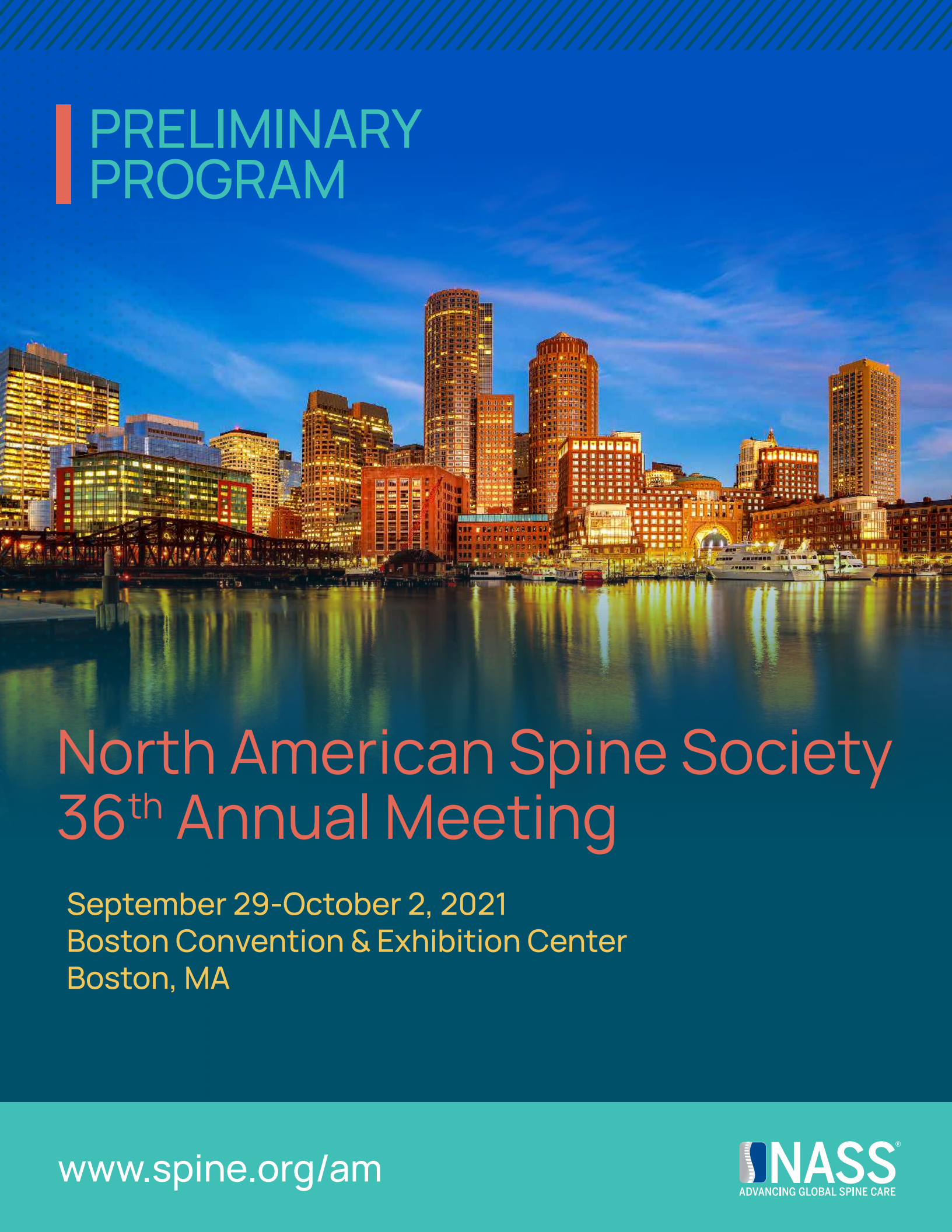


A photograph of the Boston skyline at night, featuring several illuminated skyscrapers and a bridge over the water. The lights from the buildings are reflected in the water.

PRELIMINARY PROGRAM

North American Spine Society 36th Annual Meeting

September 29-October 2, 2021
Boston Convention & Exhibition Center
Boston, MA

www.spine.org/am

 **NASS**[®]
ADVANCING GLOBAL SPINE CARE

Join Us in Boston

It's exciting to bring the NASS Annual Meeting back to Boston as we return to in-person meetings. A lot in Boston has changed...the waterfront is booming with restaurants and harbor walks, museums expanded and hotels renovated. However with all that is new, Boston still maintains its historical colonial charm.

This year's annual meeting pattern will be Wednesday to Saturday with instructional and hands-on courses on Monday, Tuesday and Friday, starting with Coding on Monday-Tuesday, Minimally Invasive Spine Surgery and EBM Training on Tuesday morning, Deformity Tuesday afternoon, and concluding with Lumbar Spinal Injections on Friday morning. Note: There is an additional fee for these courses.

Top surgeons will be live on stage to describe techniques from their pre-recorded cadaver demonstrations so the audience can pose questions in real time throughout the sessions. There are five surgical demonstrations during the meeting with two on both Wednesday and Friday, and one on Thursday.

Use your lunch hour to learn more about specific products and solutions presented by industry professionals during the Lunch 'n' Learn Solution Showcases.

Come see industry surgical innovation cadaveric demonstrations or join one of the surgical training workshops in the evening.

Settle down with a cup of coffee and view the ePosters. During the Poster Grand Rounds, you'll have the opportunity to meet with and ask questions of select ePoster authors.

For those who stay at specified NASS hotels, you will receive a \$100 complimentary Lyft Pass to get to and from the convention center.

Since COVID restrictions continue to loosen, updates are available on the annual meeting website in the Boston link.

If you're unable to attend in-person, the symposia and sessions will be streamed live. You'll be able to submit questions to faculty in real time and be part of the experience from wherever you are participating. There also will be online content released prior to the annual meeting as well as OnDemand recordings of abstract presentations, symposia and ePosters released after the meeting.

See You In Boston.



Eric Truumees, MD
2020-2021 NASS President



E. Kano Mayer, MD
2021 Program Co-chair



Michael P. Steinmetz, MD
2021 Program Co-chair



Andrew Schoenfeld, MD
2021 Program Co-chair



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Abstract Data

Total Abstracts Submitted: 1,150

784 Surgical

366 Medical

Total Abstracts Accepted: 424

239 Surgical

185 Medical

Percentage of Abstracts Accepted: 37%

30% Surgical

51% Medical

Important Dates

- May 11:**
Registration and housing opens for members only
- May 18:**
Registration and housing opens for everyone
- July 20:**
Early registration deadline--
Save \$300 with the early registration discount
- August 31:**
Housing Deadline

Questions?

Please visit www.spine.org/am for more information. Contact the following departments via email with questions:

Educational Programming:

education@spine.org

Registration:

registration@spine.org

Housing:

nassannualmeeting@onpeak.com

Exhibits:

exhibits@spine.org

Membership:

membership@spine.org



Attendee Resources

Member Concierge

NASS will provide a designated area this year to assist all NASS members with various questions that they have throughout the meeting or to renew dues. Stay tuned for more to come!

Publications Booth

Stop by the Publications booth to learn about NASS' journals, books, patient education materials and more. Want to submit a manuscript to *SpineLine*, *The Spine Journal* or *NASSJ*? How about becoming one or *SpineLine*'s 20 Under 40 or nominating a colleague for the award? NASS' publications staff will be at the booth to answer your questions and guide you in the right direction. You can also order the latest Coding book, Clinical Guidelines, patient brochures and other resources from the NASS online bookstore.

NASS International (NASSi) Booth

NASS International (NASSi) is excited to welcome you at our booth! NASSi is a global multiprofessional academic community within NASS, which is dedicated to advancing global spine care through the development of initiatives, programs, and benefits that support the personal and professional growth of international members. Stop by to learn more about how you can get involved in designing, executing and managing international programs as well as engaging in leadership roles. Information about current and upcoming initiatives will be available on-site.

NASS Advocacy and Political Action Committee: SpinePAC

Founded in July of 1999, the National Association of Spine Specialists serves as the advocacy arm of the North American Spine Society. The "other" NASS advocates in the legislative and regulatory arenas for public policies that protect members' ability to practice medicine and give patients access to the specialists, technologies and treatments they require for quality spine care.

As the primary voice for spine specialists on Capitol Hill, NASS helps frame the debate in Washington, DC by sponsoring a political action committee, SpinePAC. SpinePAC's purpose is to work within the federal election process to further the goals of the spine care community by supporting candidates for the U.S. House of Representatives and Senate. In short: SpinePAC serves as the voice of our profession in elective politics. Last election cycle, SpinePAC endorsed more than 50 candidates for Congress, 90% of whom were elected to the U.S. House of Representatives or Senate. These efforts ensured YOUR VOICE will be championed in the important debates that stand to impact our profession.

NASS members are encouraged to visit the SpinePAC booth located in the south lobby to learn more about ongoing NASS advocacy initiatives and how to get involved.



