NORTH AMERICAN SPINE SOCIETY

29TH ANNUAL MEETING

NOVEMBER 12-15, 2014 / SAN FRANCISCO, CA

PRELIMINARY PROGRAM

NASS 2014

NASSANNUALMEETING.ORG

Putting Patient and Surgeon Safety FIRST

"In my first scoliosis case with Renaissance, I *reduced my fluoro down to just one minute – a 75 percent reduction* compared to the case before it."

Christopher Chittum, MD
Neurosurgeon
Spartanburg, S.C.

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- *Precise preoperative planning*
- *May reduce use of fluoroscopy*[1]
- *Used in wide range of spine procedures including percutaneous fusion and complex deformity cases*

VISIT US AT NASS 2014 IN SAN FRANCISCO
for hands-on demonstrations and peer-to-peer discussions at our *Meet the Masters of Renaissance* sessions.

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1. Kantelhardt SR, Martinez R, Baerwinkel S, Burger R, Giese A, Rohde V. Perioperative course and accuracy of screw positioning in conventional, open robotic-guided and percutaneous robotic-guided, pedicle screw placement. Eur Spine J. 2011;20(6):860-868.

Mazor Robotics | Renaissance From Art to State of the Art

MKC0302-01 Rev. A

There are several spine-specific meetings to choose from, so why attend the NASS 29th Annual Meeting?

This is the 29th Annual Meeting, a well-established, evidence-based, scientific spine educational event.

Spine specialists from around the world develop the scientific program content through abstract and proposal submissions. NASS receives submissions, grades the quality of the content and develops the scientific program. A significant number of submissions were received this year—1,020—and only the best research will be presented.

The meeting provides a platform for surgeons, medical physicians, scientists and other spine specialists to present the evidence, debate, and discuss controversial topics about surgical and other procedures as well as the treatment of spine patients.

It's a single location to meet with others from around the globe to collaborate, hear differing perspectives, develop relationships and interact with practitioners from other specialties.

Oh yes, and the NASS 29th Annual Meeting is being held in San Francisco offering world-class cuisine, cultural attractions and breathtaking scenery. Did we mention outstanding restaurants?

For these and countless other reasons, we hope to see you in San Francisco.




William C. Watters III, MD
President

Michael L. Reed, DPT, OCS
Charles A. Reitman, MD
2014 Program Co-chairs

Simon Dagenais, DC, PhD
Committee Liaison

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"I believe establishing relationships with others, regardless of their professional degree or geographic location, is important for the exchange of information and ultimately for improved practice and patient management."

2013 Annual Meeting attendee

The North American Spine Society 29th Annual Meeting
November 12-15, 2014
Moscone Center South, San Francisco, CA

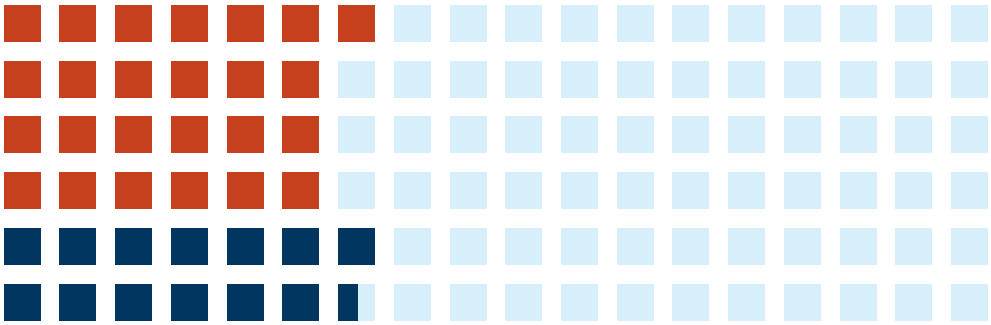
This year's meeting is about collaboration, and bringing attendees from different disciplines together to discuss how to advance spine care and research. Organized networking opportunities make it easier to connect with colleagues on a global scale.

"It is always good to meet and learn what other spine physicians are doing throughout the country and around the world."

2013 Annual Meeting attendee

2014 PROGRAM STATISTICS

386 ABSTRACTS ACCEPTED (38%) | **1,020 ABSTRACTS SUBMITTED**



250 Surgical papers and posters

136 Medical/Interventional papers and posters

= 10 abstracts

IMPORTANT DATES

MAY 6	**Registration and housing opens for members only**
MAY 20	**Registration and housing opens for all**
JULY 14	**Early registration deadline** *Save $200 with the early registration discount*
SEPT. 29	**Regular registration deadline** *Save $100 with the regular registration discount*
SEPT. 30	**Online and onsite registration fees increase by $100**
OCT. 22	**Housing deadline** *Ensure that you will have accommodations at an official NASS hotel*

QUESTIONS?

Visit www.nassannualmeeting.org for more information. Contact the following departments via email with any questions:

Educational programming:
education@spine.org

Registration:
registration@spine.org

Housing:
meetingservices@spine.org

Exhibits:
exhibits@spine.org

Membership:
membership@spine.org

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Flowable* Hemostatic Matrix in the US based on IMS data for units/mL sold Q2 2012 - Q1 2013[2,3]

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FLOSEAL Hemostatic Matrix Indication

FLOSEAL is indicated in surgical procedures (other than in ophthalmic) as an adjunct to hemostasis when control of bleeding by ligature or conventional procedures is ineffective or impractical.

Important Risk Information for FLOSEAL

Do not inject or compress FLOSEAL into blood vessels. Do not apply FLOSEAL in the absence of active blood flow, e.g., while the vessel is clamped or bypassed, as extensive intravascular clotting and even death may result.

Do not use FLOSEAL in patients with known allergies to materials of bovine origin.

Do not use FLOSEAL in the closure of skin incisions because it may interfere with the healing of the skin edges.

FLOSEAL contains Thrombin made from human plasma. It may carry a risk of transmitting infectious agents, e.g., viruses, and theoretically, the Creutzfeldt-Jakob disease (CJD) agent.

Excess FLOSEAL (material not incorporated in the hemostatic clot) should always be removed using gentle irrigation from the site of application. FLOSEAL swells by approximately 10-20% after product is applied. Maximum swell volume is achieved within about 10 minutes.

Adverse Events: The most common adverse events recorded for FLOSEAL and the control arm during the clinical trial (during and after application) were anemia, atrial fibrillation, infection, and hemorrhage. Adverse events (rated mild) that were deemed by the surgeon as "Possibly Related" to FLOSEAL were anemia (1%), mild post-operative bleeding (<1%), and local inflammation (<1%).

Caution: Federal Law (United States) restricts this device to sale by or on the order of a licensed healthcare practitioner.

*FLOSEAL is one of 4 flowable hemostatic agents available in the US.

References: 1. Floseal Hemostatic Matrix Instructions for Use. Hayward, CA: Baxter Healthcare Corporation. 0717965. August 2012. **2.** IMS Hospital Supply Index, 2012. **3.** Spotnitz WD, Burks S. Hemostats, sealants, and adhesives: components of the surgical toolbox. *Transfusion.* 2008;48:1502-1516. **4.** Oz MC, et al. Controlled clinical trial of a novel hemostatic agent in cardiac surgery. *Ann Thorac Surg.* 2000;69:1376-1382.

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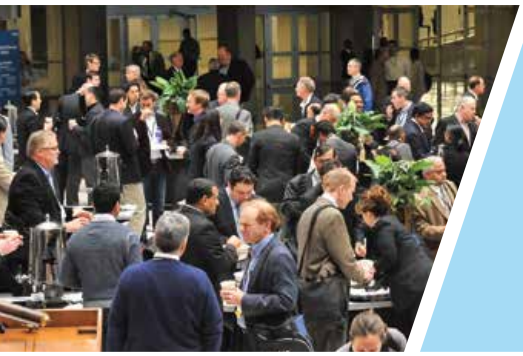
WELCOME RECEPTION

Tuesday, November 11, 6:00–7:30 p.m.
San Francisco Marriott Marquis Hotel

The Welcome Reception is a great networking event to kick off the Annual Meeting. Reconnect with old friends and meet new ones.



BEVERAGE STATIONS

Occur Throughout the Week

Attendees will enjoy complimentary beverages during seven breaks. Breaks will occur twice daily Wednesday and Thursday, and once on Friday in the Technical Exhibition. Friday afternoon and Saturday morning breaks will be held outside of the general session room.

ALLIED HEALTH RECEPTION

Thursday, November 13, 5:30–7:00 p.m.

This event provides a networking opportunity for allied health practitioners as well as an opportunity to learn how NASS is supporting this segment of its membership. Heidi Prather, DO, NASS 1st Vice President, is the special guest speaker and will discuss *Forging New Alliances in Spine Care: A Focus on the Expanding Role of Allied Providers*. The committee members of the Section on Allied Health also will be in attendance to discuss the Section's function within NASS and to outline their initiatives for 2015 and beyond.

RESIDENT, FELLOW AND PROGRAM DIRECTORS RECEPTION

Thursday, November 13, 5:00–6:00 p.m.

Meet colleagues in your and other resident and fellow programs, alums who have completed their residencies and fellowships as well as program directors at the 12th Annual Resident, Fellow and Program Directors Reception. The reception offers a casual environment to relax, enjoy a beverage and hors d'oeuvres after a day of education. It's a great opportunity to socialize, discuss the day's sessions and make new connections.

INTERNATIONAL RECEPTION

Friday, November 14, 4:45–5:45 p.m.

Network with colleagues from around the world after the sessions have concluded. This reception is open to all attendees and exhibitors.

J. CRAIG VENTER, PhD

Thursday,
November 13
10:10–11:00 a.m.

J. Craig Venter, PhD, is regarded as one of the leading scientists of the 21st century for his numerous invaluable contributions to genomic research. He is Founder, Chairman, and CEO of the J. Craig Venter Institute (JCVI), a not-for-profit, research organization with approximately 300 scientists and staff dedicated to human, microbial, plant, synthetic and environmental genomic research, and the exploration of social and ethical issues in genomics.

Dr. Venter also is Founder and CEO of Synthetic Genomics Inc. (SGI), a privately held company dedicated to commercializing genomic-driven solutions to address global needs such as new sources of energy, new food and nutritional products, and next generation vaccines.

