker, Lola B. Chambless, Si Chen, Christine Dinh, Michael J. Link, Jason P. Sheehan
Seminar Description: Review of the current guidelines for management of acoustic neuromas including GTR, STR, and SRS.
Learning Objectives:
- Evaluate the role of STR vs GTR in acoustic neuroma surgery
- Compare outcomes across treatment strategies
- Apply a multi-modal approach to patient management where appropriate

NEW! TR M5: Neurovascular Care in Neurotrauma

Moderator: Ramesh Grandhi
Faculty: Mark R. Harrigan, Brian T. Jankowitz, Ning Lin, Ryan Morton
Seminar Description: The role of the neurovascular neurosurgeon in managing patients with neurotrauma is becoming increasingly important.
Learning Objectives:
- Identify the techniques and indications for MMA embolization
- Evaluate treatment strategies for penetrating brain injury
- Compare various treatment paradigms in the workup of blunt cerebrovascular injury
- Identify various treatment/management strategies for patients with blunt cerebrovascular injury

NEW! SE M6: Safety, Quality, and Value in Neurosurgery

Moderators: Wayel Kaakaji, Kristopher T. Kimmell
Faculty: Owoicho Adogwa, Maya A. Babu, Holly Gilmer, Cara L. Sedney, Ann R. Stroink
Seminar Description: The talks for this seminar will focus on patient safety, defining quality, defining value of a neurosurgeon to a system, and outlining how reimbursement will be tied to quality.
Learning Objectives:
- Define value as it relates to their healthcare setting
- Identify how cost impacts value and the major drivers of cost
- Describe opportunities to improve value in spine care

NEW! PE M7: Development of International Relationships in Pediatric Neurosurgery

Moderator: John Ragheb
Faculty: Michael C. Dewan, Aria Fallah, James M. Johnston, Sandi Lam, Brandon G. Rocque, Benjamin C. Warf
Seminar Description: Presentation and discussion of various approaches to the development and fostering of international partnerships in neurosurgery and pediatric neurosurgery.
Learning Objectives:
- Compare different methods of international collaboration
- Assess whether they are interested in international collaboration

PN M8: Peripheral Nerve Entrapment Versus Radiculopathy

Moderator: Line G. Jacques
Faculty: Zarina Ali, Jason H. Huang, Mark A. Mahan, Jonathan Stone, Gabriel C. Tender
Seminar Description: To hone diagnostic skills in differentiating radiculopathy from common peripheral nerve entrapment syndromes.
Learning Objectives:

- Describe a systematic approach to evaluation of patients with peripheral nerve entrapment syndromes
- Develop a non-operative or operative management strategy for these conditions
- Discuss advantages and disadvantages and expected outcomes of various surgical approaches

NEW! CV M9: Artificial Intelligence in Cerebrovascular Neurosurgery

Moderators: Laura S. McGuire, Eric K. Oermann
Faculty: Hormuzdiyar H. Dasenbrock, Jason Davies
Seminar Description: Artificial intelligence is mostly theoretical now in daily neurosurgical practice, but will no doubt become an important part of practice in the near future. In this seminar, published experts in the field of AI in neurosurgery discuss current and future applications.
Learning Objectives:

- Describe the current use of AI in neurosurgical practice
- Describe the use of AI in the evaluation of neuroimaging
- Describe the use of AI in research

SP TU M10: Spinal Tumor Surgery–Case Based Management

Moderators: Paul M. Arnold, Khoi D. Than
Faculty: Mark H. Bilsky, Ziya L. Gokaslan, Laurence D. Rhines, Daniel M. Sciubba, John H. Shin, Hesham M. Soliman
Seminar Description: This luncheon seminar will review and discuss laser ablation, separation surgery, MIS stabilization techniques, and modern management of giant cell tumor/chordoma/chondrosarcoma.
Learning Objectives:

- Discuss techniques and approaches to treat spinal tumors
- Determine appropriate indications and treatment pathways as well as guidelines for the treatment of spinal tumors
- Identify and avoid common complications associated with treatment of spinal tumors

NEW! TU M11: Immunotherapy: Practical Guidelines for Daily Practice

Moderators: Gordon Li, Michael Lim
Faculty: Gavin P. Dunn, Kim Margolin, Donald M. O'Rourke, Ian F. Parney, Viviane S. Tabar
Seminar Description: Review of the current status of immune-therapies for glioma.
Learning Objectives:

- Identify the roles for immune-based therapies in glioma patients
- Evaluate the effects of immune therapies in the context of standard of care treatment
- Implement the session findings into their own practice

NEW! SF M12: DBS for Emerging Indications

Moderators: Shiro Horisawa Charles B. Mikell
Faculty: Kim J. Burchiel, Casey H. Halpern, Andres M. Lozano, Ali R. Rezai
Seminar Description: This seminar will cover investigational applications of DBS, including Alzheimer's, eating disorders, and traumatic brain injury.
Learning Objectives:

- Evaluate new indications for DBS in neuropsychiatric disorders
- Apply the research principles described to their own research program
- Determine which of the many emerging indications for DBS will be most impactful

NEW! GE M13: Perspectives: Editorial Process for International Neurosurgical Manuscripts

Moderators: Roberta P. Glick, Alexandra J. Golby
Faculty: Bernard R. Bendok, T. Forcht Dagi, Nelson M. Oyesiku, Jessica Striley, Caitlyn Trautwin
Seminar Description: This new session seeks to give an overview of some of the issues that international scholars may have about the workflow and steps leading to a successful submission and possible acceptance of their scholarly work in rigorous scientific journals. By addressing common experiences and pitfalls in some subspecialty areas, the audience will be able to calibrate their future submissions and potentially increase their chance of success.
Learning Objectives:

- Discuss details of the editorial process for manuscripts from submission to acceptance with particular focus on international submissions
- Review common problems and pitfalls that hinder the successful submission and acceptance of a manuscript
- Discuss strategies to improve their submission of manuscripts with examples from but not limited to the cerebrovascular and spinal subspecialties

1:45–2:45 pm

ABNS Special Session: Guidelines for Boards Preparation and MOC (*Non-CME*)

Speakers: Garni Barkhoudarian, Betsy Koehnen, Elad I. Levy, Akash J. Patel, Daniel K. Resnick

ABNS Directors, Chief Administrative Officer and CNS Written and Oral Board preparation course directors will discuss the process of board preparation and maintenance of certification.

1:45–2:45 pm
AFTERNOON BEVERAGE BREAK
Visit the Exhibit Hall

2:00–2:30 pm
DEVICE INNOVATION SHOWCASE

CNS Wellness and Resilience

Look for this image to find sessions on CNS' new Wellness and Resilience initiative.

AFTERNOON SESSIONS

MONDAY, OCTOBER 18

SECTION SESSIONS

SE 2:45–4:15 pm

Council of State Neurosurgical Societies: The Medical Legal Environment in 2021

Moderators: Bharat Guthikonda, Jason D. Stacy
Speakers: Mick J. Perez-Cruet, Ann R. Stroink, Richard N. Wohns
Session Description: This session will provide a concise, but thorough, overview of the state of medical legal affairs in neurosurgery in 2021. This will focus on what is new, what is better, and what is worse in the medical legal realm of neurosurgery.
Learning Objectives:

- Identify current medical legal trends for neurosurgery in America
- Evaluate and quantify the medical legal risks of outpatient spine surgery
- Identify the medical legal environment with neurosurgery from the vantage point of Washington, D.C.

2:45–2:59 pm
National Medical Legal Trends in 2021
Richard N. Wohns

3:00–3:14 pm
The Medical Legal Risks of Outpatient Spine Surgery
Mick J. Perez-Cruet

3:15–3:29 pm
The Medical Legal Atmosphere, as Seen from Washington D.C.
Ann R. Stroink

3:30–4:15 pm
Oral Abstract Presentations

CV 2:45–4:15 PM

Section on Cerebrovascular Surgery: Neuroprotection in Cerebrovascular Disease—The Next Wave of Ischemic and Hemorrhagic Stroke Treatments

Moderators: Bradley N. Bohnstedt, Robert M. Starke
Speakers: Waleed Brinjikji, E. Sander Connolly, Matthew J. Gounis, Adnan H. Siddiqui, Gary K. Steinberg, Michael Tymianski
Session Description: After procedural interventions like thrombectomy and minimally-invasive ICH evacuation, surgeons find themselves in the location of maximal injury without options yet to prevent secondary injury.
Learning Objectives:

- Describe experimental efforts to develop a neuroprotective medication in acute ischemic stroke
- Discuss available models to develop neuroprotective strategies in stroke
- Describe devices under development for neuroprotection in ischemic and hemorrhagic stroke

2:45–2:55 pm
Neuroprotective Drug Development in Acute Stroke
Michael Tymianski

2:56–3:06 pm
Neuroprotection Through Stem Cell Treatment
Gary K. Steinberg

3:07–3:17 pm
Acute Stroke Modelling for the Evaluation of Post-Thrombectomy Neuroprotection
Matthew J. Gounis

3:18–3:28 pm
Learning from the Clot
Waleed Brinjikji

3:29–3:32 pm
Hopkins Lecturer Introduction
Adnan H. Siddiqui

3:33–3:48 pm
Hopkins Lecture
E. Sander Connolly

3:49–4:15 pm
Oral Abstract Presentations

SP 2:45–4:15 pm

Section on Disorders of the Spine: Past Presidents Spine Section Update

Moderators: Domagoj Coric, Eric A. Potts, Wilson Z. Ray, Michael P. Steinmetz, Cheerag D. Upadhyaya
Speakers: Michael W. Groff, Regis W. Haid, Christopher I. Shaffrey, Marjorie C. Wang, Michael Y. Wang
Session Description: This spine specific session will provide attendees with valuable insight on various relevant topics in spine surgery. All speakers were strategically selected based on their vast experience and have served as past presidents of the DSPN.
Learning Objectives:

- Evaluate the utility of new spine technologies
- Analyze patients differently to help reduce complications
- Demonstrate greater understanding of the benefits of the various surgical approaches discussed in this session

2:45–2:53 pm
What's Better for Deformity Correction? Posterior, Anterior, or Both?
Christopher I. Shaffrey

2:54–3:02 pm
From Napkin Sketch to Final Product: My Insight on the Development of New Spine Devices and Their Implementation
Regis W. Haid

3:03- 3:11 pm
Trends in Opioid Use Before and After Spine Surgery
Marjorie C. Wang

3:12–3:20 pm
Zero-profile ACDF Devices, When to Use Them, and Pearls for Getting a Solid Fusion
Michael W. Groff

3:21–3:29 pm
When Does MIS Deformity Correction Fail? Lessons I Have Learned From My Own Cases
Michael Y. Wang

3:30–4:15 pm
Oral Abstract Presentations

TR 2:45–4:15 pm

Section on Neurotrauma and Critical Care Session: Global Neurotrauma Surgery

Moderators: Bradley Dengler, Martina Stippler
Speakers: Allan D. Levi, Gail L. Rosseau
Session Description: Tator lecturer on Neurotrauma and

Miller lecturer on Global Surgery and Neurotrauma care will be presented and provide an update on the current state of affairs as well as highlight new directions for the future. Presentation of the best abstracts in neurotrauma and critical care research will take place following the Miller lecture.
Learning Objectives:
- Illustrate changes in neurotrauma and neurocritical care over time
- Identify challenges in global neurotrauma care
- Recognize how one may get involved in global neurosurgery/neurotrauma initiatives and programs
- Highlight the latest research in neurotrauma and neurocritical care

2:45–2:46 pm
Tator Lectureship Introduction
Bradley Dengler

2:47–3:12 pm
Tator Lectureship
Allan D. Levi

3:13–3:14 pm
Miller Lectureship Introduction
Martina Stippler

3:15–3:40 pm
Miller Lectureship—Global Neurotrauma Care
Gail L. Rosseau

3:41–4:15 PM
Oral Abstract Presentations

2:45–4:15 pm
(PA) Section on Pain Session: Trigeminal Neuralgia for Residents/Fellows Video 3D
Moderators: Mojgan Hodaie, Mario F. Izurieta-Ulloa, Raymond F. Sekula
Speakers: Ellen L. Air, Andrew W. Grande, Sean J. Nagel, Raymond F. Sekula
Session Description: The treatment of trigeminal neuralgia requires an in-depth understand of the anatomy and the spectrum of treatment options available. This course will look at the relevant anatomical structures and the associated surgical techniques, ranging from microvascular decompression to lesioning.
Learning Objectives:
- Identify the anatomy of the fifth cranial nerve extending from the dorsal root entry zone to the gasserian ganglion
- Know the types of lesioning procedures for trigeminal neuralgia, including indications and techniques
- Identify the surgical technique for an MVD and the nuances associated with a revision MVD

2:45–2:53 pm
3D Anatomy Review
Ellen L. Air

2:54–3:02 pm
Percutaneous Procedures
Andrew W. Grande

3:03–3:11 pm
Gamma Knife
Sean J. Nagel

3:12–3:20 pm
Open Technique
Raymond F. Sekula

3:21–3:29 pm
Revision MVD
Mojgan Hodaie

3:30–4:15 pm
Oral Abstract Presentations

(PE) 2:45–4:15 pm
Section on Pediatric Neurological Surgery: Pediatric Practice Response to the COVID-19 Pandemic
Moderators: Joshua J. Chern, Hugh Garton
Speakers: Michael H. Handler, Mark D. Krieger
Session Description: The hospital and hospital system level response taken by Children's Hospital Systems in response to the COVID-19 pandemic. Neurosurgeons who held senior hospital level positions during 2020 will discuss broader strategies that Children's Hospitals and healthcare systems employed. From a daily practice of pediatric neurosurgery standpoint, COVID may not have had a unique effect relative to adult neurosurgery. However, from a systems standpoint, the perspective was quite distinct. Strategies had to focus more on how an institution could support the medical community, using tools such as opening capacity at community hospitals by accepting older patients or providing information and resources to struggling primary care practices.
Learning Objectives:
- Review existing strategies employed by Children's hospitals to mitigate impact of COVD
- Identify long term impact of COVID on pediatric neurosurgical practice
- Develop approaches to facilitate successful transition to future patient care models

2:45–3:04 pm
Children's Hospital Systems' Response to the COVID-19 Pandemic
Mark D. Krieger

3:05–3:24 pm
Impact of the Covid-19 Pandemic on Healthcare Systems
Michael H. Handler

