



FOUNDED 1973

CSRS 2019

PROGRAM BOOK

www.csrs.org

Alexander R. Vaccaro, MD, PhD, MBA, *President*Michael D. Daubs, MD, *Instructional Course Program Chair*Gregory D. Schroeder, MD and Justin Smith, MD, *Scientific Program Co-Chairs*

WIFI Information Network Name: Marriott_CONF Password: CSRSMeeting2019

THE MARRIOTT MARQUIS . NEW YORK CITY, NY

MORE CONTACT. MORE VISUALIZATION. MORE PRECISION.

T2 Stratosphere

Expandable Corpectomy System





Stop by the Medtronic booth and visit medtronic.com/t2s to learn more.

T2 Stratosphere Expandable Corpectomy System

INDICATIONS

Cervical (C2-C7) - 13mm Centerpieces Only

To be used in skeletally mature patients to replace a collapsed, damaged, or unstable vertebral body due to tumor, trauma lie. Fracturel, or osteomyelitis, or for reconstruction in cervical degenerative disorders, or for patients with advanced stage tumors in whom life expectancy is of insufficient duration to permit achievement of fusion. The device is intended to be used with supplemental fixation and must include posterior fixation at more than two levels. The System is intended for use with autograft or allogenic bone graft comprised of cancellous and/or corticocancellous bone graft as an adjunct to fusion. RISKS

A successful result is not always achieved in every surgical case. Potential risks associated with the

- Subsidence, implant migration, or vertebral body fracture
- Tissue damage, nerve damage, or loss of neurological function implant loosening, breakage, fracture, or debris
- Postoperative change in spinal curvature, loss of correction, height, and/or reduction Site complications including pain, infection, or wound healing problems.

Atlantis VisionTH Elite Anterior Cervical Plate

The Atlantis Vision¹⁷⁶ Elite Anterior Cervical Plate is intended for anterior interbody screw fixation The Attantis vision "Elist Anterior Cervical Plate's intendentor afterior interior screw historior from C2 to 71. The indications of socious restrictions of spinal instrumentation systems should be well understood by the surgeon. The system is indicated for use in the temporary stabilization of the anterior spine during the development of cervical spinal fusions in patients with: 1) degeneration disc disease las defined by neck pain of discogenic origin with degeneration of the disc confirmed by patient history and radiographic studies), 2) traums (including fractures), 3) tumors, 4) deformity (defined as kyphosis, lordosis, or scoliosis), 5) pseudarthrosis, and/or 6) failed previous fusions.

1. Compared to T2 Altitude" Device

© 2019 Modtronic, UC202004566 EN PMD023231-1.0

Medtronic

Further, Together



DAILY SCHEDULE

2019 Instructional Course & Annual Meeting

Tuesday, November 19, 2019

12:00 PM - 5:00 PM 1:00 PM - 6:00 PM	Registration Open – <i>5th Floor Foyer</i> Technical Exhibit Set-Up – <i>Westside Ballroom, 5th Floor</i>
6:00 AM - 7:00 PM 7:00 AM - 7:45 AM 7:00 AM - 5:00 PM 7:45 AM - 5:00 PM 10:06 AM - 10:36 AM 11:30 AM - 5:00 PM 11:48 AM - 12:48 PM 3:09 PM - 3:30 PM 5:00 PM - 6:00 PM 6:00 PM - 8:00 PM	Wednesday, November 20, 2019 Registration Open – 5th Floor Foyer Breakfast – Westside Ballroom, 5th Floor Exhibit Hall Open – Westside Ballroom, 5th Floor Scientific Program - Instructional Course* – Broadway Ballroom, 6th Floor Break – Westside Ballroom, 5th Floor Board of Directors Meeting – Odets, 4th Floor Lunch – Westside Ballroom, 5th Floor Break – Westside Ballroom, 5th Floor Instructional Course Reception – Westside Ballroom, 5th Floor NuVasive Industry Event Pre-registration required. For more info, contact jreeves@nuvasive.com.
6:00 AM - 5:00 PM 6:00 AM - 5:00 PM 6:00 AM - 7:00 AM 6:00 AM - 5:00 PM 7:00 AM - 5:00 PM	Thursday, November 21, 2019 Registration Open – 5th Floor Foyer E-Posters Open – 5th Floor Foyer Breakfast – Westside Ballroom, 5th Floor Exhibit Hall Open – Westside Ballroom, 5th Floor Scientific Session - Annual Meeting* – Broadway Ballroom, 6th Floor
8:00 AM - 10:00 AM 9:15 AM - 9:45 AM 11:30 AM - 1:30 PM	CSRS Spouse and Guest Breakfast – Wilder, 4th Floor Break – Westside Ballroom, 5th Floor Industry Workshops & Lunch – Meeting Rooms on 4th and 6th Floors
3:25 PM - 3:55 PM 5:00 PM - 6:30 PM 6:30 PM - 9:00 PM	Break – Westside Ballroom, 5th Floor Annual Meeting Welcome Reception – Westside Ballroom, 5th Floor Medtronic Industry Dinner Pre-registration required. For more info, visit Medtronic Booth #406
	Friday, November 22, 2019
6:00 AM - 5:00 PM 6:00 AM - 5:00 PM 6:00 AM - 7:00 AM 6:00 AM - 1:30 PM 7:00 AM - 4:00 PM 8:00 AM - 10:00 AM 9:20 AM - 9:54 AM 12:05 PM - 1:05 PM	Registration Open — 5th Floor Foyer E-Posters Open — 5th Floor Foyer Breakfast — Westside Ballroom, 5th Floor Exhibit Hall Open — Westside Ballroom, 5th Floor Scientific Session - Annual Meeting* — Broadway Ballroom, 6th Floor CSRS Spouse and Guest Breakfast — Wilder, 4th Floor Break — Westside Ballroom, 5th Floor
2:25 PM - 2:55 PM	Lunch – Westside Ballroom, 5th Floor Break – Broadway Foyer

Saturday, November 23, 2019

CSRS Members' Business Meeting – Broadway Ballroom, 6th Floor

6:00 AM - 12:00 PM	Registration Open – 5th Floor Foyer
6:00 AM - 12:00 PM	E-Posters Open – 5th Floor Foyer
6:00 AM - 7:00 AM	Breakfast – Westside Ballroom, 5th Floor
7:00 AM - 12:48 PM	Scientific Session - Annual Meeting* - Broadway Ballroom, 6th Floor
8:00 AM - 10:00 AM	CSRS Spouse and Guest Breakfast – Wilder, 4th Floor
11:15 AM - 11:29 AM	Break – <i>Broadway Foyer</i>
12:49 PM	Annual Meeting Adjourns

^{*} Denotes CME Session

4:00 PM - 4:30 PM

WELCOME TO THE CSRS 24TH INSTRUCTIONAL COURSE AND 47TH ANNUAL MEETING



CSRS President Alexander Vaccaro, MD, PhD, MBA



CSRS Asia Pacific Section President Kyung-Soo Suk, MD, PhD



CSRS European Section President Björn Zoega, MD, PhD

LETTER FROM NYC LOCAL HOST

On behalf of the CSRS, I want to welcome you to join us at this year's CSRS Meeting in NYC November 20-23, 2019.

This will be a very exciting meeting in one of the greatest cities in the world. There are so many incredible things to do while you are here.

The hotel is very centrally located and there are many fun places and activities within walking distance or a short cab ride. You might want to take in one of the many new plays or musicals on Broadway. Or you might want to take in a NY Knicks, NY Rangers or Brooklyn Nets game or two during your visit. There are restaurants for every taste and kind of food. The museums are also unparalleled (The Met, MOMA, Guggenheim, Museum of Natural History). The 9/11 memorial should not be missed as well! Lastly, November in NY starts the holiday season with both Thanksgiving and Christmas festivities getting underway.

I look forward to seeing you in New York!

Andrew C. Hecht M.D.

Chief Spine Surgery, Mount Sinai Hospital and Health, New York City



FOUNDED 1973

ORIGINS OF THE SOCIETY

The Cervical Spine Research Society is an organization of individuals interested in clinical and research problems of the cervical spine. Its purpose is the exchange and development of ideas and philosophy regarding the diagnosis and treatment of cervical spine injury and disease.

The concept of a sub-specialty group devoted to the cervical spine was first considered in 1966. As interest in this area grew, a preliminary meeting to consider the formation of such an organization was held in Las Vegas, Nevada, in February, 1973, during the annual meeting of the American Academy of Orthopaedic Surgeons.

Present at the meeting were Edward H. Simmons and Ian McNab of Toronto; Richard Rothman and Henry H. Sherk of Philadelphia; Lee H. Riley, Jr. of Baltimore; Alice L. Garrett of West Haverstraw, New York; and Bernard Jacobs and J. William Fielding of New York City.

The name "Cervical Spine Research Society" was agreed upon and annual meetings were planned. The first such meeting was held in New York City in November, 1973. Since that time, yearly meetings have taken place at various locations within the North American continent.

Since the primary purpose of the organization is to carry out research and develop and exchange information on the cervical spine, international participation has been encouraged.

To provide a wide range of interest, it was felt that the composition of the membership should reflect the varying specialties and disciplines dealing with the cervical spine; biomechanical engineering, neurology, neurosurgery, radiology, orthopaedic surgery, and others. Qualifications for membership were to include demonstration of continued interest in the cervical spine and its related structures.

The organization has developed projects and has continued to grow. Current members are encouraged to seek out individuals, with appropriate interests, for membership to ensure the Society's future.

J. William Fielding, MD

MISSION STATEMENT

The Cervical Spine Research Society is a multidisciplinary organization that provides a forum for the exchange of ideas and promotes clinical and basic science research of the cervical spine. The organization values collegial interaction and strong scientific principles.

TABLE OF CONTENTS

Daily Schedule	
Welcome	
Origins of the Society	
Exhibit Companies	
Exhibit Hall Floor Plan	
Instructional Course Schedule	
Las Vegas Save the Date	
Annual Meeting Schedule	
Workshop Sponsors	
Future Meetings	
CME Information	
Disclosure of Conflict of Interest	
FDA Statement	
Insurance, Liabilities, and Disclaimer	
Henry H. Bohlman Presidential Guest Lecture	
Henry H. Bohlman Educational Endowment Fund Donors	
Industry Partner Thank You	
CSRS Legacy Donors	



FOUNDED 1973

Cervical Spine Research Society 555 E Wells St. Suite 1100 Milwaukee, WI 53202 Phone: 414-918-9834

> Fax: 414-276-3349 Email: info@csrs.org

No electronic devices of any kind may be used to record any portion of the Instructional Course, Annual Meeting Scientific Program, E-Posters or Technical Exhibits.