Dr. Venter began his formal education after a tour of duty as a Navy Corpsman in Vietnam from 1967 to 1968. After earning both a Bachelor's degree in Biochemistry and a PhD in Physiology and Pharmacology from the University of California at San Diego, he was appointed professor at the State University of New York at Buffalo and the Roswell Park Cancer Institute. In 1984, he moved to the National Institutes of Health campus where he developed Expressed Sequence Tags or ESTs, a revolutionary new strategy for rapid gene discovery. In 1992 Dr. Venter founded The Institute for Genomic Research (TIGR, now part of JCVI), a not-for-profit research institute, where in 1995 he and his team decoded the genome of the first free-living organism, the bacterium Haemophilus influenzae, using his new whole genome shotgun technique.

In 1998, Dr. Venter founded Celera Genomics to sequence the human genome using new tools and techniques he and his team developed. This research culminated with the February 2001 publication of the human genome in the journal, *Science*. He and his team at Celera also sequenced the fruit fly, mouse and rat genomes.

Dr. Venter and his team at JCVI continue to blaze new trails in genomics. They have sequenced and analyzed hundreds of genomes, and have published numerous important papers covering such areas as environmental genomics, the first complete diploid human genome, and the groundbreaking advance in creating the first self-replicating bacterial cell constructed entirely with synthetic DNA.

Dr. Venter is one of the most frequently cited scientists, and the author of more than 250 research articles. He also is the recipient of numerous honorary degrees, public honors, and scientific awards, including the 2008 United States National Medal of Science, the 2002 Gairdner Foundation International Award, the 2001 Paul Ehrlich and Ludwig Darmstaedter Prize and the King Faisal International Award for Science. Dr. Venter is a member of numerous prestigious scientific organizations including the National Academy of Sciences, the American Academy of Arts and Sciences, and the American Society for Microbiology.

"I think the current spread of topics is excellent, and gives me a chance to keep current in areas which otherwise I would not spend much time."

2013 Annual Meeting attendee

These educational offerings have an additional fee. All courses and workshops are held Tuesday, November 11 unless otherwise noted.

CODING COURSE

Coding Update 2014: Essentials and Controversies of Spine Care Coding
Monday, Nov. 10–Tuesday, Nov. 11, 7:30 a.m.–4:00 p.m.

Correct coding is the key to appropriate and timely reimbursement. This course will cover pertinent issues in ICD-10 implementation, payer reimbursement rules and the complex nuances of surgical and medical coding. Meet one-on-one with physician faculty who lead NASS' CPT, RUC and reimbursement efforts; participate in "real op notes" sessions and network with others in the same Medicare region.

HANDS-ON COURSE

Minimally Invasive Spine Surgery
7:30 a.m.–4:30 p.m.

Faculty will focus on basic and advanced minimally invasive spine surgery techniques of the lumbar spine as well as review microsurgical anatomy. Hands-on cadaver procedures will include minimally invasive approaches for lumbar decompression, pedicle screw instrumentation, lateral approaches and interbody access/fusion. Endoscopic transforaminal decompressive techniques will be demonstrated.

TECHNIQUE WORKSHOPS

Fundamentals of Spine Deformity
8:00 a.m.–12:00 p.m.

Didactic discussions will address sagittal and coronal balance, clinical applications of pelvic parameters, osteotomy and illiolumbar fixation techniques, and anatomy techniques utilizing thoracic pedicle screws. There also will be hands-on spinal deformity procedures using sawbones.

Diagnosis and Treatments in Cervical Spine Surgery
1:00–5:00 p.m.

Didactic presentations will include anterior/posterior instrumentation and stabilization techniques in the cervical spine, occipital fixation, C1-2 transarticular and C1 lateral mass/C2 pars screw fixation, anterior cervical plating techniques, and lateral mass and odontoid screw fixation. There also will be hands-on practice using sawbones.

INSTRUCTIONAL COURSES

Fundamentals of Evidence-based Medicine
7:00 a.m.–4:00 p.m.

With a specific focus on critically appraising the literature, this EBM course will include presentations and small group assignments that allow for practice in critiquing studies and assigning levels of evidence. It is intended to develop skills in critical analysis of study methodologies and assigning levels of evidence to studies. Completion meets the EBM training requirement for certain NASS committees.

Leadership Development and Training
8:00 a.m.–12:00 p.m.

The Leadership Development Program will provide an opportunity for individuals to enhance their leadership skills within the ever-changing health care environment and expand the pool of well-qualified candidates ready for advancement.

Taking the 'Non' out of Non-specific Back Pain
8:00 a.m.–12:00 p.m.

Non-specific back pain is a term that has its historical roots in the 'art' of medicine. International expert researchers will address muscle function and injury, neuromuscular control and education, measurements to assess exercise and its role in treating low back pain (LBP), and explanations of neurobehavioral mechanisms. Clinicians also will present symptom case scenarios.

Fundamentals of Image-guided Spinal Surgery
1:00–5:00 p.m.

The course will discuss the fundamentals of image-guided spinal surgery, the caveats and pitfalls of this technology, operating room setup, and reimbursement strategies. Participants will assess the applications of image guidance to cervical, thoracic, lumbar, minimally invasive, revision and deformity spinal surgery procedures. There also will be hands-on experience with image-guided systems available.

Imaging of the Spine: Spectrum of Disease and Live/Interactive Case Reviews
1:00–5:00 p.m.

This course will bridge the gap between spine surgeons, specialists and radiologists to provide each specialist with the requisite skills of the complementary specialty in a collaborative and interactive format.

OsteoAMP®

Clinically Superior Fusion Rates Compared to rhBMP-2[1]

1. Roh J. et al. Allogeneic morphogenetic protein vs. recombinant human bone morphogenetic protein-2 in lumbar interbody fusion procedures: a radiographic and economic analysis. Journal of Orthopaedic Surgery and Research, 2013, 8:49 doi:10.1186/1749-799X-8-49

ADVANCED BIOLOGICS
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Surgeons, medical physicians, scientists and other spine specialists present the evidence, debate, and discuss controversial topics.

WEDNESDAY, NOVEMBER 12

Lateral Approach to the Lumbar Spine
8:35–10:00 a.m.

This symposium will discuss the indications, techniques and potential complications associated with the lateral approach as well as address the future developments including disc replacement, anterior release and the L5-S1 interspace. There also will be a presentation addressing an all posterior versus a combined lateral posterior approach for deformity correction, the risks and benefits. Case presentations and open discussion will conclude the symposium.

Implementing Accountable Care in Spine Surgery to Promote Sustainable Health Care
10:35 a.m.–12:00 p.m.

The costs associated with spinal conditions are large and there is concern the current cost of spine care is not sustainable. This symposium will highlight some of the initiatives that may impact the practice, coverage and reimbursement of spine surgery in the changing health care system in the United States.

Controversies in Spine Imaging
3:40–5:10 p.m.

There are numerous clinical scenarios in which imaging can be confusing or controversial. Such dilemmas may delay treatment or conversely suggest aggressive intervention. Subsequent decisions may have significant impact on patient care and medicolegal liability. This symposium will review controversial and challenging imaging clinical scenarios to provide guidance for practicing clinicians.

THURSDAY, NOVEMBER 13

Computer-assisted Surgery: Which Tools and Techniques Are Ready for Adoption in Your Operating Room?
7:35–9:10 a.m.

This symposium will provide an overview and critical analysis of the currently available image guidance, navigation, robotics, and other automating technologies for the operating room.

Vertebral Bone Augmentation: Understanding the Entire Spectrum
3:45–5:15 p.m.

This symposium will provide an overview of bone augmentation and address imaging analysis, patient management, treatment steps, new devices, pearls, radiation safety, and economic/regulatory issues. Presenters with two decades of experience in this area will provide a unique perspective for the future and potential direction in the understanding of the disease process and treatment options.

FRIDAY, NOVEMBER 14

Beyond the Imaging Findings: Predictors of Treatment and Outcomes for the Spine Patient
8:35–10:00 a.m.

A good diagnostic work up and input from a strong multidisciplinary team that includes an assessment of movement, provocation and relieving activities in the setting of psychosocial beliefs and barriers can provide meaningful guidance for patient treatment. This symposium will focus on how such a team can provide meaningful input to the treating physician that permit a more comprehensive and meaningful treatment plan.

Own the Bone: The Spine Practitioner Taking Ownership of the Bone
1:05–2:30 p.m.

This symposium will introduce “Own the Bone,” a program established by The American Orthopedic Association (AOA) to promote the use of diagnostic tests, initiate treatment and provide leadership to develop fracture liaison programs. It will review the pathophysiology of metabolic bone disease, address osteoporosis and estimate the risk of fracture. Pharmacologic management, the use of these agents and their effectiveness also will be reviewed.

SATURDAY, NOVEMBER 15

Minimally Invasive Surgical Management of Degenerative Lumbar Scoliosis: The Good, the Bad and the Ugly
8:00–9:30 a.m.

This symposium presents both a pragmatic and best evidence approach to the pros and cons of MIS management of degenerative lumbar scoliosis. Opinion leaders who currently perform conventional or MIS surgical techniques will debate the pros and cons of adopting MIS surgical treatment for the elderly with degenerative lumbar scoliosis. In addition, the panel and participants openly will discuss what clinical and/or radiographic factors are indicative of the ideal scenario for consideration of MIS techniques for the surgical management of lumbar degenerative scoliosis.

These 21 papers are the top rated from more than 1,000 abstracts submitted for this year's Annual Meeting.

WEDNESDAY, NOVEMBER 12
7:30–8:30 a.m.

