

# CURRICULUM VITAE

**Michael P. Steinmetz, MD**

**William P. And Amanda C. Madar Professor and Chairman**

**Department of Neurological Surgery**

**Cleveland Clinic Lerner College of Medicine**

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**ADDRESS:** Cleveland Clinic  
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**PERSONAL:** Birthplace: Detroit, MI  
Date of birth: 09/25/71

Spouse: Bettina  
Children: Cameron and Marcus  
Hobbies: fly fishing

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**EDUCATION****Undergraduate: New Mexico State University, Las Cruces, NM**

Bachelor of Science, 1994

Microbiology

Crimson Scholar, Honors

**Medical School: Texas Tech University School of Medicine, Lubbock, TX**

Doctor of Medicine, 1998

President, Alpha Omega Alpha, Zeta Chapter

Graduated #1 out of 112.

**POST-GRADUATE TRAINING****Intern, 1998-1999**

Department of General Surgery, University of New Mexico, Albuquerque, NM

**Resident, 1999 – 2004**

Department of Neurosurgery, Cleveland Clinic, Cleveland, OH

**Research Fellow, 2002-2004**

Department of Neuroscience, Case Western Reserve University SOM, Cleveland, OH

Advisor-Jerry Silver, PhD

**Chief Resident, 2004-2005**

Department of Neurosurgery, Cleveland Clinic, Cleveland, OH

**Fellowship, 2005-2006**

Complex Spine Surgery

Department of Neurosurgery, University of Wisconsin, Madison, WI

**Leadership Training, 2013**

Program for Chiefs of Clinical Departments

School of Public Health, Harvard, Boston, MA

**LICENSURE**

State of Ohio	License #: 81788	Date of issue: 09/27/2002	Expiration: 1/01/2020
State of Wisconsin	License # 47979-020	Date of issue: 03/30/2005	Expired

**EXAMINATIONS**

- USMLE I
- USMLE II
- USMLE III
- Diplomate-American Board of Neurologic Surgeons 2009

**PROFESSIONAL AFFILIATIONS****Hospital**

- Limited Staff Privileges, Cleveland Clinic Foundation Ambulatory Surgery Centers, 2002-2005
- Clinical Instructor, Department of Neurosurgery, University of Wisconsin, Madison, WI, 2005-2006
- Associate Staff, Department of Neurosurgery, Meriter Hospital, Madison, WI, 2005-2006
- Associate Staff, Department of Neurosurgery, Veterans Affairs Hospital, Madison, WI, 2005-2006
- Associate Staff, Cleveland Clinic Center for Spine Health and Department of Neurosurgery, Cleveland Clinic, Cleveland, OH, 2006-2010
- Staff, Cleveland Clinic Center for Spine Health and Department of Neurosurgery, Neurologic Institute, Cleveland Clinic, Cleveland, OH, 2010-2011
- Adjunct Staff, Department of Neurosurgery, Cleveland Clinic, Cleveland, OH, 2011-2014
- Chairman, Neurosciences, MetroHealth Medical Center, Cleveland, OH, 2011-2014
- Director, Center for Spine Health, Neurologic Institute, Cleveland Clinic, Cleveland, OH, 2014-present
- Chairman, Department of Neurosurgery, Neurological Institute, Cleveland Clinic, Cleveland, OH, November 2015-present

**Academic**

- Assistant Professor of Surgery, Cleveland Clinic Lerner College of Medicine of Case Western Reserve University, Cleveland, OH, 2007-2010
- Associate Professor of Surgery, Cleveland Clinic Lerner College of Medicine of Case Western Reserve University, Cleveland, OH, 2010-2011
- Associate Professor of Surgery, Case Western Reserve University School of Medicine, Cleveland, OH, 2011
- Associate Professor of Neurosurgery, Case Western Reserve University School of Medicine, Cleveland, OH, 2011-present
- Chairman, Department of Neurological Surgery, Case Western Reserve University School of Medicine at MetroHealth Medical Center, Cleveland, OH, 2011-2014
- Professor of Neurosurgery, Case Western Reserve University School of Medicine, Cleveland, OH 2011-present
- Professor of Neurosurgery, Cleveland Clinic Lerner College of Medicine of Case Western Reserve University, Cleveland, OH, 2016-present

**ADDITIONAL TRAINING**

- Hands on Spine Course. Dr. Edward C Benzel (Course Director), Cleveland, OH, 2001
- Techniques of Epilepsy Surgery. Dr. William Bingaman (Course Director), Cleveland, OH, 2002
- Resident Leadership Conference, Brain Lab, Munich, Germany, 2003
- Gamma Knife 2-Day Practical Course. Dr. Gene Barnett (Course Director), Cleveland, OH, 2004
- Kyphoplasty-Infatable Bone Tamp Course. Dr. Richard Schlenk (Course Director), Cleveland, OH, 2004
- XLIF Course, San Diego, CA, 2007
- Pro-Disc C Training, Charlotte, NC, 2008
- Leibrock Leadership Development Course, Washington, DC, 2010
- Advisory Group Leadership Development, Cleveland, OH, 2013-2014
- Mazor robotic training, Orlando, FL 2017
- Globus robotic training, Philadelphia, PA 2017
- Mobi C cervical disc training, Webinar 2018
- Lean Healthcare Transformation Summit, Chicago, IL 2018

**PROFESSIONAL SOCIETY MEMBERSHIPS**

- American Association of Neurological Surgeons
- AANS/CNS Section on Disorders of the Spine and Peripheral Nerves
- AO Spine North America
- Congress of Neurological Surgeons
- Council of State Neurological Societies
- Cervical Spine Research Society
- Lumbar Spine Research Society
- North American Spine Society
- Society of Neurological Surgeons

**HONORS**

- Alumni Out of State Scholarship, New Mexico State University, 1994
- Golden Key National Honor Society, New Mexico State University, 1994
- O'Neil Endowed Scholarship, Texas Tech, 1995
- McGraw Hill Recognition of Outstanding Medical Student, Texas Tech, 1996
- Outstanding Student in Pharmacology, Texas Tech, 1996
- Robert Flygare Scholarship, Texas Tech, 1996
- Southern Medical Association Scholarship, Texas Tech, 1996
- Junior Alpha Omega Alpha, Texas Tech, 1997
- Outstanding Student in Neurology, Texas Tech, 1998
- Outstanding Student in Surgery, Texas Tech, 1998
- Dean's Highest Academic Achievement, Texas Tech, 1998
- Gold Headed Cane Award, Texas Tech, 1998
- Humanitarian Award-Department of Neurosurgery, Cleveland Clinic, 2000
- Academic Award-Department of Neurosurgery, Cleveland Clinic, 2001
- Cloward Fellowship Award, 2003-2004
- Academic Award-Department of Neurosurgery, Cleveland Clinic, 2003
- 1<sup>st</sup> Place Poster Session, Congress of Neurological Surgeons Meeting, Denver, CO, 2003
- Marquis Who's Who in America, 2003, 2004
- Sanford Larson Research Award, 2004-2005
- World Class Service Award in Leadership, Cleveland Clinic Foundation, 2005
- Neurosurgery Research and Education Foundation (NREF) Young Investigator Award, 2010
- 1<sup>st</sup> Place Poster Session, Neurosurgical Forum, Congress of Neurological Surgeons, Washington DC, 2011
- Golden Apple Teacher of the Year, Department of Neurological Surgery Case Western Reserve University School of Medicine, 2013
- Lumbar Spine Research Society Annual Grant Recipient 2018
- William P. and Amanda C. Madar Endowed Professor and Chair 2019
- Health Network Service Excellence Award 2019

**PROFESSIONAL ACTIVITIES/APPOINTMENTS**

## American Board of Neurological Surgeons

- Scholars Program
- Guest examiner Phoenix Arizona Fall 2018

## American Association of Neurological Surgeons

- Ex Officio-Executive Committee 2019-2021
- Annual Meeting Committee 2019-2021
- Active Member 2010-present
- IT Committee 2008-2011
- Public Relations Committee 2008-Present
- Vice Chair NQC Committee 2019-Present

## AO Spine

- Member
- Research Committee 2013-2016

## Cervical Spine Research Society

- Member
- Research Committee 2015-Present

## Congress of Neurological Surgeons

- Nominating Committee 2017-2019
- Ex Officio, Executive Committee 2005-2016
- Vice President 2015-2016
- CNS Appointee, Washington Committee 2011-2016
- Chairman, Compliance and Ethics Committee 2011-2016
- Chairman, Stand Alone Meetings Committee 2012-2016
- Chairman Future Sites Committee 2010-present
- Chairman, IT Committee 2010-2011
- Managing Editor, SANS Life Long Learning, 2007-2010
- Chairman, Website Committee 2006-2010
- Assistant Managing Editor, SANS Life Long Learning, 2006-2007
- Chairman, Resident Committee 2005-2008
- Vice-Chairman, Website Committee, Congress of Neurological Surgeons, 2004-2006
- IT Committee 2004-2006
- Publications Committee 2005-2010
- SANS Wired Committee 2005-2010
- Education Committee 2005-present
- Co-Chairman, Special Courses, Congress of Neurological Surgeons Annual Meeting, Chicago, IL 2012
- Co-Chairman, General Scientific Session, Congress of Neurological Surgeons Annual Meeting. San Diego, CA 2010
- Chairman, Resident Program, Congress of Neurological Surgeons Annual Meeting, Boston, MA 2005
- Chairman, Resident Program, Congress of Neurological Surgeons Annual Meeting, Denver, CO, 2003
- Co-Chairman, General Session IV, Congress of Neurological Surgeons Annual Meeting, San Francisco, CA, 2004
- Editorial Board/Administrative Team, Congress of Neurological Surgeons Web Site
- Sergeant-at-Arms Committee, Congress of Neurological Surgeon Annual Meeting, Denver, CO, 2003
- Sergeant-at-Arms Committee, Congress of Neurological Surgeon Annual Meeting, San Diego, CA, 2001

## CNS/AANS Joint Section on Diseases of the Spine &amp; Peripheral Nerves

- Executive Committee 2007-present
- Chair Elect Executive Committee 2019-2020
- Chairman Exhibits Committee 2016-2019

- Co Chairman-Exhibits Committee 2015-2016
- Member at Large 2014-2015
- Chairman, Outcomes Committee 2012-2014
- Chairman, Public Relations Committee, 2007-2012
- Scientific planning committee 2007-present

World Spinal Column Society

- Board of Directors
- Editor World Spinal Column Society Journal

**PROFESSIONAL ACTIVITIES/APPOINTMENTS (continued)**

## Council of State Neurological Societies

- Chairman Executive Committee 2020-2022
- Vice Chairman 2017-2019
- Recording Secretary 2015-2017
- Treasurer 2013-2015
- Chairman, Communications and Education Committee, 2007-2013
- CNS Appointee to CSNS 2005-2014
- Chairman, Website subcommittee 2005-2007
- Vice-Chairman, Communications and Education Committee 2005-2006
- Resident Delegate, 2004-2005
- Website, ad hoc committee 2004-2005

## Lumbar Spine Research Society

- Member
- Membership Committee

## NeuroPoint Alliance

- Board of Directors

## North American Spine Society

- Member
- Biologics Committee 2010-2013
- Public Affairs Committee 2011-2014
- Nominating Committee-2014-2015
- Governance Committee 2014-2021
- Minimally Invasive Section 2018-2021
- Legislative Affairs Committee 2018-2021
- Scientific Program Committee Chair 2021

## Society of Neurological Surgeons

- Active member 2015

## Washington Committee

- CNS Appointee 2013-2016

## Miscellaneous

- President-Alpha Omega Alpha, Zeta Chapter, 1997-1998

## Editorial

- Deputy Editor, *The Spine Journal*, 2018-present
- Editorial Board, *Journal of Neurosurgery Spine* 2018-present
- Editor-in-Chief, *World Spinal Column Journal*, 2016-present
- Editorial Board, *Operative Neurosurgery* 2016-present
- Section Editor (Spine), *World Neurosurgery*, 2015-present
- Editorial Board, *World Spinal Column Journal*, 2014-present
- Ad Hoc Reviewer, *World Neurosurgery* 2011-present
- Ad Hoc Reviewer, *NEUROSURGERY*, 2006-present
- Deputy Editorial Board, *The Spine Journal*, 2006-2018
- Content Reviewer, *Cervical Spine Surgery-A Guide to Preoperative and Postoperative Patient Care*. American Association of Neuroscience Nurses 2007