4WEB Medical is an orthopedic implant device company founded in 2008 in Dallas, Texas. The company's proprietary truss implant

platform utilizes mechanobiology to actively participate in the healing process. Under load, the implants deliver strain to adjacent cellular material, stimulating osteogenic activity. The 4WEB Medical product portfolio includes Cervical, Anterior, Posterior and Lateral Spine Truss Systems, as well as the Osteotomy Truss System and custom implant services for extremity, tumor and trauma procedures. To learn more about 4WEB Medical's Truss Implant Technology™ visit www.4webmedical.com.

ADDI+IVE IMPLANTS

215

213

Additive Implants is a medical device company based in Phoenix, Arizona. The company is focused on identifying and providing solutions to unmet surgeon needs. Through the power of additive manufacturing, Additive Implants develops devices with properties unlike any other on the market. Our unique designs utilize optimized geometries and features that address clinical challenges and improve patient outcomes. Procedure specific instrumentation provides for safe, simple and reproducible techniques. For more information, go to our website: www.additiveimplants.com.



AlloSource. Advancing Cellular & Tissue Therapies. Please stop by our new booth and learn how AlloSource partners with healthcare leaders to progress patient healing. AlloSource is a preferred provider of innovative allograft solutions including cellular bone allografts, spinal

grafts and DBMs, for spine procedures . AlloSource is registered with the FDA, accredited by the AATB and is compliant with all applicable state regulations and with the ISO 9001:2008 standard.

411

Alphatec Holdings, Inc., through its wholly-owned subsidiaries, Alphatec Spine, Inc. and SafeOp Surgical, Inc., is a medical device company

dedicated to revolutionizing the approach to spine surgery. ATEC designs, develops and markets spinal fusion technology products and solutions for the treatment of spinal disorders associated with disease and degeneration, congenital deformities and trauma. The Company markets its products in the U.S. via independent sales agents and a direct sales force.

413

TLAS spine Atlas Spine creates, manufactures, and markets minimally invasive implant and instrument systems for the treatment of various

pathologies of the spine. Our mission is to develop and market the most innovative, costeffective, and clinically efficacious spinal implant systems available. By working intimately with some of today's top spine surgeons Atlas is building its reputation as an innovator in the spine implant industry and forging the future of spine care.



410

Biologica Technologies is a company fully dedicated to improving patients' lives and the health care providers' experience through innovative biologic solutions. Our core, proprietary technology,

ProteiOS® growth factor possesses the largest amount of non-recombinant osteoinductive, angiogenic and mitogenic growth factors on the market today.

316

ERAPEDICS Cerapedics is an advanced orthobiologics company focused on developing its proprietary biomimetic small

peptide molecule (P-15) for commercialization in spinal applications. i-FACTOR® Peptide Enhanced Bone Graft (P-15/ABM) is only the second FDA PMA Approved bone graft on the market, and it has shown statistical superiority to local autograft through an IDE trial on single-level ACDFs in overall clinical success at one year. i-FACTOR® is the only biologic bone graft in orthopedics that incorporates a small peptide as an attachment factor to stimulate the natural bone healing process. This novel mechanism of action (Attract, Attach, Activate) is designed to support safer and more predictable bone formation compared to other commercially available bone growth factors.



308

409

DePuy Synthes, part of the Johnson & Johnson Medical Devices Companies, provides one of the most

comprehensive orthopaedics portfolios in the world. DePuy Synthes solutions, in specialties including joint reconstruction, trauma, craniomaxillofacial, spinal surgery and sports medicine, are designed to advance patient care while delivering clinical and economic value to health care systems worldwide. For more information, visit www.depuysynthes.com.



Globus Medical, Inc. is a leading musculoskeletal solutions company and is driving significant technological advancements across a complete suite of products ranging from spinal and trauma therapies to robotics, navigation and imaging. Globus is driven to utilize superior engineering and technology to achieve pain free, active lives for all patients with

musculoskeletal disorders.





HansBiomed USA Inc. specializes in biologics and medical device products. As the first Asian tissue bank approved by the US FDA, HansBiomed produces safe and high-quality allograft and medical

device products in accordance with the US FDA, EATB, and AATB standards. Our mission is to be the ideal partner for aesthetic and reconstructive solutions to help healthcare professionals make a real and long-lasting difference to the well-being of patients.



514

HD LifeSciences 3D printed Hive interbodies feature a Soft Titanium® lattice core with HD's 4 evolutionary technologies

- reduced stiffness similar to PEEK, superior imaging characteristics, 70% porous for bony ingrowth, and advanced on-growth properties using NanoHive® Surface Technology.



209

Innovasis is a rapidly growing company engaged in the research, development, manufacturing, and marketing of spinal implant

devices and related products. Innovasis offers a spinal product line with implants and instruments that address the major pathologies and focus areas of traditional spinal surgery.



309

Isto Biologics is an orthobiologics company dedicated to improving patient quality of life by using the science of human biology to advance solutions for spine, orthopedics, and sports medicine.



Life Instruments is dedicated to serving surgeons with the highest quality surgical instruments. Handcrafted from the finest materials. Life Instruments are longer and lighter to provide maximum

comfort, with ergonomic handles for better control, Surgeons have remarked on the sharpness of our elevators, osteotomes and curettes, a necessity in saving valuable operating room time. Perfectly balanced for excellent feel and ease of use, Life Instruments are an extension of the surgeon's hands. We customize and modify instruments to fit individual needs in addition to providing ongoing development of new products with surgeons and healthcare professionals.

Medtronic

406

Patients are at the center of everything we do —and we believe medical technology can play an even greater role in

improving people's lives. Join us in our commitment to take healthcare Further, Together. Be inspired at medtronic.com.



307

NuVasive is the leader in spine technology innovation, focused on transforming spine surgery and beyond with

minimally disruptive, procedurally integrated solutions designed to deliver reproducible and clinically-proven surgical outcomes. The Company's portfolio includes access instruments. implantable hardware, biologics, software systems for surgical planning, navigation and imaging solutions, magnetically adjustable implant systems for spine and orthopedics, and intraoperative monitoring service offerings.



312

ORTHOFIX® Orthofix Medical Inc. is a global medical device company focused on musculoskeletal products

and therapies. The M6-C™ artificial cervical disc – an innovative product designed to mimic your natural disc's structure and movement - is the latest addition to Orthofix's comprehensive cervical portfolio. Orthofix also offers intraoperative and postoperative solutions for cervical fusion, including Centurion® POCT System, CONSTRUX® Mini™ PTC Spacer System, Trinity ELITE™ Allograft with Viable Cells, and CervicalStim™ Spinal Fusion Therapy, Headquartered in Lewisville, Texas, Orthofix's spine and orthopedic extremities products are distributed in more than 70 countries. For more information, please visit www.orthofix.com and www. M6disc.com.



Paradigm Bio Devices Paradigm Bio Devices, Inc. specializes in novel

310

spinal technologies including Interplate™

a system based solution to simple and complex spinal care; and the QuickDraw Bone Harvester® used for harvesting and collecting autogenous bone graft.



508

Rethink Posterior Cervical Fusion with CORUS™ Spinal System.

412

RTI Surgical is a leading global surgical implant company providing surgeons with safe biologic, metal and synthetic

implants. Committed to delivering a higher standard, RTI's implants are used in sports medicine, general surgery, spine, orthopedic and trauma procedures and are distributed in nearly 50 countries. For more information, visit www.rtix.com.

315

417

414

SeaSpine is a global medical technology company focused on the design, development and commercialization of surgical solutions for the treatment of patients suffering from spinal disorders. SeaSpine has a comprehensive portfolio of orthobiologics and spinal implants solutions. Go to www.seaspine.com for more information.



Founded in 2011, SMTP Technology Co., Ltd. is a national high-tech enterprise oriented on the innovative RD,

manufacture of ultrasonic therapeutic equipments. The company undertook the Key Projects in the National Science& Technology Pillar Program, and served as the drafter of Industry Compulsory Standard on Ultrasonic Surgical Devices for Bone Tissues.

SOLCO.

Established in 1974, SOLCO BIOMEDICAL is a global medical & healthcare company that exports its products to 20 different

countries overseas. It is also the first medical device manufacturer in Korea, and has developed implants for orthopedic surgery, surgical instruments. Under our business philosophy, "make the world smile with health", we're devoted to improve the quality of life for everyone by developing high tech medical instruments and health products based on medical R&D and clinical researches.



314

217

SpineCraft is a privately held US medical device company offering a wide range of products for addressing

spinal deformities & complex spine problems, minimally invasive spine surgery, cervical & thoracolumbar degenerative conditions and non-fusion applications.

SpineSearch 9°

SpineSearch, LLC is a premier healthcare recruitment and continuing education company, that partners with

private practices and hospital systems nationwide. We recruit all levels of staff, front desk to physician; both executive, clinical and administrative. Our primary clients are Orthopedic, Spine, and Neurosurgeons; Pain Management, and Rehabilitation Physicians. Founded in 2009 by Nicola Hawkinson, DNP, RN, our staff brings two decades of expertise in the clinical and administrative side of Spine, creating a high-quality alternative to bulge bracket recruitment firms.

SPINE WAVE

317

Spine Wave is a leader in minimally invasive fixation and expandable fusion technology with a broad product and

intellectual property portfolio. Following the successful 2018 release of the Paramount® Anterior Cervical Cage and Proficient® Posterior Cervical System, Spine Wave strengthens its leadership role in minimally invasive fixation with the release of the Proficient® MIS Posterior Cervical Spine System. Through navigation, dilation, and extended tab screws, Proficient® MIS allows surgeons to treat and stabilize a variety of indications through a muscle sparing approach.

506

Stryker is one of the world's leading medical technology companies and, together with our customers, is driven to make healthcare better. We offer innovative products and services in Orthopaedics, Medical and Surgical, and Neurotechnology and Spine that help improve patient and hospital outcomes.