Outcomes of Operative and Nonoperative Treatment for Adult Spinal Deformity (ASD): A Prospective, Multicenter Matched and Unmatched Cohort Assessment with Minimum Two-Year Follow-up
Justin S. Smith, MD, PhD

Comparison of Best Versus Worst Clinical Outcomes for Adult Spinal Deformity (ASD) Surgery: A Prospective, Multicenter Assessment with Minimum Two-Year Follow-up
Justin S. Smith, MD, PhD

Correlation of Cervical Sagittal Alignment Parameters on Full-Length Spine Sadiographs Compared with Dedicated Cervical Radiographs
Casey L. Smith, MD

Does Intrawound Application of Vancomycin Influence Bone Regeneration in Spinal Fusion?
Michael Ogon, MD

Operative Treatment of Adult Spinal Deformity (ASD) Improves Disease State and Physical Function Regardless of Age and Deformity Type, While Nonoperative Treatment Has No Impact: A Two-Year Prospective Analysis
Shay Bess, MD

Discrepancies in Preoperative Planning and Operative Execution in the Correction of Sagittal Spinal Deformities
Bertrand Moal, MS

Benchmarking the Outcome of Lumbar Spine Surgery Using a Spine Register Database
Björn Strömqvist, MD

THURSDAY, NOVEMBER 13
1:05–2:05 p.m.

Preliminary Report from the Ontario Interprofessional Spine Assessment and Education Clinics (ISAEC)
Raja Y. Rampersaud, MD, FRCSC

Variations in Medicare Payments for Episodes of Spine Surgery
Andrew J. Schoenfeld, MD

Cervical Total Disc Replacement and Anterior Cervical Discectomy and Fusion: A Comparison of One- and Two-Level Treatment
Hyun W. Bae, MD

Improving Surgical Spine Outcomes Through a Targeted Postoperative Rehabilitation Approach
Kristin Archer, PhD

Efficacy and Safety of Riluzole in Acute Spinal Cord Injury (SCI): Rationale and Design of AOSpine Phase III Multicenter Double-Blinded Randomized Controlled Trial
Michael G. Fehlings, MD, PhD, FRCSC

Potentially Modifiable Risk Factors for Neck Pain in the US Adult Population
Scott Haldeman, MD, PhD, DC

Risk of Osteoporotic Fracture After Steroid Injections in Medicare Patients
Leah Y. Carreon, MD, MSc

FRIDAY, NOVEMBER 14
7:30–8:30 a.m.

Functional Outcomes After Lumbar Spine Fusion Between Patients With Spondylolisthesis and Those With Degenerative Disc Disease: A Propensity Matched Prospective, Multi-Institutional Longitudinal Study of 1,741 Patients
Terence Verla, MPH

Surgical Interspinous Implant Versus Conventional Decompression for Lumbar Spinal Stenosis: A Randomized Controlled Trial Long-Term Results
Wouter A. Moojen, MD, MSc

Effect of Superior Adjacent Segment Degeneration After Lumbar Posterolateral Fusion Using Two Different Pedicle Screw Insertion Positions With Nine-Year Minimum Follow-up
Dingjun Hao, MD

Increased Incidence of Pseudarthrosis After Unilateral Instrumented Transforaminal Lumbar Interbody Fusion in Patients With Lumbar Spondylosis
Branko Skovrlj, MD

Lumbar Discectomy in the Ambulatory Care Setting: Defining Its Value Across the Acute and Post-Acute Care Episode
Scott L. Parker, MD

Interspinous Process Devices Versus Standard Conventional Surgical Decompression for Lumbar Spinal Stenosis: Cost Utility Analysis
Wouter A. Moojen, MD, MSc

Sensitivity of MRI in the Diagnosis of L4-5 Degenerative Spondylolisthesis
Benjamin Kuhns

An open, casual forum to discuss today's most relevant topics and exchange ideas about current trends and issues in spine care.

WEDNESDAY, NOVEMBER 12

Best Practices Update: Diagnosis and Treatment of Degenerative Lumbar Spondylolisthesis
1:00-2:00 p.m.

Join moderator, Paul Matz, MD, co-chair of the Evidence-based Guideline Development Committee, along with members of the work group who developed Diagnosis and Treatment of Degenerative Lumbar Spondylolisthesis, in a discussion of the key recommendations made within the guideline.

Best Practices Update: Diagnosis and Treatment of Adult Isthmic Spondylolisthesis
2:05-3:05 p.m.

Join moderator, Scott Kreiner, MD, co-chair of the Evidence-based Guideline Development Committee, along with members of the work group who developed Diagnosis and Treatment of Adult Isthmic Spondylolisthesis, in a discussion of the key recommendations made within the guideline.

THURSDAY, NOVEMBER 13

Wonder Medicine for the Spine: Hope or Hype? (Bone)
11:00 a.m.-12:00 p.m.

This discussion will focus on emerging biologic therapeutics for spinal disorders and whether or not they are likely to replace or change the current treatment regimens. There will be review of the evidence for the current "gold standard" therapies and presentation of the scientific rationale for biologic strategies.

Advancements in the Management of Postoperative Pain With or Without Opioids
11:00 a.m.-12:00 p.m.

Presenters will discuss various approaches used in managing postoperative pain following spine surgery without opioids, including peri-dural corticosteroids, elastometric pumps with local anesthetics, intravenous non-opioid analgesics, IV or oral non-steroidal anti-inflammatory drugs or adjunctive analgesics, and local infiltration with long-acting local anesthetics.

Wonder Medicine for the Spine: Hope or Hype? (Disc)
2:10-3:10 p.m.

This discussion will address emerging biologic therapeutics for spinal disorders and whether or not they are likely to replace or change the current treatment regimens. There will be review of the evidence for the current "gold standard" therapies and presentation of the scientific rationale for biologic strategies.

FRIDAY, NOVEMBER 14

BMP Use in Spine Surgery: The Post-YODA Era
11:00 a.m.-12:00 p.m.

Surgeons have become more aware of the potential complications and benefits from use of bone morphogenetic protein. The Yale Open Data Access (YODA) Project studied the available industry-sponsored data to answer some questions about the use of BMP in clinical trials. More published data now is available to assist in understanding the implications from BMP-2 use. This session will address this recent data and discuss the role of BMP-2 in the post-YODA studies era.

Reducing the Risk of Surgical Site Infection
3:40-4:40 p.m.

Surgical site infections (SSI) occur in 1-10 percent of patients after spine surgery. This focused discussion will review the best available medical evidence of modifiable factors that can reduce the risk of developing a SSI in a patient undergoing surgery.

SATURDAY, NOVEMBER 15

Management of Complex Problems in Lumbar Spinal Stenosis
11:00 a.m.-12:00 p.m.

This discussion will focus on the evaluation and management of patients with particularly complex and challenging cases of spinal stenosis, including patients with recurrent or residual stenosis, stenosis and degenerative scoliosis, stenosis encompassing the thoracolumbar junction, and stenosis in the very elderly and medically-compromised.

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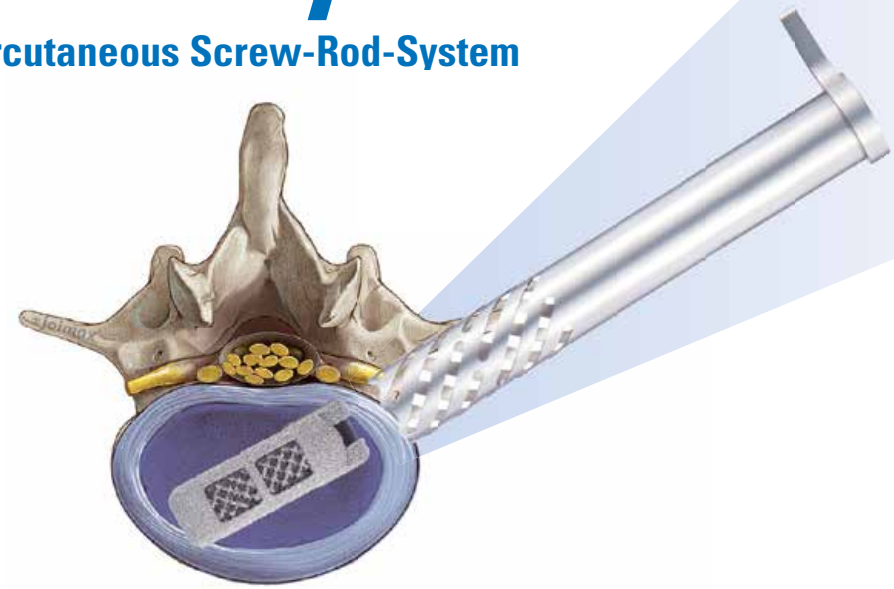

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Following are specialty educational sessions for physician assistants, nurse practitioners, nurses, chiropractors and other spine specialists.

TUESDAY, NOVEMBER 11

The Aging Spine: Do the Guidelines Apply?
1:00–5:00 p.m.
Moderators: Evan K. Johnson, PT, DPT, OCS and Sherri Weiser-Horwitz, PhD

Low back pain and neurological symptoms from spinal disorders are among the most common musculoskeletal conditions for patients over age 65. This session will review the etiology, clinical presentation and management of spinal disorders including lumbar spondylosis, spinal stenosis, osteoporosis, and acquired scoliosis and spinal deformity. Faculty also will present indications for commonly utilized clinical examination techniques, conservative care and operative treatments in elderly patients with these disorders.

WEDNESDAY, NOVEMBER 12

Directional Preference: An Interdisciplinary Guide to Decision Making
10:00 a.m.–12:00 p.m.
Moderator: Ryan Tauzell, MA, PT, Cert. MDT

There is no more important topic in spine care than decision making, specifically deciding the best treatment for each individual patient. Determining if a patient's spinal disorder has a directional preference (DP) is of immense value in surgical decision making, selecting predictably effective nonoperative treatment, and to optimize post-surgical outcomes. This session will offer clinical perspectives from a spectrum of spine clinicians on the value and use of DP in any spine practice.

Radiculopathy: A Key in Spinal Management, Outcome and Expense
1:00–3:10 p.m.
Moderator: Gregory L. Whitcomb, DC

Spinal root compromise has a major impact on clinical decision making and patient outcome in spine practice. Given the clear ramifications for timely, cost-effective and high-quality patient care, this session is intended to augment the attendee's ability to differentiate radicular and pseudoradicular syndromes and to enhance an understanding of best-evidence treatment options.