**INSTITUTIONAL/HOSPITAL SERVICE**Cleveland Clinic

- Surgical Education Committee, Division of Surgery, Cleveland Clinic, 2003-2004
- House Staff Association, Cleveland Clinic, 2001-2002, 2002-2003
- Center for Spine Health, New Products Committee, 2007-2011
- Neurological Institute Research Committee, 2007-2011
- Neurological Institute Hospital Operations Council, 2007-2011
- Center for Spine Health Research Committee, 2007-2011
- IACUC, 2008-2011
- Quality Review Officer, Center for Spine Health, 2010-2011
- OR Allocation Committee, 2015-Present
- Chairman, OR Allocation Committee, 2016-Present

MetroHealth Medical Center

- Medical Executive Committee, 2010-2014
- Council of Chairs, 2010-2014
- Operating Room Committee, 2010-2014

**TEACHING ACTIVITIES**Cleveland Clinic, 2006-Present

- Faculty-Neural and Musculoskeletal Sciences-MSI (neuroembryology)  
Formal classroom teaching, 90 minute teaching experience, 2 classes once yearly
- Faculty-Neurosurgery Clinical MS II and III  
Anatomic teaching, case based presentation, 60 minute teaching experience, 2 sessions yearly. Lectures-1. Stab wound to the spinal cord 2. Facial pain
- Neuroscience ICU nurse lecture: Autonomic Dysreflexia, 15 minute teaching experience, once yearly
- PGY-1 Intern Lecture: Neurological Emergencies. Didactic lecture, 60 minute teaching experience, once yearly
- PGY-2-PGY-7 Neurosurgery House Officers.
  - Daily teaching rounds 10 contact hours weekly
  - Hands-on operating room teaching 16 contact hours weekly
  - Case Based Resident Teaching Conference-one contact hour weekly, case based
- Cleveland Clinic Spine Fellowship Co-Director, 2015-current

Cleveland Clinic/MetroHealth Spine Fellowship, 2011-Present

- Co-Director CCF Spine Surgery Fellowship (2015-present)
- Hands-on operating room teaching 10 contact hours weekly
- Faculty-Clinical Controversies, one contact hour yearly, minimally invasive vs. conventional surgery
- Faculty-Fellowship Teaching Curriculum, one contact hour yearly, cervical deformity surgery



**TEACHING ACTIVITIES (continued)****Case Western Reserve University School of Medicine, 2011-2014**

- ANAT 410: Human Anatomy, Brachial plexus, 60 min didactic teaching experience, once annually. Graduate Students
- Core 3 IQ+ 60 minute teaching experience, small group session, once monthly, 3<sup>rd</sup> year Medical Students
- 3<sup>rd</sup> year Medical Students-Neuroscience clinical rotation
  - Daily teaching rounds 10 contact hours weekly for 2 week rotation
  - Hands-on operating room teaching 10 contact hours weekly
  - Didactic lecture on radiculopathy vs. myelopathy, 1 hour teaching experience during rotation
- PGY 2-7 Neurosurgery House Officers
  - Daily teaching rounds 10 contact hours weekly
  - Hands-on operating room teaching 16 contact hours weekly
  - Case Based Resident Teaching Conference-one contact hour weekly, case based
  - Journal Club, faculty organizer and planner, one contact hour monthly
  - Cranial and spinal trauma conference, faculty organizer and planner, one contact hour monthly

**MetroHealth Medical Center, 2011-2014**

- Neuroscience Nursing Teaching Curriculum, Co-organizer, one contact hour weekly
- Multidisciplinary Approach to Spine Care: A Comprehensive Approach (2012)-Multidisciplinary (primary care, ortho/neurosurgery, chiropractor, resident, fellow, medical students) CME event-6 CME, Course Chairman, planner/organizer
- Comprehensive Treatment of the Aging Spine (2013)-Multidisciplinary (primary care, ortho/neurosurgery, chiropractor, resident, fellow, medical students) CME event-6 CME, Course Chairman, planner/organizer

**Community Teaching, 2011-2014**

- Back Pain Relief: Advanced Treatment Options, Organizer/Planner, Faculty
  - November 2011
  - April 2012
  - March 2013
- Cuyahoga County Library Health Talks on Back Pain Relief, Organizer/Planner, Faculty – 2012
- MetroHealth Men's Event, Cleveland Browns Stadium, Faculty-Back Pain, 2013
- MetroHealth Every Woman's Event, Faculty-Back Pain in a Woman, 2013
- Back to a Better You: A Spine Health Expo, Organizer/Planner, Faculty 2013
- The Aging Spine, Lakewood Senior Health Campus, 2014

**Neurosurgical Residents Trained**

- John Butler, MD, 2000-2007
- Shaye Moskowitz, MD, 2000-2007
- Alex Mason, MD, 2000-2007
- Vivek Gonugunta, MD, 2001-2008
- Jorge Gonzalez-Martinez, MD, PhD, 2001-2008
- Raymond Turner, MD, 2002-2008
- John Park, MD, 2002-2009
- Girish Hiremath, MD, 2002-2009
- G. Alex Jones, MD, 2003-2008
- Vitaly Siomin, MD, 2003-2009
- Kene Ugokwe, MD, 2003-2009
- Mark Bain, MD, 2004-2010
- Christopher Iannotti, MD, PhD, 2004-2010
- Sean Nagel, MD, 2004-2010
- Julie Chen, MD, 2005-2011

- Nick Marko, MD, 2005-2011
- Dani Bidros, MD, 2006-2011
- Tarun Bhalla, MD, 2007-2012
- Miguel Lopez-Gonzalez, MD, 2007-2012
- Alejandro Spiotta, MD, 2007-2012
- Gwyneth Hughes, MD, 2008-2013
- James Liu, MD, 2008-2013
- Virgilio Matheus, MD, 2008-2013
- Amer Khalil, MD, 2007-2014
- Bjorn Lobo, MD, 2007-2014
- Sumeet Vadera, MD, 2007-2014
- Mike Kelly, MD, 2008-2015
- Varun Kshetry, MD, 2008-2015
- Benjamin Rosenbaum, MD, 2008-2015
- Ryan Brennan, MD, 2009-2016
- Andrew Torre Healy, MD, 2009-2016
- Saksith Smithason, MD, 2009-2016
- Rupa Juthani, MD, 2010-2017
- Jeffrey Mullin, MD, 2010-2017
- Kevin Walsh, MD, 2010-2017
- E. Emily, Bennett, MD, 2011-2018
- Nina Moore, MD, 2011-2018
- Louis Ross, MD, 2011-2018
- Andres Maldonado, MD, 2012-2019
- Alex Witek, MD, 2012-2019
- Bryan Lee, MD, 2012-2019

#### **Post Graduate Clinical Spine Fellows Trained**

- Khalid Abbed, MD, 2006-2007
- Jeremy Amps, MD, 2006-2007
- Eric Klineberg, MD, 2006-2007
- Alexander Mohit, MD, 2006-2007
- Dhruv Pateder, MD, 2006-2007
- Artem Vaynman, MD, 2006-2007
- William Montgomery, MD, 2006-2008
- Cristian Brotea, MD, 2007-2008
- Richard Burg, MD, 2007-2008
- Paul Kim, MD, 2007-2008
- William Lavelle, MD, 2007-2008
- Vincent Miele, MD, 2007-2008
- Ron Riesenburger, MD, 2007-2008
- David Gwinn, MD, 2008-2009
- Saad Chaudhary, MD, 2008-2009
- Robert Talac, MD, 2008-2009
- Andrew Utter, MD, 2008-2009
- Srinivas Prasad, MD, 2008-2009
- Lawrence Alexander, MD, 2009-2010
- Nathaniel Brooks, MD, 2009-2010
- Scott Lollis, MD, 2009-2010
- Ran Harel, MD, 2009-2010
- Daniel Hoh, MD, 2009-2010
- Sharad Rajpal, MD, 2009-2010
- Daniel Refai, MD, 2009-2010
- John Shin, MD, 2009-2011
- Frank Bishop, MD, 2010-2011

- Eli Hothem, MD, 2010-2011
- Christopher Iannotti, MD, PhD, 2010-2011
- Joshua Landa, MD, 2010-2011
- Fernando Techy, MD, 2010-2011
- Gandi Varma, MD, 2010-2011
- Deb Bhowmick, MD, 2011-2012
- Todd Francis, MD, 2011-2012
- Suzanne Tharin, MD, 2011-2012
- Stephen Tolhurst, MD, 2011-2012
- Matheus Virgilio, MD, 2011-2012
- Dang-Hai Zhang, MD, 2011-2012
- David Anderson, MD, 2012-2013
- Perry Dhaliwal, MD, 2012-2013
- Mark Kayanja, MD, 2012-2013
- Saavedra Manuel, MD, 2012-2013
- Tiffany Perry, MD, 2012-2013
- Jason Taub, MD, 2012-2013
- Basheal Agrawal, MD, 2013-2014
- Colin Buchanan, MD, 2013-2014
- Konstantino Margetis, MD, 2013-2014
- Sergiy Nesterenko, MD, 2013-2014
- Vedant Vaksha, MD, 2013-2014
- Santaram Vallurupallim, MD, 2013-2014
- Paul Porensky, MD, 2014-2015
- Ryan Brennan, MD, 2014-2015
- Andrew Torre-Healy, MD, 2014-2015
- Sina Pourtaheri, MD, 2014-2015
- Matthew Karek, MD, 2014-2015
- Colby Fagin, MD, 2014-2015
- Emily Bennett, MD, 2015-2016
- Kevin Walsh, MD, 2015-2016
- Colin Haines, MD, 2015-2016
- Timothy Roberts, MD, 2015-2016
- Assem Sultan, MD, 2015-2016
- Alexander Ivanov, MD, 2016-2017
- Vamsi Kancharla, MD, 2016-2017
- Bryan Lee, MD, 2016-2017
- Dominic Pelle, MD, 2016-2017
- Farbod Rastegar, MD, 2016-2017
- Gabriel Smith, MD, 2016-2017
- John Freeland Ackley, MD, 2017-2018
- Anup Gangavalli, MD, 2017-2018
- Maziyar Kalani, MD, 2017-2018
- Samuel Overley, MD, 2017-2018
- Ganesh Shankar, MD, 2017-2018
- Ghaith Habboub, MD, 2018-2019
- Dan Coughlin, MD, 2018-2019
- Shaleen Vira, MD 2018-2019
- Elyne Khan, MD, 2018–2019

### **Post Doctral Fellowship Mentorship**

Chris Iannotti MD, PhD 2009-2010

Liposomal clodronate plus cAMP impact on neuroprotection and regeneration following experimental spinal cord injury.

Basem Awad MD, PhD 2011-2013

A study of the crossed phrenic pathway and recovery of respiratory function following experimental spinal cord injury

### **Research Thesis Mentorship**

Committee Chair 2019

Student: Joshua Golubovsky

Thesis title: Comparison of Surgical Interventions for Low Back Pain Due to Bertolotti Syndrome via Development of a Novel Technique for In Vitro Biomechanical Testing

Committee member 2019-2020

Student: Shehryar Shiekh

Thesis title: The Cost Effectiveness of Epilepsy Surgery and Surgical Evaluation in the United States

Committee member 2019-2020

Student: Jianning Shao

Intraoperative monitoring for optimal outcome following lumbar level deformity surgery

### **Medical Students Mentored**

Robert Winkelman - Opioid prescribing studies

Josh Golubosky - Bertolotti syndrome study + ALIF vs. TLIF cost effectiveness study

Nick Rabah - HCAHPS studies

Arbaz Momin - Prior surgery in setting of ALIF study

Edward Barksdale - Prior surgery in setting of ALIF study

Kelsey Goon - Delirium study

Nicole Keller - Tritanium vs. PEEK study

Isaac Lapite - Tritanium vs PEEK study

Christina Gerges - Preoperative PT study

Peter Palmer - Stryker recall study

Shiv Dewan - Stryker recall study

Naveen Jasty – Transfusion study

## **RESEARCH EXPERIENCE**

### **Undergraduate, 1992-1994**

Jeff Arterburn, Ph.D. New Mexico State University, Department of Chemistry, Las Cruces, NM.

