

# QUICK PLANNER

AMERICAN ASSOCIATION OF NEUROLOGICAL SURGEONS

**THE CULTURE OF NEUROSURGERY**



---

# AANS**2022** PHILADELPHIA

---

APRIL 29-MAY 2

---

**#AANS2022**

Access the Meeting App

**[aans.org/app](https://aans.org/app)**

Complimentary internet access is available throughout  
the Pennsylvania Convention Center and The Headquarter Hotel,  
The Philadelphia Marriott Downtown

**Network:** AANS **Password:** aansmtgs

# M6-C™

Artificial Cervical Disc

Designed to mimic the structure and movement of a natural disc

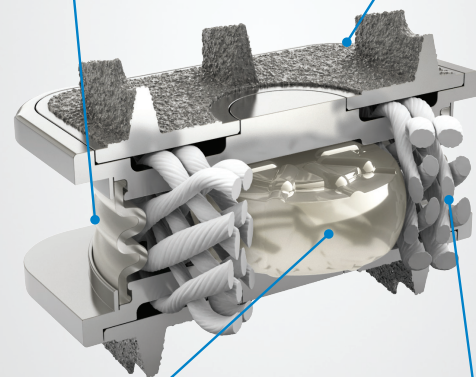
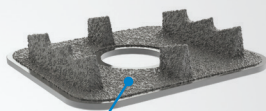
## Sheath

Minimizes tissue in-growth and debris migration.



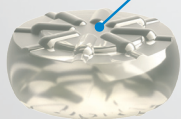
## Titanium Endplates

Provides acute fixation and long-term stability.



## Artificial Nucleus

Allows physiological axial compression.



## Artificial Annulus

Permits controlled motion in all planes and axes of rotation.



Booth #1544

[M6disc.com](http://M6disc.com) | [Orthofix.com](http://Orthofix.com)

OFS-2209 © Orthofix US LLC 02/2022

2 [www.aans.org/Meetings](http://www.aans.org/Meetings)

On the **MOVE.**



# TABLE OF CONTENTS

Thursday .....	5
Friday .....	15
Saturday .....	35
Sunday .....	63
Monday .....	85
Acknowledgements .....	146
Floor Plans for the.....	150
Pennsylvania Convention Center	
Floor Plans for the.....	152
Philadelphia Marriott Downtown	
Exhibit Hall Information .....	154

All room numbers refer to the Pennsylvania Convention Center unless otherwise noted.

**The following are available for the duration of the meeting:**

First Aid Station: Rear of Exhibit Hall A

Mother's Pod: Exhibit Hall AB Foyer

Quiet/Prayer Room: Room 308

Luggage and Coat Check available near 107

Sunday, May 1 & Monday, May 2.

\$3 fee per each item checked, cash only



# AANS2022 PHILADELPHIA

APRIL 29-MAY 2

## WIFI

Complimentary internet throughout  
the convention center



**Network Name: AANS**  
**Password: aansmtgs**

## AANS Meeting App

View scientific sessions, look up speakers,  
build your schedule and more.  
The AANS Meeting App is the easiest way to  
organize your meeting experience.

**Access the Meeting App at**  
**[aans.org/app](https://aans.org/app)**

## STAY CONNECTED WITH AANS



**[facebook.com/  
AANSneuro](https://facebook.com/AANSneuro)**



**[youtube.com/  
AANSneurosurgery](https://youtube.com/AANSneurosurgery)**



**@AANSneuro**  
AANS news and updates



**@AANSneurosurg** Latest articles and news  
from the neurosurgery community presented by  
*AANS Neurosurgeon*



**@thejns** Official Twitter feed of the *Journal of  
Neurosurgery* (JNS)



**@neurosurgery** Legislative, advocacy and  
policy-related news from the Washington Office

# #AANS2022

# THURSDAY, APRIL 28

Speakers listed are those who accepted the invitation to speak by March 24, 2022.

Please Note: All abstracts are published as submitted by authors.

**7:45 am–6 pm**

**Speaker Ready Room**

Location: 202 B

**7 am–6 pm**

**AANS Registration**

Location: Registration Bridge East

**10 am–7:30 pm**

**AANS Badge Pick Up**

Location: Room 309 Foyer, Philadelphia Marriott Downtown

**Badges  
required for entry to  
all sessions.**

There is a \$200 badge  
reprint fee for all lost or  
forgotten badges.



# THURSDAY, APRIL 28

It is with great pleasure that the leaders of the AANS welcome the Continental African Association of Neurological Societies (CAANS) and the European Association of Neurological Societies (EANS).

8 am–5 pm

## International Symposium

Location: 203 AB



9–9:17 am

## International Symposium—Opening Session

Moderator: K. Arunautovic

9–9:01 am

## Welcome: Chair, AANS International Program Committee, Coordinator of Committees, WFNS

K. Arunautovic



9:02–9:05 am

## Welcome: WFNS President

N. Oyesiku



9:06–9:09 am

## Welcome: EANS Secretary

A. Demetriades

9:10–9:13 am

## Welcome: CAANS President

N. El-Ghandour

9:14–9:17 am

## Welcome: WFNS President, Cape Town, South Africa (2023)

A. Fieggen

**9:18 am–12 pm**

**International Symposium—Session I: Pediatric**

Location: 203 AB

Moderators: P. Adelson, F. Boop, G. Grant

---

**9:18–9:33 am**

**New Perspectives on Cerebellar Mutism**

K. Aquilina

**9:34–9:49 am**

**Endoscopic Third Ventriculostomy Versus  
Ventriculo-Peritoneal Shunt in the Treatment  
of Obstructive Hydrocephalus Due to Posterior  
Fossa Tumors in Children**

N. El-Ghandour

**9:50–10:05 am**

**Current Concepts in Spina Bifida**

A. Fieggen

**10:06–10:20 am**

**Beverage Break**

**10:21–10:36 am**

**Staged Multi Technique Approach for Complex  
Hypothalamic Hamartomas**

J. Hinojosa

**10:37–10:52 am**

**Neurosurgical Training in Ghana, Past,  
Present and Future**

T. Totimeh

**10:53–11:08 am**

**Evidence in Entrapment Nerve Syndromes in the  
Pediatric Population—Indication for Surgery or Not?**

L. Rasulic

**11:09–11:24 am**

**Adjuncts in Pediatric Brain Tumor Surgery:  
The Role of Intraoperative Ultrasound**

L. Padaychy

# THURSDAY, APRIL 28

**11:25–11:40 am**

## **Upper Cervical Spinal Trauma in Pediatric Population**

B. Meyer

**11:41–12 am**

## **Pediatric Panel/Case Discussions**

**12:01–1:01 pm**

### **Lunch**

Concessions are available for purchase at ecoGrounds located level 2 near registration

**1:02–3:25 pm**

## **International Symposium— Session II: Stereotactic and Functional**

Location: 203 AB

Moderators: S. Sani, K. Slavin

**1:02–1:17 pm**

## **Hemispherotomy Complications**

K. Fountas

**1:18–1:33 pm**

## **Placement of Gasserian Balloon Compression in Percutaneous Treatment of Essential Trigeminal Neuralgia Series of 1080 Cases**

G. Lakhdar

**1:34–1:49 pm**

## **Combined Treatment in Spine Lesions: Surgery and Radiosurgery**

K. Sallabanda Daiz

**1:50–2:05 pm**

## **Volume Target Delineation of Malignant Brain Tumors in Gamma Knife Radiosurgery: Time to Change the Paradigm?**

F. Derkaoui Hassani

**2:06–2:21 pm**

## **Surgical Management of Spasticity in a LMIC**

N. Enslin

**2:22–2:37 pm**

**Repeated MR Guided Laser Induced Thermal Therapy (LITT) for Refractory Epilepsy in Tuberous Sclerosis Children (TSC): A Minimal Invasive Successful New Concept?**

K. Rossler

**2:38–2:53 pm**

**Functional Neurosurgery and Pediatric Neurological Disability in Egypt: 100 Years of NEUROSURGERY**

W. Abdel Ghany

**2:54–3:09 pm**

**Connectomics-based Personalized Targets in Functional Neurosurgery**

J. Barcia

**3:10–3:25 pm**

**Stereotactic and Functional Panel/Case Discussions**

**3:26–3:41 pm**

**Beverage Break**

**3:42–6 pm**

**International Symposium—Session III: Neurotrauma**

Location: 203 AB

Moderators: A. Reisner, F. Servadei, S. Timmons

**3:42–3:57 pm**

**The Need of International Collaboration for Developing Neurosurgical Care and Training in Ethiopia**

A. Tirsit

**3:58–4:13 pm**

**Surgery for Post Traumatic Epilepsy**

G. Broggi

**4:14–4:29 pm**

**The Role of Tranexamic Acid in the Management of TBI**

A. Belli

# THURSDAY, APRIL 28

**4:30–4:45 pm**

## **White Matter Abnormalities in Athletes with Persistent Post-concussion Symptoms**

N. Marklund

**4:46–5:01 pm**

## **Recent Developments in Neurotrauma Research—An European Perspective**

A. Unterberg

**5:02–5:17 pm**

## **Middle Meningeal Artery Embolization for Management of Chronic Subdural Hematoma**

C. Iaccarino

**5:18–5:33 pm**

## **Center-TBI's Surgical Considerations t-ASDH & t-ICH**

W. Peul

**5:34–6 pm**

## **Neurotrauma Panel / Case Discussions**



1–5 pm

## Practical Clinics

---

### 101 Neurotrauma and Neurocritical Care for the Practicing Neurosurgeon

Location: 110 AB

P. Ball, P. Hutchinson, S. Hoffer, R. Kitagawa, D. Okonkwo,  
P. Raksin, A. Rubiano, P. Villanueva

### 102 My Worst Mistakes in My First Year of Practice

Location: 108 AB

N. Bentley, L. Chambless, B. Elder, C. Halpern, E. Nduom, W. Stetler,  
K. Than, K. Tomei, A. Wang, C. Washington;

### 103 Minimally Invasive Lesioning: LITT, HIFU and RF

Location: 111 AB

E. Air, E. Chang, K. Smith, J. Willie



## NOTES

[illegible]

[illegible]

# AANS2022 PHILADELPHIA

APRIL 29-MAY 2

**Visit the AANS Neuro Hub  
Booth 1127**

## AANS Supports Your Neurosurgical Career

Visit the AANS Neuro Hub for all of  
your AANS Membership needs.

- ☐ AANS Member Services will answer questions regarding membership, including dues inquiries.
- ☐ Meet key personnel from AANS-affiliated organizations: *Journal of Neurosurgery* (JNS) and the Neurosurgery Research & Education Foundation (NREF). These organizations play an important role in advancing the cause of organized neurosurgery.
- ☐ Shop for AANS-branded apparel, gifts and publications.
- ☐ Pick up a complimentary 2022 AANS Annual Scientific Meeting travel blanket. Limited quantities.
- ☐ Make time to stop at the CME self-reporting station to document all of your earned CME.
- ☐ Stop by NeuroPoint Alliance (NPA) to see the latest registry partners
- ☐ See what opportunities are available at the AANS Volunteer Corp kiosk

**[www.aans.org/Meetings](http://www.aans.org/Meetings)**

# FRIDAY, APRIL 29

**7:45 am–4 pm**

## **Speaker Ready Room**

Location: 202 B

**7 am–7:30 pm**

## **Registration**

Location: Registration Bridge East

**7 am–7 pm**

## **AANS Badge Pick Up**

Location: Room 309 Foyer, Philadelphia Marriott Downtown

**9 am–4 pm**

## **COVID-19 Testing**



Location: 107 AB

**7:30am–4:30 pm**

## **International Symposium**

Moderator: K. Arnautovic

---

**7:30–10:18 am**

## **International Symposium—Session IV: Tumor**

Location: 201 C

Moderators: K. Arnautovic, E. Chiocca, O. Al-Mefty

---

**7:30–7:34 am**

## **Welcome**

K. Arnautovic

**7:35–7:50am**

## **Brainstem Tumors: Challenges of the Surgical Treatment**

M. Arraez

**7:51–8:06 am**

## **Pitfalls and Complications Avoidance in Endoscopic Surgery of Pituitary Adenomas**

N. El-Abadi

**8:07–8:22 am**

## **Fourth Ventricular Tumors of Adult and Pediatric Age**

F. Signorelli

# FRIDAY, APRIL 29

**8:23–8:38 am**

**Quo Vadis Neurosurgical Oncology—  
Molecular Oncology and Neurosurgery**

J. Tonn

**8:39–8:54 am**

**Na-Fluorescein Guided Surgery in Gliomas**

I. Solaroglu

**8:55–9:10 am**

**Parangliomas of Skull Base—A Surgical Entity**

L. Borba

**9:11–9:26 am**

**The Use of Skull Base Approaches to Minimize  
Approach-related Complications in Complex  
Neoplastic and Vascular Intraxial Lesions**

M. Iacoangelli

**9:27–9:42 am**

**Surgical Management of Lower Clivus and  
Foramen Magnum Tumors**

S. Caglar

**9:43–10:02 am**

**Tumor Panel/Case Discussions**

**10:03–10:18 am**

**Beverage Break**

**10:19 am–12:46 pm**

**International Symposium—Session V: Spine**

Location: 201 C

Moderators: Z. Gokaslan, T. Urakov, J. Wilson

---

**10:19–10:34 am**

**Where to Stop in Long Deformity Fusions  
(L5-S1 or Pelvis)**

A. Saoud

**10:35–10:50 am**

**When and How Far to Cross  
Thoracolumbar Junction?**

J. Lafuente

**10:51–11:06 am**

**Evolution of Treatment of Spine Metastasis**

S. Sharif

**11:07–11:22 am**

**Degenerative Cervical Myelopathy: A Wide  
Spectrum of Diseases**

E. Tessitore

**11:23–11:38 am**

**Discontinued and Unpublished RTCs in  
Spinal Conditions: Costs and Ethics of Research  
Resources Wastage**

A. Demetriades

**11:39–11:54 am**

**Spinal Dural AV Fistulas: Endovascular or  
Surgical Treatment?**

M. Vukic

**11:55 am–12:10 pm**

**Management of Lumbar Spinal Stenosis:  
WFNS Spine Committee Recommendations**

M. Zileli

# FRIDAY, APRIL 29

**12:11 pm–12:26 pm**

## **Decision-making in Spinal Infection— The MSI-20 Score**

C. Thome

**12:27–12:46 pm**

## **Spine Panel/Case Discussions**

**12:47–1:47 pm**

### **Lunch**

Concessions are available for purchase at ecoGrounds located level 2 near registration

**1:48–4:30 pm**

## **International Symposium—Session IV: Cerebrovascular**

Location: 201 C

Moderators: A. Arthur, N. Khan, J. Morcos

---

**1:48–2:03 pm**

## **The Effectiveness of Surgery in S.M Grade 3 and 4 Brain AVMs**

S. Florian

**2:04–2:19 pm**

## **Vascular Neurosurgery in Senegal: An Overview**

M. Thioub

**2:20–2:35 pm**

## **Contemporary Management Options for Intracranial Aneurysms of Distal Arterial Branche**

K. Rotim

**2:36–2:51 pm**

## **Role of Developing and Implementing Microsurgical Techniques of Clipping in the Mangement of Cerebral Aneurysms in Africa**

A. El Ouahabi

**2:52–3:07 pm**

## **Advances in the Endovascular Management of Brain AVMs**

R. Harrichandparsing

**3:08–3:23 pm**

**Timing of Carotid Endarterectomy After  
I.V. Thrombolysis and Mechanical Thrombectomy**

M. Sames

**3:24–3:39 pm**

**Beverage Break**

**3:40–3:55 pm**

**Cottonoid-guided Intraoperative Ultrasonography in  
Vascular Neurosurgery**

U. Türe

**3:56–4:11 pm**

**Hybrid Microsurgical and Endovascular Approach in  
the Treatment of Multiple Cerebral Aneurysms**

T. Sajko

**4:12–4:30 pm**

**Cerebrovascular Panel / Case Discussions**

**8 am–4:30 pm**

**Advanced Practitioners Plenary Session**

Location: 204 C

Moderators: A. Edwards, R. Saiki

**8–8:06 am**

**Welcome**

A. Edwards, R. Saiki

**8:07–8:35 am**

**Burden of Proof: Emerging Trends of Stroke  
Diagnostic Platforms Using AI and Treatment options**

TBD

**8:36–9:04 am**

**Anatomy: Correlative Neuroanatomy, Can You Name  
the Pathology and Expected Presentation?**

S. Ojemann

# FRIDAY, APRIL 29

**9:05–9:33 am**

**Clinical: DBS: Emerging Trends and Applications**

J. Gerrard

**9:34–10:02 am**

**Quality is the Best Policy**

A. Brill

**10:03–10:35 am**

**Beverage Break**

**10:36–11:04 am**

**Clinical: Spinal Jeopardy: APP Edition with Prizes!**

K. Crandall

**11:05–11:33 am**

**Clinical: Decreasing EMR Burnout in Clinical Practice**

A. Vigil

**11:34 am–12:02 pm**

**Clinical: Wheel of Misfortune:**

**You're on Call for the ER Tonight!**

A. Sethi

**12:03–1:03 pm**

**Lunch**

**Concessions are available for purchase at ecoGrounds located level 2 near registration**

**1:04–1:32 pm**

**Surgical: Burning Questions: Brain Tumors (When Surgery vs RT vs GK is Appropriate)**

S. Johnson

**1:33– 2:01 pm**

**Quality: Prevention & Treatment of Surgical Site Infection/SSI: To Be or Not To Be: Best Practice**

M. Johnson

**2:02–2:30pm**

**Radiology: Trauma Bay #1 S/c MVC: Radiology Edition**

J. Heymann, MD

**2:31–2:59 pm**

**Surgical: Burning Questions: Spine Edition—When is More Than One Approach Necessary?**

K. Crandall

**3–3:32 pm**

**Beverage Break**

**3:33–4:01 pm**

**Pharm: Applications and Potential Pitfalls of Cannabis in Neurosurgery**

N. Gofman

**4:02–4:30 pm**

**Pharm: Agitation in the Hospital—to Treat or Not to Treat**

N. Gofman

**8 am–4:30 pm**

**Practical Clinics**

---

**8 am–4:30 pm**

**201 Introduction to Cerebrovascular Neurosurgery for Residents**

Location: 113 BC

M. Binning, J. Davies, J. Fraser, D. Hoit, B. Jankowitz, J. Johnson, P. Kan, C. Kellner, J. Mascitelli, C. Ogilvy, J. Osbun, A. Pandey, R. Rahme, R. Replogle, D. Sigounas, R. Starke, R. Turner, S. Wolfe

**8 am–4:30 pm**

**202 Case-based Management of Traumatic Brain Injury**

Location: 103 AB

R. Bell, A. DiGiorgio, Z. Hickman, J. Jagid, J. Jallo, R. Kitagawa, D. Okonkwo, R. Rodgers, E. Sieg

# FRIDAY, APRIL 29

**8–11:30 am**

## **204 How to Apply to Residency**

Location: 201 A

O. Adogwa, N. Agarwal, F. Attenello, N. Barbaro, T. Chen, J. DiCesare, D. Dornbos, C. Graffeo, B. Howard, B. Kennedy, R. Komotar, J. Linzey, K. Madhavan, D. Mukherje, C. Quinsey, A. Richardson, L. Stone-McGuire, I. Yang, J. Yeung

**8–11:30 am**

## **205 Technological Adjuncts for Malignant Brain Tumor Surgery**

Location: 110 AB

M. Aghi, K. Chaichana, F. DiMeco, C. Hadjupanayis, D. Orringer, A. Sloan, W. Stummer, M. Vogelbaum

**8–11:30 am**

## **206 Brain Mapping and Awake Mapping Techniques**

Location: 111 AB

L. Bello, M. Berger, R. Byrne, H. Duffau, J. Gonzales-Martinez, G. Grant, G. McKhann, N. Sanai,

**1–4:30 pm**

## **207 You Are Never Too Old for Surgery: Spine Management in an Aging Population**

Location: 201 A

N. Brooks, D. Dirisio, K. Jones, A. Krishnaney, V. Matheus, E. Momin, L. Prado, J. Shin, M. Steinmetz, A. Strayer, E. Tsai,

**1–4:30 pm**

## **208 CPT Coding Update with ICD-10 for Neurosurgeons**

Location: 203 B

A. Desai, R. Johnson, J. Ratliff, S. Meyer, M. Oppenlander, K. Pollock, C. Schirmer, S. Simon, L. Tumialan, C. Upadhyaya, A. Veeravagu,

**1–4:30 pm**

## **209 Practical Clinic—Building a High Volume Patient-Centric Practice with Optimal Outcomes**

Location: 114

R. Byrne, A. Dailey, D. Eichberg, J. Howington, R. Komotar, S. Prasad, L. Schlatter, R. Spetzler, A. Wilson

**1–4:30 pm**

**Problems and Solutions Using Cutting  
Edge Technology**

Location: 108 AB

---

**1–2:30 pm**

**Cerebrovascular Cases**

A. Arthur, M. Bain, D. Hoit, S. Wolfe

**2:30–4 pm**

**Spine Cases**

J. Chen, J. Larson, J. Yoon, M. Wang

**12–5 pm**

**NREF Cushing Circle of Giving VIP Lounge**

Location: 203 A

---

Open to members of the NREF Cushing Circle of Giving, the Young Neurosurgeons Circle of Giving and invited guests, access to this lounge is by invitation only.