THURSDAY, NOVEMBER 13

Axial Pain in Late Adolescence and Early Adulthood: An Emerging Demographic
1:00–3:40 p.m.
Moderators: Gregory L. Whitcomb, DC and Evan K. Johnson, PT, DPT, OCS

Axial pain ranks as one of the most costly health conditions with an extensive impact of quality-of-life and productivity. The relatively small percentage of patients with chronic pain are more resistant to treatment and account for disproportionately higher expenses. This session will allow participants to gain insight into epidemiology, diagnostic evaluation, common presentations, serious spine disease and evidence-sensitive approaches to the physical and psychosocial management of non-specific axial pain in late adolescence and early adulthood.

FRIDAY, NOVEMBER 14

Interprofessional Referrals and Care Collaboration in Spine Care: Who, What, When, Where and Why?
11:00 a.m.–12:00 p.m.
Moderator: Scott Haldeman, MD, PhD, DC

While research has provided some foundation for best practices, gaps in communication between medical and allied health providers have the potential to affect optimal patient selection, timely inter-professional referral and collaborative case management. This forum will enhance the participant's clinical decision-making skill through a facilitated dialogue between medical, allied health and health systems administrative professionals with extensive spine care experience.

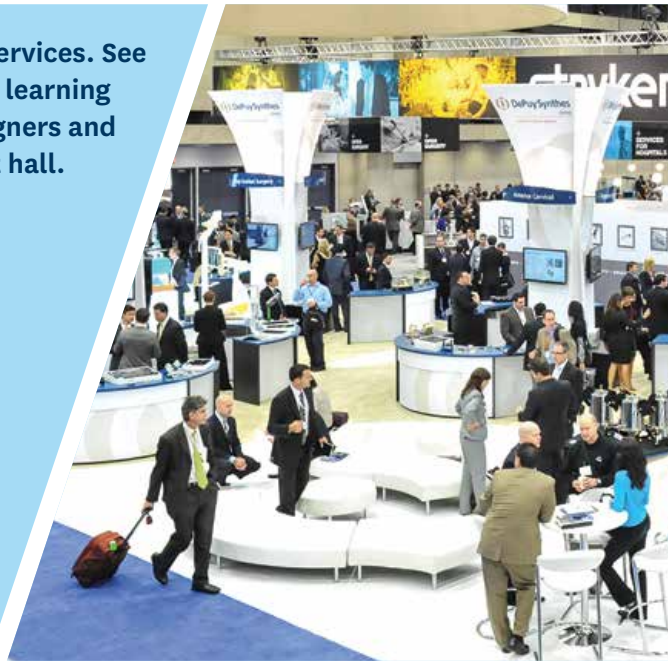
Case Conference: Differential Diagnosis
3:40–4:40 p.m.
Moderator: Rick J. Placide, MD, PT

This session is designed to be highly interactive, utilizing case discussions. The purpose will be to review differential diagnoses based on a patient's presenting signs and symptoms. The emphasis will be on appropriate interpretation of the history and physical exam to help narrow the differential and ultimately lead to the correct diagnosis.

"Collaborative sessions with physiatrists, physical therapists and chiropractors provided another perspective on the nonoperative treatment of spine problems."
2013 Annual Meeting attendee

Experience the industry's largest display of spine care products and services. See and touch countless spine care products. 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.

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



NEW FOR 2014

More Exhibit Hours
Now opening at 9:00 a.m. on Wednesday.

More Detailed Product Categories and New Product Highlights
Don't wander the floor aimlessly hoping to find a product you can use; use the mobile app to search with our more detailed product categories. Looking for just the newest products? The app will highlight each company's newest product. **www.spine.org/mobile**

SOLUTION SHOWCASE

Wednesday–Friday, 12:00–12:25 p.m.; 12:30–1:00 p.m.

Lunch 'n Learn in the Solution Showcase. Enjoy your lunch listening to presentations about the latest products from industry with a Solution Showcase. The presentation schedule will be posted at www.nassannualmeeting.org.

EDUCATION RESOURCE CENTER

Continue your education in the Technical Exhibition! View the ePosters with a colleague or visit our Exercise Demonstration area. Sit down in the theater and hear from NASS experts on topics of interest to you and your practice. Bring your coffee or your lunch and relax while learning or checking your email. Located on the right hand side of the Technical Exhibition.

SURGICAL SHOWCASE

See a cadaveric demonstration on the show floor in the surgical showcase. Once the meeting is over for the day companies will host surgical workshops. Check www.nassannualmeeting.org for schedules.

NEW!

NASS CAREER FAIR

November 12
11:00 a.m.–5:00 p.m.
November 13
9:00 a.m.–5:00 p.m.
Front of Technical Exhibition

Stop by to speak with employers face-to-face about opportunities in their organizations at the first-ever NASS Career Fair.

This is a free service to NASS members and meeting attendees. To participate, sign up online or simply show up at the Career Fair. At the event, you will fill out a brief profile and upload your CV, and participating companies will be able to reach out to you to set up interviews. If you won't be attending the meeting in San Francisco, you can still participate by signing up online to make your information available to participating employers.

If your company or organization is recruiting and would like details on how to participate, please direct any questions to Jim Cook at 513-451-7597 or j.cook@jobtarget.com.

CONCURRENT SESSIONS

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

FOCUSED DISCUSSIONS

Join your peers in an open forum that encourages a mutual exchange of ideas and discussion. Topics will address current trends and issues, and hot topics from the meeting. More details on page 12.

GLOBAL SPINE FORUM

The 5th Annual Global Spine Forum will feature programming from international organizations. These sessions will highlight the state of spine care around the world.

ePOSTER STATIONS

ePosters can be viewed in the Education Resource Center in the Technical Exhibition.

COLLABORATIVE CONCEPTS IN SPINE CARE SESSIONS

Specialty educational tracks for physician assistants, nurse practitioners, nurses, chiropractors and rehabilitation professionals. Open to all attendees. More details on page 14.

PRACTICAL THEATER

NASS volunteers will address topics of interest to you and your practice at scheduled times. Stop by and pick up information about the NASS registry efforts, new clinical guidelines and clinical care information, patient safety, and more.

MONDAY, NOVEMBER 10

6:30 a.m.–5:00 p.m.	**Attendee Registration**
7:30 a.m.–4:00 p.m.	**Course** 🎟 Coding Update 2014: Essentials and Controversies of Spine Care Coding
8:00 a.m.–5:00 p.m.	**Exhibitor Registration**

TUESDAY, NOVEMBER 11

6:30 a.m.–5:00 p.m.	**Attendee Registration**
7:00 a.m.–4:00 p.m.	**Instructional Course** 🎟 Fundamentals of Evidence-based Medicine
7:30 a.m.–4:00 p.m.	**Course** 🎟 Coding Update 2014: Essentials and Controversies of Spine Care Coding
7:30 a.m.–4:30 p.m.	**Hands-on Course** 🎟 Minimally Invasive Spine Surgery
8:00 a.m.–12:00 p.m.	**Technique Workshop** 🎟 Fundamentals of Spine Deformity **Instructional Courses** 🎟 • Leadership Development and Training • Taking the "Non" out of Non-specific Back Pain
8:00 a.m.–5:00 p.m.	**Exhibitor Registration**
1:00–5:00 p.m.	**Technique Workshop** 🎟 Diagnosis and Treatments in Cervical Spine Surgery **Instructional Courses** 🎟 • Fundamentals of Image-guided Spinal Surgery • Imaging of the Spine: Spectrum of Disease and Live/Interactive Case Reviews
1:00–5:00 p.m.	**Collaborative Concepts in Spine Care** The Aging Spine: Do the Guidelines Apply?
6:00–7:30 p.m.	**Welcome Reception**

🎟 *Requires separate registration fee*

THE NASS 2014 APP: 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.

» **Review** the Exhibitor List, search for exhibitors, mark exhibitors with visited tags, request meetings and add personal notes. Map booth locations on the interactive floor plan and download a personalized walking map.

» **Tap into** local San Francisco attractions, restaurants and more.

» **Read, follow and comment** using Twitter.

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

WEDNESDAY, NOVEMBER 12

6:30–8:00 a.m.	**Continental Breakfast**
6:30 a.m.–5:30 p.m.	**Attendee Registration**
7:00 a.m.–5:00 p.m.	**Exhibitor Registration**
7:20–7:30 a.m.	**Welcome Remarks**
7:30–8:30 a.m.	**Best Papers**
8:30–8:35 a.m.	**NASS Working for You** Clinical/Patient Safety
8:35–10:00 a.m.	**Symposium** Lateral Approach to the Lumbar Spine
9:00 a.m.–5:00 p.m.	**Technical Exhibition Open**
	ePosters Open for Viewing
10:00–10:30 a.m.	**Networking Break—Beverage Service**
	Practical Theater
10:00 a.m.–12:00 p.m.	**Collaborative Concepts in Spine Care** Directional Preference: An Interdisciplinary Guide to Decision Making
10:30–10:35 a.m.	**NASS Working for You** Update on Sections
10:35 a.m.–12:00 p.m.	**Symposium** Implementing Accountable Care in Spine Surgery to Promote Sustainable Health Care
11:00 a.m.–5:00 p.m.	**NASS Career Fair**
12:00–1:00 p.m.	**Complimentary Box Lunch** (Medical Attendees Only)
	Solution Showcase
1:00–2:00 p.m.	**Concurrent Sessions** • Diagnostic Imaging in Spine Care • Spine Trauma • Surgical Management of Cervical Myelopathy • Biomechanics in Spine Care • Outcomes in Deformity Surgery
	Focused Discussion Best Practices Update: Diagnosis and Treatment of Degenerative Lumbar Spondylolisthesis
1:00–3:10 p.m.	**Collaborative Concepts in Spine Care** Radiculopathy: A Key in Spinal Management, Outcome and Expense
2:05–3:05 p.m.	**Concurrent Sessions** • Socioeconomics • Cervical Disc Arthroplasty • Injections • Surgical Outcomes • Proximal Findings Following Deformity Surgery
	Focused Discussion Best Practices Update: Diagnosis and Treatment of Adult Isthmic Spondylolisthesis
3:05–3:35 p.m.	**Networking Break—Beverage Service**
3:35–3:40 p.m.	**NASS Working for You** SpineWeek
3:40–5:10 p.m.	**Symposium** Controversies in Spine Imaging

SESSION RECORDINGS ON DEMAND

Approximately 12 *AMA PRA Category 1 Credits*™ are available for recorded symposia.