313

211

516

416



Surgeons Capital Management (SCM) is a wealth management firm dedicated to and working with surgeons around the country. We specialize in creditor and asset

protection, tax-advantaged distribution, and wealth and estate strategies for high net worth individuals. Please visit our website to learn more – www.surgeonscapitalmanagement.com.



TeDan Surgical

TeDan Surgical Innovations (TSI) is a market leading provider of access systems for ACDF procedures. From our

patented blade locking mechanism that simplifies the use of retractor blades in surgery, to our springless distraction screwdriver that minimizes maintenance costs, TSI and its culture of innovation continue to revolutionize the access industry.



Terumo BCT is a global leader in blood component, therapeutic apheresis, cellular and autologous biologic technologies. We believe in the potential of cells to do even more for patients than they do today. This belief inspires us to share our expertise in cell separation and collaborate with customers to advance the practice of autologous biologic technologies together.

hompson 🕡 SURGICAL INSTRUMENTS

Thompson Surgical is a leader in spine exposure and the original manufacturer of the table-mounted retractor. We

understand the value of exposure in surgery and are dedicated to providing innovative, high quality systems that deliver safe, versatile, and low-profile retraction.

Tobra Medical is focused on autograft bone collection. Tobra Bone Basket ~ "Bone Collection Made Easy". The 1st drilled bone collection

device that maximizes autograft collection, easy to use, efficient, and provides autograft bone with great handling characteristics. This patent protected product utilizes a mesh basket filtration system to collect drilled autograft bone while not interrupting surgery. Great for patient fusion and for facility in helping to reduce costly bone substitutes. Please visit Tobra Booth for "Bone Collection Made Easy"



415

207

Xtant Medical is a global medical technology company focused on the design, development, and commercialization of a

comprehensive portfolio of orthobiologics and spinal implant systems to facilitate spinal fusion in complex spine, deformity and degenerative procedures. Xtant people are dedicated and talented, operating with the highest integrity to serve our customers.

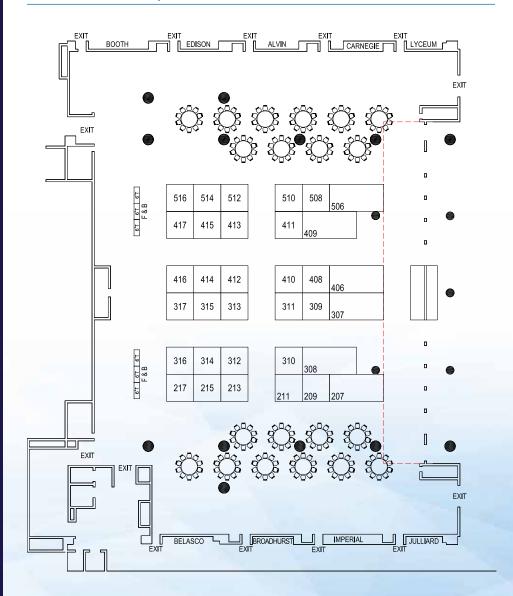


ZIMMER BIOMET Zimmer Biomet Spine is a leader in restoring mobility, alleviating pain, and improving the

quality of life for patients around the world by delivering surgeons a comprehensive portfolio of quality spine technologies and procedural innovation, best-in-class training, and unparalleled service via a network of responsive team members and sales professionals.

EXHIBIT HALL FLOOR PLAN

Westside Ballroom, 5th Floor





24TH

TWENTY-FOURTH ANNUAL INTERNATIONAL COURSE

OF THE



FOUNDED 1973

November 20, 2019

The Marriott Marquis New York City, NY

Education Committee Chair Michael D. Daubs, MD

Education Committee Paul M. Arnold, MD • Wayne K. Cheng, MD • Clinton J. Devin, MD
John C. France, MD • Michael C. Gerling, MD • Steven S. Hughes, MD • Douglas G. Orndorff, MD
Kristen E. Radcliff, MD • Gregory Schroeder, MD • Neill M. Wright, MD

President Alexander Vaccaro, MD, PhD, MBA

CSRS 24th Instructional Course

Course Objectives:

- Review appropriate anatomy of the Cervical Spine.
- Compare the methods for diagnosis of neck disorders.
- Evaluate Operative and non-Operative Treatment options for Cervical Spine disorders.
- Recognize and respond to complications of surgical Treatment.
- Exchange information on Cervical Spine research, diagnosis and Treatment with both US and international surgeons.

No electronic devices of any kind may be used to record any portion of the Instructional Course, Annual Meeting Scientific Program, E-Posters or Technical Exhibits.

WEDNESDAY, NOVEMBER 20*All Scientific Sessions are located in Broadway Ballroom, 6th Floor

	-
7:00 am - 7:45 am	Breakfast — Exhibit Hall, Westside Ballroom, 5 th Floor
7:45 am - 7:49 am	Welcome and Introduction Michael D. Daubs, MD
7:50 am - 8:58 am	SESSION I: Trauma Moderator: John France, MD
7:50 am - 7:51 am	Introduction by Moderator John France, MD
7:52 am - 7:53 am	CASE 1: OCCIPTOCERVICAL DISSOCIATION Presentation John France, MD
7:54 am - 8:03 am	Discussion Panel Faculty
8:04 am - 8:08 am	Literature Review Carlo Bellabarba, MD
8:09 am - 8:13 am	Conclusion Panel Faculty
8:14 am - 8:15 am	CASE 2: HANGMANN'S FRACTURE Presentation John France, MD
8:16 am - 8:25 am	Discussion Panel Faculty
8:26 am - 8:30 am	Literature Review Brandon Lawrence, MD
8:31 am - 8:35 am	Conclusion Panel Faculty
8:36 am - 8:37 am	CASE 3: ANKYLOSED SPINE FRACTURE Presentation John France, MD
8:38 am - 8:47 am	Discussion Panel Faculty
8:48 am - 8:52 am	Literature Review Timothy Moore, MD
8:53 am - 8:58 am	Conclusion Panel Faculty

WEDNESDAY, NOVEMBER 20*All Scientific Sessions are located in Broadway Ballroom, 6th Floor

8:59 am - 10:05 am	SESSION II: Degenerative Cervical Disorders Moderator: Paul Anderson, MD
8:59 am - 9:05 am	Pseudoarthrosis of ACDF How to Workup and Treat- Diagnosis and Cause, Workup, Patient optimization, Patient Selection and Outcomes Clint Devin, MD
9:06 am - 9:07 am	Pseudoarthrosis of ACDF How to Workup and Treat- Case Presentation 2 Level ACDF with Symptomatic Nonunion Clint Devin, MD
9:08 am - 9:14 am	Pseudoarthrosis of ACDF How to Workup and Treat- Anterior Approach Is Best Wellington Hsu, MD
9:15 am - 9:21 am	Pseudoarthrosis of ACDF How to Workup and Treat- Posterior Approach Is Best Mohamad Bydon, MD
9:22 am - 9:31 am	Discussion Panel Faculty
9:32 am - 9:38 am	Failed Disc Arthroplasty- Diagnosis, Workup, Imaging Jason Savage, MD
9:39 am - 9:40 am	Failed Disc Arthroplasty- Case Presentation of Failed CDA with Images/Exam Douglas Orndorff, MD
9:41 am - 9:47 am	Failed Disc Arthroplasty- Anterior Approach for Revision with Either New Disc Replacement/ACDF Wellington Hsu, MD
9:48 am - 9:54 am	Failed Disc Arthroplasty- Combined Anterior/Posterior Approach, or Just Posterior Approach Domagoj Coric, MD, FAANS
9:55 am - 10:05 am	Discussion Panel Faculty
10:06 am - 10:36 am	Break — Exhibit Hall, Westside Ballroom, 5 th Floor
10:37 am - 11:47 am	SESSION III: Complications Moderators: Paul Arnold, MD, and Steven S. Hughes, MD
10:37 am - 10:40 am	New Post-Operative Deficit John France, MD
10:41 am - 10:50 am	Discussion Panel Faculty
10:51 am - 10:54 am	Post-Operative Epidural Hematoma Jacob BucHowski, MD, MS

WEDNESDAY, NOVEMBER 20*All Scientific Sessions are located in Broadway Ballroom, 6th Floor

All Scientific Sessions are located in broadway ballioon, o Trool		
10:55 am - 11:04 am	Discussion Panel Faculty	
11:05 am - 11:08 am	C5 Palsy Bruce Darden, MD	
11:09 am - 11:18 am	Discussion Panel Faculty	
11:19 am - 11:22 am	Vertebral Artery Injury Paul Anderson, MD	
11:23 am - 11:32 am	Discussion Panel Faculty	
11:33 am - 11:36 am	Dural Tear Anterior/Posterior Carlo Bellabarba, MD	
11:37 am - 11:47 am	Discussion Panel Faculty	
11:48 am - 12:48 pm	Lunch — Exhibit Hall, Westside Ballroom, 5 th Floor	
12:49 pm - 1:57 pm	SESSION IV: Decision Making and Dilemmas Moderators: Kristen E. Radcliff, MD, and Neill M. Wright, MD	
12:49 pm - 12:56 pm	Myelomalacia/Cord Compression without Clinical Findings W. Ryan Spiker, MD	
12:57 pm - 1:04 pm	Cervical Stenosis with Mild Clinical Findings Langston Holly, MD, FAANS	
1:05 pm - 1:12 pm	Lumbar Patient with Cervical Myelopathy On Exam Michael Kelly, MD	
1:13 pm - 1:22 pm	Discussion Panel Faculty	
1:23 pm - 1:30 pm	Fusion Evaluation with Metal Interbody Implants Han Jo Kim, MD	
1:31 pm - 1:38 pm	A Review of the Clinical Research on Various Cellular Biologics Harvey Smith, MD	
1:39 pm - 1:46 pm	Role of Neurophysiology Monitoring in Cervical Spine Surgery- Update on Medicolegal State- Standard or Option Vincent Traynelis, MD	
1:47 pm - 1:57 pm	Discussion Panel Faculty	
1:58 pm - 3:08 pm	SESSION V: New Technologies/Innovation Moderators: Wayne K. Cheng, MD, and Michael C. Gerling, MD	
1:58 pm - 2:05 pm	Focus on Adjacent Segment Disease: Biomechanics, Bioscience, Prevalence Studies Peter Passias, MD	