**12–3:30 pm**

**Young Neurosurgeons Research Forum**

Location: 204 A

Moderator(s): R. D'Amico, D. Mukherjee, J. Turner

---

**12–12:02 pm**

**Welcome**

J. Turner

**12:03–12:05 pm**

**Introduction to the Osler Lecture**

W. Sivakumar



**12:06–12:33 pm**

**Osler Lecture**

S. Giannotta

# FRIDAY, APRIL 29

**12:34–12:43 pm**

**Medical Summer Research Foundation Award:  
Abstract Presentation**

M. Bauman

**12:44–12:51 pm**

**Intra-Arterial Encephalography from  
Acutely Implanted Aneurysm Embolization  
(WEB) Device in Awake Humans**

A. Piscopo



**12:52–12:59 pm**

**Neuroprotective Effect of Steroid Receptor  
Coactivator Stimulator (MCB-613) in a Murine  
Ischemic Stroke Model**

T. Lazaro

**1–1:07 pm**

**Analysis of Spinal Canal Diameter in the Placement of  
Thoracic Spinal Cord Stimulator (SCS) Paddle Leads**

T. Riedman

**1:08–1:15 pm**

**Case Series: Postoperative Radiculopathy after  
Spinal Cord Stimulator Placement**

S. Parker

**1:16–1:23 pm**

**Whole Exome Sequencing and Integrative  
Multi-omics Approach Identify Biological  
Mechanisms and Critical Spatiotemporal Points  
Related to Neurodevelopmental Symptoms of  
Craniosynostosis**

E. Kiziltug

**1:24–1:31 pm**

**Is Cranial Ultrasound Prognostic Beyond the Papile  
Grade? A Volumetric Analysis of Germinal Matrix  
Hemorrhage-Intraventricular Hemorrhage**

P. Yang

**1:32–1:48 pm**

**Beverage Break**

**1:49–1:56 pm**

**Resection of the Fusiform Gyrus Predicts Decline in Object Naming**

K. Snyder

**1:57–2:04 pm**

**Epidural Stimulation Restores Muscle Synergies by Modulating Neural Drives in Complete Spinal Cord Injured Patients**

I. Pena Pino

**2:05–2:12 pm**

**Quantifying the Need for Emergency Neurosurgical Intervention Around the World**

A. Smith

**2:13–2:20 pm**

**The Impact of a Problem-based Note Template on Neurosurgical Quality Metrics**

R. Ali

**2:21–2:28 pm**

**Does the Use of Preoperative Gabapentinoids or Benzodiazepines Decrease Postoperative Use of Narcotics in Neurosurgery Patients?**

V. Letchuman

**2:29–2:36 pm**

**Functional Outcomes after Surgery for Grade 1 Lumbar Spondylolisthesis: A 5-Year QOD Study**

T. Yee



**2:37–2:44 pm**

**Surgical Management of Spinal Nerve Schwannoma of the Sacrum: a Retrospective Study and Literature Review**

W. Mualem

# FRIDAY, APRIL 29

**2:45–2:52 pm**

## **The Impact of Nerve Reconstruction on Long-Term Shoulder and Elbow Function in Neonatal Brachial Plexus Palsy**

W. Muhlestein

**2:53–3 pm**

## **Effects of Hours of Sleep on Immediate Post-Concussion Assessment & Cognitive Testing (ImPACT): Comparing Baseline to 1st Concussion Performance**

E. Hrabarchuk

**3:01–3:08 pm**

## **Presentation, Treatment and Outcome of Traumatic Dural Venous Sinus Thrombosis**

C. Young

**3:09–3:16 pm**

## **Enhanced Immunogenicity via Protein Phosphatase 2A (PP2A) Inhibition in SB28 Mouse Glioma Model**

O. Das

**3:17–3:24 pm**

## **Convection-delivered Adenoviral Gene Therapy Reprograms the Immunosuppressive Glioblastoma Microenvironment**

J. Young

**3:25–3:30 pm**

## **Presentation of Quest Award Winners**

Reviewer/Judge: R. D'Amico, S. Giannotta, D. Mukherjee,  
W. Sivakumar, J. Turner

**5–6:30 pm**

**AANS Opening Session**

Location: Exhibit Hall C

Moderator(s): R. Haid

---

**5–5:02 pm**

**Welcome to the Opening Session**

R. Haid

**5:03–5:05 pm**

**Introduction to the Rhoton Family Lecture**

S. Wolfe



**5:06–5:18 pm**

**Rhoton Family Lecture**

L. Tumialán

**5:19–5:21 pm**

**Introduction of the Distinguished Service Award**

R. Haid



**5:21–5:22 pm**

**Distinguished Service Award**

J. Rutka

**5:23–5:25 pm**

**Introduction of the Humanitarian Award**

A. Asher



**5:25–5:26 pm**

**Humanitarian Award**

R. Hartl

# FRIDAY, APRIL 29

**5:27–5:29 pm**

## **Introduction to the Chuck Noll Lecture**

D. Okonkwo



**5:30–5:48 pm**

## **Chuck Noll Lecture**

A. Sills

**5:49–5:53 pm**

## **Diversity Initiative**

A. Abosch

**5:54–5:56 pm**

## **Introduction of Michael Bush**

A. Abosch

**5:56–5:58 pm**

## **Introduction of Jerome Bettis**

J. Maroon



**5:59–6:30 pm**

## **Panel Discussion**

A. Abosch, J. Bettis,  
M. Bush, R. Haid

**6:30–8:30 pm**

## **AANS Exhibit Hall**

The AANS Exhibit Hall brings together over 150 companies, offering innovation products and services to the neurosurgical field. This is an opportunity to interact with exhibitors and experience unique advancements in the field of neurosurgery.

**6:30–8:30 pm**

### **AANS Opening Reception in the AANS Exhibit Hall**

Celebrate The Culture of Neurosurgery with an enjoyable evening of music, cocktails and hors d'oeuvres with colleagues. Taking place in the AANS Exhibit Hall, this is a chance to reconnect in-person with colleagues, as well as an opportunity to see the latest technology up-close. Accompanied by live music from The Neurosurgery Jazz Quintet Plus One, make sure to be seen at this annual event.

### **The Neurological Jazz Quintet Plus One members:**



#### **Drums**

Philip R. Weinstein, MD, FAANS(L)



#### **Trumpet**

James E. Rose, MD, FAANS



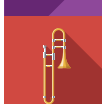
#### **Vocal**

Sue Ellen Barbaro



#### **Piano**

R. Michael Scott, MD, FAANS



#### **Trombone**

Donald Quest, MS, FAANS(L)



#### **Bass:**

Paul Camarata, MD, FAANS



#### **Saxophone:**

Casey Halpern, MD



## NOTES

[illegible]

# AANS2022 PHILADELPHIA

## Rules and Regulations

**PLEASE NOTE** that presenters, exhibitors and attendees are **not allowed** to record any presentations or sessions that are part of the AANS Annual Scientific Meeting. This includes any and all means of recording, including but not limited to video or audio recordings.

All sessions conducted during the AANS Annual Scientific Meeting, or as part of pre- or post-meeting content, are the sole and exclusive property of the AANS and are not eligible for recording, pre-purpose or re-broadcast except by the AANS.

Presenters or attendees found to be in violation of this policy will surrender their badges and be escorted from the meeting.

The AANS reserves the right to pursue and exercise any and all remedies available to it, whether in law or in equity, for violations of this policy.

## NOTES

[illegible]

# AANS2022 PHILADELPHIA

APRIL 29-MAY 2

## PRESENTATION THEATER

Located in the AANS Neuro Hub  
**Booth 1127**

### **The Presentation Theater**

features industry presentations, late-breaking abstracts, meet and greets with AANS leadership, as well as a sampling of AANS products and services. If you are looking for a little education and entertainment, stop in during exhibit hours and check the app for the latest schedule.

### **SATURDAY**

**10:20-10:45 am**

*Presented by Orthofix*

**3:45-4:10 pm**

**Simplifying Surgery: Augmented Reality  
in Complex Procedures**

**Speaker: T. Williamson**

*Case Studies featuring Augmedics xvision*

**NEW THIS YEAR**

# 2022 AANS Annual Scientific Meeting

## COMMUNITY SESSIONS

### WHAT ARE COMMUNITY SESSIONS?

Community Sessions are interactive debates and presentations featuring the most important literature, controversial topics and newest technologies in neurosurgery.

These high-level discussions present opportunities to connect, collaborate and generate new ideas. Each session provides a sharp focus on a specific area of neurosurgical practice, pathology or techniques.

### WHEN ARE THE SESSIONS?

Participants can visit sessions on **May 2** to offer thoughts, and discover work by others with similar goals and ambitions toward advancing neurosurgery.

### IS LUNCH PROVIDED AT THE SESSIONS?

Lunch will be provided at Philadelphia's historic Reading Terminal Market.

### ARE THE SESSIONS TICKETED EVENTS?

You do not need a ticket to take advantage of Community Sessions.

# SATURDAY, APRIL 30

**7:45 am–4 pm**

## **Speaker Ready Room**

Location: 202 B

**7 am–6:30 pm**

## **AANS Registration**

Location: Registration Bridge East

**6:30 am–2 pm**

## **AANS Badge Pick Up**

Location: Room 309 Foyer, Philadelphia Marriott Downtown

**9 am–4 pm**

## **COVID-19 Testing**



Location: 107 AB

**7 am–4 pm**

## **NREF Cushing Circle of Giving VIP Lounge**

Location: 203 A

---

Open to members of the NREF Cushing Circle of Giving, the Young Neurosurgeons Circle of Giving and invited guests, access to this lounge is by invitation only.

**7–8 am**

## **AANS/CNS Section on Women in Neurosurgery (WINS) Breakfast**

Non-CME Event

Location: Liberty Ballroom, Salon C,  
Philadelphia Marriott Downtown



### **Louise Eisenhardt Lecturer**

E. Duflo

Ticket Required

\$125 for physicians

\$65 for neurosurgical team members

**8 am–4:30 pm**

## **AANS Exhibit Hall**

Location: Exhibit Hall AB

# SATURDAY, APRIL 30

**8–10 am and 11am–1 pm**

**Surgical Suite Presentations by DePuy Synthes**

Location: Booth 1851

---

**UNLEASH® Solutions Procedure Based Practical Lab**

Please join DePuy Synthes at this hands-on practical lab focusing on MIS TLIF Solutions.

**8–8:30 am**

**Beverage Break in the AANS Exhibit Hall**

**8:30 am–12:34 pm**

**Plenary Session I**

Access to Plenary Session is through the AANS Exhibit Hall

Moderator(s): A. Arthur, M. Wang

---

**8:30–8:36 am**

**Historical Film: Constitution: Consensus amid Polarization**

**8:36–8:39 am**

**Welcome**

A. Arthur

**8:40–8:42 am**

**Introduction to the AANS Presidential Address**

C. Shaffrey



**8:43–9:12 am**

**AANS Presidential Address**

R. Haid

**9:13–9:15 am**

**Introduction to the Louise Eisenhardt Lecture**

E. Air



**9:16–9:45 am**

**Louise Eisenhardt Lecture**

E. Duflo

**9:46–9:54 am**

**Leica Award**

**A multi-center Study of Intra-operative, in Vivo, Optics-based Detection of Brain Tumor Tissue Using Raman Spectroscopy and Machine Learning**

C. Hadjipanayis

**9:55–9:57 am**

**Abstract Discussant: A Multi-center Study of Intra-operative, in Vivo, Optics-based Detection of Brain Tumor Tissue Using Raman Spectroscopy and Machine Learning**

D. Orringer

**9:58–10:06 am**

**A Novel and Targetable Mechanism of Immuno-secretory Function at the Choroid Plexus-Cerebrospinal Fluid Interface**

S. Robert

**10:07–10:09 am**

**Abstract Discussant: A Novel and Targetable Mechanism of Immuno-secretory Function at the Choroid Plexus-cerebrospinal Fluid Interface**

S. Robinson

**10:10–10:13 am**

**NREF Update**

M. Groff

**10:14–10:44 am**

**Beverage Break in the AANS Exhibit Hall**

Sponsored by: Elekta

# SATURDAY, APRIL 30

**10:45–10:47 am**

## **Introduction of the International Lifetime Recognition Award**

M. Wang



**10:48–10:50 am**

## **International Lifetime Recognition Award**

A. Falavigna

**10:51–10:53 am**

## **Introduction to the Hunt-Wilson Lecture**

R. Haid



**10:54–11:33 am**

## **Hunt-Wilson Lecture**

P. Noonan

**11:34–11:41am**

## **Late Breaking Abstract: Long-Term Safety of an Endovascular Brain-Computer Interface for Severe Paralysis: Results of a First-in-Human Clinical Trial**

J Mocco

**11:42–11:44 am**

## **Discussant: Long-Term Safety of an Endovascular Brain-Computer Interface for Severe Paralysis: Results of a First-in-Human Clinical Trial**

S. Sheth

**11:45–11:53 am**

## **Stewart Dunsker Award for Best Clinical Spine Abstract**



## **Comparing Posterior Cervical Foraminotomy with Anterior Cervical Discectomy and Fusion in Radiculopathic Patients: An Analysis from the QOD**

M. Bydon

**11:54–11:56 am**

**Discussant: Comparing Posterior Cervical Foraminotomy with Anterior Cervical Discectomy and Fusion in Radiculopathic Patients: An Analysis from the QOD**

E. Benzel

**11:57 am–12 pm**

**NPA Update**

J. Knightly

**12:01–12:02 pm**

**Introduction of the AANS Cushing Award for Technical Excellence and Innovation in Neurosurgery**

R. Haid



**12:03–12:06 pm**

**AANS Cushing Award for Technical Excellence and Innovation in Neurosurgery**

C. Shaffrey

**12:07–12:09 pm**

**Introduction of the NREF WINS Mummenl Resident Award**

P. Mummaneni

**12:09–12:17 pm**

**Young Neurosurgeon Abstract Award  
Single-Cell Transcriptome Analysis Reveals Dynamic Cell Populations and Differential Gene Expression Patterns in a Mouse Cerebral Aneurysm Model**

I. McCormack

**12:18–12:20 pm**

**Abstract Discussant: Single-Cell Transcriptome Analysis Reveals Dynamic Cell Populations and Differential Gene Expression Patterns in a Mouse Cerebral Aneurysm Model**

B. Hoh

# SATURDAY, APRIL 30

**12:21–12:22 pm**

## **Introduction to the Richard Schneider Lecture**

V. Traynelis



**12:23–12:32 pm**

## **Richard Schneider Lecture**

R. Byrne

**12:33–12:34 pm**

## **Introduction to the Lunch and Learn Seminars**

M. Wang

**12:35–1:30 pm**

## **Lunch in the AANS Exhibit Hall for Medical Attendees**

**Location: Exhibit Hall AB**

**12:40–1:25 pm**

## **Lunch and Learn Seminars**

Non-CME Events

Learn while you have lunch in the Exhibit Hall.

### **Stealth Tractography | The New Standard for Easier, More Advanced Tractography**

Location: Booth 1611

*Presented by Medtronic*

### **PTP—Prone Transposas The Evolution of Lateral Surgery**

Location: Booth 1835

*Presented by ATEC Spine*

**Learn more about STaRT, including clinical data, case reviews, and the Piedmont Brain Tumor Center's early experience with their GammaTile Therapy program.**

Location: Booth 1635

*Presented by GT Medical Technologies, Inc.*

**ZEISS CONVIVO In Vivo Pathology Suite—User Experience With Real-time & Remote Collaboration Between the Neurosurgeon and the Pathologist.**

Location: Booth 1811

*Presented by ZEISS*

**Comprehensive 2-in-1 Robotic Navigation Platform: Spine and Cranial Applications**

Location: Booth 1849

*Presented by Globus Medical*

**1–2:30 pm**

**Advanced Practitioners Luncheon**



Location: 104 B

Moderator(s): A. Edwards, R. Saiki

Ticket Required

\$65

**2:30–6 pm**

**APP Advancements in Neurotrauma Care**

Location: 204 C

C. Baker, V. Ban, A. Carlson, A. Edwards, H. Hoffman, T. Jensen, J. Maroon, P. Patel, S. Perera, R. Saiki

**2–3:30 pm**

**3D Session—Operative Nuances I: Difficult Cases: What Have We Learned?**

Location: 114

M. Baskaya, A. Cohen-Gadol, J. Fernandez-Miranda, P. Gardner

**2–5:30 pm**

**Scientific Session I: Tumor**

Location: 201 C

Moderator(s): R. D'Amico, N. Moss



**2–2:03 pm**

**Welcome**

Moderators: R. D'Amico, N. Moss

**2:04–2:06 pm**

**Introduction to the Bittner Lecturer**

J. Sheehan

# SATURDAY, APRIL 30



**2:07–2:25 pm**

## **Bittner Lecture: Artificial Intelligence and Augmented Reality in Neuro-oncology**

W. Couldwell

**2:26–2:31 pm**

## **Introduction of The NeuroPoint Alliance Tumor Registry**

J. Elder

**2:32–2:37 pm**

## **Introduction of the AANS SRS Registry**

J. Sheehan

**2:38–2:48 pm**

## **Augmented reality In Neuro-Oncology**

W. Jean

**2:49–2:59 pm**

## **Brain Mapping/Connectome**

M. Sughrue

**3–3:10 pm**

## **Intraop Radiation**

C. Cifarelli

**3:11–3:21 pm**

## **Drug Delivery**

M. Vogelbaum

**3:22–4:32 pm**

## **Updates on Fluorescence Guided Neuro-oncology**

C. Hadjipanayis

**3:33–4:03 pm**

## **Beverage Break in the AANS Exhibit Hall**

**Location: Exhibit Hall AB**

**4:04–4:10 pm**

**American Brain Tumor Association  
Young Investigator Award**



**Microenvironmental Correlates of Immune  
Checkpoint Inhibitor Response in Human Melanoma  
Brain Metastases Revealed by T Cell Receptor and  
Single-cell RNA Sequencing**

C. Alvarez-Breckenridge

**4:11–4:17 pm**

**KLS Martin Award**

**Prospective Validation of Machine Learning  
Technique for Automated Intraoperative Frozen  
Diagnosis of Brain Tumors**

S. Khalsa

**4:18–4:24 pm**

**Stryker CNS Tumor Award**

**Evaluating Efficacy of a Novel Hydrogel-CXCL9-  
mRNA Vaccine in Combination with Temozolomide  
in a Murine Glioma Model**

Y. Mehkri

**4:25–4:31 pm**

**Ronald L. Bittner Award on Brain Tumor Research  
CNS Drug Screening Identifies Metixene as a Novel  
Autophagy Modulator in Brain Metastases**

J. Fares

**4:32–5:30 pm**

**Skull Base Panel Discussion: Controversies in  
Craniopharyngioma Management**

Moderator: G. Zenonos

---

**4:32–4:37 pm**

**Presentation of Cases**

G. Zenonos

**4:38–4:48 pm**

**Surgery Remains the Standard of Care for  
Craniopharyngioma**

G. Bakhoudarian

# SATURDAY, APRIL 30

**4:49–4:59 pm**

## **Melting Craniopharyngiomas Away**

F. Barker

**5–5:30 pm**

## **Case Discussion Panel**

P. Gardner, D. Prevedello, P. Recinos

**2–5:30 pm**

## **Scientific Session II: Spine**

Location: 201A

Moderator(s): S. Meyer, C. Sansur, L. Tumialan



**2–2:03 pm**

## **Welcome**

S. Meyer, C. Sansur, L. Tumialan

**2:04–2:29 pm**

## **Success and Failure in Cervical Motion Preservation—Lessons Learned Over Time, and Predictions for the Future.**

V. Traynelis

**2:30–2:50 pm**

## **Follow the Patient: Central Cord Syndrome**

P. Mummaneni

**2:51–3:11 pm**

## **Follow the Patient: Geriatric Odontoid Fracture**

B. Aarabi

**3:12–3:31 pm**

## **Clinical Quandaries: Cervical Stenosis with Myelopathy—When is Laminoplasty Reasonable**

Z. Ghogawala

**3:32–4:01 pm**

## **Beverage Break in the AANS Exhibit Hall**

Location: Exhibit Hall AB

4:02–4:25 pm

**Top Abstracts**

---

4:02–4:07 pm

**Improvement in Resident Performance for Minimally Invasive Lumbar Decompression Using a State-of-the-Art Simulator**

I. Hussain

4:08–4:13 pm

**Outpatient versus Inpatient Lumbar Discectomy: A Matched Study Investigating Patient-Reported and Surgical Outcomes**

J. Mooney



4:14–4:19 pm

**Sarcopenia as A Predictor of Survival in Oncological Spine Surgery: Validation of CT Morphometric Measurement of Psoas Size**