Visit www.nassannualmeeting.org to order annual meeting conference session recordings and get 24/7 access to scientific presentations. This recording includes abstract presentations, symposia and electronic posters. These web-based, fully-synchronized audio, video and slide presentations are available anywhere you can access the Internet. Don't miss your chance to view the archived online compilations of what you missed!

THURSDAY, NOVEMBER 13

6:30–8:00 a.m.	**Continental Breakfast**
6:30 a.m.–5:30 p.m.	**Attendee Registration**
7:00 a.m.–5:00 p.m.	**Exhibitor Registration**
7:25–7:30 a.m.	**Announcements**
7:30–7:35 a.m.	**NASS Working for You** Advocacy Update
7:35–9:10 a.m.	**Symposium** Computer-assisted Surgery: Which Tools and Techniques Are Ready for Adoption in Your Operating Room?
9:00 a.m.–5:00 p.m.	**Technical Exhibition Open**
	ePosters Open for Viewing
	NASS Career Fair
9:10–9:40 a.m.	**Networking Break—Beverage Service**
	Practical Theater
9:40–10:10 a.m.	**Introduction and Presidential Address** Heidi Prather, DO and William C. Watters III, MD
10:10–11:00 a.m.	**Introduction and Presidential Guest Speaker** William C. Watters III, MD and J. Craig Venter, PhD
11:00 a.m.–12:00 p.m.	***The Spine Journal* Outstanding Paper Awards and Editors' Choice Award Presentation**
	Focused Discussions • Wonder Medicine for the Spine: Hope or Hype? (Bone) • Advancements in the Management of Postoperative Pain With or Without Opioids
12:00–1:00 p.m.	**Complimentary Box Lunch** (Medical Attendees Only)
	Solution Showcase
1:00–1:05 p.m.	**Spine Safety Updates**
1:00–3:40 p.m.	**Collaborative Concepts in Spine Care** Axial Pain in Late Adolescence and Early Adulthood: An Emerging Demographic
1:05–2:05 p.m.	**Best Papers**
2:10–3:10 p.m.	**Concurrent Sessions** • Physical Activity and Rehabilitation • Epidemiology of Spinal Conditions and Care • Surgical Management of the Cervical Spine • Comparative Effectiveness in Spine Surgery • Outcomes in Deformity Surgery
	Focused Discussion Wonder Medicine for the Spine: Hope or Hype? (Disc)
3:10–3:40 p.m.	**Networking Break—Beverage Service**
	Members' Business Meeting
	Practical Theater
3:40–3:45 p.m.	**NASS Working for You** Advocacy/Health Policy
3:45–5:15 p.m.	**Symposium** Vertebral Bone Augmentation: Understanding the Entire Spectrum
5:00–6:00 p.m.	**Resident, Fellow and Program Directors Reception**
5:30–7:00 p.m.	**Allied Health Reception**

FRIDAY, NOVEMBER 14

6:30–8:00 a.m.	**Continental Breakfast**
7:00 a.m.–5:00 p.m.	**Attendee Registration**
7:25–7:30 a.m.	**Announcements**
7:30–8:30 a.m.	**Best Papers**
8:00 a.m.–1:00 p.m.	**Exhibitor Registration**
8:30–8:35 a.m.	**NASS Working for You** Coding Update
8:35–10:00 a.m.	**Symposium** Beyond the Imaging Findings: Predictors of Treatment and Outcomes for the Spine Patient
9:00 a.m.–1:30 p.m.	**Technical Exhibition Open**
	ePosters Open for Viewing
10:00–10:30 a.m.	**Networking Break—Beverage Service**
	Practical Theater
10:30–11:00 a.m.	**Global Spine Forum**
10:30–10:55 a.m.	**Research Grant and Fellowship Awards Presentation**
10:55–11:00 a.m.	**NASS Recognition Awards**
11:00 a.m.–12:00 p.m.	**Concurrent Sessions** • Minimally Invasive Procedures • Predictors of Surgical Outcomes • Complications Following Spine Surgery • Sagittal Alignment for Deformity Corrections
	Focused Discussion BMP Use in Spine Surgery: The Post-YODA Era
	Collaborative Concepts in Spine Care Interprofessional Referrals and Care Collaboration in Spine Care: Who, What, When, Where and Why?
	Global Spine Forum
12:00–1:00 p.m.	**Complimentary Box Lunch** (Medical Attendees Only)
	Solution Showcase
1:00–1:05 p.m.	**NASS Working for You** Coverage Task Force/Professional, Economic and Regulatory Committee Update
1:05–5:00 p.m.	**Global Spine Forum**
1:05–2:30 p.m.	**Symposium** Own the Bone: The Spine Practitioner Taking Ownership of the Bone
2:30–3:00 p.m.	**Networking Break—Beverage Service**
3:00–3:05 p.m.	**Spine Safety Updates**
3:05–3:35 p.m.	**Value Abstract Awards Presentations**
3:40–4:40 p.m.	**Concurrent Sessions** • Complications of Lumbar Surgery • Basic Science • Prognostic Indicators of Outcomes • Deformity
	Focused Discussion Reducing the Risk of Surgical Site Infection
	Collaborative Concepts in Spine Care Case Conference: Differential Diagnosis
4:45–5:45 p.m.	**International Reception** (Open to all attendees)

SATURDAY, NOVEMBER 15

7:30–9:00 a.m.	**Continental Breakfast**
7:30 a.m.–12:00 p.m.	**Attendee Registration**
7:55–8:00 a.m.	**Announcements**
8:00–9:30 a.m.	**Symposium** Minimally Invasive Surgical Management of Degenerative Lumbar Scoliosis: The Good, the Bad and the Ugly
9:30–10:00 a.m.	**Networking Break—Beverage Service**
10:00–11:00 a.m.	**Concurrent Sessions** • Deformity • Surgical Complications • Outcomes in Spine Care
11:00 a.m.–12:00 p.m.	**Focused Discussion** Management of Complex Problems in Lumbar Spinal Stenosis
12:00 p.m.	**Meeting Adjourns**

MAXIMIZE YOUR EDUCATIONAL EXPERIENCE AND GAIN ADDITIONAL CME CREDITS

Attend courses and workshops prior to the official start of the Annual Meeting.

There is a two-day coding course, a full-day minimally invasive spine surgery hands-on course, a full-day EBM course, two half-day technique workshops using sawbones, and additional half-day courses addressing leadership, back pain and imaging.

Coding Update 2014: Essentials and Controversies of Spine Care Coding
Monday and Tuesday, November 10–11 / 7:30 a.m.–4:00 p.m.

Fundamentals of Evidence-based Medicine
Tuesday, November 11 / 7:00 a.m.–4:00 p.m.

Minimally Invasive Spine Surgery (Hands-on)
Tuesday, November 11 / 7:30 a.m.–4:30 p.m.

Fundamentals of Spine Deformity (Workshop)
Tuesday, November 11 / 8:00 a.m.–12:00 p.m.

Leadership Development and Training
Tuesday, November 11 / 8:00 a.m.–12:00 p.m.

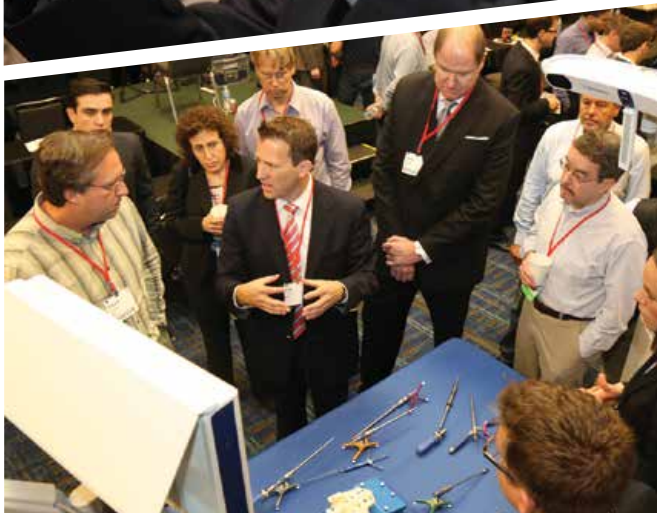
Section on Rehabilitation, Interventional and Medical Spine: Taking the 'Non' out of Non-specific Back Pain
Tuesday, November 11 / 8:00 a.m.–12:00 p.m.

Diagnosis and Treatments in Cervical Spine Surgery (orkshop)
Tuesday, November 11 / 1:00–5:00 p.m.

Fundamentals of Image-guided Spinal Surgery
Tuesday, November 11 / 1:00–5:00 p.m.

Section on Radiology: Imaging of the Spine: Spectrum of Disease and Live/Interactive Case Reviews
Tuesday, November 11 / 1:00–5:00 p.m.

Refer to page 8 for details. There is an additional fee for these courses.



NASS 2014 CAREER FAIR

Moscone Center South

Wednesday, Nov. 12
11 a.m.–5 p.m.

Thursday, Nov. 13
9 a.m.–5 p.m.

JOB SEEKERS

Sign up now for the First NASS Career Fair being held in conjunction with its 29th Annual Meeting. The NASS Career Fair connects you directly with employers that have open career opportunities in the field of spine care.

As an attendee you will have the opportunity to engage with employers that want to hire talent, learn about the specific opportunities available, and gather additional information about each hiring organization.

To register please go to: **http://careers.spine.org**

EMPLOYERS

Don't miss out on your opportunity to connect with over 4,000 multidisciplinary professionals involved in spine care from throughout the United States.

If your company is interested in participating or would like additional information please contact **Jim Cook** at **513-451-7597** or by email at **j.cook@jobtarget.com**

San Francisco is often called “Everybody’s Favorite City,” a title earned by its scenic beauty, cultural attractions, diverse communities and world-class cuisine. Measuring 49 square miles, this very walkable city is dotted with landmarks like the Golden Gate Bridge, cable cars, Alcatraz and Chinatown.