WEDNESDAY, NOVEMBER 20*All Scientific Sessions are located in Broadway Ballroom, 6th Floor

2:06 pm - 2:07 pm	Case Presentation I: "Two Level Cervical Disk Herniation in Young Adult." Michael Gerling, MD
2:08 pm - 2:17 pm	2-Level TDR Is the Best Option As It Minimizes ASD Alpesh Patel, MD, FACS
2:18 pm - 2:27 pm	2-Level ACDF Is the Most Reliable Option John Rhee, MD
2:28 pm - 2:37 pm	2- Level Hybrid Constructs Are the Best of Both Worlds K. Daniel Riew, MD
2:38 pm - 2:45 pm	Stretching Indications for TDR, Failures and How to Avoid Them Themistocles Protopsaltis, MD
2:46 pm - 2:47 pm	Case Presentation II: "Split ACDF causing ASD / DDD" at Mid-Level Wayne Cheng, MD
2:48 pm - 2:57 pm	Panel Discussion Panel Faculty
2:58 pm - 3:08 pm	Discussion Panel Faculty
3:09 pm - 3:39 pm	Break — Exhibit Hall, Westside Ballroom, 5 th Floor
3:40 pm - 4:50 pm	SESSION VI: Master Techniques, Tips, and Pearls Moderator: Michael Daubs, MD
0:40	
3:40 pm - 3:49 pm	Anterior Cervical Approach: Tips from an Otolaryngologist Joe Muscarella, DO
3:40 pm - 3:49 pm 3:50 pm - 3:59 pm	
	Joe Muscarella, DO Anterior Odontoid Fixation
3:50 pm - 3:59 pm	Joe Muscarella, DO Anterior Odontoid Fixation Andrew Dailey, MD, FAANS Posterior Occipital- C1-C2 Fixation
3:50 pm - 3:59 pm 4:00 pm - 4:09 pm	Joe Muscarella, DO Anterior Odontoid Fixation Andrew Dailey, MD, FAANS Posterior Occipital- C1-C2 Fixation Tom Mroz, MD Laminoplasty
3:50 pm - 3:59 pm 4:00 pm - 4:09 pm 4:10 pm - 4:19 pm	Joe Muscarella, DO Anterior Odontoid Fixation Andrew Dailey, MD, FAANS Posterior Occipital- C1-C2 Fixation Tom Mroz, MD Laminoplasty Jeff Wang, MD Cervical Corpectomy
3:50 pm - 3:59 pm 4:00 pm - 4:09 pm 4:10 pm - 4:19 pm 4:20 pm - 4:29 pm	Joe Muscarella, DO Anterior Odontoid Fixation Andrew Dailey, MD, FAANS Posterior Occipital- C1-C2 Fixation Tom Mroz, MD Laminoplasty Jeff Wang, MD Cervical Corpectomy K. Daniel Riew, MD Posterior Cervical Osteotomy
3:50 pm - 3:59 pm 4:00 pm - 4:09 pm 4:10 pm - 4:19 pm 4:20 pm - 4:29 pm 4:30 pm - 4:39 pm	Anterior Odontoid Fixation Andrew Dailey, MD, FAANS Posterior Occipital- C1-C2 Fixation Tom Mroz, MD Laminoplasty Jeff Wang, MD Cervical Corpectomy K. Daniel Riew, MD Posterior Cervical Osteotomy Darrel Brodke, MD Discussion
3:50 pm - 3:59 pm 4:00 pm - 4:09 pm 4:10 pm - 4:19 pm 4:20 pm - 4:29 pm 4:30 pm - 4:39 pm 4:40 pm - 4:49 pm	Anterior Odontoid Fixation Andrew Dailey, MD, FAANS Posterior Occipital- C1-C2 Fixation Tom Mroz, MD Laminoplasty Jeff Wang, MD Cervical Corpectomy K. Daniel Riew, MD Posterior Cervical Osteotomy Darrel Brodke, MD Discussion Panel Faculty Closing Remarks

MARK YOUR CALENDARS!



FOUNDED 1973

The Cervical Spine Research Society Announces its 25th Instructional Course, December 9, 2020 And 48th Annual Meeting, December 10-12, 2020

THE COSMOPOLITAN

Las Vegas, Nevada



Call for Abstracts: March 2 - April 24, 2020 Visit www.csrs.org.

47TH

FORTY-SEVENTH ANNUAL MEETING

OF THE



FOUNDED 1973

November 21-23, 2019

The Marriott Marquis New York City, NY

President Alexander Vaccaro, MD, PhD, MBA

Scientific Program Co-Chairs Gregory D. Schroeder, MD and Justin Smith, MD

Program Committee Jacob M. Buchowski, MD • Matthew W. Colman, MD • Andrew T. Dailey, MD William F. Donaldson, III, MD • Andrew C Hecht, MD • Han-Jo Kim, MD • Brian K. Kwon, MD Craig A. Kuhns, MD • Sergio A. Mendoza-Lattes, MD • Addisu Mesfin, MD • Thomas E. Mroz, MD Ahmad Nassr, MD • Themistocles Protopsaltis, MD • Jeffrey A. Rihn, MD • Carlo Santaguida, MD Jason W. Savage, MD • W. Ryan Spiker, MD • Eeric Truumees, MD • Barrett I. Woods, MD Ronald A. Lehman, MD • Brian W. Su, MD

Scientific Meeting Objectives:

- Present the results of current cervical spine research data.
- Promote discussion of new developments and techniques.
- · Foster research concerning the diagnosis and treatment of cervical spine injury and disease.

No electronic devices of any kind may be used to record any portion of the Instructional Course, Annual Meeting Scientific Program, E-Posters or Technical Exhibits.

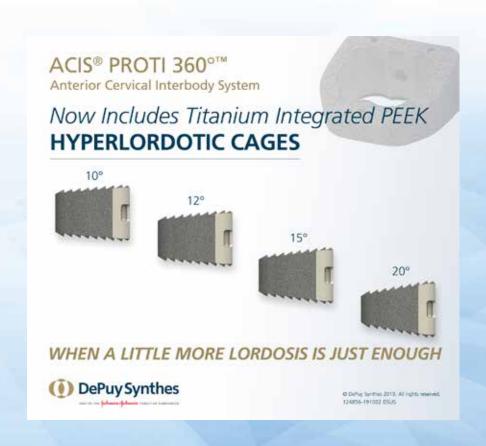
THURSDAY, NOVEMBER 21*All Scientific Sessions are located in Broadway Ballroom, 6th Floor

7 iii Ooloniino Ooloololo are loodata iii Broddway Edinooni, o		
6:00 am - 7:00 am	Breakfast — Exhibit Hall, Westside Ballroom, 5th Floor	
7:00 am - 7:10 am	Welcome and Announcements Moderators: Gregory D Schroeder, MD and Justin S Smith, MD, PhD	
7:11 am - 7:51 am	Session I: Outcomes I, Cervical Myelopathy	
7:52 am - 8:33 am	Session II: Complications I Moderators: K Daniel Riew, MD and Vincent Traynelis, MD	
8:34 am - 9:15 am	Session III: Trauma Moderators: James Harrop, MD and Daniel Sciubba, MD	
9:15 am - 9:45 am	Break — Exhibit Hall, Westside Ballroom, 5 th Floor	
9:46 am - 10:49 am	Symposium I: Spine Trauma Moderators: Michael Fehlings, MD, PhD and Alexander Vaccaro, MD, PhD, MBA	
10:50 am - 11:25 am	Presidential Introduction and Address	
10:50 am – 10:55 am	Introduction of CSRS President Rick Sasso, MD	
10:55 am - 11:25 am	Presidential Address Alexander Vaccaro, MD, PhD, MBA	
11:30 am - 1:30 pm	Industry Workshops - Lunch Available for Workshop Attendees Only, Prior Registration Not Required, No CME Credits	
	Workshop 1: Medtronic Shubert/Uris, 6 th Floor Circumferential Fixation in the Complex Corpectomy Patient	
	Workshop 2: NuVasive Majestic/Music Box, 6th Floor Cervical Spine Surgery: Why Should I Change? Featuring Advanced Materials Science.	
	Workshop 3: DePuy Synthes Ziegfield, 4th Floor The F.A.T.E. of Complex Cervical Surgery Featuring the SYMPHONY™ OCT System	
	Workshop 4: Globus Medical Cervical Corpectomy for Spondylotic Myelopathy Oneill, 4 th Floor	
	Workshop 5: Zimmer Biomet Wilder, 4th Floor 30% at 10 years? The Experts Discuss Techniques & Technology to Reduce Adjacent Segment Disease: A Discussion on How to Protect Against Adjacent Level Cervical Pathology	
	Workshop 6: Stryker Odets, 4th Floor Management of Complex Cervical Pathologies: An Interactive Panel Discussion	
1:35 pm - 2:38 pm	Symposium II: Pearls from the Experts Moderators: Andrew Dailey, MD, FAANS and Justin S Smith, MD, PhD	

THURSDAY, NOVEMBER 21

*All Scientific Sessions are located in Broadway Ballroom, 6th Floor

2:39 pm - 3:24 pm	Session IV: Cervical Deformity
3:25 pm - 3:55 pm	Break — Exhibit Hall, Westside Ballroom, 5 th Floor
3:56 pm - 4:59 pm	Session V: Complications II Moderators: Alan S Hilibrand, MD and Alpesh Patel, MD, FACS
5:00 pm - 6:30 pm	Welcome Reception — Exhibit Hall, Westside Ballroom, 5th Floor
6:30 pm - 9:00 pm	Medtronic Industry Dinner Pre-registration required. For more info, visit Medtronic Booth #406.