R. De la Garza Ramos

4:20–4:25 pm

**Abstract Discussion (Q&A)**

4:26–4:46 pm

**Patient Perspective: Spinal Cord Injury Patient That Got Better—Interview with Former NFL Player Ryan Shazier**

Moderator: R. Haid

Interview Speaker: D. Okonkwo, R. Shazier, L. Tumialan

4:47–5:08 pm

**Published Essentials**

---

4:47–4:57 pm

**Paper #1**

M. Wang

4:48–5:08 pm

**Paper Title #2**

C. Upadhyaya

# SATURDAY, APRIL 30

5:09-5:30 pm

## Technique Sessions

---

5:09-5:19 pm

### C1-C2 Fusion

M. Groff

5:20-5:30 pm

### Odontoid Screw

E. Bisson

2-5:30 pm

## Scientific Session III: AANS/CNS Section on Pain

Location: 110 AB

Moderator(s): P. Patil, C. Wu



2-2:02 pm

### Welcome

2:03-2:05 pm

### Introduction

P. Patil



2:06-2:36 pm

### John Loeser Lecture

J. Campbell

2:36-2:47 pm

### Discussion (Q&A)

2:48-3:43 pm

## Top Abstracts

---

2:48-2:56 pm

### William H. Sweet Young Investigators Award Internal Neurolysis Versus Intraoperative Glycerin Rhizotomy for Trigeminal Neuralgia

R. Xu

**2:57–3:05 pm**

**Twelve-month Outcomes from RCT: 10kHz Spinal Cord Stimulation for Treating Non-surgical Refractory Back Pain**

N. Patel

**3:06–3:14 pm**

**Durability of 10-kHz Spinal Cord Stimulation for Painful Diabetic Neuropathy: 18-Month Multicenter Randomized Controlled Trial Results**

E. Petersen

**3:15–3:23 pm**

**Can Paddle Spinal Cord Stimulators be Safely Replaced?**

T. Harland

**3:24–3:39 pm**

**Abstract Discussion (Q&A)**

**3:40–4:03 pm**

**Beverage Break in the AANS Exhibit Hall**  
**Location: Exhibit Hall AB**

**4:04–4:25 pm**

**Ancillary Updates**

---

**4:04–4:19 pm**

**Using Imaging for Prognosis in Microvascular Decompression**

P. Patil

**4:20–4:25 pm**

**Discussion (Q&A)**

# SATURDAY, APRIL 30

4:26–4:59 pm

## Technique Session

---

4:26–4:36 pm

### Nucleus Caudalis Dorsal Root Entry Zone Ablation (DREZ)

A. El-Naggar

4:37–4:42 pm

### Discussion (Q&A)

4:43–4:53 pm

### Nervus Intermedius Sectioning

A. Raslan

4:54–4:59 pm

### Discussion (Q&A)

5–5:30 pm

### Open Panel Discussion: Spinal Cord Stimulation Versus Revision Open Spine Surgery for Pain

2–5:30 pm

### Scientific Session IV: AANS/CNS Section on Pediatric Neurological Surgery

Location: 111 AB

Moderator(s): D. Hertzler, R. Naftel



2–2:04 pm

### Welcome

Moderators: D. Hertzler, R. Naftel

2:05– 2:08 pm

### Introduction to the Donald D. Matson Lecture

M. Krieger



2:09–2:39 pm

### Donald D. Matson Lecture: Modernization of the Pediatric Neurosurgeon: Lessons Learned Over 30 Years

J. Rutka

2:40–2:50 pm

**Discussion (Q&A)**

2:51–3:56 pm

**Top Abstracts**

---

2:51–2:59 pm

**Surgical Revascularization Decreases Stroke and TIA Risk in Children with Sickle Cell Disease and Moyamoya Syndrome: Results of the Stroke in Sickle Cell Revascularization Study (SiSCRS)**

P. Aldana



3–3:08 pm

**Modeling the Effect of Repetitive Mild Traumatic Brain Injury on Long-Term Seizure Risk in Children**

M. Jin

3:09–3:17 pm

**Predicting Changes in Cranial Index Following Spring Mediated Cranial Vault Expansion in Non-Syndromic Sagittal Craniosynostosis: Stepwise and Machine Learning Algorithm Approach**

D. Villavisanis

3:18–3:26 pm

**Effects of Socioeconomic Status on Glial Tumor Survival in Pediatric Populations: A Population-Based Study**

G. Johnson

3:27–3:35 pm

**Impact of Syndromic Conditions on Outcomes after Decompression in Children with Type I Chiari Malformation and Syringomyelia: an Analysis of the Park-Reeves Syringomyelia Research Consortium Registry**

S. Savchuk

# SATURDAY, APRIL 30

**3:36–3:44 pm**

**Novel 3D Modeling of Brain and Ventricular Compliance in Children with Hydrocephalus Using Deformation-based Morphometry**

M. Zhang

**3:45–3:56 pm**

**Abstract Discussion (Q&A)**

**3:57–4:26 pm**

**Beverage Break in the AANS Exhibit Hall**

**4:27–4:57pm**

**Clinical Quandaries: Craniopharyngioma**

P. Storm

**4:58–5:27 pm**

**Published Essentials**

---

**4:58–5:07 pm**

**Dural Augmentation Approaches and Complication Rates After Posterior Fossa Decompression for Chiari I Malformation and Syringomyelia: a Park-Reeves Syringomyelia Research Consortium Study**

A. Yahanda

**5:08–5:17 pm**

**Management Strategies for Recurrent Pediatric Craniopharyngioma: New Recommendations**

M. Fouda

**5:18–5:27 pm**

**Discussion (Q&A)**

**5:28–5:30 pm**

**Award Acknowledgment**

D. Hertzler

2–5:30 pm

**Scientific Session V: AANS/CNS  
Cerebrovascular Section**

Location: 204 A

Moderator(s): D. Sasaki-Adams, R. Starke



2–2:02 pm

**Welcome**

D. Sasaki-Adams, R. Starke

2:03–2:06 pm

**Introduction to the M. Gazi Yasargil Lecture**

C. Schirmer



2:07–2:37 pm

**M. Gazi Yasargil Lecture**

B. Hoh

2:38–2:41 pm

**Discussion (Q&A)**

2:42–3:02 pm

**Follow the Patient—Diagnostic Challenge: Pro and  
Con Perfusion Imaging vs. Non-contrast CT**

F. Albuquerque, E. Levy

3:03–3:23 pm

**Discussion (Q&A)**

3:24–3:26 pm

**Introduction to the Raymond M. Donaghy Lecture**

S. Tjoumakaris



3:27–3:57 pm

**Raymond M. Donaghy Lecture**

C. David

# SATURDAY, APRIL 30

3:58–4:01 pm

Discussion (Q&A)

4:02–4:32 pm

Beverage Break in the AANS Exhibit Hall

4:33–5:08 pm

Top Abstracts

4:33–4:40pm

**Cerebrovascular Section Best Basic Scientific Paper**  
**Fetal Radiation Exposure Risks in the Pregnant**  
**Neurointerventionalist**

S. Cheng

4:40–4:47 pm

**Louise Eisenhardt Travel Scholarship**

**NREF WINS Mummaneni Resident Award**

**Non-invasive Vagus Nerve Stimulation to Mitigate**  
**Subarachnoid Hemorrhage Induced Inflammation:**  
**A Pilot Randomized Controlled Trial**

A. Huguenard



4:48–4:55 pm

**International Travel Scholarship**

**Middle Meningeal Artery Embolization for Chronic**  
**Subdural Hematomas: Predictors of Treatment Failure**  
**from Multicenter Experience of 368 Embolizations**

M. Salem

4:56–5:03 pm

**Intra-arterial Transplantation of Mitochondria After**  
**Ischemic Stroke Reduces Cerebral Infarction**

M. Kalani

5:03–5:08 pm

**Abstract Discussion (Q&A)**

5:09–5:30 pm

**Open Panel Discussion on AVM Multimodal**  
**Management**

Moderator: A Siddiqui

M. Lawton, D. Kondziolka, V. Mendes Pereira, S. Wolfe

2–5:30 pm

**Scientific Session VI:**

**AANS/CSNS Socioeconomic**

Location: 112 AB

Moderator(s): B Guthikonda, J. Phelps



2–2:03 pm

**Welcome**

B. Guthikonda

2:04–2:44 pm

**Top Abstracts**

---

2:04–2:10 pm

**Robert Florin, MD Resident Award**

**Socioeconomic Factors Associated with Pediatric Moyamoya Disease Hospitalizations: A Nationwide Cross-sectional Study**

K. Raygor

2:11–2:17 pm

**Byron Cone Pevehouse Young Neurosurgeon Resident Award**

**BRAINterns 2.0: Durability of Webinar-Based Education and Social Media Beyond the COVID-19 Pandemic**

R. D'Amico

2:18–2:24 pm

**Substance Use Disorders are Independently Associated with Hospital Readmission Among Brain Tumor Patients**

A. Jimenez

2:25–2:31 pm

**Efficiency of Neurosurgical Operating Room According to Nursing Characteristics: A Cost-benefit Analysis.**

A. Bartoli

2:32–2:38 pm

**The Political Polarization of Surgeons in the United States—An Analysis of Campaign Contributions throughout the 2020 Election Cycle**

A. Barpujari

# SATURDAY, APRIL 30

**2:39–2:44 pm**

**Abstract Discussion (Q&A)**

**2:45–2:48 pm**

**Introduction of Keynote Speaker**

J. Phelps

**2:49–3:14 pm**

**Keynote Speaker**

A. Stroink

**3:15–3:35 pm**

**2022 CSNS Update**

J. Cheng

**3:36–4:06 pm**

**Beverage Break in the AANS Exhibit Hall**

**Location: Exhibit Hall AB**

**4:07–4:27 pm**

**Published Essentials: What's New in Socioeconomic  
Neurosurgery—2021**

C. Schirmer

**4:28–5:11 pm**

**Rapid Fire Abstracts**

---

**4:28–4:31 pm**

**Disparities in Screening for Alcohol and Drugs of  
Abuse After Traumatic Brain Injury: A TRACK-TBI  
investigation.**

A. DiGiorgio

**4:32–4:35 pm**

**The Contrast Between Medical Student Interest In  
Neurosurgery and the Needs of the Neurosurgical  
Field of the Future: An Opportunity to Reevaluate  
Residency Selection Metrics**

M. Williams

**4:36–4:39 pm**

**Gender of the Patient Does Not Correlate with Early Outcomes of Elective Lumbar Fusions**

S. Alomari

**4:40–4:43 pm**

**Do Neurosurgeons Receive More Patient Complaints Than Other Physicians? Describing Who is Most at Risk and How We Can Improve**

R. Dambrino

**4:44–4:49 pm**

**Abstract Discussion (Q&A)**

**4:50–4:53 pm**

**Factors Associated with On-Time First-Start Elective Neurosurgical Cases**

P. Booney

**4:54–4:57 pm**

**Trends in Online Patient Perspectives of Neurosurgeons: A Sentiment Analysis**

A. Quinones

**4:58–5:01 pm**

**A Lack of Cost Awareness Amongst Neurosurgeon Faculty and Residents: A Need for Health Care Sustainability Education to Improve Surgical Stewardship of Operating Room Costs**

J. Young

**5:02–5:05 pm**

**Reporting Policies in Neurosurgical Journals: A Meta-Science Study of the Current State and Case for Standardization**

N. Shlobin

**5:06–5:11 pm**

**Abstract Discussion (Q&A)**

# SATURDAY, APRIL 30

5:12-5:30

## Late Breaking Abstracts

---

5:12-5:16 pm

### Analysis of Hospital Price Transparency Tools for Cervical Spinal Fusion Among 332 High-performing Spine Surgery Centers

J. Yoon

5:17-5:21pm

### Impact of Socio-economic Factors on Radiation Treatment after Resection of Metastatic Brain Tumors: Trends from Optum Database

G. Haider

5:22-5:30 pm

### Abstract Discussion (Q&A)

2-5:30 pm

### Scientific Session VII: AANS Section on the History and Culture of Neurosurgery

Location: 109 AB

Moderator(s): T. Dagi, J. Sherman



2-2:05 pm

### Welcome

T. Dagi

2:06-2:09 pm

### Introduction to the Victor Horsley History Lectureship

C. Prestigiacomo



2:10-2:50 pm

### Victor Horsley History Lectureship: How a Scoville Aneurysm Clip Fought in the Cold War and Helped to Found Neurosurgery in Iceland

S. Greenblatt

**2:51–3:28 pm**

**Top Abstracts**

---

**2:51–3:09 pm**

**Vesalius and his Manikin: An Enduring Impact on Modern Anatomical Teaching**

J. Jubran

**3:10–3:28 pm**

**The Brain and a Biological Basis for Violence: A Historical Retrospective**

T. Dagi

**3:29–3:58 pm**

**Beverage Break in the AANS Exhibit Hall**

**Location: Exhibit Hall AB**

**3:59–4:33 pm**

**Round Table Discussion on the Culture of Neurosurgery**

---

**3:59–4:02 pm**

**Introduction to Studies in Culture of Neurosurgery**

T. Dagi

**4:03–4:33 pm**

**Reflections on Acculturating to Neurosurgery from the Outside**

T. Hodges, N. Oyesiku, J. Morcos, A. Quinones-Hinojosa

**4:34–4:54 pm**

**Special Lecture on the History and Culture of Neurosurgery: Suzanne Corkin, Patricia Goldman-Rakic, and Elizabeth Gould: Three Extraordinary Neuroscientists in Pursuit of the “Glue of Consciousness” and the Mechanisms of Memory**

K. Gassie

# SATURDAY, APRIL 30

4:55–5:30 pm

## Top Abstracts

---

4:55–5:12 pm

### William Beecher Scoville: A James Bond in Scrubs

A. Wang

5:13–5:30 pm

### Pre-incisional Radiographic Localization: An Overlooked Contribution by Ralph Bingham Cloward

M. Johnson

5:30–6 pm

### The Joint Annual Business Meeting of The American Association of Neurological Surgeons and the American Association of Neurosurgeons

Location: 114

6:30–7:30 pm

## Industry Session

Location: Philadelphia Marriott Downtown, Franklin Hall 2

### Recent Developments for Adult Patients With Certain VHL-Associated Tumors

Speaker: A. Sumrall

*Presented by Merck*

Non-CME Presentation



**6–7:30 pm**

**Ticketed Sessions**



---

**303 Serving Knowledge Series**

**Neurotrauma: Hot Topics in Neurotrauma**

Location: Independence Ballroom II

Philadelphia Marriott Downtown

S. Browd, R. Diaz-Arrastia, J. Jallo, P. LeRoux,

L. Ngwenya, S. Zuckerman

**304 Serving Knowledge Series**

**“In Vino Veritas”: My Way of Dealing with  
Neurovascular Diseases**

Location: Liberty Ballroom, Salon B

Philadelphia Marriott Downtown

D. Hasan, P. Jabbour, D. Kung, E. Levy, A. Polifka,

A. Thomas, S. Tjoumakaris

**305 Serving Knowledge Series**

**Wine and Spine: Challenging Spine Surgical Cases:  
What Wrong and What I learned.**

Location: Independence Ballroom III,

Philadelphia Marriott Downtown

D. Hoh, A. Kanter, D. Resnick, C. Shaffrey, L. Tumialan

**6–7:30 pm**

**NREF Donor Reception**

Location: Liberty Ballroom, Salon A

Philadelphia Marriott Downtown

---

The NREF Board of Directors hosts its annual reception honoring donors, industry partners and collaborating organizations. By invitation only.

# SATURDAY, APRIL 30

7–8:30 pm

International Reception



This is a ticketed event.

\$65 US or Canadian Attendees | Complimentary for international attendees.

Experience an evening at the National Constitution Center. Join international neurosurgical leaders, AANS leadership and special dignitaries for this special event. Relax and enjoy the company of your colleagues from around the world. This is a ticketed event and everyone is welcome to attend.

**Shuttle Service:** Pick up at the 12th Street entrance of the Philadelphia Marriott Downtown beginning at 6:30 pm.



## NOTES



# *Thank You*

With honor, respect  
and gratitude,  
thank you to all military  
attendees for your  
courageous service to the  
United States of America.



Please stop by  
the registration area  
to receive a ribbon  
that commemorates  
your service.



American  
Association of  
Neurological  
Surgeons

# SUNDAY, MAY 1

**7:45 am–4 pm**

## **Speaker Ready Room**

Location: 202 B

**7:30 am–5 pm**

## **AANS Registration**

Location: Registration Bridge East

**8 am–4:30 pm**

## **AANS Exhibit Hall**

Location: Exhibit Hall AB

**9 am–4 pm**

## **COVID-19 Testing**



Location: 107 AB

**7 am–4 pm**

## **NREF Cushing Circle of Giving VIP Lounge**

Location: 203 A

Open to members of the NREF Cushing Circle of Giving, the Young Neurosurgeons Circle of Giving and invited guests, access to this lounge is by invitation only.



# SUNDAY, MAY 1

8:30 am–12:36 pm

## Plenary Session II

Access the Plenary Session through the AANS Exhibit Hall

Moderator(s): E. Chiocca, J. Morcos

---

8:30–8:36 am

## Historical Film: History of Philadelphia Neurosurgery

8:37–8:39 am

## Introduction to the Kurze Lecture

R. Haid



8:40–9:10 am

## Kurze Lecture

L. Wainwright

9:11–9:14 am

## Washington Committee Update

J. Ratliff

9:15–9:23 am

## Lake-breaking Abstract

**Disc Progenitor Cell Therapy Produces Clinically Meaningful Improvements in Pain, Disability, and Quality of Life for Patients with Lumbar Disc Degeneration with Durability of Results at 78 weeks.**

K. Foley

9:24–9:26 am

**Discussant: Disc Progenitor Cell Therapy Produces Clinically Meaningful Improvements in Pain, Disability, and Quality of Life for Patients with Lumbar Disc Degeneration with Durability of Results at 78 weeks**

A. Veeravagu

**9:27–9:35 am**

**Blood Ethanol Level Confounds Glasgow Coma Scale Interpretation and Increases Health Care Utilization Following Traumatic Brain Injury: A TRACK-TBI Study**

J. Young

**9:36–9:38 am**

**Abstract Discussant: Blood Ethanol Level Confounds Glasgow Coma Scale Interpretation and Increases Health Care Utilization Following Traumatic Brain Injury: A TRACK-TBI Study**

M. Stippler

**9:39–9:47 am**

**Sanford Larson Award for Best Research  
Full-endoscopic Transforaminal Discectomy is Non-inferior and Cost-effective Compared to Microdiscectomy for Sciatica: Two-year Results of a Randomized Controlled Trial**

P. Gadjradj

**9:48–9:50 am**

**Abstract Discussant: Full-endoscopic Transforaminal Discectomy is Non-inferior and Cost-effective compared to Microdiscectomy for Sciatica: Two-year results of a randomized controlled trial**

R. Fessler

**9:51–9:54 am**

**CNS Update**

N. Bambakidis

**9:55–10:25 am**

**Beverage Break in the AANS Exhibit Hall**

**Location: Exhibit Hall AB**

**10:26–10:34 am**

**Vagus Nerve Stimulation Paired with Rehabilitation for Upper Limb Motor Function After Ischemic Stroke**

C. Liu

# SUNDAY, MAY 1

**10:35–10:37 am**

**Abstract Discussant: Vagus Nerve Stimulation Paired with Rehabilitation for Upper Limb Motor Function After Ischemic Stroke**

A. Machado

**10:38–10:40 am**

**Introduction of the AANS Incoming President**

J. Ratliff



**10:41–10:51 am**

**AANS Incoming President**

A. Stroink

**10:52–10:54 am**

**Introduction to the Van Wagenen Lecture**

N. Barbaro



**10:55–11:15 am**

**Van Wagenen Lecture**

G. Harsh

**11:16–11:24 am**

**Future Grant Funding and Academic Achievement Following Neurosurgery Research and Education Foundation (NREF) Awards**

A. Huguenard

**11:25–11:27 am**

**Abstract Discussant: Future Grant Funding and Academic Achievement Following Neurosurgery Research and Education Foundation (NREF) Awards**

E. Eskandar

**11:28–11:36 am**

**Cerebrovascular Section Best Clinical  
Scientific Paper**

**Multi-national Genome-wide Association Study  
and Functional Genomics Analysis Implicates  
Decreased SIRT3 Expression Underlying  
Intracranial Aneurysm Risk**

A. Hale

**11:37–11:39 am**

**Abstract Discussant: Multi-national Genome-  
wide Association Study and Functional Genomics  
Analysis Implicates Decreased SIRT3 Expression  
Underlying Intracranial Aneurysm Risk**

R. Starke

**11:40–11:45 am**

**Late Breaking Abstract  
Deep Brain Stimulation (DBS) for  
Opioid Use Disorder**

A. Rezai

**11:46–11:48 am**

**Introduction of the Cushing Medalist**

R. Haid



**11:49–11:51 am**

**Cushing Medalist**

W. Couldwell

**11:52–11:54 am**

**Introduction/Moderator of Cushing Orator**

R. Haid



**11:55–12:34 am**

**Cushing Orator**

Y. Ma

# SUNDAY, MAY 1

**12:35–12:36 pm**

## **Announcement of the Lunch and Learn Seminars**

J. Morcos

**12:35–1:30 pm**

## **Lunch in the AANS Exhibit Hall for Medical Attendees**

**Location: Exhibit Hall AB**

**12:40–1:25 pm**

## **Lunch and Learn Seminars**

Non-CME Events

Learn while you have lunch in the Exhibit Hall.