3:25–3:34 pm
Questions and Discussion

3:35–4:15 pm
Oral Abstract Presentations

(PN) 2:45–4:15 pm
Section on Peripheral Nerves: Recovering Function: Future Perspective
Moderators: Line G. Jacques, Mark A. Mahan
Speakers: Justin M. Brown, Allan D. Levi, Ian Valerio
Session Description: The focus of the session will be on enhancing rehabilitation, recovery and regeneration after peripheral nerve injury. An expert panel of speakers will discuss the state of the are in various aspects of post injury management with an emphasis on future directions in management of peripheral nerve injury. Following this, the oral abstract session will feature presentations on recent advances in the clinical and basic science of peripheral nerve injury.
Learning Objectives:
- Describe the indications and surgical methods for re-establishing neurologic function of the upper extremity after CNS paralysis
- Detail the future for machine-PNS interface after limb loss or other paralyzing injuries

AFTERNOON SESSIONS

- Explain the capacity and future for cell-based therapies for peripheral nerve regeneration

2:45–2:59 pm
Nerve Transfers for Severe Paralyzing Injuries
Justin M. Brown

3:00–3:14 pm
Targeted Muscle Re-innervation: Robotic Limbs
Ian Valerio

3:15–3:29 pm
Restorative Cell Therapies and the Future of Function Restoration
Allan D. Levi

3:30–4:15 pm
Oral Abstract Presentations

SF 2:45–4:15 pm
Section on Stereotactic and Functional Neurosurgery: Current Topics in Movement Disorder DBS

Moderator: Nicole Bentley
Speakers: Kelly D. Foote, Erika A. Petersen, Francisco A. Ponce
Session Description: This session will discuss the current, most relevant topics in movement disorder DBS surgery. Attendees will be able to evaluate the most recent trends in DBS and determine whether to incorporate any into their practice.
Learning Objectives:
- Evaluate the evidence behind directional leads and sensing technology
- Compare outcomes of asleep and awake DBS surgery
- Assess the utility of these modern DBS features for your practice

2:45–2:59 pm
Maximizing the Potential of Directional Leads
Erika A. Petersen

3:00–3:14 pm
Incorporation of Sensing Technology
Kelly D. Foote,

3:15–3:29 pm
Optimizing Asleep DBS
Francisco A. Ponce

3:30–4:15 pm
Oral Abstract Presentations

TU 2:45–4:15 pm
Section on Tumors: Innovations in Adjuvant Therapy for Primary & Metastatic Brain Tumors

Moderators: Betty Y.S. Kim, Pascal O. Zinn
Speakers: Kimberly B. Hoang, Ian Y. Lee, L. Dade Lunsford, Jason P. Sheehan, Adam M. Sonabend
Session Description: This session will address the surgical adjuvant procedures beyond tumor resection that are driven by neurosurgeons within the multi-disciplinary management of primary and metastatic tumors.
Learning Objectives:
- Identify surgical adjuncts that can aid in PFS and OS of patients with brain tumors
- Evaluate the effectiveness of these techniques in comparison to and in conjunction with the standard of care
- Determine appropriateness for application of these techniques within their own practice

2:45–2:47 pm
Introduction of Bitner Lecturer
Jason P. Sheehan

2:48–3:03 pm
Bitner Lecturer
L. Dade Lunsford

3:04–3:12 pm
LITT
Ian Y. Lee

3:13–3:21 pm
FUS
Adam M. Sonabend

3:22–3:30 pm
Brachytherapy
Kimberly B. Hoang

3:31–4:15 pm
Oral Abstract Presentations

OPERATIVE TECHNIQUES AND CASE-BASED DISCUSSION SESSIONS

Submit your cases by **July 15** to be discussed during these sessions.
Visit cns.org/case-based-2021 for details!

SE 4:15–5:45 pm
Financial Planning for Young Neurosurgeons

CNS Wellness and Resilience

Moderator: Stacey Q. Wolfe
Discussants: Chaim B. Colen, Clarence B. Watridge, Sharon W. Webb, Edie E. Zusman
Session Description: This will be a session designed to help neurosurgery residents and young practicing neurosurgeons become financially responsible and savvy as they start the practice portion of their career.
Learning Objectives:
- Identify the importance of financial planning
- Evaluate simple questions such as how to invest, where to invest, when to buy a house/car, who to ask for help
- Analyze how to plan for retirement

4:15–4:19 pm
Welcome and Introduction
Stacey Q. Wolfe

4:20–4:37 pm
Financial Planning – Important Ideas When Starting Practice
Chaim B. Colen

4:38–4:55 pm
How to Manage Debt – Planning for this Early On
Edie E. Zusman

4:56–5:13 pm
Investment Strategies during Your Career – How to Do It and Who Can Help
Sharon W. Webb

5:14–5:31 pm
Planning for Retirement – Early and Late Career Strategies
Clarence B. Watridge

5:15–5:45 pm
Questions and Discussion

CV 4:15–5:45 pm
Multimodality AVM Treatment: Operative Techniques and Case-based Discussions
Moderator: Ketan R. Bulsara
Discussants: Sepideh Amin-Hanjani, Alejandro Berenstein, René Chapot, Robert M. Friedlander, Douglas Kondziolka, Justin R. Mascitelli, Paritosh Pandey, Min S. Park, Adnan H. Siddiqui, Robert M. Starke, Stacey Q. Wolfe
Session Description: Panelists will submit cases to the moderator who will invite each participant to present their case and then guide an interactive discussion between panelists and audience members. Pre-submitted cases will be presented and the audience will vote on diagnosis and treatment. An expert panel will then provide their individual opinions and a re-vote will be taken.
Learning Objectives:
- Compare different modalities in the treatment of AVMS
- Describe indications for transvenous embolization
- Describe evidence for embolization followed by SRS in AVM management

4:15–4:45 pm
Operative Management Case Presentations

4:45–5:15 pm
Transvenous Embolization Case Presentations

5:15–5:45 pm
Stereotactic Radiosurgery Case Presentations

SP 4:15–5:45 pm
Spinal Deformity and MIS Surgery: Operative Techniques and Case-based Discussions
Moderators: Yi Lu, Juan S. Uribe
Speakers: Adam S. Kanter, Jay D. Turner
Discussants: Ali A. Baaj, Jared Fridley, Tyler R. Koski, Justin Slavin, Laura A. Snyder, Luis M. Tumialán
Session Description: As minimally invasive spine surgery techniques continue to evolve, more can be accomplished. In this cases based session, see how spinal deformity can be treated using cutting edge minimally invasive strategies.
Learning Objectives:
- Apply MIS strategies in deformity patients
- Evaluate patients who are potential candidates for MIS deformity correction
- Analyze which patients are not candidates for MIS deformity correction

4:15–4:24 pm
Operative Technique and Video with Clinical Example of ALL Release
Adam S. Kanter

4:25–4:34 pm
MIS TLIF Operative Technique with Video for Treatment of Grade 1 Spondylolisthesis
Jay D. Turner

4:35–5:45 pm
Case-based Discussion

TR 4:15–5:45 pm
Crossfire Debates in Neurotrauma: Operative Techniques and Case-based Discussions
Moderators: Daniel B. Michael, James M. Wright
Discussants: Bizhan Aarabi, Mark R. Harrigan, Zachary L Hickman, Michael McGinity, David O. Okonkwo, Patricia B. Raksin, Christian B. Ricks, Uzma Samadani, Eve C. Tsai, Gregory Weiner
Session Description: The field of neurotrauma is constantly evolving. Management protocols and treatment paradigms, however, still vary among centers, as there is a paucity of level I evidence in the care of patients with traumatic brain and spinal cord injuries. In this session, experts will debate each other over imaging in acute spinal cord injury, use of brain tissue oxygenation in the management of patients with severe TBI, treatment protocols for patients with blunt cerebrovascular injury, early versus late cranioplasty, and early versus late surgery for patients with central cord injury.
Learning Objectives:
- Identify different perspectives when it comes to the management of patients with neurotrauma
- Incorporate various management strategies into their personal practice

4:15–5:04 pm
Debates

5:05–5:45 pm
Case-based Discussion

PA 4:15–5:45 pm
Spinal Cord Stimulation: Operative Techniques and Case-based Discussions
Moderators: Julie G. Pilitsis, Gaddum D. Reddy
Speakers: Steven N. Falowski, Wendell B. Lake, Jason M. Schwalb, Konstantin V. Slavin, Christopher J. Winfree
Session Description: This session will review operative techniques associated with spinal cord stimulation, including complication management. It will also review the business of pain and alternative therapies including marijuana.
Learning Objectives:
- Identify the literature related to spinal cord stimulation and alternative practices
- Define the techniques related to spinal cord stimulation implantation
- Interpret the business of pain

4:15–4:23 pm
Review the Literature that Shows Poor Outcomes/Poor Responders/Placebo Effect
Steven M. Falowski

AFTERNOON SESSIONS

4:24–4:32 pm
Why Does SCS Fail Long Term
Wendell B. Lake

4:33–4:41 pm
Complications and Patient Complaints
Konstantin V. Slavin

4:42–4:50 pm
Cost Analysis
Jason M. Schwalb

4:51–4:59 pm
Alternatives-revision Spine Surgery: Medications and Marijuana
Christopher J. Winfree

5:00–5:45 pm
Case-based Discussion

PE 4:15–5:45 pm
Stereotactic EEG: Operative Techniques and Case-based Discussions
Moderator: Jason S. Hauptman, Matthew D. Smyth
Discussants: Allyson L. Alexander, Robert J. Bollo, Brent R. O'Neill
Session Description: Discussion of cases in which sEEG have been successful as well as those for which it may not be the first-line approach.
Learning Objectives:
- Analyze cases for which sEEG is an ideal option
- Analyze cases for which sEEG may not be first line
- Discuss the strengths and weakness of sEEG in pediatric epilepsy

4:15–5:45 pm
Case-based Discussion

TU 4:15–5:45 pm
Progression Versus Pseudo Progression in GBM: Operative Techniques and Case-based Discussions
Moderators: Brian V. Nahed, Kevin A. Walter
Discussants: Kenneth Aldape, Mitchel S. Berger, Sherise D. Ferguson, Michael E. Ivan, James K. Liu, Jonathan H. Sherman, Viviane S. Tabar
Session Description: Review of cases of progression versus pseudo-progression with management strategies and outcomes.
Learning Objectives:
- Recognize pseudo-progression in clinical practice
- Develop evidence-based strategies for management of pseudo-progression
- Employ repeat surgical resection for cases a real disease progression

4:15–5:45 pm
Discussion of Faculty- and Attendee-submitted Cases
Submit your cases by July 15 to be discussed during these sessions. Visit cns.org/case-based-2021 for details!

SF 4:15–5:45 PM
Epilepsy Case Discussions
Moderators: Dario J. Englot, John D. Rolston
Discussants: Aviva Abosch, Robert E. Gross, Steven N. Roper, David Weintraub
Session Description: Faculty will prepare cases to be discussed with the attendees. Through case discussions, attendees will be exposed to a variety of epilepsy surgery clinical scenarios.
Learning Objectives:
- Discuss multiple options for challenging epilepsy cases
- Incorporate both resective/ablative and neuromodulatory approaches in your epilepsy practice
- Evaluate a variety decision-making approaches in epilepsy surgery

4:15–5:45 pm
Case-based Discussion

PN 4:15–5:45 pm
Peripheral Nerves: Operative Techniques and Case-based Discussion Session
Moderators: Rajiv Midha, Gabriel C. Tender, Eric L. Zager
Discussants: Zarina S. Ali, Mark A. Mahan, Shaun T. O'Leary, Mario G. Siqueira, Thomas J. Wilson, Christopher J. Winfree
Session Description: Peripheral nerve surgery experts will review technical nuances and provide case examples across an array of cases that are critical parts of the peripheral nerve surgeons' armamentarium.
Learning Objectives:
- Compare techniques, risks, and outcomes of different approaches to carpal and cubital tunnel syndromes
- Discuss key techniques in the management of peripheral nerve tumors
- Review differences in outcomes for neurectomy versus decompression for meralgia paresthetica

4:15–5:45 pm
Case-based Discussion

Submit your cases by **July 15** to be discussed during these sessions.
Visit cns.org/case-based-2021 for details!

NEUROSURGERY RESIDENCY FAIR
We invite all medical students to attend the new Neurosurgery Residency Fair on **Monday, October 18, from 5:45–7:45 pm.** You will have the opportunity to interact with representatives from residency programs in the United States and network with other medical students. Watch for more details on this exciting opportunity!

SUBSPECIALTY SESSION HIGHLIGHTS KEY

AP ADVANCED PRACTICE PROVIDER	PN PERIPHERAL NERVES	TR NEUROTRAUMA
CV CEREBROVASCULAR	RE RESIDENT	TU TUMOR
GE GENERAL	SE SOCIOECONOMIC	WI WOMEN IN NEUROSURGERY
PA PAIN	SF STEREOTACTIC AND FUNCTIONAL	
PE PEDIATRIC	SP SPINE	

INTERNATIONAL SYMPOSIA

MONDAY, OCTOBER 18 | 5:45–7:15 pm

International Symposium I: Cerebrovascular and Endovascular Neurosurgery

Moderators: Monika Killer, Miikka Korja
Speakers: Matteo Baccanelli, Daniel L. Barrow, Feres E.A. Chaddad Neto, Rose Du, Eberval G. Figueiredo, Akira Ishii, Hiroharu Kataoka, Kouichi Misaki, Laurent Pierot
Session Description: This session is part of the international symposia and gives a platform for renown international and domestic faculty to share viewpoints and updates concerning the management and surgical or endovascular treatment of patients with cerebrovascular diseases. A best international paper award will be given and discussed.
Learning Objectives:

- Illustrate the different challenges facing cerebrovascular neurosurgeons in different countries globally
- Discuss different approaches to contemporary cerebrovascular problems and patients
- Review strategies to achieve high-quality outcomes and minimize morbidity and mortality in cerebrovascular patients

5:45–5:54 pm
Best International Cerebrovascular Paper Award—Aneurysm Treatment with Woven EndoBridge in the Cumulative Population of 3 Prospective, Multicenter Series: 2-Year Follow-Up
Laurent Pierot

5:55–5:59 pm
Paper Discussion
Rose Du

6:00–6:09 pm
The Risk of Small Aneurysms
Hiroharu Kataoka

6:10–6:19 pm
Blood Blister-Like Aneurysms
Feres E.A. Chaddad Neto

6:20–6:29 pm
Giant Aneurysms
Akira Ishii

6:30–6:39 pm
Advances in Bypass Surgery
Eberval G. Figueiredo

6:40–6:49 pm
Surgical Treatment of Spinal Circulation Aneurysms
Matteo Baccanelli

6:50–6:59 pm
Advances in Endovascular Techniques
Kouichi Misaki

7:00–7:09 pm
Equipoise and the Treatment of Unruptured Aneurysms—Lessons Learned
Daniel L. Barrow