NATIONAL
ASSOCIATION OF
SPINE
SPECIALISTS





Presidential Guest Speaker



Steven Pinker

**Thursday, September 30
11:00 a.m.–12:00 p.m.**

Steven Pinker asks the big questions about human progress—and sets out, in public, to answer them. In 2018's *Enlightenment Now*, Pinker argues that, despite the headlines, the world is getting better, not worse. His optimistic keynote address, full of sharp wit, common sense, and dazzling argumentation, Pinker will make the case for reason, science and humanism. These Enlightenment ideals, in the face of tribalism, authoritarianism, and other modern dangers to democracy, are worth celebrating—and protecting.

A provocative speaker, much in demand, Steven Pinker is a cognitive scientist who has been named by *TIME* as one of the 100 Most Influential People in the World. His keynotes have helped millions demystify the science behind human language, thought and action.

Pinker is a Harvard professor, a TED speaker, and a bestselling author, twice nominated for the Pulitzer Prize. Highly respected in the scientific community, his work and opinions are extensively covered in the mainstream media, and have won a wide general audience.

In his new talks—based on *Enlightenment Now: The Case for Reason, Science, Humanism, and Progress*—Pinker argues that, despite fear-mongering and political upheaval, the world is getting better: peace, prosperity, knowledge and happiness are on the rise. *The New York Times* included the book in its year-end list of 100 Notable Books, and NPR and *Esquire* both named it as one of the best books of 2018.

A native of Montreal, Pinker is Johnstone Professor of Psychology at Harvard University. Previously, he taught at Stanford and at MIT. He is a fellow of the American Academy of Arts and Sciences and the American Association for the Advancement of Science. He has won a number of teaching prizes, and his research on visual cognition and the psychology of language has received numerous awards, including the Troland Award from the National Academy of Sciences.



Instructional and Hands-on Courses

These educational offerings have additional fees.

Monday-Tuesday, September 27-28
8:00 a.m.–5:00 p.m.

Coding Update 2021: Mastering the Coding Maze

During this highly interactive course, physician faculty who lead NASS' CPT and RUC efforts will address ICD-10, E&M coding and CPT4 coding of spinal surgical, medical and radiologic procedures. Attendees will leave this course with the necessary knowledge and critical tips on how to utilize new E&M codes and guidelines, navigate through the authorization and denial process, identify nuances that affect proper billing and cause rejected/delayed claims, utilize Medicare NCCI edits, and properly document to receive reimbursement.

Credits: The North American Spine Society designates this educational activity for a maximum of 14.0 AMA PRA Category 1 Credits™.

Tuesday, September 28
7:00 a.m.–12:00 p.m.

Hands-on Course: Section on Minimally Invasive Procedures: Minimally Invasive Spine Surgery

Faculty will provide a targeted focus on current minimally invasive spine techniques, including laser endoscopy (LESS), augmented reality, navigation enabled Exoscope and MIS surgeries from incision to closure. In addition, there will be opportunity for those who would like to advance their MIS techniques, including, correction of deformity with MIS systems. Materials providing a basic approach to MIS surgery, pros and cons, patient selection and information about the procedures demonstrated in the cadaver lab will be sent to attendees prior to the course for review.

Credits: The North American Spine Society designates this educational activity for a maximum of 4.0 AMA PRA Category 1 Credits™.

Tuesday, September 28
8:00–10:00 a.m.

Instructional Course: Evidence-Based Medicine Training Program— Live Capstone Session

In order to attend this live capstone session, registrants of the Fall 2021 EBM Training Program must first successfully complete the prerequisite coursework online by the appropriate deadline. Additional fees apply; details and registration at spine.org/ebmtraining.

The NASS EBM Training Program, open to NASS members and nonmembers, is an interactive course on the fundamentals of evidence-based medicine and the critical analysis of study methodologies. During this live interactive session, faculty will discuss course concepts, review homework assignments and answer audience questions.

Tuesday, September 28
1:30–6:00 p.m.

Hands-on Course: Section on Spinal Deformity: Deformity

Top experts in the field will address the latest research, surgical techniques and products to treat adult spinal deformity, and reduce complications and improve outcomes. Participants will learn techniques on open and minimally invasive surgical correction for thoracolumbar and cervical deformities in the adult patient, including robotic surgery and industry product updates. Hands-on cadaver surgical lab sessions will translate the research findings into practical surgical techniques and knowledge. The course structure will be a flipped classroom style to optimize learning and hands-on time in the lab.

Credits: The North American Spine Society designates this educational activity for a maximum of 4.5 AMA PRA Category 1 Credits™.

Instructional and Hands-on Courses

Friday, October 1
7:00 a.m.–12:00 p.m.

Hands-on Course:
Lumbar Spinal Injections

Faculty will provide an opportunity to improve your knowledge of patient selection and technique for lumbar epidural steroid injections, facet injections, sacroiliac joint injections, transforaminal injection/selective nerve blocks, medial branch blocks and lumbar RFA. Gain hands-on training of multiple injection procedures. Physicians and Residents/Fellows/In-training only. Attendees will receive the didactic lectures prior to the course so focus on-site will be in the lab.

Credits: The North American Spine Society designates this educational activity for a maximum of 4.0 AMA PRA Category 1 Credits™.

OnDemand Session Recordings

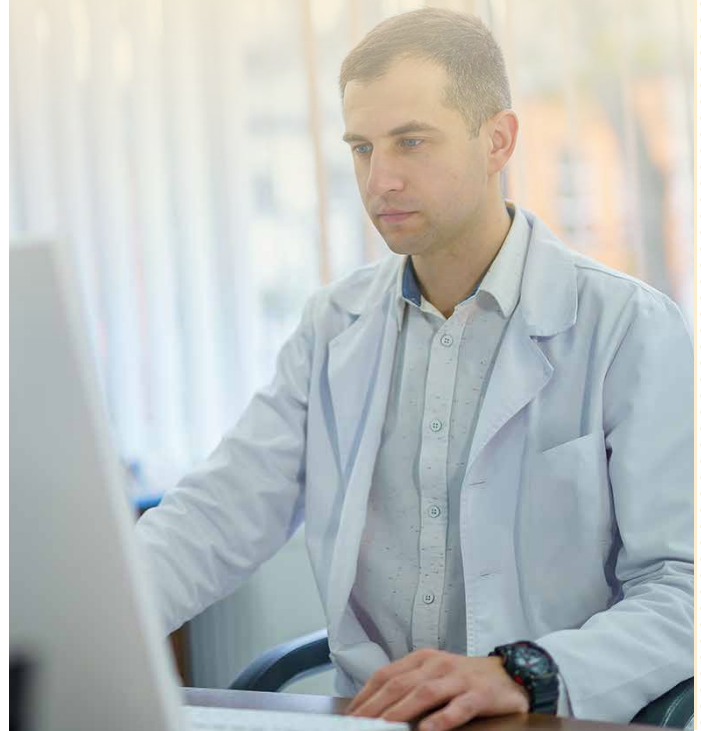
Free with general registration

81.5

AMA PRA Category 1
Credits™ are available for
recorded sessions.

Go back and view sessions. The OnDemand recordings include abstract presentations, symposia and ePosters.

**Take advantage of this chance to view
the archived online compilations of
what you missed!**





Symposia

Wednesday, September 29

7:35-8:35 a.m.

Social Media: How to Use it and Not

Social media and internet use for acquiring health care information is about 72% among US citizens and continues to increase dramatically. In this symposium, faculty will discuss various social platforms, how to make them work for you, website optimization, where to place your ads, experiences with social media by early adopters, and understanding negative outcomes.

Intradiscal Cellular Therapies for Degenerative Disc Disease: Where are We Now and Where are We Going?

Spine related pathology is the leading cause of disability worldwide and is strongly associated with degenerative disc disease. Since surgical treatment in essence is palliative rather than disease modifying, faculty will address the clinical evidence for development of cellular therapies to modify the course of degenerative disc disease (DDD). Topics include safety, efficacy, and regulatory challenges.

8:35-10:00 a.m.

Future of Healthcare

Faculty will discuss the recent advances in the healthcare field that directly or indirectly influences spine surgery and ambulatory care centers, and provide a glimpse into what to expect for the future including government and insurance company perspectives.

10:35 a.m.-12:00 p.m.

Section on Spine Oncology: Tough Calls in Spine Oncology

Faculty will present difficult or controversial cases involving lesions of the spine and encourage attendees to participate in the decision making process. Each case will cover a particular pathology or approach to pathology. The session will conclude with a round table faculty discussion on these controversial topics.

2:05-3:05 p.m.

Exercise Committee: Virtual Delivery of Spine Care

Telehealth (e.g. telemedicine, virtual care, digital care) provides a possible solution for improving service delivery for patients by enhancing access and fostering patient-centered approaches. In this session, faculty will provide essential knowledge to help the spine provider make informed decisions to appropriately implement telehealth into their practices.

3:35-5:05 p.m.

Section on Robotics & Navigation: Which Robotic System Should Be Part of Your Operating Room?

Faculty will identify the unique features of the different robotic platforms used in spine surgery as well as the advantages and disadvantages of image-guided surgery to robotic spine surgery.