### **The Evolving Role of AI and Enabling Technologies in Spine Surgery**

Location: Booth 1611

*Presented by Medtronic*

### **The Future of Posterior MIS Spine Surgery**

Location: Booth 1811

*Presented by DePuy Synthes*

### **Robotic Navigation: Striving to Make Robotics the Standard Form of Care and Helping to Ensure a Successful New Generation of Adopters, Featuring ExcelsiusGPS**

Location: Booth 1849

Speaker: V. Matheus

*Presented by Globus Medical*

### **Pulse: One Platform for Better Spine Surgery**

Location: Booth 1835

*Presented by NuVasive*

### **Restorative Neurostimulation's Permanent Role in the Future of Neurosurgery**

Location: Booth 1635

*Presented by Mainstay Medical*



**12:45–4:45 pm**

### **Young Neurosurgeons Luncheon**

Speaker: C. Shaffrey

Location: 108 AB

Advance Ticket Purchase Required  
\$25



**2–3:30 pm**

**3D Session—Operative Nuances II: Challenging  
Operative Moments During Microsurgery**

Location: 114

A. Cohen-Gadol, W. Couldwell, M. Lawton, C. Maher

**2–5:30 pm**

**AANS/CNS Section on Disorders  
of the Spine and Peripheral Nerves—  
Peripheral Nerves Section Session**

Location: 203 B

Moderator(s): L. Jacques, M. Mahan



**2–2:02 pm**

**Welcome**

L. Jacques, M. Mahan

**2:03–2:22 pm**

**Technique Session: Endoscopy in Peripheral  
Nerve Surgery**

K. Krishnan, M. Mahan

**“HARV” Talks: When is Early Nerve Surgery?**

**2:23–2:26 pm**

R. Spinner

**2:27–2:30 pm**

R. Midha

**2:31–2:34 pm**

A. Levi

**2:35–2:40 pm**

**Team Discussions**

**2:41–2:52 pm**

**Interactive Panel Discussion**

**2:53–3:07 pm**

**Ancillary Updates**

**MEK Inhibitors and the Future of Medical  
Management for NF1**

D. Viskochil

# SUNDAY, MAY 1

3:08–3:27 pm

## Clinical Quandaries: Reconstruction Options for Terrible Nerve Injuries

J. Brown

3:28–3:48 pm

## Beverage Break in the AANS Exhibit Hall

Location: Exhibit Hall AB

3:49–3:51 pm

## Introduction to the 2022 David G. Kline Lectureship

M. Mahan



3:52–4:12 pm

## Integra Foundation 2022 David G. Kline Lectureship: Neurotomies in the Armamentarium for Spasticity and Focal Dystonia

M. Sindou

4:13–4:18 pm

## Report from 2019 Kline Research Awardees: Focused Ultrasound and Microbubble Utilization for Reversible Opening and Disruption of the Blood-Nerve-Barrier

R. Midha, D. Umansky

4:19–4:42 pm

## Top Abstracts

Moderator: J. Brown

4:19–4:24 pm

## Meralgia Paresthetica: A Large International Study on Prevalence and Treatment Pathways

J. Lee

4:25–4:30 pm

## A Retrospective Propensity-Matched Patient Comorbidity Analysis Comparing Simultaneous Versus Staged Bilateral Cubital Tunnel Release Surgeries

L. Daggubati

4:31–4:36 pm

**Cortical Representation of Median and Ulnar Nerve  
Suggests Functional Reorganization Induced by  
Motor-eloquent Gliomas**

S. Ille

4:37–4:42 pm

**Abstract Discussion (Q&A)**

4:43–4:58 pm

**Published Essentials**

**Peripheral Nerve in JNS 2021—What We Have Learned**

T. Wilson

4:59–5:14 pm

**Follow the Patient—Diagnostic Challenge:  
Plexiform Lesions**

A. Belzberg

5:15–5:30 pm

**Patient Perspective**

A. Ali, E. Zager

2–5:30 pm

**AANS/CNS Section on Neurotrauma  
and Critical Care Section Session**

Location: 201 C

Moderator(s): S. Woodrow, J. Wright



2–2:04 pm

**Welcome**

2:05–2:08 pm

**Introduction to the Marmarou Lecture**

J. Wright



2:09–2:39 pm

**Marmarou Lecture**

D. Smith

# SUNDAY, MAY 1

2:40–3:20 pm

**Panel Discussion: To Operate or Not in TBI?**

Moderator: M. Stippler

Panelist: A. DiGiorgio, G. Manley, E. Sieg

3:21–3:51 pm

**Beverage Break in the AANS Exhibit Hall**

3:52–4:28 pm

**Top Abstracts**

---

3:52–3:57 pm

**Natus Resident/ Fellow Award for  
Traumatic Brain Injury**

**Cost comparison for Open Surgery versus Middle  
Meningeal Artery Embolization in Patients with  
Chronic Subdural Hematomas: A Propensity Score  
Matched Analysis**

M. Salih

3:58–4:03 pm

**Natus Resident/Fellow Award for Neurocritical Care  
Predicting Intracranial Hypertension in Severe  
Traumatic Brain Injury Using Physiologic Data**

S. Miranda

4:04–4:09 pm

**Natus Resident/ Fellow Award for Neurocritical  
Care (2021 Award Winner)**

**Oscillations In Cerebral Blood Flow Protect the  
Pericontusional Penumbra in Traumatic Brain Injury**

T. White

4:10–4:15 pm

**Charles Tator Spinal Cord Injury Resident  
Research Award**

**Comparison of Intraoperative Ultrasound with  
Postoperative MRI in the Assessment of Spinal Cord  
Decompression from a Posterior Approach**

T. Chryssikos

4:16–4:21 pm

**Charles Tator Spinal Cord Injury Resident Research Award (2021 Award Winner)**

**The Effects of Connexin Inhibitors on the Behavioral, Cellular and Molecular Outcomes in a Porcine Spinal Cord Injury Model**

K. Alok

4:22–4:28 pm

**Abstract Discussion (Q&A)**

4:29–5:06 pm

**Panel Discussion: Three Dos, Three Don'ts, and Three New Things in TBI**

Moderator: P. Arnold, P. Das

---

4:29–4:37 pm

**Panelist 1 Presentation**

J. Wright

4:38–4:46 pm

**Panelist 2 Presentation**

L. Ngwenya

4:49–4:55 pm

**Panelist 3 Presentation**

D. Okonkwo

4:56–5:06 pm

**Panel Discussion**

L. Ngwenya, D. Okonkwo, J. Wright

5:07–5:30 pm

**Technique Session**

---

5:07–5:24 pm

**How I Do It: MMA Embolization for Chronic SDH—Technique and Outcomes**

A. Thomas

5:25–5:30 pm

**Discussion (Q&A)**

# SUNDAY, MAY 1

2–5:30 pm

**AANS/CNS Section on Stereotactic & Functional Neurosurgery Section Session**

Location: 204 C

Moderator(s): J. Sweet, A. Viswanathan



2–2:04 pm

**Welcome**

J. Sweet, A. Viswanathan

2:04–2:24 pm

**Ancillary Updates: FUS Applications Across Tumor and Stereotactic and Functional**

J. Chang

2:25–2:45 pm

**Patient Perspective: DBS for depression**

R. Gross

2:46–3:01 pm

**Published Essentials: Articles from Stereotactic and Functional**

N. Bentley

3:02–3:17 pm

**Technique Session: Technical Nuances of sEEG Implantation**

G. McKhann

3:18–3:33 pm

**Clinical Quandaries: DBS for Tremor: Beyond the Vim**

E. Petersen

3:34–4:04 pm

**Beverage Break in AANS the Exhibit Hall**

**4:05–4:49 pm**

**Top Abstracts**

Moderator: E. Air

---

**4:05–4:13 pm**

**Philip L. Gildenberg Resident Award**

**Preclinical Evidence for Deep Brain Stimulation of the Ventral Tegmental Area as a Potential Treatment for Addiction and Hyperdopaminergic Diseases**

J. Yuen

**4:14–4:22 pm**

**Decoding Neural Correlates of Speech Production from Intracranial Depth Electrodes**

T. Thomas

**4:23–4:31 pm**

**Seizure Source Propagation Patterns Mirror Interictal Spike Networks and White Matter Tracts**

J. Diamond

**4:32–4:40 pm**

**Single-neuron Firing Properties in the Human OFC, Amygdala and Hippocampus Encode Subjective Decisions and Cue Information on the Delay Discounting Task**

M. Omidbeigi

**4:41–4:49 pm**

**Abstract Discussion (Q&A)**

**4:50–5:10 pm**

**Clinical Quandaries: Resection and Neuromodulation Approaches to Challenging Cases in Epilepsy**

S. Sheth

**5:10–5:30 pm**

**DBS for Emerging Indications**

A. Machado

# SUNDAY, MAY 1

2–5:30 pm

## AANS/CNS Section on Tumors Section Session

Location: 201 A

Moderator(s): I. Germano, G. Li



2–2:02 pm

### Welcome

I. Germano, G. Li

2:02–2:23 pm

### Clinical Quandaries: Spine Oncology:

Moderator: Z. Gokaslan

2:03–2:08 pm

### A Multifaceted Approach in the Treatment of Spinal Metastatic Disease: What has Changed?

L. Rhines

2:09–2:14 pm

### Updates in the Management of Intra-dural Spinal Tumors.

J. Chi

2:15–2:23 pm

### Question and Answer Session

2:24–2:34 pm

### Glioblastoma: How Aggressive Should a Surgeon Be? An Analysis of the Current Data, Limitations and Future Directions.

R. Komotar

2:35–2:45 pm

### Surgical Treatment of Thalamic High Grade Gliomas: Indications and Limitations

M. Baskaya

2:46–2:56 pm

### Multimodal Treatment and Salvage of Brain Metastases

N. Moss

**2:57–3:07 pm**

**The Immune Landscape of Metastatic Disease to the Brain**

M. Lim

**3:08–3:15 pm**

**Pituitary Adenomas: Surgical Advancements in the Treatment of Pituitary Adenomas: Pushing the Boundaries of Resectability**

J. Fernandez-Miranda

**3:16–3:23 pm**

**Pituitary Adenomas: Update on the Genetics of Pituitary Adenomas and a Glimpse of the Future**

M. Aghi

**3:24–3:34 pm**

**Featured Speaker: Genomics of Meningiomas**

J. Moliterno

**3:35–4:03 pm**

**Beverage Break in the AANS Exhibit Hall**

**Location: Exhibit Hall AB**

**4:04–4:31 pm**

**Top Abstracts**

Moderator: R. D'Amico, G. Zenonos

**4:04–4:10 pm**

**StacheStrong Award**

**EGFRvIII Mutation Detection in Plasma Derived Extracellular Vesicle RNA**

S. Batool

**4:11–4:17 pm**

**Lunsford & Leksell Radiosurgery Award**

**Matched Comparison of Hearing Outcomes after Stereotactic Radiosurgery or Observation Alone in Vestibular Schwannoma Patients**

Z. Schnurman

# SUNDAY, MAY 1

4:18–4:24 pm

**Integra Foundation Award**

**Single-cell Transcriptomic Analysis of Sporadic Cushing's Adenomas and Adjacent Gland Reveals Novel Tumorigenic Pathways**

D. Asuzu

4:25–4:31 pm

**Synaptive Preuss Research Award**

**Systemic Adoptive-Cell-Transfer Immunotherapy for High-Grade Meningiomas Targeting NY-ESO-1 Using TCR-transduced T-Cells**

M. Sun

4:32–4:39 pm

**Meningioma: Advances in Understanding the Disease Process**

I. Yang

4:40–5:30 pm

**Meningiomas: The Clash on Suprasellar Meningioma Treatment and Case Panel Discussion**

Moderator: G. Zenonos

---

4:40–4:47 pm

**Endoscopic approaches are Associated with Superior Visual Outcomes: The Simpson Grade is Irrelevant**

T. Schwartz

4:48–4:55 pm

**The Data Supporting the Open Treatment of Suprasellar Meningiomas: The Simpson Grade is Alive and Well**

J. Morcos

4:56–5:03 pm

**Radiosurgery is Tricky, but Works...Indications, Limitations and Long-term Outcomes**

C. Chen

**5:04–5:30 pm**

**Meningiomas: Panel Discussion**

M. McDermott, S. Raza, J. Van Gompel

**2–5:30 pm**

**ANS/CNS Section on Disorders of  
the Spine and Peripheral Nerves—  
Spine Section Session**

Location: 204 A

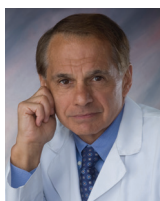
Moderator(s): D. Coric, Z. Ghogawala



**2–2:03 pm**

**Welcome**

D. Coric, Z. Ghogawala



**2:04–2:29 pm**

**Sonntag Lecture: A Survivors Guide  
for Personal and Professional  
“Lifequakes”!**

J. Maroon

**2:30–3:11 pm**

**Follow the Patient—Diagnostic Challenge:  
Plexiform Lesions**

---

**2:30–2:50 pm**

**Cauda Equina Syndrome—Pearls and Pitfalls**

Z. Gokaslan

**2:51–3:11 pm**

**Acute foraminal lumbar Disc Herniaion in ER with  
Severe Pain but Moderate Weakness: What’s the  
Best Strategy?**

J. Knightly

**3:12–3:32 pm**

**Ancillary Updates: Advances in Scoliosis Surgery:  
What have we Learned from the Past and How can  
This Guide our Future?**

A. Veeravagu

# SUNDAY, MAY 1

**3:33–4:03**

**Beverage Break in the AANS Exhibit Hall**

**Location: Exhibit Hall AB**

**4:04–4:24 pm**

**Clinical Quandaries: PJK—When is Less Correction more Effective**

C. Shaffrey

**4:25–5:04 pm**

**Technique Sessions: L4/5 Spondy: How I Treat It, and Why**

---

**4:25–4:34 pm**

A. Kanter

**4:35–4:44 pm**

J. Uribe

**4:45–4:54 pm**

J. Shin

**4:55–5:04 pm**

D. Chou

**5:05–5:30 pm**

**HARV Talk: Pressure to Cut costs and Simultaneously Improve Care: How Do We Achieve a Balance?**

J. Cheng

5:30–7 pm

**AANS Section on the History and  
Culture of Neurosurgery  
Annual Reception**

Location: Salon A, Liberty Ballroom,  
Philadelphia Marriott Downtown

Moderator: T. Dagi



**Setti S. Rengachary Lecture:  
Taking the First Picture of a  
Black Hole**

P. Galison

Ticket Required

\$100 History Section Members

\$200 History Section Non-Members



6:30–8:30 pm

**Ticketed Sessions**



**402 Serving Knowledge Series:**

**Complex Cranial Surgery—Advanced Approaches and  
Complication Avoidance/Management**

Location: Independence Ballroom II,  
Philadelphia Marriott Downtown

M. Baskaya, B. Bendok, C. David, A. Dehdashti

**403 Serving Knowledge Series:**

**Spine Trauma: State of the Art, From Bone to Cord**

Location: Independence Ballroom III,  
Philadelphia Marriott Downtown

P. Arnold, D. Chou, S. Eden, J. Jallo, A. Parr

## NOTES

[illegible]

Neurosurgical Education Anywhere, Anytime

# AANS NEURO

Conveniently  
meet CME  
requirements  
online.

Courses  
are free or  
discounted  
for AANS  
members.



[www.aans.org/NeuroU](http://www.aans.org/NeuroU)



American  
Association of  
Neurological  
Surgeons

**SAVE THE DATE**

**NEUROSURGEONS  
AS ADVOCATES**



**AANS 2023  
LOS ANGELES**

**APRIL 21-24**

**[aans.org/meetings](https://aans.org/meetings)**

# MONDAY, MAY 2

**6:30 am–4:30 pm**

## **Speaker Ready Room**

Location: 202 B

**6:45 am–4 pm**

## **AANS Registration**

Location: Bridge East

**9 am–4 pm**

## **COVID-19 Testing**

Location: 107 AB



## **Abstract Session**

Location: 203 B

---

**7–7:01 am**

### **Welcome: Introduction to the Abstract Session**

P. Das, J. Morrison

**7:02–8:04 am**

### **Neurotrauma Abstract Session**

M Babu, P. Das, J. Morrison, J. Wright

---

**7:02–7:10 am**

### **Development of Cerebral Vasospasm Following Traumatic Intracranial Hemorrhage: Incidence, Risk Factors, and Clinical**

A. Dicipinigaitis

**7:11–7:19 am**

### **Leveraging Machine Learning to Identify an Intraoperative Mean Arterial Pressure Threshold for Neurological Improvement in Patients Undergoing Decompressive Surgery for Acute Spinal Cord Injury**

A. Aabedi

**7:20–7:28 am**

### **PbtO2 Modification Using Designed Cardiac-Gated ICP Modulation Generated by an Intracranial Pulsating Balloon: A Swine Model Study**

O. Doron

# MONDAY, MAY 2

**7:29–7:37 am**

**Prospective Evaluation of Complications in the Elderly Following Traumatic Spinal Cord Injury: A 40 Patient Multi-Institutional Registry**

N. Agarwal

**7:38–7:46 am**

**Prophylactic Levetiracetam and the Incidence of Early Post-traumatic Seizures Among Pediatric Patients with Traumatic Brain Injury**

B. Sciscent

**7:47–7:55 am**

**Factors Associated with Hemorrhagic Progression of Cerebral Contusion After Traumatic Brain Injury: A Multicenter Study**

L. Lima

**7:56–8:04 am**

**A Long-term Follow-up Study of Racial Disparities in Employment Status Following Traumatic Brain Injuries**

M. Bah

**8:05–9:07 am**

**Pediatrics Abstract Session**

P. Aldana D. Hertzler, R. Naftel, R. Scott

---

**8:05–8:13 am**

**Impact of Age on Post-Operative Outcomes in Children with Type I Chiari Malformations Receiving Posterior Fossa Decompression: An Analysis of the Park-Reeves Syringomyelia Research Consortium**

M. Jin

**8:14–8:22 am**

**Redefining Pediatric Cervical Spine Ossification Patterns**

J. Baisden

**8:23–8:31 am**

**Machine Learning Automated 3D Segmentation of Transependymal Cerebrospinal Fluid in Pediatric Patients**

P. Yang

**8:32–8:40 am**

**Comparison of the Safety and Efficacy of Hemispherotomy Techniques for Drug-Resistant Epilepsy: A Systematic Review and Individual Patient Data Meta-Analysis**

J. Chen

**8:41–8:49 am**

**Artificial Intelligence and Machine Learning Predicts the Need for Intervention in Premature Neonates with Intraventricular Hemorrhage**

B. Abraham

**8:50–8:58 am**

**Obstetric Management and Maternal Outcomes Among Patients with Myelomeningocele**

K. Holste

**8:59–9:07 am**

**The Impact of Social Risk Factors and Cerebral Spinal Shunting Procedures in Children**

S. Khalid

**9:08–10:10 am**

**Stereotactic and Functional Abstract Session**

Moderator: S. Bick

---

**9:08–9:16 am**

**How the Brain Anticipates: From Neurons to Networks**

A. Ramayya

**9:17–9:25 am**

**Discrimination of Normal Brain Tissue from Dysplastic Tissue in Focal Cortical Dysplasia Using Raman Spectroscopy**

T. Tran

# MONDAY, MAY 2

**9:26–9:34 am**

**Normative Intracranial EEG Maps Epileptogenic Tissues in Focal Epilepsy**

J. Bernabei

**9:26–9:34 am**

**CM/Pf DBS Alleviates Tics in a Rat Model of Tourette's Syndrome via Striatal Microcircuits**

A. Rusheen

**9:44–9:52 am**

**A Randomized Trial of MR-Guided Focused Ultrasound Bilateral Medial Thalamotomies for Chronic Trigeminal Neuropathic Pain**

M. Ishaque

**9:53–10:01 am**

**Treating Hydrocephalus by Shunting to the Venous Intracranial Sinus—SinuShunt Project 849502 Supported by the European Union's Horizon 2020 Programme**

M. Schou Andersen

**10:02–10:10 am**

**Thalamus Gates Progression of Mesial Temporal Seizures by Modulating Thalamocortical Synchrony**

A. Ilyas

**10:11–11:13 am**

**Spine Abstract Session**

Moderator: S. Dhall, A. Kanter, P. Mummaneni

---

**10:11–10:19 am**

**Outcomes of Patients Undergoing Single-level Arthroplasty Versus Anterior Lumbar Interbody fusion**

S. Khalid

**10:20–10:28 am**

**Comparison of Proximal Junctional Kyphosis Rates After L4 Versus L3 Pedicle Subtraction Osteotomies**

S. Shabani

**10:29–10:37 am**

**Malpractice Litigation in Elective Lumbar Spinal Fusion Surgery: A Review of the Past 50 Years**

J. Zhang

**10:38–10:46 am**

**Using Smartphone-Based Accelerometry to Classify Peri-Operative Course and Outcomes in Spine Surgery**

H. Ahmad

**10:47–10:55 am**

**Evaluation of a Preoperative Adverse Event Risk Index for Patients Undergoing Spinal Tumor Surgery**

S. Alomari

**10:56–11:04 am**

**Is it Better to Stop at C2 or C3/C4 in Elective Posterior Cervical Decompression and Fusion?**

H. Chanbour

**11:05–11:13 am**

**An Investigation of the Genetic Landscape of Invasive Spinal Schwannomas: Molecular Evidence of Upregulation of Proteoglycans which Induce Bone Resorption**

