



51ST ANNUAL MEETING & 28TH INSTRUCTIONAL COURSE

FINAL PROGRAM



NOVEMBER 29-DECEMBER 2, 2023

THE COSMOPOLITAN OF LAS VEGAS

NEVADA

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Date: Thursday, November 30

Time: 11:55 a.m.–12:55 p.m.

Faculty:

Dr. Hyun Bae

Professor of Orthopaedic Surgery
Cedars Sinai Medical Center

Dr. Rick Guyer

Director/Co-founder
Texas Back Institute

Dr. Dan Riew

Professor of Orthopaedic Surgery
Columbia University



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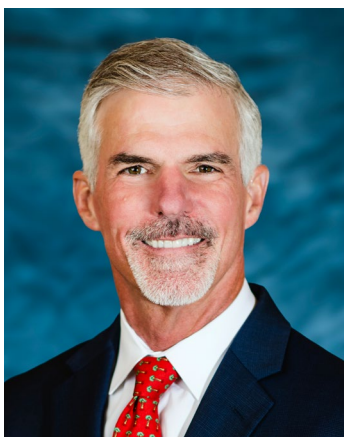
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Cervical Spine Research Society
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 Milwaukee, WI 53202
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www.csrs.org
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No electronic devices of any kind may be used to record any portion of the Instructional Course, Annual Meeting Scientific Program, E-Posters or Technical Exhibits.

Welcome



Welcome to my hometown of Las Vegas, Nevada! I am excited to welcome you to the CSRS 51st Annual Meeting, held at The Cosmopolitan of Las Vegas. Brandon Lawrence, MD; Tom Mroz, MD; and Michael Steinmetz, MD, the meeting program co-chairs, have put together an amazing scientific program.

Wednesday, following the ICL, we will start the Annual Meeting with, “The Ex-Presidents Case Debates,” a special CME session and reception to kick-off the meeting. The scientific content will feature 70 podium abstract presentations, four specially curated symposia and a Virtual Poster Hall. Our very own friend and colleague, Rex Marco, MD, will be giving the Henry Bohlman Presidential Guest Lecture, “When Life Takes Your Breath Away” – his story of transformation and recovery as he experienced difficulties related to his severe codependency.

Not only is this meeting packed with educational content, we wanted to enhance your networking experience and give you time to explore the famous Las Vegas strip. New this year, we added a dining room and coffee bar for you to enjoy your complimentary breakfast prior to the start of scientific sessions. We also arranged the schedule so that Friday afternoon you have free time to explore Las Vegas at your leisure. This break from content provides extra opportunities to network, reconnect with colleagues and make new friends!

Don’t forget to be in attendance on Saturday morning as we present the 2023 CSRS Lifetime Achievement Award to Augustus White III, MD, PhD. His remarkable leadership is unparalleled, and we thank him for his dedication and service to CSRS, including his term as CSRS President in 1988. Dr. White’s achievements go beyond personal triumphs and have truly advanced the field of cervical spine surgery. For these reasons and many others, CSRS is proud to launch the Augustus White Endowment Fund to provide financial assistance to aspiring cervical spine surgeons to attend CSRS events.

In addition to the Annual Meeting, the CSRS Instructional Course is celebrating its 28th year. This event will be fully in-person for the first time since the global pandemic. Max Boakye, MD, FAANS and Jason Savage, MD have put together a program that fosters discussion on all the hot cervical spine topics.

Once, again, welcome to the fabulous Las Vegas! I can’t wait to see all that the 28th Instructional Course and 51st Annual Meeting have in store!

Sincerely,

A handwritten signature in black ink, appearing to read "Michael Daubs". The signature is fluid and stylized.

Michael Daubs, MD
President, CSRS

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.

CSRS Allied Organizations



CSRS Asia Pacific President: Gabriel Liu, MSc, FRCS



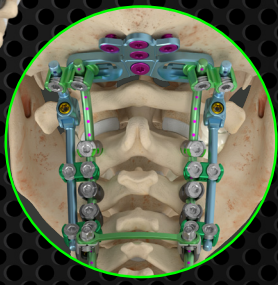
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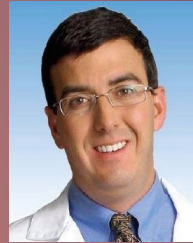
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Brandon D. Lawrence, MD

DEI Task Force

Barrett I. Woods, MD

CSRS 28th Instructional Course Schedule

Wednesday, November 29		Location
7:00 am- 7:00 pm	Registration Open	Gracia Commons
7:30 am- 9:00 am	Breakfast & Coffee Bar	Castellana
9:00 am- 10:00 am	ICL Session 1: Cervical Myelopathy*	Gracia Ballroom
10:00 am- 11:00 am	ICL Session 2: Trauma*	Gracia Ballroom
11:00 am- 12:00 pm	ICL Session 3: Cervical Deformity*	Gracia Ballroom
12:00 pm- 12:50 pm	Instructional Course Lunch	Castellana
12:50 pm- 1:50 pm	ICL Session 4: Cervical Disc Arthroplasty*	Gracia Ballroom
1:50 pm- 2:50 pm	ICL Session 5: Complications*	Gracia Ballroom
2:50 pm- 3:00 pm	ICL Break	Gracia Commons
3:00 pm- 4:00 pm	ICL Session 6: Ask the Experts*	Gracia Ballroom

**Session Recorded*

CSRS 51st Annual Meeting Schedule

Wednesday, November 29		Location
7:00 am- 7:00 pm	Registration Open	Gracia Commons
5:00 pm- 7:00 pm	Annual Meeting Opening Night: "The Ex-President's" Case Debates*	Gracia Ballroom
7:30 pm- 9:30 pm	CSRS Resident & Fellow Scholarship Program and Dinner - Sponsored, in part, by Medtronic	Brera 5
Thursday, November 30		
6:30 am- 8:00 am	Breakfast & Coffee Bar	Castellana
6:30 am- 12:00 pm	Guest Lounge Open	Brera 1
7:00 am- 7:30 pm	Registration Open	Gracia Commons
8:00 am- 8:05 am	Morning Welcome	Gracia Ballroom
8:05 am- 9:20 am	Abstract Session 1: Techniques	Gracia Ballroom
9:20 am- 10:20 am	Symposia 1- Forget the Hardware: Bone Graft Strategy for Successful Fusion*	Gracia Ballroom
10:00 am- 7:30 pm	Exhibit Hall Open	Exhibit Hall, Gracia Ballroom
10:20 am- 10:40 am	Morning Coffee Break	Exhibit Hall, Gracia Ballroom
10:40 am- 11:55 am	Abstract Session 2: Deformity	Gracia Ballroom
12:00 pm- 1:00 pm	Industry Lunch Workshops	Brera 2-6
1:05 pm- 2:25 pm	Abstract Session 3: Trauma and the Elderly	Gracia Ballroom
2:25 pm- 3:25 pm	Symposia 2- Management of Complex Upper Cervical Trauma*	Gracia Ballroom
3:25 pm- 3:45 pm	Afternoon Coffee Break	Exhibit Hall, Gracia Ballroom
3:45 pm- 4:30 pm	Henry H. Bohlman Presidential Guest Lecture*	Gracia Ballroom
4:30 pm- 5:00 pm	CSRS Allied Organization Presidential Talks*	Gracia Ballroom
5:00 pm- 6:15 pm	Abstract Session 4: Anterior Cervical Disc	Gracia Ballroom
6:15 pm- 7:30 pm	Annual Meeting Reception	Exhibit Hall, Gracia Ballroom

*Session Recorded

CSRS 51st Annual Meeting Schedule

Friday, December 1		Location
6:30 am- 8:00 am	Breakfast & Coffee Bar	Castellana
6:30 am- 12:00 pm	Guest Lounge Open	Brera 1
7:00 am- 8:00 am	CSRS Member Business Meeting & Breakfast	Brera 5
7:00 am- 1:30 pm	Registration Open	Gracia Commons
8:00 am- 8:05 am	Morning Welcome	Gracia Ballroom
8:05 am- 9:20 am	Abstract Session 5: Cervical Spondylotic Myelopathy (CSM)	Gracia Ballroom
9:00 am- 1:30 pm	Exhibit Hall Open	Exhibit Hall, Gracia Ballroom
9:20 am- 10:20 am	Symposia 3- Laminoplasty: Updates from the Experts*	Gracia Ballroom
10:20 am- 10:40 am	Morning Coffee Break	Exhibit Hall, Gracia Ballroom
10:40 am- 11:55 am	Abstract Session 6: Ossification of the Posterior Longitudinal Ligament (OPLL)	Gracia Ballroom
11:55 am- 12:25 pm	CSRS Presidential Address*	Gracia Ballroom
12:25 pm- 12:35 pm	2024 CSRS Presidential Induction Ceremony	Gracia Ballroom
12:35 pm- 1:30 pm	Networking Social with Vintage Cocktails	Exhibit Hall, Gracia Ballroom
1:30 pm	Afternoon Free	
Saturday, December 2		
6:30 am- 8:00 am	Breakfast & Coffee Bar	Castellana
6:30 am- 12:00 pm	Guest Lounge Open	Brera 1
7:00 am- 8:00 am	CSRS New Member Breakfast- Invite only	Brera 5
7:30 am- 10:00 am	Registration Open	Gracia Commons
8:00 am- 8:10 am	Morning Welcome & New Member Recognition	Gracia Ballroom
8:10 am- 9:00 am	Past Research Grant Presentations & 2023 Research Grant Awards*	Gracia Ballroom
9:00 am- 9:25 am	Lifetime Achievement Award*	Gracia Ballroom
9:25 am- 9:35 am	CSRS 2024 Meeting Previews	Gracia Ballroom
9:35 am- 9:55 am	Awards Session	Gracia Ballroom
9:55 am- 10:55 am	Symposia 4- Complications? We Don't Need No Stink'in Complications! Case Based Discussion with the Experts*	Gracia Ballroom
10:55 am- 12:10 pm	Abstract Session 7: Fun facts	Gracia Ballroom
12:10 pm- 12:15 pm	Annual Meeting Farewell	Gracia Ballroom

