

NORTH AMERICAN SPINE SOCIETY

31ST ANNUAL MEETING

OCTOBER 26-29, 2016
BOSTON, MA

PRELIMINARY PROGRAM



YOU COULD USE A LITTLE HELP FROM THE ***STRONG SENSITIVE TYPES***



BONE PROBES Available in an unmatched variety of styles and options. Use the handle styles, with or without an impactor cap, or use one of our many other styles of Comfort Grip™ handles.



T HANDLES ergonomically superior comfort grip silicone handles with true zero-play mechanism featuring ultra precise adapters.

BRADSHAW MEDICAL is committed to exceed customer expectations with product quality and innovation – and the service to match.

This level of quality is evident in the effective maintenance of a quality management system that is highly reflective of our core competencies as spinal and orthopedic instrument specialists. The Bradshaw quality management system includes processes that ensure compliance to stringent regulatory requirements and conformance to ISO 13485 standards.

LET US SHOW YOU THE BRADSHAW DIFFERENCE...CONTACT US TODAY!



ROD GRIPPER Unique geometry ensures maximum surface contact in spinal rod applications.



STEALTH Ergonomic. Intuitive. Customizable. Every handle can be molded quickly and cost-effectively with the PANTONE® color of your choice – choose from over 1,000 colors.

Add your corporate logo or optional texture to most of our standard handles.



877-201-7661

WWW.BRADSHAW-MEDICAL.COM

Pantone is a registered trademark of Pantone LLC

WELCOME TO NASS 2016!

NASS 2016 in Boston will deliver dynamic and challenging educational programs, an outstanding technical exhibition, the chance to network and build relationships with celebrated spine professionals, and renowned guest speakers.

You will hear the most current scientific research during the Best Papers and abstract presentations and as you view the ePosters throughout the meeting. Poster Grand Rounds enable you to meet with and ask questions of ePoster authors.

Some of this year's symposia include: Counteracting Stress, Burnout and Frustration with Coaching and Enhanced Self Care; Low Back Pain Secondary to Degenerative Disc Disease: Interdisciplinary Perspectives on the Value of Treatment; and Own the Bone®: Establishing a Fragility Fracture Service and Preventing the Next Vertebral Fracture.

There are Interdisciplinary Spine Forums as well as Section Specialty Track sessions and the 7th Annual Global Spine Forum, all of which conclude with a reception.

If you want more education, attend ticketed courses such as Coding Update 2016, followed by Minimally Invasive Spine Surgery, in addition to The Key Role of Psychologically-informed Practice, and Resident and Fellow Surgical Hands-on Training Course.

To further your educational opportunities, view the latest products and services in the Technical Exhibition and attend the Surgical Innovation Labs where you can hear didactic lectures and see product demonstrations as well as gain hands-on experience with the latest spine systems.

And new this year, exhibiting company MD and PhD consultants will present their latest research during afternoon New Technology Presentations.

You won't want to miss the Presidential Guest Speaker, Dr. Michio Kaku. A renowned futurist, theoretical physicist, international authority in Einstein's unified field theory, and predictor of business and economic trends, Dr. Kaku will enlighten you with a glimpse into our future. Attend the Healthcare Outlook 2017 featuring Bob Woodward, legendary Pulitzer Prize-winning journalist/author and associate editor of *The Washington Post*.

Come to Boston for NASS 2016 and enjoy the city known for its wonderful blend of stylish sophistication and historic New England charm, where you can easily uncover the city's past while enjoying its distinctively modern edge.



Christopher M. Bono, MD
President

Alan S. Hilibrand, MD
D. Scott Kreiner, MD
2016 Program Co-chairs

IMPORTANT DATES

MAY 9

**Registration and
housing opens**

JULY 25

Early registration deadline

Save \$200 with the
early registration discount

SEPTEMBER 20

Regular registration deadline

Save \$100 with the regular
registration discount

SEPTEMBER 20

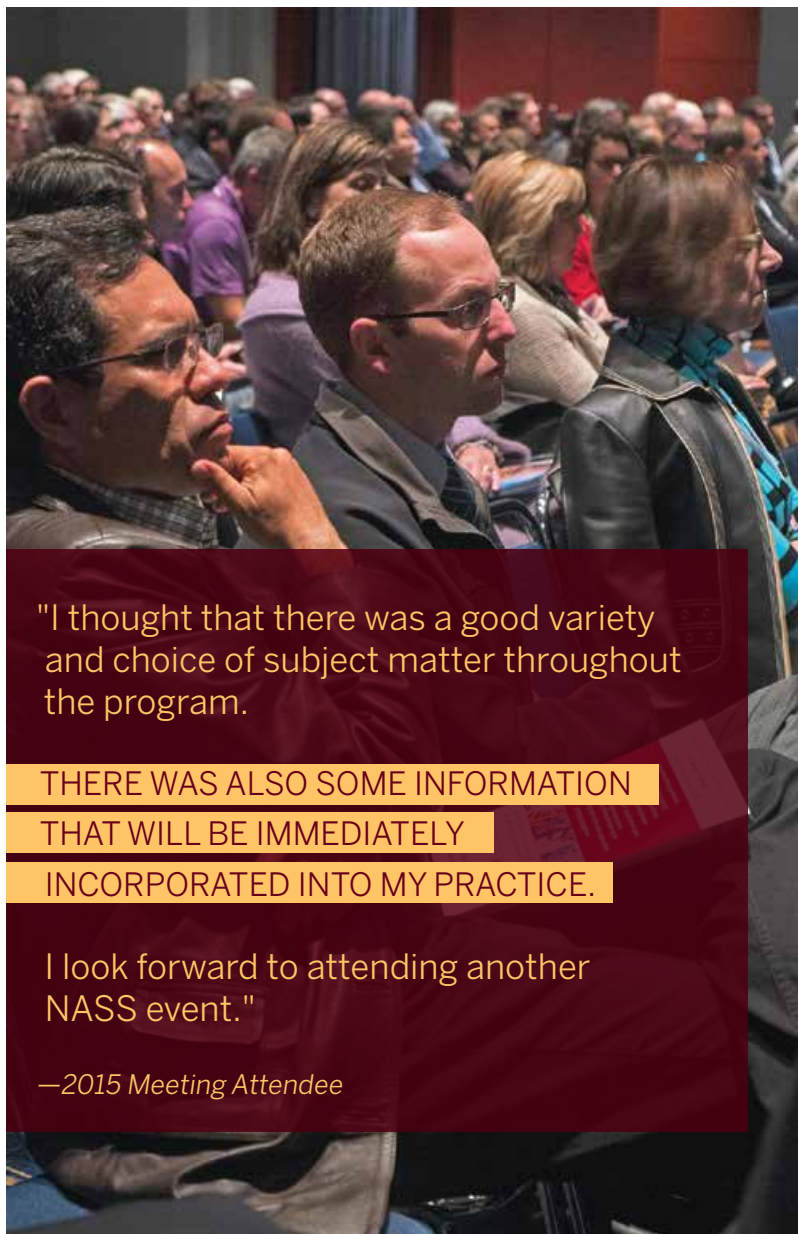
Housing deadline

Ensure you have accommodations
at an official NASS hotel

SEPTEMBER 21

**Online and onsite registration
fees increase by \$100**





"I thought that there was a good variety and choice of subject matter throughout the program.

THERE WAS ALSO SOME INFORMATION THAT WILL BE IMMEDIATELY INCORPORATED INTO MY PRACTICE.

I look forward to attending another NASS event."

—2015 Meeting Attendee

TABLE OF CONTENTS

Networking Activities	6
Guest Speakers	7
Instructional and Hands-on Courses	10
Symposia	12
Section Specialty Track	16
Interdisciplinary Spine Forum	17
Boston Attractions and Museums	19
Meeting-at-a-Glance	20
Education Credits	25
Housing Information	26
Registration	28
Technical Exhibition	30
Acknowledgements	31
Disclosure	32

QUESTIONS?

Please visit nassannualmeeting.org for more information. Contact the following departments via email with questions:

Educational programming:
education@spine.org

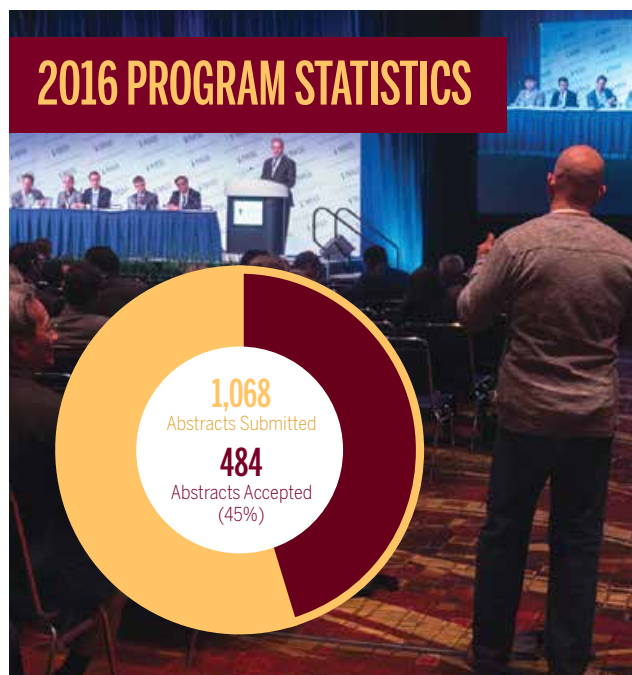
Registration:
registration@spine.org

Housing:
meetingservices@spine.org

Exhibits:
exhibits@spine.org

Membership:
membership@spine.org

2016 PROGRAM STATISTICS



SURGICAL SCALPEL-ISH

WHEN IT COMES TO
MEDICAL TECHNOLOGY,
DON'T TRUST THE
KNOCKOFFS.

IF IT'S NOT TITAN SPINE
IT'S TITANIUM-ISH.

TITAN SPINE HAS THE ONLY ENGINEERED AND VALIDATED NANOTECHNOLOGY FOR THE SPINE, BACKED BY SCIENCE AND PUBLISHED IN PEER-REVIEWED JOURNALS. NOT ALL TITANIUM INTERBODY DEVICES ARE MADE THE SAME.

DON'T SETTLE FOR ISH!

FOR MORE INFORMATION, PLEASE VISIT TITANSPINE.COM



STAND WITH THE FUTURE

NETWORKING ACTIVITIES



WELCOME RECEPTION

TUESDAY, OCTOBER 25 6:00–7:30 p.m.

The Welcome Reception will be held at The Westin Boston Waterfront, a great networking event to kick off the Annual Meeting. Enjoy food and libations in a comfortable setting with colleagues.

BEVERAGE STATIONS

THROUGHOUT THE WEEK

Attendees will enjoy complimentary beverages during the breaks. Breaks will occur twice daily Wednesday, Thursday, Friday and Saturday morning.