San Francisco

GOLDEN GATE BRIDGE

Other suspension bridges impress with engineering, but none can touch the Golden Gate Bridge for showmanship. On sunny days it transfixes crowds with a radiant glow. When afternoon fog rolls in, the bridge puts on a magic show that’s positively riveting: now you see it, now you don’t.

GOLDEN GATE PARK

In Golden Gate Park you’ll experience San Franciscans roller-discoing, drum-circling, petting starfish, sniffing orchids and racing bison toward the Pacific. These 1,017 acres of lush terrain were once just scrubby sand dunes. While in Golden Gate Park visit the de Young Fine Arts Museum featuring a Keith Haring: The Political Line exhibition. And in Lincoln Park is the Legion of Honor museum.

SFMOMA & DIVERSE ART SCENE

The San Francisco Museum of Modern Art (SFMOMA) is under construction but you can experience its art throughout the Bay area. There’s also the Cartoon Art Museum which displays political cartoons too hot to print, the Contemporary Jewish Museum allows 600 artists to take liberties with Mein Kampf, Electric Works shows North Korean propaganda posters and the world-renowned collection of art treasures spanning 6,000 years of history at the Asian Art Museum.

HILLTOP VISTAS

With wind-sculpted trees, Victorian turrets and the world at your feet atop Corona Heights, Buena Vista Park and 41 other peaks, hilltop parks like Sterling Park and Ina Coolbrith Park are San Francisco's crowning glories. Wild parrots may mock your progress up Telegraph Hill to Coit Tower.

EXPLORATORIUM

The Exploratorium is all about experiencing the excitement of experimentation, the pleasure of discovery, and the power of understanding. Located at Pier 15 on the Embarcadero at Green St., there are 150 new exhibits for a total of 600, indoors and out, including the Bay Observatory.

CABLE CARS

Lurching uphill, you may exhale when the bell finally signals the summit. But don't look now: what goes up all 338 feet of San Francisco's Nob Hill must come down. And the brakes are still hand-operated. The Victorian steampunk invention of these cable cars has hardly changed since 1873.

ALCATRAZ

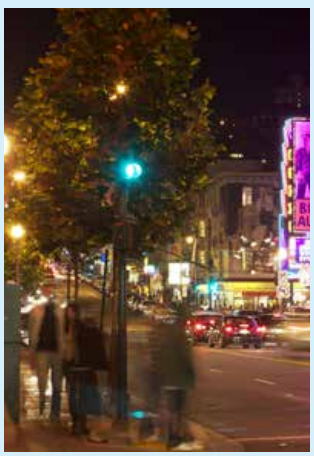
From its 19th century founding to hold Civil War deserters and Native American dissidents to its closure in 1963, Alcatraz was America's most notorious prison. Listening to the sounds of city life from across the Bay, the 1.25-mile swim through riptides may seem worth a shot. For maximum chill factor, book the popular night tour to check out the gloomy jailhouse.

MARINE LIFE AT FISHERMAN'S WHARF

Sea lions, sharks and jellyfish lurk along Fisherman's Wharf. Sharks circle nearby at Aquarium of the Bay, where the only barrier between visitors and Bay waters is a glass tube. A less ominous underwater world can be glimpsed at the Aquatic Park Bathhouse, where jellyfish flutter across 1930s mosaics created by celebrated African-American artist Sargent Johnson.

NEIGHBORHOOD BOUTIQUES

Terrariums, desert-island message bottles, necklaces made of shattered windshields can be found in San Francisco's indie boutiques. You'll find Victorian storefronts selling Icelandic gamelan music, organic-cotton Mayan clothing, as well as jewelry and art objects from local designers.



BARBARY COAST NIGHTS

Relax over historically correct cocktails at North Beach's revived Barbary Coast saloons. Today's scene would look familiar to long-gone sailors, with well-scuffed wooden floors, absinthe spoons and dim lighting.

CHINATOWN

The largest Chinatown outside of Asia as well as the oldest Chinatown in North America. Stroll down the streets and alleys to absorb the sights and smells of the Chinese culture and culinary delights in this dynamic area.

onPeak is the official housing provider for the 2014 Annual Meeting. When booking through onPeak, you will have housing support staff to assist you prior to your arrival as well as on-site in San Francisco should you have any housing issue.

Other companies may attempt to present themselves as affiliates of NASS; onPeak is the one and only housing provider for the Annual Meeting.

HOW TO RESERVE YOUR ACCOMMODATIONS

Meeting registration MUST be completed in order to secure housing for the Annual Meeting. Participants will not be permitted hotel reservations until their meeting registration is complete. NASS monitors the housing reservations list to make sure that all individuals with reservations also are officially registered for the Annual Meeting. NASS reserves the right to cancel reservations that do not meet these criteria. Attendees are required to make hotel reservations through onPeak, the NASS Housing Bureau, using any of the following options:

- **Online:** www.nassannualmeeting.org (in conjunction with meeting registration)
- **Phone:** 800-545-1773 (US/Canada) or 312-527-7300 (International), 9:00 a.m.–6:00 p.m. ET
- **Fax:** 888-726-9290 (US/Canada) or 404-393-3172 (International)

Hotels will not and cannot accept reservations directly. The only hotel rooms that can be reserved are the hotels that are in the NASS Housing Block list. The cutoff date for reservations is October 22, 2014; discounted rates may not apply after this date. Reservations are made on a first-come, first-served basis and are subject to room availability. If the room blocks sell out prior to the cutoff date, NASS will secure other hotels for attendees. This is not a guarantee as it is based on rates and availability within the city of San Francisco over our meeting dates.

WHY STAY IN NASS-CONTRACTED HOUSING?

- **Staff:** Dedicated staff will assist with hotel selection and city information.
- **Preferred rate guarantee:** NASS meets the prices of online hotel room providers. Go to www.nassannualmeeting.org for details.
- **Convenient deposit policy:** Secure your individual hotel reservation or block rooms with a credit card guarantee with no automatic prepayments.
- **Shuttles:** Access shuttle bus transportation from most official NASS hotels.
- **Overbooking protection:** Booking through the NASS official room block provides added protection from relocation to another property.

HOTEL CANCELLATION/CHANGE POLICY

Changes may be made to existing reservations online with the confirmation number and password listed on your confirmation; by email to nassannualmeeting@onpeak.co or by calling 800-545-1773 Monday through Friday, 9:00 a.m.–6:00 p.m. (ET). You must have the onPeak ID of the reservation you wish to change in order to make any changes. Changes can be submitted up to Saturday, November 1, 2014 based on availability. After November 1, changes need to be communicated directly with the hotel. Cancellations to existing reservations must be made according to the individual hotel's cancellation policy, which is noted on your confirmation. Failure to cancel your reservation according to the hotel cancellation policy will result in a charge to your credit card.

3 WAYS TO BOOK YOUR HOTEL:

ONLINE
nassannualmeeting.org

PHONE
800-545-1773 (US/Can.)
312-527-7300 (Int'l.)

FAX
888-726-9290 (US/Can.)
404-393-3172 (Int'l.)

1. **Courtyard by Marriott San Francisco Downtown**
   299 Second St. (.4 mi) $283
2. **Grand Hyatt San Francisco**
   345 Stockton St. (.8 mi) $277
3. **Hotel Abri**
   127 Ellis St. (.6 mi) $219
4. **Hotel Monaco**
   501 Geary St. (.8 mi) $289
5. **Hotel Palomar**
   12 Fourth St. (.4 mi) $290
6. **InterContinental San Francisco**
   888 Howard St. (.2 mi) $319
7. **Marriott Union Square**
   480 Sutter St. (.7 mi) $305
8. **Palace Hotel**
   Two New Montgomery St. (.4 mi) $295
9. **Parc 55 Wyndham San Francisco—Union Square**
   55 Cyril Magnin St. (.7 mi) $249
10. **Prescott Hotel**
    545 Post St. (.8 mi) $249
11. **San Francisco Marriott Marquis** HQ HOTEL
    780 Mission St. (.2 mi) $327
12. **Serrano Hotel San Francisco**
    405 Taylor St. (.8 mi) $229
13. **Sir Francis Drake Hotel**
    450 Powell St. (.7 mi) $259
14. **The St. Regis Hotel San Francisco**
    125 Third St. (.2 mi) $409
15. **W San Francisco**
    181 Third St. (.1 mi) $300
16. **The Westin San Francisco Market Street**
    50 Third St. (.3 mi) $281
17. **The Westin St. Francis On Union Square**
    335 Powell St. (.6 mi) $265

Shuttle service provided

ANNUAL MEETING REGISTRATION FEES

REGISTRATION CATEGORY	By 7/14	7/15-9/29	9/30-11/15
Member Physician	$695	$895	$995
Member Affiliate Health	$395	$595	$695
Member Emeritus	$295	$495	$595
Member Resident/Fellow	$155	$255	$355
Nonmember Physician	$995	$1195	$1295
Nonmember Affiliate Health*	$545	$745	$845
Nonmember Resident/Fellow**	$225	$325	$425
Commercial Business***	$995	$1195	$1295
Guest**** (Limit one)	$275	$375	$375

*__Nonmember Affiliate Health:__ Limited to individuals directly employed by a hospital, healthcare network, university, or freestanding facility administering to patients (e.g. DC, PA, NP, RN, PT)

**__Nonmember Resident/Fellow:__ Must provide a letter on letterhead from your program director.

***__Commercial Business:__ Interest in spine field but does not treat patients. Not permitted to purchase guest registrations

****__Guest:__ Includes breakfast (Wed.-Sat.) and lunch (Wed.-Fri.)

ON-DEMAND SESSION RECORDINGS Member: $50 Nonmember $75

REGISTRATION FEE DETAILS

Fees are designated in U.S. currency. NASS accepts Visa, MasterCard and American Express.

Conference registration fees include:

- All education sessions beginning on Wednesday, November 12 through Saturday, November 15;
- Continental breakfasts and beverage breaks (Wednesday through Saturday);
- Box lunches (Wednesday through Friday);
- Welcome reception (Tuesday evening).

Additional fees apply for Instructional/ Hands-On Courses and Technique Workshops. All courses and workshops will be held at Moscone Center South.