S. Suppiah

**11:14–11:31 am**

**Cerebrovascular Abstract Session**

Moderators: TBD

---

**11:14–11:22 am**

**Best international Abstract Award  
Development and Testing of a Photosensitive Liquid Polymer Embolization System for Neurovascular Diseases: Preliminary Animal Results**

J. Ku

# MONDAY, MAY 2

**11:23–11:31 am**

**Interleukin 6: An Emerging Mechanistic Target for Cerebral Vasospasm following Subarachnoid Hemorrhage**

B. Lucke-Wold

**11:32 am–1:06 pm**

**Lunch**

Concessions are available for purchase at ecoGrounds located level 2 near registration

**1:07–1:15 pm**

**Prospective Study on Embolization of Intracranial Aneurysms with the Pipeline Device (PREMIER study): 3-Year Outcomes and Evaluation Using a Specific Flow Diverter Occlusion Classification**

G. Cortez

**1:16–1:24 pm**

**Association of External Ventricular Drain Removal and Prophylactic Anticoagulation in Aneurysmal Subarachnoid Hemorrhage: A Propensity Adjusted Analysis**

J. Catapano

**1:25–1:33 pm**

**Diagnosis and Treatment of CSF-Venous Fistulas: A Single Institution Surgical Outcome Study and Proposed Management Algorithm**

A. Alexander

**1:34–1:42 pm**

**Continuous Blood Flow Visualization with Laser Speckle Contrast Imaging during Cerebrovascular Surgery**

R. Ashour

**1:43–2:45 pm**

**Pain Abstract Session**

A. Grande, A. Raslan, J. Schwalb

---

**1:43–1:51 pm**

**The Utility of Invasive Blood Pressure Monitoring in Microvascular Decompression**

R. Xu

**1:52–2 pm**

**Bilateral Nervus Intermedius Sectioning for Genuiculate Neuralgia: Case Report and Operative Video**

K. Piper

**2:01–2:09 pm**

**Surgical Technique: The “Paddle-Under-Bridge” Technique for Safe Thoracic Spinal Cord Simulator (SCS) Paddle Lead Placement in Patients with Thoracic Stenosis**

T. Riedman

**2:10–2:18 pm**

**A Quantitative Analysis of Quality of Life Improvement of Neurolesioning Procedures for Refractory Cancer Pain**

P. Cook

**2:19–2:27 pm**

**Evaluation of a Multimodal Pain Protocol after Craniotomy**

S. Das

**2:28–2:36 pm**

**Comparison of Low Dose Intrathecal Morphine Delivery in the Treatment of Chronic Pain Syndrome and Post-Laminectomy Syndrome**

M. Jalal

# MONDAY, MAY 2

**2:37–2:45 pm**

**Comparison of Traditional Surgical Sealing Methods to Innovative IQ Dome Repair Technique in the Management of Superior Semicircular Canal Dehiscence**

A. Pradhan

**2:46–3:57 pm**

**Socioeconomic Abstract Session**

B. Guthikonda

---

**2:46–2:54 pm**

**Socioeconomic Status Predicts Disproportionate Healthcare Utilization Following Elective Spine Surgery**

M. Hagan

**2:55–3:03 pm**

**Current Trends in Subspecialty Fellowship Training for 1687 Academic Neurological Surgeons**

A. Gupta

**3:04–3:12 pm**

**Mapping Migratory Workforce Trends in the United States: An Analysis of 4,075 Neurosurgeons**

S. Pugazenthi

**3:13–3:21 pm**

**Venous Sinus Stenting: Single Institution Safety and Healthcare Cost Review**

D. Mazur-Hart

**3:22–3:30 pm**

**Resident Education in Ethiopia: Opportunities for Global Neurosurgery Collaborations**

I. Germano

**3:31–3:39 pm**

**Geographic Variations in Continuous Insurance Duration in the United States**

K. Richter

**3:40–3:48 pm**

**Neurosurgical Responses to Evaluation of the  
Virtual Recruitment Cycle**

A. Iyer

**3:49–3:57 pm**

**The Legacy of Ambroise Paré: Advancements in  
Neurosurgery and Traumatic Brain Injuries from the  
16th Century Battlefield**

M. Park

**3:58–5 pm**

**Tumor Abstract Session**

---

**3:58–4:06 pm**

**Mizuho Minimally Invasive Brain Tumor Surgery  
Award**

**Endoscopic Endonasal Resection of Rathke's  
Cleft Cysts: A Single Institution Analysis of 113  
Consecutive Patients**

H. Algattas

**4:07–4:15 pm**

**Journal of Neuro-Oncology Award**

**ERK1/2 Phosphorylation Predicts Survival  
Following Anti-PD-1 Immunotherapy in Recurrent  
Glioblastoma**

V. Arrieta González

**4:16–4:24 pm**

**Brainlab Neurosurgery Award**

**GammaTile Brachytherapy in the Treatment of  
Recurrent Glioblastomas**

C. Chen

**4:25–4:33 pm**

**Elekta Tumor Section Award**

**Dissociating Broca's Aphasia From Broca's Area**

J. Andrews

# MONDAY, MAY 2

4:34–4:42 pm

**Southeastern Brain Tumor Foundation  
(SBTF) Award**

**Evaluation of Immunologic Parameters in  
Canine Glioma Patients Treated with an Oncolytic  
Herpes Virus**

D. Estevez-Ordonez

4:43–4:51 pm

**AANS/CNS Joint Section on Tumors  
Neuro-Oncology Trainee Award**

**Plasma Circulating Tumor DNA Enables Detection of  
Temozolomide Resistance in Glioma**

J. Jones

4:52–5 pm

**Rosenblum-Mahaley Clinical Research Award  
Survival Outcomes of Molecular Glioblastoma:  
A Multicenter Study**

A. Ramos-Fresnedo

## Community Sessions

7–3 pm

**501 Thoracolumbar Spinal Deformity**

Location: 109 AB

This course is a collaboration between AANS and SRS.



7–7:02 am

**Welcome**

S. Glassman, C. Shaffrey

7:03–9:14 am

**Session I: Restoring Alignment in  
Degenerative Deformity**

7:03–7:22 am

**Patient Specific Implants**

D. Sciubba

**7:23–7:42 am**  
**TLIF, LLIF, ALIF**

L. Snyder

**7:43–8:02 am**  
**Osteotomy**

K. Jones

**8:03–9:14 am**  
**Session II: Small Group Case Discussions**

S. Glassman, J. Gum, P. Hsieh, M. Pham

**9:15–9:29 am**  
**Beverage Break**

**9:30–10:11 am**  
**Session III: Debate/Discussion**

---

**9:30–9:40 am**  
**Potential of AI/Predictive Analytics (Pro)**

A. Asher

**9:41–9:59 am**  
**Limitations of AI/Predictive Analytics (Con)**

S. Glassman

**10–10:11 am**  
**Discussion with Audience**

**10:12–10:38 am**  
**The Future of Orthopedic-neurosurgical Relationship**

R. Heary

**10:39–11:29 am**  
**Leadership Lecture**

---

**10:39–10:43 am**  
**Introduction of Chris Shaffrey**

A. Dailey

# MONDAY, MAY 2

10:44–11:29 am

## **At What Point Will New Technologies Actual Impact Outcome**

C. Shaffrey

11:30 am–12:59 pm

### **Lunch**

Participants in the Neurological Communities will receive a \$15 voucher to be used at Reading Terminal

1–1:59 pm

## **Session VI: Incremental Cost of New Technology— Is it Worth it?**

---

1–1:19 pm

### **Navigation**

I. Kalfas

1:20–1:39 pm

### **Robotics**

J. Gum

1:40–1:59 pm

### **MIS Deformity**

P. Park

2–2:29 pm

## **Existential Crisis: Deformity Surgery is too Expensive to Survive the Next Healthcare Reform**

A. Vaccaro

2:30–3 pm

## **Session V: Debate/Discussion: Procedure Selection—Why Exactly Do I Use:**

---

2:30–2:34 pm

### **Anterior/Lateral Surgery**

A. Kanter

2:35–2:39 pm

### **Pelvic Fixation**

P. Passias

**2:40–2:44 pm**

**SI Fusion**

C. Sansur

**2:45–3 pm**

**Debate/Discussion**

A. Kanter, P. Passias, C. Sansur

**7 am–5 pm**

**502 Cervical Spinal Deformity**

Location: 103 BC

Moderator: T. Koski, J. Shin

---

**7–7:07 am**

**Welcome: Introduction**

J. Shin

**7:08–7:14 am**

**Welcome: Housekeeping**

T. Koski

**7:15–8:29 am**

**Session I: From the Headlines: Value and Risk in Treating Cervical Deformity**

---

**7:15–7:34 am**

**Complications in Cervical Deformity—What you Should Know About Frailty**

P. Passias

**7:35–7:54 am**

**ERAS for Cervical Deformity: Practical Tips for Practice**

C. Zygourakis

**7:55–8:14 am**

**Value Based Care: Does Treating Deformity have Value or is it Too Expensive? Why You Should be Thinking About This**

R. Sethi

# MONDAY, MAY 2

**8:15–8:29 am**

**Panel Discussion with Speakers**

**8:30–8:59 am**

**Innovation Lecture: Molecular Targeting  
(Personalized Medicine)**

J. Johnson

**9–9:29 am**

**Leadership Lecture: Lessons Learned in Cervical  
Deformity from Doing Too Much or Too Little: How  
my Practice has Changed**

D. Riew

**9:30–9:44 am**

**Beverage Break**

**9:45–11:59 am**

**Session II: Degenerative Cases are Deformity Cases:  
There is No Such Thing as Simple**

---

**9:45–10:04 am**

**Reconstruction for Deformity at the Cranio-cervical  
Junction**

N. Dahdaleh

**10:05–10:24 am**

**Lowest Instrumented Vertebrae (LIV) Selection for  
Stenosis Without Deformity—C7, T1, T2?**

J. Turner

**10:25–10:44 am**

**Laminoplasty or Posterior Fusion for Stenosis?  
Combined Approaches?**

L. Holly

**10:45–11:04 am**

**C5 Palsy: How to Prevent and Treat**

L. Snyder

**11:05–11:24 am**

**Case: Disastrous Distal Junctional Kyphosis**

A. Ganju, MD

**11:25–11:59 am**

**Panel Discussion with Speakers**

**12–12:59 pm**

**Lunch**

Participants in the Neurological Communities will receive a \$15 voucher to be used at Reading Terminal

**1–2:14 pm**

**Debate: Cervical Alignment Does Not Always Matter**

Moderator: T. Koski

**1–1:14 pm**

**Cervical SVA > 4 Is Always a Deformity and Must Be Corrected**

TBD

**1:15–1:29 pm**

**Treat the Symptom (Radiculopathy/Myelopathy), Not the Deformity!**

E. Klineberg

**1:30–1:49 pm**

**Rebuttal**

**1:50–1:59 pm**

**Moderator Wrap-up**

T. Koski

**2–2:14 pm**

**Question and Answer Session with Audience Polling**

# MONDAY, MAY 2

2:15–3:49 pm

## **Session III: Practical Questions and Solutions in Cervical Deformity**

---

2:15–2:34 pm

### **Considerations in OPLL—Is There Ever a Case for Anterior?**

R. Sasso

2:35–2:54 pm

### **LIV Selection and DJK Prevention After 3 Column-osteotomy**

T. Koski

2:55–3:14 pm

### **PSO and VCR Correction and Closure Techniques**

D. Okonkwo

3:15–3:34 pm

### **Indications for Combined Anterior and Posterior Approaches for Deformity**

J. Shin

3:35–3:49 pm

### **Discussion with Speakers**

3:50–3:59 pm

### **Beverage Break**

4–4:19 pm

### **Vertebral Artery Injury: Stop or Go? What Do You Do?**

J. Harrop

4:20–4:39 pm

### **Loss of Motor Evoked Potentials During Surgery: Abort or Continue?**

TBD

4:40–5 pm

### **Discussion and Wrap Up**

**7 am–5 pm**

**503 Arthroplasty and Motion Preservation**

Location: 112 AB

Moderator: D. Coric, V. Traynelis

---

**7–7:03 am**

**Introduction**

D. Coric, V. Traynelis

**7:04–7:59 am**

**Session I: Current State-of-the-art in  
Cervical Arthroplasty**

---

**7:04–7:19 am**

**Cervical Arthroplasty Outcomes Update**

R. Haid

**7:20–7:39 am**

**Cervical Arthroplasty—What's New**

D. Coric

**7:40–7:59 am**

**Cervical Arthroplasty Multilevel Strategies**

O. Alves

**8–8:19 am**

**Current State-of-the-art in Cervical Arthroplasty:  
Questions and Panel Discussion**

**8:20–9:16 am**

**Session II: Degenerative Cases are Deformity Cases:  
There is no Such Thing as Simple**

---

**8:20–8:38**

**Update on Payor Coverage**

L. Tumialan

**8:39–8:57 am**

**Why Is Europe so Far Ahead on Motion  
Preservation?**

E. Tessitore

# MONDAY, MAY 2

**8:58–9:16 am**

## **Is There a Moratorium on New Technologies in This Area?**

J. Cheng

**9:17–9:39 am**

## **Beverage Break**

**9:40–11:39 am**

## **Session III: Pearls in Surgical Technique**

---

**9:40–9:59 am**

## **Arthroplasty Adjacent to Fusion**

P. Nunley

**10–10:19 am**

## **Cervical Laminoplasty: Review of Techniques**

J. Heller

**10:20–10:39 am**

## **Is Laminoplasty Motion Preserving?**

T. Albert

**10:40–10:59 am**

## **Motion Preservation for Atlas and Axis Fractures**

V. Traynelis

**11–11:19 am**

## **Cervical Arthroplasty: Complication Avoidance and Management**

M. Bydon

**11:20–11:39 am**

## **Questions and Panel Discussion**

**11:40–12:59 pm**

## **Lunch**

**Participants in the Neurological Communities will receive a \$15 voucher to be used at Reading Terminal**

**1–1:59 pm**

**Debate: Cervical TDR vs Posterior Cervical Laminoforaminotomy**

---

**1–1:19 pm**

**Cervical TDR**

R. Sasso

**1:20–1:39 pm**

**Posterior Cervical Laminoforaminotomy**

M. Smith

**1:40–1:59 pm**

**Discussion**

**2–5 pm**

**Debate: L5-S1 ALIF vs. L-TDR**

---

**2–2:19 pm**

**L5-S1 ALIF**

R. Nasser

**2:20–2:39 pm**

**L5-S1 L-TDR**

T. Lanman

**2:40–2:59 pm**

**Panel Discussion with Speakers**

**3–3:29 pm**

**Lumbar TDR Evidence Basis and update**

J. Harrop

**3:30–3:59 pm**

**Lumbar Facet Replacement**

S. Meyer

**4–4:29 pm**

**Does Preserving Motion Alter the Rate of Adjacent Level Disease**

E. Braxton

**4:30–5 pm**

**Panel Discussion with Speakers**

# MONDAY, MAY 2

**7 am–3:30 pm**

## **504 Minimally Invasive Spine**

Location: 204 AB

Moderator: P. Mummaneni, J. Uribe

---

**7–7:02 am**

### **Introduction**

Moderators: P. Mummaneni, J. Uribe

**7:03–8:02 am**

### **Session I: The Most Disruptive MIS Technologies**

---

**7:03–7:22 am**

#### **Endoscopy**

C. Hoffstetter

**7:23–7:42 am**

#### **Robotics and Expanded Applications**

J. Ebinu

**7:43–8:02 am**

#### **Enabling Technologies**

J. Godzik

**8:03–8:44 am**

### **Session II: Leadership Lectures. What is MIS?**

---

**8:03–8:21 am**

R. Fessler

**8:22–8:44 am**

K. Foley

8:45–9:14 am

**Beverage Break**

9:15–10:30 am

**Session III: MIS Techniques in Action**

---

9:15–9:33 am

**Deformity**

K. Fu

9:34–9:52 am

**Trauma**

C. Molina

9:53–10:11 am

**Tumor**

D. Chou

10:12–10:30 am

**Degenerative**

C. Upadhyaya

10:30–11:59 am

**Panel Discussion: Community Cases with Surgical Nuances for Degen, Trauma, Tumor, and Defromity**

Moderator: J. Harrop

D. Chou, R. Fessler, K. Foley, R. Hartl

12–12:59 am

**Lunch**

Participants in the Neurological Communities will receive a \$15 voucher to be used at Reading Terminal

1–1:59 pm

**MIS Case Debates Part 1—Too Much Hype and Not Enough Evidence?**

---

1–1:05 pm

**Case Topic: L4-L5 Spondylolisthesis**

E. Potts

# MONDAY, MAY 2

**1:06–1:29 pm**

**Debate: TLIF vs. LLIF—TLIF**

L. Tumialan, J. Uribe

**1:30–1:35 pm**

**Case Topic: Burst Fractures, Percutaneous vs Open Approaches**

S. Woodrow

**1:36–1:59 pm**

**Debate: Percutaneous vs. Open Approaches**

R. Berkman, C. Molina

**2–3:30 pm**

**MIS Case Debates Part 2**

---

**2–2:05 pm**

**Case Topic: L5-S1 TLIF vs ALIF**

TBD

**2:06–2:29 pm**

**Debate: TLIF vs. ALIF**

D. Coric, M. Virk

**2:30–2:35 pm**

**Case Topic: Prespsoas vs Transpsoas at L3-4**

J. Turner

**2:36–2:59 pm**

**Debate: Prespsoas vs. Transpsoas**

M. Virk, D. Chou

**3–3:05 pm**

**Case Topic: Third Time Reherniated Disc:  
TLIF Awake vs TLIF with GETA and Endoscope**

E. Potts

**3:06–3:30 pm**

**Debate: Awake vs. General Anesthesia  
with Endoscope**

C. Hofstetter, B. Pennicooke

**7 am–4:30 pm**

**505 Emerging Technologies in  
Peripheral Nerve Surgery**

Location: 108 AB

Moderator: M. Mahan; R. Midha

---

**7–7:02 am**

**Introduction**

M. Mahan, R. Midha

**7:03–8:44 am**

**The Most Ground-breaking New Technology**

---

**7:03–7:23 am**

**Peripheral Nerve Imaging**

R. Dortch

**7:24–7:44 am**

**PEG Technology**

G. Bittner

**7:45–8:05 am**

**Powered Prosthesis**

T. Lenzi

**8:06–8:26 am**

**Absorbable Electrodes for Nerve Simulation**

M. MacEwan

**8:27–8:44 am**

**Question and Answer Session**

**8:45–9:14 am**

**Beverage Break**

**9:15–10:29 am**

**What's on The Horizon**

---

**9:15–9:39 am**

**Axon Implants for Nerve Regeneration**

D. Cullen

# MONDAY, MAY 2

**9:40–10:04 am**

**Contralateral C7 for Stroke and Cerebral Palsy**

T. Wilson

**10:05–10:29 am**

**New Therapies for ALS**

N. Boulis

**10:30–11:59 am**

**Panel Discussions: Nerve Controversies**

Moderator: H. Gilmer

---

**10:30–10:59 am**

**Parsonage Turner Syndrome:  
Surgical Neuropathy or Not?**

R. Spinner, A. Belzberg

**11–11:29 am**

**Decompression vs Resection Versus Stimulation for  
Painful Neuropathy**

A. Hanna, J. Schwalb, C. Winfree

**11:30–11:59 AM**

**AIN Transfer For Proximal Ulnar Lesions**

R. Midha, E. Zager

**12–12:59 pm**

**Lunch**

**1–1:59 pm**

**Existential Crises in Your Community**

---

**1–1:29 pm**

**How to Avoid the PN Land Grab—Developing a  
Working relationship with Orthopedics and Plastics.**

A. Belzberg, J. Brown, R. Spinner

**1:30–1:59 pm**

**Resident Engagement in PN Training**

H. Gilmer, L. Jacques

**2–3:29 pm**

**Debate Between Experts**

Moderator: Z. Ali, R. Puffer

---

**2–2:53 pm**

**Proximal Repair vs Distal Transfers**

J. Huang, L. Rasulic

**2:54–3:29 pm**

**GSW—Management Strategies and Timing**

M. Mahan, E. Zager

**3:30–4:30 pm**

**Industry Hands-on Session**

**7 am–4:30 pm**

**506 Endovascular Approaches to Neurological Problem**

Location: 113 A

Moderator: A. Arthur, S. Tjoumakaris

---

**7–7:02 am**

**Introduction**

A. Arthur, S. Tjoumakaris

**7:02–7:59 am**

**Session I: Ground-breaking New Technology**

---

**7:02–7:19 am**

**The Future of Functional Endovascular Surgery**

J Mocco

**7:20–7:39 am**

**Robotics in Neuroendovascular**

P. Jabbour

**7:40–7:59 am**

**Ultrasonic Histotripsy for ICH**

A Pandey

**8–8:44 am**

**The Future of Endovascular Neurosurgery**

R. Rosenwasser

# MONDAY, MAY 2

8:45–9:14 am

**Beverage Break**

9:15–10:29 am

**What's on the Horizon**

---

9:15–9:39 am

**IA Chemotherapy for GBM**

J. Knopman

9:40–10:04 am

**Tranvenous Therapy for Paralysis**

T. Oxley

10:05–10:29 am

**Endovascular CSF Shunt for Communicating HCP**

A. Malek

10:30–11:59 am

**Transvenous AVM Treatment, CSF-venous Fistulae, MMA Embo for CSDH, ICH, Venous Stenting for IIH, DVST**

R. Hanel, H. Riina, A. Siddiqui, P. Taussky

12–1 pm

**Lunch**

Participants in the Neurological Communities will receive a \$15 voucher to be used at Reading Terminal