7:10–7:15 pm
Questions and Conclusion

International Symposium II: Neurooncology and Skullbase

Moderators: John A. Boockvar, Mahua Dey
Speakers: Miguel A. Arraez, Cesar Chong, Giuseppe Cinalli, Hugues Duffau, Allan H. Friedman, Mariangela B. Gonçalves, Rachel Grossman, Manabu Kinoshita, Mitsutoshi Nakada
Session Description: This session is part of the international symposia and gives a platform for renown international and domestic faculty to share viewpoints and updates concerning the management and surgical treatment of patients with skullbase, extra- and intraaxial tumors. A best international paper award will be given and discussed.
Learning Objectives:

- Illustrate the different challenges facing neurosurgeons focused on oncology and skullbase in different countries globally
- Discuss different approaches to contemporary neurooncologic and skullbase problems and patients
- Review strategies to achieve high-quality outcomes and minimize morbidity and mortality in neuro-oncology and skullbase patients

5:45–5:54 pm
Surgical Approaches for Anterior Cranial Fossa Meningiomas
Cesar Chong

5:55–6:04 pm
Awake Brain Tumor Surgery
Mitsutoshi Nakada

6:05–6:14 pm
Best Neurooncology International Paper Award—Comparison of Motor Outcome in Patients Undergoing Awake Versus General Anesthesia Surgery for Brain Tumors Located Within or Adjacent to the Motor Pathways
Rachel Grossman

6:15–6:19 pm
Paper Discussion
Hugues Duffau

6:20–6:29 pm
A Life in Tumor Neurosurgery
Allan H. Friedman

6:30–6:39 pm
Advances in the Treatment of Malignant Brain Tumors
Manabu Kinoshita

6:40–6:49 pm
Clival Chordoma: Microsurgery Versus Endoscopy
Miguel A. Arraez

6:50–6:59 pm
Intraventricular Tumors
Giuseppe Cinalli

7:00–7:09 pm
Advances in the Treatment of Benign Brain Tumors
Mariangela B. Gonçalves

7:10–7:15 pm
Questions and Conclusion

INTERNATIONAL SYMPOSIA

SP International Symposium III: Spinal Neurosurgery

Moderators: Aneela Darbar, Marisa Luisa Gandía González
Speakers: Giuseppe Barbagallo, Nicolas Dea, Michael G. Fehlings, Atul H. Goel, Shrinivas Mahadeo Rohidas, Natarajan Muthukumar, Julio Pozuelos, Jose A. Soriano-Sanchez, Claudio G. Yampolsky
Session Description: This session is part of the international symposia and gives a platform for renown international and domestic faculty to share viewpoints and updates concerning the management and surgical treatment of patients with spinal disorders. A best international paper award will be given and discussed.
Learning Objectives:

- Illustrate the different challenges facing neurosurgeons focused on spinal disorders in different countries globally
- Discuss different approaches to contemporary spine problems and patients
- Review strategies to achieve high-quality outcomes and minimize morbidity and mortality in spine patients

5:45–5:54 pm
Modified Lumbar TLIF Approach
Julio Pozuelos

5:55–6:04 pm
Craniovertebral Junction Surgery
Atul H. Goel

6:05–6:14 pm
Pediatric Spine
Natarajan Muthukumar

6:15–6:24 pm
Best Spine International Paper Award—Metastatic Spine Disease: Should Patients with Short Life Expectancy Be Denied Surgical Care? An International Retrospective Cohort Study
Nicolas Dea

6:25–6:29 pm
Paper Discussion
Giuseppe Barbagallo

6:30–6:39 pm
Update on Spinal Cord Recovery
Michael G. Fehlings

6:40–6:49 pm
Primary Spinal Tumors: Multidisciplinary Approach or MIS Approach in Spinal Mets
Claudio G. Yampolsky

6:50–6:59 pm
FLANC Presidential Address
Jose A. Soriano-Sanchez

7:00–7:09 pm
Endoscopic Spine Surgery
Shrinivas Mahadeo Rohidas

7:10–7:15 pm
Questions and Conclusion

DINNER SEMINAR II | MONDAY, OCTOBER 18 | 7:30–9:30 pm

$225 (includes three-course dinner and beverages) | Advance registration recommended

SP Navigation and Robotics: Fad or Future?

Moderators: Paul Park, Mark E. Shaffrey
Speakers: Joseph S. Cheng, Robert E. Isaacs, J. Patrick Johnson, Christopher M. Maulucci, Nicholas Theodore, Michael Y. Wang
Seminar Description: What is the current state of spine navigation and robotics? See what leaders in spine surgery have to say, with opinions ranging from those who do not feel navigation or robots are helpful to those who feel that robots will be the standard of care in the future.
Learning Objectives:

- Evaluate when navigation can be used during spine surgery
- Demonstrate to their respective institutions the benefits of navigation and robotics
- Compare the benefits and risks of surgery with and without navigation and robotics

7:30–7:49 pm
I Get Along Fine Without Navigation or Robotics; It's All Fluff
Joseph S. Cheng

7:50–8:09 pm
Navigation for Spine Surgery Is the Standard of Care
J. Patrick Johnson



8:10–8:29 pm
Navigation Is Reasonable, But Robotics Is Overkill
Robert E. Isaacs

8:30 PM–8:49 pm
The Spine Robot Is a Key Tool for MIS Spine Surgery
Michael Y. Wang

8:50–9:09 pm
With Practice and the Right OR Team, Robots Can Save Valuable OR Time for All Fusions
Nicholas Theodore

9:10–9:30 pm
Only Scoliosis and Revision Spine Fusions are Good Cases for Robotics
Christopher M. Maulucci

Truluck's | 400 Colorado Street, Austin, TX
Dining at Truluck's is a celebration for the senses. Enjoy the captivating ambience and genuine Southern Hospitality. Housed in a beautifully remodeled building in the Warehouse District, Truluck's is known for fresh seafood and outstanding service. Truluck's has been chosen a Top 100 Restaurant in America on OpenTable.
Complimentary shuttle service will depart from the JW Marriott Austin at 7:15 pm.

SUNRISE SCIENCE AND GUIDELINES

TUESDAY, OCTOBER 19

TR **Sunrise Science Abstract Session III**
Moderators: Robert H. Bonow, Gary Schwartzbauer

SF **Sunrise Science Abstract Session IV**
Moderators: Hui Ming Khoo, Peter Konrad

TU **Sunrise Science Abstract Session V**
Moderators: Chetan Bettegowda, Toral R. Patel

7:00–8:30 am
Learning Objectives:
- Analyze the findings of novel neurosurgical studies, critique the design and methodology
- List important areas for further knowledge development and research
- Identify the most important ongoing clinical trials
- Apply lessons of ongoing research to neurosurgical care of patients

SP 7:00–8:30
Lumbar Fusion Guidelines
Moderators: Erica F. Bisson, John E. O'Toole, Marjorie C. Wang
Speakers: Tanvir Choudhri, Domagoj Coric, Andrew T. Dailey, Zoher Ghogawala, Michael G. Kaiser, Adam S. Kanter, Daniel K. Resnick, Michael P. Steinmetz
Session Description: This session will overview the current guidelines for the performance of fusion procedures for degenerative disease of the lumbar spine. Faculty will discuss evidence related to clinical and diagnostic measures, surgical techniques, and relevant clinical and radiographic outcomes.
Learning Objectives:
- Discuss clinical and diagnostic measures for determining indications for lumbar fusion
- Discuss the role of decompression alone versus decompression and fusion for lumbar degenerative conditions
- Discuss relevant clinical and radiographic outcomes associated with various surgical options for lumbar degenerative conditions

7:00–7:09 am
Lumbar Fusion for Intractable Low-back Pain Without Stenosis or Spondylolisthesis
Michael P. Steinmetz

7:10–7:19 am
Lumbar Fusion for Disc Herniation and Radiculopathy
Domagoj Coric

7:20–7:29 am
Lumbar Fusion for Stenosis with Spondylolisthesis
Zoher Ghogawala

7:30–7:39 am
Lumbar Fusion for Stenosis without Spondylolisthesis
Daniel K. Resnick

7:40–7:49 am
Interbody Techniques for Lumbar Fusion
Adam S. Kanter

7:50–7:59 am
Injection Therapies, Low-back Pain, and Lumbar Fusion
Andrew T. Dailey

8:00—8:09 am
Electrophysiological Monitoring and Lumbar Fusion
Michael G. Kaiser

8:10–8:19 am
Bone Graft Extenders and Substitutes as an Adjunct for Lumbar Fusion
Michael W. Groff

8:20—8:29 am
Bone Growth Stimulators as an Adjunct for Lumbar Fusion
Tanvir Choudhri

8:30 am
Session Conclusion

CV 7:00–8:30 am
Cerebrovascular Guidelines: Aneurysms, Arteriovenous Malformations, and Acute Ischemic Stroke
Moderators: Joshua W. Osbun, Deanna M. Sasaki-Adams
Speakers: Felipe Albuquerque, Eric J. Arias, Kathleen Dlouhy, Bradley A. Gross, Brian T. Jankowitz, Michael J. Lang, Michael R. Levitt, Ben Waldau
Session Description: A diverse and experienced panel of leaders in cerebrovascular neurosurgery will provide an overview of the most current guidelines in the neurosurgical treatment of brain aneurysms, brain arteriovenous malformations, and acute ischemic stroke.
Learning Objectives:
- Identify the current guidelines for the treatment of brain aneurysms
- Identify the current guidelines for the treatment of AVMs
- Identify the current guidelines for the neurosurgical treatment of acute ischemic stroke

7:00–7:29 am
Guidelines for the Treatment of Cerebral Arteriovenous Malformations

7:00–7:09 am
Natural History and Management of Unruptured AVMs
Felipe Albuquerque

7:10–7:19 am
Management of Ruptured AVMs
Ben Waldau

7:20–7:29 am
Management of Dural AVFs
Bradley A. Gross

SUNRISE SCIENCE AND GUIDELINES

7:30–7:49 am
Guidelines for the Treatment of Cerebral Aneurysms

7:30–7:39 am
Screening, Natural History, and Medical Management of Cerebral Aneurysms
Michael R. Levitt

7:40–7:49 am
Indications and Outcomes of Operative/Endovascular Treatment of Cerebral Aneurysms
Michael J. Lang

7:50–8:19 am
Guidelines for the Management of Ischemic and Hemorrhagic Stroke

7:50–7:59 am
Guidelines for the Neurosurgical Treatment of Acute Ischemic Stroke: Update on Trials
Kathleen Dlouhy

8:00–8:09 am
Guidelines for the Neurosurgical Treatment of Spontaneous Intracerebral Hemorrhage
Brian T. Jankowitz

8:10–8:19 am
Guidelines for the Rehabilitation of Patients Recovering from Severe Stroke
Eric J. Arias

8:20–8:30 am
Questions and Discussion



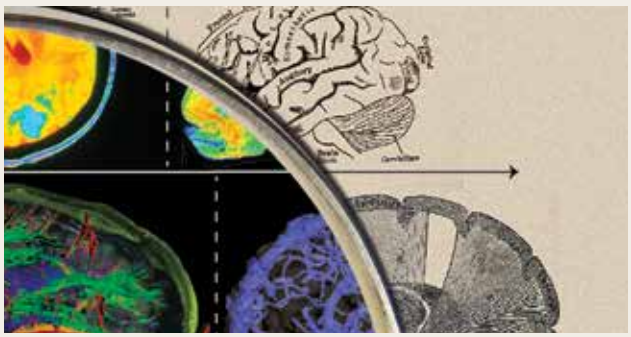
SUBSPECIALTY SESSION HIGHLIGHTS KEY		
AP ADVANCED PRACTICE PROVIDER	PN PERIPHERAL NERVES	TR NEUROTRAUMA
CV CEREBROVASCULAR	RE RESIDENT	TU TUMOR
GE GENERAL	SE SOCIOECONOMIC	WI WOMEN IN NEUROSURGERY
PA PAIN	SF STEREOTACTIC AND FUNCTIONAL	
PE PEDIATRIC	SP SPINE	

GENERAL SCIENTIFIC SESSION III

TUESDAY, OCTOBER 19
8:40 am–12:10 pm

Presiding Officer: Nicholas C. Bambakidis
Moderators: Lola B. Chambless, Clemens M. Schirmer
Learning Objectives:

- Discuss the neurosurgeon as a professional
- Summarize key evidence-based advances in the management of chiari malformations
- Describe how the use of smarter machines can boost human creativity, satisfaction and performance





8:40–9:10 am
2021 HONORED GUEST PRESENTATION
William A. Friedman

9:10–9:12 am
Introduction of Garry Kasparov
Garni Barkhoudarian



9:13 am–9:40 am
CNS MICHAEL L. J. APUZZO LECTURER ON CREATIVITY AND INNOVATION
The Future of Augmented Intelligence: How Smarter Machines Can Boost Human Creativity, Satisfaction, and Performance
Garry Kasparov

9:40–10:40 am
MORNING BEVERAGE BREAK
Visit the Exhibit Hall

10:00–10:30 am
LIVE SURGERY IN THE EXHIBIT HALL

10:40–10:44 am
Introduction of the 2021 CNS President
Daniel J. Hoh



10:45–11:07 am
2021 PRESIDENTIAL ADDRESS
Brian L. Hoh

11:08–11:10 am
Introduction of Featured Speaker

11:10 am–12:10 pm
FEATURED SPEAKER

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Tumor Section Symposium | October 15–16 | cns.org/tumor

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CNS Members join us for free in Austin! Register at cns.org/2021 by September 15!