THANK YOU TO OUR INDUSTRY WORKSHOPS

Thursday, November 21, 2019 11:30am – 1:30pm



Shubert/Uris, 6th Floor



Majestic/Music Box, 6th Floor



Ziegfield, 4th Floor



Oneill, 4th Floor



Wilder, 4th Floor



Odets, 4th Floor

FRIDAY, NOVEMBER 22
*All Scientific Sessions are located in Broadway Ballroom, 6th Floor

7:00 am - 7:10 am Welcome and Announcements Moderators: Gregory D Schroeder, MD and Justin S Smith, MD, PhD 7:11 am - 7:58 am Session VI: Outcomes IV Moderators: Howard S An, MD and Kris Radcliff, MD 7:59 am - 8:38 am Session VII: Basic Science Moderators: Brian Kwon, MD and Thomas Mroz, MD Research Grant Session Brandon Lawrence, MD and Zoher Ghogawala, MD 9:20 am - 9:54 am Break — Exhibit Hall, Westside Ballroom, 5thory Fresidential Guest Lecture Introduction of Presidential Guest Speaker Alexander Vaccaro, MD, PhD, MBA 10:00 am - 10:45 am 10:45 am - 11:01 am Discussion 11:02 am - 12:05 pm Symposium III: Concussions, Spine Injury, and Return to Play Moderators: Wellington Hsu, MD and Alexander Vaccaro, MD, PhD, MBA 12:05 pm - 1:36 pm Traveling Fellowship Report and Meeting Previews John Rhee, MD 1:10 pm - 1:24 pm Traveling Fellowship Report Ilyas S. Aleem, BSc, MD, MS, FRCSC and Lee A. Tan, M.D. Preview CSRS 2020 Annual Meeting in Las Vegas, NV Michael Daubs, MD, 2020 Meeting Local Host Preview CSRS Asia Pacific Section 2020 Annual Meeting Kyung-Soo Suk, MD, President CSRS - AP Preview CSRS Saia Pacific Section 2020 Annual Meeting Björn Zoëga, MD, President CSRS - EU 1:37 pm - 2:24 pm Session IX: Outcomes II Moderators: Eric O Klineberg, MD and Almad Nassr, MD CSRS Members Business Meeting CSRS Members Business Meeting CSRS Members Business Meeting	6:00 am - 7:00 am	Breakfast — Exhibit Hall, Westside Ballroom, 5th Floor	
7:59 am - 8:38 am Session VII: Basic Science Moderators: Brian Kwon, MD and Thomas Mroz, MD 8:39 am - 9:20 am Research Grant Session Brandon Lawrence, MD and Zoher Ghogawala, MD 9:20 am - 9:54 am Presidential Guest Lecture Introduction of Presidential Guest Speaker Alexander Vaccaro, MD, PhD, MBA 10:00 am - 10:45 am 10:45 am - 11:01 am 10:45 am - 11:01 am 10:45 am - 12:05 pm Symposium III: Concussions, Spine Injury, and Return to Play Moderators: Wellington Hsu, MD and Alexander Vaccaro, MD, PhD, MBA 12:05 pm - 1:05 pm Lunch — Exhibit Hall, Westside Ballroom, 5th Floor 1:10 pm - 1:36 pm Traveling Fellowship Report and Meeting Previews John Rhee, MD 1:19 pm - 1:24 pm Preview CSRS 2020 Annual Meeting in Las Vegas, NV Michael Daubs, MD, 2020 Meeting Local Host 1:25 pm - 1:36 pm Preview CSRS Asia Pacific Section 2020 Annual Meeting Björn Zoëga, MD, President CSRS - EU 1:37 pm - 2:24 pm Session IX: Outcomes II Moderators: Eric O Klineberg, MD and Ahmad Nassr, MD	7:00 am - 7:10 am		
8:39 am - 9:20 am Research Grant Session Brandon Lawrence, MD and Zoher Ghogawala, MD 9:20 am - 9:54 am Break — Exhibit Hall, Westside Ballroom, 5th Floor 9:55 am - 11:00 am 9:55 am - 10:00 am Introduction of Presidential Guest Speaker Alexander Vaccaro, MD, PhD, MBA 10:00 am - 10:45 am Henry Bohlman Presidential Guest Speaker: Steve Forbes, Chairman and Editor-in-Chief of Forbes Media "Healthcare in America" 10:45 am - 11:01 am Discussion 11:02 am - 12:05 pm Symposium III: Concussions, Spine Injury, and Return to Play Moderators: Wellington Hsu, MD and Alexander Vaccaro, MD, PhD, MBA 12:05 pm - 1:05 pm Lunch — Exhibit Hall, Westside Ballroom, 5th Floor 1:10 pm - 1:36 pm Traveling Fellowship Report and Meeting Previews John Rhee, MD 1:10 pm - 1:24 pm Preview CSRS 2020 Annual Meeting in Las Vegas, NV Michael Daubs, MD, 2020 Meeting Local Host 1:25 pm - 1:36 pm Preview CSRS Asia Pacific Section 2020 Annual Meeting Kyung-Soo Suk, MD, President CSRS - AP Preview CSRS European Section 2020 Annual Meeting Björn Zoëga, MD, President CSRS - EU 1:37 pm - 2:24 pm Session VIII: Motion Preservation Moderators: Frank Phillips, MD and Rick Sasso, MD 2:25 pm - 2:55 pm Break — Broadway Ballroom Foyer, 6th Floor Session IX: Outcomes II Moderators: Eric O Klineberg, MD and Ahmad Nassr, MD	7:11 am - 7:58 am		
Brandon Lawrence, MD and Zoher Ghogawala, MD 9:20 am - 9:54 am Break — Exhibit Hall, Westside Ballroom, 5 th Floor 9:55 am - 11:00 am 9:55 am - 10:00 am 10:00 am - 10:45 am Henry Bohlman Presidential Guest Speaker Alexander Vaccaro, MD, PhD, MBA Henry Bohlman Presidential Guest Speaker: Steve Forbes, Chairman and Editor-in-Chief of Forbes Media "Healthcare in America" 10:45 am - 11:01 am Discussion 11:02 am - 12:05 pm Symposium III: Concussions, Spine Injury, and Return to Play Moderators: Wellington Hsu, MD and Alexander Vaccaro, MD, PhD, MBA 12:05 pm - 1:05 pm Lunch — Exhibit Hall, Westside Ballroom, 5 th Floor 1:10 pm - 1:36 pm Traveling Fellowship Report and Meeting Previews John Rhee, MD 1:10 pm - 1:24 pm Preview CSRS 2020 Annual Meeting in Las Vegas, NV Michael Daubs, MD, 2020 Meeting Local Host 1:25 pm - 1:30 pm Preview CSRS Asia Pacific Section 2020 Annual Meeting Kyung-Soo Suk, MD, President CSRS - AP Preview CSRS European Section 2020 Annual Meeting Björn Zoega, MD, President CSRS - EU 1:37 pm - 2:24 pm Session VIII: Motion Preservation Moderators: Frank Phillips, MD and Rick Sasso, MD 2:25 pm - 2:55 pm Break — Broadway Ballroom Foyer, 6 th Floor Session IX: Outcomes II Moderators: Eric O Klineberg, MD and Ahmad Nassr, MD	7:59 am - 8:38 am		
9:55 am - 11:00 am 9:55 am - 10:00 am 10:00 am - 10:45 am 10:00 am - 10:45 am 10:00 am - 10:45 am 10:45 am - 11:01 am 11:02 am - 12:05 pm 11:02 am - 12:05 pm 11:02 am - 12:05 pm 11:05 pm 11:05 pm 11:06 pm 11:07 pm - 1:36 pm 11:09 pm - 1:36 pm 11:00 pm - 1:30 p	8:39 am - 9:20 am		
9:55 am - 10:00 am Introduction of Presidential Guest Speaker Alexander Vaccaro, MD, PhD, MBA 10:00 am - 10:45 am Henry Bohlman Presidential Guest Speaker: Steve Forbes, Chairman and Editor-in-Chief of Forbes Media "Healthcare in America" 10:45 am - 11:01 am Discussion 11:02 am - 12:05 pm Symposium III: Concussions, Spine Injury, and Return to Play Moderators: Wellington Hsu, MD and Alexander Vaccaro, MD, PhD, MBA 12:05 pm - 1:05 pm Lunch — Exhibit Hall, Westside Ballroom, 5th Floor 1:10 pm - 1:36 pm Traveling Fellowship Report and Meeting Previews John Rhee, MD 1:10 pm - 1:18 pm Traveling Fellowship Report Ilyas S. Aleem, BSc, MD, MS, FRCSC and Lee A. Tan, M.D. 1:19 pm - 1:24 pm Preview CSRS 2020 Annual Meeting in Las Vegas, NV Michael Daubs, MD, 2020 Meeting Local Host 1:25 pm - 1:30 pm Preview CSRS Asia Pacific Section 2020 Annual Meeting Kyung-Soo Suk, MD, President CSRS - AP 1:31 pm - 1:36 pm Preview CSRS European Section 2020 Annual Meeting Björn Zoëga, MD, President CSRS - EU 1:37 pm - 2:24 pm Session VIII: Motion Preservation Moderators: Frank Phillips, MD and Rick Sasso, MD 2:25 pm - 2:55 pm Break — Broadway Ballroom Foyer, 6th Floor Session IX: Outcomes II Moderators: Eric O Klineberg, MD and Ahmad Nassr, MD	9:20 am - 9:54 am	Break — Exhibit Hall, Westside Ballroom, 5 th Floor	
"Healthcare in America" 10:45 am - 11:01 am Discussion 11:02 am - 12:05 pm Symposium III: Concussions, Spine Injury, and Return to Play Moderators: Wellington Hsu, MD and Alexander Vaccaro, MD, PhD, MBA 12:05 pm - 1:05 pm Lunch — Exhibit Hall, Westside Ballroom, 5th Floor 1:10 pm - 1:36 pm Traveling Fellowship Report and Meeting Previews John Rhee, MD 1:10 pm - 1:18 pm Traveling Fellowship Report Ilyas S. Aleem, BSc, MD, MS, FRCSC and Lee A. Tan, M.D. 1:19 pm - 1:24 pm Preview CSRS 2020 Annual Meeting in Las Vegas, NV Michael Daubs, MD, 2020 Meeting Local Host 1:25 pm - 1:30 pm Preview CSRS Asia Pacific Section 2020 Annual Meeting Kyung-Soo Suk, MD, President CSRS - AP 1:31 pm - 1:36 pm Preview CSRS European Section 2020 Annual Meeting Björn Zoëga, MD, President CSRS - EU 1:37 pm - 2:24 pm Session VIII: Motion Preservation Moderators: Frank Phillips, MD and Rick Sasso, MD 2:25 pm - 2:55 pm Break — Broadway Ballroom Foyer, 6th Floor Session IX: Outcomes II Moderators: Eric O Klineberg, MD and Ahmad Nassr, MD	9:55 am - 10:00 am	Introduction of Presidential Guest Speaker Alexander Vaccaro, MD, PhD, MBA	
11:02 am - 12:05 pm Symposium III: Concussions, Spine Injury, and Return to Play Moderators: Wellington Hsu, MD and Alexander Vaccaro, MD, PhD, MBA 12:05 pm - 1:05 pm Lunch — Exhibit Hall, Westside Ballroom, 5th Floor Traveling Fellowship Report and Meeting Previews John Rhee, MD 1:10 pm - 1:18 pm Traveling Fellowship Report Ilyas S. Aleem, BSc, MD, MS, FRCSC and Lee A. Tan, M.D. 1:19 pm - 1:24 pm Preview CSRS 2020 Annual Meeting in Las Vegas, NV Michael Daubs, MD, 2020 Meeting Local Host 1:25 pm - 1:30 pm Preview CSRS Asia Pacific Section 2020 Annual Meeting Kyung-Soo Suk, MD, President CSRS - AP 1:31 pm - 1:36 pm Preview CSRS European Section 2020 Annual Meeting Björn Zoëga, MD, President CSRS - EU 1:37 pm - 2:24 pm Session VIII: Motion Preservation Moderators: Frank Phillips, MD and Rick Sasso, MD 2:25 pm - 2:55 pm Break — Broadway Ballroom Foyer, 6th Floor 2:56 pm - 3:58 pm Session IX: Outcomes II Moderators: Eric O Klineberg, MD and Ahmad Nassr, MD			
12:05 pm - 1:05 pm Lunch — Exhibit Hall, Westside Ballroom, 5th Floor 1:10 pm - 1:36 pm Traveling Fellowship Report and Meeting Previews John Rhee, MD 1:10 pm - 1:18 pm Traveling Fellowship Report Ilyas S. Aleem, BSc, MD, MS, FRCSC and Lee A. Tan, M.D. 1:19 pm - 1:24 pm Preview CSRS 2020 Annual Meeting in Las Vegas, NV Michael Daubs, MD, 2020 Meeting Local Host 1:25 pm - 1:30 pm Preview CSRS Asia Pacific Section 2020 Annual Meeting Kyung-Soo Suk, MD, President CSRS - AP 1:31 pm - 1:36 pm Preview CSRS European Section 2020 Annual Meeting Björn Zoëga, MD, President CSRS - EU 1:37 pm - 2:24 pm Session VIII: Motion Preservation Moderators: Frank Phillips, MD and Rick Sasso, MD 2:25 pm - 2:55 pm Break — Broadway Ballroom Foyer, 6th Floor Session IX: Outcomes II Moderators: Eric O Klineberg, MD and Ahmad Nassr, MD	10:45 am - 11:01 am	Discussion	
1:10 pm - 1:36 pm Traveling Fellowship Report and Meeting Previews John Rhee, MD Traveling Fellowship Report Ilyas S. Aleem, BSc, MD, MS, FRCSC and Lee A. Tan, M.D. Preview CSRS 2020 Annual Meeting in Las Vegas, NV Michael Daubs, MD, 2020 Meeting Local Host Preview CSRS Asia Pacific Section 2020 Annual Meeting Kyung-Soo Suk, MD, President CSRS - AP Preview CSRS European Section 2020 Annual Meeting Björn Zoëga, MD, President CSRS - EU 1:37 pm - 2:24 pm Session VIII: Motion Preservation Moderators: Frank Phillips, MD and Rick Sasso, MD 2:25 pm - 2:55 pm Break — Broadway Ballroom Foyer, 6th Floor Session IX: Outcomes II Moderators: Eric O Klineberg, MD and Ahmad Nassr, MD	11:02 am - 12:05 pm		
1:10 pm - 1:18 pm Traveling Fellowship Report Ilyas S. Aleem, BSc, MD, MS, FRCSC and Lee A. Tan, M.D. Preview CSRS 2020 Annual Meeting in Las Vegas, NV Michael Daubs, MD, 2020 Meeting Local Host Preview CSRS Asia Pacific Section 2020 Annual Meeting Kyung-Soo Suk, MD, President CSRS - AP Preview CSRS European Section 2020 Annual Meeting Björn Zoëga, MD, President CSRS - EU 1:37 pm - 2:24 pm Session VIII: Motion Preservation Moderators: Frank Phillips, MD and Rick Sasso, MD 2:25 pm - 2:55 pm Break — Broadway Ballroom Foyer, 6th Floor Session IX: Outcomes II Moderators: Eric O Klineberg, MD and Ahmad Nassr, MD	12:05 pm - 1:05 pm Lunch — Exhibit Hall, Westside Ballroom, 5 th Floor		
Ilyas S. Aleem, BSc, MD, MS, FRCSC and Lee A. Tan, M.D. 1:19 pm - 1:24 pm Preview CSRS 2020 Annual Meeting in Las Vegas, NV Michael Daubs, MD, 2020 Meeting Local Host 1:25 pm - 1:30 pm Preview CSRS Asia Pacific Section 2020 Annual Meeting Kyung-Soo Suk, MD, President CSRS - AP Preview CSRS European Section 2020 Annual Meeting Björn Zoëga, MD, President CSRS - EU 1:37 pm - 2:24 pm Session VIII: Motion Preservation Moderators: Frank Phillips, MD and Rick Sasso, MD 2:25 pm - 2:55 pm Break — Broadway Ballroom Foyer, 6th Floor Session IX: Outcomes II Moderators: Eric O Klineberg, MD and Ahmad Nassr, MD	1:10 pm - 1:36 pm	• • • • • • • • • • • • • • • • • • • •	
Michael Daubs, MD, 2020 Meeting Local Host 1:25 pm - 1:30 pm Preview CSRS Asia Pacific Section 2020 Annual Meeting Kyung-Soo Suk, MD, President CSRS - AP 1:31 pm - 1:36 pm Preview CSRS European Section 2020 Annual Meeting Björn Zoëga, MD, President CSRS - EU 1:37 pm - 2:24 pm Session VIII: Motion Preservation Moderators: Frank Phillips, MD and Rick Sasso, MD 2:25 pm - 2:55 pm Break — Broadway Ballroom Foyer, 6th Floor 2:56 pm - 3:58 pm Session IX: Outcomes II Moderators: Eric O Klineberg, MD and Ahmad Nassr, MD	1:10 pm - 1:18 pm	· ·	
1:31 pm - 1:36 pm Preview CSRS European Section 2020 Annual Meeting Björn Zoëga, MD, President CSRS - EU 1:37 pm - 2:24 pm Session VIII: Motion Preservation Moderators: Frank Phillips, MD and Rick Sasso, MD 2:25 pm - 2:55 pm Break — Broadway Ballroom Foyer, 6th Floor 2:56 pm - 3:58 pm Session IX: Outcomes II Moderators: Eric O Klineberg, MD and Ahmad Nassr, MD	1:19 pm - 1:24 pm	· · · · · · · · · · · · · · · · · · ·	
Björn Zoëga, MD, President CSRS - EU 1:37 pm - 2:24 pm Session VIII: Motion Preservation Moderators: Frank Phillips, MD and Rick Sasso, MD 2:25 pm - 2:55 pm Break — Broadway Ballroom Foyer, 6th Floor 2:56 pm - 3:58 pm Session IX: Outcomes II Moderators: Eric O Klineberg, MD and Ahmad Nassr, MD	1:25 pm - 1:30 pm		
Moderators: Frank Phillips, MD and Rick Sasso, MD 2:25 pm - 2:55 pm Break — Broadway Ballroom Foyer, 6 th Floor 2:56 pm - 3:58 pm Session IX: Outcomes II Moderators: Eric O Klineberg, MD and Ahmad Nassr, MD	1:31 pm - 1:36 pm	•	
2:56 pm - 3:58 pm Session IX: Outcomes II Moderators: Eric O Klineberg, MD and Ahmad Nassr, MD	1:37 pm - 2:24 pm		
Moderators: Eric O Klineberg, MD and Ahmad Nassr, MD	2:25 pm - 2:55 pm	Break — Broadway Ballroom Foyer, 6 th Floor	
4:00 pm - 4:30 pm CSRS Members Business Meeting	2:56 pm - 3:58 pm		
	4:00 pm - 4:30 pm	CSRS Members Business Meeting	