**Session Recorded*

28TH

Twenty-Eighth Instructional Course

of the



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November 29, 2023

The Cosmopolitan of Las Vegas in Las Vegas, Nevada

On-Demand recordings of scientific sessions available
January 22, 2024 - December 31, 2024

President: Michael D. Daubs, MD

Instructional Course Program Co-Chairs: Maxwell M. Boakye, MD, FAANS • Jason W. Savage, MD

Instructional Course Sub-Committee: Jesse E. Bible, MD • Barrett S. Boody, MD • Ivan Cheng, MD • Sang Hun Lee, MD • Tim A. Moore, MD • Thomas E. Mroz, MD • Themistocles S. Protopsaltis, MD • P. Bradley Segebarth, MD • Adam L. Shimer, MD • Michael P. Steinmetz, MD • Jefferson Wilson, MD, PhD, FRCSC

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, Virtual Poster Hall, Industry Workshops, or Technical Exhibits.

Wednesday, November 29, 2023

Registration Open

Time: 7:00 am- 7:00 pm
Location: Gracia Commons

Breakfast

Time: 7:30 am- 9:00 am
Location: Castellana

ICL Session 1: Cervical Myelopathy

Time: 9:00 am- 10:00 am
Location: Gracia Ballroom
Moderators: P. Bradley Segebarth, MD; Andrew C. Hecht, MD

9:00 am **New Imaging Modalities for Cervical Spondylotic Myelopathy**
 Zoher Ghogawala, MD, FACS

9:08 am **Pros and Cons of Crossing the CT Junction**
 Brandon Lawrence, MD

9:16 am **Case debate: Multi-level ACDF for Cervical Myeloradiculopathy**
 Thomas Mroz, MD

9:24 am **Case debate: Laminoplasty for Cervical Myeloradiculopathy**
 Wellington Hsu, MD

9:32 am **Case debate: PCF for Cervical Myeloradiculopathy**
 Alpesh Patel, MD, MBA, FACS

9:40 **Discussion**

ICL Session 2: Trauma

Time: 10:00 am- 11:00 am
Location: Gracia Ballroom
Moderators: Jesse Bible, MD; Maxwell Boakye, MD, FAANS

10:00 am **Neuroprotective Agents for Acute SCI...Have We Gotten Anywhere?**
 Michael G. Fehlings, MD, PhD, FRCSC

10:08 am **Management of Bilateral Facet Dislocation: Factors that Influence Surgical Decision Making**
 Steven C. Ludwig, MD

10:16 am **"Stiff" Spine Fractures: Tips and Tricks**
 Tim A. Moore, MD

10:24 am **Case Debate: Type 2 Odontoid Fracture in the Elderly Patient (Non-operative Care)**
 James S. Harrop, MD

10:32 am **Case Debate: Type 2 Odontoid Fracture in the Elderly Patient (Surgical Treatment)**
 Corinna Zygourakis, MD

10:40 am **Discussion**

Wednesday, November 29, 2023

ICL Session 3: Cervical Deformity

<i>Time:</i>	11:00 am- 12:00 pm
<i>Location:</i>	Gracia Ballroom
<i>Moderators:</i>	Themistocles Protopsaltis, MD; Jason W. Savage, MD
11:00 am	So Many Numbers....What's Really Important? Adam L. Shimer, MD
11:10 am	Developing an Algorithm for Treating Cervical Deformity Christopher Shaffrey, MD
11:20 am	Important Factors in Choosing your UIV/LIV Han Jo Kim, MD
11:30 am	Correction Techniques in Cervical Deformity Christopher Ames, MD
11:40 am	Discussion

Lunch

<i>Time:</i>	12:00 pm- 12:50 pm
<i>Location:</i>	Castellana

ICL Session 4: Cervical Disc Arthroplasty

<i>Time:</i>	12:50 pm- 1:50 pm
<i>Location:</i>	Gracia Ballroom
<i>Moderator:</i>	John K. Houten, MD, FAANS
12:50 pm	Biomechanics of Cervical Disc Replacement: Classifying Arthroplasty Implants Praveen Mummaneni, MD, MBA
1:00 pm	Systematic Review and Meta-analysis of Data From Multicenter Trials on Disc Replacement Andrew T. Dailey, MD
1:10 pm	Impact of Posterior Cervical Foraminotomy Before or After Cervical Disc Replacement: Current Evidence Amir M. Abtahi, MD
1:20 pm	Cervical Disc Replacement in Athletes Sheeraz Qureshi, MD, MBA
1:30 pm	Discussion

ICL Session 5: Complications

<i>Time:</i>	1:50 pm- 2:50 pm
<i>Location:</i>	Gracia Ballroom
<i>Moderators:</i>	Sang Hun Lee, MD; Neill M. Wright, MD
1:50 pm	How to Minimize Dysphagia in Anterior Neck Surgery Gregory Schroeder, MD
2:00 pm	Management of Vertebral Artery Injuries Paul Arnold, MD
2:10 pm	Bailout Fixation Techniques in the Osteoporotic Spine John France, MD
2:20 pm	Avoiding and Managing Complications in the ASC Brian W. Su, MD
2:30 pm	Discussion

Wednesday, November 29, 2023

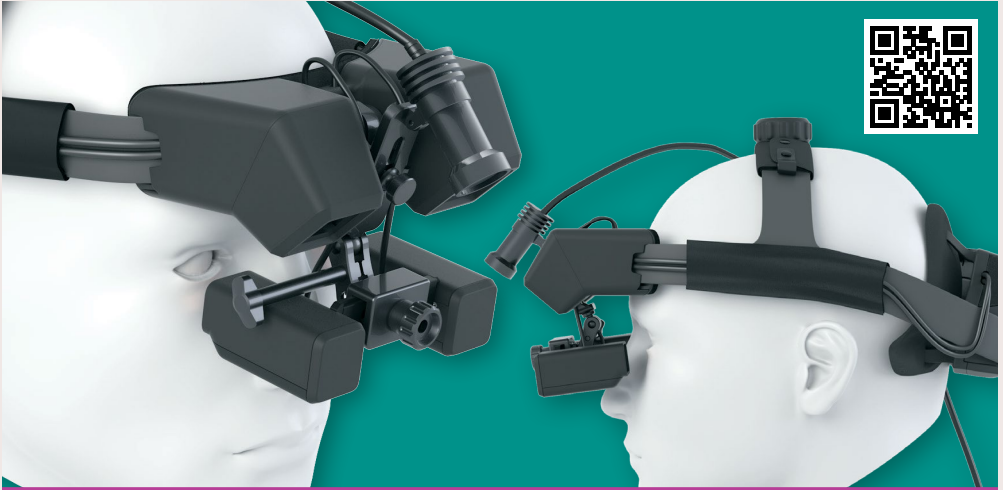
Break

Time: 2:50 pm- 3:00 pm
Location: Gracia Commons

ICL Session 6: Ask the Experts

Time: 3:00 pm- 4:00 pm
Location: Gracia Ballroom
Moderators: Maxwell Boakye, MD, FAANS; Jason W. Savage, MD
Panelists: Darrel S. Brodke, MD; John M. Rhee, MD; and K. Dan Riew, MD

3:00pm	Case 1: Cervical Myeloradiculopathy
3:05pm	Discussion/Debate
3:20pm	Case 2: Cervical Trauma
3:25pm	Discussion/Debate
3:40pm	Case 3: Cervical Deformity
3:45pm	Discussion/Debate



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51ST

Fifty-First Annual Meeting

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November 29 - December 2, 2023

The Cosmopolitan of Las Vegas in Las Vegas, Nevada

On-Demand recordings of scientific sessions available

January 22, 2024 - December 31, 2024

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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.