SPINEPAC LUNCHEON

WEDNESDAY, OCTOBER 26 12:00–1:00 p.m.

Legendary Pulitzer Prize-winning journalist/author and associate editor of *The Washington Post*, Bob Woodward, will be on site to sign copies of his latest book, *The Last of the President's Men*, during an exclusive luncheon in honor of 2016 SpinePAC members.

SPINECONNECT RECEPTION

WEDNESDAY, OCTOBER 26 5:00–6:00 p.m.

This event, held immediately following the Case-based Discussion: Top Cases from SpineConnect, provides attendees who have participated in the SpineConnect site, or those interested in learning more about this resource, the opportunity to meet face-to-face and network with others who have shared their expertise on the site.

NASS JOINT SECTIONS RECEPTION

THURSDAY, OCTOBER 27 5:00–6:00 p.m.

This event provides a networking opportunity for all Section members and those interested in becoming involved in Sections. Come enjoy and learn how NASS is supporting these specific sections of its membership.

- ▶ Allied Health
- ▶ Biologics and Basic Research
- ▶ Minimally Invasive Procedures
- ▶ Radiology
- ▶ Rehabilitation, Interventional and Medical Spine (RIMS)
- ▶ Robotics and Navigation
- ▶ Spine Motion Technology

RESIDENT, FELLOW AND PROGRAM DIRECTORS RECEPTION

THURSDAY, OCTOBER 27 5:00–6:00 p.m.

Meet colleagues in your program, residents and fellows from around the country, program directors, and alums who have completed their residencies and fellowships at the 14th Annual Resident, Fellow and Program Directors Reception. The reception offers a casual environment to relax and 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, OCTOBER 28 4:45–5:45 p.m.

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

GUEST SPEAKERS

HEALTHCARE OUTLOOK 2017 SYMPOSIUM GUEST SPEAKER: BOB WOODWARD

WEDNESDAY, OCTOBER 26 10:35 a.m.–12:00 p.m.



Bob Woodward is an associate editor of *The Washington Post*, where he has worked since 1971. He has shared in two Pulitzer Prizes, first in 1973 for the coverage of the Watergate scandal with Carl Bernstein, and second in 2002 as the lead reporter for coverage of the 9/11 terrorist attacks.

He has authored or coauthored 18 books, all of which have been national non-fiction best sellers. Twelve of those have been #1 national best sellers, spanning the years from 1974 to 2010. Bob Schieffer of CBS News has said, “Woodward has established himself as the best reporter of our time. He may be the best reporter of all time.”

In 2014, Robert Gates, former director of the CIA and Secretary of Defense, said that he wished he’d recruited Woodward into the CIA, saying of Woodward, “He has an extraordinary ability to get otherwise responsible adults to spill [their] guts to him...his ability to get people to talk about stuff they shouldn’t be talking about is just extraordinary and may be unique.”

Gene Roberts, the former managing editor of *The New York Times*, has called the Woodward-Bernstein Watergate coverage, “maybe the single greatest reporting effort of all time.” In listing the all-time 100 best non-fiction books, *TIME* magazine has called *All the President’s Men*, by Bernstein and Woodward, “Perhaps the most influential piece of journalism in history.”

LEADERSHIP DEVELOPMENT GUEST SPEAKER: MARY CRANE

WEDNESDAY, OCTOBER 26 9:00–11:00 a.m.; 1:30–3:30 p.m.



For more than ten years, Mary Crane has delivered high energy, high impact programs to leading universities, Fortune 500 companies and AmLaw 100 law firms. Her fundamental message has remained the same: While an individual’s IQ and GPA helps open doors, critically important people skills ultimately land the job, close the deal and help build teams that transform

organizations. Her seminars provide participants with the skills they need to put their best, most effective selves forward. Crane is the creator of the “100 Things You Need To Know” book series. Premised on the belief that no one professional needs to know everything, Crane maintains that professionals who know the 100 most important things about a particular subject area possess the critical information they need to succeed. Topics covered include: “Starting Work” (May 2013); “Networking” (December 2013); “Business Etiquette” (2014); “Getting Along with Others” (2014); and “Managing Projects & Time” (2015).

Crane is a graduate of the University of Missouri-Columbia and George Washington University Law School. She is also a graduate of the Culinary Institute of America, where she studied tortes after studying torts. She has worked for entities as diverse as the American Petroleum Institute and the American Heart Association. Get this: she’s also a former White House assistant chef. Crane has been featured on *60 Minutes*. She is a regular contributor to *Let’s Talk Live*, a Washington, D.C. news-talk program. She has been quoted extensively in a variety of print and electronic media, including *The New York Times*, *The Wall Street Journal*, *Forbes.com*, *Fortune.com* and *CNN.com*.

PRESIDENTIAL GUEST SPEAKER: MICHIO KAKU, PhD

THURSDAY, OCTOBER 27 11:00 a.m.–12:00 p.m.



Dr. Michio Kaku is one of the most widely recognized figures in science in the world today. He has more than 2.5 million fans on Facebook, and his latest book, *The Future of the Mind*, hit #1 on the *New York Times* and Amazon best sellers lists.

He is an internationally recognized authority in two areas. The first is Einstein's unified field theory, which Dr. Kaku is attempting to complete. The other is to predict trends affecting business, commerce, and finance based on the latest research in science. He is the author of three *New York Times* best sellers, including *Physics of the Impossible*, and *Physics of the Future*. He has also hosted numerous documentaries on the Discovery Channel, the Science Channel, and also BBC-TV.

Dr. Kaku holds the Henry Semat Chair in Theoretical Physics at the City University of New York. He graduated from Harvard University in 1968 (summa cum laude and 1st in his Physics class). He received his PhD in Physics from the University of California at Berkeley in 1972, and been a professor at CUNY for almost 30 years. He has taught at Harvard and Princeton as well. His goal is the complete Einstein's dream of a "theory of everything," to derive an equation, perhaps no more than one inch long, which will summarize all the physical laws of the universe. He is the co-founder of string theory, a major branch of string theory, which is the leading candidate today for the theory of everything. His PhD level textbooks are required reading at many of the world's leading physics laboratories.

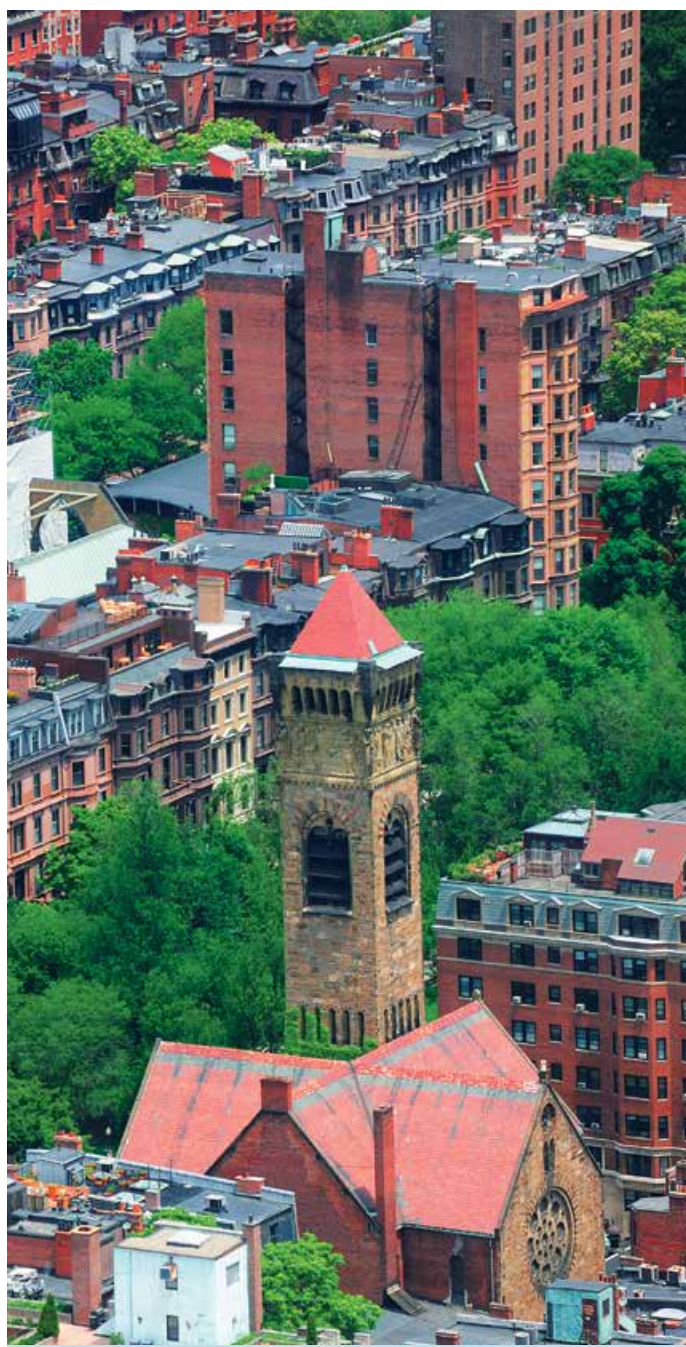
He is the author of several international best-sellers and has interviewed 300 of the world's top scientists, many of them Nobel Laureates and directors of the largest scientific laboratories, about their vision for the next 20 to 100 years in computers, robotics, biotechnology, space travel, etc. These are the scientists who are inventing the future in their laboratories.

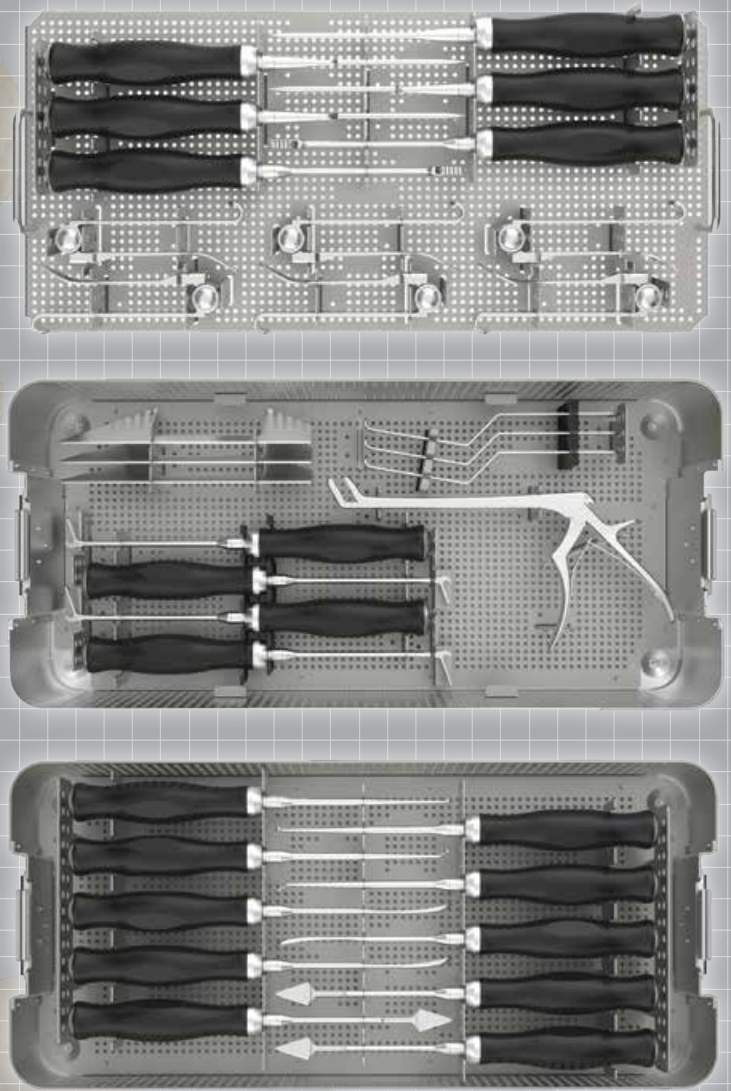
Many of his books have been made into TV series. *Physics of the Impossible* was made into a 24 episode Discovery/Science Channel TV series called *Sci Fi Science*, and *Physics of the Future* was the basis of a four hour TV series for the Discovery/Science Channel called *Futurescape*.