The object of research performed was to form linkages between Rhenium and various peptides. These constructs have the potential to be used in medical imaging.

### **Medical School, 1996**

Robert M. Hardaway, III, MD. Texas Tech Department of Surgery, El Paso, TX.

The object of the project was to study the effect of Urokinase, a plasminogen activator, in a pig model of septic shock.

### **Research Fellow 2002-2003 & Cloward Fellow 2003-2004**

Jerry Silver, PhD. Case Western Reserve University, Cleveland, OH.

The object of research performed was to investigate novel techniques to overcome intrinsic and extrinsic barriers to effective spinal cord regeneration. My projects specifically focused on stimulating dorsal root ganglion regeneration while overcoming proteoglycan inhibition at the site of spinal cord injury and at the dorsal root entry zone.

### **Spine Fellowship 2005-2006**

Daniel Resnick, MD Department of Neurosurgery, University of Wisconsin; Jerry Silver PhD Case Western Reserve University

The object of the research performed was to investigate novel techniques to overcome intrinsic and extrinsic barriers to spinal cord regeneration, *in vivo*. Our project focuses on stimulating both motor and sensory neurons to sprout axons following injury by increasing neuronal cAMP while overcoming proteoglycan inhibition at the site of spinal cord injury by delivering macrophage factors intrathecally.

### **Director, Spinal Cord Injury Laboratory Cleveland Clinic 2006-2011**

The object of the research performed is two fold: 1) investigate novel techniques to overcome intrinsic and extrinsic barriers to neuronal regeneration *in vitro* and *in vivo* 2) investigate the modulation of inflammation following spinal cord injury and its impact on neuroprotection. The lab studied the effect of peripheral monocyte depletion with the combination of increasing neuronal cAMP on functional, physiological and anatomic recovery following contusive spinal cord injury. The lab further studied opticogenetics (viral delivery of light-responsive ion channels) to the spinal cord following injury for the recovery of bladder function.

### **Spinal Cord Injury Laboratory Rammelkamp Research Institute, MetroHealth Medical Center 2011-2014**

The object of the research performed is to investigate novel techniques to promote regeneration and plasticity following spinal cord injury. The laboratory is also studying the effect of immunomodulation on neuroprotection following spinal cord injury and the novel use of opticogenetics to promote recovery of the lower urinary tract.

### **Spine Clinical Outcomes Research Laboratory, Cleveland Clinic Center for Spine Health 2014-present**

The object of the research is to use out spine outcomes registry (Knowledge Project) to answer key clinical questions and drive hypothesis driven research.

## RESEARCH PROJECTS

### Active

- Principal Investigator: Defining the threshold response of lumbar selective nerve root block in predicting good outcome following lumbar foraminotomy.  
Sponsor: Lumbar Spine Research Society Dates: 04/2018-04/2019 Direct Support: \$20,000
- **Type:** R01NS092033; **PI:** Labhassetwar V.; **Dates:** 04/01/2015 – 03/31/2020; **Effort:** 2.4 months; **Source:** NIH/NINDS; **Total Direct Support:** \$360,000/per year; **Title:** Neuronal Protective NanoParticles for Treating Acute SCI; Main objective is to demonstrate robust preclinical efficacy with Neuronal Protective NanoParticles (Pro-NPs) in an animal model of spinal cord injury (SCI) under clinically relevant conditions and to improve mechanistic understanding of the treatment, particularly to determine how Pro-NPs inhibit the secondary injury cascade and promote neuronal repair mechanisms. There are three *specific aims*: (1) Delineate parameters critical for Pro-NP delivery to the lesion site; (2) Determine functional recovery following treatment; and (3) Understand the functional repair mechanisms at molecular and cellular levels.
- Site Principal Investigator: Randomized controlled trial of TOPS facet replacement vs. posterolateral interbody fusion.  
Sponsor: Premia Spine Date 1/1/-2018-01/1-2020 \$175,110
- Co-Investigator: Comparison of Surgical Interventions for Low Back Pain Due to Bertolotti Syndrome via Development of a Novel Technique for In Vitro Biomechanical Testing  
RPC Cleveland Clinic 6/2018-07/2019 \$25,000  
Principal Investigator: Robb Colrunn, PhD
- Principal Investigator: Corelation of rod strain and proximal junctional kyphosis: a biomechanical analysis.  
RPC Cleveland Clinic 6/2018-7/2019 \$25,000
- Site Principal Investigator: Spondy Trial: Optimal treatment for L5/S1 Spondylolisthesis. Sponsor: AO Spine North America. 2017-2019
- Co-Investigator: Cervical Spondylotic Myelopathy Surgical Trial (CSM-S Trial). Principal Investigator-Zoher Gogawala, MD Lahey Clinic. Sponsor: Patient Centered Outcomes Research Institute (PICORI) 2013-Present

### In active

- Principal Investigator: A Prospective Evaluation of InQu(r) Bone Graft Extender & Substitute for Transforaminal Lumbar Interbody Fusion. Sponsor: Isto Technologies. 2011-2013
- Principal Investigator: Biomechanical analysis of dual screw construct in the osteoporotic spine.  
Sponsor: Globus Spine Date 8/2017-9/2018 \$30,000
- Principal Investigator: Intraoperative assessment of the Intellirod LOADPRO disposable spinal rod strain sensor for use during kyphotic corrective surgery. Sponsor: Intellirod. 9/16/2017-12/2018, \$37,818.00
- Co-Investigator: Early Appropriate Care. This prospective study assesses the effect of early surgery for patients that have suffered poly trauma including fractures of the limbs and/or axial spine. Sponsor: Orthopedic Trauma Association. PI: Heather Vallier, MD
- Co-Investigator: A Randomized, Double-Blind, Placebo-Controlled Phase 3 Study to Investigate the Efficacy and Safety of Progesterone in Patients with Severe Traumatic Brain Injury, BHR-100-301.  
Sponsor: BHR Pharma LLC. Site PI: Jeffrey Claridge
- Co-Principal Investigator: A Multicenter, Randomized, Double-Blind, Placebo-Controlled, Parallel-Group

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Study to Evaluate the Efficacy, Safety, and Pharmacokinetics of SUN13837 Injection in Adult Subjects with Acute Spinal Cord Injury. Sponsor: Asubio Pharmaceuticals, Inc.

- Co-Investigator: Double-Blind, Randomized, Placebo-Controlled, Phase 2 Safety and Efficacy Trial of MultiStem® in Adults With Ischemic Stroke
- Investigational Product: MultiStem® Protocol Number: B01-02 Sponsor: Athersys
- Principal Investigator: Light induced alteration of external urethral function through the activation of channel rhodopsin2. Spinal Cord Injury Laboratory MetroHealth Medical Center
- Principal Investigator: The effect of monocyte depletion combined with phosphodiesterase inhibition on neural protection and regeneration in a contusive model of spinal cord injury. Spinal Cord Injury Laboratory MetroHealth Medical Center
- Principal Investigator: The effect of soluble macrophage factors plus extracellular matrix modification on neuronal regeneration *in vitro* and *in vivo*. Spinal Cord Injury Laboratory, Cleveland Clinic Foundation.
- Principal Investigator: BMP 7 effect on neuronal survival and regeneration in a proteoglycan environment. Spinal Cord Injury Laboratory, Cleveland Clinic.

**RESEARCH PROJECTS (continued)****In active (continued)**

- Co-investigator: Randomized Controlled Trial of Duragen Plus Adhesion Barrier Matrix to Minimize Adhesions Following Lumbar Discectomy. IRB# 07-002 Sponsor: Integra (Duragen) PI: Benzel
- Co-investigator: A Prospective, Multi-Center, Randomized Controlled Study to Compare the Spinal Sealant System as an Adjunct to Sutured Dural Repair with Standard of Care Methods during Spinal Surgery. IRB#07-071 Sponsor: Confluent (DuraSeal) PI: Krishnaney
- Principal Investigator: OP-1 Putty IRB#07-477 Sponsor: Stryker (Putty)
- Co-investigator: A Prospective, Randomized Clinical Investigation of the Cervitech, Inc. Porous Coated Motion Artificial Disc for Stabilization of the Cervical Spine between C3-C4 and C7-T1 IRB#7903 Sponsor: Cervitech (PCM) PI: Lieberman
- Co-investigator: The evaluation of patients with acute hypertension and intracerebral hemorrhage with intravenous clevidipine treatment (ACCELERATE). PI: Lynch
- Principal Investigator: Cost savings in the operative room, standard radiographs vs. fluoroscopy for localization IRB#07-009
- Principal Investigator: Multimodality treatment of the injured rat spinal cord sensory system with an immature astrocytes bridge, chondroitinase ABC, and dorsal root ganglion cell stimulation. 2002-2003. Sponsor: Dr. Jerry Silver. Department of Neuroscience, Case Western University, Cleveland, Ohio.
- Principal Investigator: Effect of chronic dorsal root ganglion stimulation combined with intrathecal delivery of chondroitinase ABC on dorsal column stimulation in the rat. 2002-2003.
- Sponsor: Dr. Jerry Silver. Department of Neuroscience, Case Western University, Cleveland, Ohio.
- Principal Investigator: The Effect of Chondroitinase ABC and Zymosan on Axonal Regeneration in an Animal Model of Nerve Root Injury. 2004-2005. Sponsor: Dr. Jerry Silver. Department of Neuroscience, Case Western University, Cleveland, Ohio.
- Principal Investigator: The effect of soluble macrophage factors and rolipram on axonal regeneration in a mammalian model of contusive spinal cord injury. Sponsor: Daniel Resnick. Department of Neurosurgery, University of Wisconsin, Madison, WI.

**GRANTS****Active**

- **Type:** R01NS092033; **PI:** Labhassetwar V.; **Dates:** 04/01/2015 – 03/31/2020; **Effort:** 2.4 months; **Source:** NIH/NINDS; **Total Direct Support:** \$360,000/per year; **Title:** Neuronal Protective NanoParticles for Treating Acute SCI; **Effort 1.35%;** Main objective is to demonstrate robust preclinical efficacy with Neuronal Protective NanoParticles (Pro-NPs) in an animal model of spinal cord injury (SCI) under clinically relevant conditions and to improve mechanistic understanding of the treatment, particularly to determine how Pro-NPs inhibit the secondary injury cascade and promote neuronal repair mechanisms. There are three *specific aims*: (1) Delineate parameters critical for Pro-NP delivery to the lesion site; (2) Determine functional recovery following treatment; and (3) Understand the functional repair mechanisms at molecular and cellular levels.
- **Lumbar Spine Research Society.** PI: Steinmetz, MP  
Defining the threshold response of lumbar selective nerve root block in predicting good outcome following lumbar foraminotomy.  
Sponsor: Lumbar Spine Research Society Dates: 04/2018-04/2019 Direct Support: \$20,000

**In active**

- Daniel Human Foundation for Spinal Cord Research - \$40,000. *Multimodality treatment of the injured rat spinal cord sensory system with an immature astrocytes bridge, chondroitinase ABC, and dorsal root*



*ganglion cell stimulation.* 2002-2003.