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Wednesday, November 29, 2023

Registration Open

Time: 7:00 am- 7:30 pm
Location: Gracia Commons

Annual Meeting Opening Session: "The Ex-President's" Case Debates

Time: 5:00 pm- 7:00 pm
Location: Gracia Ballroom
Moderators: Brandon Lawrence, MD; Thomas Mroz, MD
Panelists: Darrel Brodke, MD; Michael D. Daubs, MD; James S. Harrop, MD, MSHQS; John M. Rhee, MD; Jeffrey C. Wang, MD

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Hands-On Surgical
Techniques Course

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Thursday, November 30, 2023

Breakfast & Coffee Bar

Time: 6:30 am- 8:00 am
Location: Castellana

Registration Open

Time: 7:00 am- 7:30 pm
Location: Gracia Commons

Morning Welcome

Time: 8:00 am- 8:05 am
Location: Gracia Ballroom
Moderators: Brandon Lawrence, MD; Thomas Mroz, MD

Abstract Session 1: Techniques

Time: 8:05 am- 9:20 am
Location: Gracia Ballroom
Moderators: Michael D. Daubs, MD; James S. Harrop, MD, MSHQS

8:05 am **Introduction**

8:10 am  **1ST PLACE CLINICAL RESEARCH AWARD**

1. Surgical Outcomes of Extensive Dome-like Laminoplasty Using En Bloc Resection of the C2 Inner Lamina for Patients With Severe Cord Compression Behind the C2 Body
Kyung-Chung Kang, MD

8:15 am **2. Open-Door Cervical Laminoplasty with Skip-fixation is Not Inferior to that of All-fixation: A Multicenter Randomized Controlled Trial**
Koji Tamai, MD

8:20 am **3. How to Choose the Open Side for Unilateral Open-door Laminoplasty in the Treatment of Cervical Ossification of the Posterior Longitudinal Ligament?**
Yifan Tang, MD

8:25 am **4. Different Patterns in Postoperative Sagittal Parameter Change After Laminoplasty According to the Preoperative T1 Slope**
Sehan Park, MD

8:30 am **5. C4-C6 Laminoplasty with and without C3 Laminectomy, the Fate of the C2-C3 level: A Cadaveric Biomechanical Study**
Orlando M. Martinez, BS

8:35 am **Discussion**

8:45 am **6. What Effect Does T1 Slope Have on Sagittal Balance and the Relationship with Caudal End of Three or More Level Posterior Cervical Fusions?**
Eric Truumees, MD

8:50 am **7. Comparison of Outcomes Between Anterior Cervical Ossified Posterior Longitudinal Ligament En Bloc Resection and Posterior Total Laminectomy and Fusion in Patients with Cervical Ossification of the Posterior Longitudinal Ligament: A Prospective Randomized Controlled Trial**
Xiongsheng Chen, MD

8:55 am **8. The Impact of C2 Screw Placement Technique on Radiographic and Clinical Outcomes after C2-T2 Posterior Cervical Fusion**
Hannah A. Levy, MD

Thursday, November 30, 2023

Abstract Session 1: Techniques, *continued*

- 9:00 am **9. The Effect of C2 Muscular Exposure Technique on Radiographic and Clinical Outcomes after C2-T2 Posterior Cervical Fusion**
Hannah A. Levy, MD
- 9:05 am **10. Cervical Pedicle Screw Insertion in Degenerative Vertebrae Using a Robot System**
Masashi Neo, MD, PhD
- 9:10 am **Discussion**

Symposia 1 - Forget the Hardware: Bone Graft Strategy for Successful Fusion

- Time:* 9:20 am- 10:20 am
- Location:* Gracia Ballroom
- Moderators:* Erica F. Bisson, MD, MPH; Alpesh Patel, MD, MBA, FACS
- 9:20 am **Bone Graft Landscape - Regulatory Pathway and Impact on Quality of Evidence**
Samuel C. Overley, MD
- 9:30 am **Evidence Based Usage**
Wellington Hsu, MD
- 9:40 am **How do we Measure Success? (Clinical vs. Radiographic, Modalities to Use? When to Order)**
Vincent C. Traynelis, MD
- 9:50 am **High Risk Case Presentation and Discussion: Choosing the Best Graft Options - Ask the Experts (Failed Occipitocervical Fusion, Multi-level ACDF in Active Smoker)**
Wellington Hsu, MD; Vincent C. Traynelis, MD

Exhibit Hall Open

- Time:* 10:00 am- 7:30 pm
- Location:* Gracia Ballroom

Morning Coffee Break

- Time:* 10:20 am- 10:40 am
- Location:* Exhibit Hall, Gracia Ballroom

Abstract Session 2: Deformity

- Time:* 10:40 am- 11:55 am
- Location:* Gracia Ballroom
- Moderators:* Han Jo Kim, MD; Christopher Shaffrey, MD
- 10:40 am **Introduction**
- 10:45 am **11. The Evolution of ERAS: Assessing the Clinical Benefits of Developments within Enhanced Recovery After Surgery Protocols in Adult Cervical Deformity Surgery**
Robert Eastlack, MD
- 10:50 am **12. Are we Getting Better at Treating Adult Cervical Deformity? Complication Rate Trends Analysis in Adult Cervical Deformity Over 10 Years**
M. Burhan Janjua, MD
- 10:55 am **13. Working Towards Personalized Realignments in Adult Cervical Deformity Surgery: Consideration of Upper Cervical Region Reserve and Deformity Morphology in the Application of the Cervical Lordosis Distribution Index**
Thomas J. Buell, MD

Thursday, November 30, 2023

Abstract Session 2: Deformity, *continued*

- 11:00 am **14. Incorporation of Frailty Based Realignment Target Goals for Cervical Deformity Surgery in Adults Can Mitigate Mechanical Complications and Improve Perioperative Course**
M. Burhan Janjua, MD
- 11:05 am **15. Preoperative Optimization of Modifiable Patient-Related Factors Reduces the Risk of Distal Junctional Kyphosis (DJK): A Virtual Analysis of a Novel Multicenter Complex Adult Cervical Deformity Database**
Thomas J. Buell, MD
- 11:10 am **Discussion**
- 11:20 am **16. Radiographic Parameter Analysis of Positive Sagittal Decomensation After Long-level Posterior Cervical Fusion**
Hyunwook Nam, MD
- 11:25 am **17. Identifying Intra-operative C2 Slope Thresholds for Optimal Functional and Clinical Outcomes in Cervical Deformity Correction**
Peter G. Passias, MD
- 11:30 am **18. Influence of Upper Cervical Malalignment and Negative Sagittal Imbalance on Clinical Outcomes in Patients with Craniovertebral Junction Kyphosis**
Jae Taek Hong, MD, PhD
- 11:35 am **19. Evolution of Osteotomy Techniques over Time in Adult Cervical Deformity Surgery: Impact of New Technologies and Techniques on Patient Outcomes**
Robert Eastlack, MD
- 11:40am **20. Longer Screws Decrease the Risk of Radiographic Pseudarthrosis Following Elective Anterior Cervical Discectomy and Fusion**
Byron F. Stephens, MD, MSCI
- 11:45 am **Discussion**

Industry Lunch Workshops

Time: 12:00 pm- 1:00 pm

Please note: *Each industry lunch workshop will be limited to the first 40 individuals that arrive.*

ATEC Spine – Complex Cases: Planning, Procedure, and Pearls

Location: Brera 5

Faculty: Steven Ludwig, MD; Alpesh Patel, MD, MBA; Tim Yoon, MD, PhD

Cerapedics – Mastering Complexity in Spinal Fusions: An Evidence-Based Review of the Bone Graft Landscape

Location: Brera 4

Faculty: Safdar N. Khan, MD

DePuy – Unleash Cervical: A Complex Cervical Discussion

Location: Brera 6

Moderator: Chris Ames, MD

Faculty: James Harrop, MD, MSHQS; Addisu Mesfin, MD

Medtronic – Cervical Alignment Planning and Correction Techniques

Location: Brera 2

Faculty: Peter Passias, MD; Lee Tan, MD

NuVasive – Advantages of a PEEK on Ceramic Prosthesis

Location: Brera 3

Faculty: Hyun Bae, MD; Richard Guyer, MD; Dan Riew, MD

Thursday, November 30, 2023

Abstract Session 3: Trauma and the Elderly

<i>Time:</i>	1:05 pm- 2:25 pm
<i>Location:</i>	Gracia Ballroom
<i>Moderators:</i>	Brian A. Karamian, MD; Chris Kepler, MD, MBA
1:05 pm	Introduction
1:10 pm	21. Is Routine Use of External Spinal Orthoses Necessary After Operative Stabilization of Cervical Spine Injuries? Mark Prasarn, MD
1:15 pm	22. The Effect of Mean Arterial Pressure (MAP) Augmentation on Intra-parenchymal Hemorrhage Progression in Cervical Spinal Cord Injury (SCI) Toluyemi A. Malomo, MD, MSc, FWACS
1:20 pm	23. The Effect of Early Surgical Decompression on Segmental Neurological Recovery in Acute Traumatic Spinal Cord Injury: A Pooled Analysis of Individual Participant Data from Prospective, Multicenter Trials Michael Fehlings, MD, PhD, FRCSC, FACS
1:25 pm	24. Mortality Following Operative and Nonoperative Treatment of Odontoid Fracture Among Medicare Beneficiaries and the Influence of Dementia: A Matched Cohort Analysis Darrel Brodke, MD
1:30 pm	25. Can Generative Artificial Intelligence Provide Accurate Medical Advice?: A Case of ChatGPT vs. Congress of Neurological Surgeons Management of Acute Cervical Spine and Spinal Cord Injuries Clinical Guideline Michael Saturno, BA
1:35 pm	 1ST PLACE BASIC SCIENCE AWARD 26. Ex Vivo Gene Therapy Using Human-induced Pluripotent Stem Cell-derived Neural Stem/Progenitor Cells to Deliver Synaptic Organizer CPTX for Spinal Cord Injury Yusuke Saijo, MD
1:40 pm	Discussion
1:50 pm	27. The Effects of Cervical Orthoses on Multiplanar Intervertebral Range of Motion Anthony A. Oyekan, MD
1:55 pm	28. Does Approach Matter? Comparison of Early Postoperative Life-threatening Complications in Elderly Patients with Multilevel Cervical Stenosis Tomoyuki TA. Asada, MD
2:00 pm	29. Similar Post-operative Complications but Increased Rates of Prolonged Hospitalization and Non-home Discharge in Octogenarians Undergoing Anterior Cervical Decompression and Fusion Compared to Matched Younger Patients Alexander Upfill-Brown, MD
2:05 pm	30. Investigation of Risk Factors of C5 Palsy After Anterior Cervical Spine Surgery Yu Matsukura, MD, PhD
2:10 pm	31. Comparison of CTA and MRI for C1 Instrumentation Presurgical Planning Artine Arzani, BS
2:15 pm	Discussion