LUNCHEON SEMINARS

TUESDAY, OCTOBER 19 | 12:15–1:45 pm

All Seminars include lunch.
Luncheon Seminar fee is $125 each ($100 for residents, fellows, medical students, and advance practice providers)

RE T14: Honored Guest Luncheon

**Advance registration recommended. Complimentary for Resident and International Vista Resident Members!*
Speaker: Bob S. Carter
Learning Objectives:
- Describe the evolution of brain tumor surgery throughout the Honored Guest's career
- Discuss the role of academic neurosurgery in neurosurgical oncology
- Discuss the future of neurosurgical oncology care

TU T15: Management of Sellar and Parasellar Lesions: Unexpected Pathologies and Treatment Strategies

Moderators: Manish Aghi., Manuel Ferreira
Faculty: Pamela S. Jones, Daniel F. Kelly, Kalmon D. Post, Daniel M. Prevedello, Theodore H. Schwartz, Georgios A. Zenonos
Seminar Description: Case-based review of the less common pathologies of the sellar/parasellar regions.
Learning Objectives:
- Identify atypical lesions of the sellar/parasellar regions based on imaging and/or clinical history
- Compare the management of those lesions to those of standard non-functioning adenomas
- Apply critical analysis of atypical sellar/parasellar lesions to their own practice

NEW! TR T16: Global Neurosurgery Update Experience and How to Get Involved

Moderators: Andres M. Rubiano, Sarah Woodrow
Faculty: Christopher M. Bonfield, Idara J. Edem, Basant K. Misra, Kee B. Park, Jogi V. Pattisapu, Gail L. Rosseau
Seminar Description: Thirty percent of the global disease burden is caused by surgically treatable disease. Death from traumatic brain injury in low- to middle-income countries is one of the greatest health care disparities between high- and low- to middle-income countries. With raising rates of motorization in these countries, the problem is going to get worse. This course will highlight global neurotrauma disease burden.
Learning Objectives:
- Apply newly gained knowledge to start their own global neurotrauma program
- Identify what is needed to develop or get involved in a global neurotrauma program
- Identify the pitfalls on global neurosurgery initiatives

NEW! SE T17: Neurosurgical Contracts—How to Get What You Want

CNS Wellness and Resilience

Moderators: Joseph S. Cheng, Jeremy T. Phelps
Faculty: Jay T. Barnes, Troy D. Payner, Michael P. Steinmetz, Sherry L. Taylor, Edie E. Zusman
Seminar Description: This seminar will provide an overview of what to ask for, decide what your deal-breakers are, and how to get what you want without appearing greedy. The nuanced differences between a first and second contract will also be discussed.
Learning Objectives:
- Demonstrate how to properly evaluate a contract
- Determine what your deal-breakers are for the contract
- Analyze how to get what you want without appearing greedy

NEW! PE T18: Transnasal Endoscopic Neurosurgery in Pediatric Patients

Moderator: Phillip B. Storm
Faculty: Samer K. Elbabaa, Gerald A. Grant, Todd C. Hankinson, John A. Jane, Robert P. Naftel, Elizabeth C. Tyler-Kabara
Seminar Description: Discussion of the unique aspects of pediatric pathology and anatomy as they impact the use of Transnasal Endoscopic Neurosurgical Procedures.
Learning Objectives:
- Compare the use of transnasal versus transcranial approaches to specific case types
- Evaluate when to use transnasal approaches in their practice
- Design the team that is most likely to participate in transnasal surgery in their institution

NEW! SP T19: SI Joint Fusion: Indications, Technique, and Outcomes

Moderator: Paul Park
Faculty: Thomas B. Freeman, Kai-Ming G. Fu, Peter M. Grossi, Joshua E. Heller, Yi Lu
Seminar Description: Diagnosis of SI joint dysfunction is increasing, and SI fusion is increasing. This course will go over the procedure's indications, techniques, and outcomes.
Learning Objectives:
- Define appropriate pre-surgical evaluation, including diagnostic studies
- Describe the surgical technique of SI joint fusion
- Identify outcomes and complications following SI joint fusion

SP T20: Peak Performance: Optimizing the Spine Surgical Patient from Pre-op to Post-op

Moderator: Neil R. Malhotra
Faculty: Christopher M. Holland, John J. Knightly, John K. Ratliff, Laura A. Snyder, Marjorie C. Wang, Robert G. Whitmore
Seminar Description: This seminar will explore various approaches for optimizing spine surgical patients from prior to surgery through the perioperative and postoperative period. Faculty will discuss methods for identifying the high-risk patient and strategies for complication avoidance and enhancing patient outcomes.
Learning Objectives:
- Discuss approaches for identifying high-risk spine surgical patients
- Describe strategies for medical optimization of spine surgical patients from prior to surgery through the perioperative period
- Discuss the impact of medical optimization on complication avoidance and improved patient outcomes

NEW! CV SF T21: Robotic Approaches in Endovascular Neurosurgery

Moderators: Pascal Jabbour, Ben Waldau
Faculty: Gavin W. Britz, Rohan V. Chitale, Vitor Mendes Pereira, Aquilla S. Turk
Seminar Description: This luncheon seminar will focus on the current progress in robotic endovascular catheterization. The safety of robotic systems for neurovascular indications will be discussed with data from animal labs, and body IR interventionalists will share their experiences in patients. Recent progress in human cerebrovascular catheterization will be covered.
Learning Objectives:

- Describe current applications for the use of robotics in the treatment of cerebrovascular disease
- Compare available robotic catheterization systems
- Discuss future applications of robotic systems in the treatment of cerebrovascular disease

TU T22: Modern Management of Low-Grade Gliomas

CNS | SANS Lifelong Learning

Moderators: Daniel P. Cahill, Viviane S. Taber
Faculty: Yoshua Esquenazi, Ashley Ghiaseddin, Shawn L. Hervey-Jumper, Jennifer A. Moliterno Gunel
Seminar Description: This seminar will describe recent advance in the understanding molecular and radiographic features of diffuse lower grade gliomas. The influence of surgical resection on patient outcomes will be discussed.
Learning Objectives:

- Demonstrate the impact of tumor genetic alterations on patient outcomes in diffuse gliomas
- Analyze and compare feasibility of—and clinical outcomes associated with—supratotal, gross total, and subtotal resection of diffuse low-grade gliomas
- Design effective surgical strategies that incorporate genetic alterations and preoperative resection goals in your practice

NEW! CV T23: Virtual and Augmented Reality in Neurosurgery

Moderators: Brian M. Howard, Nina Z. Moore
Faculty: Joshua B. Bederson, Samuel R. Browd, Juan C. Fernandez-Miranda, Neil A. Martin, Adnan H. Siddiqui
Seminar Description: Augmented and virtual reality have enormous potential to transfer the way we train neurosurgeons and perform surgery. Experts discuss current applications of this technology.
Learning Objectives:

- Describe the role of VR/AR in training
- Discuss the value of AR in microsurgery
- Evaluate the value of VR in performing digital neurosurgery

GE CV T24: Social Media Use in Neurosurgical Practice: Showboating or Real Value

Moderator: Dimitri Sigounas
Faculty: Kyle M. Fargen, Pascal Jabbour, David J. Langer, Joseph R. Linzey, Erika A. Petersen, Walavan Sivakumar
Seminar Description: The use of social media by physicians is increasingly prominent and both social and official guidelines surrounding its use trail actual practice. In this seminar, experts discuss various uses for social media and good practice regarding its use.
Learning Objectives:

- Describe current applications of social media in neurosurgery
- List good practice rules regarding the use of social media in neurosurgery
- Discuss positive and negative implications of the use of social media in neurosurgical practice

1:00–2:45 pm
NEUROSURGERY® Publications Editorial Roundtable
The Roundtable will feature the Editors-in-Chief of several leading subspecialty journals. Panelists will discuss the current scholarly publishing landscape with a particular focus on Open Access and Plan S, Multimedia Functions and Novel Content Delivery, Preprint Archives, and Predatory Publishing. The Roundtable discussion will be followed by a Q&A with the audience.

Featured publications include:
Global Spine Journal, Jeffrey C. Wang
Journal of NeuroInterventional Surgery, Felipe C. Albuquerque
Journal of Neuro-Oncology, Jason Sheehan
NEUROSURGERY® Publications, Nelson M. Oyesiku
Stereotactic and Functional Neurosurgery, Andres M. Lozano

1:45–2:45 pm
AFTERNOON BEVERAGE BREAK
Visit the Exhibit Hall

1:45–2:45 pm
CNS RESIDENT SANS CHALLENGE CHAMPIONSHIP ROUND



2:00–2:45 pm
ANNUAL BUSINESS MEETING
Plan to attend the Annual Business Meeting to hear an update on CNS business from the past year. CNS members will have the opportunity to vote on any proposed bylaws amendments.

CNS | SANS Lifelong Learning *Look for this image for a SANS exam that accompanies this course and can be purchased on the Annual Meeting registration site.*

AFTERNOON SESSIONS

TUESDAY, OCTOBER 19

SECTION SESSIONS

SE 2:45–4:15 pm

Council of State Neurosurgical Societies: Cutting Costs and Maximizing Quality

Moderators: Daniel K. Fahim, Corinna C. Zygourakis
Speakers: Deborah L. Benzil, Bharat Guthikonda, Jeremy T. Phelps
Session Description: This session will identify how to maximize your income by optimizing your collection of profit while minimizing your costs/expenses.
Learning Objectives:

- Identify common sources of waste in neurosurgery
- Evaluate better ways to minimize costs in neurosurgery
- Apply these techniques to maximize profits

2:45–2:59 pm
Maximizing Take Home Revenue
Jeremy T. Phelps

3:00–3:14 pm
Measuring Quality
Deborah L. Benzil

3:15–3:29 pm
Quantifying OR Costs
Bharat Guthikonda

3:30–4:15 pm
Oral Abstract Presentations

CV 2:45–4:15 pm

Section on Cerebrovascular Surgery: Advanced Aneurysm Treatment Techniques

Moderators: Dale Ding, Jonathan A. Grossberg
Speakers: Adam S. Arthur, David M. Hasan, Peter K. Nelson, Clemens M. Schirmer, Peter Vajkoczy, Ajay K. Wakhloo
Session Description: Discussion of endovascular and open cerebrovascular techniques in treatment of challenging aneurysms. Master surgeons and interventionalists will debate the merits of each modality and how to best incorporate each option in optimizing outcomes.
Learning Objectives:

- Describe indications for open and endovascular management of intracranial aneurysms
- Compare parent vessel and intrasaccular flow diversion
- Discuss novel devices recently available and on the horizon for the treatment of complex intracranial aneurysms

2:45–2:53 pm
Intrasaccular Flow Diversion
Adam S. Arthur

2:54–3:02 pm
Development of the Flow Diverter
Ajay K. Wakhloo

3:03–3:11 pm
Next Generation Flow Diversion
Peter K. Nelson

3:12–3:20 pm
Medical Treatment of Aneurysms
David M. Hasan

3:21–3:29 pm
Minimally Invasive Craniotomy
Clemens M. Schirmer

3:30–3:33 pm
Drake Lecturer Introduction
Clemens M. Schirmer

3:34–3:49 pm
Drake Lecture
Peter Vajkoczy

3:50–4:15 pm
Oral Abstract Presentations

SP 2:45–4:15 pm

Section on Disorders of the Spine and Peripheral Nerves: Didactics

Moderators: Erica F. Bisson, Dean Chou, Yi Lu, Scott A. Meyer, Hesham M. Soliman
Speakers: Sanjay S. Dhall, Zoher Ghogawala, Michael G. Kaiser, Daniel C. Lu, Praveen V. Mummaneni
Session Description: In this session, faculty will incorporate a case-based format for discussing complex spinal pathologies and assess various treatment strategies with respect to patient outcome.
Learning Objectives:

- Discuss current concepts regarding the management of complex spinal pathologies
- Compare various spine surgical treatment strategies with respect to patient outcome
- List important areas for further knowledge development and research

2:45–2:49 pm
Case-cervical SCI
Daniel C. Lu

2:50–2:58 pm
Ultra-early Surgery for SCI Improves Outcomes
Sanjay S. Dhall

2:59–3:06 pm
Start with ICU Care and Proceed to Surgery Within 24 Hours
Dean Chou

3:07–3:11 pm
Case-CSM Patient
Michael G. Kaiser

3:12–3:20 pm
Laminoplasty Is a Superior Approach for CSM
Zoher Ghogawala

3:21–3:29 pm
Fusion, Either Anterior and Posterior Yields Superior Alignment Outcomes
Praveen V. Mummaneni

3:30–4:15 pm
Oral Abstract Presentations

TR 2:45–4:15 pm

Section on Neurotrauma and Critical Care Session

Moderators: James M. Ecklund, Laura B. Ngwenya
Discussants: Randy S. Bell, Geoffrey T. Manley

Session Description: Presentation of the best abstracts in neurotrauma and critical care research.
Learning Objectives:
- Apply current approaches to outcome prediction to your TBI patients
- Analyze the nuances of goal-of-care discussion and how they can shape your TBI patient care
- Compare ethical considerations, clinical uncertainties and family expectations in TBI care

2:45–3:15 pm
Oral Abstract Presentations

3:16–3:43 pm
How Do We Know Whom We Can Save? A Panel Discussion
Moderator: Kimberly P. Kicielinski
Discussants: Randy S. Bell, Geoffrey T. Manley, Sarah T. Menacho

3:44–4:15 pm
Oral Abstract Presentations

PA 2:45–4:15 pm
Section on Pain Session: Off-Label Therapies for Atypical Facial Pain
Moderators: Ahmed M.T. Raslan, Ajmal Zemmar
Speakers: Rushna Ali, Nadan P. Lad, Ashwini D. Sharan, Jennifer A. Sweet
Session Description: The treatment of various head and facial pain syndromes including occipital neuralgia, trigeminal neuropathic pain, and deafferentation pain requires a thoughtful approach to the armamentarium of available surgical options. This course will look at the relevant anatomical structures and the associated surgical techniques, ranging from peripheral and cortical stimulation to lesioning.
Learning Objectives:
- Identify the anatomy of the occipital nerves and their origin off the C2/3 ganglia, the trigeminal nerve branches and their origin off the brainstem, and the facial region of the motor cortex
- Know the types of lesioning and stimulation procedures for occipital neuralgia, trigeminal neuropathic pain, and deafferentation pain

2:45–2:53 pm
C2 Ganglionectomies
Ahmed M.T. Raslan

2:54–3:02 pm
Occipital Nerve Stimulation
Jennifer A. Sweet

3:03–3:11 pm
Nucleus Caudalis Drezotomy
Nadan P. Lad

3:12–3:20 pm
Supraorbital/Infraorbital Nerve Stimulation
Ashwini D. Sharan

3:21–3:29 pm
Motor Cortex Stimulation
Rushna Ali

3:30–4:15 pm
Oral Abstract Presentations

PE 2:45–4:15 pm
Section on Pediatric Neurological Surgery: Transition of Care for Young Adults and Adolescents with Pediatric Neurosurgical Conditions
Moderators: Philipp R. Aldana, Brandon G. Rocque
Speakers: Mark G. Hamilton, Betsy D. Hopson
Session Description: Discussion and introduction to the population of patients who face transition from the pediatric to adult healthcare setting; challenges associated with this transition; and methods being employed to maximize the likelihood of success.
Learning Objectives:
- Discuss challenges that are unique to the care of young adult patients with chronic pediatric neurosurgical conditions
- Identify some of the existing strategies used to help young adults transition from the pediatric to adult health care setting
- Develop approaches to facilitate successful transitions of care

2:45–3:14 pm
An Evidence-based, Individualized Treatment Plan for Young Adults with Spina Bifida
Betsy D. Hopson

3:15–3:19 pm
Questions and Discussion

3:20–3:32 pm
Developing a Transition Program in Calgary, Alberta
Mark G. Hamilton