Section on IONM: Neuromonitoring in Cervical Spine Surgery: Utility, Value and Lessons Learned

While many consider intraoperative neuromonitoring (IONM) to be an important tool for improving safety in cervical spine surgery, questions remain regarding its utility, value and patterns of use. This symposium will review the basics of intraoperative neuromonitoring, discuss clinical decisions guiding its use, and use large national datasets to examine its utility and value in cervical spine surgery.

Symposia

Thursday, September 30

7:25-8:25 a.m.

Quest for Truth—Online Databases versus Registries: Reflecting the True Outcomes

In this symposium, faculty will summarize data procured based on the CPT/ISD codes entered from the patient visit to the hospital and registry data populated by patient data entered directly by a researcher based on patient interview as well as how to procure data, and how to contribute to big data in registries with pricing and value.

Adult Cervical Spine Deformity: Patient Assessment, Surgical Correction Techniques, and Complication

Faculty will address the assessment and treatment options for patients with adult cervical spine deformity since many surgeons/healthcare providers are unfamiliar with cervical deformity assessment or are uncomfortable with surgically treating cervical spine deformities.

8:30-9:30 a.m.

Spine Care in the Post-Pandemic World: Lessons Learned from COVID-19 and Future Threats on the Horizon

In this symposium, faculty will contextualize and collate the potential for future threats to the healthcare system from emerging viruses and the prospect of more pandemic, as well as best practices for the field going forward.

1:00-2:00 p.m.

Endoscopic Surgery: Relevance, Economy and Latest Trends

A follow-up to last year's symposium, faculty will address combining different technology with endoscopy, discuss the investment and learning curve to adopt endoscopy as well as transforming an endoscopic practice to ambulatory care surgery, its pitfalls and back-up plans.

2:05-3:05 p.m.

AMA Guides® to the Evaluation of Permanent Impairment: Achieving Equitable Impairment Ratings Through the Most Current Medicine

In this symposium, attendees will learn about the substantial modernization and simplified utilization of the new and improved AMA Guides, directly from the source. Faculty will address the importance of using the most current evidence-based medicine to determine impairment ratings and will specifically address how the recent content updates impact impairment ratings and independent medical examinations of the spine.

3:35-5:05 p.m.

Seeing Spinal Metastases 20:20—A Review of the Current State of the Art and Future Directions

Faculty will provide a comprehensive review of current advances and best practices in the management of patients with spinal metastatic disease.

Friday, October 1

7:30-8:55 a.m.

Cellular Bone Matrices for Spinal Fusion: A Critical Evaluation of the Evidence, Safety, and Value

Cellular bone matrices comprise an estimated 17% of all bone grafts used, yet clinical evidence remains limited regarding their efficacy. Faculty will discuss the available products on the market and examine their technical specifications, US Food and Drug Administration (FDA) regulations, cost and potential pitfalls and efficacy.

9:00-10:00 a.m.

Individualizing Surgical Care for Degenerative Cervical Myelopathy (AOSpine RECODE DCM Research Priority): Current Perspectives and Future Directions for Practice and Research

10:30 a.m.-12:00 p.m.

Contemporary Surgical Concepts for Acute Spinal Cord Injury

In this symposium, faculty will review the latest data on the timing of surgical decompression for complete and incomplete spinal cord injury as well as address some of the technical aspects of decompression that consider the post-injury swelling that often occurs in the spinal cord.

Symposia

1:00-2:30 p.m.

2021 NASS Advocacy Symposium

This symposium will take an in-depth look at the future of health care, especially as it pertains to spine care providers' ability to deliver high quality care to patients. Further, attendees will gain a better understanding of how the health care debate shaping on Capitol Hill aligns with NASS objectives and how NASS Advocacy is working to shape this conversation.

Benchmarking and Predictive Analytics to Improve Safety and Outcomes for Adult and Pediatric Spine Surgery

This symposium will take an in-depth look at the future of health care, especially as it pertains to spine care providers' ability to deliver high quality care to patients. Further, attendees will gain a better understanding of how the health care debate shaping on Capitol Hill aligns with NASS objectives and how NASS Advocacy is working to shape this conversation.

3:00-4:00 p.m.

What Every Surgeon Needs to Know About Adult Lumbar Scoliosis

Faculty will review the evaluation and work-up, as well as surgical considerations in managing the care of patients with adult lumbar scoliosis.

4:05-5:05 p.m.

The State of Robotic Spine Surgery in 2021

This symposium will explore the new advances in the field of robotics in spine surgery. We are hoping to provide the participant with the current state of the art in the use of robotics for treating spinal pathology. Topics include and are not limited to present state of robotics, integrating robotics into your workflow, learning curves, combinatorial techniques including MIS and endoscopy.

**Saturday, October 2**

8:00-9:00 a.m.

AR, VR, AI and Large Data

In this symposium, attendees will learn about the difference between augmented reality (AR) and virtual reality (VR), recent advances in the AR/VR platforms, artificial intelligence (AI) platforms currently in use, patient centered apps to harness data for AI, current technological limitations and future advances. Additionally, faculty will present a live demonstration on these technologies.

9:00-10:00 a.m.

Patient Frailty and Associated Impact on Spine Surgery: Assessment, Outcomes and Optimization

Patient frailty is rapidly gaining attention as an important physiological measure that is associated with patient outcomes, complications and cost of care. Faculty will define patient frailty and evaluate the impact of frailty upon spine surgery.

10:30 a.m.-12:00 p.m.

Evolving Trends in Ambulatory Surgical Care Pre- and Current COVID Era

In this symposium, faculty will provide expert opinion on experiences with ambulatory surgery centers during the COVID era, including Medicare benefits and potential growth, as well as trends for the future of ambulatory surgery centers.

Nuances of Lateral Access Techniques to the Lumbar Spine: Antepsoas, Oblique, Transpsoas and Prone-Lateral

This symposium debates the pearls & pitfalls of different lateral access techniques used to approach the lumbar spine for interbody fusion. Participants will take home valuable points regarding the advantages of and differences between the Anterior-to-psoas (ATP), Oblique (OLIF), Transpsoas lateral (LLIF), and Prone-lateral (pLLIF) lumbar interbody fusion techniques. The symposium also discusses the anatomic challenges of accessing the lumbosacral (L5-S1) junction through these techniques. The learning curve, potential complications, need for access surgeons, possibilities of direct decompression and anterior column release (ACR), and drawbacks of each technique are also addressed. The session ends with a panel discussion with audience participation.



Best Papers

Hear the best of the best science. Authors will present the best 23 papers out of 424 accepted during the Best Paper sessions.

Wednesday, September 29

Early mobilization versus prolonged (>24hrs) bedrest for incidental durotomy

Christopher Verma, MD

Association between initial site of care and subsequent treatment patterns for back and neck pain

Katherine Bobroske, MSc

Comparison of complications, outcomes, and cost in frail vs. non-frail adult spinal deformity surgery patients

Peter Passias, MD

Single level cervical disc replacement using a PEEK-on-ceramic implant: Results of a multicenter FDA IDE trial with 24-month follow-up

Richard Guyer, MD

Impact of racial and ethnic disparities on health outcomes following cervical spine surgery

Hiral Master, PhD, PT, MPH

Telemedicine visits generate accurate surgical plans in spine surgery

Alexander Crawford, MD

An algorithm for using deep learning convolutional neural networks with three-dimensional depth sensor imaging in scoliosis detection

Terufumi Kokabu, MD

Thursday, September 30

How the back affects the neck: Preoperative sagittal vertical axis is correlated with cervical myelopathy scores

Justin Scheer, MD

Effects of anterior cervical discectomy and fusion on mental health

Thomas Dowling, MD

Highest achievable outcomes for adult spinal deformity corrective surgery by frailty

Peter Passias, MD

Global coronal decompensation after adult spinal deformity surgery: Comparison of upper vs. lower thoracic proximal fixation

Thomas Buell, MD

Seven- to 21-year clinical outcomes of 1,187 patients treated with one and two level lumbar total disc arthroplasty

Thierry Marnay, MD

Cervical alignment and distal junctional failure in posterior cervical fusion: A multicenter comparison of two surgical approaches

Zachariah Pinter, MD

Friday, October 1

Full endoscopic versus open discectomy for sciatica A randomized controlled trial

Pravesh Gadjradj, MD

Correcting ASD patients to normative alignment results in no functional benefit but more PJK and PJF

Themistocles Protopsaltis, MD

Do robotic procedures have improved perioperative outcomes after a learning curve period?

Peter Passias, MD

Is patient geography a risk factor for chronic opioid use after ACDF?

Hannah Levy, BS

Catastrophic acute failure of pelvic fixation in adult spinal deformity requiring revision surgery: A multi-center review of incidence, failure mechanisms, and risk factors

Christopher Martin, MD

Role of psychosocial factors on the effect of physical activity on physical function in patients after lumbar spine surgery

Hiral Master, PhD, PT, MPH

Psychological distress in patients undergoing cervical spine surgery: 2-year outcomes of a randomized controlled trial

Peter Passias, MD

A clinical model to predict postoperative improvement in sub domains of the modified Japanese Orthopedic Association score for degenerative cervical myelopathy

Byron Stephens, MD

Persistent sleep disturbance after spine surgery is associated with failure to achieve meaningful improvements in pain and health related quality of life

Richard Skolasky, ScD

The inclusion of frailty improves predictive modeling for postoperative outcomes in the surgical management of primary and secondary lumbar spine tumors

Shane Shahrestani, MS



Surgical Technique Cadaver Demonstrations

Top surgeons will describe techniques from their pre-recorded cadaver demonstrations so the audience can pose questions in real time throughout the sessions. Surgeons will be live on stage to answer questions and discuss the techniques in detail.