Thursday, November 30, 2023

Symposia 2 - Management of Complex Upper Cervical Trauma

Time:	2:25 pm- 3:25 pm
Location:	Gracia Ballroom
Moderators:	Brandon Lawrence, MD; Tim A. Moore, MD
2:25 pm	Case Presentation: Polytrauma Patient Where Extension to Occiput is Necessary - Can Occipital Plate be Removed Later? <i>Brandon Lawrence, MD</i>
2:30 pm	Atlanto-Occipital Dislocation (AOD) <i>John France, MD</i>
2:40 pm	Unstable Jeffersons Injuries with Vertebral Artery Anomaly <i>Steven C. Ludwig, MD</i>
2:50 pm	Discussion
3:05 pm	Case Presentation: Surgical Management of Hangman's Fractures <i>Brandon Lawrence, MD</i>
3:10 pm	Overview of Injuries - Atypical Fractures <i>Jefferson Wilson, MD, PhD, FRCSC</i>
3:20 pm	Wrap-up and Discussion

Afternoon Coffee Break

Time: 3:25 pm- 3:45 pm
Location: Exhibit Hall, Gracia Ballroom



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Thursday, November 30, 2023

Henry H. Bohlman Presidential Guest Lecture

- Time:* 3:45 pm- 4:30 pm
- Location:* Gracia Ballroom
- Moderator:* Michael D. Daubs, MD
- 3:45 pm **Introduction**
Michael D. Daubs, MD
- 3:50 pm **When Life Takes Your Breath Away**
Rex Marco, MD
- 4:20 pm **Discussion**

Rex A.W. Marco, MD



Rex Marco was born and raised in California. His academic training began with undergraduate studies, followed by a research fellowship and medical school. His residency in orthopaedic surgery led to a deep interest in spine surgery, as well as a passion for treating patients with orthopaedic oncologic disorders. This passion led Dr. Marco to complete two fellowships- musculoskeletal oncology and reconstructive spine surgery. Dr. Marco is one of the only surgeons in the world with training and expertise in the treatment of both adult and pediatric patients with complex spinal disorders and musculoskeletal tumors.

Dr. Marco’s unique training provided many career opportunities including positions as Professor in the Department of Orthopedic Surgery; Chief of Spine Surgery, Spine Trauma, and Musculoskeletal Oncology; and Co-Director of the Spine Service at Shriner’s Hospital for Children. He previously served as the Vice-Chairman of Orthopedic Surgery at Houston Methodist Hospital and is currently the Director of The Houston Methodist Hospital Spine Surgery Fellowship. Dr. Marco has been involved in many professional associations, including being an Active member of the Cervical Spine Research Society for the past 12 years, since 2011.

In 2019, Dr. Marco sustained a C3-4 fracture-dislocation and began living with C3 quadriplegia. He currently serves as the Chief Medical Ambassador for the Christopher and Dana Reeve Foundation where he is dedicated to raising money to find a cure for spinal cord injury (SCI) and improving the quality of life for those living with SCI.

Dr. Marco is known to be creative and transformative in his practice and teachings but says that his real transformation came when he was forced into recovery and experienced difficulties related to his severe codependency. He will share his story of recovery for the CSRS Henry H. Bohlman Presidential Guest Lecture at this year’s Annual Meeting, titled, “When Life Takes Your Breath Away.”

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.

Thursday, November 30, 2023

CSRS Allied Organization Presidential Talks

- Time:* 4:30 pm - 5:00 pm
Location: Gracia Ballroom
Moderator: John M. Rhee, MD
- 4:30 pm **Laminoplasty Update**
 Gabriel K. Liu, MSc, FRCS
- 4:40 pm **Cervical Disc Arthroplasty: European Perspectives**
 Carmen Vleggeert-Lankamp, MD, MSc, PhD
- 4:50 pm **Discussion**

Abstract Session 4: Anterior Cervical Disc

- Time:* 5:00 pm - 6:15 pm
Location: Gracia Ballroom
Moderators: Regis W. Haid, Jr., MD; Langston Holly, MD, FAANS
- 5:00 pm **Introduction**
- 5:05 pm **32. Do Tracheal Traction Exercises Help Prevent Dysphagia Following Anterior Cervical Spine Surgery: A Randomized Double Blind Placebo Controlled Trial**
 Addisu Mesfin, MD
- 5:10 pm **33. The Surgical Learning Curve for Cervical Disc Replacement**
 Andrea M. Roca, MA
- 5:15 pm **34. Determining Minimum Clinically Important Difference for PROMIS Domains in Patients Undergoing Cervical Disc Replacement**
 Andrea M. Roca, MA
- 5:20 pm  **4TH PLACE RESIDENT/FELLOW RESEARCH AWARD**
35. Anterior Cervical Disc Replacement (ACDR) versus Minimally Invasive Posterior Cervical Foraminotomy (MI-PCF) in the Treatment of Cervical Radiculopathy: A 5-Year Retrospective Analysis
 Stuart Changoor, MD
- 5:25 pm **Discussion**
- 5:35 pm  **1ST PLACE RESIDENT/FELLOW RESEARCH AWARD**
37. Opioid-free Analgesia is Safe and Effective in Anterior Cervical Spine Surgery: A Randomized Controlled Trial
 Michael Schallmo, MD
- 5:40 pm **38. 20 Year Radiographic Outcomes of BRYAN Cervical Disc Arthroplasty: A Prospective, Randomized, Controlled Trial**
 David P. Foley, MD, MBA
- 5:45 pm **39. Five-year Follow-up of a Prospective FDA IDE Trial Evaluating Single-level PEEK-on-Ceramic Cervical Disc Replacement**
 Richard D. Guyer, MD
- 5:50 pm **40. Obesity Does Not Negatively Affect Patient-Perceived Outcomes Following Cervical Disc Replacement for Disc Herniation**
 Fatima N. Anwar, BA
- 5:55 pm **41. The Impact of Smoking on Outcomes Following Cervical Disk Arthroplasty: A Quality Outcomes Database Study**
 Byron F. Stephens, MD, MSCI
- 6:00 pm **Discussion**

Thursday, November 30, 2023

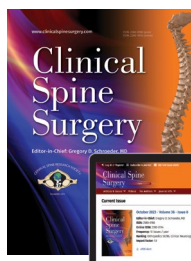
Annual Meeting Reception

Time: 6:15 pm - 7:30 pm
Location: Exhibit Hall, Gracia Ballroom

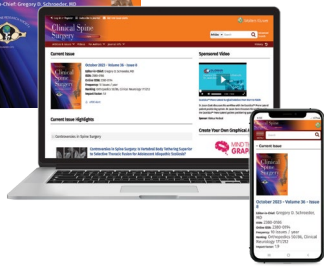


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Friday, December 1, 2023

Breakfast & Coffee Bar

Time: 6:30 am- 8:00 am

Location: Castellana

CSRS Member Business Meeting and Breakfast

Time: 7:00 am- 8:00 am

Location: Brera 5

Registration Open

Time: 7:30 am- 1:30 pm

Location: Gracia Commons

Morning Welcome

Time: 8:00 am- 8:05 am

Location: Gracia Ballroom

Moderators: Brandon Lawrence, MD; Thomas Mroz, MD

Abstract Session 5: CSM

Time: 8:05 am- 9:20 am

Location: Gracia Ballroom

Moderators: Don Moore, MD; Ahmad Nassr, MD

8:05 am

Introduction

8:10 am

42. Is Upper Extremity or Lower Extremity Function More Important for Patient Satisfaction? An Analysis of 24-Month Outcomes from the QOD Cervical Myelopathy Cohort

Eunice Yang, BS

8:15 am

43. Quantitative Romberg on a Force Plate: Objective Assessment After Surgery for Patients with Cervical Spondylotic Myelopathy

Kyle Kesler, MD

8:20 am

44. Anterior Cervical Discectomy and Fusion Versus Laminectomy and Posterior Cervical Fusion Across 3 Interspaces Using the QOD CSM Module: Are There Differences in Outcomes?