His web page, www.mkaku.org, registered more than 110 million page hits in just the past four years. Dr. Kaku also does considerable public speaking on international radio and TV.

He was featured in the full-length, 90 minute feature film, *Me and Isaac Newton*, which was nominated for an Emmy in 2001. He was profiled in Tech-TV's Big Thinkers series and is a regular commentator on that cable network. He has spoken on more than 500 radio stations around the country.

He also hosts his own national weekly radio program which airs in 130 cities in the US and also the KU national satellite band and internet, called Science Fantastic. It is the largest nationally syndicated science radio show on commercial radio in the United States, and perhaps the world.





AVALIGN

Spinal Osteotomy Set

Specialized Instrumentation to Aid Surgeons

The Avalign German Specialty Instruments Division team of engineers has developed a spinal osteotomy instrument set that includes a wide selection of specialized instrumentation designed to aid surgeons in challenging procedures such as Pedicle Subtraction Osteotomy (PSO) and Vertebral Column Resection (VCR).

Available for private label distribution with your branding or for immediate purchase with Avalign branding. We are the manufacturer of record, getting you to market faster.



AVALIGN

German Specialty Instruments Division

626 Cooper Ct, Schaumburg, IL 60173 | 877-289-1096 | Avalign.com

INSTRUCTIONAL AND HANDS-ON COURSES

These educational offerings have an additional fee.

CODING UPDATE 2016: ESSENTIALS AND CONTROVERSIES OF SPINE CARE CODING

MONDAY, OCTOBER 24/TUESDAY, OCTOBER 25

7:30 a.m.–4:00 p.m.

Recognized by spine professionals as one of the most comprehensive, informative, and interactive courses in the spine industry, the NASS coding course is essential to practices desiring to maximize reimbursement through proper coding while staying on the forefront of coding changes, payer policies and new government regulations. The course provides tools and instruction to increase your practice's bottom line and propel it into the future, including ICD10, E&M coding, and CPT4 coding of surgical, medical, and radiologic procedures. Participants will leave this course with tips on how to navigate through the authorization and denial process, utilize Medicare NCCI edits, and properly document to receive reimbursement.

Participants will be given the opportunity to meet one-on-one with physician faculty who lead NASS' CPT, RUC and reimbursement efforts, participate in "real op notes" hands-on coding sessions and be part of an interactive panel discussion with leading experts in the spine coding industry.

HANDS-ON COURSE: MINIMALLY INVASIVE SPINE SURGERY

TUESDAY, OCTOBER 25 7:30 a.m.–4:30 p.m.

This course will provides a targeted focus on current minimally invasive techniques to the spine, including posterior, lateral, OLIF, navigation and endoscopy techniques. In addition to the didactic lectures, attendees will have an opportunity for guided practice in the hands-on cadaver bioskills lab.

OPTIMIZING VALUE AND OUTCOMES IN SPINE CARE: THE KEY ROLE OF PSYCHOLOGICALLY-INFORMED PRACTICE

FRIDAY, OCTOBER 28/SATURDAY, OCTOBER 29

8:00 a.m.–4:30 p.m./7:30 a.m.–1:30 p.m.



*Co-sponsored by the
Rehabilitation Institute of Chicago*

For more than two decades, research has called into question a purely pathoanatomical basis for axial pain and its treatment. It also is well established that spine treatments are often of limited benefit. In an environment of spiraling disability, heavy investment in purely biomedical spine care has led to skyrocketing health costs, heightened stakeholder scrutiny and calls for improved cost-to-outcome value.

Concurrently, extensive science has shown that psychosocial factors are probably more predictive of the transition from acute to chronic and disabling spine pain. Data supporting the importance of early return to normal activity and work have elevated the importance of effective screening and management of nonphysical barriers to recovery.

This course assembles thought and research leaders in an in-depth conference on spine care as informed by the latest science on the neurophysiology and neuropsychological aspects of pain, risk screening and modification, current and future provider training, developing psychologically-informed care teams, and identifying and overcoming barriers to the implementation of a biopsychosocial care model.

RESIDENT/FELLOW SURGICAL HANDS-ON TRAINING COURSE

FRIDAY, OCTOBER 28/SATURDAY, OCTOBER 29

2:00–6:30 p.m./8:00 a.m.–12:30 p.m.

This course will introduce anatomic approaches to the cervical, thoracic and lumbar spine. Panel discussion, lectures and case presentations will provide the background for hands-on cadaver sessions where participants will have the opportunity to practice these techniques with faculty who are considered experts in their fields.

Attendees will have the opportunity to learn about surgical approaches in the treatment of spinal disorders. The focus of this educational experience will be to provide the fundamental knowledge and skills necessary in order to benefit the most from spinal fellowship training.



NASS RESOURCE CENTER

Visit the Resource Center in the lobby to pay your dues and ask membership questions. Membership staff will answer questions about the application process and member benefits. Pending members may check the status of their membership application and potential members can apply for membership. The Publications staff will be available to answer any questions regarding *SpineLine* or *The Spine Journal*. NASS logo items also will be available for sale.





WEDNESDAY, OCTOBER 26

Own the Bone®: Establishing a Fragility Fracture Service and Preventing the Next Vertebral Fracture

7:35–9:00 a.m.

Fragility fractures have a major impact, not only on the patient, but on their families and on society as a whole. Fractures due to osteoporosis or low bone mass are responsible for more than 432,000 hospital admissions, nearly 2.5 million physician office visits, and about 180,000 nursing home admissions annually. Spine fractures result in some 150,000 hospital admissions each year, and the actual incidence of vertebral fractures is likely much greater given the large number that go undetected. In 2001, the annual US medical cost for vertebral fracture management was estimated at \$13.8 billion; since then, that figure is likely to have increased with a growing elderly population.

This symposium introduces the spine community to fracture liaison service models of care which help implement a systems-based approach to the identification, evaluation and bone health treatment of patients with fragility fractures. Fragility fracture programs have shown significant improvement in patients receiving appropriate testing and bone health treatment, and have been shown to reduce subsequent osteoporotic related fractures. The American Orthopedic Association offers a quality improvement program, Own the Bone®, to encourage orthopedic surgeons to become involved in the management and initiation of care coordination for patients who have fragility fractures. The program includes education to patients and practitioners, and the dissemination of best practices employed, such as active co-management of the patient's osteoporosis with other specialties and primary care physicians.

Spine practitioners in their practices today are likely to confront both greater numbers of fragility fracture patients and greater expectations that they will diagnose and treat the underlying basis of these fragility fractures. This symposium introduces strategies to provide the necessary leadership to establish fracture liaison services, operate these programs, and effectively initiate care coordination to diminish their patients' risk of fracture recurrence.

Leadership Development and Training

Special guest speaker: Mary Crane

9:00–11:00 a.m.; 1:30–3:30 p.m.

The Leadership Development Program provides an opportunity for individuals to enhance their leadership skills within the ever changing healthcare environment and expand the pool of well-qualified candidates ready for advancement. Whether you're looking to build your own skills, those of a committee or even an entire organization, look to the NASS Leadership Development Program to gain knowledge and expertise from highly qualified faculty. The Leadership Development Program will help develop leaders who lead with a vision of a better future.

Healthcare Outlook 2017: The Elections, Delivery System Reform and MACRA Implementation

Special guest speaker: Bob Woodward

10:35 a.m.–12:00 p.m.

Recent controversies surrounding the Affordable Care Act (ACA), such as the announcement by one of the nation's top insurance companies that it would no longer offer plans on the government-run state health insurance exchanges and the collapse of more than half of the federally funded insurance cooperatives, suggest that we may be witnessing the beginning of the unraveling of the ACA. Can we afford to let the current healthcare system crash or do viable alternatives exist? What will be the fate of the ACA under a new Administration and Congress and will the two branches work together to fix or repeal the law? This symposium will examine how well spine specialists have fared under the ACA and shed light on alternative proposals currently being offered by the 2016 presidential candidates and members of Congress. Other key healthcare trends in 2017 also will be analyzed in the context of the new Congress and how this will impact NASS' advocacy agenda moving forward. Additionally, new Medicare payment reform efforts, such as the Medicare Access and CHIP Reauthorization Act (MACRA), seek to emphasize a more value and performance-based system through a variety of new payment models. These new payment structures will present many new challenges to spine care providers and the delivery of care. Finally, this symposium will focus on how the Centers for Medicare and Medicaid Services (CMS) is planning to implement the new Merit-Based Incentive Payment System (MIPS) and examine the role NASS is playing in the evolution of Alternative Payment Models (APMs) and bundled payments in spine care.

Section on Biologics and Basic Research: ACDF vs. TDR: Adjacent Segment Disease and Clinical Outcomes

10:35 a.m.–12:00 p.m.

This session will address topics including: adjacent segment disease (biology or biomechanics), single-level anterior cervical discectomy and fusion vs. total disc replacement (TDR) (critical review of the literature), and two-level disease (TDR and hybrid procedures). This interactive session allows time for open discussion and debate.

Assessment and Management of Oncologic Lesions of the Spine: A Multidisciplinary Approach

10:35 a.m.–12:00 p.m.

Faculty will review the diagnosis, work-up and contemporary management of spinal column tumors. Upon completion of the program, participants will better understand the relevant anatomy and the important differences between metastasis and primary spinal column tumors, and how those differences impact appropriate management. Faculty also will address the important public health implications of this increasingly common problem.

Value-based Healthcare: Impact on Caring for Spine Patients

3:40–5:10 p.m.

Complex Spinal Infections: Comprehensive Evaluation and Management

3:40–5:10 p.m.

Management of the Elderly Spine Patient

3:40–5:10 p.m.