Upon completion of these sessions, participants should gain strategies to:

- Incorporate the latest techniques in complex spine surgery into their practice;
- Identify the nuances, advantages and limitation of endoscopy, and minimally invasive spine surgery;
- Determine concepts and principles of spinal deformity surgery as well as the technical considerations and surgical strategies to treat adult spinal deformity.

Wednesday, September 29

10:35 a.m.-12:00 p.m.

Endoscopic Spine Surgery

Presenter: Michael Y. Wang, MD

3:35-5:05 p.m.

Minimally Invasive Surgery TLIF

Presenter: John C. Liu, MD

Thursday, September 30

3:35-5:05 p.m.

Robotics Surgery

Presenters: Isador H. Lieberman, MD; Alex Satin, MD

Friday, October 1

10:30 a.m.-12:00 p.m.

Minimally Invasive Lateral Interbody Fusion

Presenter: Juan S. Uribe, MD

3:00-5:05 p.m.

Cervical Spine Deformity Surgery

Presenters: K. Daniel Riew, MD; Christopher P. Ames, MD



Additional Educational Sessions

Abstract Presentations

Daily

Topic-specific abstract presentations highlighting detailed research with discussion to follow.

Session topics include:

- Best Papers
- Spinal Infections
- Spinal Implant Research
- Pre-Op, Intraop and Postop Considerations in Thoracolumbar Spine Surgery
- Spinal Deformity
- Robotics (Surgery Thoracolumbar)
- Social and Psychosocial Determinants of Health
- Operative Planning in Spinal Deformity
- Research in Injection and Percutaneous Interventions
- Outcomes and Complications
- Emerging Technologies in Spinal Healthcare (Telemedicine, AI, 3-D Printing and Navigation)
- Cervical Spine Surgery
- Big Data Considerations in Spinal Healthcare Research
- Injections and Nonoperative Interventions/Imaging
- Management of Spinal Tumors
- Thoracolumbar Surgery I
- Cervical Spine Deformity
- Perioperative and Postoperative Management
- Attaining Balance After Spine Surgery
- Novel Findings in Diagnostic Related Research
- Opioids, Pain and Behavioral Health in Current Spinal Care
- Motion Preservation
- Thoracolumbar Surgery II
- Spinal Alignment
- ERAS and Perioperative Care
- Socioeconomics and Cost of Spine Care
- Evaluating Outcome in Spine Care
- Advancements in Cervical Myelopathy and Radiculopathy Research
- Complications Following High Intensity Surgical Procedures
- Safety and Quality in Spinal Care Delivery
- Behavioral Factors in Clinical Practice
- Decision Making in Spinal Trauma
- Bone Mineral Density, Sarcopenia, Frailty and Perioperative Outcomes

Interdisciplinary Spine Forum

Wednesday–Friday, September 29–October 1

Specialty educational sessions for physician assistants, nurse practitioners, nurses, chiropractors and other spine specialists.

Awards and Presentations

Research Grant Award, Value Awards and Resident/Fellow Abstract Presentations

One previous research winner and other awarded winners will present at the end of selected topical abstract sessions throughout the week.

Outstanding Paper Awards

The Spine Journal and NASS present Outstanding Paper Awards to leading scholarly publications in multidisciplinary spine care science.

Recognition Awards

NASS presents this year's Recognition Awards to outstanding society members who have made unique and outstanding contributions to the fields of spine.

Additional Educational Sessions

Virtual Schedule

There will be online content released prior to the annual meeting. More sessions will be added as the meeting virtual schedule progresses.

Section on Biologics: The Bone Morphogenetic Protein Pendulum: Reemergence of Use and Alternatives

Usage of bone morphogenetic protein has seen large fluctuations given the controversy regarding its safety. With a reemergence in use of BMP2 as well as use of small molecule and peptide alternatives to BMP2, faculty will evaluate the efficacy and safety of these applications.

NASS Exercise Committee: How to Incorporate Psychologically-Informed Practice into Exercise Management of Spine Care: Behavioral Approach

Section on IONM: Regulatory and Medicolegal Aspects of Neuromonitoring in Spine Surgery

Faculty will address the most common questions the IONM Section receives about IONM guidelines and standards, clinical practice patterns, and closed claims involving IONM and spine surgery. Attendees are encouraged to share their experiences and perspectives during the question and answer portion.

NASS 2021 App Coming in July

Your Comprehensive Tool for Navigating the Meeting



Build your personal planner, plan your itinerary, add personal notes, tag your favorite sessions and exhibitors.



View the meeting schedule, search for and rate sessions, add and email session notes and view handouts.



Search for exhibitors and mark with visited tags, request meetings and add personal notes. Download a personalized walking map.



View ePosters and contact ePoster authors.



Tap into local Boston attractions, restaurants and more.



Read, follow and comment using Twitter.

Available in July at www.spine.org/mobile.





Technical Exhibition

Experience the spine industry's largest display of implants, instruments, and additional products and services.

Touch and feel the countless spine care instruments and equipment. Take advantage of hands-on learning experiences with an in-booth demonstration while talking to the designers and engineers. Make the most of your time by enjoying lunch in the exhibit hall.

Solution Showcase

Lunch 'n' Learn in the Solution Showcase. Use your lunch time to learn more about specific products and solutions to help you provide your professional care. The theater presentation schedule will be available at www.spine.org/am in June.

Surgical Innovation Labs

View the latest surgical innovations in action. Come see industry demonstrate their latest products or join one of the surgical training workshops in the evening. These cadaveric demonstrations and workshops will run Wednesday through Friday.

Innovative Technology Presentations (Non-CME)

Attention NASS Exhibitors:

Please submit abstracts about new and innovative technologies for presentation during these non-CME sessions. Each presentation will be approximately six minutes and presented by a MD, DO or PhD. The submission deadline is June 14, 2021. The NASS Program Committee will review/select the highest graded abstracts. Submit abstracts at sms.spine.org.

Want to exhibit or know a company that should exhibit? Go to exhibitatnass.org for information.

The Learning Place

Looking for an alternative to sitting in a lecture hall? Continue your education in the Technical Exhibition. Come to the Learning Place. Settle down with a cup of coffee and view the ePosters. Also view ePosters using your phone or tablet through the conference mobile app. More information about accessing ePosters will be available on-site.

Poster Grand Rounds

Attendees will have the opportunity to meet with and ask questions of select ePoster authors.

Practical Theater

Attend presentations on specific spine topics. These presentations will occur during breaks throughout the meeting.

Meeting-at-a-Glance

Monday, September 27

8:00 a.m.–5:00 p.m.	Ticketed Course: Coding Update 2021: Mastering the Coding Maze (Two-day Course)
8:00 a.m.–5:00 p.m.	Exhibitor Registration

Tuesday, September 28

8:00–10:00 a.m.	Evidence-Based Medicine Training Program—Live Capstone Session
8:00 a.m.–5:00 p.m.	Ticketed Course: Coding Update 2021: Mastering the Coding Maze (Two-day Course Continued)
7:00 a.m.–12:00 p.m.	Ticketed Hands-on Course: Section on Minimally Invasive Spine Surgery: Minimally Invasive Spine Surgery
1:00–4:30 p.m.	Attendee Registration
1:30–6:00 p.m.	Ticketed Hands-on Course: Section on Spinal Deformity: Deformity
8:00 a.m.–6:00 p.m.	Exhibitor Registration

Wednesday, September 29

6:30–8:00 a.m.	Continental Breakfast
6:30 a.m.–6:00 p.m.	Attendee Registration
7:00 a.m.–5:30 p.m.	Exhibitor Registration
7:25–7:30 a.m.	Welcome Remarks
7:30–7:35 a.m.	NASS Working for You
7:35–8:35 a.m.	Symposia: • Social Media: How to Use it and Not • Intradiscal Cellular Therapies for Degenerative Disc Disease: Where are We Now and Where are We Going? Best Papers Abstract Presentations: • Spinal Infections • Spinal Implant Research
8:00–10:00 a.m.	Surgical Innovation Lab Demos
8:35–10:00 a.m.	Plenary Session: Future of Healthcare
9:00 a.m.–5:00 p.m.	Technical Exhibition
10:00–10:30 a.m.	Networking Break Beverage Service
10:30–10:35 a.m.	NASS Working for You