1:01–1:59 pm

**Existential Crises in Your Community**

---

1:01–1:30 pm

**Will Neuroendovascular Become a Part of Neurosurgery, Remain Multi-specialty, or Become its Own Specialty?**

J. Bukhardt, D. Dornbos, S. Monteith

1:31–1:43 pm

**Rebuttal**

J. Bukhardt, D. Dornbos, S. Monteith

**1:44–1:59 pm**

**Question and Answer with Audience**

J. Bukhardt, D. Dornbos, S. Monteith

**2–3:30 pm**

**In the Next Ten Years, the Next Big Disease State in Endovascular Neurosurgery is:**

- 1) Expansion in Patients Eligible for Mechanical Thrombectomy**
- 2) Minimally Invasive Treatment of ICH,**
- 3) Functional Endovascular Neurosurgery**

M. Bain, C. Kellner, M. Levitt, P. Kan, R. Starke

**3:31–4:30 pm**

**Industry Hands-on Session**

**6:50 am–5:15 pm**

**507 Cerebral Aneurysms**

Location: 114

Moderator: W. Mack, J. Morcos

---

**6:50–7 am**

**Introduction**

W. Mack, J. Morcos

**7:01–8 am**

**Session I: State of the Art: Predicting Aneurysm Rupture**

Moderator: R. Du, S. Lavine

---

**7:01–7:15 am**

**Wall Imaging to Determine/  
Guide Aneurysm Treatment**

M. Niemela

**7:16–7:30 am**

**Computational Fluid Dynamics to  
Determine/Guide Treatment**

M. Levitt

# MONDAY, MAY 2

**7:31–7:45 am**

## **Blood Based Biomarkers for Aneurysms**

A. Siddiqui

**7:46–8 am**

## **Surveillance of Aneurysms: Quantifying Risks**

D. Hasan

**8:01–8:45 am**

## **Session II—Point-CounterPoint: Treatment of Blister Aneurysms**

P. Kan, G. Steinberg

---

**8:01–8:05 am**

## **Audience Vote (pre-debate)**

P. Kan, G. Steinberg

**8:06–8:15 am**

## **Blister Aneurysms Should be Treated with Microsurgery**

M. Baskaya

**8:16–8:25am**

## **Blister Aneurysms Should Be Treated with Flow Diverters**

H. Woo

**8:26–8:30 am**

## **Rebuttal 1**

M. Baskaya

**8:31–8:35 am**

## **Rebuttal 2**

H. Woo

**8:36–8:40 am**

## **Audience Vote (post-debate)**

P. Kan, G. Steinberg

**8:41–8:45 am**

## **Discussion**

**8:46–9:30 am**

**Session III: Treatment of Giant and Fusiform Aneurysms—Panel Discussion**

Moderator: F. Alburquerque, J. Mura

Panelists: M. Baskaya, F. Charbel, K. Cockroft,

E. Levy, L. Sekhar

**9:31–10:30 am**

**Session IV: Real Life Complications**

---

**9:31–9:39 am**

E. Connolly

**9:40–9:48 am**

C. Schirmer

**9:49–9:56 am**

C. David

**9:57–10:04 am**

M. Aziz-Sultan

**10:05–10:12 am**

A. Wang

**10:13–10:20 am**

B. Bendok

**10:21–10:30 am**

**Discussion**

**10:31–11 am**

**Beverage Break**

# MONDAY, MAY 2

**11:01–11:30 am**

## **Session V: State of the Industry**

Moderator: A. Abula, B. Jahromi

---

**11:01–11:05 am**

## **Intraoperative Blood Flow Measurements**

S. Amin-Hanjani

**11:06–11:10 am**

## **Fluorescence Vascular Techniques**

J. Russin

**11:11–11:15 am**

## **Augmented/Virtual Reality in Cerebrovascular Surgery**

A. Cohen-Gadol

**11:16–11:20 am**

## **Robotics in Neuroendovascular Surgery**

P. Jabbour

**11:21–11:25 am**

## **Topic: TBD**

A. Malek

**11:26–11:30 am**

## **Topic: TBD**

B. Hoh

**11:31–12 pm**

## **Session VI: Keynote Lecture: The Refined Craft of Aneurysm Clipping: Subtleties, Blunders and Lessons Learned**

D. Barrow

**12:01–1 pm**

## **Lunch**

Participants in the Neurological Communities will receive a \$15 voucher to be used at Reading Terminal

1:01–1:45 pm

**Session VII—Panel II: Treatment of Middle Cerebral and Basilar Tip Aneurysms**

Moderator(s): B. Jankowitz, S. Wolfe

A. Day, J. Mocco, A. Krisht, H. Riina, B. Welch

---

1:01–1:45 pm

**Treatment of Middle Cerebral and Basilar Tip Aneurysms**

1:46–2:45 pm

**Session VIII: Breakout Hands-on Groups**

2:46–3:15 pm

**Beverage Break**

3:16–3:45 pm

**Session IX: The Pivot/Lipton Interview with the Experts**

Moderator(s): J. Morcos

D. Barrow, D. Langer, C. Ogilvy, R. Rosenwasser

---

3:46–4:30 pm

**Session X: Panel III—Pre-Submitted Audience Cases**

Moderator(s) N. Khan, G. Thompson

A. Dehdasht, S. Giannotta, A. Khalessi, G. Lanzino, G. Zipfel

---

4:31–5:15 pm

**Session XI—Pushing the Envelope and Imagining the Future**

Moderator(s) G. Britz, J. Bukhardt

---

4:31–4:45 pm

**Endovascular Devices of the Future**

E. Levy

4:46–5 pm

**Bypasses of the Future**

M. Lawton

# MONDAY, MAY 2

**5:01-5:15 pm**

**The Future of Cerebrovascular Disease in Children**

M. Levy

**7 am-4 pm**

**508 Movement Disorders and Epilepsy**

Location: 201 BC

Moderator(s): A. Abosch, P. Starr

---

**7-7:05 am**

**Introduction**

A. Abosch, P. Starr

**7:06-9:15 am**

**Ground Breaking Technology: DBS**

---

**7:06-7:31 am**

**Next Generation DBS Hardware**

T. Denison

**7:32-7:57 am**

**The New Era of Big Data From the Brain**

R. Abbasi-Asl

**7:58-8:23 am**

**DBS in Psychiatry**

S. Sheth

**8:24-8:49 am**

**Neural Decoding of Chronic Pain and Its Implication  
for Neuromodulation**

P. Shirvalkar

**8:50-9:15 am**

**Leadership Lecture/Pre-eminent Thought Leader:  
Thalamic Neurostimulation for Cognitive Rehab**

J. Henderson

**9:16-9:46 am**

**Beverage Break**

**9:47–11:20 am**

**Existential Crises and Critical Issues**

---

**9:47–10:07 am**

**Adopting New Surgical Technologies**

TBD

**10:08–10:28 am**

**Challenges of Launching a Practice in Functional  
Neurosurgery as a New Attending—Academic**

B. Lee

**10:29–10:49 am**

**Challenges of Launching a Private Practice in  
Functional Neurosurgery**

P. Gigante

**10:50–11:20 am**

**Panel Discussion**

Moderator(s): A. Abosch, B. Lee, A. Machado,  
N. Puratian, P. Starr

**11:21–12:51 pm**

**Lunch**

Participants in the Neurological Communities will receive a  
\$15 voucher to be used at Reading Terminal

**12:52–1:54 pm**

**Ground Breaking Technology: Epilepsy**

Moderator(s): N. Barbaro, E. Chang

---

**12:52–1:12 pm**

**Role of Thalamus in Epilepsy Surgery:  
Implications for SEEG/DBS/SEEG**

K. Riley

**1:13–1:33 pm**

**Targeting Consciousness in Epilepsy Surgery**

A. Machado

# MONDAY, MAY 2

**1:34–1:54 pm**

**DBS vs. RNS vs. VNS: Algorithmic Approaches**

J. Rolston

**1:55–2:25 pm**

**Beverage Break**

**2:26–4 pm**

**Existential Crises and Critical Issues**

---

**Panel Discussion: Minimally Invasive:  
Risks vs. Benefits**

Moderator(s): N. Barbaro, E. Chang

Panelists: R. Gross, J. Willie, K. Zaghloul

**7 am–5 pm**

**509 Pediatric Brain Tumor and Hydrocephalus**

Moderator(s): G. Grant, B. Iskandar

---

**7–7:04 am**

**Introduction**

G. Grant, B. Iskandar

**7:03–9:41 am**

**Session I: Pediatric Brain Tumors**

---

**7:05–7:35 am**

**The Past and Present**

F. Boop

**7:36–8:16 am**

**The Future: Big Data and CNS Tumors**

P. Dirks

**8:17–8:57 am**

**CNS Tumors and Genomic Landscape (low grade)**

A. Resnick

**8:58–9:41 am**

**Debate Between Experts**

F. Boop, P. Dirks, J. Rutka, V. Tabar

9:42–10:12 am

**Beverage Break**

10:13–11:39 am

**Session II: Technology**

---

10:13–10:33 am

**Molecular Targeting (Personalized Medicine)**

V. Tabar

10:33–10:54 am

**The Non-surgical Future of Primary CNS Tumors?**

A. Resnick

10:55–11:39 am

**Panel: Debate Between Experts and Q & A**

11:40–12:40 pm

**Lunch**

Participants in the Neurological Communities will receive a \$15 voucher to be used at Reading Terminal

12:41–1:57 pm

**Session III: Hydrocephalus**

---

Moderators: J. Drake

12:41–1:11 pm

**The Past and Present**

M. Walker

1:12–1:57 pm

**The Future**

S. Schiff

1:58–2:28 pm

**Beverage Break**

# MONDAY, MAY 2

2:29–5 pm

## Session III: Technology

---

2:29–2:48 pm

### Using Big Data Science for Hydrocephalus Treatment and Prevention

K. Kahle

2:49–3:08 pm

### Future Endoscopic Technology

M. Souweidane

3:09–3:28 pm

### The Future of Global Hydrocephalus Care

B. Warf

3:29–4:14 pm

### Future Shunt Design Panel

Panelists: S. Browd, J. Ray-Cambrin, M. Walker

4:15–5 pm

### Debate Between Experts and Q & A

Moderators: J. Drake, B. Iskandar

Panelists: J. Riva-Cambrin, J. McAllister, J. Madsen

7 am–4:30 pm

## 511 Glioblastoma

Location: 113 BC

Moderator(s): F. Barker, L. Liao

---

7–7:02 am

### Introduction

F. Barker, L. Liao

7:03–8:32 am

## Session I: Ground-breaking New Technology

---

7:03–7:17 am

### Intra-operative Histology & AI Image Analysis

D. Orringer

**7:18–7:32 am**

**Progression vs. Pseudo-progression:  
How to Differentiate & When to Operate**

TBD

**7:33–7:47 am**

**Laser Interstitial Thermal Therapy (LITT)  
for Gliomas**

W. Kim

**7:48–8:02 am**

**Epigenetic Modulation for Brain Tumor  
Immunotherapy**

R. Everson

**8:03–8:17 am**

**Autophagy Inhibition in Treatment of Glioblastoma**

N. Amankulor

**8:18–8:32 am**

**Knowing When to Stop Removing Tumor**

C. Hadjipanayis

**8:33–9:17 am**

**Leadership Lecture**

M. Berger

**9:18–9:44 am**

**Beverage Break**

**9:45–10:29 am**

**Leadership Lecture: Overcoming the Challenges in  
Glioma Therapy**

R. Stupp

**10:30–11:59 am**

**Session II: What's on the Horizon**

---

**10:30–10:50 am**

**New Science & Clinical Trials That Will Change  
Glioblastoma Management in the Next Five Years**

E. Choicca

# MONDAY, MAY 2

**11–11:59 am**

## **Panel Discussion/Q&A: Interesting Cases**

Moderator(s): F. Barker, L. Liau

N. Amankulor, M. Berger, E. Chiocca, R. Everson, C. Hadjipanayis,  
W. Kim, D. Orringer, R. Stupp

**12–1 pm**

## **Lunch**

Participants in the Neurological Communities will receive a  
\$15 voucher to be used at Reading Terminal

**1–1:59 pm**

## **Session III: Existential Crises in Your Community**

---

**1–1:29 pm**

## **Negative Clinical Trials Over and Over Again**

P. Wen

**1:30–1:59 pm**

## **Why Our Clinical Trials Fail**

F. Barker

**2–2:50pm**

## **Session VI: Debate Between Experts**

---

**2–2:29pm**

## **Supratotal Resection for Gliomas: It is Indicated or Not?**

H. Duffau, S. Hervey-Jumper

**2:30–2:59 pm**

## **Tumor Treating Fields for Glioblastoma**

J. Sampson, R. Stupp

**3–4:30 pm**

## **Industry Hands on Session**

**7 am–4:30 pm**

**512 Pituitary and Endoscopic Skull Base**

Location: 204 BC

Moderator(s): W. Couldwell, N. Oyesiku

---

**7–7:02 am**

**Introduction**

Moderators: W. Couldwell, N. Oyesiku

**7:03–8:02am**

**Session I: Ground-breaking New Technology**

---

**7:03–7:17 am**

**Extended Transsphenoidal Surgery**

D. Prevedello

**7:18–7:32 am**

**Advanced Imaging for Pituitary Surgery**

G. Barkhoudarian

**7:33–7:47 am**

**Advanced Endoscopy and Pituitary Surgery**

T. Schwartz

**7:48–8:02 am**

**Intraoperative MRI**

E. Knosp

**8:03–8:47 am**

**Pituitary Surgery: Past, Present, and Future**

E. Laws

**8:48–9:14 am**

**Beverage Break**

**9:15–11:59 am**

**Session II: What's On The Horizon**

---

**9:15–9:27 am**

**Intraop MRI**

TBD

# MONDAY, MAY 2

**9:28–9:40 am**

## **Genomic Alterations in Pituitary Adenomas**

W. Bi

**9:41–9:53 am**

## **Pituitary Apoplexy Management**

M. Aghi

**9:54–10:06 am**

## **Giant Adenoma Management**

J. Fernandez-Miranda

**10:07–10:19 am**

## **Management of Functioning Adenoma Recurrence**

G. Zada

**10:20–10:32 am**

## **Reaching Into the Cavernous Sinus**

P. Gardner

**10:33–11:59 am**

## **Panel Discussion with Questions from Audience**

Moderator: J. Sheehan

M. Aghi, W. Bi, J. Fernandez-Miranda, P. Gardner, G. Zada

**12–1 pm**

## **Lunch**

Participants in the Neurological Communities will receive a \$15 voucher to be used at Reading Terminal

**1–3:30 pm**

## **Session III: Existential Crises in Your Community**

---

**1–1:14 pm**

## **Medical Therapy is the Future of Pituitary Adenoma treatment**

M. Fleseriu

**1:15–1:29 pm**

## **Surgery is the Future of Pituitary Adenoma Treatment**

W. Couldwell

**1:30–1:44 pm**

**Radiation is the Future of Pituitary  
Adenoma Treatment**

D. Kondziola

**1:45–1:59 pm**

**Guidelines, Consensus Statements, and Evidence  
Based Practice**

K. Post

**2–3:30 pm**

**Cases for Panel Review with Audience Polling**

Moderator(s): J. Jane, D. Kelly

M. Bergesneider, M. Fleseriu, E. Laws, A. Lochimescu, J. Sheehan

**3:31–4:30 pm**

**Industry Hands-on Session**

**7–2:15 pm**

**513 Focused Energy Treatments of the Nervous System**

Location: 110 AB

Moderator(s): R. Gross, A. Rezai

---

**7–7:29 am**

**Introduction and the Need for New Technology**

---

**7–7:14 am**

**Focused Energy Treatments and Ultrasound**

A. Rezai

**7:15–7:29 am**

**MRI Guided vs. Thermistor Controlled  
Thermocoagulative Ablation**

R. Gross

**7:30–8:59 am**

**Session I: State of the Art Ablation**

---

**7:30–7:44 am**

**Movement Disorders**

R. Cosgrove

# MONDAY, MAY 2

**7:45–7:54 am**

**Tumors**

G. Barnett

**7:55–8:06 am**

**Obsessive Compulsive Disorder and Depression**

J. Chang

**8:07–8:16 am**

**Epilepsy**

TBD

**8:17–8:26 am**

**Epilepsy and Movement Disorders**

TBD

**8:27–8:38 am**

**Chronic pain**

V. Krishna

**8:39–8:59 am**

**Panel Question/Answers and Discussion**

**9–9:29 am**

**Beverage Break**

**9:30–10:29 am**

**Session II: Leadership Lectures**

---

**9:30–9:49 am**

**Gamma Knife Lesioning in Neurosurgery**

D. Kondziolka

**9:50–10:09 am**

**Focused Ultrasound Technology:  
A Paradigm Shift in Neurosurgery**

K. Hynynen

**10:10–10:29 am**

**Bringing Lasers into the Light**

TBD

10:30–11:44 am

**Session III: Blood Brain Barrier Opening  
and Neuromodulation**

---

10:30–10:42 am

**Alzheimer's Disease**

TBD

10:43–10:55 am

**Brain Tumors**

TBD

10:56–11:06 am

**Gene and Stem Cell Delivery**

TBD

11:07–11:14 am

**Neuromodulation for Addiction**

A. Rezai

11:15–11:22 am

**Neuromodulation for Neurological Conditions**

J. Adler

11:23–11:44 am

**Panel Question/Answers and Discussion**

11:45–12:45 pm

**Lunch**

Participants in the Neurological Communities will receive a  
\$15 voucher to be used at Reading Terminal

12:46–1:07 pm

**Session IV: New Technology Around the Bend**

---

12:46–12:56 pm

**Is There a Practical Option for Optogenetics**

TBD

12:57–1:07 pm

**Photomodulation and Optical Energy**

TBD

# MONDAY, MAY 2

1:08–2:15 pm

**Session V: Existential Crises in Your Community:  
Point-Counter Pont—Is the Tail Wagging the Dog?  
Technology vs. Clinical Need as the Driver of Change**

---

1:08–1:18 pm

**Focused Ultrasound is a Better Therapy and Will  
Replace Gamma Knife for Movement Disorders (Pro)**

R. Cosgrove

1:19–1:29 pm

**Focused Ultrasound is a Better Therapy and Will  
Replace Gamma Knife for Movement Disorders (Con)**

D. Kondziolka

1:30–1:40 pm

**Laser and RF Ablation is a Better Therapy and Will  
Replace Open Resection (Pro)**

R. Gross

1:41–1:51 pm

**Laser and RF Ablation is a Better Therapy and Will  
Replace Open Resection (Con)**

TBD

1:52–2:15 pm

**Panel Question/Answers and Discussion**

7 am–4:25 pm

**Rapid Fire Research Forum**

Location: 111 AB

---

7–8:09 am

**Rapid Fire Abstracts: Cerebrovascular**

---

7:05–7:09 am

**Risk Factors for Chronic Depression Following  
Aneurysmal Subarachnoid Hemorrhage:  
A 17-year Experience**

J. Catapano

**7:10–7:14 am**

**Shorter Reproductive Lifespan and Early Age at Menopause are Associated with Aneurysmal Subarachnoid Hemorrhage in Women**

P. Lai

**7:15–7:19 am**

**Non-invasive Low Pulsed Electric Fields Induce Transient BBB Disruption, Depicted by the TRAMs, Enabling Efficient Delivery of Biologics Into the Brain**

Y. Mardor

**7:20–7:24 am**

**Sympathetic Nervous System Hyperactivity Results in Potent Cerebral Hypoperfusion in a Swine Model of Cerebral Vasospasm**

W. Kim

**7:25–7:29 am**

**Inflammasomes in Large Vessel Occlusion Thrombi**

S. Chen



**7:30–7:34 am**

**Rescue Stenting for Acute Ischemic Stroke with Refractory Emergent Large Vessel Occlusion in the Modern Thrombectomy Era**