Orthofix.com BoneGrowthTherapy.com M6Disc.com



SATURDAY, NOVEMBER 23*All Scientific Sessions are located in Broadway Ballroom, 6th Floor

6:00 am - 7:00 am	Breakfast — Exhibit Hall, Westside Ballroom, 5 th Floor
7:00 am - 7:10 am	Welcome and Announcements Moderators: Gregory D Schroeder, MD and Justin S Smith, MD, PhD
7:11 am - 8:14 am	Session X: Complications III and Outcomes III Moderators: Darrel Brodke, MD and Kazuhiro Chiba, MD
8:15 am - 9:18 am	Session XI: Surgical Techniques and Imaging Parameters Moderators: Paul Arnold, MD and John Rhee, MD
9:19 am - 10:22 am	Symposium IV: Cervical Deformity and Complex Cervical Reconstruction Moderators: Christopher Ames, MD and Han Jo Kim, MD
9:19 am - 9:29 am	Alignment Planning for Deformity Correction Themistocles S Protopsaltis, MD
9:30 am - 9:40 am	Management of Cervical Deformity Resulting from Trauma <i>Heiko Koller, PhD, MD</i>
9:40 am - 9:50 am	Discussion
9:51 am - 10:01 am	Three-Column Osteotomies for Deformity Correction: Technique and Video Demonstration Christopher Ames, MD
10:02 am - 10:12 am	Complications Associated with Complex Cervical Reconstruction: Occurrence and Techniques for Avoidance Peter Passias, MD
10:12 am - 10:22 am	Discussion
10:22 am - 10:28 am	Announcement of Abstract and E-Poster Award Winners Jeffrey D Coe, MD, Awards Committee Chair
10:28 am - 10:33 am	Presentation of CSRS Medallion to Incoming President Rick Sasso, MD Alexander Vaccaro, MD, PhD, MBA
10:34 am - 11:14 am	Session XII: Economics, Safety, and Health Policy Moderators: Michael P Kelly, MD, MSc and Michael Steinmetz, MD
11:15 am - 11:29 am	Break — Broadway Ballroom Foyer, 6th Floor
11:29 am - 12:44 pm	Session XIII: Focused Podium Presentations Moderators: Michael Daubs, MD and Robert Hart, MD
12:45 pm - 12:46 pm	Closing Remarks Moderators: Gregory D Schroeder, MD and Justin S Smith, MD, PhD
12:47 pm - 12:48 pm	Adjourning Notices Rick Sasso, MD

FUTURE MEETINGS

CSRS Future Annual Meetings and Instructional Courses

December 9-12, 2020

The Cosmopolitan of Las Vegas, NV

December 1-4, 2021

Marriott Marguis, Atlanta, GA

I Ith Annual Meeting of Cervical Spine Research Society Asia Pacific Section

March 19-21, 2020

Seoul, Korea

36th Annual Meeting of Cervical Spine Research Society European Section

May 27th - 29th, 2020

Paris, France

Federation of Spine Associations Specialty Day

March 28, 2020

Orlando, FL

March 13, 2021

San Diego, CA

March 26, 2022

Chicago, IL

MODULUS Cervical

Intelligently designed for fusion

Modulus Cervical is a fully porous titanium (Ti) cervical interbody implant designed to provide a favorable environment for bone in-growth¹ while enhancing visualization compared to traditional Ti interbody implants.