**GRANTS (continued)****In active (continued)**

- Cloward Fellowship - \$30,000. Given by the CNS/AANS Joint Section on Disorders of the Spine and Peripheral Nerves. *Effect of Chronic Dorsal Root Ganglion Stimulation Combined with Intrathecal Delivery of Chondroitinase ABC on Dorsal Column Axon Regeneration in the Rat.* 2003-2004
- Larson Research Grant - \$30,000. Given by the CNS/AANS Joint Section on Disorders of the Spine and Peripheral Nerves. *The Effect of Chondroitinase ABC and Zymosan on Axonal Regeneration in an Animal Model of Nerve Root Injury.* 2004-2005
- The Robert and Elizabeth Miller Foundation-\$10,000. *The effect of soluble macrophage factors and rolipram on axonal regeneration in a mammalian model of contusive spinal cord injury.* 2005-2006.
- The Center for Spine Health. Cleveland Clinic. \$300,000/3 years. *The effect of neuronal stimulation combined with extracellular matrix modification on regeneration in the injured mammalian spinal cord.* PI: Steinmetz 2006-2009
- Congress of Neurological Surgeons Basic and Translational Research Award \$10,000. Chris Iannotti, Resident in the Laboratory, *The effect of immunomodulation and increased cAMP on neuroprotection and locomotor recovery following spinal cord injury.* 2009-2010.
- AANS/CNS Ronald Apfelbaum Research Award \$15,000. John Shin, Fellow in the Laboratory. 2010 *Regeneration of bladder function following spinal cord injury: a combined therapeutic strategy utilizing macrophage depletion, cAMP elevation, and neural stem cell transplantation.*
- Neurosurgery Research and Education Foundation Young Investigator Award \$40,000. *Restoration of Urinary Function Following Acute Spinal Cord Injury.* 2010-2011.
- Ohio 3<sup>rd</sup> Frontier Award. Athersys, Case Western Reserve University School of Medicine. \$35,000. *The use of human mesenchymal stem cells on recovery of urinary and locomotor function following experimental spinal cord injury.* 2012-2013
- NIH R21 Restoring normal urinary function following spinal cord injury with optogenetics, submitted 2014
- Patient Centered Outcomes Research Institute. *Cervical Spondylotic Myelopathy.* Award \$91,266 (site award). 2014-2016
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**VISITING PROFESSORSHIPS**

- Gurdjian-Thomas Visiting Professor, Wayne State Department of Neurosurgery, 2011
- University of Buffalo, Department of Neurosurgery, 2015
- Oklahoma State Neurosurgical Society, 2016
- Stanford Department of Neurosurgery, 2017
- University of Wisconsin Department of Neurosurgery 2018
- Dartmouth Department of Orthopedic Surgery 2018
- LSU Shreveport Department of Neurosurgery 2018

**INVITED PRESENTATIONS****Regional**

1. Small Group Instructor - Spinal Cord II, Brainstem Anatomy, Supratentorial Lesions; Case Western Reserve University Department of Neuroscience, Neuroscience Committee, 2003.
2. Resident Instructor, Cleveland Spine Review, 2003.
3. Faculty, "Emerging Therapies in the Management of Spinal Cord Injury." Annual Update in Neuroscience Nursing, Cleveland, OH, 2004.
4. Faculty, Cleveland Hands-on Spine Review, Cleveland, OH, 2006.
5. Speaker, "Cervical stenosis and instability." Orthopedics for the Primary Care Physician, Independence, OH, 2007.
6. Faculty, "Image guided spinal surgery." Cleveland Spine Review. Cleveland, OH, 2007.
7. Faculty, "Dorsal cervical fixation." Cleveland Spine Review. Cleveland, OH, 2007.
8. Faculty, "Ventral thoracic and lumbar fixation." Cleveland Spine Review. Cleveland, OH, 2007.
9. Faculty, "Arthrodesis and disc replacement." Pain Management for the Primary Care Physician. Cleveland, OH, 2007.
10. Faculty, "Stem Cells and Spinal Cord Injury." Annual Update in Neuroscience Nursing. Cleveland, OH, 2007.
11. Moderator, "Health Talk-My Nagging Back Pain: What to do?" Independence, OH, 2007.
12. Speaker, "Surgery for Back Pain. My Nagging Back Pain: What to do?" Independence, OH, 2007.
13. Faculty, "Spinal Cord Disease." The 5<sup>th</sup> Annual Cleveland Neurocritical Care and Stroke Conference. Cleveland, OH 2007.
14. Faculty, "Dorsal Cervical Fixation." Cleveland Spine Review. Cleveland Clinic, Cleveland, OH, 2008.
15. Faculty, "Ventral Thoracic and Lumbar Fixation Techniques. Cleveland Spine Review. Cleveland Clinic, Cleveland, OH, 2008.
16. Speaker, "Non-oncologic Surgical Management of Spinal Metastasis." Palliative Medicine Grand Rounds. Cleveland Clinic, Cleveland, OH, 2008.
17. Faculty, "Dorsal Cervical Fixation." Cleveland Spine Review. Cleveland Clinic, Cleveland, OH, 2010.
18. Faculty, "Degenerative Spondylolisthesis and Scoliosis." Cleveland Spine Review. Cleveland Clinic, Cleveland, OH, 2010.

**INVITED PRESENTATIONS (continued)****Regional (continued)**

19. Faculty, "Cervical radiculopathy and myelopathy." Essentials for the Spine Care Physician. Cleveland Clinic, Cleveland, OH, 2010.
20. Faculty, "Surgical Treatment of the Craniovertebral Junction." Anatomy of the craniovertebral junction. Cleveland, OH, 2011.
21. Faculty, "Dorsal Cervical Fixation." Cleveland Spine Review. Cleveland Clinic, Cleveland, OH, 2011.
22. Faculty, "Minimally invasive spine surgery, pearls, tricks and results." Cleveland Spine Review. Cleveland Clinic, Cleveland, OH, 2011.
23. Course Organizer and Director. Multidisciplinary Approach to Spine Care: A Comprehensive Review. Independence, OH 2012.
24. Faculty, "Advances in Spine Surgery, Lumbar: When is surgery Appropriate." Multidisciplinary Approach to Spine Care: A Comprehensive Review. Independence, OH, 2012.
25. Faculty, "Thoracic Fixation." Cleveland Clinic Spine Review. Cleveland, OH, 2013.
26. Faculty, "MIS lumbar fusion." Cleveland Clinic Spine Review. Cleveland, OH, 2013.
27. Faculty, "Spinal Shock and Autonomic Dysreflexia." Advances in Neuroscience Nursing. Cleveland, OH, 2013.
28. Faculty, "Choosing Biologics in Spinal Fusion." Cleveland Spine Symposium. Cleveland, OH, 2013.
29. Course Organizer and Director. Comprehensive Treatment of the Aging Spine. Independence, OH, 2013.
30. Faculty, "The spine as we age, the degenerative cascade." Comprehensive Treatment of the Aging Spine. Independence, OH, 2013.
31. Faculty, "Lumbar osteoporotic compression fracture. Kyphoplasty is best." Comprehensive Treatment of the Aging Spine. Independence, OH, 2013.
32. Faculty, "Degenerative scoliosis and back pain. Long segment fusion." Comprehensive Treatment of the Aging Spine. Independence, OH, 2013.
33. Faculty, "Odontoid fracture > 80 years old. C1/2 fusion." Comprehensive Treatment of the Aging Spine. Independence, OH, 2013.
34. Faculty, "Dorsal Thoracic and Lumbar Instrumentation." Cleveland Clinic Spine Review Cleveland, OH, 2014.
35. Faculty, "Minimally Invasive Lumbar Fusion." Cleveland Clinic Spine Review. Cleveland, OH, 2014.

**INVITED PRESENTATIONS (continued)****Regional (continued)**

36. Faculty, "Cervical radiculopathy and myelopathy." Essentials for the Spine Care Clinician. Cleveland, OH, 2014.
37. Faculty, "Dorsal thoracic and lumbar instrumentation." Cleveland Clinic Spine Review. Cleveland, OH, 2015.
38. Faculty, "MIS fusion techniques." Cleveland Clinic Spine Review. Cleveland, OH, 2015.
39. Faculty, "Role of en bloc surgery for primary malignant tumors." Cleveland Clinic Spine Review. Cleveland, OH, 2015.
40. Faculty, "Role of en bloc surgery for primary malignant tumors." Cleveland Clinic Spine Review. Cleveland, OH, 2016.
41. Faculty, "Dorsal thoracic and lumbar instrumentation." Cleveland Clinic Spine Review. Cleveland, OH, 2016.
42. Faculty, "MIS fusion techniques." Cleveland Clinic Spine Review. Cleveland, OH, 2016.
43. Faculty, "Anatomy and Biomechanics of the Occipitocervical junction." Surgical Treatment of the Craniovertebral Junction CNS Course. Cleveland, OH, 2016.
44. Faculty, "Role of en bloc surgery for malignant spine tumors." Cleveland Clinic Spine Review. Cleveland, OH, 2017.
45. Faculty, "Intraoperative monitoring changes." Cleveland Clinic Spine Review. Cleveland, OH, 2017.
46. Faculty, "Minimally invasive spine fusion techniques." Cleveland Clinic Spine Review. Cleveland, OH, 2017.
47. Director: Cleveland Clinic Spine Review. Cleveland, Ohio 2018.
48. Minimally invasive cervical techniques. Cleveland Clinic Spine Review. Cleveland, Ohio 2018.
49. What to do with intraoperative monitoring changes. Cleveland Clinic Spine Review. Cleveland, Ohio 2018.
50. Endoscopic spine decompression and fusion. Cleveland Clinic Spine Review. Cleveland, Ohio 2018.
51. Anatomy and Biomechanics of the Occipitocervical junction. Surgical Treatment of the Craniovertebral Junction CNS Course. Cleveland, OH 2018
52. Director: Midwest Spine Review, Cleveland, OH 2018.
53. Endoscopic decompression and fusion. Midwest Spine Review. Cleveland, OH 2018.
54. Opening Remarks. ASSFN Epilepsy Surgery Program for Residents. Cleveland, OH 2019.

55. Craniovertebral junction anatomy and biomechanics. Resident Craniovertebral Course. University Hospitals. Cleveland, Ohio 2019.

**INVITED PRESENTATIONS (continued)****National**

1. Moderator, Luncheon Seminar - Career Transitions-from Residency into Practice; Congress of Neurological Surgeons Annual Meeting, Denver, CO, 2003.
2. Moderator, General Session IV, Congress of Neurological Surgeons Annual Meeting, San Francisco, CA, 2004.
3. Moderator, Honored Guest Luncheon, Congress of Neurological Surgeons Annual Meeting, San Francisco, CA, 2004.
4. Faculty, Surgical Arthrodesis of the Cervical Spine, Congress of Neurological Surgeons Annual Meeting, San Francisco, CA, 2004.
5. Practical Course Director-Neurosurgical Practice Development, Negotiation and Professional Liability: What the Neurosurgeon Needs to Know. Congress of Neurological Surgeons Annual Meeting, Boston, MA, 2005.
6. Moderator, Honored Guest Luncheon, Congress of Neurological Surgeons Annual Meeting, Boston, MA, 2005.
7. Faculty, Neurosurgical Treatment of Spinal Metastasis, The Challenges for Caring for a Patient with Spinal Metastasis. The AANS/CNS Section on Disorders of the Spine and Peripheral Nerves Annual Meeting, Orlando, FL 2006.
8. Faculty, CNS 3D Surgical Anatomy for Residents, St. Louis, MO 2006.
9. Faculty, Surgical Arthrodesis of the Cervical Spine. Congress of Neurological Surgeons Annual Meeting, Chicago, IL, 2006.
10. Practical Course Director-Neurosurgical Practice Development, Negotiation and Professional Liability: What the Neurosurgeon Needs to Know. Congress of Neurological Surgeons Annual Meeting, Chicago, IL 2006.
11. Faculty-Inpatient and Outpatient Management Dilemmas: For Nurses and Physician Assistants. Congress of Neurological Surgeons Annual Meeting, Chicago, IL 2006.
12. Faculty-Thoracic and Lumbar Fusion: Emerging Technologies. Congress of Neurological Surgeons Annual Meeting, Chicago, IL 2006.
13. Moderator-Resident/Honored Guest Luncheon. Congress of Neurological Surgeons Annual Meeting, Chicago, IL 2006.
14. Faculty-Breakfast Seminar. Guidelines for the Management of Acute Cervical Spinal Cord Injury. American Association of Neurological Surgeons Annual Meeting, 2007.
15. Moderator-Honored Guest Luncheon. Congress of Neurological Surgeons Annual Meeting. San Diego, CA 2007.