Praveen Mummaneni, MD

8:25 am

45. Clinical Predicting Models for Diagnosis the Patients with Degenerative Cervical Myelopathy: An Analysis of 180 Cases of Degenerative Cervical Myelopathy Comparison with 1211 Asymptomatic Subjects

Masahiro M. Funaba, MD, PhD

8:30 am

46. Development of the Cervical Myelopathy Severity Index: A New Myelopathy Specific Patient Reported Outcome Measure to Facilitate Clinical Care and Research

Armaan K. Malhotra, MD

8:35 am

Discussion

8:45 am

47. The Degenerative Cervical Myelopathy Subjective and Objective Score (DCM-SOS): A Novel Outcome Measure

Khadija H. Soufi, BS

8:50 am

48. Impact of Cervical Spondylotic Myelopathy on Preoperative and Postoperative Care Dependency: A Quality Outcomes Database (QOD) Study

Raj S. Lavadi, MBBS

Friday, December 1, 2023

Abstract Session 5: CSM, *continued*

- 8:55 am **49. Selective Modified K-line Interval on T2-weighted MRI can Predict JOA Recovery Rate After Posterior Decompression Surgery in Patients with Cervical Spondylotic Myelopathy**
Naoki N. Yamaguchi, MD
- 9:00 am **50. Which Social Determinants of Health Affect the Odds of Readmission Following Surgical Treatment of CSM?**
Mohamed Macki, MD, MPH
- 9:05 am **51. The Comparison Between Ossification of Posterior Longitudinal Ligament and Cervical Spondylotic Myelopathy Patients in Health-related Quality of Life: A Multicenter Cross-sectional Study**
Go Uesugi, MD
- 9:10 am **Discussion**

Exhibit Hall Open

Time: 9:00 am- 1:30 pm
Location: Gracia Ballroom


Symposia 3 - Laminoplasty: Updates from the Experts

- Time:* 9:20 am- 10:20 am
Location: Gracia Ballroom
Moderators: Darrel Brodke, MD; Thomas Mroz, MD
- 9:20 am **Literature Update on Laminoplasty**
Zoher Ghogawala, MD
- 9:30 am **C3: Remove or Laminoplasty**
Michael D. Daubs, MD
- 9:40 am **C7: Dome it or Laminoplasty**
Jeffrey C. Wang, MD
- 9:50 am **Pearls to Consider for Laminoplasty Fusion Hybrids**
John G. Heller, MD
- 10:00 am **Pearls to Consider with Laminoplasty for OPLL**
K. Daniel Riew, MD
- 10:10 am **Discussion**

Morning Coffee Break

Time: 10:20 am- 10:40 am
Location: Exhibit Hall, Gracia Ballroom

Abstract Session 6: OPLL

- Time:* 10:40 am- 11:55 am
Location: Gracia Ballroom
Moderators: James D. Kang, MD; Samuel Overley, MD
- 10:40 am **Introduction**
- 10:45 am  **3RD PLACE CLINICAL RESEARCH AWARD**
52. Factors Associated with Repeat Surgery in Cervical Ossification of the Posterior Longitudinal Ligament: An 8-year Follow-up Study
Hyun Jun Jang, MD

Friday, December 1, 2023

Abstract Session 6: OPLL, *continued*

- 10:50 am **53. The Incidence and Alert Timing of Spontaneous Electromyogram in Surgery for Ossification of the Posterior Longitudinal Ligament**
Jun Hashimoto, MD, PhD
- 10:55 am **54. Evaluating Changes to The Modified K-line Using Kinematic MRIs**
Andy Ton, BS
- 11:00 am **55. Investigation of Orthopaedic Surgery Resident Education Regarding the Management of Unintentional Durotomies**
Austin H. Carroll, MD
- 11:05 am **56. Indications and Limitations of Laminoplasty for Cervical Spondylotic Myelopathy Using Modified K-line –Importance of Dynamic Factor-**
Takuya Tamaoka, MD
- 11:10 am **Discussion**
- 11:20 am **57. “Adjacent-Level Ossification Development” and Clinical Implications for Adjacent Segment Pathology Following ACDF**
Micahel Raad, MD
- 11:25 am **58. Predictors of Ligamentum Flavum Buckling in Patients with Congenital Cervical Stenosis**
Ryan Palmer, BS
- 11:30 am **59. Predictive Risk Factors for the Incidence of Cervical Spine Instabilities in Rheumatoid Arthritis: A Multicenter Prospective Study During Over 10 years**
Yutaro Kanda, MD, PhD
- 11:35 am **60. Fifty Percent of Patients with Chronic Renal Failure Experience Major Medical Complication with a Third Requiring ICU admission for Anterior Cervical Discectomy and Fusion Surgery**
Spencer Smith, MD
- 11:40 am **61. Neck Pain Does NOT Contraindicate Cervical Laminoplasty**
Nathaniel L. Rawicki, MD
- 11:45 am **Discussion**

CSRS Presidential Address

- Time:* 11:55 am- 12:25 pm
Location: Gracia Ballroom
- 11:55 am **Presidential Introduction**
Alpesh Patel, MD, MBA, FACS
- 12:05 pm **Presidential Address**
Michael D. Daubs, MD

2024 CSRS Presidential Induction Ceremony

- Time:* 12:25 pm- 12:35 pm
Location: Gracia Ballroom
- Michael D. Daubs, MD
Alpesh Patel, MD, MBA, FACS

Networking Social with Vintage Cocktails

- Time:* 12:35 pm- 1:30 pm
Location: Exhibit Hall, Gracia Ballroom

Afternoon Free

Saturday, December 2, 2023

Breakfast & Coffee Bar

Time: 6:30 am- 8:00 am
Location: Castellana

Registration Open

Time: 7:30 am- 10:00 am
Location: Gracia Commons

Morning Welcome and New Member Recognition

Time: 8:00 am- 8:10 am
Location: Gracia Ballroom
Moderators: Andrew Hecht, MD; Praveen Mummaneni, MD, MBA

Past Research Grant Presentations and 2023 Research Grant Awards

- Time:* 8:10 am- 9:00 am
Location: Gracia Ballroom
Moderators: Wellington Hsu, MD; Brandon Lawrence, MD
- 8:10 am **Introduction & Presentation of 2023 Grant Awards**
 Wellington Hsu, MD; Brandon Lawrence, MD
 - 8:23 am **Patient Preoperative Health Confidence and Postoperative Outcomes After Cervical Spine Surgery: A Quantitative Analysis**
 Erik Gerlach, MD
 - 8:26 am **The Comparative Effect of NSAIDs and Opioids on Spinal Fusion: A Rodent Model**
 Mark Lambrechts, MD
 - 8:29 am **Motorized Cervical Traction versus Weight and Pulley Traction: A Cadaveric Biomechanical Comparison**
 Brandon Sherrod, MD
 - 8:32 am **Quantifying and Classifying Quality-Associated Waste in the Care of Cervical Myelopathy**
 Ahilan Sivaganesan, MD
 - 8:35 am **Discussion**
 - 8:43 am **Sleep Quality in Patients With Cervical Radiculopathy**
 Alexander M. Satin, MD
 - 8:46 am **Therapeutic Effect of Immunoreceptor CD300a Blockade for Acute Spinal Cord Injury**
 Hiroshi Takahashi, MD, PhD
 - 8:49 am **Analysis of Piezo1-dependent Mechanotransduction in Spinal Fusion and Pseudoarthrosis**
 Ganesh M. Shankar, MD
 - 8:52 am **Discussion**

2023 CSRS Research Grant Award Winners

21st Century Grant Awards

Surgical Approaches for Cervical Spondylotic Myelopathy: Impact of Radiographic Characteristics on Pain, Disability, Functional Status, and Quality of Life via an Analysis of the Quality Outcomes Database

Columbia University

Primary Investigator: Andrew Chan, MD

Does Axial Cervical Pain Improve with Surgical Fusion?

Thomas Jefferson University

Primary Investigator: James Harrop, MD, MSHQS

Spinal Cord Injury Grant Award

The Potential Association Between the APOE ε4 Gene and the Development of C5 Palsy After Surgical Treatment for Degenerative Cervical Myelopathy: A Prospective Case-Control Study

KITE Research Institute (University Health Network), University of Toronto

Primary Investigator: Julio Furlan, MD, LLB, MBA, MSc, PhD

Seed Starter Grant Award

Investigation of the Altered Lipid Metabolism in the Intervertebral Disc Under Dyslipidemia

University of Maryland

Primary Investigator: Joe Kodama, MD, PhD

Defining the Severity and Need for Advanced Swallow Studies for Dysphagia After Anterior Cervical Discectomy and Fusion and Cervical Disc Replacement

Virginia Mason Medical Center

Primary Investigator: Philip Louie, MD

In Vivo Changes in Disc Stress and Stiffness After One- and Two-Level Cervical Arthrodesis

University of Pittsburgh

Primary Investigator: Jeremy Shaw, MD, MS

Resident/Fellow Grant Awards

Exploration of Appropriate Combinatorial Rehabilitation With Neural Circuit Modification Therapy for Spinal Cord Injury

Krembil Research Institute

Primary Investigator: Soichiro Takamiya, MD, PhD

Use of Tractography and Diffusion Tensor Imaging in the Treatment of Cervical Spondylotic Myelopathy

Thomas Jefferson University Hospital

Primary Investigator: Adam Leibold, MD

Accuracy and Safety of Robot-Assisted Cervical Pedicle Screw Placement: A Cadaveric Study

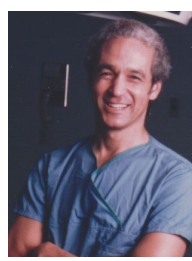
Hospital for Special Surgery

Primary Investigator: Greg Kazarian, MD

Saturday, December 2, 2023

Lifetime Achievement Award

Time: 9:00 am- 9:25 am
Location: Gracia Ballroom
Moderators: James S. Harrop, MD, MSHQS; Barrett Woods, MD



August White, MD, PhD

The Cervical Spine Research Society proudly awards Augustus White, MD, PhD as the 2023 recipient of the CSRS Lifetime Achievement Award. Dr. White is awarded this honor, not only for personal accomplishments, but also for accomplishments that advanced the field of cervical spine surgery. His remarkable leadership is unparalleled, and we thank him for his dedication and service to CSRS, including his term as CSRS President in 1988.