 Preclinical data on file. Data may not be representative of clinical results. TR 9804787.

©2019, NuVasive, Inc. All rights reserved. 9512017 A

nuvasive.com



Disclosure of Conflict of Interest

It is the policy of CSRS to insure balance, independence, objectivity and scientific rigor in all of their educational activities. In accordance with this policy, CSRS identifies conflicts of interest with instructors, content managers and other individuals who are in a position to control the content of an activity. Conflicts are resolved by CSRS to ensure that all scientific research referred to, reported or used in a CME activity conforms to the generally accepted standards of experimental design, data collection and analysis. Complete faculty disclosures are included in the final program.

CME Information

This activity has been planned and implemented in accordance with the accreditation requirements and policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint providership of the American Academy of Orthopaedic Surgeons and the Cervical Spine Research Society. The American Academy of Orthopaedic Surgeons is accredited by the ACCME to provide continuing medical education for physicians.

The American Academy of Orthopaedic Surgeons designates the Annual Meeting Scientific Program for a maximum of 19.25 *AMA PRA Category 1 Credits* TM . The American Academy of Orthopaedic Surgeons designates the Instructional Course program for a maximum of 7.25 *AMA PRA Category 1 Credits* TM . Physicians should claim only the credit commensurate with the extent of their participation in the activity. A link to claim CME will be sent to all meeting delegates after the Annual Meeting.

The American Association of Neurological Surgeons accepts these *AMA PRA Category 1 Credits*™ towards the Continuing Education Award in Neurosurgery to maintain membership in the AANS and towards the ABNS Continuous Certification program.

Electronic devices of any kind may not be used to record any portion of the Annual Meeting Scientific Program, E-Posters or Industry Workshops.

CSRS 2019 ANNUAL MEETING – EVENING EVENTS

Wednesday, November 20

CSRS Instructional Course Reception

5:00 pm - 6:00 pm Exhibit Hall, Westside Ballroom, 5th Floor Open to all registered attendees. No prior registration required

NuVasive Industry Event

Cervical Spine Surgery: Why Should I Change?

6:00 pm - 8:00 pm

Pre-registration is required. For more information, please email jreeves@nuvasive.com

Thursday, November 21

CSRS Welcome Reception

5:00 pm - 6:30 pm Exhibit Hall, Westside Ballroom, 5th Floor Open to all registered attendees. No prior registration required

Medtronic Industry Dinner

Innovations in Cervical Spine Surgery: How Technology is Shaping My Practice 6:30 pm - 9:00 pm

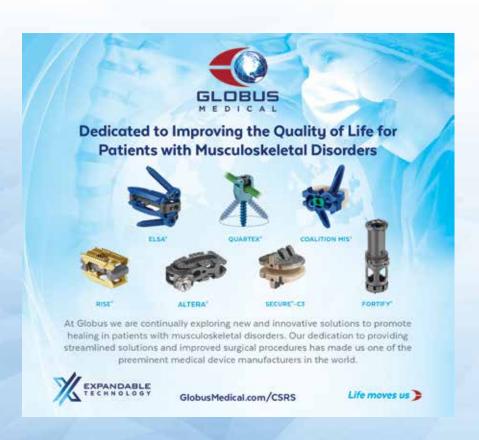
Pre-Registration required. Visit Medtronic Booth #406 for more information

FDA Statement (United States)

Some drugs and medical devices demonstrated during this course have limited FDA labeling and marketing clearance. It is the responsibility of the physician to be aware of drug or device FDA labeling and marketing status.

Insurance, Liabilities, and Disclaimer

CSRS will not be held liable for personal injuries or for loss or damage to property incurred by participants or quests at the Annual Meeting including those participating in tours and social events. Participants and guests are encouraged to take out insurance to cover loss incurred in the event of cancellation, medical expenses or damage to or loss of personal effects when traveling outside of their own countries. CSRS cannot be held liable for any hindrance or disruption of the Annual Meeting proceedings arising from natural, political, social or economic events or other unforeseen incidents beyond its control. Registration of a participant or quest implies acceptance of this condition. The materials presented at this Continuing Medical Education activity are made available for educational purposes only. The material is not intended to represent the only, nor necessarily best, methods or procedures appropriate for the medical situations discussed, but rather is intended to present an approach, view, statement or opinion of the faculty that may be helpful to others who face similar situations. CSRS disclaims any and all liability for injury or other damages resulting to any individual attending a scientific meeting and for all claims that may arise out of the use of techniques demonstrated therein by such individuals, whether these claims shall be asserted by a physician or any other person. The presentation material included in this book is included as received from program participants. We apologize for any oversight, deletion, or misspelling. Any such occurrences were unintentional.



10TH ANNUAL HENRY H. BOHLMAN PRESIDENTIAL GUEST LECTURE

Healthcare in America

Steve Forbes

Friday, November 22, 10:00 am - 11:00 am

Broadway Ballroom



This year, we are privileged to welcome Steve Forbes, Chairman and Editor-in-Chief of Forbes Media, as our 10th Annual Presidential Guest Speaker at the CSRS 2019 Annual Meeting. Steve Forbes, is renowned worldwide for his leadership in global economics and politics.

Steve writes editorials for each issue of Forbes under the heading of "Fact and Comment." A widely respected economic prognosticator, he is the only writer to have won the highly prestigious Crystal Owl Award four times. The prize was formerly given by U.S. Steel Corporation to the financial journalist whose economic forecasts for the coming year proved most accurate.

Steve's keynote, "Healthcare in America," focuses on the average American's high out-of-pocket price for healthcare and rising drug prices upsetting the populace. With Democrats proposing European-style government domination and even some Republicans demanding a bigger role from Washington- what happens now?

Henry H. Bohlman, MD



Henry H. Bohlman, MD was a pioneer of modern cervical spine surgery and a founding member of CSRS. He served as President in 1989.

In addition to being a leader, he was a teacher and a mentor to more than 120 Fellows and Residents, many of whom have established their own Fellowships as well as significant academic careers. He trained more CSRS Presidents than anyone in the history of the Society.

Given his influence on our organization, CSRS leadership established a guest lectureship in his name in 2010.

CSRS gratefully acknowledges our

HENRY H. BOHLMAN EDUCATIONAL ENDOWMENT FUND DONORS

Visionary Level	\$12,500-\$25,000
Sanford E. Emery, MD, MBA John G. Heller, MD	Robert A. Hart & Susan L. Orloff K. Daniel Riew, MD
Leadership Level	\$7,500-\$12,499
Frank J. Eismont, MD Gary Ghiselli, MD Alan S. Hilibrand, MD John S. Kirkpatrick, MD R. Alden Milam IV, MD Jack E. Zigler, MD	Alexander J. Ghanayem, MD Dr. & Mrs. Michael Gerling James D. Kang, MD Paul C. Mcafee, MD, MBA Glenn R. Rechtine II, MD
Gold Level	\$5,000-\$7,499
Jeffrey C. Wang, MD	
Silver Level	\$2,500-\$4,999
Darrel S. Brodke, MD	
Bronze Level	\$1,000-\$2,499
Paul A. Anderson, MD Jeremy Lee Fogelson, MD Wellington K. Hsu, MD Frank M. Phillips, MD Kyung-jin Song, MD, PhD	Gregory D. Carlson, MD Stephen E. Hanks, MD Michael P. Kelly, MD Michael D. Smith, MD Thomas A. Zdeblick, MD
Iron Level	\$500-\$999
Andrew Cappuccino, MD Kevin J. Mcguire, MD	Brian Kwon, MD
Steel Level	Under \$499
Brian Jacob Ipsen, MD	David J. Lunardini, MD

THANKYOU FOR YOUR GENEROSITY!

INDUSTRY PARTNER THANK YOU

Diamond Level Corporate Partner \$100,000+

In support of CSRS Research and Education

Medtronic



TRANSFORMING OUTCOMES THROUGH PROCEDURAL INNOVATION





Prestige LP™ Cervical Disc is the First FDA Approved Device to publish 10 Year Data and Demonstrate Overall Success for All Indicated Uses.