**INVITED PRESENTATIONS (continued)****National (continued)**

16. Practical Course Director-Neurosurgical Practice Development, Negotiation and Professional Liability: What the Neurosurgeon Needs to Know. Congress of Neurological Surgeons Annual Meeting, San Diego, CA 2007.
17. Moderator-Graduating Resident's Luncheon Seminar, Congress of Neurological Surgeons Annual Meeting. San Diego, CA 2007.
18. Faculty-Cervicothoracic Junction-Applied Spinal Biomechanics. Congress of Neurological Surgeons Annual Meeting, San Diego, CA 2007.
19. Faculty-Care of the Spine Trauma Patient-Advances in Spinal Cord Injury Science and Rehabilitation. AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves. Orlando, FL 2008.
20. Faculty-Management of Thoracolumbar Spine Trauma. Classification of thoracolumbar spine trauma. AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves. Orlando, FL 2008.
21. Speaker-What's New? X-Stop: Biomechanics and Patient Selection. AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves. Orlando, FL 2008.
22. Co-Moderator-Cervical Motion Preservation. AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves. Orlando, FL 2008.
23. Faculty-Decision Making and the Spine Patient. Dynamic Spine Stabilization. AANS Annual Meeting, Chicago, IL 2008.
24. Faculty-Management of Acute Spinal Cord Injury-Nonoperative Management of Spinal Cord Injury. AANS Annual Meeting, Chicago, IL 2008.
25. Moderator-Practice Evaluation, Negotiation and Liability for the Neurosurgeon. Practical Course. Congress of Neurological Surgeons Annual Meeting, Orlando, FL, 2008.
26. Moderator-Graduating Residents Course. Luncheon Seminar. Congress of Neurological Surgeons Annual Meeting, Orlando, FL 2008.
27. Moderator-Compensation Models in Neurosurgery. Congress of Neurological Surgeons Annual Meeting, Orlando, FL 2008.
28. Faculty-Fundamentals of Spinal Biomechanics. Biomechanics of the Cervicothoracic Junction. Congress of Neurological Surgeons. Orlando, FL 2008.
29. Faculty-Peripheral Nerve for Spine Surgeons. Differential Diagnosis of Lumbar Radiculopathy vs. Peripheral Nerve Pathology. Congress of Neurological Surgeons Annual Meeting. Orlando, FL 2008.
30. Faculty-Lessons Learned Upon Entering Practice. AANS Resident Socioeconomic Course. Phoenix, AZ 2008.



**INVITED PRESENTATIONS (continued)****National (continued)**

31. Spinal Cord Contusion: Early Decompression or Not? AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves. Phoenix, AZ 2009.
32. The Aging Spine: Demographics and How Old is Too Old? Surgery for the Aging Spine. AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves. Phoenix, AZ 2009.
33. The Biomechanics of the Aging Spine. Surgery for the Aging Spine. AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves. Phoenix, AZ 2009.
34. Classification of Spinal Fractures. Care for the Spine Trauma Patient. AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves. Phoenix, AZ 2009.
35. Dynamic Spine Stabilization. Decision Making and the Spine Patient for Nurses, APRNs, and PAs. AANS Annual Meeting. San Diego, CA, 2009.
36. Moderator, AANS/CNS Socioeconomic Session. AANS Annual Meeting. San Diego, CA, 2009.
37. Complications of vertebroplasty and kyphoplasty. Vertebroplasty and Kyphoplasty: Indications, Controversies, and Credentialing. Breakfast Seminar. AANS Annual Meeting. San Diego, CA 2009.
38. Time of decompression for acute spinal cord injury. Management of Acute Spinal Cord Injury. Breakfast Seminar. AANS Annual Meeting. San Diego, CA 2009.
39. Management of cervical deformity. Winter Clinics Annual Meeting, Snowmass, CO, 2010.
40. Course Director, Management of Perioperative Pain Issues. AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves, 2010.
41. Minimally invasive spine surgery: is there less pain? Management of Perioperative Pain Issues. AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves, 2010.
42. Moderator, What's new session II. AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves, 2010.
43. Vertebral column fractures. The Geriatric Spine. AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves, 2010.
44. Anterior Column Support: Indications and Device Options. Current Techniques in Spinal Deformity Surgery. Denver, CO 2010.
45. Managing surgical complications: Practical advice for getting out of trouble. Spinal Fluid Leakage. American Association of Neurological Surgeons Annual Meeting. Philadelphia, PA, 2010.
46. Faculty: Vertebroplasty and Kyphoplasty: Indications, Controversies and Credentialing. Complications and Their Avoidance. American Association of Neurological Surgeons Annual Meeting. Philadelphia, PA, 2010.

**INVITED PRESENTATIONS (continued)****National (continued)**

47. Faculty-Academy of Spinal Cord Injury Professionals, Surgical Management of Spinal Cord Injury. Las Vegas, NV 2010.
48. Faculty-Biologics Pre-meeting Course. Stem cell enhanced allografts. North American Spine Society Annual Meeting. Orlando, FL 2010.
49. Faculty-Congress of Neurological Surgeons Oral Board Preparation Course. Congress of Neurological Surgeons Annual Meeting. San Francisco, CA 2010.
50. Faculty-Operative Spine Care. Minimal Access Surgery. Congress of Neurological Surgeons Annual Meeting. San Francisco, CA 2010.
51. Faculty-Intraoperative Salvage Techniques-Getting Out of Trouble. Intraoperative monitoring. Congress of Neurological Surgeons Annual Meeting. San Francisco, CA 2010.
52. Faculty-Minimally invasive lumbar fusion. Federation of Spine Surgery Association (FOSA). American Academy of Orthopedic Surgeons Annual Meeting. San Diego, CA 2011.
53. Invited Speaker-Worst Cervical Complication: What I Learned. Winter Clinics Annual Meeting. Snowmass, CA 2011.
54. Moderator-Management of Perioperative Pain. AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves Annual Meeting. Phoenix, AZ 2011.
55. Faculty-Minimally invasive spine surgery-is there less pain?. Management of Perioperative Pain. AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves Annual Meeting. Phoenix, AZ 2011.
56. Faculty-Vertebral Column Fractures. Care of the Geriatric Spine. AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves Annual Meeting. Phoenix, AZ 2011.
57. Spondylolisthesis, when to reduce and current techniques: Indications and Device Options. Current Techniques in Spinal Deformity Surgery. Orlando, FL 2011.
58. Faculty-Congress of Neurological Surgeons Webinar-Odontoid Fractures in the Elderly. Non-operative care. 2011.
59. Gurdjian-Thomas Lecture-Cervical deformity correction. Wayne State University Department of Neurosurgery. Detroit, MI 2011.
60. Neurosurgery Grand Rounds-Neuroprotective strategies for spinal cord injury. Wayne State University Department of Neurosurgery. Detroit, MI 2011.
61. Faculty-Overview of Minimally Invasive Spine Surgery. Inpatient and Outpatient Management Dilemmas for Allied Health Care Professionals. Congress of Neurological Surgeons Annual Meeting. Washington DC 2011.

**INVITED PRESENTATIONS (continued)****National (continued)**

62. Faculty-Significant esophageal tear. My Worst Spinal Complication: What I Learned. Congress of Neurological Surgeons Annual Meeting. Washington DC 2011.
63. Faculty-Oral Boards Preparation Course. Congress of Neurological Surgeons Annual Meeting. Washington DC 2011.
64. Faculty-Intraoperative Monitoring Loss. Managing Difficult Scenarios in Spine Surgery. Congress of Neurological Surgeons Annual Meeting. Washington DC 2011.
65. Faculty-Experimental Targets for Spinal Cord Injury. Contemporary Management of Traumatic Spine and Spinal Cord Injury. Congress of Neurological Surgeons Annual Meeting. Washington DC 2011.
66. Moderator-CNS Socioeconomic oral platform and poster session. Congress of Neurological Surgeons Annual Meeting. Washington DC 2011.
67. Moderator-Impact of Conflict of Interest on Neurosurgical Practice. Congress of Neurological Surgeons Annual Meeting. Washington DC 2011.
68. Minimally invasive cervical foraminotomy: indications and video. Minimally Invasive Spine Society Annual Meeting. Las Vegas, NV 2011.
69. Stem cells for spine surgery: are they safe? North American Spine Society Annual Meeting. Chicago, IL 2011.
70. Allograft Stem Cells: The Evidence. North American Spine Society Annual Meeting. Chicago, IL 2011.
71. Minimally invasive spine surgery: The evidence. First Annual International Brain Tumor and Spine Surgery Symposium. Cleveland Clinic Florida, Weston, FL 2012.
72. Cervical deformity management. First Annual International Brain Tumor and Spine Surgery Symposium. Cleveland Clinic Florida, Weston, FL 2012.
73. Cervical osteotomy in ankylosing spondylitis. First Annual International Brain Tumor and Spine Surgery Symposium. Cleveland Clinic Florida, Weston, FL 2012.
74. Patient satisfaction: what determines patient experience. Neurosurgical spine: business and compensation. AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves Annual Meeting. Orlando, FL 2012.
75. Course Director: Management of perioperative pain, perioperative complications. AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves Annual Meeting. Orlando, FL 2012.
76. Minimally invasive spine surgery: is there less pain. Management of perioperative pain, perioperative complications. AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves Annual Meeting. Orlando, FL 2012.

**INVITED PRESENTATIONS (continued)****National (continued)**

77. Course Director: Craniovertebral junction. AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves Annual Meeting. Orlando, FL 2012.
78. Cervical trauma: Classification and Management. Management of the Neurotrauma patient. Pittsburgh, PA 2012.
79. Moderator: Are We Paying Too Much for Our Surgeries: Socioeconomic Session. American Association of Neurological Surgeons Annual Meeting. Miami, FL 2012.
80. Biology and Biomechanics of Spine Fusion. Spine Section Session. American Association of Neurological Surgeons Annual Meeting. Miami, FL 2012.
81. Stem cells and spinal disorders. Minimally Invasive Neurosurgery Society Annual Meeting. Mackinaw Island, MI 2012.
82. Moderator: Special course I: Robotics, the Future of Neurosurgery? Congress of Neurological Surgeons Annual Meeting. Chicago, IL 2012.
83. Moderator: Special course II: Functional Neuroimaging, Where do we Go From Here? Congress of Neurological Surgeons Annual Meeting. Chicago, IL 2012.
84. Significant esophageal tear. My Worst Complication. Congress of Neurological Surgeons Annual Meeting. Chicago, IL 2012.
85. Faculty: Difficult scenarios in spinal surgery. Congress of Neurological Surgeons Annual Meeting. Chicago, IL 2012.
86. Course Director: Cervical Spine Advanced Techniques. North American Spine Society Annual Meeting. Dallas, TX 2012.
87. Occipitocervical fusion. Cervical Spine Advanced Techniques. North American Spine Society Annual Meeting. Dallas, TX 2012.
88. Percutaneous fixation of flexion/distraction fractures of the thoracolumbar spine. Winter Clinics. Snowmass, CO 2013.
89. Moderator: Management of Spine Trauma in the Elderly. AANS/CNS Section on Disorders of the Spine and Peripheral Nerves Annual Meeting. Phoenix, AZ 2013.
90. Patient satisfaction: what really drives patient perception. Neurosurgical Spine: Business and Compensation. AANS/CNS Section on Disorders of the Spine and Peripheral Nerves Annual Meeting. Phoenix, AZ 2013.
91. Traumatic odontoid fractures in the elderly. Management of Spine Trauma in the Elderly. AANS/CNS Section on Disorders of the Spine and Peripheral Nerves Annual Meeting. Phoenix, AZ 2013.