K. El Naamani

**7:35–7:39 am**

**Laparoscopic Omental-cerebral Transposition for Repeat Revascularization of Refractory Moyamoya Disease**

B. Yim

**7:40–7:44 am**

**Factors Associated with Intracranial Aneurysm Rupture: A HEAT Trial Secondary Study**

B. Jones

# MONDAY, MAY 2

**7:45–7:49 am**

**Vessel Wall Imaging and Quantitative Flow Assessment in Arteriovenous Malformations: A Feasibility Study**

L. Stone McGuire

**7:50–7:54 am**

**Angiographic Study of Cranial Venous Outflow Patterns at the Skull Base in Patients With and Without Idiopathic Intracranial Hypertension**

M. Sattur

**7:55–7:59 am**

**Between Scylla and Charybdis: A Neuroanatomic & Clinical Assessment of Safe Navigation Routes Through the Middle Cerebellar Peduncle for Brainstem Cavernous Malformation Resection**

C. Graffeo

**8–8:04 am**

**Pre-operative Brain Mapping Supports Clinical Decision and Guides Surgical Management in Eloquent Arteriovenous Malformation. A Clinical Prospective Study.**

S. Karadimas

**8:05–8:09 am**

**Pilot Study of a Randomized, Blinded, Placebo-Controlled Trial of Shunt Surgery in Idiopathic Normal Pressure Hydrocephalus**

M. Luciano

**8:10–8:59 am**

**Rapid Fire Abstracts: Pain; History**

---

**8:10–8:14 am**

**A Role for Steroids in Acute Pain Management in Patients with Trigeminal Neuralgia**

R. Xu

**8:15–8:19 am**

**Interventional Therapies for SUNCT/SUNA: A Review**

R. Smit

**8:20–8:24 am**

**The Effect of Intraoperative Intrathecal Morphine Administration on the Length of Stay and Postoperative Pain Control for Patients Undergoing Lumbar Interbody Fusion**

K. Beasley

**8:25–8:29 am**

**The Internal Structure of Gasserian Ganglion and its Implications on the Efficacy of Percutaneous Radiofrequency Thermocoagulation for Trigeminal Neuralgia**

B. Bozkurt

**8:30–8:34 am**

**Effective Treatment of Refractory Complex Facial Pain with Motor Cortex Stimulation by Spinal Paddle Electrodes**

A. Gong

**8:35–8:39 am**

**Augmentation of Postoperative Pain and Opioid Consumption Following Craniotomy: A Study of Subcutaneous Sumatriptan**

J. Woodward

**8:40–8:44 am**

**PHANOR L. PEROT, JR: South Carolina's Father of Neurosurgery**

Z. Hubbard

**8:45–8:49 am**

**The History of Closed Skeletal Traction in the Management of Cervical Facet Dislocations**

T. Chryssikos

# MONDAY, MAY 2

**8:50–8:54 am**

**“Life and Death 2” The First Neurosurgical  
Computer Simulation**

I. Bhatia

**8:55–8:59am**

**The Operating Table—Past, Present and Future**

M. Helton

**9–10:14 am**

**Rapid Fire Abstracts: Socioeconomic**

---

**9–9:04 am**

**Building and Implementing an Institutional Registry  
for a Data-driven National Neurosurgical Practice:  
Experience From a Multi-site Medical Center.**

M. Bydon

**9:05–9:09 am**

**Factors Associated with Pregnancy and  
Perinatal Outcomes in Female Neurosurgeons:  
A Cross-sectional Study**

S. Parker

**9:10–9:14 am**

**Affective Disorders are Associated with Longer  
Hospitalization and Hospital Charges in Patients  
Undergoing Elective Lumbar Spinal Fusion**

S. Alomari

**9:15–9:19 am**

**From Their Eyes: What Constitutes Effective  
Formative Feedback for Neurosurgery Residents**

C. Neal

**9:20–9:24 am**

**Association of Medicaid Expansion Under  
the Affordable Care Act with Receipt of  
Meningioma Treatment**

C. Lopez Ramos

**9:25–9:29 am**

**Influence of Healthcare Disparities On Outcomes for Spinal Metastasis Patients**

K. Ashayeri

**9:30–9:34 am**

**Legal Considerations of the Neurosurgical Physician and Physician Assistant Team**

K. Hickman

**9:35–9:39 am**

**Predicting Resilience and Burnout in Neurosurgery Trainees and Neurosurgeons Globally: Need for a Culture Shift**

J. Skulsampaopol

**9:40–9:44 am**

**Supplementary Insurance to Medicare: A Significant Factor in Discharge Disposition after Lumbar Spine Fusion in New York**

A. Carpenter

**9:45–9:49 am**

**A Qualitative Study of Fear and Unintended Consequences Emerging from Restrictive Opioid Prescribing Policies**

C. Sedney

**9:50–9:54 am**

**Surgical Start Time Impacts Length of Stay for Elective Neurosurgical Procedures**

C. Cifarelli

**9:55–9:59 am**

**Return to Work, Activities of Daily Living and Sports After Spinal Ependymoma Resection: A Monocenter Experience with Long-term Follow-up**

V. Butenschoen

**10–10:04 am**

**Characteristics of Transfer Patients Who Undergo Craniotomy**

A. Carpenter

# MONDAY, MAY 2

**10:05–10:09 am**

**Role of Early Postoperative CT Scan in  
Elective Cranial Surgeries**

J. Ruparelia

**10:10–10:14 am**

**Improving Education on Cost-Effective Care  
in Neurosurgery: A Personalized, Web-Based  
Intervention for Residents**

A. Khalafallah

**10:15–11:09 am**

**Rapid Fire Abstracts: Tumor**

---

**10:15–10:19 am**

**Novel Bipolar Electric Field Therapy for the  
Treatment of Glioblastoma: Preliminary In-vitro and  
In-vivo Results**

S. Dhawan

**10:20–10:24 am**

**ACOT-7 Knockdown Regulates IRE1 $\alpha$  and Prolongs  
Survival in Preclinical Breast Cancer Brain  
Metastases**

E. Petrosyan

**10:25–10:29 am**

**Determining Surgically Relevant Structural  
Connectivity Inter-individual Biotypes Using  
Simulated Brain Surgery**

M. Sughrue

**10:30–10:34 am**

**BOLD Asynchrony is a Contrast-Independent  
Biomarker of High-Grade Glioma in Patients on  
Bevacizumab**

P. Wu

**10:35–10:39**

**Transcriptomic Landscape of Diffuse Infiltrating Gliomas Identifies Immune Subgroups in IDH Wildtype and Mutant Patients**

X. Zhang

**10:40–10:44**

**MRI Radiogenomics of Pediatric Medulloblastoma: A Multi-Center Study**

M. Zhang

**10:45–10:49 am**



**Identification of Targetable Glioblastoma Specific Antigens Using a B-cell-based Vaccine**

B. Castro

**10:50–10:54 am**



**Genetic Manipulation of CD97 Inhibits Patient-Derived Glioblastoma Stem Cell Invasion In Vivo**

D. Eichberg

**10:55–10:59 am**

**Circulating Tumor-Leukocyte Hybrid Cells: A Novel, Sensitive, and Specific Biomarker for Glioma in Peripheral Blood**

S. Bowden

**11–11:04 am**

**Radiogenomics and Radiomics of Skull Base Chordoma: Machine Learning-based Classification of Genetic Signatures and Clinical Outcomes by Multiparametric MRI**

Z. Gersey

**11:05–11:09 am**

**Integrated Computational Analyses Reveal Novel Insights Into the Stromal Microenvironment of SHH-subtype Medulloblastoma**

A. Landry

# MONDAY, MAY 2

11:10 am–1:25 pm

## Rapid Fire Abstracts: Neurotrauma

---

11:10–11:14

### Expression of Thrombin-Cleaved Osteopontin and Integrin $\alpha 9$ and $\beta 1$ Signaling Pathway Molecules in Chronic Subdural Hematomas

K. Osuka

11:15–11:19 am

### Improving Trauma Readiness in the Military Neurosurgical Community—Early Experience from the Army Military Civilian Trauma Team Training (AMCT3) Program

C. Mossop

11:20–11:24 am

### MRI-based Treatment Response Assessment Maps, TRAMs, for Depicting Short/long-term Subtle BBB Disruption in Traumatic Brain Injury

Y. Mardor

11:25–11:29 am

### Technical Nuances and Complications of Endoscopic-assisted Ventricular Catheter Placement in Ventriculo-peritoneal Shunt Insertion: a Single Center Experience

S. Jeong

11:30–11:34 am

### Cerebral Cortical Functional Connectivity Following Mild, Repetitive Traumatic Brain Injury in the Mouse

S. Cramer

11:35 am–12:55 pm

## Lunch

Concessions are available for purchase at ecoGrounds located level 2 near registration

**12:56–1 pm**

**Patterns of Intracranial Pressure Monitoring  
in Patients with Severe Traumatic Brain Injury:  
A TRACK-TBI Study**

V. Wang

**1:01–1:05 pm**

**Barriers to Early Surgery for Spinal Cord Injuries:  
A Report from the North American Clinical Trials  
Network for Spinal Cord Injury**

C. Neal

**1:06–1:10 pm**

**Antiplatelet, Anticoagulant, or Endovascular  
Treatment for Stroke Prevention in Blunt  
Cerebrovascular Injury: A Retrospective Cohort  
Study with Systematic Review and Meta-analysis**

J. Ku

**1:11–1:15 pm**

**Association between Physiologic Frailty and  
Discharge Outcomes after Admission for Non-  
Operative Traumatic Brain Injury**

R. Sastry

**1:16–1:20 pm**

**Delayed Intracranial Hemorrhage of Mild Traumatic  
Brain Injury Patients under Antithrombotics on  
Routine Repeat CT Scan: a Systematic Review and  
Meta-Analysis**

S. Elhadwe

**1:21–1:25 pm**

**Hemispherotomy for Post-Traumatic Epilepsy**

K. Wojcik

# MONDAY, MAY 2

1:26–2:25 pm

**Rapid Fire Abstracts: Pediatrics**

---

1:26–1:30 pm

**Surgical Decision Making in Brachial Plexus Birth Injuries: A Three Year Retrospective Review of 34 Patients**

C. Gegg

1:31–1:35 pm

**Complications of Internal Cranial Distractors**

C. Wilkinson

1:36–1:40 pm

**LITT Therapy for SEGA: Establishing its Role in Standard of Care**

S. Boop

1:41–1:45 pm

**Microsurgical Treatment of Pediatric Arteriovenous Malformations: A Large Single Center Case Series**

D. Peters

1:46–1:50 pm

**Comparison of Surgical Interventions for Early-Onset Scoliosis: a Systematic Review and Meta-analysis**

M. Bydon

1:51–1:55 pm

**Clinical Outcomes for Pediatric Hydrocephalic Patients Treated with ETV+CPC: A Systematic Review and Meta-analysis**

J. Mann

1:56–2 pm

**Spinal Dysraphism in Epispadias-exstrophy Complex**

B. Judy

2:01–2:05 pm

**The Role of Vagus Nerve Stimulation in Genetic Etiologies of Drug Resistant Epilepsy: A Meta-Analysis**

M. LoPresti

**2:06–2:10 pm**

**Feasibility of Low Field-Strength Magnetic Resonance Imaging in the Pediatric Neurosurgery Clinic**

D. Donoho

**2:11–2:15 pm**

**Effects of Extended Operative Time on Surgical and Hospital Outcomes After Posterior Spinal Fusion for Adolescent Idiopathic Scoliosis**

A. Elsamadicy

**2:16–2:20 pm**

**Pediatric Stereotactic Image-Guided C1-2 Transarticular Screw Placement**

M. Prablek

**2:21–2:25 pm**

**Impact of Transfer Status on Discharge Disposition and Adverse Events Among Pediatric Patients Undergoing Malignant Brain Tumor Resection**

S. Rangwala

**2:26–3:25 pm**

**Rapid Fire Abstracts: Stereotactic and Functional**

---

**2:26–2:30 pm**

**First-in-human Use of Novel Platinum-Nanorod (PtNR) Multi-thousand Channel High Density Grid During Craniotomies for Pathologic Brain Resections**

A. Raslan

**2:31–2:35 pm**

**High Density Electrocorticography Reveals Functional Microstructure of Human Superior Temporal Gyrus**

D. Cleary

**2:36–2:40 pm**

**Impact of Subthalamic Nucleus Stimulation on Urinary Dysfunction and Constipation in Parkinson's Disease**

A. Askari

# MONDAY, MAY 2

**2:41–2:45 pm**

**Distinct Perceptive Pathways Selected with Bursting and Tonic Patterns of Thalamic Electrical Stimulation**

M. Willsey

**2:46–2:50 pm**

**Safety and Effectiveness of the Assessment and Treatment of idiopathic Normal Pressure Hydrocephalus in 424 Patients in the Adult Hydrocephalus Clinical Research Network**

M. Hamilton

**2:51–2:55 pm**

**Complete Corpus Callosotomy: Palliation for Catastrophic, Non-Localizing, Medically Refractory Epilepsy**

J. Baumgartner

**2:56–3 pm**

**Ambulatory Local Field Potential Recordings from the Thalamus in Epilepsy: Early Experience**

D. Satzer

**3:01–3:05 pm**

**Stereotactic Magnetic Resonance Guided Laser Ablation of Periventricular Nodular Heterotopia**

R. McCormack

**3:06–3:10 pm**

**Convection Enhanced Delivery of Autologous Cerebrospinal Fluid Improves Basal Ganglia Visualization During MRI-Guided Deep Brain Stimulation Surgery**

S. Moosa

**3:11–3:15 pm**

**Caudate Beta Power During Working Memory is Increased in Parkinson's Disease Patients**

D. Paulo

**3:16–3:20 pm**

**Short-latency Myogenic Evoked Potentials in Human Subjects from Cerebellar Dentate Nucleus Deep Brain Stimulation**

F. Pucci

**3:21–3:25 pm**

**Presence of Massa Intermedia; Implications on Neurocognitive Performance in a Geriatric Population**

J. Pearce

**3:26–4:25 pm**

**Rapid Fire Abstracts: Spine**

---

**3:26–3:30 pm**

**Prediction Model for Neurogenic Bladder Recovery One Year After Traumatic Spinal Cord Injury**

M. Bydon

**3:31–3:35 pm**

**Lateral Mass Screws Versus Pedicle Screws at C7—Reoperation Rates for Adjacent Segment Disease (Operative ASD) and Nonunions (Operative Nonunions) in Posterior Cervical Fusions Stopping at C7.**

H. Brara

**3:36–3:40 pm**

**Hydrogel Matrix Human Stem Cell Based Nucleus Pulposus Intervertebral Disc Regeneration**

M. Perez-Cruet

**3:41–3:45 pm**

**Optimal Realignment Outweighs Increased Perioperative Risk in ASD Surgery**

P. Passias

**3:46–3:50 pm**

**Lumbar Motion is Maintained with Paraspinous Tension Band for Degenerative Spondylolisthesis: Results from 24-month FDA Study**

K. Kim

# MONDAY, MAY 2

**3:51–3:55 pm**

**Verteporfin-loaded Microparticles for Treatment and Radio-sensitization of Spinal Metastatic Disease**

O. Akinduro



**3:56–4 pm**

**Determining Timeframe of Maximum Clinical Improvement in Surgical Decompression for Cervical Spondylotic Myelopathy when Stratified by Preoperative Myelopathy Severity**

C. Berlin



**4:01–4:05 pm**

**The Comparison of Deep Learning and Classical Machine Learning Algorithms to Predict Post-operative Outcomes for Anterior Cervical Discectomy and Fusion Procedures with State-of-the-art Performance**

A. Rodrigues

**4:06–4:10 pm**

**6-month Outcomes for Patients Undergoing Posterior vs Circumferential Surgical Approach for Isthmic Spondylolisthesis**

P. Arnold

**4:11–4:15 pm**

**Preoperative Insomnia on Poor Postoperative Pain Control After Elective Spine Surgery and the Modified CAPPS Score**

M. Yang

**4:16–4:20 pm**

**Return to Work, Activities of Daily Living and Disability Improvement: 12-month Outcomes of an FDA IDE Trial of Decompression and Tension Band Stabilization for Degenerative Spondylolisthesis**

W. Welch

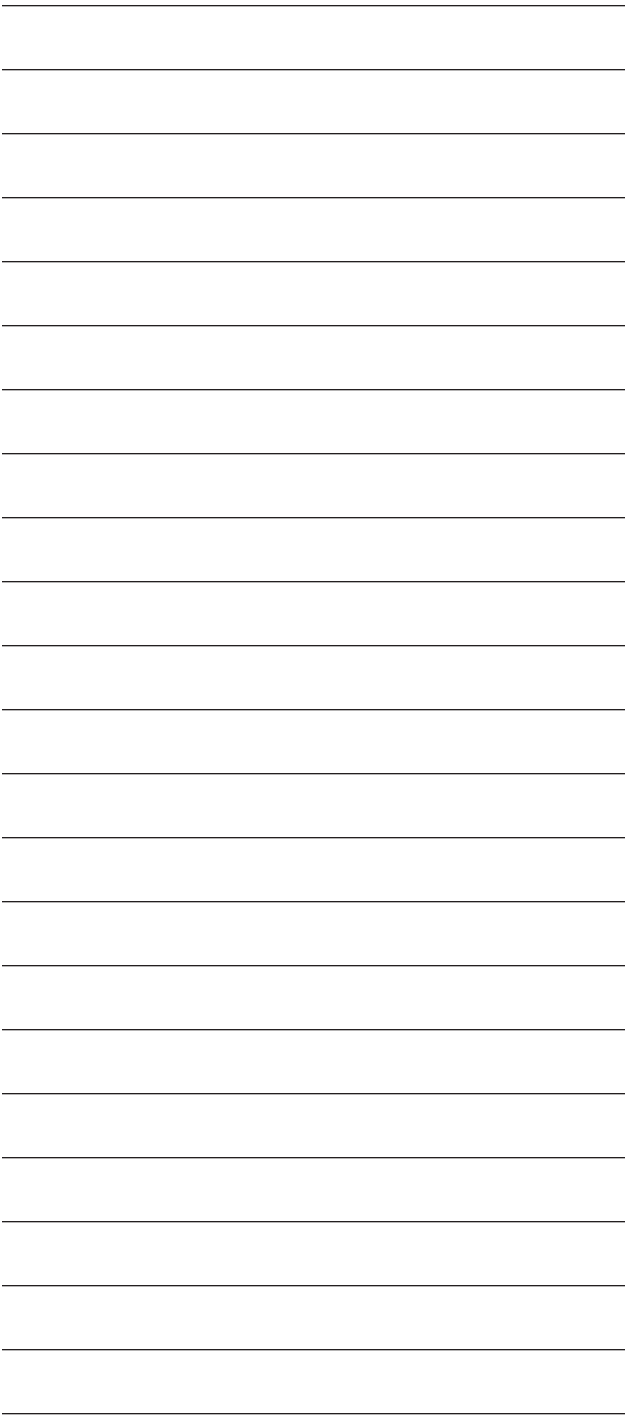
**4:21–4:25 pm**

**Assessing Pre-Operative Functional Decline in Lumbar Fusion and Lumbar Decompression Patients Through Smartphone-Based Accelerometry**

S. Singh

[illegible]

[illegible]



# INDUSTRY SUPPORT As of 3/28/22

The American Association of Neurological Surgeons wishes to acknowledge the following companies for their generous support of the 2022 Annual Meeting:

## TITLE

Medtronic  
Stryker

## PLATINUM

DePuy/J&J  
Codman Specialty Surgical,  
a Division of Integra  
LifeSciences  
Globus  
NuVasive  
Zeiss

## GOLD

Brainlab  
GT Medical Technologies Inc.  
Leica Microsystems  
Merck

## SILVER

Aesculap, Inc.  
ATEC Spine  
Carlsmed  
Elekta  
Longeviti Neuro Solutions  
Mainstay Medical  
Medexus Pharma  
Mizuho America, Inc.  
Phasor Health, LLC

## BRONZE

3Spine  
Aidoc  
Azurity Pharmaceuticals  
BK Medical  
Fujifilm  
Hyperfine  
Kogent Surgical  
Mitaka USA  
Mizuho OSI  
Natus  
NICO Corporation  
Novarad  
Orthofix  
Penumbra Inc  
RapidAI  
Synaptive Medical  
Varian, A Siemens  
Healthineers Company  
Xoran  
Zimmer Biomet

# NREF

## OPENS DOORS



**Be Part of Neurosurgery's Future.** Your continued support helps the NREF in its ongoing efforts to advance the specialty.