3:33–4:15 pm
Oral Abstract Presentations

SF 2:45–4:15 pm
Section on Stereotactic and Functional Neurosurgery: Neuromodulation in Epilepsy
Moderators: Jason L. Gerrard, Mariel Szapiel
Speakers: S. Kathleen Bandt, Bradley Lega, Guy M. McKhann
Session Description: This session will cover modern approaches to epilepsy surgery, focusing on neuromodulatory approaches. Topics span patient selection to combination therapies for challenging patients.
Learning Objectives:
- Evaluate currently used neuromodulation techniques and their pros and cons
- Evaluate patients for suitability for one or more of these approaches
- Demonstrate the ability to use neuromodulation approaches in combination with other traditional approaches

2:45–2:59 pm
Patient Selection (VNS Versus RNS Versus DBS)
Bradley Lega

3:00–3:14 pm
Using Intracranial EEG to Guide Neuromodulatory Therapy
S. Kathleen Bandt

3:15–3:29 pm
Combining Neuromodulation with Resection/Ablation
Guy M. McKhann

3:30–4:15 pm
Oral Abstract Presentations

AFTERNOON SESSIONS

TU 2:45 PM–4:15 PM

Section on Tumors: Improving Outcomes in Patients with Brain Tumors

Moderators: Carolina G. Benjamin, Analiz Rodriguez
Speakers: Michael J. Link, Marcos Maldaun, Timothy R. Smith, Isaac Yang
Session Description: This session will investigate the limitations to achieving good outcomes in patients with malignant and benign brain tumors. Speakers will discuss healthcare disparities, challenges in diagnosis and treatment, quality improvement initiatives, and attempts to measure quality of life in patients with brain tumors.
Learning Objectives:

- Evaluate the socioeconomic and racial limitations for providing quality care for patients with brain tumors
- Compare and analyze treatment strategies to improve clinical outcomes and quality of life
- Demonstrate the impact of regional resources on patient outcomes in the U.S. and other countries

2:45–2:55 pm
Quality Initiatives
Michael J. Link

2:56–3:06 pm
Population Health
Timothy R. Smith

3:07–3:17 pm
Disparities in Care
Isaac Yang

3:18–3:28 pm
International Experience
Marcos Maldaun

3:29–4:15 pm
Oral Abstract Presentations

OPERATIVE TECHNIQUES AND CASE-BASED DISCUSSION SESSIONS

Submit your cases by **July 15** to be discussed during these sessions.
Visit cns.org/case-based-2021 for details!

SE 4:15–5:45 pm

CSNS: Neurosurgery as Authors–Alternate Career?

Moderator: Alan M. Scarrow
Discussants: Katrina S. Firlik, Mark Greenberg, Allan J. Hamilton, Richard P. Menger, Gary R. Simonds
Session Description: This session will provide insight from neurosurgical authors on how to convert an idea into a finished book (including neurosurgical books, non-fiction books, and fiction books), how to pitch your idea to a publishing company, how to obtain funding, and how to protect your intellectual property.
Learning Objectives:

- Identify the process of the journey from idea to finished book product
- Compare different publishing options
- Protect intellectual property

4:4:15–4:19 pm
Welcome and Introduction
Alan M. Scarrow

4:20–4:34 pm
How to Get Started – Converting an Idea into a Finished Book
Katrina S. Firlik

4:35–4:49 pm
Publishing Options in 2021
Richard P. Menger

4:50–5:04 pm
Protecting Intellectual Property
Gary R. Simmonds

5:05–5:19 pm
How to Maintain Interest with Recurring Volumes – Lessons from Greenberg
Mark S. Greenberg

5:20–5:34 pm
Philosophical Writing – Writing About Our Experiences to A Neurosurgical Audience
Allan J. Hamilton

5:35–5:45 pm
Question and Answer

CV 4:15–5:45 pm

Aneurysm Treatment: Operative Techniques and Case-based Discussions

Moderator: Joshua W. Osbun
Discussants: Miki Fujimura, Louis J. Kim, Deanna M. Sasaki-Adams, Justin A. Singer, Babu G. Welch, Stacey Q. Wolfe
Session Description: Pre-submitted cases will be presented, and the audience will vote on diagnosis and treatment. An expert panel will then provide their individual opinions and a re-vote will be taken.
Learning Objectives:

- Identify the role of microsurgery in aneurysm treatment
- Identify the role of embolization in aneurysm treatment
- Identify the role of observation in aneurysm treatment

4:15–4:45 pm
Open Surgical Management Case Presentations

4:45–5:15 pm
Endovascular Management Case Presentations

5:15–5:45 pm
Complex Management Case Presentations

SP 4:15–5:45 pm

Management of Osteoarthritis and Discitis: Operative Techniques and Case-based Discussions

Moderators: Charles A. Sansur, Hesham M. Soliman
Speakers: Kenneth M. Crandall, Rod J. Oskouian
Discussants: Kai-Ming G. Fu, Alia M. Hdeib, Isaac O. Karikari, Eric A. Potts, Chun-Po Yen
Session Description: Treatment of non-iatrogenic spine infection is controversial. The standard of care varies and often depends on the unique circumstances of each patient. This session will serve to shed light on how these difficult cases should be managed through a broad spectrum of case examples.
Learning Objectives:

- Demonstrate indications for surgery in patients with non-iatrogenic spine infections
- Evaluate which patients are best served by medical management alone
- Evaluate which patients should have fusion

4:15–4:24 pm
Operative Technique for Treatment of Thoracic Kyphosis Secondary to Progressive Thoracic Vertebral Osteomyelitis
Kenneth M. Crandall

4:25–4:34 pm
Operative Technique for Treatment of Lumbar Diskitis with Review of Indications
Rod J. Oskouian

4:35–5:45 pm
Case-based Discussion

TR 4:15–5:45 pm

My Worst Complication: Perspectives in Caring for Neurotrauma Patients

Moderator: Shankar P. Gopinath
Discussants: Randall M. Chesnut, Geoffrey T. Manley, Gazanfar Rahmathulla, Christian B. Ricks, Emily P. Sieg, Sarah Woodrow
Session Description: Despite the best intentions, complications occur in neurosurgery patients, particularly so in patients with complex traumatic brain and spinal cord injuries. In this session, speakers will provide a case-based discussion, but will also discuss their personal perspectives in caring for neurotrauma patients.
Learning Objectives:

- Discuss the myriad of complications that may occur when taking care of patients with complex brain and spine injuries
- Identify from seasoned neurosurgeons who take care of complex neurotrauma patients how to potentially avoid complications

4:15–5:45 pm
Case-based Discussion

PA 4:15–5:45 pm

Neurosurgery Cases for Pain: Alternative Therapies to Spinal Cord Stimulation and Case-based Discussions

Moderators: Rohit Kesarwani, Hamid M. Shah
Speakers: Albert S. Lee, Zaman Mirzadeh, Parag G. Patil, Erika A. Petersen, Ashwin Viswanathan
Sessions Description: Specific neurosurgical cases will be presented with detailed descriptions of associated treatment strategies, alternative therapies, and complication management.
Learning Objectives:

- Execute managing complex cases pertaining to pain
- Develop own treatment algorithms for the management of difficult cases
- Manage complications related to pain therapies

4:15–4:23 pm
Overview of Alternative Therapies to SCS for Back & Limb Pain: DRG Stimulation, ITP Pumps, Lesioning Techniques
Albert S. Lee

4:24–4:32 pm
Dorsal Root Ganglion Stimulation
Zaman Mirzadeh

4:33–4:41 pm
Intrathecal Pain Pumps
Erika A. Petersen

4:42–4:50 pm
Lesioning Procedures
Ashwin Viswanathan

4:51–4:59 pm
Complication Avoidance Techniques of DRG, ITP, and Lesioning
Parag G. Patil

5:00–5:45 pm
Case-based Discussion

PE 4:15–5:45 pm

Shunt Infection Management: Do All Shunts Still Need to be Explanted: Operative Techniques and Case-based Discussions

Moderator: Hugh Garton
Discussants: Lissa C. Baird, Joshua J. Chern, Paul Klimo, Sandi Lam
Session Description: There have been recent updates from both the WHO and CDC regarding the management of CSF infection and surgical-site prophylaxis.
Learning Objectives:

- Discuss the current WHO and CDC Guidelines around surgical site prophylaxis
- Discuss the circumstances under which shunt infection may be treated non-operatively
- Discuss current recommendations regarding the treatment of CSF shunt infection

4:15–5:45 pm
Case-based Discussion

TU 4:15–5:45 pm

Recurrent Meningioma Management: Operative Techniques and Case-based Discussions

Moderators: Michael W. McDermott, Carolyn Quinsey
Discussants: Frederick G. Barker, Garni Barkhoudarian, Luis A. B. Borba, Paul A. Gardner, Randy L. Jensen, Brian J. Williams, Gelareh Zadeh
Session Description: This session will review the current management challenges of treating patients with recurrent meningioma. Multimodality therapy including surgical techniques, the role of radiation and novel molecular therapies will be covered. Concepts will be reinforced with case-based presentations and discussions.

Learning Objectives:
- Describe the role for radiation and radiosurgery in the management of recurrent meningioma
- Identify the surgical considerations necessary for managing recurrent meningioma
- Recognize the potential morbidity of surgical management for recurrent meningioma

4:15–5:45 pm
Case-based Discussion

SF 4:15–5:45 pm
Cases of DBS for Psychiatric Disorders: Operative Techniques and Case-based Discussions
Moderators: Wael Assad, Sharona Ben-Haim
Discussants: Joan A. Camprodon, Wayne Goodman, Robert M. Richardson, Sameer A. Sheth
Session Description: We will present cases of patients with severe psychiatric disorders considered for DBS. We will discuss candidacy considerations, surgical approach, and DBS programming strategies.
Learning Objectives:
- Demonstrate competence in evaluating patients with severe psychiatric disorders for DBS
- Design stereotactic plans for common psychiatric DBS targets
- Describe best practices for DBS programming for these patients

4:15–5:45 pm
Case-based Discussion

PN 4:15–5:45 pm
Peripheral Nerves Task Force—Evidence on Procedures
Moderators: Lukas G. Rasulic, Lynda Jun-San Yang
Discussants: Allan D. Levi, Mark A. Mahan, Wilson Z. Ray, Ian Valerio
Session Description: The peripheral nerve task force will present the latest evidence for advanced peripheral nerve procedures, including targeted re-innervation and nerve transfer for spinal cord injury. The latest updated evidence will be presented, including key limitations, obstacles, and next steps.
Learning Objectives:
- Describe the results of the most recent studies of nerve transfer for spinal cord injury
- Discuss the clinical utility of targeted muscle re-innervation
- Review the most recent clinical studies in the management of peripheral nerve injuries, tumors, and entrapments

4:15–4:34 pm
Nerve Transfers for Spinal Cord Injury: Results of a Prospective Trial
Wilson Z. Ray

4:35–4:54 pm
Targeted Muscle Reinnervation: Ready for Prime Time?
Mark A. Mahan

4:55–5:14 pm
Case Presentations
Allan D. Levi

5:15–5:34 pm
Case Presentations
Ian Valerio

5:35–5:45 pm
Discussion and Questions

TUESDAY, OCTOBER 19 | 5:45–7:15 pm

Interactive Multimedia Research Presentation Session
The interactive poster session aims to invigorate scientific presentation and discussion, complemented by wine and cheese. Selected posters will present "poster talks" in the poster hall, highlighting key advances in each field.
Learning Objectives:
- Analyze the findings of novel translational and clinical neurosurgical studies, critique the design and methodology
- Identify knowledge gaps requiring additional investigation and research
- Identify the most important ongoing clinical trials and recent results impacting clinical practice
- Apply lessons of ongoing research to neurosurgical care of patients

Moderators:
Council of State Neurosurgical Societies: Owoicho Adogwa, Kristopher T. Kimmell, Richard P. Menger, Cara L. Sedney, Jason D. Stacy, Omar A. Zalatimo

Section on Cerebrovascular Surgery: R. Webster Crowley, Kathleen Dlouhy, Benjamin Rapoport, Dimitri Sigounas, Michelle J. Smith, Ben Waldau

Section on Disorders of the Spine and Peripheral Nerve:
Peripheral Nerve—Justin M. Brown, Holly Gilmer, Amgad S. Hanna, Mark A. Mahan
Spine—Victor W. Chang, Kenneth M. Crandall, Yakov Gologorsky, John H. Shin, Justin Slavin, Eve C. Tsai

Section on Neurotrauma and Critical Care: Robert H. Bonow, Nicholas J. Brandmeir, Daniel B. Michael, Craig H. Rabb, Uzma Samadani, Eve C. Tsai

Section on Pain: Rushna Ali, Nicholas M. Boulis, Steven M. Falowski, Parag G. Patil, Julie G. Pilitsis, Oren Sagher

Section Pediatric Neurological Surgery: Philipp R. Aldana, Tord D. Alden, Joshua J. Chern, James M. Johnston, Toba Niazi, O. Adetola Roberts, Luis F. Rodriguez

Section Stereotactic and Functional Neurosurgery: S. Kathleen Bandt, Sarah KB Bick, Tejas Sankar

Section on Tumors: Wenya L. Bi, Daniel P. Cahill, Gavin P. Dunn, Arnold B. Etame, Seunggu J. Han, Albert H. Kim

TUESDAY, OCTOBER 19 | 7:30–9:00 pm
Resident Social — **JW Marriott Austin**

Submit your cases by **July 15** to be discussed during these sessions.
Visit cns.org/case-based-2021 for details!