**INVITED PRESENTATIONS (continued)****National (continued)**

92. MIS TLIF Complications. Advanced MIS Techniques/Managing MIS Complications. AANS/CNS Section on Disorders of the Spine and Peripheral Nerves Annual Meeting. Phoenix, AZ 2013.
93. Faculty, Lumbar Spine Research Society Webinar, Thoracolumbar trauma. 2013.
94. Course Chairman, Surgical Management of Spinal Deformity. Indianapolis, IN 2013.
95. Course Chairman, Skin to Skin Advanced Trauma Techniques. New Orleans, LA 2013.
96. MIS TLIF Minimally Invasive Spine Surgery ICL. North American Spine Society. New Orleans, LA 2013.
97. Cervicothoracic Junction. Posterior Cervical Spine ICL. North American Spine Society. New Orleans, LA 2013.
98. Course Director. Spine Trauma in the Elderly. AANS/CNS Section on Disorders of Spine and Peripheral Nerves Annual Meeting. Orlando, FL 2014.
99. Faculty. Patient Satisfaction: What Drives Perception? Neurosurgical Spine: Business and Compensation. AANS/CNS Section on Disorders of Spine and Peripheral Nerves Annual Meeting. Orlando, FL 2014.
100. Moderator. Symposium: Minimally Invasive Spine Surgery. North American Spine Society. Summer Spine Meeting. Amelia Island, FL 2014.
101. MIS Lumbar Complications. North American Spine Society. Summer Spine Meeting. Amelia Island, FL 2014.
102. MIS: Cost, Outcomes, and Complications. Technique Workshop: Minimally Invasive Spine Surgery. North American Spine Society. Summer Spine Meeting. Amelia Island, FL 2014.
103. Allograft Cells in Spine Surgery. Symposium: Biologics in Spine Care: Present Options and Future Possibilities. North American Spine Society. Summer Spine Meeting. Amelia Island, FL 2014.
104. Image Guided Navigation in Minimally Invasive Spine Surgery. Foundational Techniques in Minimally Invasive Spine Surgery Regional Meeting. Saratoga, NY 2014.
105. Moderator: Affordable Care Act Update: Successfully Navigating Unknown Territories. Congress of Neurological Surgeons Annual Meeting. Boston, MA, 2014.
106. Faculty: Neurosurgery in the Changing Health Care System. Alternative Payment Models. Congress of Neurological Surgeons Annual Meeting. Boston, MA, 2014.
107. Esophageal Injury. PC 21: My worst spinal complication: what I learned. Congress of Neurological Surgeons Annual Meeting. Boston, MA, 2014.

**INVITED PRESENTATIONS (continued)****National (continued)**

108. Organized Neurosurgery. PC 25: The advanced practice providers guide to integrative innovation and conventional wisdom. Congress of Neurological Surgeons Annual Meeting. Boston, MA, 2014.
109. Course Chairman, Advanced Trauma Techniques. San Francisco, CA, 2014.
110. Faculty-AO Value Based Spine Surgery Webinar. Value based principles of minimally invasive spine surgery compared to conventional surgery. 2014.
111. International Symposium on Long-Term Control of Metastases to the Brain and Spine. Spine Stabilization in Metastatic Spine Disease. Las Vegas, NV, 2014.
112. Course Director, Spinal Complications, Congress of Neurological Societies, Lake Tahoe, CA 2014.
113. Patient satisfaction: What really drives perception. Neurosurgical Business and Compensation. AANS/CNS Section on Disorders of the Spine and Peripheral Nerves Annual Meeting. Phoenix, AZ 2015.
114. Course Director. Spine Trauma: Case Based Controversies. AANS/CNS Section on Disorders of the Spine and Peripheral Nerves Annual Meeting. Phoenix, AZ 2015.
115. Screening for vertebral artery injuries. AANS/CNS Section on Disorders of the Spine and Peripheral Nerves Annual Meeting. Phoenix, AZ 2015.
116. Course Director. Advanced trauma and spine oncology techniques. Phoenix, AZ 2015
117. Advances in spinal cord injury. Advanced trauma and spine oncology techniques. Phoenix, AZ 2015.
118. Alternatives to S1 fixation. Alternatives to transpedicular approaches to achieving arthrodesis. American Association of Neurological Surgeons Annual Meeting. Washington DC, 2015.
119. Operative treatment of odontoid fractures. Spine management in the aging population. American Association of Neurological Surgeons Annual Meeting. Washington DC, 2015.
120. Spinal Trauma: State of the Art. Biomechanical consideration in surgical decision-making. American Association of Neurological Surgeons Annual Meeting. Washington DC, 2015.
121. Cleveland Clinic experience in IPU development. NASS Leading Change Webinar. July 2015.
122. When can cervical stenosis be treated non-operatively and how to monitor? Cervical Myelopathy: Ossification of Posterior Longitudinal Ligament. NASS Spine Across the Sea. Hawaii 2015.
123. Role of decompression alone: Is there any advantage of MIS over open surgery? Minimally Invasive Spine Surgery: Degenerative Spondylolisthesis Debate. NASS Spine Across the Sea. Hawaii 2015.
124. Course Co-Director: Cervical Spine Techniques. North American Spine Society Annual Meeting. Chicago, IL 2015.

**INVITED PRESENTATIONS (continued)****National (continued)**

125. Faculty-Minimally Invasive Spine Surgery. Innovations in Intraoperative Imaging and Navigation. North American Spine Society Annual Meeting. Chicago, IL 2015.
126. Faculty-My Worst Complication. Esophageal Injury. Congress of Neurologic Surgeons Annual Meeting. New Orleans, LA. 2015
127. Faculty-Physician extenders and organized neurosurgery. Congress of Neurologic Surgeons Annual Meeting. New Orleans, LA. 2015
128. Course Director: Crossing the Chasm, Spine Complications. Park City, UT 2016.
129. Council of State Neurosurgical Societies Update. Oklahoma State Neurosurgical Society Meeting. Oklahoma City, OK 2016.
130. Value in Spine Surgery. Oklahoma State Neurosurgical Society Meeting. Oklahoma City, OK 2016.
131. Course Director: BNS: Spine Trauma Challenges and Solutions. AANS/CNS Section on Disorders of the Spine and Peripheral Nerves Annual Meeting. Orlando, FL, 2016.
132. How to choose the appropriate treatment and approach to type II odontoid fractures in elderly patients. AANS/CNS Section on Disorders of the Spine and Peripheral Nerves Annual Meeting. Orlando, FL, 2016.
133. Moderator: Scientific Session I: How the Masters Avoid Disasters. AANS/CNS Section on Disorders of the Spine and Peripheral Nerves Annual Meeting. Orlando, FL, 2016.
134. Discussant for Symptomatic adjacent segment degeneration after anterior cervical discectomy and fusion: a long-term MRI analysis. Mazur MD et al. AANS/CNS Section on Disorders of the Spine and Peripheral Nerves Annual Meeting. Orlando, FL, 2016.
135. CNS Oral Board Review Course. Spine. San Diego, CA 2016.
136. Esophageal tear. My Worst Spine Complication: Case Based Examples and What I learned. Congress of Neurologic Surgeons Annual Meeting. San Diego, CA 2016.
137. Improve Quality, Reduce Cost, and Increase Revenue. Congress of Neurologic Surgeons Annual Meeting. San Diego, CAN 2016.
138. Course Director: Spine Complications. Park City, UT 2017.
139. How to advocate for new technology at your hospital. Hands on Spine Navigation. AANS/CNS Section on Disorders of the Spine and Peripheral Nerves. Las Vegas, NV 2017.
140. What's new session: Endoscopic TLIF. Globus Spine. AANS/CNS Section on Disorders of the Spine and Peripheral Nerves. Las Vegas, NV 2017.
141. Young Leadership Course. American Association of Neurological Surgeons Annual Meeting. Los Angeles, CA 2017.

**INVITED PRESENTATIONS (continued)****National (continued)**

142. Management of odontoid fractures. You are never too old for surgery: spine management in an aging population. American Association of Neurological Surgeons Annual Meeting. Los Angeles, CA 2017.
143. Alternatives to S1 fixation. Alternatives to transpedicular approaches to achieving arthrodesis. American Association of Neurological Surgeons Annual Meeting. Los Angeles, CA 2017.
144. Surgical updates for spine surgery. American Society of Neurophysiological Monitoring. Cleveland, OH 2017.
145. Visiting Professorship “Dissecting the Patient Experience of Lumbar Spine Surgery.” Stanford University Medical Center, Stanford, CA, 2017.
146. Advocating for a spine robot in your hospital. Luncheon Seminar: The Future is Now Spinal Robotics. Congress of Neurologic Surgeons Annual Meeting. Boston, MA, 2017.
147. Moderator: Case Based Discussion: Revision Spine Surgery. Congress of Neurological Surgeons Annual Meeting. Boston, MA 2017.
148. Moderator: Spine tumors and metastases. 8<sup>th</sup> Annual on Brain and Spine Metastases. Las Vegas, NV 2017.
149. Vertebral augmentation and quality of life. 8<sup>th</sup> Annual on Brain and Spine Metastases. Las Vegas, NV 2017.
150. Patient selection: Surgery for metastatic spine tumors. 8<sup>th</sup> Annual on Brain and Spine Metastases. Las Vegas, NV 2017.
151. Spine Biomechanics. Chicago Neurosurgery Review. Chicago, IL 2018.
152. Spine Tumors. Chicago Neurosurgery Review. Chicago, IL 2018.
153. You are Never Too Old for Spine Surgery: Treatment of Odontoid fractures: American Association of Neurological Surgeons Annual Meeting. New Orleans, LA 2018.
154. Endoscopic spine surgery. Endoscopic spine fusion and bridge therapies. American Association of Neurological Surgeons Annual Meeting. New Orleans, LA 2018.
155. Course Director: Emerging minimally invasive spine techniques. Audubon, PA. 2018.
156. Intradiscal lumbar interbody fusion (Intralif) technique. Emerging minimally invasive spine techniques. Audubon, PA. 2018.
157. Interbody grafting and sagittal balance. Advanced Minimally Invasive Surgery. Las Vegas, NV 2018.
158. Moderator: Minimally invasive spine surgery. North American Spine Society National Meeting. Los Angeles, CA, 2018.
159. Moderator: How to Start and ERAS Program at Your Hospital. . North American Spine Society



- National Meeting. Los Angeles, CA, 2018.
160. Blood Management. How to Start and ERAS Program at Your Hospital. . North American Spine Society National Meeting. Los Angeles, CA, 2018.
  161. Advocating for a robot in your hospital. Robotics and Spine Surgery. Congress of Neurological Surgeons Annual Meeting, Houston, Texas, 2018.
  162. Moderator: Council of State Neurosurgical Societies. Congress of Neurological Surgeons Annual Meeting, Houston, Texas, 2018.
  163. Faculty: Getting a job. Stryker Fellows and Residents Course. Miami, FL. 2019
  164. Faculty: How to advocate for new technology at your hospital. Disorders of the Spine and Peripheral Nerves Annual Meeting. Miami, FL 2019.
  165. Faculty: 3D Porous Titanium Cages are Best in Class. . Disorders of the Spine and Peripheral Nerves Annual Meeting. Miami, FL 2019.
  166. Faculty: Spinal Biomechanics. Chicago Review Course. Chicago, IL. 2019.
  167. Faculty: Spinal Oncology: Chicago Review Course. Chicago, IL, 2019.
  168. Patient satisfaction in lumbar spine surgery. Winter Clinics. Snowmass, CO, 2019.
  169. Course Co-Director-Midwest Spine Symposium. Pittsburgh, PA, 2019.
  170. Decompress and Screws 2 above and 2 down: The Gold Standard. Midwest Spine Symposium. Pittsburgh, PA 2019.
  171. Moderator: 2 Rooms/Overlapping Surgery. Midwest Spine Symposium. Pittsburgh, PA 2019.
  172. A Facet Cyst Denotes Instability: Fuse it Now, or You'll Have to Later. Midwest Spine Symposium Pittsburgh, PA 2019.
  173. Moderator: Endoscopic Spine Surgery: New Techniques and Outcomes. North American Spine Society Annual Meeting. Chicago, IL 2019.
  174. Moderator: Ambulatory Surgical Centers: Is This the Next Big Thing? North American Spine Society Annual Meeting. Chicago, IL 2019.
  175. Hospital Based Practice: My Take on It. In Ambulatory Surgical Centers: Is this the Next Big Thing? North American Spine Society Annual Meeting. Chicago, IL 2019.
  176. Endoscopic Fusion in Section on Minimally Invasive Procedures Advances and Case Scenarios. North American Spine Society Annual Meeting. Chicago, IL 2019.
  177. Moderator: Abstract Presentations: Thoracolumbar Spine IV. North American Spine Society Annual Meeting. Chicago, IL 2019.
  178. Moderator: Best Papers. North American Spine Society Annual Meeting. Chicago, IL 2019.
  179. Ask The Experts: Endoscopic Spine Surgery. North American Spine Society Annual Meeting. Chicago, IL 2019.
  180. Moderator: Augmented and Virtual Reality and Artificial Intelligence: Are We There Yet? North American Spine Society Annual Meeting. Chicago, IL 2019.