For full registration instructions, policies and to register, please visit **www.nassannualmeeting.org.**

QUESTIONS?

Please call NASS at 866-960-6277 or 630-230-3600.

NASS MEMBERSHIP DISCOUNTS AND REWARDS

Save at least $300 on your registration fees!

All attendees registering for the Annual Meeting are encouraged to become members and join the over 8,000 spine care providers worldwide who rely on NASS to provide the resources needed to advance their careers. With a diverse membership of surgeons, physiatrists, pain specialists, researchers, allied health professionals and others, NASS fosters an atmosphere of multidisciplinary collaboration unmatched by other professional societies.

If you are not already a 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 Spine Care Provider Search and much more.

Detailed information about benefits, qualifications for membership and an online application can be found at www.spine.org. You can also join by completing the membership section of the Annual Meeting registration form or the application on page 28 and sending a copy of your current curriculum vitae (CV) to membership@spine.org. Questions regarding membership can be directed to the membership department by sending an email to membership@spine.org or calling 866-960-NASS (6277) or 630-230-3600.

Already a member? Earn $25 in NASS Store credit and be entered into a drawing for a free 2015 membership for every colleague that you refer through the 2014 Member-Get-A-Member program; full details about this program can be found at www.spine.org.

CODING UPDATE 2014

REGISTRATION CATEGORY	FEE
Member Physician	$700
Member Affiliate Health	$550
Member Resident/Fellow	$350
Nonmember Physician	$800
Nonmember Affiliate Health	$600
Nonmember Resident/Fellow	$400

Monday, November 10 (7:30 a.m.–4:00 p.m.)
Tuesday, November 11 (7:30 a.m.–4:00 p.m.)

INSTRUCTIONAL COURSES

REGISTRATION CATEGORY	FEE
Member By 7/14	$150
Member 7/15–11/11	$250
Nonmember By 7/14	$250
Nonmember 7/15–11/11	$350

All courses on Tuesday, November 11:

Fundamentals of Evidence-based Medicine (7:00 a.m.–4:00 p.m.)

Leadership Development and Training (8:00 a.m.–12:00 p.m.)
Taking the "Non" out of Non-specific Back Pain (8:00 a.m.–12:00 p.m.)

Fundamentals of Image-guided Spinal Surgery (1:00–5:00 p.m.)
Imaging of the Spine (1:00–5:00 p.m.)

TECHNIQUE WORKSHOPS PHYSICIANS ONLY!

REGISTRATION CATEGORY	FEE
Member By 7/14	$475
Member 7/15–11/11	$675
Nonmember By 7/14	$675
Nonmember 7/15–11/11	$875

Technique Workshops on Tuesday, November 11:

Fundamentals of Spine Deformity (8:00 a.m.–12:00 p.m.)

Diagnosis and Treatments in Cervical Spine Surgery (1:00–5:00 p.m.)

HANDS-ON COURSE PHYSICIANS ONLY!

REGISTRATION CATEGORY	FEE
Member By 7/14	$895
Member 7/15–11/11	$995
Nonmember By 7/14	$995
Nonmember 7/15–11/11	$1095

Hands-on Course on Tuesday, November 11:

Minimally Invasive Spine Surgery (7:30 a.m.–4:30 p.m.)

NASS NORTH AMERICAN SPINE SOCIETY

APPLICATION FOR MEMBERSHIP

Full Name (including degrees): _____

Date of Birth (mm/dd/yy): _____ Gender: ❑ Male ❑ Female

Preferred Mailing Address: ❑ Professional ❑ Home

Professional Address (as it should be listed in the membership directory)

Company Name: _____

Address: _____

City: _____ State/Province: _____ Postal Code: _____ Country: _____

Phone: _____ Fax: _____ Email: _____

Office Manager Name (to contact regarding membership information): _____

Office Manager Email: _____ Office Manager Phone: _____

Home Address

Address: _____

City: _____ State/Province: _____ Postal Code: _____ Country: _____

Mobile Phone: _____ Email: _____

Professional Information

Specialty: _____

MDs and DOs (or international equivalent): Are you board certified? ❑ Yes ❑ No

Name of Board providing your certification (required if applying for Active or Associate membership):

_____

Percentage of professional activities dedicated to spine: ❑ Less than 50% ❑ 50% or Greater

Percentage of professional activities spent in: _____ % Academic _____% Clinical _____% Research

Primary Employer: ❑ Hospital ❑ Private Practice ❑ Academic Institution ❑ Other: _____

Has your license to practice ever been revoked or otherwise suspended? ❑ No ❑ Yes (if yes, please attach explanation)

Application Requirements

Curriculum Vitae/Résumé

Please submit a copy of your most recent curriculum vitae (CV) or résumé with this application. Your membership will ***remain inactive*** until a copy of this document is received.

Please provide your primary reason for applying for membership.

- ❑ Recommendation from colleague (optional, provide colleague name: _____)
- ❑ Career development, CME, or to receive updates on spine care issues
- ❑ To take advantage of membership discounts on educational offerings
- ❑ To access journals and publications
- ❑ To network with colleagues
- ❑ To support and contribute to the field
- ❑ Other: _____

The NASS Professional Compliance Panel (PCP) exists to ensure member compliance with the NASS ethics policies as well as any other rules or regulations incumbent upon a healthcare professional. By applying, you acknowledge that you are required to comply with such policies, rules and regulations, and further agree to promptly comply with all requests to provide documentation concerning PCP investigations, when it is within your legal ability to do so.

North American Spine Society

7075 Veterans Blvd. | Burr Ridge, IL 60527 | Phone: 630-230-3600 | Fax: 630-230-3700

www.spine.org | membership@spine.org

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.

WHO SHOULD ATTEND?

Join the leading authorities in spine care, representing a multidisciplinary community that includes: orthopedic surgeons, neurosurgeons, neurologists, radiologists, physiatrists, pain management specialists, anesthesiologists, psychologists, chiropractors, physician assistants, nurse practitioners, nurses, rehabilitation professionals, researchers, administrators and all other health care professionals with an abiding interest in spine.

CME CREDIT

This activity has been planned and implemented in accordance with the Essentials and Standards of 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 25.75 *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*™.

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 Credits*™ for the Physician's Recognition Award from organizations, such as NASS, accredited by the ACCME.

Each state has different requirements for nonphysician providers; please contact your credit granting organization for their requirements.

CME/CEU CERTIFICATES

Meeting evaluations are submitted electronically and CME certificates can be printed for the sessions you have attended once you have completed the evaluation. Additional information will be available in the Final Program.

CONTINUING EDUCATION (CE) CREDIT FOR ALLIED HEALTH PROFESSIONALS

NASS is proud to offer continuing education units and credit to accommodate nonphysician attendees' certification requirements. The following indicates the status of CE accreditation for nonphysician attendees:

Nurses
Contact hours have been applied for from the National Association of Orthopaedic Nurses. Please look for information at www.nassannualmeeting.org and in the Final Program distributed on-site.

Chiropractors
Application is pending for continuing education by the Canadian Memorial Chiropractic College. Please look for information at www.nassannualmeeting.org and in the Final Program distributed on-site.

Nurse Practitioners
Application is pending for continuing education credentialing through the American Academy of Nurse Practitioners (AANP). Please look for information at www.nassannualmeeting.org and in the Final Program distributed on-site.

2013-2014 BOARD OF DIRECTORS

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

William C. Watters III, MD
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Executive Director

2014 SCIENTIFIC PROGRAM COMMITTEE

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

William C. Watters III, MD
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Michael L. Reed, DPT, OCS
2013-2014 Program Co-chair
Charles A. Reitman, MD
2014 Program Co-chair
Simon Dagenais, DC, PhD
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Gwendolyn Sowa, MD, PhD
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Education Council Director

Edward J. Dohring, MD
Continuing Medical Education Chair

DISCLAIMER

The material presented at the 29th Annual Meeting is made available by the North American Spine Society for educational purposes only. The material is not intended to represent the only, nor necessarily the best, method or procedure appropriate for the medical situations discussed; rather, it is intended to present an approach, view, statement or opinion of the faculty which 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 the Preliminary Program has been distributed. 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.

PHOTO CREDITS

Cover, top left: San Francisco Travel Association (SFTA)/Scott Chernis. **Cover, top right:** SFTA/Can Balcioglu. **Cover, bottom:** SFTA. **Page 3:** SFTA/Can Balcioglu. **Page 22, clockwise from top:** SFTA/Can Balcioglu; SFTA/Scott Chernis; SFTA/Scott Chernis; SFTA/Can Balcioglu. **Page 23, clockwise from top left:** SFTA/Scott Chernis; Exploratorium/Amy Snyder; SFTA/Scott Chernis; SFTA/Scott Chernis; SFTA/Scott Chernis; SFTA/Scott Chernis; SFTA/Jack Hollingsworth; SFTA/Scott Chernis. **Page 24:** SFTA.

NASS FINANCIAL CONFLICT OF INTEREST DISCLOSURE POLICY

NASS recognizes that professional relationships with industry are essential for development of new spine technologies and medical advancement. According to the NASS Ethics Committee, which authored the disclosure policy, "the goal is to create an environment of scientific validity, in which learners can accurately judge whether the information they receive is objective and unbiased, and to be sure that our members are current and forthright in their dealings with one another and with their colleagues and patients." The establishment of uniform disclosure requirements frees individuals from having to decide which relationships might influence his or her decision-making and which are irrelevant; transparent disclosure allows the audience to participate in the interpretation of the significance. All authors and faculty speaking at the Annual Meeting have been required to provide complete disclosure of all conflicts of interest.

COMMERCIAL SUPPORT DISCLOSURE

As a sponsor accredited by the ACCME, the North American Spine Society must ensure balance, independence, objectivity and scientific rigor in all its sponsored activities.

All individuals participating in a sponsored activity are expected to disclose to the activity audience any significant financial interest or other relationship (1) with the manufacturer(s) of any commercial product(s) and/or provider(s) of commercial services discussed in an educational presentation and (2) with any commercial supporters of the activity. Significant financial interest or other relationships may include: grants or research support, employee, consultant, major stockholder, member of the speaker's bureau, etc. Disclosure information will be made available visually on a PowerPoint® slide before each presentation, in the Final Program, orally by the moderator and in *The Spine Journal* Proceedings supplement.