From a young age, Dr. White opened doors for people of color in the medical, research, and education fields. Dr. White's career includes many firsts for the black community, including being the first black medical student at Stanford, the first black surgical resident at Yale, and the first black medical professor at Yale. Dr. White continues to be a decorated author and philanthropist. His legacy is ongoing, as seen through the Augustus A. White III Institute, which is dedicated to raising national awareness for healthcare equity.

Dr. White has made amazing contributions and strides in the field of cervical spine research and surgery for our entire community. His example has been an inspiration to not only CSRS members, but also the field of medicine and beyond. We recognize his long and prosperous career in cervical spine surgery as a researcher, humanitarian, educator, innovator, leader, and philanthropist.

The CSRS is proud to establish and sponsor the Dr. Augustus A. White, III Educational Trust. Dr. White has been an inspiration in that he has overcome numerous obstacles through his path to become a pre-eminent spine surgeon. He provides guidance and enlightenment to all future spine surgeons. The goal of this trust is to provide funding such to provide further direction and guidance to future spine surgeons, therefore, providing less resistance on their pathway to improving spinal care.

CSRS 2024 Meeting Previews

Time: 9:25 am- 9:35 am
Location: Gracia Ballroom

Saturday, December 2, 2023

Awards Session

Time: 9:35 am - 9:55 am
Location: Gracia Ballroom
Moderator: James S. Harrop, MD, MSHQS

Top Abstract and Poster Awards, Scholarship Recipient Recognition

Symposia 4 - Complications? We Don't Need No Stink'in Complications! Case Based Discussion with the Experts

Time: 9:55 am - 10:55 am
Location: Gracia Ballroom
Moderator: Jason W. Savage, MD

9:55 am **Esophageal Injury: Identification and Management**
Brandon Lawrence, MD

10:05 am **Multi-level Construct Failure After CT Deformity Correction**
Christopher Ames, MD

10:15 am **Kickout of Multilevel Corpectomy Graft**
Thomas Mroz, MD


10:25 am **New Focal Nerve Palsy Following Surgery and Persistent Foraminal Stenosis - When to Intervene and When it is Safe to Watch and Wait**
Andrew T. Dailey, MD

10:35 am **Discussion**

Abstract Session 7: Fun Facts


Time: 10:55 am - 12:10 pm
Location: Gracia Ballroom
Moderators: Matthew W. Colman, MD; Ryan Spiker, MD


10:55 am **Introduction**

11:00 am  **3RD PLACE RESIDENT/FELLOW RESEARCH AWARD**
62. Cervical Spine Surgery following COVID-19 Infection: When is it Safe to Proceed?
Justin P. Chan, MD

11:05 am **63. Anatomic Study of Cervical Neuroforaminal Dimensions, Interpedicular Distance, and Disc Space Height from C2-T1 Using Computed Tomography of 1,000 Patients**
Jacob Razzouk, BS

11:10 am **64. Dynamic Radiographs are Unreliable to Assess Arthrodesis following Cervical Fusion: A Modeled Radiostereometric Analysis of Cervical Motion**
Zachariah W. Pinter, MD

11:15 am  **2ND PLACE CLINICAL RESEARCH AWARD**
65. Adjunctive Use of Bone Growth Stimulation Increases Cervical Spine Fusion Rates in Patients at Risk for Pseudarthrosis
Vikas V. Patel, MD

11:20 am  **2ND PLACE RESIDENT/FELLOW RESEARCH AWARD**
66. MRI Vertebral Bone Quality Correlates with Interbody Cage Subsidence After Anterior Cervical Discectomy and Fusion
James Bernatz, MD

11:25 am **Discussion**

11:35 am **67. Pulsed Electromagnetic Fields (PEMF) Used as an Adjunct to Cervical Spine Fusion**
Vikas V. Patel, MD

Saturday, December 2, 2023

Abstract Session 7: Fun Facts, *continued*

- 11:40 am **68. Decreased Opioid Use After Anterior Cervical Discectomy and Fusion during 2014-15 to 2018-19: The Influence of State Policies**
Spencer Smith, MD
- 11:45 am **69. How Much Money Do You Actually Save Your Hospital When You Choose a Posterior Foraminotomy Instead of an ACDF for Cervical Radiculopathy?**
Ahilan Sivaganesan, MD
- 11:50 am **70. How Does the Cervical Spinal Cord Run After Cervical Laminoplasty? Additional Risk Factor Analysis for Spinal Cord Alignment Deterioration After Cervical Laminoplasty**
Nam Yeop Kim, MD
- 11:55 am **71. Impact of Frailty and Cervical Radiographic Parameters on Postoperative Dysphagia Following Anterior Cervical Spine Surgery: mFI-11, T1 slope, Change in Cervical Lordosis and C3/4 Surgery**
Tomoyuki TA. Asada, MD
- 12:00 pm **Discussion**

Annual Meeting Farewell

Time: 12:10 pm- 12:15 pm
Location: Gracia Ballroom
Moderators: Brandon Lawrence, MD; Thomas Mroz, MD

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CSRS Annual Meeting Scholarship Recipients

Congratulations to our 2023 Annual Meeting Full Travel Scholarship Recipients
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Medtronic will host all scholarship recipients, and any interested resident or fellow, for a hosted program and dinner Wednesday, November 29 after the Annual Meeting opening session.

2022 Annual Meeting Scholarship Recipients



Virtual Poster Hall

Viewing

View the CSRS Virtual Poster Hall on the Annual Meeting attendee portal from November 29, 2023 to December 31, 2024. The Virtual Poster Hall is also available in the CSRS mobile app or the web version of the mobile app.

The full abstracts from Virtual Poster Hall participants can be found by clicking on the title in within the Virtual Poster Hall or in the 51st Annual Meeting Abstract Book.

Poster Awards

BASIC SCIENCE GENERAL POSTER AWARD

Pretreatment with Hepatocyte Growth Factor Enhances Human iPSC-NS/PC Transplantation-mediated Functional Recovery After Spinal Cord Injury
Yu Suematsu, MD

CLINICAL RESEARCH GENERAL POSTER AWARD

Assessing the Economic Benefit of Enhanced Recovery After Surgery (ERAS) Protocols in Adult Cervical Deformity Patients: Is the Initial Additive Cost of Protocols Offset by Clinical Gains
Peter Tretiakov, BS

1ST PLACE RESIDENT/FELLOW POSTER AWARD

Intraoperative Ultrasound Using a Linear (Minimally Invasive) Transducer During Anterior Cervical Surgery: Description of a New Technique
Timothy Chrysikos, MD, PhD

2ND PLACE RESIDENT/FELLOW POSTER AWARD

Comparison of Complication Frequency After Anterior Cervical Spine Surgery – CSM vs OPLL
Motonori Hashimoto, MD



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The continued success and increased impact of the Cervical Spine Research Society's research and education effort is dependent upon industry support.

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Exhibit Hall Hours

Location: Gracia Ballroom, Exhibit Hall


Thursday, November 30 10:00 am - 7:30 pm

Morning Coffee Break 10:20 am- 10:40 am
 Afternoon Coffee Break 3:25 pm- 3:45 pm
 Annual Meeting Reception 6:15 pm- 7:30 pm




Friday, December 1 9:00 am - 1:30 pm

Morning Coffee Break 10:20 am- 10:40 am
 Networking Social with Vintage Cocktails 12:35 pm- 1:30 pm



CSRS Exhibitors

Company	Booth	Company Description
 <small>INFORMED BY EOS</small>	408	ATEC is more than a medical technology company. We are an Organic Innovation Machine™ Revolutionizing the Approach to Spine Surgery. We are committed to creating clinical distinction by developing new approaches that integrate seamlessly with the Alpha InformatiX™ System to achieve the goals of spine surgery. Our ultimate vision is to be The Standard Bearer in Spine.
Axiomed, LLC	207	Since 2001, Axiomed pioneers clinically validated cervical and lumbar viscoelastic disc replacements, replicating natural human disc function. Our proprietary viscoelastic core boasts 50+ years of proven longevity and exceptional shock absorption. Radiolucent and MRI-compatible, our discs have over 800 successful global implants. Completing a landmark US lumbar disc IDE clinical study with 10-year follow-up data, alongside published peer-reviewed cervical disc research and an innovative patented lateral lumbar disc in development, Axiomed leads in spinal disc replacement evolution.
Biologica Technologies	416	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, is our ability to access intracellular growth factors found within allograft tissue. ProteiOS® growth factor and OsseoGEN® cellular bone matrix are both products utilizing this unique, proprietary technology and possess the highest amount of GFs within their respective biologic categories.
Centinel Spine	303	Centinel Spine® will highlight its market leading prodisc® Total Disc Replacement (TDR) technology, the first-and-only cervical and lumbar TDR portfolio providing the ability to match the most appropriate TDR device to the needs of the surgeon and patient. The company will highlight its prodisc L lumbar TDR system as well as its two recently launched cervical TDR devices- prodisc C Vivo and prodisc C SK. Visit the company’s website at www.CentinelSpine.com .