181. Moderator: Surgical Technique Cadaver Demonstration. Cervicothoracic Osteotomy for Cervical Kyphosis. Dan Riew as Faculty. North American Spine Society Annual Meeting. Chicago, IL 2019.
182. 3D Surface Printed Technology: Is there something to it? Society of Minimally Invasive Spine Surgery. Las Vegas, NV 2019.
183. Esophageal Injury: My Worst Complication. Lessons Learned. Congress of Neurological Surgeons Annual Meeting. San Francisco, CA, 2019.
184. Moderator: Spine Section Update. Congress of Neurological Surgeons Annual Meeting. San Francisco, CA, 2019.

**INVITED PRESENTATIONS (continued)****International**

1. Faculty, Annual Invited Lectures Hospital Herrera Lierandi. Universidad de San Carlos De Guatemala. Spine Surgery. Guatemala City, Guatemala, 2008.
2. Percutaneous Lumbar Facet Fusion. International Meeting of Neurosurgery and Spine. Queraterro, Mexico, 2008.
3. Minimally Invasive Thoracic Discectomy. International Meeting of Neurosurgery and Spine Queraterro, Mexico, 2008.
4. Thoracic Pedicle Screw Placement. International Meeting of Neurosurgery and Spine Queraterro Mexico, 2008.
5. Lumbar Fusion and Fixation: State of the Art. International Conference on Spine Surgery and Rehabilitation. Milan, Italy, 2008.
6. Faculty-Role of Platelet Gels, DBM, Bone Marrow Aspirate. NASS Biologics Pre-meeting Course. Toronto, CA, 2008.
7. Lumbar Arthroplasty. 3<sup>rd</sup> International Congress. Selected Topics in Neurosurgery. Los Cabos, Mexico, 2008.
8. Multi-level Anterior Cervical Discectomy and Fusion for Myelopathy. 3<sup>rd</sup> International Congress. Selected Topics in Neurosurgery. Los Cabos, Mexico, 2008.
9. Surgical Treatment of Spinal Metastasis. 3<sup>rd</sup> International Congress. Selected Topics in Neurosurgery. Los Cabos, Mexico, 2008.
10. Minimally Invasive Cervical and Lumbar Decompression. 2<sup>nd</sup> American-Kuwait Neurosurgical Meeting. Kuwait, 2008.
11. Minimally Invasive Thoracic Discectomy. 2<sup>nd</sup> American-Kuwait Neurosurgical Meeting. Kuwait, 2008.
12. Experimental neuroprotection for spinal cord injury. 10<sup>th</sup> Annual Congress of Surgery of the Spine. Sao Paulo, Brazil, 2010.
13. Management of cervical myelopathy. 10<sup>th</sup> Annual Congress of Surgery of the Spine. Sao Paulo, Brazil, 2010.
14. Management of metastatic tumors of the spine. 10<sup>th</sup> Annual Congress of Surgery of the Spine. Sao Paulo, Brazil, 2010.
15. Minimally invasive lumbar surgery. Clinica Alemana Facultad de Medicina, Chile Spine Review, Santiago, Chile, 2010.
16. Dorsal cervical fixation. Clinica Alemana Facultad de Medicina, Chile Spine Review, Santiago, Chile, 2010.

**INVITED PRESENTATIONS (continued)****International (continued)**

17. Moderator: Acute Spinal Cord Injury Session. World Spine 6. Montego Bay, Jamaica, 2014.
18. Spinal cord injury: Evidence for early Surgery. World Spine 6. Montego Bay, Jamaica, 2014.
19. Minimally invasive surgery: does the evidence support less postoperative pain. World Spine 6. Montego Bay, Jamaica, 2014.
20. Biomechanics 201: Instrument and construct design. Cleveland Spine Review. Montego Bay, Jamaica, 2014.
21. Iatrogenic deformity: prevention. Cleveland Spine Review. Montego Bay, Jamaica, 2014.
22. MIS in deformity and trauma. Cleveland Spine Review. Montego Bay, Jamaica, 2014.
23. MIS in trauma. 3<sup>rd</sup> Asian Congress of Minimally Invasive Spine Surgery and Techniques. Antalya, Turkey, 2014.
24. Is MAS more cost effective than conventional open surgery? 3<sup>rd</sup> Asian Congress of Minimally Invasive Spine Surgery and Techniques. Antalya, Turkey, 2014.
25. Latest on the treatment of cervical spondylotic myelopathy. World Spine Egyptian Updates. Cairo, Egypt, 2016.
26. Debate ACDF for radiculopathy. World Spine Egyptian Updates. Cairo, Egypt, 2016.
27. MIS decompression and fusion techniques. World Spine Egyptian Updates. Cairo, Egypt, 2016.
28. MIS techniques in TL spine: Is it worth the hustle? World Spine Egyptian Updates. Cairo, Egypt, 2016.
29. New Pharmacologic Advancements in Spinal Cord Injury. Presentation at Indian Spinal Injury Center. New Delhi, India, 2016.
30. Pathology and approaches of the occipito-cervical junction. World Spine Pre-Meeting Cadaver Course. New Delhi, India, 2016.
31. Lumbosacral fixation techniques. World Spine Pre-Meeting Cadaver Course. New Delhi, India, 2016.
32. Applied anatomy for MIS surgery. World Spine Pre-Meeting Cadaver Course. New Delhi, India, 2016.
33. New therapeutic targets in spinal cord injury. World Spine 7. New Delhi, India, 2016.
34. Moderator: Craniovertebral Junction. World Spine 7. New Delhi, India, 2016.
35. Moderator: Trauma. World Spine 7. New Delhi, India, 2016.
36. SCI therapeutic targets. Continental Association of African Neurosurgical Societies. Capetown,

South African, 2016.

37. Evolution in the management of spine tumors. Continental Association of African Neurosurgical Societies. Capetown, South African, 2016.
38. Coventry Spine Masters: Contemporary management of spinal cord injury. Coventry, UK 2017.
39. Coventry Spine Masters: Neurotrauma assessment. Coventry, UK 2017.
40. Coventry Spine Masters: Intraoperative fracture reduction technique. Coventry, UK 2017.
41. Coventry Spine Masters: SCI therapeutic targets. Coventry, UK 2017.

**INVITED PRESENTATIONS (continued)****International (continued)**

42. Early surgery vs. late surgery for spinal cord injury. World Spine 7. New Delhi, India, 2016.
43. Moderator: Degenerative Lumbar Spine. World Spine 7. New Delhi, India, 2016.
44. Does resection of bilateral facets improve bone alignment after lumbar spin surgery? World Spine 7. New Delhi, India, 2016.
45. Evolution of spine tumor surgery: from no to separation surgery. Continental Association of African Neurosurgical Societies Annual Meeting. Cape Town, South Africa, 2016.
46. Role of biopsy in spine metastases. Continental Association of African Neurosurgical Societies Annual Meeting. Cape Town, South Africa, 2016.
47. Spinal cord regeneration: where are we now. Spine Masters 2017. Coventry UK 2017.
48. Neurotrauma evaluation. Spine Masters 2017. Coventry UK 2017.
49. Sequela of spine trauma. Spine Masters 2017. Coventry UK 2017.
50. MIS for spine tumors. Advanced Spine Surgery updates. Cairo, Egypt, 2018
51. Endoscopic spine surgery. Advanced Spine Surgery updates. Cairo, Egypt, 2018.
52. Robotic spine surgery. Advanced Spine Surgery updates. Cairo, Egypt, 2018.
53. Dissecting patient experience after spine surgery. World Spine 8. Porto, Portugal, 2018.
54. Advanced concepts: Navigation and robotics. World Spine 8. Porto, Portugal, 2018.
55. Multidisciplinary spine tumor management. World Spine 8. Porto, Portugal, 2018.
56. Midline lumbar decompression and interbody fusion (MIDLIF). World Spine 8 pre-meeting cadaver course. Lisbon, Portugal 2018

**PRESENTATIONS**

1. **Steinmetz MP**, Williams CH, Hardaway RM. Cortisol and TNF-alpha during septic shock in swine. *Experimental Biology* 98. San Francisco, CA 1998. (Poster Presentation)
2. **Steinmetz MP**, Barnett GH, Kim BS, Chidel M, Suh JH. Metastatic seeding of the stereotactic biopsy tract in Glioblastoma Multiforme: case report and review of the literature. Ohio State Neurosurgical Society, Cleveland, Ohio, 2000. (Oral Presentation)
3. Elbabaa DK, Fukuhara T, **Steinmetz MP**, Luciano MG. Endoscopic third ventriculostomy for obstructive hydrocephalus in the pediatric population: evaluation of outcome. Society for Research into Hydrocephalus and Spina Bifida. Uppsala, Sweden. 2001; International Hydrocephalus Workshop, Kos, Greece, 2001. (Oral Presentation)
4. **Steinmetz MP**, Lechner RM, Verrees M, Anderson JS. Management of atlanto-occipital dislocation in children. Congress of Neurologic Surgeons Annual Meeting, San Diego, CA, 2001. (Poster Presentation)
5. **Steinmetz MP**, Lechner RM, Verrees M, Anderson JS. Recent experience in the management of atlanto-occipital dislocation in children. AANS/CNS Section on Pediatric Neurosurgery, New York, New York, 2001. (Poster Presentation)
6. **Steinmetz MP**, Warbel A, Whitfield M, Bingaman WE. Preliminary experience with the DOC dynamic cervical implant for cervical spondylosis with or without myelopathy: A review of 56 cases. AANS/CNS Section on Disorders of the Spine and Peripheral Nerves Annual Meeting, Orlando, Florida, 2002. (Poster Presentation)
7. **Steinmetz MP**, Kager C, Benzel EC. Ventral correction of post-surgical cervical kyphosis. Ohio State Neurosurgical Society Meeting, Canton, Ohio, 2002. (Oral Presentation)
8. **Steinmetz MP**, Kager C, Benzel EC. Ventral correction of post-surgical cervical kyphosis. AANS/CNS Section on Disorders of the Spine and Peripheral Nerves Annual Meeting, Orlando, Florida, 2002. (Poster Presentation)
9. McCormick WE, Warbel A, **Steinmetz MP**, Bingaman WE. Posterior lumbar interbody fusion with carbon fiber cages. AANS/CNS Section on Disorders of the Spine and Peripheral Nerves Annual Meeting, Orlando, Florida, 2002. (Posterior Presentation)
10. **Steinmetz MP**, McCormick WE, Kalfas I. Combined anterior/posterior correction of complex cervical kyphosis: recent experience, indications, and technique. Congress of Neurological Surgeons Annual Meeting, Philadelphia, PA, 2002. (Poster Presentation)
11. Grimpe B, **Steinmetz MP**, Silver J. The role of the GAG chain initiating xylosyltransferase-1 during proteoglycan synthesis in reactive astrocytes and spinal cord injury. Society for Neurosciences Annual Meeting, Orlando, FL, 2002. (Poster Presentation)
12. Rasmussen PA, Mayberg MR, Kapurai M, Cavaglia M, Albensi B, **Steinmetz MP**, Janigro D. Minimally invasive mechanical evacuation of ICH in a porcine model using a rheolytic catheter. AANS/CNS Cerebrovascular Section Annual Meeting, Dallas, TX, 2002. (Poster Presentation).