PROGRAM COMMITTEE STATEMENT ON RESOLUTION OF CONFLICT OF INTEREST IN PRESENTATIONS

The intent of this disclosure is to ensure that all conflicts of interest, if any, have been identified and have been resolved 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.

FDA DISCLOSURE

If a device or drug requiring FDA approval is identified as an important component of a presentation, the author must indicate the FDA status of those devices or drugs as Approved, Investigational or Not Approved for distribution within the United States. The Final Program and *The Spine Journal* Proceedings supplement will include all FDA status information. Certain medical devices and drugs identified at the 29th Annual Meeting may have FDA clearance for use for specific purposes only, or in restricted research settings. The FDA has stated it is the responsibility of the physician to determine the FDA status of each drug or device he or she wishes to use in clinical practice and to use these products in compliance with applicable law.

CONFLICT OF INTEREST DISCLOSURE INDEX

All participants provided estimated dollar amounts per the NASS Disclosure Policy through the NASS online disclosure module. NASS staff then translated that information into dollar ranges for purposes of this index.

These ranges 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

NASS BOARD OF DIRECTORS AND PROGRAM COMMITTEE DISCLOSURES

Bono, Christopher M.: Royalties: Wolters Kluwer (B); Consulting: Harvard Clinical Research Institute (None), United Health Care (B); Board of Directors: North American Spine Society (Second Vice President); Other Office: Intrinsic Therapeutics (B), JAAOS (B, Deputy Editor), The Spine Journal (Deputy Editor).

Cheng, Joseph S.: Board of Directors: North American Spine Society (Professional, Economic and Regulatory Chair); Other Office: AANS/CNS (Recording Secretary AANS/CNS Council of State Neurosurgical Societies; Past-Chair AANS/CNS Joint Spine Section).

Dagenais, Simon: Royalties: Elsevier (A); Stock Ownership: Pacira Pharmaceuticals (<1%); Private Investments: Palladian Health (2%); Consulting: University of South Florida (C), Intrinsic Therapeutics (A), NCMIC Foundation (B), Dr. Louis Sportelli (B), Pacira Pharmaceuticals (D), New York University (C), Palladian Health (E), Foundation for Chiropractic Progress (B), Gerson Lerhman Group (A); Speaking and/or Teaching Arrangements: NCMIC Foundation (B), Chiropractic and Osteopathic College of Australasia (A); Trips/Travel: Canadian Chiropractic Research Foundation (A), North American Spine Society (B); Scientific Advisory Board: Societe Franco-Europenne de Chiropraxie (None), Palladian Health (C); Other Office: North American Spine Society (Annual Meeting Program Co-chair), Pacira Pharmaceutical (Salary); Grants: NCMIC Foundation (D).

Daubs, Michael D.: Royalties: Synthes Spine (F); Consulting: DePuy-Synthes Spine (B); Speaking and/or Teaching Arrangements: AOSpine North America (B); Board of Directors: AOSpine North America (B); Other Office: North American Spine Society (Annual Meeting Program Committee); Fellowship Support: AOSpine North America (D, Paid directly to institution/employer).

Dohring, Edward J.: Royalties: Stryker (D, Paid directly to institution/employer); Board of Directors: North American Spine Society (CME Committee Chair); Research Support (Staff/Materials): Medtronic (B, Paid directly to institution/employer).

Finkenberg, John G.: Royalties: Biomet Spine (E); Speaking and/or teaching arrangements: Biomet (Travel expenses); Board of Directors: North American Spine Society (Advocacy Committee Chair), Satori World Medical (Medical Advisor).

Ghogawala, Zoher: Board of Directors: American Association of Neurological Surgeons – Neuropoint Alliance (None), Congress of Neurological Surgeons (Executive Committee), Collaborative Spine Research Foundation (None), North American Spine Society (Clinical Research Development Chair); Research Support (Staff/Materials): Stuart Foundation (F, Paid directly to institution/employer); Grants: NIH (None), PCORI (H, Paid directly to institution/employer).

Harris, Mitchel B.: Consulting: HCRI (Amount not disclosed), Medtronic (Medical Monitor for Open Tibia Fracture Study, Paid directly to institution/employer); Board of Directors: North American Spine Society (Governance Committee Chair).

Kauffman, Christopher P.: Stock Ownership: NOC2 (0.02%); Consulting: Hospital Corporation of America (HCA) - TriStar Spine Physician Advisory Panel (None); Speaking and/or teaching arrangements: North American Spine Society (Travel expenses); Board of Directors: North American Spine Society (Health Policy Council Director).

Mick, Charles A.: Board of Directors: North American Spine Society (Past President, D).

Mitchell, William: Private Investments: South Jersey Cyberknife (<1%); Speaking and/or teaching arrangements: North American Spine Society (B); Trips/Travel: North American Spine Society (C); Board of Directors: North American Spine Society (Section Development Chair).

Mroz, Thomas E.: Stock Ownership: Pearl Diver (<1%); Consulting: Ceramtec (None, Paid directly to institution/employer); Speaking and/or teaching arrangements: AOSpine (B); Board of Directors: AOSpine North America (None), North American Spine Society (Education Council Director); Fellowship Support: AOSpine (E, Paid directly to institution/employer).

Muehlbauer, Eric J.: Board of Directors: North American Spine Society (Executive Director); Other Office: World Spine Care (Advisor).

O'Brien Jr., David R.: Speaking and/or teaching arrangements: North American Spine Society (B); Trips/Travel: ISIS (B), AAPMR (Travel expenses); Board of Directors: North American Spine Society (Education Publishing Chair); Other Office: ISIS (Socioeconomic Council Vice-Chair), AAPMR (Program Planning Committee).

Prather, Heidi: Board of Directors: North American Spine Society (First Vice President); Other Office: American Academy of Physical Medicine and Rehabilitation (B, Paid directly to institution/employer).

Reed, Michael L.: Nothing to Disclose.

Reitman, Charles A.: Trips/Travel: North American Spine Society (Travel expenses), AAOS Evidence Based Committee (Travel expenses); Board of Directors: North American Spine Society (Evidence Compilation and Analysis Chair, Annual Meeting Program Co-Chair); Scientific Advisory Board: Clinical Orthopedics and Related Research (B, Deputy Editor, Paid directly to institution/employer).

Resnick, Daniel K: Consulting: Asterias (B); Board of Directors: North American Spine Society (Research Council Director); CNS (President-Elect); Scientific Advisory Board: Asterias (Consulting disclosed).

Rothman, David J.: Board of Directors: North American Spine Society (Ethicist); Relationships Outside the One Year Requirement: State of Texas/Sheller (Expert witness, Dissolved 3/2012, E).

Schofferman, Jerome: Board of Directors: North American Spine Society (Committee on Ethics and Professionalism Chair).

Smuck, Matthew: Consulting: ArthroCare (B), EMKinetics (A); Other Office: The Spine Journal (Deputy Editor), North American Spine Society (Annual Meeting Program Committee); Research Support - Investigator Salary: Cytonics Corporation (C, Paid directly to institution/employer); Research Support - Staff and/or Materials: Cytonics Corporation (D, Paid directly to institution/employer); Grants: International Spine Interventions Society (C, Dissolved 12/2012, Paid directly to institution/employer).

Sowa, Gwendolyn A.: Royalties: UpToDate (A); Board of Directors: Association of Academic Physiatrists (Board of Trustees); Other Office: Association of Academic Physiatrists (Research Committee), North American Spine Society (Annual Meeting Program Committee); Research Support - Investigator Salary: NIH, NIDRR, UPMC RI (E, Paid directly to institution/employer); Research Support - Staff and/or Materials: NIH/NIDRR, UPMC RI (F, Paid directly to institution/employer).

Truumees, Eeric: Royalties: Stryker Spine (C); Stock Ownership: Doctor's Research Group (<1%); Private Investments: IP Evolutions (33%); Board of Directors: North American Spine Society (Administration and Development Council Director); Other Office: AAOS Communications Cabinet (Incoming Editor-in-Chief of AAOS Now, AAOS Communications Cabinet); Research Support (Investigator Salary): Relievant (B, Paid directly to institution/employer); Research Support (Staff/Materials): Globus (B, Paid directly to institution/employer); Other: Stryker Biotech (Unknown, Paid directly to institution/employer).

Wang, Jeffrey C.: Royalties: Stryker (B), Osprey (C), Aesculap (B), Biomet (F), Amedica (D), SeaSpine (D), Synthes (C), Alphatec (E); Stock Ownership: FzioMed (<1%), Alphatec (<1%); Private Investments: Promethean Spine (<1%), Paradigm Spine (<1%), Benvenue (<1%), Nexgen (<1%), Pioneer (<1%), Amedica (<1%), VertiFlex (<1%), ElectroCore (<1%), Surgitech (<1%), AxioMed (<1%), VG Innovations (<1%), CoreSpine (<1%), Expanding Orthopaedics (<1%), Syndicom (<1%), Osprey (<1%), Amedica (<1%), Bone Biologics (<1%), Curative Biosciences (<1%), Pearl Diver (<1%); Board of Directors: North American Spine Society (Treasurer), Cervical Spine Research Society (Travel expenses), AOSpine/AO Foundation (E), Collaborative Spine Research Foundation (Travel expenses); Fellowship Support: AO Foundation (E, Paid directly to institution/employer).

Watters, William C.: Royalties: Stryker Corporation (B); Stock Ownership: Intrinsic Therapeutics (<1%); Board of Directors: North American Spine Society (President, E), World Spine Care (None), American College of Spine Surgeons (None); Scientific Advisory Board: Intrinsic Therapeutics (None, Dissolved 2014), Palladian Health (B, Clinical Advisory and Policy Board); Other: The Spine Journal (Deputy Editor), Spine Arthroplasty Journal (Assistant Editor), Spine (Reviewer), Kirby Glenn Surgical Center (1/22nd minority interest ownership).

Wetzel, F. Todd: Stock Ownership: Relievant Medical (1%); Board of Directors: McKenzie Institute International (B), North American Spine Society (Secretary).

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