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Meeting-at-a-Glance

Wednesday, September 29 (Continued)	
10:35 a.m.–12:00 p.m.	Surgical Technique Cadaver Demonstration: Endoscopic Spine Surgery Section on Spine Oncology: Tough Calls in Spine Oncology Abstract Presentations: • Preop, Intraop and Postop Considerations in Thoracolumbar Spine Surgery • Spinal Deformity Interdisciplinary Forum
11:00 a.m.–1:00 p.m.	Surgical Innovation Lab Demos
12:00–1:00 p.m.	Complimentary Boxed Lunch (Medical Attendees Only) Solution Showcase
12:55–1:00 p.m.	NASS Working for You
1:00–2:00 p.m.	Abstract Presentations: • Robotics (Surgery Thoracolumbar) • Social and Psychosocial Determinants of Health • Operative Planning in Spinal Deformity • Research in Injection and Percutaneous Interventions • Outcomes and Complications
2:05–3:05 p.m.	Exercise Committee: Virtual Delivery of Spine Care Section on Posterior Pelvic Girdle Pain: Symposium Section on SCI: Complex Spinal Trauma Cases/Spinal Trauma Guideline Discussion (Cobranded with ISCoS) Abstract Presentations: • Emerging Technologies in Spinal Healthcare (Telemedicine, AI, 3-D Printing and Navigation) • Cervical Spine Surgery
2:00 – 4:00 p.m.	Surgical Innovation Lab Demos
3:00 – 3:30 p.m.	Networking Break Beverage Service
3:35 – 5:05 p.m.	Surgical Technique Cadaver Demonstration: MIS TLIF Section on Robotics & Navigation: Which Robotic System Should Be Part of Your Operating Room? Section on IONM: Neuromonitoring in Cervical Spine Surgery: Utility, Value and Lessons Learned Abstract Presentations: • Big Data Considerations in Spinal Healthcare Research • Injections and Nonoperative Interventions/Imaging
5:00–8:00 p.m.	Surgical Innovation Lab Workshops

Meeting-at-a-Glance

Thursday, September 30	
6:30–8:00 a.m.	Continental Breakfast
6:30 a.m.–5:30 p.m.	Attendee Registration
7:25–8:25 a.m.	Symposia: • Quest for Truth; Online Databases versus Registries: Reflecting the True Outcomes • Adult Cervical Spine Deformity: Patient Assessment, Surgical Correction Techniques, and Complication Avoidance
	Best Papers
	Abstract Presentations: • Management of Spinal Tumors • Thoracolumbar Surgery I
8:00–10:00 a.m.	Surgical Innovation Lab Demos
8:00 a.m.–5:30 p.m.	Exhibitor Registration
8:30–9:30 a.m.	Plenary Session: Spine Care in the Post-Pandemic World: Lessons Learned from COVID-19 and Future Threats on the Horizon
9:00 a.m.–5:00 p.m.	Technical Exhibition
9:30–10:00 a.m.	Networking Break Beverage Service
9:45–10:00 a.m.	2021 Award Presentations: • 9:45-9:55 a.m.: NASS 2021 Recognition Awards Presentation • 9:55-10:00 a.m.: 2021 Research Grants Presentation
10:00–10:15 a.m.	Incoming (2021-2022) Presidential Remarks: Edward J. Dohring, MD
10:15–11:00 a.m.	2020-2021 Presidential Address: Eeric Truumees, MD
11:00 a.m.–12:00 p.m.	Presidential Guest Speaker: Steven Pinker
11:00 a.m.–1:00 p.m.	Surgical Innovation Lab Demos
12:00–1:00 p.m.	Complimentary Boxed Lunch (Medical Attendees Only)
	Solution Showcase
12:55–1:00 p.m.	NASS Working for You
1:00–2:00 p.m.	Symposium: Endoscopic Surgery During the Covid Era: Relevance, Economy and Latest Trend
	The Spine Journal Outstanding Paper Awards Presentations
	Abstract Presentations: • Cervical Spine Deformity • Perioperative and Postoperative Management
	Innovative Technology Presentations (Non-CME)
	Interdisciplinary Forum
2:00–4:00 p.m.	Surgical Innovation Lab Demos

Continued on next page

Meeting-at-a-Glance

Thursday, September 30 (Continued)	
2:05–3:05 p.m.	Abstract Presentations: - Attaining Balance After Spine Surgery - Novel Findings in Diagnostic Related Research Symposium: AMA Guides® to the Evaluation of Permanent Impairment: Achieving Equitable impairment Ratings Through the Most Current Medicine
	Interdisciplinary Forum
	Resident/Fellow Education Pathway
3:05–3:35 p.m.	Networking Break Beverage Service Members' Business Meeting
3:35–5:05 p.m.	Surgical Technique Cadaver Demonstration: Robotics Surgery Symposium: Seeing Spinal Metastases 20:20—A Review of the Current State of the Art and Future Directions Abstract Presentations: - Opioids, Pain and Behavioral Health in Current Spinal Care - Motion Preservation - Thoracolumbar Surgery II
5:00–8:00 p.m.	Surgical Innovation Lab Workshops
Friday, October 1	
6:30–8:00 a.m.	Continental Breakfast
6:30 a.m.–5:00 p.m.	Attendee Registration
7:00 a.m.–12:00 p.m.	Ticketed Hands-on Course: Lumbar Spinal Injections
7:30–8:55 a.m.	Symposium: Cellular Bone Matrices for Spinal Fusion: A Critical Evaluation of the Evidence, Safety, and Value Best Papers Abstract Presentations: Spinal Alignment Interdisciplinary Forum
8:00 a.m.–1:00 p.m.	Surgical Innovation Lab Demos Exhibitor Registration
8:55–9:00 a.m.	NASS Working for You
9:00–10:00 a.m.	Plenary Session: Individualizing Surgical Care for Degenerative Cervical Myelopathy [AOSpine RECODE DCM Research Priority]: Current Perspectives and Future Directions For Practice and Research
9:00 a.m.–1:30 p.m.	Technical Exhibition

Continued on next page

Meeting-at-a-Glance

Friday, October 1 (Continued)	
10:00–10:30 a.m.	Networking Break Beverage Service
10:30 a.m.–12:00 p.m.	Surgical Technique Cadaver Demonstrations: Minimal Invasive Lateral Interbody Fusion Abstract Presentations: - ERAS and Perioperative Care - Socioeconomics and Cost of Spine Care Symposium: Contemporary Surgical Concepts for Acute Spinal Cord Injury
12:00–12:50 p.m.	Solution Showcase
12:00–1:00 p.m.	Complimentary Boxed Lunch (Medical Attendees Only) SpinePAC Luncheon
12:55–1:00 p.m.	NASS Working for You
1:00–2:30 p.m.	2021 NASS Advocacy Symposium Abstract Presentations: - Evaluating Outcome in Spine Care - Advancements in Cervical Myelopathy and Radiculopathy Research Symposium: Benchmarking and Predictive Analytics to Improve Safety and Outcomes for Adult and Pediatric Spine Surgery
2:30–2:55 p.m.	Networking Break Beverage Service
2:55–3:00 p.m.	NASS Working for You
3:00–4:00 p.m.	Symposium: What Every Surgeon Needs to Know About Adult Lumbar Scoliosis Abstract Presentations: Complications Following High Intensity Surgical Procedures Interdisciplinary Spine Forum
3:00–5:00 p.m.	Cervical Deformity Cadaver: Surgical Spine Deformity Surgery
4:05–5:05 p.m.	Symposium: The State of Robotic Spine Surgery in 2021 Abstract Presentations: Safety and Quality in Spinal Care Delivery Interdisciplinary Spine Forum

Disclaimer

The material presented at NASS 2021 is available from the North American Spine Society for educational purposes only. The material does not intend to represent the only, nor necessarily the best, method or procedure appropriate for the medical situations discussed; rather, the intent is to present an approach, view, statement or opinion of the faculty that may be helpful to others who face similar situations.

NASS disclaims any and all liability for injury or other damages to any individual attending the meeting and for all claims which may arise out of the use of the techniques demonstrated therein by such individuals, whether these claims shall be asserted by physicians or any other person.

On occasion, changes in program content or faculty may occur after distribution of the preliminary program. The final program will contain confirmed program content, faculty and presenters. Any further changes from the published final program will be announced at the beginning of the session.

Meeting-at-a-Glance

Saturday, October 2	
7:30 – 8:00 a.m.	Continental Breakfast
7:30 – 10:45 a.m.	Attendee Registration
8:00 – 9:00 a.m.	Plenary Session: AR, VR, AI and Large Data
9:00 – 10:00 a.m.	Abstract Presentations: • Behavioral Factors in Clinical Practice • Decision Making in Spinal Trauma Symposium: Patient Frailty and Associated Impact on Spine Surgery: Assessment, Outcomes and Optimization
10:00 – 10:30 a.m.	Networking Break Beverage Service
10:30 a.m. – 12:00 p.m.	Symposia: • Evolving Trends in Ambulatory Surgical Care Pre- and Current COVID ERA • Nuances of Lateral Access Techniques to the Lumbar Spine: Antepsoas, Oblique, Transpsoas, and Prone-lateral Abstract Presentations: Bone Mineral Density, Sarcopenia, Frailty and Perioperative Outcomes
12:00 p.m.	Meeting Adjourns

Virtual Schedule
Section on Biologics: The Bone Morphogenetic Protein Pendulum: Reemergence of Use and Alternatives
NASS Exercise Committee: How to Incorporate Psychologically-Informed Practice into Exercise Management of Spine Care: Behavioral Approaches
Section on IONM: Regulatory and Medicolegal Aspects of Neuromonitoring in Spine Surgery
Section on SCI: Complex Spinal Trauma Cases / Spinal Trauma Guideline Discussion (Cobranded with ISCoS)

Keep up with all of the latest NASS news and information!