Attendees will learn about unique diagnostic challenges in elderly patients and strategies to develop care protocols for active elderly patients. The faculty will discuss surgical options for spinal stenosis, deformity and spondylolisthesis, and how to implement these options in the aging population, with specific goals to decrease surgical complications and postoperative "downtime."

Case-based Discussions: Top Cases from SpineConnect

3:40–5:10 p.m.

The top-rated cases from hundreds presented at SpineConnect's case-based discussion forum. Physicians will present original cases, share input received from a worldwide network of physicians, request additional input from the audience and provide patient outcomes. This interactive session will address several procedures and provide information about how and why certain techniques were used and their outcomes. SpineConnect is a private spine care community that allows participants to discuss cases in real time with colleagues from around the world.

THURSDAY, OCTOBER 27**Counteracting Stress, Burnout and Frustration with Coaching and Enhanced Self Care**

7:00–8:30 a.m.

Given the pressures and demands of the current healthcare system, physicians and other clinicians face a growing number of stressors that may impact patient care as well as personal and professional well-being. Burnout and high levels of workplace frustration have become increasingly evident at all organizational levels. Systemic, economic and cultural factors that contribute to these occupational challenges will be identified. The faculty will describe coaching and other self-care enhancement strategies that may enhance professional performance, heighten employee morale, and support a culture of professionalism and well-being.

Think Before You Tweet #socialmedia #ethics #professionalism

1:05–2:05 p.m.

Social media is here to stay. Learning to utilize what social media has to offer and avoiding pitfalls is of growing importance for providers.

Decreasing Radiation Exposure During Spine Surgery and Interventional Procedures

1:05–2:05 p.m.

Radiation exposure is a significant concern for the spine specialist. This is especially true given the advances in minimally invasive spine surgery techniques, which may rely heavily on fluoroscopy. In addition to exposing the spine surgery patient to radiation, those specialists affected include orthopaedic and neurosurgeons, interventional radiologists, interventional pain specialists, and anesthesiologists. Other medical professionals, such as physician assistants, nurses and operating room technicians, may be frequently exposed to radiation as well. This session provides a focused discussion on current strategies for decreasing radiation exposure during spine surgery and other interventional procedures, while also exploring future directions to reduce the radiation burden to both spine specialist and patient.

FRIDAY, OCTOBER 28**Low Back Pain Secondary to Degenerative Disc Disease: Interdisciplinary Perspectives on the Value of Treatment**

7:30–8:55 a.m.

Intradiscal Biologic Therapy

1:15–2:45 p.m.

Managing the Delivery of Spine Care: What Can Healthcare Learn from the Business Community

1:15–2:45 p.m.

Allografts for Spinal Fusion: Rethinking Dogma

1:15–2:45 p.m.

Over the past several years, there has been a significant proliferation of the formulations and materials available as allogeneic bone graft. In addition, the recent controversy associated with the use of BMPs has resulted in many surgeons changing their choice of bone graft for spinal fusion. Navigating the literature to determine the science behind the processing of the grafts and their efficacy for successful fusion is often difficult and confusing. The goal of this session is to review the current classes of allogeneic bone graft material available and educate the audience as to the science behind their processing and efficacy.

SATURDAY, OCTOBER 29**Spinal Cord Stimulation and Function**

7:30–9:00 a.m.

Improving Outcomes and Reducing Complications for the Surgical Treatment of Degenerative Lumbar Scoliosis

10:30 a.m.–12:00 p.m.

Management of High Risk and Cancer Patients: Fast Track Recovery ERAS and Beyond

10:30 a.m.–12:00 p.m.

It is a challenge for spine surgeons to operate on high risk patients and cancer as the rate of complications are quite high, although they benefit from spine surgery. Cardiopulmonary dysfunction, morbid obesity, cancer patients, elderly population and immunocompromised patients or a combination of these are considered high risk. Life expectancy in United States has been increasing, with the elderly population (>75 years) expected to reach nearly 45 million by 2050. With increased life expectancy, there are several co-existing medical conditions which influence the recovery during the perioperative period.

The perioperative period is the most critical time where body mobilizes several resources to start the process of healing. One of the keys to manage this is through perioperative fluid management and control of pain. Delayed surgical site healing can be low grade infection, high BMI with several skin folds, insufficient mobilization, smoking, poor nutrition, diabetes, immune compromise, use of non-steroidal anti-inflammatory drugs, corticosteroids and chemotherapy. The body is unable to repair this after the initial inflammatory healing response subsides noted by normalizing CRP levels in second week of surgery.

The wound closures need to be very meticulous in these patients especially with cancer due to poor condition of the tissue from the disease itself in addition to chemo-radiation. There are several options to treat the metastatic diseases in spine using minimally invasive stabilization, to radiofrequency ablation and laser ablation.

Faculty will discuss the strategies to stabilize and manage the high risk cardiopulmonary patients especially in the perioperative period. Strategies include management of patients with delayed healing of surgical site and spinal fluid leak, various methods of wound closures in infection and cancer patients including skin flaps, decision making in approach to patients with cancer, and different options of surgery and outcome. Dermal matrix, alloderm, use of collagenase, and wound vacuum placement also will be discussed. Additionally, faculty will address recent updates, optimum timing for each intervention and the evidence supporting each of these approaches, and provide an overview of their efficacy, effectiveness, safety and costs.

Changing Behavior through Physical Therapy: Improving Patient Outcomes

10:30 a.m.–12:00 p.m.

This symposium will present a targeted approach to rehabilitation for patients at-risk for poor rehabilitation outcomes. Faculty will explain how evidence-based cognitive and behavioral strategies can be integrated into clinical care and how the principles of motivational interviewing skills can be used to facilitate behavior change within a physical therapy framework. Attendees will learn to identify successful strategies for addressing psychosocial risk factors and improving pain, disability, and physical activity.

SECTION SPECIALTY TRACK



ALL SESSIONS WILL BE PRESENTED ON THURSDAY, OCTOBER 27 focusing on various topics to include symposia and/or abstract presentations.

Section on Biologics and Basic Research

Section on Minimally Invasive Procedures

Section on Radiology

Section on Rehabilitation, Interventional and Medical Spine

Section on Robotics and Navigation

Section on Spine Motion Technology

NASS 2016 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 Boston attractions, restaurants and more.

Read, follow and comment using Twitter.

Available in June at spine.org/mobile



INTERDISCIPLINARY SPINE FORUM

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

WEDNESDAY, OCTOBER 26

Early Return to Work

9:00 a.m.–12:00 p.m.

Work disability from spine-related injuries poses a major burden to society in the form of suffering and cost associated with treatment and work-loss time. There is evidence that early coordinated efforts to return injured workers back to the workplace or maintain them at work during an episode of spine pain is successful. This approach is a collaboration among different stakeholders including workplace management and supervisor staff, occupational healthcare providers, claims adjusters, case coordinators, treating team members, and patients. This session will provide the perspective of various stakeholders and propose a model for coordinated care.

The Global Spine Care Initiative: The Development of Evidence-informed, Practical, Sustainable Spine Healthcare Models for Communities Around the World with Various Levels of Resources

1:00–3:05 p.m.; 3:40–5:10 p.m.

The WHO Burden of Disease 2010 study listed spinal disorders as having a greater impact on global health than HIV/AIDs, malaria, lower respiratory infections, stroke, breast cancer, lung cancer, Alzheimer's disease or diabetes. The WHO and World Bank have estimated that low back and neck pain afflict almost one billion people worldwide and are the major causes of disability in the world. The growth of disability related to spinal disorders is increasing much more rapidly in developing, low-income countries compared to developed, high-income countries. Currently no global approach has been developed and tested that is likely to reduce the health burden of spinal disorders. There has not been any attempt to develop an implementable comprehensive, cost-effective model of care that could be implemented by clinicians, community and government health agencies with different resource capacities.

The Global Spine Care Initiative (GSCI) was convened in 2014 to bring together an interdisciplinary, international team of clinicians and scientists with the goal of developing an evidence-informed model of care that would apply to all people or patients likely to present to or seek advice from a spine care clinician or clinical setting. A requirement of this model of care is that it should be implementable in communities with different resource capacities.

THURSDAY, OCTOBER 27

Gender Specificity: It's Time to Abandon "One Size Fits All" in Spine Care

7:00–9:30 a.m.

Sex and gender specificity are progressively informing research and clinical care. The recognition that sex and gender affect the expression of disease has prompted National Institutes of Health research mandates, and these differences are increasingly affecting patient management across multiple disease populations. The spine community lags in these regards despite significant variation in structure and function in men and women. Spine care providers have tended toward a "one size fits all" approach that has failed to systematically address these differences and their potential effects on outcome and costs.

This session will present data regarding these variations and introduce attendees to the importance of sex and gender specificity in effective spine care, including an overview of existing clinical initiatives as well as developing research and trends for future spine care, presented by leaders in this rapidly evolving field.

FRIDAY, OCTOBER 28

Shoulder/Neck Syndromes: Evaluation and Treatment of Patients with Concurrent Neck Pain and Upper Quarter Pathology

9:00 a.m.–12:00 p.m.

The relationship between upper quarter and cervical spine syndromes is referenced in the spine literature. A complex relationship exists between cervical spine pain and scapulothoracic mechanics. It is often challenging for clinicians to distinguish between pain generated by cervical spine degeneration and pain generated from soft tissues of the shoulder girdle.

This session will review the etiology, clinical presentation and management of patients with concurrent cervical spine and shoulder girdle pathology. A multidisciplinary faculty will present on the interdependence of neck and scapulothoracic motion and the effects of altered shoulder girdle mechanics on cervical spine conditions. Biomechanical considerations, examination techniques and treatment modalities in common conditions arising from concurrent cervical spine and shoulder girdle pathology will be reviewed. Indications for clinical examination techniques and treatment modalities in patients who present with shoulder-neck syndromes will be presented. Presenters will emphasize the importance of utilizing reliable, sensitive and specific clinical examination techniques where they exist to screen the interdependent functions of the cervical spine and upper quarter.

Whiplash-associated Disorders (WAD): A Biopsychosocial Perspective on its Assessment and Management

1:00–2:45 p.m.; 3:15–4:45 p.m.

Through integrated global and interdisciplinary research efforts, it has become clear that understanding and managing traffic-related whiplash-associated disorders (WAD) involves appreciating the complex interplay between biological, psychological and social/environmental processes. In this session, faculty will explore the emerging advancements in understanding, assessing and managing WAD from the perspective of engineering, psychology, epidemiology, radiology, implementation sciences and rehabilitation.





BOSTON ATTRACTIONS AND MUSEUMS

FREEDOM TRAIL thefreedomtrail.org

A must while in Boston is to follow the 2.5-mile redbrick trail from Boston Common to Bunker Hill. The trek will take 1-3 hours. You can power walk through the historical sites or go on a tour with a guide in Revolutionary garb.