DEVELOPING NATION DISCOUNT

In an effort to make the best in neurosurgery more accessible to doctors and scientists around the world, the CNS is pleased to offer a discounted registration rate of $150 to non member attendees from the following countries:

Afghanistan
Angola
Bangladesh
Benin
Bhutan
Bolivia
Burkina Faso
Burundi
Cabo Verde
Cambodia
Cameroon
Central African Republic
Chad
Comoros
Congo, Dem. Rep.
Congo, Rep.
Côte d'Ivoire
Djibouti
Egypt
El Salvador
Eritrea
Ethiopia
Gambia, The
Ghana
Guinea
Guinea-Bissau
Haiti
Honduras
India
Indonesia
Kenya
Kiribati
Korea, Dem. People's Rep.
Kyrgyz Republic
Lao PDR
Lesotho
Liberia
Madagascar
Malawi
Mali
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Myanmar
Nepal
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Pakistan
Palestine
Papua New Guinea
Philippines
Rwanda
São Tomé and Principe
Senegal
Sierra Leone
Solomon Islands
Somalia
South Sudan
Sri Lanka
Sudan
Swaziland
Syrian Arab Republic
Tajikistan
Tanzania
Timor-Leste
Togo
Tunisia
Uganda
Ukraine
Uzbekistan
Vanuatu
Vietnam
West Bank and Gaza
Yemen
Zambia
Zimbabwe

SUNRISE SCIENCE AND GUIDELINES

WEDNESDAY, OCTOBER 20

SE **Sunrise Science Abstract Session VI**
Moderators: Kristopher T. Kimmell, Analiz Rodriguez

PA **Sunrise Science Abstract Session VII**
Moderators: Ausef A. Bari, Michael D. Staudt

PE **Sunrise Science Abstract Session VIII**
Moderators: Nathan J. Ranalli, O. Adetola Roberts

7:00–8:30 am
Learning Objectives:
- Analyze the findings of novel neurosurgical studies, critique the design and methodology
- List important areas for further knowledge development and research
- Identify the most important ongoing clinical trials
- Apply lessons of ongoing research to neurosurgical care of patients

TU 7:00–8:30 am
Guidelines on the Management of Glioblastoma
Moderators: Pascal O. Zinn, Mateo Ziu
Speakers: Cameron W. Brennan, William T. Curry, Maryam Rahman, Michael A. Vogelbaum
Session Description: This morning guidelines sessions will present a critical overview of evidence-based guidelines for management of glioblastoma, including discussions of the role of surgery and the impact of extent of resection on overall management. The session will discuss potentially important adjuncts to the surgical management of glioblastoma including neuromonitoring and laser ablation. Finally, key thought leaders in neuro-oncology will review the merging field of personalized medicine and chemotherapy for glioblastoma.
Learning Objectives:
- Explain the role of and safe strategies for aggressive resection in the management of patients with glioblastoma
- Critically analyze the literature supporting the use of laser ablation in the management of patients with glioblastoma
- Critically assess the evolving field of personalized medicine and chemotherapy in the management of glioblastoma

7:00–7:04 am
Introduction
Mateo Ziu

7:05–7:24 am
Cytoreductive Surgery in Newly Diagnosed and Progressive GBM
Maryam Rahman

7:25–7:44 am
Neuroradiology in Progressive Glioblastoma
Cameron W. Brennan

7:45–8:04 am
Novel Surgical Adjuncts Including Laser Interstitial Thermal Therapy
William T. Curry

8:05–8:24 am
Personalized Medicine for GBM
Michael A. Vogelbaum

8:25– 8:30 am
Discussion and Questions

CONGRESS OF NEUROLOGICAL SURGEONS 1951 ERUDITIO OBSERVANTIA SOCIETAS

The 2021 CNS Annual Meeting is FREE to All CNS Members Until September 15

Join us at the 2021 CNS Annual Meeting in Austin, Texas, October 16–20.

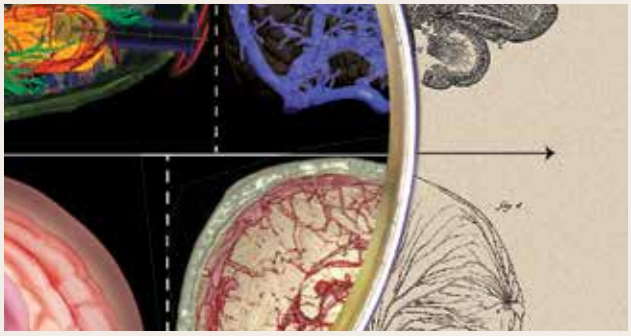
We understand the difficult challenges neurosurgeons everywhere face during these uncertain times. To show our gratitude for your support, **we are waiving registration fees for our loyal members.**

GENERAL SCIENTIFIC SESSION IV

WEDNESDAY, OCTOBER 20
8:40 am–12:10 pm

Presiding Officer: Daniel J. Hoh
Moderators: Tiffany R. Hodges, Nader Pouratian
Learning Objectives:

- Describe how to critically analyze your own practice and learn from the experiences of others
- Discuss how artificial intelligence, personalized medicine and cellular therapy are changing the way we treat neurological disease
- Discuss transcriptional regulation of glioma stem cells and its application in neurosurgery



8:40–8:43 am
Introduction of NINDS/CNS K12 Scholar Award Presentation
Alexander A. Khalessi, Stephen J. Korn

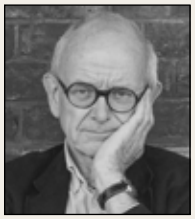
8:44–8:51 am
NINDS/CNS K12 Scholar Award Presentation
Babacar Cisse

8:52–8:59 am
Neurosurgery Top Paper of the Year: Validation and Optimization of Barrow Neurological Institute Score in Prediction of Adverse Events and Functional Outcome After Subarachnoid Hemorrhageâ€"Creation of the HATCH (Hemorrhage, Age, Treatment, Clinical State, Hydrocephalus) Score
Menno Germans

9:00–9:02 am
Announcement of Innovator of the Year
Maryam Rahman

9:03–9:06 am
Announcement of SANS Challenge Winners, Top Posters, and Residency Program Abstract Competition Winners
Laura A. Snyder

9:07–9:09 am
Introduction of Henry Marsh
Praveen V. Mummaneni



9:10–9:40 am
Painful Lessons from 40 Years of Neurosurgery
FEATURED SPEAKER:
Henry Marsh

9:40–10:40 am
MORNING BEVERAGE BREAK
Visit the Exhibit Hall

10:00–10:30 am
LIVE SURGERY IN THE EXHIBIT HALL



10:40–10:46 am
SBN Presidential Address
Eberval G. Figueiredo

10:47–10:51 am
Washington Committee Update
John K. Ratliff

10:52–10:56 am
SNS Update
Warren R. Selman



10:57–11:03 am
NSI Presidential Address
Lokendra Singh

11:04–11:10 am
The Future of Education (Nexus, Virtual, Micro Learning, Social Media)
Nicholas C. Bambakidis, Nader Pouratian



11:11–11:17 am
JAPANESE CNS PRESIDENTIAL ADDRESS
Koji Yoshimoto

11:18–11:25 am
Posterior Fossa Decompression With or Without Duraplasty for Chiari Type I Malformation with Syringomyelia
David D. Limbrick

11:26–11:29 am
Educator of the Year Presentation

11:30–11:32 am
CNS Foundation and Guidelines
Brian L. Hoh, Steven N. Kalkanis

11:33–11:36 am
AANS President
Regis W. Haid

11:37–11:39 am
Introduction of Siddhartha Mukherjee
Ellen L. Air



11:40 am–12:10 pm
JOHN THOMPSON HISTORY OF MEDICINE LECTURER
Thinking Outside the Medical Box: Three Themes for the Future of Medicine
FEATURED SPEAKER:
Siddhartha Mukherjee

CNS Members join us for free in Austin! Register at cns.org/2021 by September 15!

LUNCHEON SEMINARS

WEDNESDAY, OCTOBER 20 | 12:15–1:45 pm

All Seminars include lunch.
Luncheon Seminar fee is $125 each ($100 for residents, fellows, medical students, and advance practice providers)

(RE) W25: Honored Guest Luncheon: Our Non-Surgical Responsibilities to Brain Tumor Patients – The "Stuff" that Makes a Huge Difference to Them and Your Practice

*Advanced registration recommended. Complimentary for Resident and International Vista Resident Members!
Speaker: Marc L. Rosenblum
Learning Objectives:

- Discuss how important communication is for a patient's quality of life
- Describe how to better deliver bad news
- Review what our roles can accomplish to improve patient satisfaction

NEW! (WI) (GE) W26: Residency Challenges in 2021: It's Not Like It Used to Be

CNS Wellness and Resilience

Moderators: Alia M. Hdeib, Sarah Woodrow
Faculty: John A. Jane, Jody Leonardo, Karin M. Muraszko, Susan C. Pannullo, Daniel K. Resnick, Ajith J. Thomas
Seminar Description: Greater emphasis in graduate surgical education is being placed on curriculum structure and competencies. This seminar course is designed to provide a practical approach to neurosurgical faculty, program coordinators, and senior residents to help them deal with challenging situations that can occur in their role as educators.
Learning Objectives:

- Analyze the evolving environment in neurosurgical postgraduate education
- Identify strategies to work with residents in challenging situations
- Discuss and apply principles of managing difficulty trainees

NEW! (TR) W27: Anticoagulation/Antithrombotic Agents Before and After Traumatic Brain Injury

Moderators: Anthony M. DiGiorgio, Gregory W.J. Hawryluk
Faculty: Ryan S. Kitagawa, Laura B. Ngwenya, Emily Sieg, Shelly D. Timmons
Seminar Description: Provide guidance for the treatment of bleeding and thrombosis in TBI.
Learning Objectives:

- Implement appropriate treatments for patients with TBI and blood thinners
- Demonstrate appropriate management of patients with TBI who then require blood thinners
- Analyze difficult cases in bleeding and thrombosis

NEW! (SP) W28: Ambulatory Surgery Center: Why to Have It and How to Start It

Moderator: Kurt M. Eichholz
Faculty: Robert Bohinski, Kevin T. Foley, Scott A. Meyer, Eric A. Potts
Seminar Description: This course will describe how and when to consider establishing or practicing at an ambulatory surgery center. The initial set up and benefits will be described.
Learning Objectives:

- Describe negotiations with hospitals/payers in regards to ASC
- Identify strategies for drawing patients to ASC
- Define set patient population that are/are not appropriate for this setting

(TU) W29: Complex Intracranial Approaches

Moderators: Vijay Agarwal, Pamela S. Jones
Faculty: James K. Liu, Shaan M. Raza, Pablo F. Recinos, Charles Teo
Seminar Description: A reference session for the management of intracranial lesions necessitating a combined approach. Discussed in detail will be appropriate approach selection, technique, nuance, and complication avoidance. Combined approaches will not be limited solely to open approaches, but will include both endoscopic and keyhole techniques, as well as vascular approaches.
Learning Objectives:

- Discuss surgical approaches to vascular and skull based lesions
- Discuss endoscopic/endonasal approaches

NEW! (TU) W30: New Concepts in Tumor Fluorescence

Moderators: Randy D'Amico, Kimberly B. Hoang
Faculty: Linton T. Evans, Constantinos G. Hadjipanayis, John Y.K. Lee, Peter Nakaji, Walter Stummer
Seminar Description: In this luncheon seminar, practicing neurosurgeons will learn how to apply existing technology to improve extent of resection with fluorescence. They will also learn about ongoing research to improve fluorescent imaging for safer tumor resections in the future.
Learning Objectives:

- Explain the evidence supporting the use of 5ALA to improve extent of resection of malignant gliomas
- Describe the FDA approval process for 5ALA in the United States
- Discuss the potential benefits and drawbacks of newer fluorophores for surgical resections

SUBSPECIALTY SESSION HIGHLIGHTS KEY		
(AP) ADVANCED PRACTICE PROVIDER	(PN) PERIPHERAL NERVES	(TR) NEUROTRAUMA
(CV) CEREBROVASCULAR	(RE) RESIDENT	(TU) TUMOR
(GE) GENERAL	(SE) SOCIOECONOMIC	(WI) WOMEN IN NEUROSURGERY
(PA) PAIN	(SF) STEREOTACTIC AND FUNCTIONAL	
(PE) PEDIATRIC	(SP) SPINE	

NEW! PA W31: Lesioning for Pain/Neuroablation Guidelines

Moderators: Andre Machado, Hilarie C. Tomasiewicz
Faculty: Zaman Mirzadeh, Parag G. Patil, William S. Rosenberg, Ido Strauss, Ashwin Viswanathan, Brian J. Williams
Seminar Description: Inadequately treated cancer pain is a public health crisis. This course will discuss pain medicine and neurosurgical techniques for cancer pain described in recently developed guidelines, as well as how to integrate them into your practice.
Learning Objectives:

- Identify the anatomy and techniques associated various lesioning procedures
- Identify the indications for various lesioning procedures associated with different pain syndromes

NEW! PE PN W32: Neurosurgical Management of Spasticity

Moderator: Justin M. Brown
Faculty: Kathy Chuang, Jean-Pierre Farmer, George Ibrahim, Line G. Jacques, Peter C. Rhee, Shenandoah Robinson, Manish N. Shah, C. Corbett Wilkinson
Seminar Description: To survey available surgical modalities to address function impairing spasticity.
Learning Objectives:

- Apply appropriate diagnostic workup of patients with spasticity
- Identify common surgical spasticity-reducing modalities
- Describe the long-term efficacy and potential complications of different surgical modalities

CV W33: Middle Meningeal Artery Embolization in the Treatment of Chronic Subdural Hematomas

Moderator: Jeremiah N. Johnson
Faculty: Adam S. Arthur, R. Webster Crowley, Peter Kan, Jared Knopman, Michael J. Lang, Ichirro Nakagawa
Seminar Description: The chronic subdural hematoma is one of the most common diseases treated in neurosurgery. For decades, the mainstay of treatment has been surgical evacuation including burr holes, craniotomy, or SEPS evacuation, but this treatment strategy is limited by high recurrence rates and challenges performing neurosurgery on this patient population—often on anticoagulation or with numerous comorbidities. Recently, MMA embolization has gained traction as an alternative treatment option with preliminary data and multiple industry-sponsored clinical trials evaluating the efficacy of the procedure.
Learning Objectives:

- Describe the pathophysiology of a cSDH
- Explain evidence-based options for maximal SDH expansion or recurrence prevention
- Translate ongoing clinical trials evaluating MMA embolization for the treatment of cSDH

CNS Wellness and Resilience

Look for this image to find sessions on CNS' new Wellness and Resilience initiative.



AFTERNOON SPECIAL SEMINARS

WEDNESDAY, OCTOBER 20
1:45–4:45 pm

Afternoon Seminar 1: Advanced Endoscopic and Exoscopic Neurosurgery Seminar

Course Directors: William T. Curry, Amy Lee, Brian V. Nahed
Faculty: Christopher J. Farrell, Juan C. Fernandez-Miranda, Constantinos G. Hadjipanayis, Paul A. Gardner, David J. Langer, Peter Nakaji, Shaan M. Raza
Course Description: The use of minimally invasive approaches is becoming more prevalent. Through this seminar, we hope to explore and review the most up-to- date technologies, strategies employing endoscopic, and exoscopic visualization.
Learning Objectives:

- Recognize novel methods and approaches to CSN pathology using endoscopy
- Identify benefits, drawbacks, and the potential applications of neurosurgical visualization using exoscopic technology

Afternoon Seminar 2: Implicit Bias: How to Promote Equity in Neurosurgical Practice and Training

Course Directors: Aviva Abosch, Langston T. Holly, Edjah K. Nduom
Faculty: Odette Harris, Nnenna Mbabuike, Gail L. Rosseau, Marjorie C. Wang
Session Description: During this session faculty will review the historical events that have lead to inequity in healthcare system, case studies of how biases affect training, hiring and promotion in neurosurgery, and strategies to mediate implicit biases. Participants will be asked to have completed implicit bias evaluation prior to attending the session.
Learning Objectives:

- Compare experiences of medical students, residents and practicing neurosurgeons who may be affected by implicit biases
- Identify biases that affect good people and how these can affect learners and practicing neurosurgeons
- Adapt current processes in teaching, recruitment, and training to reduce the risks of inequity that result from implicit biases

**All speakers and topics are subject to change*



CNS
Wellness and Resilience

Build Resilience in Austin!