CSRS Exhibitors

Company	Booth	Company Description
	101, 103	<p>Cerapecdics is a global, commercial-stage orthopedics company that aspires to redefine the standard of care for bone repair by healing bones faster and at higher rates, without compromising safety, so that patients can live their healthiest lives. Bone grafts, including Cerapecdics' products, are used in over four million annual spine, orthopedics, trauma and interventional procedures worldwide. i-FACTOR is a Class III FDA approved product indicated for single-level ACDF. Cerapecdics' next-generation product is currently being evaluated for use in lumbar interbody fusion through ASPIRE, a pivotal clinical study, and has been granted a Breakthrough Device Designation by the FDA.</p>
	211	<p>Stop by the CSRS booth to take photos with our backdrop and props to commemorate the 51st Annual Meeting! We will also have patient education materials and printed copies of the 2023 CSRS special issues of <i>Clinical Spine Surgery</i> available.</p>
<p><i>Clinical Spine Surgery</i></p>	209	<p><i>Clinical Spine Surgery</i>, the official journal of the Cervical Spine Research Society, provides readers with primary research studies, specifically level 1, 2 and 3 studies, ensuring that articles that may actually change a surgeon's practice will be read and published. Each issue includes a brief article that will help a surgeon better understand the business of healthcare, as well as an article that will help a surgeon understand how to interpret increasingly complex research methodology. <i>Clinical Spine Surgery</i>, a Lippincott journal, is the official journal of the Cervical Spine Research Society. Stop by booth 209 to pick up print copies of the CSRS special issues from 2023!</p>
Curiteva, Inc.	300	<p>Curiteva is a privately held technology and manufacturing company based in Huntsville, AL. The company was founded in 2017 in a 35,000 sq ft facility by a machinist entrepreneur, focusing on building a portfolio of proprietary spinal implants. Since its founding, Curiteva is pioneering 3D printing of porous PEEK implants with a bioactive nano-surface to revolutionize how engineered structures and implant biomaterials accelerate immunomodulation, enhance healing, and improve patient outcomes. Visit www.curiteva.com to learn more.</p>
	202	<p>At DePuy Synthes, our mission is to solve the most complex and challenging procedures in orthopaedic & neurological spine surgery by providing an innovative product portfolio, leading professional education and superior operating room support. With new advancements in orthopaedic devices, medical technology, and digital surgery across the continuum of care, we are proud to provide surgeons with solutions as diverse as their patients. https://www.jnjmedtech.com/en-US/companies/depuysynthes</p>


CSRS Exhibitors

Company	Booth	Company Description
Eminent Spine, LLC	410	The evolution of Eminent Spine has always been focused on biomaterials and spinal implants for spinal surgeries. Since the introduction of the first PEEK interbody spinal fusion system to the advancement of the MIS pedicle screw system to the support of revolutionary 3D titanium printing technology, Eminent Spine has emerged as an industry leader in the evolution of spinal implants. Eminent spine is dedicated to making this process easy. Find out what we can do for you today. Visit www.eminentspine.com for more information.
 	201, 203, 205	Globus Medical is committed to providing innovative technologies and industry-leading clinical support to help surgeons and healthcare providers deliver better care around the globe. The Company provides one of the most comprehensive offerings of musculoskeletal solutions and enabling technologies to impact the care continuum, now including the procedurally integrated portfolio of NuVasive. The Company’s employees are relentlessly focused on advancing patient care. For more information, please visit www.globusmedical.com/uniting .
Kuros Biosciences	402	We help patients live fuller, more active lives by giving surgeons the technology they need to eliminate non-unions. We achieve this with a unique surface design called NeedleGrip that’s proven to unlock the untapped power of the body’s immune system by growing new bone throughout the graft- for more predictable fusions. *MagnetOs bone graft, which features NeedleGrip Surface Technology, has been used to treat over 15,000 patients across the Globe. Disclaimers *Results from in vivo laboratory testing may not be predictive of clinical experience in humans. For important safety and intended use information please visit kurosbio.com .
Life Instrument Corporation	310	Life Instruments is dedicated to serving surgeons with the highest quality surgical instruments. Handcrafted from the finest materials, Life Instruments are an extension of the surgeons’ hands. We customize and modify instruments to fit individual needs in addition to providing ongoing development of new products with surgeons and healthcare professionals.
Medical Metrics	311, 313	Medical Metrics is excited to introduce SpineCAMP™, an AI-powered imaging platform that brings the power of quantitation and visualization to clinicians. SpineCAMP™ provides Actionable Insights, instantly. Is it fused? What level(s) are unstable? How’s the spinopelvic alignment? MMI’s reputation for high-quality analysis is built on scientific expertise, QMA®, our proprietary technology that has been used in 300 + spine trials, and a commitment to objectivity and accuracy.

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Company	Booth	Company Description
Medtronic	400	Bold thinking. Bolder actions. We are Medtronic. We lead global healthcare technology and boldly attack the most challenging health problems facing humanity by searching out and finding solutions. Our Mission — to alleviate pain, restore health, and extend life — unites a global team of 95,000+ passionate people. Powered by our diverse knowledge, insatiable curiosity, and desire to help all those who need it, we deliver innovative technologies that transform the lives of two people every second, every hour, every day. Expect more from us as we empower insight-driven care, experiences that put people first, and better outcomes for our world. In everything we do, we are engineering the extraordinary. Learn more at www.medtronic.com
Mighty Oak Medical	404	Mighty Oak has become the premier provider of patient-specific solutions for spinal surgery by harnessing the power of data to make surgery thoroughly personalized and more predictable. We employ advanced analytics which provide surgeons with the ability to visualize and understand the patient's spinal anatomy in 3D. Our concierge pre-surgical planning platform is available from C1 to the pelvis and is paired with FIREFLY 3D printed guides and an autoclavable bone model to achieve a choreographed, efficient, and safer surgery. FIREFLY is the only form of navigation not affected by intersegmental motion, making it ideal for the cervical spine.
MiRus	309	MiRus® is a life sciences company headquartered in Marietta, Georgia that has developed and is commercializing proprietary novel biomaterials, implants and procedural solutions for the treatment of spine, orthopaedic and structural heart disease. Inspired by the pioneering material science of NASA for rocket engines, MiRus has created Rhenium based medical alloys that are transforming medicine by making surgeries less invasive and implants safer and more durable. Find out more information about MiRus at www.mirusmed.com .
OrthoFix/Seaspine	109, 111	The newly merged Orthofix-SeaSpine organization is a leading global spine and orthopedics company with a comprehensive portfolio of biologics, innovative spinal hardware, bone growth therapies, specialized orthopedic solutions and a leading surgical navigation system. Its products are distributed in approximately 68 countries worldwide. The company is headquartered in Lewisville, Texas and has primary offices in Carlsbad, CA, with a focus on spine and biologics product innovation and surgeon education, and Verona, Italy, with an emphasis on product innovation, production, and medical education for orthopedics. To learn more, visit Orthofix.com .
Providence Medical Technology	204	Our Mission is to establish Circumferential Cervical Fusion (CCF) as the standard of care for high-risk patients. Our Purpose is to improve clinical outcomes for high-risk patients and prevent surgical failures of the cervical spine. Because high-risk cervical fusion patients deserve more.

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Company	Booth	Company Description
Spartan Medical Inc	302	Spartan Medical Inc provides leading innovative medical technologies and solutions for healthcare providers, government agencies, schools, hospitals, and ambulatory surgery centers (ASCs). Located near Washington, D.C., the veteran-owned company is recognized as a “top priority vendor” for the Veterans Health Administration, America’s largest integrated health care system. Spartan Medical has been awarded more than 700 federal government contracts, and it has served hundreds of private medical facilities and schools. Spartan Medical’s vast network and experience have made it an industry leader for any organization seeking to buy or sell innovative medical technologies and solutions.
Spinal Elements	105	Spinal Elements is a leading designer, developer, manufacturer, and marketer of innovative medical devices used in spinal surgical procedures. Spinal Elements combines leading medical device technologies, biologics, and instrumentation to create positive surgical outcomes that exceed surgeon and patient expectations. Spinal Elements has built a reputation delivering innovative and differentiated technologies that enable fundamental shifts in solutions for spine surgery. The company markets a complete portfolio of advanced spinal implant and instrumentation technologies. For more information, please visit www.spinalelements.com .
 stryker®	301	At Stryker, we deliver the total spine experience, empowering our customers to keep the world moving. Together, we do more to challenge the standard, respond to clinical needs and pioneer new possibilities. Our core technologies include biologic solutions, spinal implants and surgical instruments for use in spine procedures. Our enabling technologies include digital health, guidance and imaging for both cranial and spine procedures.
Sure Retractors	304	SURE radiolucent retractors are surgery ready, sterile packed, easy to use, single-use retractors that allow you to maximize surgical volume. Each retractor (Cervical, mini-open, and Lumbar) and all the blades come in 1 sterile packed box. With Sure Retractors, you can maximize your operational and logistical efficiency, which can help you plan more cases with certainty, drive revenue, reduce infections and save costs. If you want to try one of our retractors free of charge then please come and visit us.
Surgeons Capital Management	406	Busy surgeons need to work with a specialized wealth management firm that has keen insights into their unique financial and business needs, and that offers advantages they won’t find elsewhere. Our principals attend 30+ surgical conferences each year and make ourselves available to clients 24/7. These are just of the many ways we tailor concierge financial services to your needs. Whether it’s investments, estate planning, or finding new ways to lower your taxes, our team specializes in understanding your situation and providing solutions designed to work for you and your family.