FANEUIL HALL faneuilhallmarketplace.com

Located along the Freedom Trail is Faneuil Hall Marketplace. The original Faneuil Hall dates back to 1742 and the festival marketplace now encompasses the North Market, Quincy Market and South Market buildings. Grab a bite beneath the Quincy Market canopies, pick up unique finds and watch the street performers.

FENWAY PARK mlb.mlb.com/bos/ballpark

There's nothing quite like a visit to Fenway Park, one of America's most beloved baseball stadiums since it opened in 1912. View the "Green Monster" up close during one of the 50-minute tours offered daily.

CAMBRIDGE cambridgeusa.org

Cross the Charles River to nearby Cambridge where Harvard and the Massachusetts Institute of Technology (MIT) are located. There is a mix of stunning architecture, an incredible range of restaurants and shopping that attracts students, locals and visitors. Stroll through the historic Harvard Yard, and walk along Tory Row to view the colonial mansions.

CHEERS cheersboston.com

For fans of the television show, stop in for one at the bar shown in the opening credits of this '90s sitcom. Afterward, walk up Beacon Street to the State House and across the street is the Public Garden. Then make your way to Newbury Street for some shopping at some of Boston's most upscale boutiques.

BOSTON TEA PARTY MUSEUM bostonteatartyship.com

Located in the middle of the Fort Point Channel, the museum is near where the Boston Tea Party actually occurred. Hop aboard a faithful recreation of a colonial-era ship—and throw tea crates overboard in defiance of King George III's "taxation without representation" policy.

AFRICAN MEETING HOUSE afroammuseum.org

See where the abolitionist movement found a voice. In the historic Beacon Hill neighborhood, see the oldest African-American church edifice still standing in the US and where the New England Anti-slavery Society was founded and later, Frederick Douglass delivered an anti-slavery speech.

MUSEUM OF FINE ARTS mfa.org

The MFA's collection of more than 450,000 artifacts and paintings spans nearly every major period and region. See Renoir's *Dance at Bougival*, van Gogh's *Portrait of the Postman* and Winslow Homer's *The Fog Warning* as well as new contemporary art collections.

ISABELLA STEWART GARDNER MUSEUM gardnermuseum.org

Art and food abound at this museum. After checking out the museum's mainstays—from Vermeer's *The Concert* to Rembrandt's *The Storm on the Sea of the Galilee*—enjoy classic American fare along with more eclectic choices by chef-owner Peter Crowley.

THE SPORTS MUSEUM sportsmuseum.org

Delve into the history of the Boston area's top sports teams and events with exhibits on the Boston Bruins, New England Patriots, the Boston Marathon and the Boston Red Sox.

MUSEUM OF SCIENCE mos.org

Take your pick from among 500 interactive exhibits. Enjoy a variety of simulator experiences, from an orbital journey around the International Space Station to a ride on history's greatest flying machines. Get a first-hand look at cosmic collisions, fractal patterns and a close-up view of Mars in the Charles Hayden Planetarium.

MEETING-AT-A-GLANCE



ABSTRACT PRESENTATIONS

Topic-specific abstract presentations highlighting detailed research with discussion to follow. Session topics include:

- ▶ Adult Spinal Deformity
- ▶ Anterior Cervical and Complications
- ▶ Best Papers: Biologics and Interventional Care
- ▶ Best Papers: Cervical Myelopathy
- ▶ Best Papers: Disc Replacement and Socioeconomics
- ▶ Biomechanics/Mechanical Testing
- ▶ Cervical and Thoracolumbar Deformity
- ▶ Cervical Complications
- ▶ Cervical Myelopathy
- ▶ Cervical Surgery
- ▶ Deformity Complications
- ▶ Deformity Outcomes
- ▶ Deformity/Sagittal Alignment
- ▶ Diagnostics and Imaging
- ▶ Epidemiology
- ▶ Infections
- ▶ Injections and Biologics
- ▶ Intradiscal Biologic Therapy
- ▶ Low Back Pain and Imaging Modalities
- ▶ Lumbar Stenosis
- ▶ Lumbosacral/Pelvic
- ▶ Psychosocial
- ▶ Socioeconomics and Surgical Decision Making
- ▶ Spinal Trauma
- ▶ Spinal Tumors
- ▶ Spine Surgery in the Elderly Population
- ▶ Thoracolumbar Surgery

PRACTICAL THEATER

Connect with specific topics of interest to you and your practice as presented by selected speakers. Located in The Learning Place in the Technical Exhibition, presentations will occur during breaks throughout the day. NASS Research resources also can be found in the Practical Theater, including information on the NASS Registry, grants, clinical practice guidelines, appropriate use criteria, and patient safety and performance measurement initiatives.

ePOSTER STATIONS

ePosters can be viewed in The Learning Place in the Technical Exhibition.

GLOBAL SPINE FORUM

The 7th Annual Global Spine Forum will feature programming from international organizations. These sessions will highlight the state of spine care around the world.

POSTER GRAND ROUNDS

During the morning and afternoon networking breaks, attendees will have the opportunity to meet with and ask questions of ePoster authors.

NEW TECHNOLOGY PRESENTATIONS

New this year, exhibitors are invited to submit abstracts on new technologies. Reviewed by the Program Committee, the highest graded abstracts will be chosen to present during these afternoon sessions. Each presentation will be approximately six minutes and presented by an MD or PhD.

MONDAY, OCTOBER 24

7:30 a.m.–4:00 p.m. **Instructional Course** ■
Coding Update 2016: Essentials and Controversies of Spine Care Coding

8:00 a.m.–5:00 p.m. **Exhibitor Registration**

TUESDAY, OCTOBER 25

6:30 a.m.–4:30 p.m. **Attendee Registration**

7:30 a.m.–4:00 p.m. **Instructional Course** ■
Coding Update 2016: 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.–6:00 p.m. **Exhibitor Registration**

6:00–7:30 p.m. **Welcome Reception**

■ Requires separate registration fee

WEDNESDAY, OCTOBER 26

6:30–8:00 a.m.	Continental Breakfast
6:30 a.m.–5:00 p.m.	Attendee Registration NASS Resource Center
7:00 a.m.–5:00 p.m.	Exhibitor Registration
7:25–7:30 a.m.	Welcome Remarks
7:30–7:35 a.m.	NASS Working for You
7:35–9:00 a.m.	Interdisciplinary Symposium Own the Bone®: Establishing a Fragility Fracture Service and Preventing the Next Vertebral Fracture
9:00–10:00 a.m.	Best Papers Cervical Myelopathy
9:00–11:00 a.m.	Leadership Development and Training
9:00 a.m.–12:00 p.m.	Interdisciplinary Spine Forum Early Return to Work
9:00 a.m.–5:00 p.m.	Technical Exhibition ePosters NASS Career Fair
10:00–10:30 a.m.	Networking Break Beverage Service Practical Theater Poster Grand Rounds
10:30–10:35 a.m.	NASS Working for You
10:35 a.m.–12:00 p.m.	Symposia - Healthcare Outlook 2017: The Elections, Delivery System Reform and MACRA Implementation Guest Speaker: Bob Woodward - Section on Biologics and Basic Research: ACDF vs. TDR: Adjacent Segment Disease and Clinical Outcomes - Assessment and Management of Oncologic Lesions of the Spine: A Multidisciplinary Approach Abstract Presentations - Injections and Biologics - Complications
12:00–1:00 p.m.	Complimentary Box Lunch Medical Attendees Only Solution Showcase SpinePAC Luncheon

1:00–2:00 p.m.	Abstract Presentations - Thoracolumbar Surgery - Psychosocial - Cervical Surgery - Biomechanics - Infection
1:00–3:05 p.m.	Interdisciplinary Spine Forum The Global Spine Care Initiative: The Development of Evidence-informed, Practical, Sustainable Spine Healthcare Models for Communities Around the World with Various Levels of Resources (Part 1)
1:30–3:30 p.m.	Leadership Development and Training (Continued)
2:05–3:05 p.m.	Abstract Presentations - Cervical Myelopathy - Adult Spinal Deformity - Thoracolumbar Surgery - Complications - Diagnostics and Imaging
3:05–3:35 p.m.	Networking Break Beverage Service Poster Grand Rounds
3:35–3:40 p.m.	NASS Working for You
3:40–5:10 p.m.	Symposia - Value-based Healthcare: Impact on Caring for Spine Patients - Complex Spinal Infections: Comprehensive Evaluation and Management - Management of the Elderly Spine Patient - Case-based Discussions: Top Cases from SpineConnect Abstract Presentations - Anterior Cervical - Spinal Trauma Interdisciplinary Spine Forum The Global Spine Care Initiative: The Development of Evidence-informed, Practical, Sustainable Spine Healthcare Models for Communities Around the World with Various Levels of Resources (Part 2)
5:00–6:00 p.m.	SpineConnect Reception
5:00–8:00 p.m.	Surgical Innovation Workshops

THURSDAY, OCTOBER 27

6:30–8:00 a.m.	Continental Breakfast
6:30 a.m.–5:00 p.m.	Attendee Registration NASS Resource Center
6:50–6:55 a.m.	Announcements
6:55–7:00 a.m.	NASS Working for You
7:00–8:30 a.m.	Interdisciplinary Symposium Counteracting Stress, Burnout and Frustration with Coaching and Enhanced Self Care
7:00–9:30 a.m.	Interdisciplinary Spine Forum Gender Specificity: It's Time to Abandon "One Size Fits All" in Spine Care
8:00 a.m.–5:00 p.m.	Exhibitor Registration
8:30–9:30 a.m.	Best Papers Biologics and Interventional Care
9:00 a.m.–5:00 p.m.	Technical Exhibition ePosters NASS Career Fair
9:30–10:00 a.m.	Networking Break Beverage Service Practical Theater Poster Grand Rounds
10:00–10:15 a.m.	Patient-centered Outcomes Research Institute Update Joe V. Selby, MD, MPH, Executive Director, PCORI
10:15–11:00 a.m.	Introduction and Presidential Address F. Todd Wetzel, MD and Christopher M. Bono, MD
11:00 a.m.–12:00 p.m.	Introduction and Presidential Guest Speaker Christopher M. Bono and Michio Kaku, PhD
12:00–1:00 p.m.	Complimentary Box Lunch Medical Attendees Only Solution Showcase
1:00–1:05 p.m.	NASS Working for You

1:05–2:05 p.m.	The Spine Journal Outstanding Paper Awards Presentations Symposia • Think Before You Tweet #socialmedia #ethics #professionalism • Decreasing Radiation Exposure During Spine Surgery and Interventional Procedures Abstract Presentations • Lumbosacral/Pelvic • Deformity (AIS) • Cervical Complications
2:10–3:10 p.m.	Section Specialty Track • Section on Biologics & Basic Research • Section on Minimally Invasive Procedures: Abstract Presentations • Section on Radiology • Section on RIMS • Section on Robotics & Navigation • Section on Spine Motion Technology: Abstract Presentations
3:10–3:40 p.m.	Networking Break Beverage Service Members' Business Meeting Practical Theater Poster Grand Rounds
3:40–5:10 p.m.	Section Specialty Track • Section on Biologics & Basic Research: Abstract Presentations • Section on Minimally Invasive Procedures • Section on Radiology • Section on RIMS • Section on Robotics & Navigation • Section on Spine Motion Technology
5:00–6:00 p.m.	Resident, Fellow and Program Directors Reception NASS Joint Sections Reception
5:00–8:00 p.m.	Surgical Innovation Lab Workshops