[nref.org/Donate](http://nref.org/Donate)



# SHUTTLE SERVICE

Most of our hotels are within walking distance, but we will provide transportation to and from the following hotels:

Four Seasons Hotel Philadelphia  
W Hotel Philadelphia  
The RitzCarlton, Philadelphia  
Element Philadelphia

*\*Please note that those that have guest rooms at The Ritz Carlton and the Element Philadelphia will use the stop at the W Hotel as a shared stop.*

## SCHEDULE

### Thursday, April 28

7:30 am–6:30 pm | Every 15 minutes

### Friday, April 29

6:30–9 am | Every 15 minutes

9 am–3:30 pm | Every 30 minutes

3:30–9 pm | Every 15 minutes

### Saturday, April 30

6:30–9 am | Every 15 minutes

9 am–3:30 pm | Every 30 minutes

3:30–7 pm | Every 15 minutes

### Sunday, May 1

6:30–9 am | Every 15 minutes

9 am–3:30 pm | Every 30 minutes

3:30–5:30 pm | Every 15 minutes

### Monday, May

6:30–9 am | Every 15 minutes

9am–3:30 pm | Every 30 minutes

3:30–5:30 pm | Every 15 minutes

NEUROSURGEONS **AS ADVOCATES**

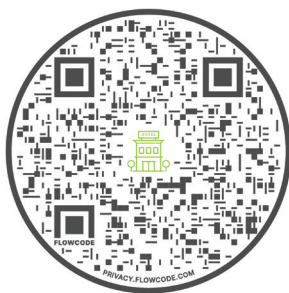


# AANS**2023** LOS ANGELES

— **APRIL 21-24** —

## SHOP HOTELS TODAY!

### Book Now



**onpeak.com/aans**



Deep  
Discounts



No Booking or  
Change Fees



Hotel Rewards  
Points

For all housing inquiries, contact onPeak at  
[aans@onpeak.com](mailto:aans@onpeak.com).

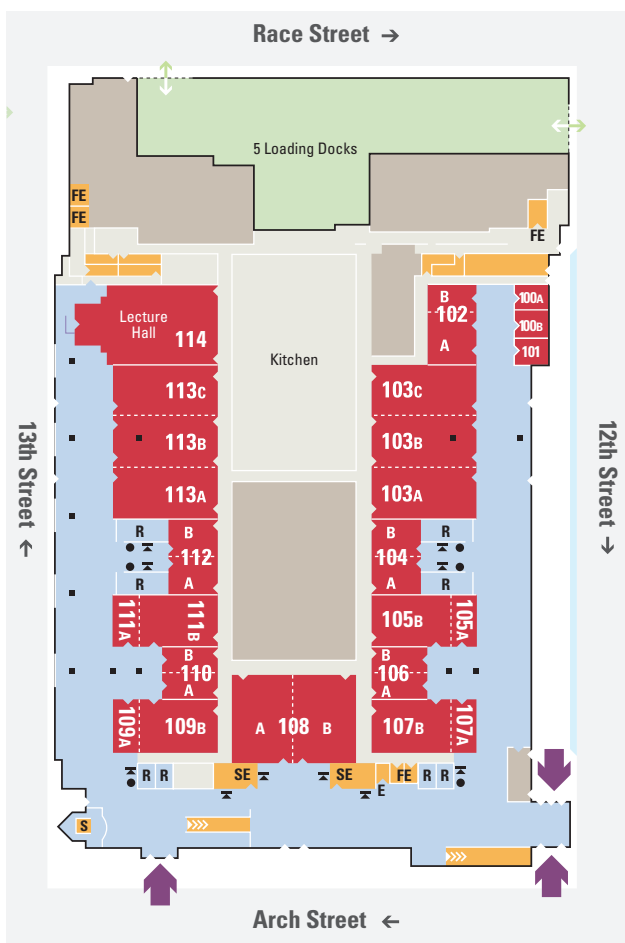


American  
Association of  
Neurological  
Surgeons

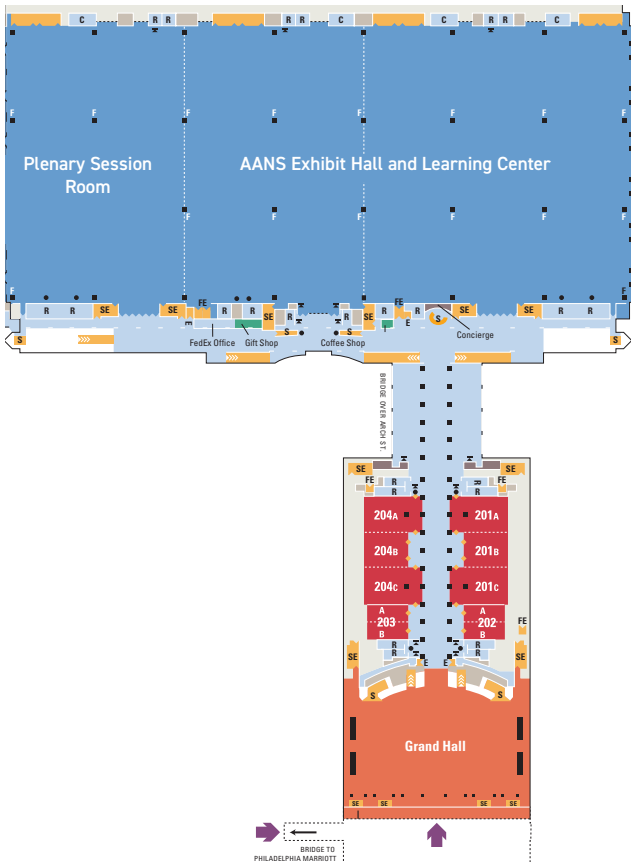
**ONPEAK**  
OFFICIAL HOTELS

# PENNSYLVANIA CONVENTION CENTER

## Level 1

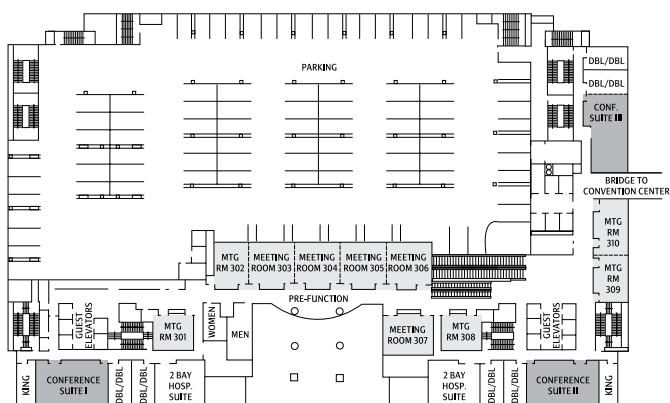


## Level 2

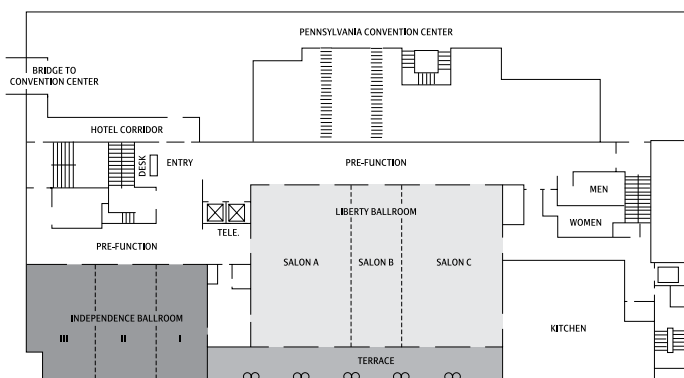


# PHILADELPHIA MARRIOTT DOWNTOWN

## 3rd Floor Meeting Rooms

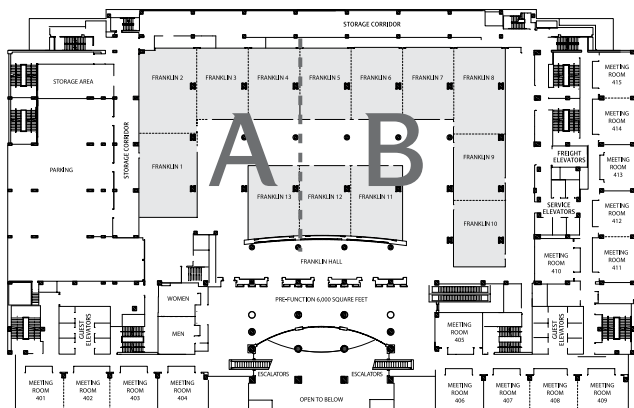


## 3rd Floor, Headhouse Tower Liberty and Independence Ballrooms



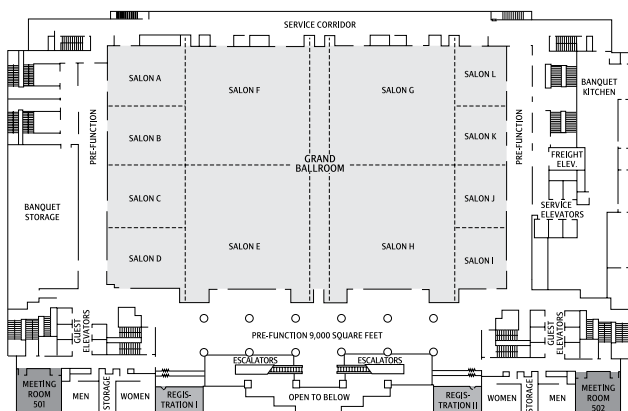
## 4th Floor

### Franklin Hall and Meeting Rooms



## 5th Floor

### Grand Ballroom and Meeting Rooms



# TEN TIMES SAFER

# AGAINST PLUNGING?



A **BATTERY-OPERATED** drill/kit upgrade

# PHASOR

**DISPOSABLE POWER DRILLS AND  
CRANIAL ACCESS KITS (ALL-INCLUSIVE)  
FOR EVDS, BIOPSIES, AND MORE  
AT AN AFFORDABLE PRICE**

**FDA-CLEARED, CE-MARKED, IN USE AT  
MANY LARGE U.S. & O.U.S. HOSPITALS**

**VISIT US AT AANS BOOTH #1121**

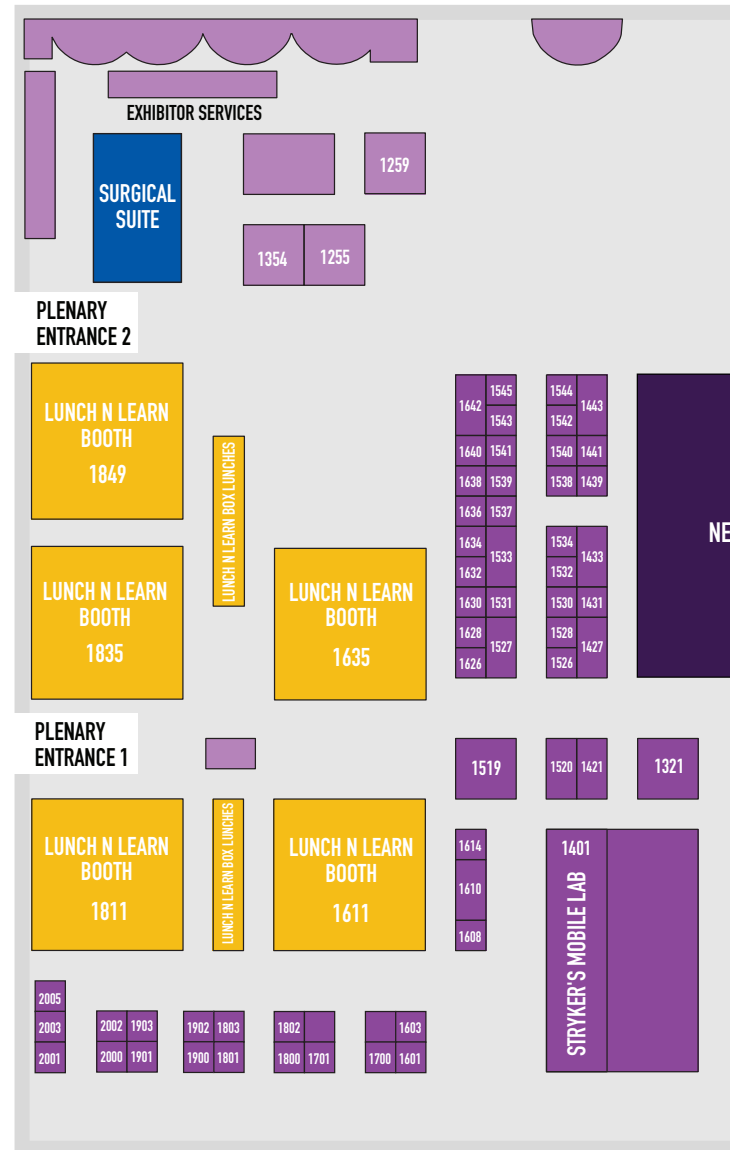
**832.982.1234 | phasorhealth.com**

- Phasor Drill Stop Extension can withstand up to 50 pounds (compared to 5 pounds) without plunging.

(c) 2022 Phasor Health, LLC, Houston, Texas, U.S.A.

PH-M 22-002

## AANS EXHIBIT HALL AND LEA



### AANS Exhibit Hours

Friday, April 29, 2022, 6:30–8:30 pm, **Opening Reception**

Saturday, April 30, 2022, 8 am–4:30 pm

Sunday, May 1, 2022, 8 am–4:30 pm

The floor plan shows the layout of the AANS Exhibit Hall Entrance. Key features include:

- NEURO HUB:** A large purple area on the left side.
- Entrance:** Labeled "AANS Exhibit Hall Entrance" at the bottom center.
- Navigation:** A north arrow pointing up is located in the top right corner.
- Exhibit Spaces:** Numerous purple rectangular areas, many containing numbers (e.g., 1039, 939, 933, 1027, 927, 827, 727, 533, 433, 333, 235, 239, 238, 139, 134, 132, 130, 128, 122, 116, 114, 108, 104, 100, 701, 509, 501, 303, 415, 409, 416, 317, 314, 217, 215, 216, 117, 210, 111, 208, 109, 302, 205, 203, 201, 204, 105, 202, 103, 200, 101, 914, 815, 910, 811, 913, 1212, 1113, 1112, 1013, 1108, 1009, 1008, 909, 1208, 1109, 1204, 1105, 1200, 1101, 1102, 1003, 1100, 1001, 1004, 905, 1000, 901, 1310, 1211, 1308, 1209, 1304, 1205, 1302, 1203, 1300, 1201, 1204, 1105, 1200, 1101, 1102, 1003, 1100, 1001, 1004, 905, 1000, 901, 1310, 1211, 1308, 1209, 1304, 1205, 1302, 1203, 1300, 1201).
- Decorative Elements:** Purple decorative shapes are visible along the top edge of the plan.

The AANS Exhibit Hall showcases over 100 companies featuring the latest technology in neurosurgery. Join your colleagues in the exhibit hall to meet with innovative exhibitors and enjoy a refreshment.

- AANS Neuro Hub
- Lunch and Learns
- Surgical Suite
- Beverage Breaks
- Headset Distribution

# EXHIBITOR LIST (AS OF MARCH 20)

COMPANY	BOOTH
3Spine	326
4WEBMedical	1138
AANS/CNS Sections	1127
AANS Neuro Hub	1127
American Association of Neurological Surgeons (AANS)	1127
Accelus	1608
Acumed	901
AddUp	1308
Ad-Tech Medical Instrument Corp.	1108
Aegis Spine, Inc.	1039
Aesculap, Inc.	721
Aidoc	235
Allegheny Health Network	1628
American Board of Neurological Surgery	202
American Surgical Company	216
Apex Medical, Inc.	743
Assent Medical Media	441
ATEC Spine	327
Augmedics	1610
Aygün Cerrahi Aletler Sanayi ve Ticaret A.Ş.	200
Azurity Pharmaceuticals	427
Baxter International	439
BIOCOMPOSITES	1538
Biologica Technologies	835
Bioplate	1533
Bioventus LLC	815
BK Medical	639
Blackrock Neurotech	1539
Blaze Bioscience	844
Bonefoam	1045
BOSS Instruments, Ltd.	302
Brain Aneurysm Foundation	341
Brainlab	501
Bremer Group	209
Camber Spine	204
Carlsmed	317
Centinel Spine	300
Cerapedics	1543
Ceribell, Inc.	1642
ChoiceSpine	1203
Clarus Medical, LLC	339
ClearPoint Neuro, Inc.	1526
CMF Medicon Surgical Inc.	221
Codman Specialty Surgical, a Division of Integra LifeSciences	521
Congress of Neurological Surgeons	837
CoreLink Surgical	1545
Covenant HealthCare	1528
Designs for Vision, Inc.	1113
Dio Medical Corp.	1044
DiscGenics	1439
DIXI Medical USA Corp.	208
DuraStat LLC	133
E-Posters	1127
Elekta	811
Elevation Spine	1431
elliquence	1209
Elsevier	438
Eminent Spine	139
Fehling Surgical Instruments Inc.	1421

COMPANY	BOOTH
Fujifilm	433
FzioMed, Inc.	1302
Glioblastoma Foundation	1542
Globus Medical	715
GT Medical Technologies Inc.	321
Hayes Locums	220
Hubly Surgical	545
Hudson Regional Hospital	1534
Hydrocephalus Association	541
Hyperfine	1321
icotec Medical, Inc.	644
IMRIS, Deerfield Imaging	1102
Insightec	1132
Invenio Imaging Inc.	1443
IRRAS	1205
Johnson & Johnson Medical Devices (JJMD)	303
joimax	210
Journal of Neurosurgery	1127
JTS Management	1634
Kaiser Permanente	1041
Kelyniam	1013
Kirwan Surgical Products LLC	1109
KLS Martin Group	416
Kogent Surgical	934
Leica Microsystems	727
Life Instrument Corporation	1527
LocumTenens.com	1441
Longeviti Neuro Solutions	527
LVH Neurosurgery	1532
Mainstay Medical	222
Medability	745
Medacta USA	1630
Medexus Pharma	533
Medi Lazer	211
Medprin Biotech GmbH	1208
Medtronic	701
Merck & Co., Inc.	909
Mercy Medical Center	238
MicroVention, Inc.	1632
Mitaka USA	333
Mizuho America, Inc.	827
Mizuho OSI	927
Monteris Medical	1101
Nadia International, Inc.	905
Natus	1519
NeuroLogica	1000
NeuroPace, Inc.	1537
NeuroPoint Alliance (NPA)	1127
Neurosurgery Research & Education Foundation (NREF)	1127
Neurosurgery PAC	1427
Nexstim	1614
NICO Corporation	415
Northwell Health	1640
NovaBone Products LLC	1001
Novarad	939
Novocure, Inc.	1304
NSK America Corporation	214
NuVasive	921

COMPANY.....	BOOTH
Olympus America Inc.....	839
Omniscient Neurotechnology.....	1433
Orthofix.....	1544
OssDsign.....	1033
Pacira BioSciences Inc.....	234
Panasonic i-PRO Sensing Soluti.....	239
Parkview Health.....	1636
Penumbra Inc.....	409
Peter Lazic US Inc.....	638
Phasor Health, LLC.....	1121
PMT Corporation.....	1212
Poriferous LLC.....	836
Pro Med Instruments.....	737
Presentation Theaters.....	1127
RapidAI.....	933
Raumedic Inc.....	1211
Renishaw Healthcare Inc.....	1531
Restor3d.....	135
Reveal Surgical.....	201
RIWOspine US.....	440
Rose Micro Solutions LLC.....	215
RosmanSearch.....	1200
Sanara Med Tech.....	320
Sanford Health.....	842
Scanlan International, Inc.....	1004
SeaSpine.....	314
Sentinel Equity Group.....	539
ShuntCheck.....	1008
SI-BONE.....	1204
Singular Health Group Ltd.....	1530
Sontec Instruments, Inc.....	217
Sophysa USA.....	308
Spectrum Spine.....	538
Spine Wave, Inc.....	1100
Spineology.....	1300
SSM Health.....	945
Stryker.....	1401
Surgalign.....	1144
Surgeons Capital Management.....	205
Surgitel.....	223
Sutter Medical Technologies, USA.....	1003
Synaptive Medical.....	1027
TAKAYAMA/MUTOH.....	232
TEAC.....	914
TeDan Surgical Innovations, Inc.....	1009
Thieme Publishers.....	1105
ThinkFirst National Injury Prevention Foundation.....	1540
Thompson Surgical Instruments, Inc.....	1201
Tobra Medical, Inc.....	1626
UFSK-International OSYS GmbH.....	1112
USOMedical.....	203
Varian, A Siemens Healthineers Company.....	1021
Viomerse Inc.....	1541
Viticus Group.....	1310
Xoran Technologies, LLC.....	1520
Zap Surgical Systems.....	638
ZEISS.....	509
Zimmer Biomet.....	913
ZimVie.....	910



## See your patients in a WHOLE NEW LIGHT.

Heads-up surgery is just the beginning.

But we didn't stop there. With precision robotics and digital visualization delivering crystal clear, immersive 3D images for the entire OR, we think you'll like what you see.

Visit **Booth 721** to learn more about the Aesculap Aeos® Robotic Digital Microscope.



Powered by **TRUE**  
DIGITAL  
SURGERY

[aesculapusa.com/aeos](http://aesculapusa.com/aeos)

**AESCLAP®**

Aesculap, Inc. - a B. Braun company



Medtronic

Visualize the  
Procedure.



Realize the  
Potential.

The power to plan, perform, and  
verify at every step for patient-  
specific treatment that sets a new  
standard for neurological care.

Come see us at **Booth #701** for  
in-person demos.

© 2022 Medtronic. Medtronic, Medtronic logo and Engineering the extraordinary are trademarks of Medtronic. All other brands are trademarks of a Medtronic company. UC202015927 EN