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Company	Booth	Company Description
Ulrich Medical	307	ulrich medical USA is a dynamic medical device company with an unparalleled business legacy. Our company was founded in Ulm, Germany in 1912 by Heinrich C. Ulrich and has remained a private, family-owned company to this day. For over 100 years, our enterprise has been focused on the development of ground-breaking medical technologies in many different sectors of the life sciences industry. Globally, ulrich products are currently sold in over 80 countries in the following areas of specialty: Spinal Implant Systems, Imaging Diagnostics, Surgical Instruments and Hospital Devices.
Unify Medical, Inc.	305	Unify Medical develops novel imaging and visualization technologies for the benefit of surgeons with a primary focus on image-guided surgical procedures. Our first product, AmplioTM, integrates intra-operative magnification capabilities of a microscope with the form factor of traditional surgical loupes.
ZSFab, Inc	208	At ZSFab, we believe everyone is created equal, but shall be treated differently when it comes to healthcare. Each of us is born unique, which is reflected in our DNA, fingerprints, faces, and bones. Such uniqueness requires better matching replacements when a part is worn, damaged, or aged. With additive manufacturing, ZSFab is structuring, designing, and printing the best medical implants to assist in the healing process for every individual. http://www.zsfab.com
 ZimVie	200	ZimVie Spine is dedicated to enhancing the quality of life for patients through comprehensive spinal solutions, along with training and clinical support for surgeons. Beyond disc replacement, fusion devices, and fixation for degenerative and complex spine, the company has novel instrumentation solutions and a complete suite of biologics and bone healing stimulators.



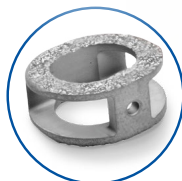
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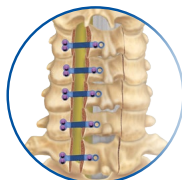
Endoskeleton TC™ interbody fusion implants

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Clearance of devices named and shown applies to planning, enabling, and providing immobilization and stabilization of spinal segments in fusion and non-fusion procedures for various acute and chronic instabilities of the craniocervical junction, the cervical spine (C1 to C7), and the thoracic spine from T1-T3 and where bony voids or gaps of the skeletal system exist.

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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.



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- Harassment, intimidation, or discrimination in any form.
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- Participants should not copy or take screen shots of Q&A or any chat room activity that takes place in the virtual space.

CSRS reserves the right to take any action deemed necessary and appropriate, including immediate removal from the meeting without warning or refund, in response to any incident of unacceptable behavior, and CSRS reserves the right to prohibit attendance at any future meeting, virtually or in person.

CME Information

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In support of improving patient care, this activity has been planned and implemented by Amedco LLC and Cervical Spine Research Society (CSRS). Amedco LLC is jointly accredited by the Accreditation Council for Continuing Medical Education (ACCME), the Accreditation Council for Pharmacy Education (ACPE), and the American Nurses Credentialing Center (ANCC), to provide continuing education for the healthcare team.

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Credit Claiming and Certificates of Attendance for the 2023 Meetings

Physicians may claim credit for sessions he or she attended in the attendee portal or meeting mobile app. Please click on the meeting link sent by CSRS in the “Know Before You Go” email to access the attendee portal. Credit claiming and evaluations may be completed in the meeting mobile app or in the attendee portal under “Session/On-Demand.” Certificates will be available after the completion of the Annual Meeting on Saturday, December 2 and may only be accessed through the attendee portal.

CSRS Future Meetings

Emerging Leaders Course

April 18-20, 2024 – Indiana Spine Group, Medical Academic Center in Carmel, Indiana

Hands-On Surgical Techniques Course

July 18-20, 2024 – Indiana Spine Group, Medical Academic Center in Carmel, Indiana



52nd Annual Meeting & 29th Instructional Course

Dec 11-14, 2024 – Sheraton Grand, Chicago, IL



53rd Annual Meeting & 30th Instructional Course

Dec 3-6, 2025 – Renaissance Hotel, Washington DC



CALL FOR RESEARCH GRANTS

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www.csr.org/research/grants

General Information

Mobile App Download

To access the mobile app:

1. Search & install **Eventsentential** in the Apple App Store or Google Play Store
2. Once the app is downloaded, enter the event code: **6AOFVSKU**
3. Select **“CSRS 51st Annual Meeting and 28th Instructional Course”**
4. Allow push notifications to receive reminders and updates throughout the meeting
5. Complete your profile by selecting “Edit Profile Details” or edit “Basic Details”



The mobile app gives you access to the schedule, Virtual Poster Hall, and credit claiming all in one place!

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Speaker Information

To use an updated slide deck, please stop by the AV table in the back of the General Session Room.

Attendee Portal

The attendee portal can only be accessed via the link sent in the “Know Before You Go” email from CSRS.

View the Virtual Poster Hall posters, full abstracts, schedule and more in the attendee portal. Credit claiming and evaluations may be completed in the attendee portal under the “Sessions/On-Demand” section.

CME Certificates will be available after the conclusion of the Annual Meeting on Saturday, December 2, after the attendee has completed the overall evaluation.

On-Demand content will be available starting January 22, 2024, for those have pre-purchased access.

Wi-Fi

Wi-Fi access in the meeting space can be purchased for \$86 from Wednesday to Sunday for one device. Scan the QR code to connect! Complimentary Wi-Fi is available in lobby areas and guest rooms.

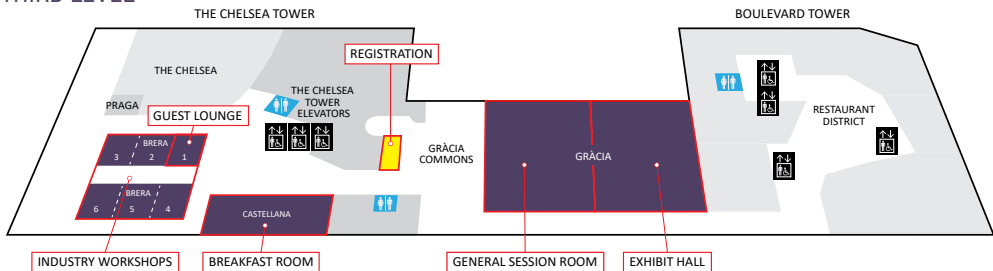


Disclosures

A full list of participant disclosures can be found in the 51st Annual Meeting Abstract Book.

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CALL FOR ABSTRACTS March 6-April 24, 2024



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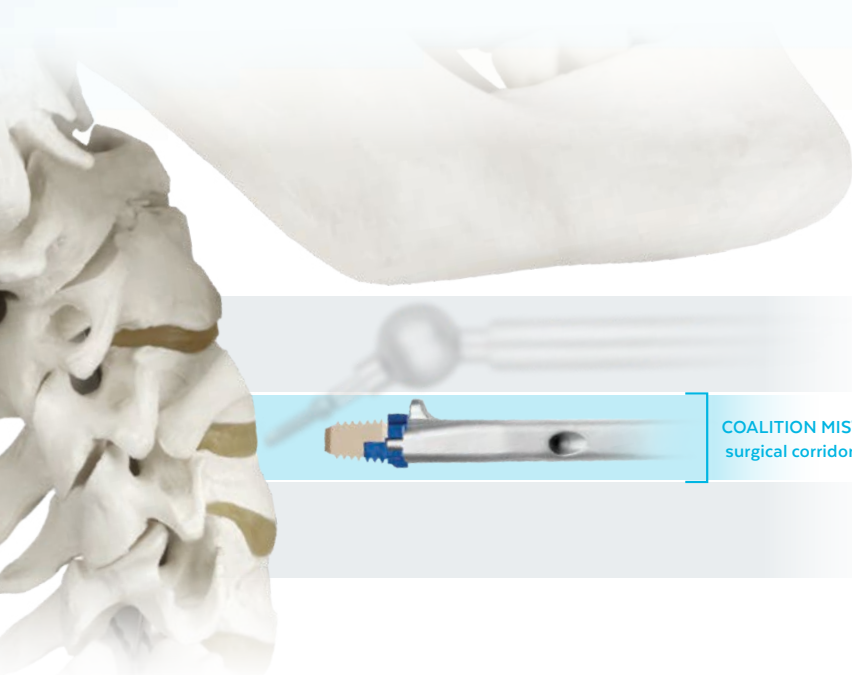
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