FRIDAY, OCTOBER 28

6:30–8:00 a.m.	Continental Breakfast
7:00 a.m.–5:00 p.m.	Attendee Registration NASS Resource Center
7:20–7:25 a.m.	Announcements
7:25–7:30 a.m.	NASS Working for You
7:30–8:55 a.m.	Interdisciplinary Symposium Low Back Pain Secondary to Degenerative Disc Disease: Interdisciplinary Perspectives on the Value of Treatment
8:00–9:00 a.m.	Interdisciplinary Spine Forum Abstract Presentations Global Spine Forum
8:00 a.m.–1:00 p.m.	Exhibitor Registration
8:00 a.m.–4:30 p.m.	Ticketed Session  Optimizing Value and Outcomes in Spine Care: The Key Role of Psychologically-informed Practice
8:55–9:00 a.m.	NASS Working for You
9:00–10:00 a.m.	Best Papers Disc Replacement and Socioeconomics Global Spine Forum
9:00 a.m.–12:00 p.m.	Interdisciplinary Spine Forum Shoulder/Neck Syndromes: Evaluation and Treatment of Patients with Concurrent Neck Pain and Upper Quarter Pathology
9:00 a.m.–1:30 p.m.	Technical Exhibition ePosters
10:00–10:30 a.m.	Networking Break Beverage Service Practical Theater Poster Grand Rounds
10:30 a.m.–12:00 p.m.	Recognition Awards/Research Grant and Fellowship Awards Presentations 10:30–10:40: Recognition Awards 10:40–12:00: Research Grant and Fellowship Awards Presentations Abstract Presentations • Spine Surgery in the Elderly Population • Low Back Pain and Imaging Modalities • Cervical and Thoracolumbar Deformity • Spinal Tumors Global Spine Forum

12:00–1:00 p.m.	Complimentary Box Lunch <i>Medical Attendees Only</i> Solution Showcase
1:00–1:10 p.m.	North American Spine Foundation Update
1:00–2:00 p.m.	Global Spine Forum
1:00–2:45 p.m.	Interdisciplinary Spine Forum Whiplash-associated Disorders (WAD): A Biopsychosocial Perspective on its Assessment and Management (Part 1)
1:00–3:40 p.m.	Young Spine Surgeons Forum
1:10–1:15 p.m.	NASS Working for You
1:15–2:45 p.m.	Symposia • Intradiscal Biologic Therapy • Allografts for Spinal Fusion: Rethinking Dogma • Managing the Delivery of Spine Care: What Can Healthcare Learn from the Business Community Abstract Presentations Deformity Complications
2:00–3:00 p.m.	Global Spine Forum
2:00–6:30 p.m.	Resident/Fellow Surgical Hands-on Training Course 
2:45–3:15 p.m.	Networking Break Beverage Service
3:00–4:00 p.m.	Global Spine Forum
3:15–3:20 p.m.	NASS Working for You
3:15–4:45 p.m.	Interdisciplinary Spine Forum Whiplash-associated Disorders (WAD): A Biopsychosocial Perspective on its Assessment and Management (Part 2)
3:20–3:50 p.m.	Value Abstract Awards Presentations Resident and Fellow Research Awards Presentations
3:50–4:50 p.m.	Abstract Presentations • Anterior Cervical and Complications • Epidemiology • Socioeconomics and Surgical Decision Making • Deformity/Sagittal Alignment • Biomechanics Global Spine Forum
4:00–5:00 p.m.	Global Spine Forum
4:45–5:45 p.m.	International Reception <i>Open to all attendees and exhibitors</i>

 Requires separate registration fee

SATURDAY, OCTOBER 29

7:00–9:00 a.m.	Continental Breakfast
7:00 a.m.–12:00 p.m.	Attendee Registration
7:30–9:00 a.m.	Symposium Spinal Cord Stimulation and Function
7:30 a.m.–1:30 p.m.	Ticketed Session  Optimizing Value and Outcomes in Spine Care: The Key Role of Psychologically-informed Practice (Continued)
7:55–8:00 a.m.	Announcements
8:00 a.m.–12:30 p.m.	Resident/Fellow Hands-on Surgical Training Course (Continued) 
9:00–10:00 a.m.	Abstract Presentations • Lumbar Stenosis • Deformity Outcomes • Biomechanics/Mechanical Testing
10:00–10:30 a.m.	Networking Break <i>Beverage Service</i>
10:30 a.m.–12:00 p.m.	Symposia • Improving Outcomes and Reducing Complications for the Surgical Treatment of Degenerative Lumbar Scoliosis • Management of High Risk and Cancer Patients: Fast Track Recovery ERAS and Beyond • Changing Behavior through Physical Therapy: Improving Patient Outcomes
12:00 p.m.	Meeting Adjourns

 Requires separate registration fee

SESSION RECORDINGS ON DEMAND



This recording includes abstract presentations, symposia and ePosters. 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!

Visit nassannualmeeting.org to order annual meeting conference session recordings and get 24/7 access to scientific presentations.

EDUCATION CREDITS

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.

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.

CME/CEU CERTIFICATES

After the meeting, evaluations will be submitted electronically and CME certificates will be printed directly from our website. Visit spine.org/CME to claim education credit and to print CME certificates. Contact education@spine.org with questions.

CONTINUING MEDICAL EDUCATION (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 27 *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 may be obtained by attending the additional courses, including: Hands-on course: Minimally Invasive Spine Surgery, Optimizing Value and Outcomes in Spine Care: The Key Role of Psychologically-informed Practice and the Resident/Fellow Surgical Hands-on Training Course.

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.

Nurses: For the purpose of recertification, American Nurses Credentialing Center (ANCC) accepts *AMA PRA Category 1 Credit™* from organizations accredited by the ACCME.

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

Requirements vary for other allied health and advanced practice providers; please contact your licensing organization for their requirements.

HOUSING INFORMATION

onPeak is the official housing provider for the 2016 Annual Meeting.

When booking through onPeak, you will have housing support staff to assist you prior to your arrival as well as on-site staff to support you should you have any housing issue while in Boston. Other companies may attempt to present themselves as affiliates of NASS. OnPeak is the one and only housing provider for the Annual Meeting.

WHY YOU SHOULD STAY IN NASS-CONTRACTED HOUSING

DEDICATED STAFF

Staff will assist with hotel selection and city information.

PREFERRED RATE GUARANTEE

NASS meets the prices of online hotel room providers. Go to nassannualmeeting.org for details.

CONVENIENT DEPOSIT POLICY

Secure your individual hotel reservation or block of 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.

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 will monitor 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	Phone	Fax
nassannualmeeting.org in conjunction with meeting registration	800-545-1773 US/Canada 312-527-7300 International 9:00 a.m.–6:00 p.m. ET	888-726-9290 US/Canada 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 September 20, 2016; 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 another hotel for attendees. This is not a guarantee as it is based on rates and availability within the city of Boston over our meeting dates.

HOTEL CANCELLATION/CHANGE POLICY

Changes may be made to existing reservations online with the confirmation number and password listed on your confirmation; by e-mail to nassannualmeeting@onpeak.com 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 Thursday, October 20, 2016 based on availability. After October 20, 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.

Official Hotels

Official Hotels & Rates:

1 Boston Convention & Exhibition Center (BCEC)			
2	Aloft Boston Seaport	401-403 D Street	\$260 Single/Double
3	Boston Marriott Copley Place	110 Huntington Avenue	\$303 Single/Double
4	Courtyard Boston Tremont Hotel	275 Tremont Street	\$262 Single/Double
5	Doubletree Hotel Downtown Boston	821 Washington Street	\$269 Single/Double
6	Element Boston Seaport	391-395 D Street	\$270 Single/Double
7	Fairmont Copley Plaza Boston	138 St James Avenue	\$340 Single/Double
8	Hilton Boston Downtown/ Faneuil Hall	89 Broad Street	\$285 Single/Double
9	Hyatt Regency Boston	One Avenue de Lafayette	\$291 Single/Double
10	Omni Parker House	60 School Street	\$259 Single/Double
11	Park Plaza Hotel & Towers	50 Park Plaza at Arlington Street	\$299 Single/Double
12	Renaissance Boston Waterfront	606 Congress Street	\$314 Single/Double
13	Seaport Hotel	One Seaport Lane	\$315 Single/Double
14	Sheraton Boston Hotel	39 Dalton Street	\$265 Single/Double
15	Westin Boston Waterfront (HQ)	425 Summer Street	\$275 Single/Double
16	Westin Copley Place	10 Huntington Avenue	\$309 Single/Double



REGISTRATION



ANNUAL MEETING REGISTRATION FEES

	Member Physician	Member Affiliate Health	Member Emeritus	Member Resident/Fellow	Nonmember Physician	Nonmember Affiliate Health ¹	Nonmember Resident/Fellow ²	Commercial Business ³	Guest ⁴
By July 25	\$695	\$395	\$295	\$155	\$995	\$545	\$225	\$995	\$275
July 26–September 20	\$895	\$595	\$495	\$255	\$1195	\$745	\$325	\$1195	\$375
September 21–October 29	\$995	\$695	\$595	\$355	\$1295	\$845	\$425	\$1295	\$375

¹**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).

²**Nonmember Resident/Fellow:** Must provide a letter on letterhead from your program director.

³**Commercial Business:** Interest in spine field but does not treat patients. Not permitted to purchase guest registrations.

⁴**Guest (limit 1):** Includes breakfast (Wed.–Sat.) and lunch (Wed.–Fri.).

VIRTUAL MEETING REGISTRATION

Access a live stream and recordings of all educational sessions.

Member \$375

Nonmember \$555

ON DEMAND RECORDINGS

Member: \$50

Nonmember \$75

CODING UPDATE 2016: ESSENTIALS AND CONTROVERSIES OF SPINE CARE CODING

Monday, October 24 and Tuesday, October 25, 7:30 a.m. – 4:00 p.m.

Member Physician	Member Affiliate Health	Member Resident/Fellow	Nonmember Physician	Nonmember Affiliate Health	Nonmember Resident/Fellow
\$700	\$550	\$350	\$800	\$600	\$400

HANDS-ON COURSE: MINIMALLY INVASIVE SPINE SURGERY

Tuesday, October 25, 7:30 a.m.–4:30 p.m.