Discover additional resources to help you build resilience at *cns.org/wellness-resilience!*

While in Austin, the CNS Wellness and Resilience Committee encourages attendees to take advantage of a variety of options to feed the mind, body, and soul. Options include both social events and scientific programming. Look for even more opportunities when you arrive in Austin!

SATURDAY, OCTOBER 16

12:45–4:15 pm
SYM8B: Performance Workshop: How to be on Top of Your Game at Work and at Home

12:45–4:15 pm
SYM10B: Entrepreneurial Neurosurgeons

4:15–5:45 pm
CNS Resident Social

5:00–6:30 pm
International Reception

SUNDAY, OCTOBER 17

8:00 am–12:00 pm
SYM15A: Women in Neurosurgery Career Symposium

12:45–4:15 pm
SYM21B: So You've Been Sued

6:30–8:30 pm
Opening Reception
Featuring the Neurosurgery Jazz Quintet Plus 1

MONDAY, OCTOBER 18

12:15–1:45 pm
M1: Honored Guest Luncheon

4:15–5:45 pm
Financial Planning for Young Neurosurgeons

TUESDAY, OCTOBER 19

12:15–1:45 pm
T14: Honored Guest Luncheon

12:15–1:45 pm
Luncheon Seminar
T17: Neurosurgical Contracts – How to Get What You Want

WEDNESDAY, OCTOBER 20

12:15–1:45 pm
W25: Honored Guest Luncheon

12:15–1:45 pm
Women in Neurosurgery Luncheon Seminar
W26: Residency Challenges in 2021: It's Not Like It Used to Be

XPERIENCE LOUNGE OFFERINGS

TUESDAY, OCTOBER 19 | 1:45–2:45 pm

- Voices of Neurosurgery: Hear inspiring stories from your colleagues!
- Giveaways *(limited quantities)*
- Fruit smoothies during Tuesday afternoon's beverage break

FOUNDATION EXERCISE CHALLENGE

CNS Foundation

Who's the Fittest of Them All?

Join your colleagues for our Annual Meeting Fitness Fun-Raisers at the JW Marriott Austin on Sunday and Monday, October 17–18, at 6:00–7:00 am.

Early morning workouts support the CNS Foundation—improving worldwide patient care.

Advance registration encouraged as space is limited! Watch for ticket information in CNS Annual Meeting communications.

CONTINUING MEDICAL EDUCATION

CONGRESS OF NEUROLOGICAL SURGEONS 2021 ANNUAL MEETING OBJECTIVES

Our Mission
The CNS exists to enhance health and improve lives through the advancement of neurosurgical education and scientific exchange.

Our Vision
To be the premier educational organization in neurological surgery.

Our Work
Our mission drives us to cultivate great neurosurgeons. We advance the practice of neurosurgery globally by inspiring and facilitating scientific discovery and its translation to clinical practice.

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

At the conclusion of the 2021 CNS Annual Meeting participants will be able to:

1. Analyze their current practice patterns and assimilate changes as needed in accordance with the latest clinical guidelines
2. Discuss indications, rationale and approaches to performing various neurosurgical procedures presented during case discussions
3. Apply and/or perform new surgical techniques and procedures as a result of participation in hands on courses
4. Interpret and understand how results of clinical and basic science research is impacting the management of neurosurgical disease through abstract presentations
5. Demonstrate change in competence through assimilation and implementation of best practices and evidence-based medicine

EDUCATIONAL FORMAT DESCRIPTIONS

The CNS offers sessions in a variety of formats to enhance your educational experience. Each session is open to all who have paid the general medical registration fee with the exception of optional Symposia, Luncheon Seminars, and Dinner Seminars, which are available for an additional fee.

SYMPOSIA

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 16, and Sunday, October 17.

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 17, through Wednesday, October 20.
- Luncheon Seminars are offered Monday, October 18, through Wednesday, October 20.
- Dinner Seminars are offered on Saturday, October 16; Monday, October 18.

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 18, and Tuesday, October 19.
- Live Surgery via telemedicine technology in the Exhibit Hall will take place Monday, October 18, through Wednesday, October 20. 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 18, Tuesday, October 19.
- 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 18, Tuesday October 19 and Wednesday, October 20.

CNS Members join us for free in Austin! Register at cns.org/2021 by September 15!

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 half-day Symposia, a maximum of 6 *AMA PRA Category 1 Credits*™ for each eligible Saturday full-day Symposia, a maximum of 3.5 *AMA PRA Category 1 Credits*™ for each eligible Sunday half-day Symposia, and a maximum of 6 *AMA PRA Category 1 Credits*™ for each eligible Sunday full-day Symposia. Physicians should only claim credit commensurate with the extent of their participation in the activity.

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 *AMA PRA Category 1.5 Credits*™ for viewing scientific posters. Physicians should self-claim credit on their AMA PRA certificate application form. Please visit the AMA web site for details at ama-assn.org.

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 Austin, or from the convenience of your home or office. Upon completion of this process, your CME certificate will be saved on your MY CME page for viewing and printing. It can also be accessed from the MY EDUCATION page.

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 ACCME defined ineligible company. 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 "ineligible company" as those whose primary business is producing, marketing, selling, re-selling, or distributing healthcare products used by or 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.

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.

NURSING CREDIT

The CNS has applied for CE credit through the American Academy of Neuroscience Nurses (AANN). Please check back for details on the approved number of contact hours for nursing professionals and claiming instructions.

CNS Wellness and Resilience

Look for this image to find sessions on CNS' new Wellness and Resilience initiative.

GENERAL INFORMATION

AIRLINE DISCOUNTS

The CNS is pleased to offer discounts with the following airlines. Discounts are available for flight dates as noted below by airline to and from Austin-Bergstrom International Airport (AUS).

American Airlines – aa.com
Valid dates: October 13–23, 2021
After selecting your flights on the "Passenger Detail" page, enter code **56H1D**K in the "Promotion Codes and Accounts" box at the bottom of the screen. You will see your discount displayed in the "Cost Summary" section of the "Review and Pay" screen.

United Airlines – united.com
Valid dates: October 13–23, 2021
After entering your travel information on the home page, click the "Advanced Search" link. Verify flight information on the next screen and scroll to the bottom of the page. Click the arrow next to "Upgrades, certificates, and promotion codes". Enter discount code **ZJU4675187** into the "Promotions and certificates" box and select "find flights." All prices displayed on the next screen will now reflect the discounted prices.

Delta Airlines – delta.com
Valid dates: October 11–25, 2021
After entering your travel information on the home page, select the downward arrow next to the "Advanced Search" link. Enter discount code **NMUMJ** in the "Meeting Code (Optional)" field. All prices displayed for your flight search will now reflect the discounted prices.

AIRPORT

The 2021 CNS Annual Meeting hotels and the Austin Convention Center are located approximately 7 miles from Austin-Bergstrom International Airport (AUS). Taxicabs are located on the arrival (ground) level of the airport, outside the baggage claim areas. Uber and Lyft are both available in the Austin area.

AMERICANS WITH DISABILITIES ACT

Wheelchairs, scooters, information booths, designated parking, TDD telephones, and other services are available for visitors with disabilities. For wheelchair or electric scooter rental, please contact Martin Mobility at 512-476-0500.

It is suggested that you make your reservation in advance of your arrival. Please let us know if, under the ADA, you require special accommodations or services in order to attend the CNS Annual Meeting. We want to ensure that no individual with a disability is excluded because of the absence of auxiliary aids and services. Your requirements should be sent directly to the Annual Meeting Registration and Housing Center at: cns@mcievents.com or by calling 800-931-9543. Please provide any requests at least 30 days prior to the Annual Meeting to allow adequate time to accommodate your request.

ATTIRE

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

CNS CENTRAL

Conveniently located **on level one of the Austin Convention Center,** visit CNS Central with your questions on CNS membership, education, or CME. CNS staff will be available to help you navigate our website, review the case-based Nexus product, assist you in the process of applying for membership, or download any CNS 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! Engage with this year's awardees and featured speakers, connect with your colleagues and mentors, view digital posters, hear unique presentations, view the live surgeries via telemedicine, and get your hands on new technology featured throughout the meeting.

CLIMATE

October temperatures in Austin average a high of 82°F and a low of 60°F.

COURSE AGENDAS AND FACULTY

Agendas are subject to change. As we 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 2021 CNS 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 2021 CNS Annual Meeting. The CNS reserves all of its rights to such material, and commercial reproduction is specifically prohibited.

EXHIBIT HALL HOURS

Monday, October 18	9:30 am–4:00 pm
Tuesday, October 19	9:30 am–3:00 pm
Wednesday, October 20	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.

FUTURE MEETINGS

2022: San Francisco, California	October 8–12
2023: Washington, D.C.	September 9–13
2024: Houston, Texas	September 28–October 2

HEALTH AND SAFETY

We are working closely with the hotels and Austin Convention Center to provide a healthy, safe environment for attendees. The CNS will follow all necessary guidelines. Watch for Annual Meeting updates on social distancing and mask mandates.

HOUSING INFORMATION

See pages 69–71 for detailed information.

PRESS ROOM

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/2021 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.

RECREATIONAL AUSTIN CITY TOUR ($75 PER TICKET)

Discover the best of Austin in just two hours! This fast-paced "bucket list" tour will provide a great snapshot of the city. You'll visit the state Capitol and look up into the dome, sightsee cool outdoor art, city landmarks, and funky neighborhoods. This tour is jam-packed with facts, history and trivia on everything Austin! By the time you're done you'll know all about Austin – the history, people, music, culture, food, and what keeps it "weird."

REGISTRATION INFORMATION

We understand the difficult challenges neurosurgeons everywhere face during these uncertain times. To show our gratitude for your support, we are waiving registration fees for our loyal members for the 2021 Annual Meeting. (Please note, this offer is valid for advanced registration through September 15, 2021. This offer does not apply to Inactive Members).

Items included in registration fee:

- General Scientific Sessions
- Scientific Program to include Section Sessions, Oral Abstract Presentations, Sunrise Science and Late-Breaking Abstract Sessions, Guidelines Sessions, Operative Technique Sessions, International Symposia, Interactive Multimedia Research Presentation Session, and Digital Posters
- CNS Xperience Lounge
- Live Surgeries via Telemedicine
- Exhibit Hall
- Opening Reception on Sunday

REGISTRATION AND CNS CENTRAL HOURS

Registration will be in the Solar Atrium on Level 1 of the Austin Convention Center.

Saturday, October 16	7:00 am–5:30 pm
Sunday, October 17	7:00 am–7:00 pm
Monday, October 18	6:30 am–6:30 pm
Tuesday, October 19	6:30 am–6:30 pm
Wednesday, October 20	6:30 am–3:15 pm

Registration will also be in the Lonestar Ballroom Foyer on level 3 at the JW Marriott Austin.

Saturday, October 16	7:00 am–5:00 pm
Sunday, October 17	7:00 am–5:00 pm
Monday, October 18	7:00 am–12:00 pm

SMOKING

The Austin Convention Center and all official CNS hotels are non-smoking facilities.

SPEAKER READY ROOM

All speakers and abstract presenters should visit the Speaker Ready Room in room 11A/B at the Austin Convention Center no less than two hours prior to scheduled presentations to upload the most recent presentation version. The Speaker Ready Room will be open during the following hours:

Saturday, October 16	7:00 am–4:30 pm
Sunday, October 17	7:00 am–6:30 pm
Monday, October 18	6:30 am–5:00 pm
Tuesday, October 19	6:30 am–5:00 pm
Wednesday, October 20	6:30 am–1:00 pm

SPOUSE HOSPITALITY SUITE

All registered CNS Annual Meeting spouses and guests are invited to visit the CNS Spouse Hospitality Suite at the JW Marriott Austin, Monday through Wednesday, from 8:00–10:30 am for continental breakfast. Please note that admittance to the Spouse Hospitality Suite is by spouse/guest badge only. A representative from Visit Austin, the Austin 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.

VISA INFORMATION

The State Department of the United States encourages international participants to apply for their visas as early as possible—at least several months before the meeting. Some consulates may have backlogs in scheduling visa interviews, so applicants should first contact the consulate to find out how long the wait is for an interview. For more information on the visa process, including wait times, please visit travel.state.gov/content/travel/en/us-visas.html.

WI-FI SERVICE

For your convenience, complimentary Wi-Fi service is provided in the meeting rooms and corridors at the Austin Convention Center and in the JW Marriott Austin wherever CNS events are being held.

REGISTRATION INFORMATION

REGISTRATION METHODS

For your convenience, you can register and reserve your hotel room via these four methods:

ONLINE

cns.org/2021

PHONE*

800-931-9543 U.S. & Canada
972-349-5539 International
8:00 am–6:30 pm CST

FAX*

972-349-7715

MAIL*

CNS Annual Meeting
CNS Registration and Housing Center
6100 West Plano Parkway
Suite 3500
Plano, TX 75093

*Allow five business days for registration and housing confirmation. The CNS Registration and Housing Center is not responsible for faxes not received due to mechanical failure or circumstances beyond our control.

CREDIT CARD PAYMENTS

U.S. dollars and drawn on a US bank

- Visa
- Mastercard
- American Express

CHECK PAYMENTS

U.S. dollars and drawn on a US bank

- Full payment must accompany your registration form.
- Any checks received from an overseas bank will be returned.
- Any checks returned for insufficient funds are subject to additional charges.

MATERIALS PICK-UP

All materials should be picked up on site at the Austin Convention Center. A satellite registration area will be set up on Saturday and Sunday at the JW Marriott Austin.

REGISTRATION RATES

We understand the difficult challenges neurosurgeons everywhere face during these uncertain times. To show our gratitude for your support, we are waiving registration fees for our loyal members for the 2021 Annual Meeting. (Please note, this offer is valid for advanced registration through September 15, 2021. This offer does not apply to Inactive Members).