Visit Booth 406 to learn more about the Prestige LP Cervical Disc System



CSRS LEGACY DONORS

Donations since inception, as of 9/30/2019

Legacy Lifetime Donors	Over \$100,000
Alan S. Hilibrand, MD	K. Daniel Riew, MD
Titanium Donors	\$50,000-\$99,999
Todd J. Albert, MD John G. Heller, MD	Glenn R. Rechtine II, MD Rick C. Sasso, MD
Gold Donors	\$30,000-\$49,999
Bradford L. Currier, MD Bruce V. Darden II, MD Sanford E. Emery, MD, MBA Timothy A. Garvey, MD	Alexander J. Ghanayem, MD Jeffrey C. Wang, MD Thomas A. Zdeblick, MD
Silver Donors	\$20,000-\$29,999
Darrel S. Brodke, MD Randy F. Davis, MD Frank J. Eismont, MD	Scott D. Hodges, DO James D. Kang, MD Seth Zeidman, MD
Bronze Donors	\$10,000-\$19,999
Paul A. Anderson, MD Ronald I. Apfelbaum, MD Jeffrey S. Fischgrund, MD James S. Harrop, MD Robert A. Hart, MD Robert F. Heary, MD Jill & John Kirkpatrick, MD Paul C. McAfee, MD, MBA	R. Alden Milam IV, MD Pasquale X. Montesano, MD Bernard A. Rawlins, MD John M. Rhee, MD Michael D. Smith, MD Christopher G. Ullrich, MD Jack E. Zigler, MD
Iron Donors	\$5,000-\$9,999
Howard S. An, MD Joseph S. Barr Jr, MD Jacob M. Buchowski, MD, MS Andrew Cappuccino, MD Gregory D. Carlson, MD Ivan Cheng, MD David H. Clements III, MD Jeffrey D. Coe, MD Nancy Epstein, MD Jeremy Lee Fogelson, MD Steven R. Garfin, MD Gary Ghiselli, MD Donald R. Gore, MD	Thomas R. Highland, MD Don Hood, PhD Louis G. Jenis, MD Steven C. Ludwig, MD Kevin J. McGuire, MD Patrick F. O'Leary, MD, FACS Mark A. Palumbo, MD Alpesh A. Patel, MD, FACS Tushar C. Patel, MD Frank M. Phillips, MD Mike H. Sun, MD Michael L. Swank, MD
Leon B. Greenspan, MD Harry N. Herkowitz, MD	Bobby K. Tay, MD Vincent C. Traynelis, MD Clifford B. Tribus, MD

CSRS LEGACY DONORS

Donations since inception, as of 9/30/2019

Merit Donors

\$1,000-\$4,999

Paul M. Arnold, MD

Edward C. Benzel, MD, FAANS

Mark Bernhardt, MD

Nitin N. Bhatia, MD

John B. Blakley, MD

Henry H. Bohlman, MD*

Mark D. Brown, MD, PhD

Frank P. Cammisa, Jr., MD Thomas D. Cha, MD, MBA

Saad Chaudhary, MD

Charles R. Clark, MD

Paul R. Cooper, MD

Jerome M. Cotler, MD

Michael D. Daubs, MD

Clinton J. Devin, MD

Curtis A. Dickman, MD William F. Donaldson III, MD

James C. Farmer, MD

Amir H. Fayyazi, MD, BS

Lawrence Foley

Paul T. Geibel, MD

Cyrus Ghavam, MD

Zoher Ghogawala, MD, FACS

John A. Glaser, MD

Cary D. Glastein, MD

Stephen E. Hanks, MD Edward N. Hanley Jr., MD

Alan E. Heilman, MD

Robert N. Hensinger, MD

Kiyoshi Hirabayashi, MD

Wellington K. Hsu, MD

Russel C. Huang, MD

S. Craig Humphreys, MD

George B. Jacobs, MD

Michael P. Kelly, MD Han-Jo Kim, MD

Fugano Voung Koh

Eugene Young Koh, MD, PhD

Craig A. Kuhns, MD

Eric B. Laxer, MD

Darren R. Lebl, MD, MBA

Alan M. Levine, MD*

Stephen J. Lipson, MD

lan A. Madom, MD

Dennis J. Maiman, MD, PhD

Kathryn J. McCarthy, MD

Alan W. McGee, MD

Robert A. McGuire Jr., MD

Srdjan Mirkovic, MD

Daniel B. Murrey, MD

Bruce E. Northrup, MD*

 $Douglas\ G.\ Orndorff,\ MD$

Ashvin I. Patel, MD

Jordan Paul

Donald S. Pierce, MD

Ravi K. Ponnappan, MD

Stephen A. Pye Jr., MD

Kevin A. Rahn, MD

John F. Raycroft Jr, MD

Richard Raynor, MD

Mitchell F. Reiter, MD

Alfred L. Rhyne, MD

James E. Ricciardi, MD

Jeffrey A. Rihn, MD Lee H. Riley III, MD

Alexander Robertson, MD

Andrew A. Sama, MD

Gregory D. Schroeder, MD

Jonathan Nubla Sembrano, MD

Christopher I. Shaffrey, MD

Henry H. Sherk, MD*

Kern Singh, MD

Justin S. Smith, MD, PhD

Kyung-jin Song, MD, PhD

Leo R. Spector, MD

Kazuo Terayama, MD

Nathaniel L. Tindel, MD

Scott G. Tromanhauser, MD

Alexander R. Vaccaro, MD, PhD, MBA

Michael Vives, MD

William C. Watters III, MD

Andrew Patrick White, MD

Charles H. Wingo, MD

Neill M. Wright, MD

Jim A. Youssef, MD

CSRS LEGACY DONORS

Donations since inception, as of 9/30/2019

Benefactors Under \$999

Jean-Jacques Abitbol, MD Kuniyoshi Abumi, MD Luis Aguilar Fernandez, MD Dirk H. Alander, MD

D. Greg Anderson, MD David T. Anderson, MD Robert B. Anderson, MD Edward E. Bell JR, MD

Brian J. Blessinger, MD Bikash Bose, MD

Jose M. Casamitjana, MD Andrew M. Casden, MD G. David Casper, MD Han Chang, MD, PhD Wayne K. Cheng, MD Samuel K. Cho. MD

Matthew W. Colman, MD Robert G. Davis, MD

Robert V. Dawe, MD
T. Craig Derian, MD
Upendra D. Desai, MD
Anthony P. Dwyer, MD

Michael Trinidad Espiritu, MD lan D. Farev. MBBS. FRACS

Ira L. Fedder, MD

Michael G. Fehlings, MD, PhD Jeffrey C. Fernyhough, MD Pierce J. Ferriter, MD

Kevin S. Finnesey, MD

Anthony K. Frempong-Boadu, MD

Vance O. Gardner, MD Edward J. Goldberg, MD Bennett D. Grimm, MD Michael Forest Heinig, MD Jan Herkowitz

Serena S. Hu, MD
Brian Jacob Ipsen, MD
Tatsuo Itoh, MD
Henry J. Iwinski, MD
Sravisht Iyer, MD
Ralph P. Katz, MD
Wayne Kelley JR, MD
Thomas James Kesman, MD
David Hanwuk Kim, MD

Scott H. Kitchel, MD

John P. Kostuik, MD
David L. Kramer, MD
Brian Kwon, MD
Robert M. Lifeso, MD
Gary L. Lowery, MD, PhD
David J. Lunardini, MD
Yukihiro Matsuvama, MD, PhD

R Michael McCaffrey James Stuart Melvin III, MD

Addisu Mesfin, MD Sohail K. Mirza, MD, MPH Ismael Montane, MD Robert A. Morgan, MD

Kazuyoshi Nakanishi, MD, PhD

Brian J. Neuman, MD
Pierce D. Nunley, MD
Peter G. Passias, MD
James A. Pearson, MD
Frank X. Pedlow, Jr., MD
Eric D. Phillips, MD
William A. Phillips, MD
Kornelis A. Poelstra, MD
Sheeraz A. Qureshi, MD, MBA

Kristen E. Radcliff, MD Kamshad Raiszadeh, MD

Susan M. Reed

Anthony S. Rinella, MD

Stephen Cunningham Robinson, MD

Jose E. Rodriguez, MD
Scott S. Russo, MD
P Bradley Segebarth, MD
Kenichi Shinomiya, MD, PhD
Edward D. Simmons, MD
Andrew V. Slucky, MD
W. Ryan Spiker, MD
James R. Stubbart, MD
Chester E. Sutterlin III, MD
Brett A. Taylor, MD
Nikhil A. Thakur, MD
Kurt W. Von Rueden, MD
Sidney L. Wallace, MD
M. Gordon Whitbeck JR, MD
Thomas S. Whitecloud III. MD

Thomas E. Whitesides Jr., MD

*=deceased



Please join the Zimmer Biomet sponsored Industry Workshop during the Cervical Spine Research Society 47th Annual Meeting for a review and discussion on how to protect against adjacent segment pathology through a review of ACDF clinical literature and the results of seven cervical disc IDE studies.

Thursday, November 21, 2019 11:30 am – 1:30 pm Wilder Room, 4th Floor

Featured Faculty

- Woosik Chung, MD
- John Rhee, MD
- Neill Wright, MD

Learrn more at booth #207



Surgeon presenters are paid consultants of Zimmer Biomet. All content herein is protected by copyright, trademarks and other intellectual property rights, as applicable, owned by or licensed to Zimmer Biomet or its affiliates unless otherwise indicated, and must not be redistributed, duplicated or disclosed, in whole or in part, without the express written concern of Zimmer Biomet. This material is intended for health care professionals. Distribution to any other receipent is prohibited. For indications, contraindications, warnings, precautions, potential adverse effects and patient counselling information, see the package insert or contact your local representative; visit www.zimmerbiomet.com for additional product information. Check for country product clearances and reference product specific instructions for use. © 2019 Zimmer Biomet Spine, Inc. All rights reserved. MedicitioS-en-REV1019





- A specialised news source in the spinal arena
- A trusted provider of latest news, review of cutting-edge research, congress coverage and opinion from thought leaders
- sn Editorially independent
- Available on three different platforms: print, web and mobile application

For complimentary print subscription* and e-newsletter subscription** visit www.spinalnewsinternational.com and click Subscriptions*

Available for US and EU readers only "Available worldwide







PHANTOM CS™ PIVOTING TECHNOLOGY



"The Phantom CS System pivoting technology minimizes pressure on the incision and vital structures in the anterior cervical approach, while still using the same small skin incision for better access"

> Ashish Sahai, M.D., F.A.A.O.S. Spine and Orthopedic Center Boca Raton, FL

Phantom CS is a trademark of TeDan Surgical Innovations, LLC.

Ph: 713-726-0886 Fax: 713-726-0846 Toll Free: 877-726-0886 12615 West Airport Blvd., Suite #200, Sugar Land, Texas 77478 Email: info@tedansurgical.com www.tedansurgical.com

Is cervical spine surgery good enough?

NuVasive evening event

Cervical spine surgery—why should I change?

Wednesday, November 20 from 6 to 8 p.m.

NuVasive lunch workshop

Cervical spine surgery—why should I change? Featuring Advanced Materials Science.

Thursday, November 21 from 11:30 a.m. to 1:30 p.m.

For more information related to the evening event, please contact **cervicalteam@nuvasive.com**

©2019. NuVasive, Inc. All rights reserved. 9512014 A

nuvasive.com