PHYSICIANS ONLY	Member Physician	Nonmember Physician
By July 25	\$895	\$995
July 26–Oct. 25	\$995	\$1095

OPTIMIZING VALUE AND OUTCOMES IN SPINE CARE: THE KEY ROLE OF PSYCHOLOGICALLY-INFORMED PRACTICE

Friday, October 28: 8:00 a.m.–4:30 p.m.; Saturday, October 29: 7:30 a.m.–1:30 p.m.

Member Physician	Member Affiliate Health	Member Resident/Fellow	Nonmember Physician	Nonmember Affiliate Health	Nonmember Resident/Fellow
\$700	\$500	\$350	\$800	\$600	\$400

RESIDENT/FELLOW SURGICAL HANDS-ON TRAINING

Friday, October 28: 2:00–6:30 p.m.; Saturday, October 29: 8:00 a.m.–12:30 p.m.

	Member Physician	Nonmember Physician
By July 25	\$300	\$400
July 26–Oct. 25	\$350	\$450

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, October 26 through Saturday, October 29;
- ▶ Continental breakfasts and beverage breaks (Wednesday through Saturday);
- ▶ Box lunches (Wednesday through Friday);
- ▶ Welcome reception (Tuesday evening).

Additional fees apply for Instructional and Hands-on Courses. All ticketed courses will be held at the Boston Convention and Exhibition Center.

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

QUESTIONS?

Call NASS at 866-960-6277 or 630-230-3600.

NASS MEMBERSHIP DISCOUNTS AND REWARDS

All attendees registering for the Annual Meeting are encouraged to become members and 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 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*, access to SpineConnect, 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.

Detailed information about benefits, qualifications for membership and an online application can be found at spine.org. You can also join by completing the membership section of the Annual Meeting registration form and sending a copy of your current curriculum vitae (CV) or résumé to membership@spine.org.

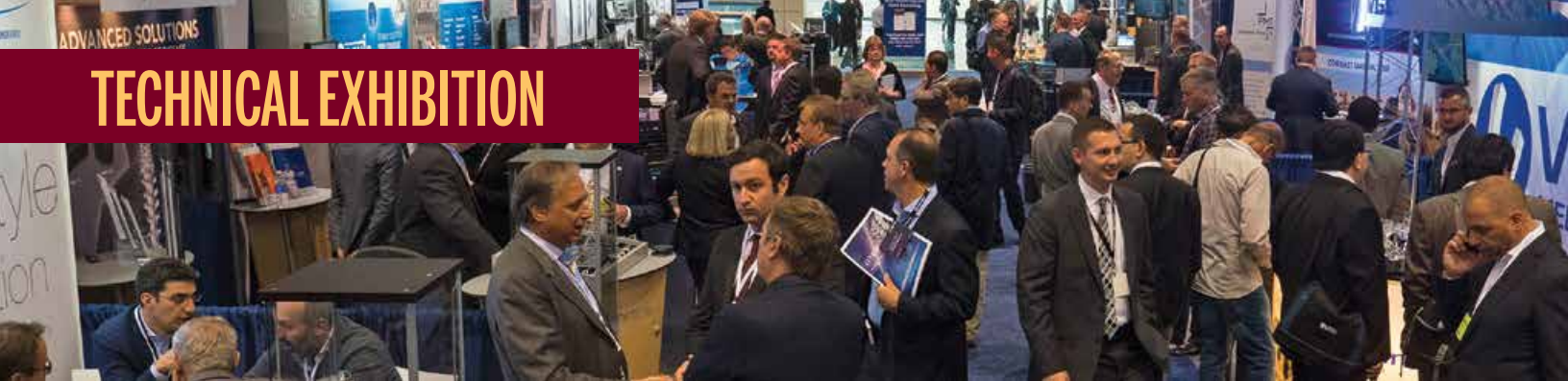
Questions regarding membership can be directed to the membership department by sending an email to membership@spine.org or calling 866-960-NASS (6277) or 630-230-3600.

ALREADY A MEMBER?

Earn \$25 in NASS Store credit and be entered into a drawing for a free 2017 membership for every colleague that you refer through the 2016 Member-Get-A-Member program; full details about this program can be found at spine.org.



TECHNICAL EXHIBITION



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 exhibitatnass.org for information.

SURGICAL INNOVATION LABS

See the latest surgical innovations in action! Come see industry demonstrate their latest products or join one of their surgical training workshops in the evening. These cadaveric demonstrations and workshops will run Wednesday through Friday. Check nassannualmeeting.org for schedules.



THE LEARNING PLACE

Tired of 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. Get up to date on the latest techniques and get your heart rate up at the Exercise Demonstration area. During the morning and afternoon networking breaks, meet with and ask questions of selected ePoster authors in addition to viewing all ePosters. Sit down in the Practical Theater and hear from NASS experts on topics of interest to you and your practice. NASS research resources also can be found in the Practical Theater, including information on the NASS Registry, grants, clinical practice guidelines, appropriate use criteria, and patient safety and performance measurement initiatives.

NASS BISTRO

The NASS Bistro is a great food option that saves time, allows attendees and exhibitors to purchase a hot lunch, and provides the largest variety and best value for lunch at the Convention Center. **Please note:** A box lunch is included in the attendee registration fee for Wednesday, Thursday and Friday. The NASS Bistro is an added lunch option at the Annual Meeting. Please visit spine.org for updated pricing and meal options during Summer 2016.

SOLUTION SHOWCASE

Lunch 'n' Learn in the Solution Showcase. Use your lunchtime to learn more about specific products and solutions to help you provide your professional care. The theatre presentation schedule will be posted at nassannualmeeting.org in June.

NASS CAREER FAIR

OCTOBER 26–27 9:00 a.m.–5:00 p.m.

NASS is pleased to offer the third NASS Career Fair. Stop by to speak with employers face-to-face about opportunities in their organizations.

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 complete a brief profile and upload your CV, and participating companies will be able to reach out to you to set up interviews. And if you won't be attending the meeting in Boston, you can still participate in the Career Fair by signing up online to make your information available to participating employers.

If your company or organization is recruiting and would like more details on how they can participate please direct any questions to Mark McGuire at 727-497-6565 Ext. 3312 or m.mcguire@yourmembership.com.

ACKNOWLEDGEMENTS



2015-2016 BOARD OF DIRECTORS

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

Christopher M. Bono, MD

President

F. Todd Wetzel, MD

1st Vice President

Daniel K. Resnick, MD, MS

2nd Vice President

William J. Sullivan, MD

Secretary

Jeffrey C. Wang, MD

Treasurer

Heidi Prather, DO

Past President

Edward J. Dohring, MD

Education Council Director

Alan S. Hilibrand, MD

Continuing Medical Education Chair

Donna Ohnmeiss, PhD

Education Publishing Chair

Charles A. Reitman, MD

Research Council Director

Charles H. Cho, MD, MBA

Evidence Compilation & Analysis Chair

Zoher Ghogawala, MD, FACS

Clinical Research Development Chair

Eric Truumees, MD

Administration & Development
Council Director

Jerome Schofferman, MD

Ethics and Professionalism
Committee Chair

TBD

Section Development Chair

Mitchel B. Harris, MD, FACS

Governance Committee Chair

David R. O'Brien, Jr., MD

Health Policy Council Director

Joseph S. Cheng, MD

Payer Policy Review Committee Chair

John G. Finkenberg, MD

Advocacy Council Director

Norman B. Chutkan, MD

At-Large Member

Matthew Smuck, MD

At-Large Member

David Rothman, PhD

Ethicist

Eric J. Muehlbauer, MJ, CAE

Executive Director

2016 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:

Christopher M. Bono, MD

President

Alan S. Hilibrand, MD

D. Scott Kreiner, MD

2016 Program Co-chairs

Michael D. Daubs, MD

Gwendolyn Sowa, MD, PhD

2015 Program Co-chairs

Ted Dreisinger, MD, PhD

Conor O'Neill, MD

2017 Program Co-chairs

Edward J. Dohring, MD

Education Council Director

Srinivas K. Prasad, MD

Joshua E. Heller, MD

2016 Program Committee Liaisons

DISCLAIMER

The material presented at the 31st 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.

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 Committee on Ethics and Professionalism, 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 31st 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

Board of Directors and Program Committee Disclosures

Bono, Christopher M.: Royalties: Wolters Kluwer (B); Consulting: CRICO (B), United Health Care (B, Advisory Board); Board of Directors: North American Spine Society (D, President); Other Office: JAAOS (B, Deputy Editor Stipend); Fellowship Support: OMEGA (D, Paid directly to institution/employer).

Cheng, Joseph S.: Trips/Travel: DePuy Synthes (Amount not disclosed, Paid directly to institution/employer); Other Office: AANS/CNS (Recording Secretary: AANS/CNS Council of State Neurosurgical Societies, Past-Chair: AANS/CNS Joint Spine Section).

Cho, Charles H.: Board of Directors: North American Spine Society (Evidence Compilation and Analysis Chair, travel expenses); Other Office: American Society of Neuroradiology (Finance Management Committee Co-chair).

Chutkan, Norman B.: Royalties: Globus Medical (E); Speaking and/or Teaching Arrangements: AO North America (Travel expenses); Board of Directors: AOSpine North America (Travel expenses), North American Spine Society (Travel expenses, At Large Member).

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); Fellowship Support: AOSpine North America (D, Paid directly to institution/employer); Other Office: North American Spine Society (2015 Annual Meeting Program Co-chair).

Dohring, Edward J.: Royalties: Stryker (E, Paid directly to institution/employer); Board of Directors: North American Spine Society (Travel expenses, Education Council Director); Research Support - Staff and/or Materials: Medtronic (B, Paid directly to institution/employer).

Dreisinger, Thomas E.: Stock Ownership: Scientific Exercise (<1%); Consulting: Scientific Exercise (Executive Vice President of Outcomes Research); Speaking and/or Teaching Arrangements: Various (Amount not disclosed); Trips/Travel: Scientific Exercise (Travel expenses), North American Spine Society (Travel expenses); Board of Directors: McKenzie Institute International (C).

Finkenberg, John G.: Board of Directors: North American Spine Society (Travel expenses, Advocacy Council Director); Research Support - Staff and/or Materials: Biomet (B).

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); Other Office: Congress of Neurological Surgeons (Vice-President); Research Support - Staff and/or Materials: Stuart Foundation (F, Private Paid directly to institution/employer); Grants: NIH (A), PCORI (H, Paid directly to institution/employer).

Harris, Mitchel: Consulting: HCRI (Amount not disclosed), Medtronic (Amount not disclosed, Paid directly to institution/employer); Board of Directors: North American Spine Society (Governance Committee Chair).

Heller, Joshua E.: Nothing to Disclose.

Hilibrand, Alan S.: Royalties: Biomet Spine (G), Amedica (D), Aesculap (B); Stock Ownership: Amedica (<1%), LifeSpine (<1%), Spinal Ventures (<3%); Private Investments: Benvenue (B), Nexgen (B), Paradigm Spine (B), Pioneer (10000 Shares), PSD (B), VertiFlex (B); Board of Directors: AAOS (Chair of Communications Cabinet), CSRS (President), North American Spine Society (CME Chair, 2016 Annual Meeting Program Co-chair).