REGISTRATION TYPE	Received on or Before September 15, 2021	Received After September 15, 2021
CNS MEMBER REGISTRANT		
Active (Domestic, International), Associate (Non-neurosurgeons with distinction in a neurosurgical-related discipline)	$ 0	$ 990
Active Duty Military	$ 0	$ 0
Armed Forces (Guard/Reserve/Retiree)	$ 0	$ 675
Resident (Domestic)	$ 0	$ 250
International Vista Resident	$ 0	$ 250
Fellow (Domestic & International)	$ 0	$ 300
Emeritus	$ 0	$ 650
Medical Student (Enrolled in an accredited medical school in US or Canada)	$ 0	$ 200
Affiliate (Allied healthcare professionals involved in neurosurgical-related patient care, teaching, or research)	$ 0	$ 550
NON-MEMBER MEDICAL REGISTRANT		
Neurosurgeon, Physician (MD, DO, etc.), Non-physician (Clinical Researcher/Scientist)*	$ 1,400	$ 1,600
Neurosurgeon (Faculty)	$ 890	$ 990
Resident	$ 400	$ 500
Fellow	$ 450	$ 550
Medical Student	$ 250	$ 450
PA/Physician Extender/Nurse/Nurse Practitioner	$ 600	$ 800
Corporate Representative†	$ 1,250	$ 1,450
Non-Member Graduate Student/Post-doctoral Scholar	$ 150	$ 250
ANSPA Member††	$ 500	$ 600
Developing Nation Rate (See page XX for complete list of nations)	$ 150	$ 250
Program Coordinator	$ 0	$ 0
Attendee Spouse	$ 0	$ 150

*Non-member/Non-physician category is limited to scientists, engineers, etc., involved in neurosurgical research and/or product development not affiliated with an exhibiting company.
†Corporate representatives attend for education only. They must not conduct sales activities in the meeting space, nor influence content in any way. Solicitation of medical attendees is strictly prohibited.
†† Includes one year of CNS Affiliate membership in 2022 for ANSPA Members only.

NOT A CNS MEMBER? THERE'S NO BETTER TIME TO JOIN!

CNS Members have complimentary access to our world-class Neurosurgery journals, discounts on valuable self-assessment tools, access to educational online resources, and so much more! Plus, you'll see instant savings when you register for the Annual Meeting, receiving complimentary registration through September 15. See our full list of member benefits and apply at cns.org/membership.

IMPORTANT DATES TO REMEMBER

SEPTEMBER 15 Free Registration, Advance Registration Discount and Housing Deadline

SEPTEMBER 22 Last day to cancel registration in order to receive a full refund, less a $100 processing fee

OCTOBER 7 Last day to make any hotel changes or cancellations through the CNS Housing provider
Email: cns@mcievents.com
Phone: 800-931-9543
International: 972-349-5539

OCTOBER 8 Any hotel changes or cancellations must be made directly with the hotel after October 7. Individual hotel cancellation policies can be found on your original housing confirmation.

REGISTRATION CHANGE/CANCELLATION INFORMATION

Full registration refunds, with no penalty, will be granted if written requests for cancellation are received by 5:00 pm CT on September 15, 2021. Course and Seminar tickets will be refunded in full until September 15, 2021. No refunds of any kind will be given after this date, regardless of cause. Refunds will not be given for no-shows.

CANCELLATION REQUESTS ACCEPTED VIA:

E-mail: cns@mcievents.com
Fax: 972-349-7715
Mail: CNS Annual Meeting
CNS Registration and Housing Center
6100 West Plano Parkway
Suite 3500
Plano, TX 75093

HOTEL INFORMATION

Please contact MCI, the official CNS Annual Meeting Registration and Housing Center, to reserve your guest rooms.

Hotels will not accept reservations from CNS meeting attendees directly. Reservations can be made online or via fax, phone, or mail.

Visit cns.org/2021 to make your reservation today! Be sure to complete the entire housing section on the registration site.

Hotel reservations are only available to registered CNS attendees. Rooms are subject to availability. Reserve your room by September 15.

DEPOSIT

A deposit of one night's room and tax is due at the time your hotel reservation is made. This payment must be submitted with your registration fee and will be charged to the credit card provided. Please make checks payable to: CNS Registration and Housing Center at 6100 W. Plano Parkway, Suite 3500, Plano, TX 75093. All rooms are subject to applicable state and local taxes. A small portion of your room rate will be used to help defray the cost of registration and housing services. Hotel reservations requested without deposit will not be processed.

HOTEL CHANGE/CANCELLATION POLICY

The deadline for new reservations is September 15 based on availability. The hotel requires a deposit of one night's room and tax to reserve your room. Please make any changes or cancellations through the CNS housing bureau, MCI, through October 7. Beginning October 8, changes and cancellations must be made directly with your reserved hotel. Please refer to your housing confirmation for your individual hotel's cancellation policy.

BEGINNING OCTOBER 8, 2021

- All changes, cancellations, or questions regarding your reservation must be made directly with the hotel.
- If cancellation notice is not received according to the hotel policy, the deposit will be forfeited. Your individual hotel's cancellation policy can be found in your emailed confirmation.

COMPLIMENTARY HOUSING FOR CNS RESIDENT MEMBERS AND INTERNATIONAL VISTA RESIDENT MEMBERS

Complimentary housing at the CNS Annual Meeting is available to a limited number of CNS Resident members and International Vista Resident members on a first-come, first-served basis. To be considered for this program, members must:

- Complete and submit the Resident member housing application by Friday, July 9, 2021. Completed applications may be submitted by email: meetings@cns.org, fax: 847-240-0804, or mail: Congress of Neurological Surgeons, 10 North Martingale Rd., Suite 190, Schaumburg, IL 60173.
- Register for the 2021 CNS Annual Meeting by Friday, July 9, 2021.
- All residents enrolled in ACGME-approved programs have been automatically given complimentary CNS Resident membership.
- If you are not a CNS Resident member or International Vista Resident member, complete your application by July 16, 2021. You may also apply for CNS membership when you register for the Annual Meeting online and will be eligible for the Resident member registration rate.

Residents who choose to reserve a room through the CNS Annual Meeting Registration and Housing Center and are later accepted into the CNS Resident Housing Program are responsible for cancelling their original reservation. For complete resident housing application guidelines, please visit cns.org/2021/residents.

THANK YOU FOR YOUR CONTINUED SUPPORT OF THE CNS!

The CNS thanks you for your support in reserving your guest room through the official CNS Housing and Registration Center. The CNS, in negotiating contracts with convention centers and hotels, must commit to a minimum number of guest rooms. This commitment helps guarantee the availability of meeting space and helps control the cost of the meeting. A history of high utilization of our room block enables the CNS to negotiate better room rates for future meetings.

CNS Members join us for free in Austin! Register at cns.org/2021 by September 15!

HOTEL INFORMATION

All official CNS hotels are walking distance to the Austin Convention Center.

❶ JW MARRIOTT AUSTIN (HEADQUARTER HOTEL) | 110 East 2nd Street, Austin, TX 78701

Voted as a top hotel in Texas by Conde Nast readers in 2020, JW Marriott Austin is situated in the heart of downtown Austin and brings luxury comforts with sophisticated amenities. The urban resort features an on-site spa, room service, seven bars, three restaurants, Starbucks® and the largest guest rooms in the city with floor-to-ceiling windows. Grab a bite at the ever-popular Burger Bar, a food truck concept without the wheels, or lounge on the rooftop at Edge Rooftop + Bar, with cocktails and picturesque views of the Texas State Capitol and Lady Bird Lake. The hotel is located just steps from the best attractions and entertainment options Austin has to offer and easy access to the Austin Convention Center. Indulge in an upscale getaway at JW Marriott Austin.



- .3 Miles to Convention Center
- $326 Single/Double Rate per night (Excludes state/local tax and fees)
- 6 restaurants on property
- Room service
- Pool
- Fitness Center (Complimentary)
- Spa
- WiFi (Complimentary)
- Parking: On-site Parking – $49/daily, Valet Parking – $54/daily

❷ HILTON AUSTIN | 500 EAST 4TH STREET, AUSTIN, TX 78701

Hilton Austin is situated adjacent to the Convention Center in downtown Austin, TX. We're a quick walk from exclusive shopping, amazing restaurants and fun live music venues on 6th Street and the surrounding area. Guests of our renovated hotel also enjoy fantastic views of the Capitol of Texas and Lady Bird Lake from 31 stories up. Hotel dining, a full-service spa, VIP perks - we've got you covered for a great stay in Austin.



- 92 Feet to Convention Center
- $285 Single/Double Rate per night (Excludes state/local tax and fees)
- 3 restaurants on property
- Room service
- Pool
- Fitness Center (Complimentary)
- Spa
- WiFi (Complimentary)
- Parking

❸ FAIRMONT AUSTIN | 101 RED RIVER STREET, AUSTIN, TX 78701

A towering icon within a vibrant Central Business District, Fairmont Austin is uniquely located in downtown Austin amid the greenery of Palm Park and Waller Creek. The 37-story luxury hotel features richly appointed guest rooms and suites with picturesque vistas of Lady Bird Lake, a dramatic cityscape and the State Capitol. Guests indulge in exquisite dining and a pampering spa. Fairmont Austin engages guests with the city's famed music scene, as well as the area's celebrated cuisine and diverse artistic lifestyle.



- (Connected) 230 Feet to Convention Center
- $329 Single/Double Rate per night (Excludes state/local tax and fees)
- 5 restaurants on property
- Room service
- Pool
- Fitness Center (Complimentary)
- Spa
- WiFi (Complimentary)
- Parking: On-site Parking – $36/daily (plus tax), Valet Parking – $49/daily (plus tax)

❹ AUSTIN MARRIOTT DOWNTOWN | 304 East Cesar Chavez Street, Austin, TX 78701

Luxury-Refined. The highly anticipated Austin Marriott Downtown, which opened in early March, features iconic guest rooms including stunning suites, a rooftop pool with breathtaking views, three bars, and locally-inspired restaurants. Located right across the street from the Austin Convention Center and in walking distance from famed 6th Street, popular shops, and hottest restaurants, the Austin Marriott Downtown is the ideal location for stay experiences in one of America's most exciting cities. Come hear the new beat of Austin.



- .2 Miles to Convention Center
- $326 Single/Double Rate per night (Excludes state/local tax and fees)
- 4 restaurants on property
- Room service
- Pool
- Fitness Center (Complimentary)
- WiFi (Complimentary)
- Parking: On-site Parking – $49/daily, Valet Parking – $54/daily

❺ HYATT PLACE AUSTIN DOWNTOWN | 211 East 3rd Street, Austin, TX 78701



Located right near all the action in downtown Austin, the Hyatt Place Austin Downtown hotel is one block from the Austin Convention Center, three blocks from the 6th Street entertainment district and one mile from UT Austin campus.

- .1 Miles to Convention Center
- $219 Single/Double Rate per night (Excludes state/local tax and fees)
- Pool
- Fitness Center (Complimentary)
- WiFi (Complimentary)
- Parking: Valet Parking – $49/daily (plus tax)

2021 CNS Annual Meeting Hotels



★ Austin Convention Center
500 East Cesar Chavez Street
Austin, TX 78701

1 JW Marriott Austin
Headquarter Hotel
110 East 2nd Street
Austin, TX 78701

2 Hilton Austin
500 East 4th Street
Austin, TX 78701

3 Fairmont Austin
101 Red River Street
Austin, TX 78701

4 Austin Marriott Downtown
304 E Cesar Chavez St 4006
Austin, TX 78701

5 Hyatt Place Austin Downtown
211 East 3rd Street
Austin, TX 78701

EXHIBITORS AT THE 2021 CNS ANNUAL MEETING

The following exhibitors have confirmed their participation as of 5/6/21.

7D Surgical
Abbott
Allergan Inc.
American Association of Neurological Surgeons
American Surgical Company
Apex Medical, Inc.
Arbor Pharmaceuticals, Inc.
Baylor Scott & White Health
Biocomposites Inc.
Bioplate
BK Medical
Black Forest Medical Group
Boss Instruments Ltd
Boston Scientific
CarboFix Orthopedics, Inc.
ClearPoint Neuro, Inc.
DePuy Synthes
Designs For Vision, Inc.
DIXI Medical USA
DJO
EagleView Imaging, Inc.
elliquence
Elsevier, Inc.
Fehling Surgical Instruments
Gauthier Biomedical
GE Healthcare
Globus Medical
Hemedex, Inc.
Hitachi Healthcare
Integra LifeSciences
Invenio Imaging Inc
Joimax, Inc.
Journal of Neurosurgery
Karl Storz Endoscopy-America, Inc.
Kirwan Surgical Products
KLS Martin Group
Life Instrument Corporation
Medivis Inc
Medtronic
MicroVention
Misonix, Inc.
Mizuho America, Inc.
Mizuho OSI
Monteris Medical
Nadia International, Inc.
Natus Neurology Incorporated
NeuroPoint Alliance
Nexstim
North American Neuromodulation Society (NANS)
NovaBone Products LLC
NSK America Corp
NX Development Corp
Olympus America, Inc.
Orthofix
Orthofix
OssDsign AB
OsteoMed
Panasonic
Penumbra, Inc.
Peter Lazic US Inc.
Phasor Health LLC
PMT Corporation
RapidAI
Renishaw Inc.
Rose Micro Solutions
RosmanSearch, Inc.
Scanlan International, Inc.
Shukla Medical
Silk Road Medical
Sophysa
Spine Wave Inc.
Stryker
Surgalign
Surgeons Capital Management
SurgiTel
Sutter Medical Technologies USA
Synaptive Medical
Takayama Instrument, Inc
The Brain Aneurysm Foundation
Thieme Medical Publishers
Thompson Surgical Instruments, Inc.
Weatherby Healthcare
Xoran Technologies
Zap Surgical Systems, Inc.
Zeiss
Zimmer Biomet



Featuring live, in-person options in Austin!

CNS Oral Boards Review Virtual Course

September 11–12, 2021

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 Virtual Course prepare you for the last leg.

Register with CNS today.

cns.org/oralboards



Congress of Neurological Surgeons

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 Oral Boards Review Course
September 11–12, 2021 | Virtual
cns.org/oralboards

CNS Skull Base Fellows Course
September 16–17, 2021 | Cleveland, Ohio
cns.org/skullbase

2021 Jointly Provided Courses

Spine Summit 2021
July 28–31, 2021 | San Diego, California
spinesection.org

Tumor Section Satellite Symposium
October 15–16, 2021 | Austin, Texas
cns.org/tumor

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The CNS educational catalog offers hundreds of products searchable by keyword or specialty.

Explore our online learning options: Case of the Month, CNS Spotlight, CNS Podcasts, Neurosurgery Watch, Nexus, and The Surgeon's Armamentarium

For more information and pricing visit **cns.org/education.**