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Housing Information

The official housing provider for NASS 2021 is onPeak.

When booking through onPeak, you will have housing support staff to assist you prior to arrival as well as on-site should you require assistance with your hotel reservation while in Boston. onPeak is the **only** housing provider for the Annual Meeting—beware of other housing-type companies that present themselves as affiliates of NASS.

How to Reserve Your Accommodations via onPeak:

1 Complete Annual Meeting registration

2 **Book your room online at www.spine.org/am**
or by phone: 800-545-1773 (US/Canada) or
312-527-7300 (International), 9:00 a.m.-5:00 p.m. ET

The cutoff date for reservations is August 31, 2021; discounted rates may not apply after this date. Reservations are on a first-come, first-served basis and are subject to room availability. Hotels will not and cannot accept reservations directly.

Hotel Cancellation/Change Policy via onPeak

Make changes to existing reservations online with the login credentials listed on your confirmation; by e-mail to nassannualmeeting@onpeak.com or by calling 800-545-1773. You must have the onPeak ID of the reservation you want to change to make modifications.

Submit changes to onPeak until mid- to late August based on availability. Please reference your confirmation email for more details. After the date(s) specified in your reservation confirmation, you should communicate directly with the hotel for additional changes. For cancellations to existing reservations, please refer to the individual hotel's cancellation policy, also on your confirmation. Failure to cancel your reservation according to the hotel cancellation policy will result in a charge to your credit card.

Get the **FLEXIBILITY** to stretch your choice and dollars.

onPeak offers a hotel booking solution that enables you to plan with ease, then make the most of your budget for NASS.



Dedicated Staff

onPeak will assist with hotel selection and city information.



Hotel Rewards Points

Continue to earn points through your loyalty rewards program.



Best Rate Pledge

onPeak comparison shops to ensure the lowest rates.



Convenient Deposit Policy

Book an individual reservation or block now and pay later.



Complimentary Lyft Pass

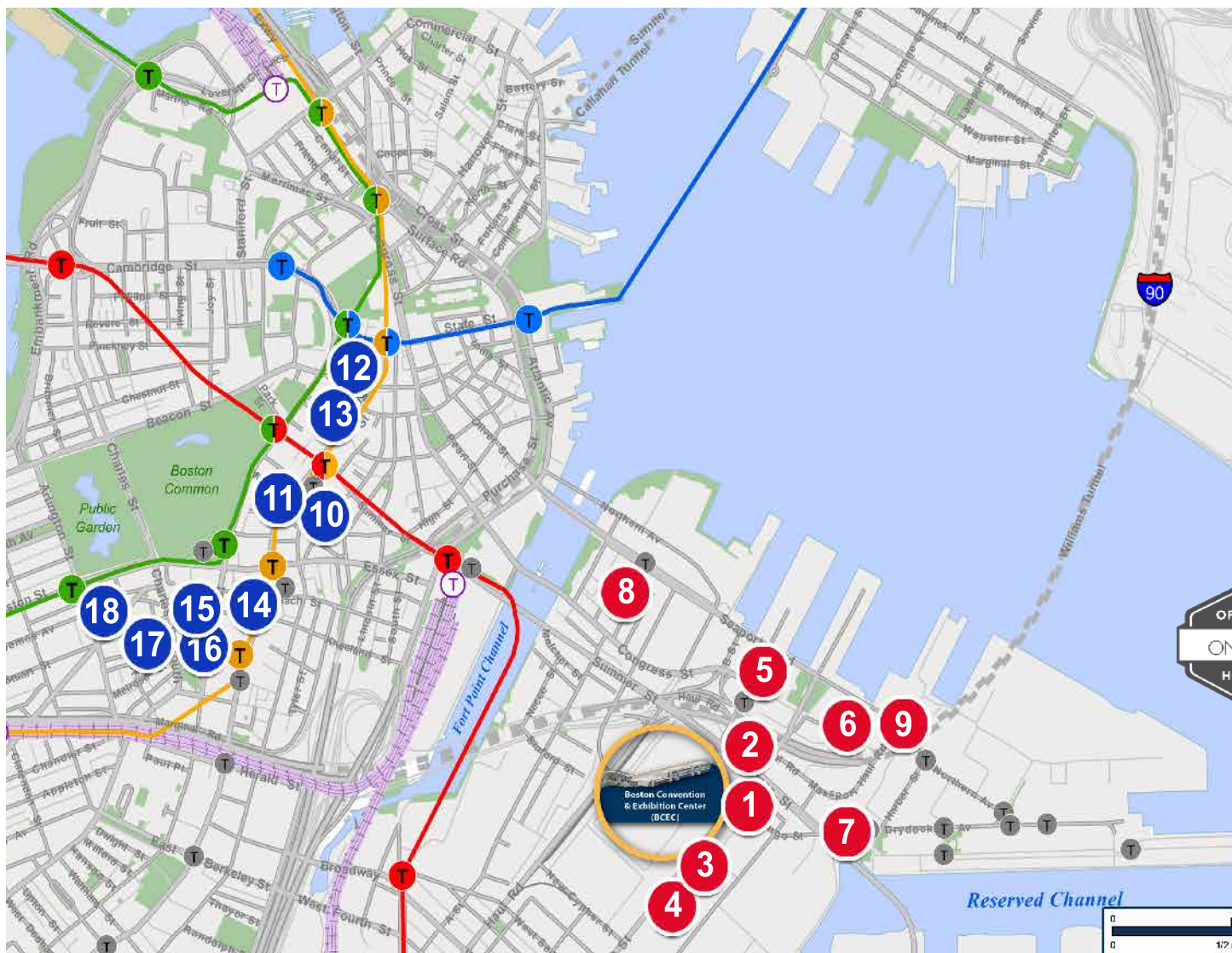
Receive a \$100 Lyft Pass to get to and from specified NASS hotels.



Overbooking Protection

Added protection from relocation to another property.

Housing Information



Waterfront Hotels

1. Westin Boston Waterfront HQ	Connected
425 Summer Street	
2. Omni Boston Hotel at the Seaport	Connected
450 Summer Street	
3. Aloft Boston Seaport District	1 Block
371 D Street	
4. Element Boston Seaport District	2 Blocks
401 D Street	
5. Seaport Hotel	2 Blocks
1 Seaport Lane	
6. Renaissance Boston Waterfront	3 Blocks
606 Congress Street	
7. Hampton Inn & Homewood Suites Seaport	3 Blocks
670 Summer Street	
8. Yotel Boston	4 Blocks
65 Seaport Boulevard	
9. Hyatt Place Boston Seaport District	5 Blocks
295 Northern Avenue	

Downtown/Midtown Hotels

10. Hyatt Regency Boston	1.0 Mile
1 Avenue de Lafayette	
11. Godfrey Hotel	1.1 Miles
505 Washington Street	
12. Omni Parker House	1.2 Miles
60 School Street	
13. Kimpton Nine Zero Hotel	1.4 Miles
90 Tremont Street	
14. DoubleTree by Hilton Boston Downtown	1.5 Miles
821 Washington Street	
15. Courtyard Boston Downtown	1.5 Miles
275 Tremont Street	
16. W Boston	1.5 Miles
100 Stuart Street	
17. Revere Hotel Boston Common	1.6 Miles
200 Stuart Street	
18. Boston Park Plaza	1.6 Miles
50 Park Plaza	

 **Lyft Pass Hotels** For more information please visit spine.org/am



Registration

NASS Membership Discounts and Rewards

All individuals registering for NASS 2021 are encouraged to become members to join the more than 8,000 spine care providers worldwide who rely on NASS to provide the resources needed to advance their careers. With a diverse, multidisciplinary membership, NASS fosters an atmosphere of collaboration unmatched by other professional spine societies.

If you are not already a NASS member, join prior to registering to receive a discount of at least \$300 on your registration fees as well as all of the other benefits of membership.

Included with membership are subscriptions to the #1 rated spine journal, *The Spine Journal* and the bi-monthly magazine, *SpineLine*, significant discounts on all educational events and resources, increased opportunities to collaborate with colleagues, patient referral resources including a listing on our online Find a Specialist Search and much more.

Apply for membership online at www.spine.org/join before you register to take advantage of the member discount on registration. Go to spine.org/membership for qualifications, benefits, etc. or contact membership@spine.org; 866-960-NASS (6277); or 001-630-230-3600 from outside the United States.

Already a Member?

Visit www.spine.org/refer to learn more about how you can get 20% off your dues for next year when you refer your colleagues to NASS.