Kreiner, Scott: Stock Ownership: LDR Holdings (<1%); Speaking and/or Teaching Arrangements: North American Spine Society (Travel expenses); Trips/Travel: ISIS (Travel expenses); Other Office: North American Spine Society (2016 Annual Meeting Program Co-chair).

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

O'Brien, David R.: Speaking and/or Teaching Arrangements: North American Spine Society (B, Health Policy Council Director); Trips/Travel: ISIS (Travel expenses, Socioeconomic Council Vice Chair), AAPMR (Travel expenses, NC CAC Representative).

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

O'Neill, Conor: Stock Ownership: Relivant (<1%), Nocimed (<1%).

Prasad, Srinivas K.: Consulting: Stryker Spine (D), Medtronic (B); Speaking and/or Teaching Arrangements: Stryker Spine (D), DePuy-Synthes (B); Board of Directors: AKOS Health Systems (Board member); Fellowship Support: AOSpine (E, Paid directly to institution/employer), NREF (E, Paid directly to institution/employer).

Prather, Heidi: Speaking and/or Teaching Arrangements: PM&R (Amount not disclosed, Senior Editor for PM&R Journal); Trips/Travel: North American Spine Society (Travel expenses); Board of Directors: North American Spine Society (Past President).

Reitman, Charles A.: Trips/Travel: North American Spine Society (Travel expenses, Research Council Director); Scientific Advisory Board: Clinical Orthopedics and Related Research (B, Deputy Editor, Paid directly to institution/employer).

Resnick, Daniel K.: Board of Directors: North American Spine Society (Second Vice President), CNS (Past President).

Rothman, David: Board of Directors: North American Spine Society (Ethicist); Other Office: Hagens Berman (Expert witness), Farrise (Expert witness); 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 & Professionalism Chair).

Smuck, Matthew: Stock Ownership: NuSpine (<1%, Scientific Advisory Board), BlueJay Mobile-Health (<1%, Chief Advisor); Private Investments: Vivametrix/Sikoya (20%); Trips/Travel: Spine Intervention Society (B), North American Spine Society (B); Board of Directors: Vivametrix / Sikoya (None), Spine Intervention Society (None), North American Spine Society (None); Scientific Advisory Board: NuSpine (Stock options), Lumo Body Tech (Stock options), BlueJay Mobile-Health (Stock options); Other Office: The Spine Journal (Deputy Editor), Spine Intervention Society (Board of Directors), North American Spine Society (At Large Member); Other: Expert witness - State Farm (F), Expert witness - Kaiser Permanente (F); Relationships Outside the One-Year Requirement: Cytonics (Research Support: Staff and/or Materials, Dissolved 12/2013, F).

Sowa, Gwendolyn A.: Royalties: UpToDate (A); Consulting: Advantage Healthcare Inco (A); Board of Directors: Association of Academic Physiatrists (Board of Trustees); Other Office: Association of Academic Physiatrists (Research Committee), American Academy of Physical Medicine and Rehabilitation (Evidence Based Practice Committee); Research Support - Investigator Salary: NIH (E, Paid directly to institution/employer), PCORI (E, Paid directly to institution/employer), Foundation for PMR (E, Paid directly to institution/employer), The Pittsburgh Foundation (E, Paid directly to institution/employer), OREF (E, Paid directly to institution/employer); Research Support - Staff and/or Materials: Wings of Life Foundation (D); Other Office: North American Spine Society (2015 Annual Meeting Co-chair).

Sullivan, William J.: Trips/Travel: North American Spine Society (B); Board of Directors: North American Spine Society (Secretary).

Truemees, Eric: Royalties: Stryker Spine (C); Stock Ownership: Doctor's Research Group (<1%); Private Investments: IP Evolutions (33%); Board of Directors: North American Spine Society (Travel expenses, Administration and Development Council Director); Other Office: AAOS (Incoming Editor-in-Chief of AAOS Now, AAOS Communications Cabinet); Research Support - Investigator Salary: Relivant (B, Paid directly to institution/employer); Research Support - Staff and/or Materials: Globus (B, Paid directly to institution/employer); Other: Stryker Biotech (None, Paid directly to institution/employer).

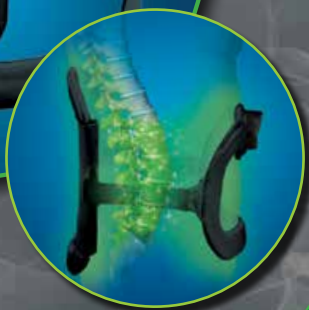
Wang, Jeffrey C.: Royalties: Stryker (A), Osprey (B), Aesculap (B), Biomet (G), Amedica (D), SeaSpine (D), Synthes (C); Stock Ownership: FzioMed (<1%), Alphatec (<1%); Private Investments: Promethean Spine (<1%), Paradigm Spine (<1%), Benvenue (<1%), Nexgen (<1%), Amedica (<1%), VertiFlex (<1%), ElectroCore (<1%), Surgitech (<1%), CoreSpine (<1%), Expanding Orthopaedics (<1%), Osprey (<1%), Bone Biologics (<1%), Curative Biosciences (<1%), PearlDiver (<1%); Board of Directors: North American Spine Society (Treasurer), North American Spine Foundation (None), Cervical Spine Research Society (Travel expenses), AOSpine/AO Foundation (E); Fellowship Support: AO Foundation (E, Paid directly to institution/employer).

Wetzel, F. Todd: Stock Ownership: Relivant Medical (<1%); Board of Directors: McKenzie Institute International (B), North American Spine Society (1st Vice President).

Spine Solutions from ORTHOFIX



*BioStim,
Spinal-Stim®*



*Spine Fixation,
FORZA® PTC™*



*Biologics,
Trinity ELITE®*



Discover the full range of Orthofix® spine solutions at the NASS annual meeting. See how our innovative products directly improve the quality of patients lives.

BioStim
Biologics
Spine Fixation

Orthofix.com

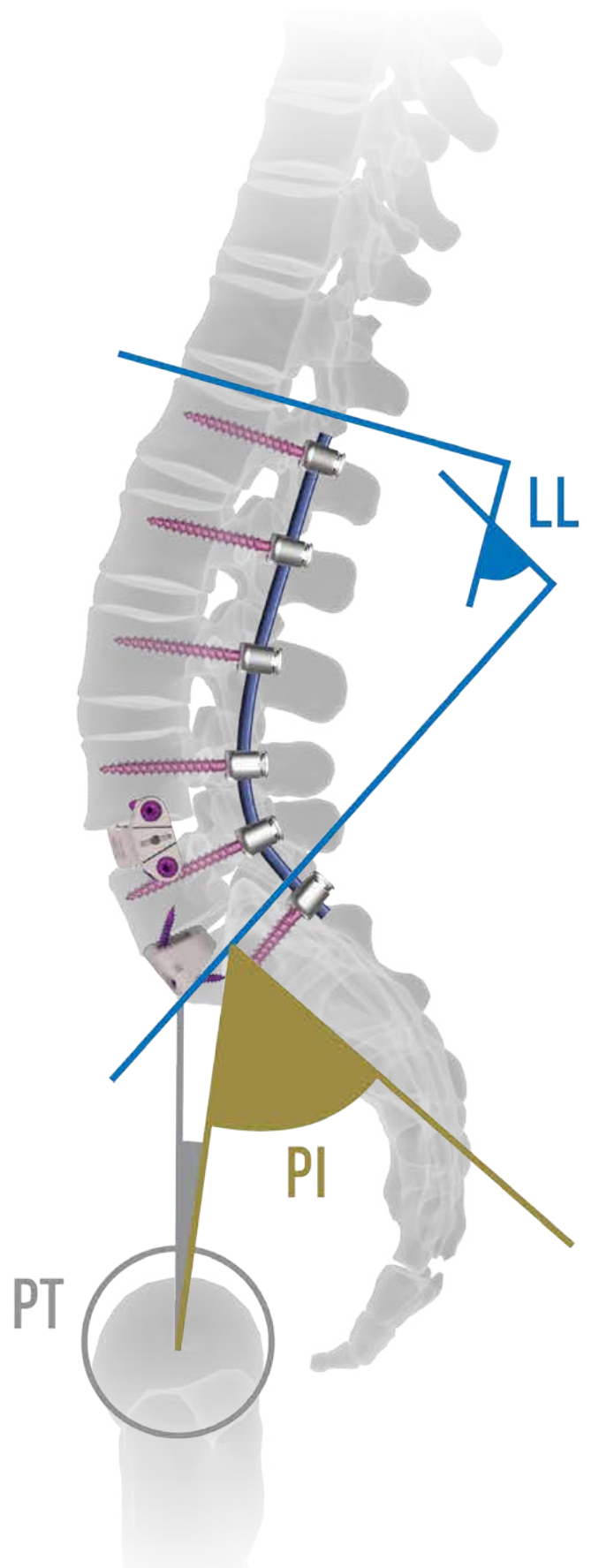
 **ORTHOFIX®**

ALIGNMENT MATTERS.



Integrated Global Alignment (iGA™) is a platform comprised of procedurally based technologies, designed to enhance clinical and economic outcomes by increasing the predictability of achieving global alignment in all spinal procedures. Integration across the surgical workflow allows the surgeon to confidently and reproducibly:

- **Calculate** alignment parameters with preoperative planning tools.
- **Correct** the anterior and posterior column with comprehensive procedural solutions from NuVasive® with the industry's only real-time intraoperative assessment.
- **Confirm** the restoration and preservation of global alignment postoperatively.

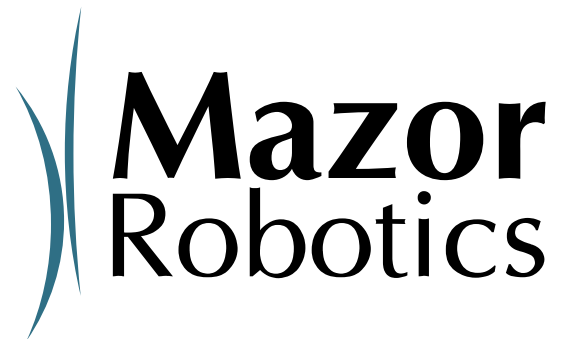


RELINE
NUVALINE®

XLIF ACR
NUVAMAP®

ALIF ACR
NUVAMAP®
O.R.

BENDINI
NUVASIVE
Speed of Innovation®



Visit us at
NASS 2016

October 26-29 | Boston, MA.

Embrace the Future of Surgical Technology with
Mazor Robotics Renaissance®
Guidance System

Renaissance
From Art to State of the Art

TheresANewWay.com

NASS 2016 ANNUAL MEETING • OCTOBER 26-29, 2016 • BOSTON, MA.