General (in-person) registration fees include:

- In-person access to all education sessions (Wednesday-Saturday)
- Access to live stream of all symposia throughout the meeting
- OnDemand recordings of symposia, abstracts, etc.
- Access to the world's largest spine Technical Exhibition (closed Saturday)
- Continental breakfasts, beverage breaks and box lunches (no lunch on Saturday)
- Earn up to 81.5 AMA PRA Category 1 Credits™—In-Person (24) + OnDemand (57.5)

One-day (in-person) registration fees include:

- In-person access to all education sessions for the day of registration only. General registration is required to attend for more than one day
- Access to the world's largest spine Technical Exhibition (closed Saturday)
- Continental breakfasts, beverage breaks and box lunch (no lunch on Saturday)
- AMA PRA Category 1 Credits™—Wednesday (7.5), Thursday (5.5), Friday (7.5) **OR** Saturday (3.5)

Note: Access to OnDemand recordings and/or live stream requires additional fees.

Virtual registration fees include:

- Access to live stream of all symposia throughout the meeting
- OnDemand recordings of symposia, abstracts, etc.
- Earn up to 81.5 AMA PRA Category 1 Credits™

Note: Virtual registration does not permit access to the discounted NASS hotel rates or attendance to the annual meeting. One-day virtual registration is not available.

Registration

*Onsite fee will apply if you require a registration representative to process your registration at the convention center.

Registration Category and Type	In-Person by Sept. 27	Onsite*	Virtual
Member Physician or Commercial Affiliate			
General Registration	\$999	\$1049	\$699
One-day Wed., Thurs. or Fri.	\$549	\$599	
One-day Saturday Only	\$433	\$483	
Member Affiliated Health Care			
General Registration	\$699	\$749	\$399
One-day Wed., Thurs. or Fri.	\$399	\$449	
One-day Saturday Only	\$333	\$383	
Member Emeritus			
General Registration	\$599	\$649	\$299
One-day Wed., Thurs. or Fri.	\$349	\$399	
One-day Saturday Only	\$299	\$349	
Member Resident/Fellow			
General Registration	\$359	\$409	\$159
One-day Wed., Thurs. or Fri.	\$279	\$329	
One-day Saturday Only	\$253	\$303	
Nonmember Physician			
General Registration	\$1299	\$1349	\$999
One-day Wed., Thurs. or Fri.	\$699	\$749	
One-day Saturday Only	\$533	\$583	
Nonmember Affiliated Health care			
<i>Employed by a hospital, health care network, university or free-standing facility administering to patients (e.g., DC, PA, NP, RN, PT)</i>			
General Registration	\$849	\$899	\$549
One-day Wed., Thurs. or Fri.	\$474	\$524	
One-day Saturday Only	\$383	\$433	
Nonmember In-Training/Resident/Fellow			
<i>Must provide a letter on letterhead from program director to 630-230-3709 or registration@spine.org.</i>			
General Registration	\$429	\$479	\$229
One-day Wed., Thurs. or Fri.	\$314	\$364	
One-day Saturday Only	\$276	\$326	
Commercial Business (Industry)			
<i>Nonclinical professional that does not treat patients.</i>			
General Registration	\$1299	\$1349	\$999
One-day Wed., Thurs. or Fri.	\$699	\$749	
One-day Saturday Only	\$533	\$583	

OnDemand Recordings

Member

With General Registration	\$0
With One-day Registration	\$215

Nonmember

With General Registration	\$0
With One-day Registration	\$315

Coding Update 2021

Mon./Tues., Sept. 27-28, 8:00 a.m.-5:00 p.m.

Member

Physician or Commercial Affiliate	\$700
Affiliated Health Care	\$550
In-training Resident/Fellow	\$350

Nonmember

Physician	\$800
Affiliated Health Care	\$600
In-training Resident/Fellow	\$400

Hands-on Courses

Section on Minimally Invasive Spine Surgery
Tuesday, October 6, 7:00 a.m.-12:00 p.m.

Section on Spinal Deformity
Tuesday, September 28, 1:30-6:00 p.m.

Lumbar Spinal Injections
Friday, October 1, 7:00 a.m.-12:00 p.m.

Member Physician

Until July 20	\$895
July 21-Oct. 2	\$995

Nonmember Physician

Until July 20	\$995
July 21-Oct. 2	\$1095



Education Details

Who Should Attend?

The entire multidisciplinary spine care community as well as others with an abiding interest in spine are welcome to attend the annual meeting this September in Boston.

Learning Objectives

Upon completion of this meeting, participants should gain strategies to:

- Promote discussion of new scientific developments and best practices in spine care;
- Demonstrate the application of current techniques, procedures and research;
- Practice evidence-based medicine relative to spine care.

Continuing Medical Education (CME) Credit

This activity has been planned and implemented in accordance with the Standards for Integrity and Independence in Accredited Continuing Education developed by the Accreditation Council for Continuing Medical Education (ACCME). The North American Spine Society is accredited by the ACCME to provide continuing medical education for physicians and takes responsibility for the content, quality and scientific integrity of this CME activity.

The North American Spine Society designates this live activity for a maximum of 24 *AMA PRA Category 1 Credits™*. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

The North American Spine Society designates this enduring activity for a maximum of 81.5 *AMA PRA Category 1 Credits™*. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

The American Medical Association has determined that physicians not licensed in the U.S. to participate in this CME activity are eligible for *AMA PRA Category 1 Credits™*.

Additional credit is available for attendance at:

- Coding Update 2021: Mastering the Coding Maze course
- Minimally Invasive Spine Surgery hands-on course
- Deformity hands-on course
- Lumbar Spinal Injections hands-on course

Continuing Education Units (CEUs) for Allied Health Professionals

NASS is proud to offer continuing education units (CEUs) to accommodate nonphysician attendees' certification requirements. The following indicates the status of CEU accreditation for nonphysician attendees. Requirements vary for other allied health and advanced practice providers; please contact your licensing organization for their requirements.

Physician Assistants: The American Academy of Physician Assistants (AAPA) accepts Category 1 credit from AOACCME, prescribed credit from the American Academy of Family Physicians (AAFP) and *AMA PRA Category 1 CME Credit™* for the Physician's Recognition Award from organizations, such as NASS, accredited by the ACCME.

Nurse Practitioners: The American Association of Nurse Practitioners (AANP) accepts *AMA PRA Category 1 CME Credit™* from organizations accredited by the ACCME.

Chiropractors: NASS has applied for approval from Southern California University Health System for chiropractic credit from select states. Approval information will be available soon. Contact education@spine.org to receive a notification when approvals occur.

Physical Therapists: NASS has applied for approval to offer credits to physical therapists in select states. Approval information will be available soon. Contact education@spine.org to receive a notification when approvals occur.

Evaluation and Education Certificates

After the meeting, submit evaluations electronically. Visit www.spine.org/CME to claim education credit and to print CME certificates. Contact education@spine.org with questions.

Acknowledgements

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NASS thanks the following Board members for their leadership and guidance throughout the year:

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NASS thanks the following members for their valued time, effort and dedication in planning the educational content for this year's annual meeting:

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Disclosure

Disclosure of Financial Relationship Information

NASS asks individuals in control of content for this activity (planners, faculty, reviewers, authors, staff, others) to disclose all financial relationships with any ineligible companies that they have had during the past 12 months using the NASS online disclosure module at www.spine.org/disclosure.

Ineligible companies, previously known as commercial interests, are those whose primary business is producing, marketing, selling, re-selling or distributing healthcare products used by or on patients. There is no minimum financial threshold; participants must disclose all financial relationships, regardless of the amount, with these companies. NASS asks all participants to disclose regardless of whether they view the financial relationships as relevant to the education.

Since healthcare professionals serve as the trusted authorities when advising patients, they must protect their learning environment from industry influence to ensure they remain true to their ethical commitments. Many healthcare professionals have financial relationships with ineligible companies/commercial interests. By identifying and mitigating relevant financial relationships, we work together to create a protected space to learn, teach, and engage in scientific discourse free from influence from organizations that may have an incentive to insert commercial bias into education.

Relevant Financial Relationship Identification and Mitigation

After disclosure information is received and prior to implementation of the educational activity, NASS staff and peers review them to determine whether the relationships are relevant to the education. Please note that identification of relevant financial relationships does not necessarily mean that the individual is unable to participate in the planning and implementation of the education activity. Rather, the accreditation standards require that relevant financial relationships are mitigated before their roles are assumed in the activity.

Disclosure information will be made available visually on a PowerPoint® slide before each presentation and below in this program. Disclosures are also available at spine.org.

Program Committee Statement on Relevant Financial Relationship Mitigation in Presentations

All relevant financial relationships, if any, have been identified and mitigated prior to the speaker's presentation. By doing so, the North American Spine Society has determined that the speaker's or author's interests or relationships have not influenced the presentation with regard to exposition or conclusion; nor does the Society view the existence of these interests or commitments as necessarily implying bias or decreasing the value of the presentation.

Conflict of Interest Disclosure Index

Ranges of financial compensation as provided to NASS are as follows:

None: Existing relationship but no remuneration in prior calendar year

- Level A. \$100 to \$1,000
- Level B. \$1,001 to \$10,000
- Level C. \$10,001 to \$25,000
- Level D. \$25,001 to \$50,000
- Level E. \$50,001 to \$100,000
- Level F. \$100,001 to \$500,000
- Level G. \$500,001 to \$1M
- Level H. \$1,000,001 to \$2.5M
- Level I. Greater than \$2.5M

Annual Meeting 2021 Program Committee Disclosures - current as of 05/10/2021

Last name, First Name: Type of disclosure: Company Name (Level).

Arnold, Paul M.: Board of Directors: AANS/CNS Joint Section On Neurotrauma (Nonfinancial), CSRS (Nonfinancial), LSRS (Nonfinancial), Spineex (1%); Research Support (Staff and/or materials): Evoke Medical, (40%, as above, This is a company that I co-founded. It currently does not manufacture any products nor do I get remuneration. The company has received a STTR NIH grant this year, Paid directly to institution/employer).

Chen, Allen S.: Fellowship Support: Medtronic (C, Paid directly to institution/employer); Trips/Travel: Spine Intervention Society (Travel Expense Reimbursement).

Cheng, Joseph S.: Other Office: CSNS (Corresponding Secretary, Council of State Neurosurgical Societies); Trips/Travel: AANS (Travel Expense Reimbursement, Paid directly to institution/employer), AOSpine (Travel Expense Reimbursement, Paid directly to institution/employer).

Dohring, Edward J.: Board of Directors: NASS (Travel Expense Reimbursement, First Vice President); Other Office: AAOS (Travel Expense Reimbursement); Private Investments: Anzu (<1%).

Disclosure

Ghogawala, Zoher: Board of Directors: Cervical Spine Research Society (Nonfinancial, Chair, Research Committee Director, CSRS Registry), GN2.0-Nidus (18,750 Shares, 66%), Joint Spine Section - AANS-CNS (Nonfinancial, Spine Section Chair).

Grauer, Jonathan N.: Board of Directors: LSRS (Nonfinancial, committee/board role); Other: NASS (D).

Horn, Scott I.: Board of Directors: Spine Intervention Society (Travel expenses); Other Office: CPT Advisor for SIS (Volunteer position. Travel expenses.); Speaking and/or Teaching Arrangements: AAPMR (Travel expenses), NASS (Travel expenses.), SIS (AMA CPT advisor, Health Policy Chair, Travel expenses).

Hsieh, Patrick C.: Royalties: Medtronic (D), Nuvasive (C), Zimmer Biomet (B).

Hwang, Steven W.: Board of Directors: Ronald McDonald House (None); Consulting: NuVasive (C); Speaking and/or Teaching Arrangements: Zimmer Biomet (C); Stock Ownership: Auctus (7.50%); Trips/Travel: NASS (A).

Kauffman, Christopher P.: Consulting: HealthTrust (B); Other: Turning Point (Salary).

Kennedy, D.J.: Board of Directors: AAPM&R (Nonfinancial, Member at Large), Spine Intervention Society (Nonfinancial, Member at Large); Consulting: State Farm Auto Insurance (B); Speaking and/or Teaching Arrangements: Spine Intervention Society (Travel Expense Reimbursement); Trips/Travel: AAPM&R (Travel Expense Reimbursement), Spine Intervention Society (Travel Expense Reimbursement).

Knight, Reginald Q.: Consulting: Stryker Spine (B).

Kreiner, Scott: Research Support (Staff and/or materials): Abbott (Future Compensation Expected, Paid directly to institution/ employer); Speaking and/or Teaching Arrangements: Spine Intervention Society (Travel Expense Reimbursement).

Liu, John C.: Consulting: Viseon (None); Trips/Travel: NASS (Travel Expense Reimbursement).

Mayer, E. Kano A.: Consulting: Turning Point (Future Compensation Expected); Other: Wharton, Levin, Ehrmantraut & Klein, P.A (B, Outside 12 month Requirement); Private Investments: Lanai Health Solutions (30.00%); Speaking and/or Teaching Arrangements: North America Spine Society (B); Stock Ownership: Infinite Orthopedics (1%); Trips/Travel: AMA (Travel Expense Reimbursement).

Mroz, Thomas E.: Royalties: Stryker (F).

Muehlbauer, Eric J.: Board of Directors: North American Spine Society (Salary).

Ohnmeiss, Donna D.: Other: Texas Back Institute Research Foundation (Salary).

Reiter, Mitchell F.: Other: DR Innovations (Future Compensation Expected, 40%. My professional partner and I have invented and received a patent for a wearable device named Sensiband that tests people for allergies to the metals commonly used in medical implants. This device itself is not an implant used in spinal surgery. Sensiband is FDA registered as a class I medical device.); Private Investments: CreOsso (4%).

Reitman, Charles A.: Board of Directors: NASS (Travel Expense Reimbursement); Other: NASS (Nonfinancial, Committee leadership); Scientific Advisory Board: Clinical Orthopaedics And Related Research (B, Paid directly to institution/employer).

Resnick, Daniel K.: Scientific Advisory Board: NIDUS (None).

Riew, K. Daniel: Board of Directors: Global Spine Journal (Nonfinancial), NASS (Nonfinancial); Consulting: Biomet (None), Happe Spine (Future Compensation Expected), Medtronic (I); Royalties: Biomet (F); Speaking and/or Teaching Arrangements: Biomet (C), Medtronic (Travel Expense Reimbursement); Stock Ownership: Amedica (B), Axiomed (E), Benvenue (C), Expanding Orthopedics (<1%), Osprey (1% options), Paradigm Spine (B), Spinal Kinetics (E), Spineology (B, <1%), Vertiflex (B); Trips/Travel: DePuy Synthes (C).

Schoenfeld, Andrew J.: Grants: Department of Defense (D, Paid directly to institution/employer), NIH (F, Paid directly to institution/ employer), OREF (F, Paid directly to institution/employer); Other Office: Journal of Bone and Joint Surgery (E); Royalties: Springer Publishers (A, Outside 12-Month Requirement), Wolters Kluwer, Springer (B).

Skolasky, Richard L.: Board of Directors: North American Spine Society (Nonfinancial, Governance Committee Chair, Research Program Management Chair); Other: International Society For Quality Of Life Research (Nonfinancial, Associate Editor)."

Steinmetz, Michael P.: Board of Directors: AANS/CNS Section on Disorders of the Spine (Exhibits Committee Chair), Council of State Neurosurgical Societies (Vice Chair); Consulting: Globus (B), Stryker Spine (B); Device or Biologic Distribution Group (Physician-Owned Distributorship): Biomet Spine (B); Speaking and/or Teaching Arrangements: Stryker (B).

Sullivan, William J.: Board of Directors: NASS (Executive Committee); Trips/Travel: NASS (B, Travel Expense Reimbursement).

Swartz, Karin R.: Research Support (Staff and/or materials): Veterans Affairs Administration (C, Paid directly to institution/ employer); Speaking and/or Teaching Arrangements: AANS/CNS (B, Travel Expenses), NASS (B, Travel Expenses).

Truumees, Eric: Board of Directors: Seton Family of Doctors (None); Other Office: AAOS (Editor-in-Chief of AAOS Now); Research Support (Staff and/or materials): Medtronic (C, Paid directly to institution/employer), Pfizer (E, Outside 12-Month Requirement, Paid directly to institution/employer), Relievant (F, Paid directly to institution/employer), Seikagaku Corporation (C, Paid directly to institution/employer), Stryker Spine (B, Outside 12-Month Requirement, Paid directly to institution/employer), Vertex Pharma (D, Outside 12-Month Requirement, Paid directly to institution/ employer); Trips/Travel: AAOS (Travel Reimbursement (B)).

Vaccaro, Alexander R.: Royalties: Aesculap (None), Atlas Spine (B), Elsevier (B), Globus (E), Jaypee (A), Medtronic (E), Spinewave (None), Stryker Spine (G), Taylor Francis/Hodder And Stoughton (A), Thieme (B); Stock Ownership: Advanced Spinal Intellectual Properties (None), Atlas Spine (None), Avaz Surgical (None), Bonovo Orthopaedics (None), Computational Biodynamics (None), Cytonics (None), Deep Health (None), Dimension Orthotics LLC (None), ElectroCore (None), Flagship Surgical (None), Flowpharma (None), Globus (None), Innovative Surgical Design (None), Insight Therapeutics (None), Jushi (None), NuVasive (None), Orthobullets (None), Paradigm Spine (None), Parvizi Surgical Innovation (None), Progressive Spinal Technologies (None), Replication Medica (None), Spine Medica (None), Spinology (None), Stout Medical (None), Vertiflex (None).

Wang, Jeffrey C.: Board of Directors: American Orthopaedic Association (Nonfinancial), AO Foundation (C, Travel Expense Reimbursement), Society For Brain Mapping And Therapeutics (Nonfinancial); Fellowship Support: AO Foundation (E, Paid directly to institution/employer); Private Investments: Bone Biologics (51,255 Shares, 1%, 51,255 options, <1%), electroCore (<1%), PearlDiver (25,000 Shares, 1%, 25,000 options, <1%), Surgitech (<1%); Royalties: Biomet (F), DePuy Synthes (B), SeaSpine (C).

The following participants have Nothing to Disclose:

Cho, Charles H.
Fehlings, Michael G
Finkenberg, John G
Fish, David E
Lahey, Donna M.
Mitchell, William
O'Brien, David Reese
Pangarkar, Sanjog
Schneider, Philip L.

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