**PRESENTATIONS (continued)**

13. Rasmussen PA, Mayberg MR, Kapurai M, Cavaglia M, Albeni B, **Steinmetz MP**, Janigro D. Differential sensitivity of the BBB after intracerebral hemorrhage and ischemic stroke. AANS/CNS Cerebrovascular Section Annual Meeting, Dallas, TX, 2002. (Oral Presentation)
14. **Steinmetz MP**, Rasmussen P, Benzel EC, Mayberg M. Functional outcome following microsurgical obliteration of Type I spinal AVMs: a seven year single institution experience. AANS/CNS Section on Disorders of the Spine and Peripheral Nerves Annual Meeting. Tampa, Florida, 2003. (Oral Presentation)
15. **Steinmetz MP**, Tom V, Miller J, Horn K, Silver J. A novel strategy to modify extrinsic and intrinsic barriers to axon regeneration. Congress of Neurologic Surgeons Annual Meeting, Denver, CO, 2003. (Poster Presentation)
16. **Steinmetz MP**, Tom V, Miller J, Horn K, Grimpe B, Silver J. A novel combinatorial strategy which dramatically influences axon regeneration across a model of the glial scar in vitro. Society for Neurosciences Annual Meeting, New Orleans, LA, 2003. (Oral Presentation)
17. Deogaonkar A, **Steinmetz MP**, DeGeorgia MA. Changes in brain tissue CO<sub>2</sub> and pH precede changes in oxygen tension during cardiac arrest. Society of Critical Care Medicine, 33<sup>rd</sup> Critical Care Congress, 2004. (Poster Presentation)
18. **Steinmetz MP**, Tom V, Miller J, Horn K, Silver J. Axonal regeneration across the glial scar is promoted by intrinsically stimulating sensory neurons with a chronic inflammation combined with chondroitinase ABC delivery. AANS/CNS Section on Disorders of the Spine and Peripheral Nerves Annual Meeting. San Diego, CA, 2004. (Oral Presentation)
19. Miller JH, Roth JC, **Steinmetz MP**, Gerson SL, Silver J. Immature astrocytes and chondroitinase promote regeneration past a lesion in the CNS. Society for Neuroscience Annual meeting, San Diego, CA, 2004. (Poster Presentation)
20. **Steinmetz MP**, Horn KP, VJ Tom, Miller JH, Nair D, Dollar C, Silver DJ, Silver J. Functional regeneration of injured sensory axons through the dorsal root entry zone in the mammalian spinal cord. Society for Neuroscience Annual meeting, San Diego, CA, 2004. (Poster Presentation)
21. Horn KP, **Steinmetz MP**, Tom VJ, Miller JH, Silver J. Soluble macrophage-derived factors digest proteoglycan and enhance neurite outgrowth in an in vitro model of the glial scar. Society for Neuroscience Annual meeting, San Diego, CA, 2004. (Poster Presentataion)
22. **Steinmetz MP**, Luders JC, Mayberg MR. Awake minimally invasive craniotomy for the microsurgical obliteration of mycotic aneurysms. Congress of Neurological Surgeons Meeting, San Francisco, CA, 2004. (Poster Presentation)
23. **Steinmetz MP**, Miller JH, Warbel A, Krishnaney AA, Benzel EC. Regional instability following surgery at the cervicothoracic junction. AANS/CNS Section on Disorders of the Spine and Peripheral Nerves Annual Meeting, Phoenix, AZ, 2005. (Oral Presentation)
24. Yonkof AL, Horn KP, Miller JH, **Steinmetz MP**, Silver J. Serotonergic by not callosal axonss sprout into the extracellular matrix of the scar region in a thermocoagulatory model of focal ischemic stroke. Society for Neuroscience Annual meeting, Washington, DC, 2005. (Poster Presentation)



**PRESENTATIONS (continued)**

25. **Steinmetz MP**, Horn KP, Miller JH, Nair D, Silver DJ, Silver J. Prelesion but not postlesion inflammation plus proteoglycan degradation results in functional regeneration. Congress of Neurological Surgeons Annual Meeting, Boston, MA 2005. (Oral Presentation)
26. **Steinmetz, MP**, Trost G, Resnick DK. Structural allograft and anterior plating for the management of thoracolumbar burst fractures: clinical and radiographic outcomes. AANS/CNS Section on Disorders of the Spine and Peripheral Nerves Annual Meeting. Orlando, FL, 2006. (poster presentation)
27. Anderson PA, Resnick DK, **Steinmetz MP**, Traynelis VC. Results of disc arthroplasty compared to arthrodesis in workers compensation patient. Spine Arthroplasty Society Meeting. 2006. (Oral presentation by Anderson PA)
28. **Steinmetz MP**, Krishnaney AA, Bingaman WE. Does on-time resident arrival have an impact on the start time of epilepsy surgery? Congress of Neurological Surgeons Annual Meeting, Chicago, IL 2006. (Select oral poster presentation)
29. **Steinmetz MP**, Resnick DK, Traynelis Vincent, Patel R, Anderson PA. Cervical arthroplasty vs. fusion in a workman's compensation population. North American Spine Society Annual Meeting, Seattle WA, 2006. (Poster Presentation)
30. **Krishnaney AA**, Moskowitz SI, Steinmetz MP, Benzel EC. O-C2 fusion with C2 translaminar fixation: an alternative procedure for the elderly. Congress of Neurological Surgeons Annual Meeting, Chicago, IL 2006. (Poster presentation)
31. **Steinmetz, MP**, Rajpal S, Cheema A, Gerovac T, Horn K, Resnick DK. The effect of acute rolipram administration of functional recovery of rats following spinal cord injury. AANS/CNS Section on Disorders of the Spine and Peripheral Nerves Annual Meeting. Phoenix, AZ 2007. (Oral poster)
32. **Steinmetz MP**, Rajpal S, Minarapuri G, Gerovac T, Resnick DK. The effect of rolipram of thermal hyperalgesia following contusive spinal cord injury in rats. AANS/CNS Section on Disorders of the Spine and Peripheral Nerves Annual Meeting. Phoenix, AZ 2007. (Oral presentation)
33. Rajpal S, **Steinmetz MP**, Cook TD, Resnick DK. Predictors of pseudoarthrosis following single level ACDF. AANS/CNS Section on Disorders of the Spine and Peripheral Nerves Annual Meeting. Phoenix, AZ 2007. (Poster presentation)
34. **Steinmetz MP**. Advances in spinal cord injury science and rehabilitation. Congress of Neurological Surgeons Annual Meeting. San Diego, CA 2007. (Oral Presentation)
35. **Steinmetz MP**. Complications of minimally invasive TLIF. SINCOL Simposio Internacioanl De Coluna. Rio de Janeiro, Brazil, 2007. (Oral Presentation)
36. **Steinmetz MP**. Minimally invasive TLIF with unilateral pedicle screws. SINCOL Simposio Internacioanl De Coluna. Rio de Janeiro, Brazil, 2007. (Oral Presentation)
37. **Steinmetz MP**, Patel R, Kobayashi H, Anderson PA. Differences in the biomechanical properties of three modern interbody grafts. Congress of Neurological Surgeons Annual Meeting. San Diego, CA 2007. (Poster Presentation)

**PRESENTATIONS (continued)**

38. Clark M, Horn K, Silver J, **Steinmetz MP**. Elucidating the zymosan effect. Society for Neurosciences Annual Meeting. San Diego, CA 2007. (Poster presentation).
39. **Steinmetz MP**. Timing of surgery for spinal cord injury: Early vs. Late. Winter Clinics, Snowmass, CO 2008. (Oral Presentation)
40. Ugokwe K, Chen J, **Steinmetz MP**. Minimally invasive approach for the treatment of Bertolotti's syndrome. AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves. Orlando, FL 2008. (Poster Presentation)
41. Ugokwe K, Mrot T, Krishnaney A, **Steinmetz MP**. Are routine radiographs necessary following anterior cervical discectomy and fusion? AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves. Orlando, FL 2008. (Poster Presentation)
42. Hiremath G, McClain R, Moore T, **Steinmetz MP**. X-stop: Time to improvement as an indicator of failure. CNS Annual Meeting. Orlando, FL 2008. (Select Abstract)
43. **Steinmetz MP**, Mroz T, Krishnaney A, Modic M. Conventional vs. digital radiographs for intraoperative cervical spine level localization: a prospective time and cost analysis. CNS Annual Meeting. Orlando, FL 2008. (Open Paper)
44. **Steinmetz, MP**, Mroz T, Krishnaney A, Modic M. Standard vs. Digital Radiographs for Intraoperative Cervical Spine Level Localization: A Prospective Time and Cost Analysis. Cervical Spine Research Society Annual Meeting. Austin, TX 2008. (Poster Presentation)
45. **Steinmetz, MP**, Mroz T, Benzel EC, Lieberman IH, Klienberg EO, Wang J. Cervical arthorplasty: a critical review of the evidence. Cervical Spine Research Society Annual Meeting. Austin, TX 2008. (Open Paper)
46. Iannotti C, Gwin D, **Steinmetz MP**. The incidence of flexible cervical kyphosis. Cervical Spine Research Society Annual Meeting. Austin, TX 2008. (Poster Presentation)
47. **Steinmetz MP**, Alilain W, Horn K, Jiang HH, Fletter P, Demasser M, Herlitze S, Silver J. Light induced alteration of external urethral function through the activation of channel rhodopsin2. Society for Neuroscience Annual Meeting. Washington DC, 2008 (Poster Presentation)
48. **Steinmetz, MP**. Minimally invasive TLIF with unilateral pedicle screws and contralateral facet screw: cost analysis. Winter Clinics, Snowmass, CO 2009. (Oral Presentation)
49. **Steinmetz, MP**, Vallorenz E, Clark M. OP-1 promotes neuroprotection and plasticity in an *in vitro* model of the glial scar. AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves. Phoenix, AZ 2009. (Oral Presentation)
50. **Steinmetz MP**, Iannotti C, Gwinn D. Reliability of digital cervical alignment measurements in patients with cervical myelopathy. AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves. Phoenix, AZ 2009. (Oral Presentation)
51. **Steinmetz MP**, Iannotti C, Gwinn D. The incidence of flexible cervical kyphosis. AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves. Phoenix, AZ 2009. (Poster Presentation)

**PRESENTATIONS (continued)**

52. **Steinmetz, MP**, Iannotti CA, Gwinn D, Benzel EC. Reliability of digital cervical alignment measurements in patients with cervical myelopathy. AANS Annual Meeting. San Diego, CA 2009. (Oral Presentation)
53. Iannotti, CA, Megan C, Horn K, van Rooijen N, Nair D, Silver J, **Steinmetz MP**. Immunomodulation using peripheral macrophage depletion and cAMP elevation promotes neuroprotection and improves locomotor recovery after contusive SCI. CNS Meeting, New Orleans, LA 2010. (Oral Presentation).  
**Synthese Award for Resident Research in Spinal Cord and Column Injury.**
54. Hoh D, Iannotti CA, Jiang HH, Harel R, Clark M, Shin JH, van Rooijen N, Damsaer M, **Steinmetz MP**. Treatment with combined immunomodulatory therapy results in early bladder recovery after experimental spinal cord injury. AANS/CNS Section on Disorders of the Spine and Peripheral Nerves. Orlando, FL 2010. (oral presentation)
55. Shin JH, Refai D, Awad B, Hoh DJ, Mroz TE, **Steinmetz MP**. Bilateral pedicle screw fixation vs. unilateral pedicle and contralateral facet screws for MIS TLIF. Clinical outcomes and cost analysis. Cleveland Clinic Neurological Institute Research Day. Cleveland, OH 2010. AANS/CNS Section on Disorders of the Spine and Peripheral Nerves. Orlando, FL 2010. (poster presentation)
56. Hoh DJ, Shin J, Mroz TE, **Steinmetz MP**. Radiographic CT evidence of nonunion after lumbar interbody fusion does not reliably predict long-term hardware failure or reoperation rates. Congress of Neurological Surgeons Annual Meeting. San Francisco, CA 2010. (poster presentation)
57. Hoh DJ, Shin JH, Clark M, Iannotti CA, Harel R, van Rooijen N, Jiang HH, Damsaer M, **Steinmetz MP**. A combined neuroprotective immune-modulatory therapy mitigates early bladder dysfunction after experimental spinal cord injury. AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves Annual Meeting. Phoenix, AZ 2011. (oral presentation)
58. Rajpal S, Hwang R, Mroz T, **Steinmetz MP**. Comparing vertebral body reconstruction implants for the treatment of thoracic and lumbar metastatic spinal tumors. AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves Annual Meeting. Phoenix, AZ 2011. (digital poster)
59. **Steinmetz MP**. Interspinous devices: an update. Minimally Invasive Neurosurgical Society Annual Meeting. Mackinaw Island, MI, 2011. (oral presentation)
60. Matheus V, Iannotti CA, Clark M, Grosso M, **Steinmetz MP**. Effects of a combined immunomodulatory therapy and chondroitinase after spinal cord hemisection injury. Congress of Neurological Surgeons Annual Meeting. Washington DC 2011. (oral presentation)
61. Grosso M, Hwang R, Mroz T, Krishnaney AA, Benzel EC, **Steinmetz MP**. Perioperative and long-term outcomes following surgery for cervical spine deformity. Congress of Neurological Surgeons Annual Meeting. Washington DC 2011. (oral poster presentation)
62. Pilitsis JG, Maxxola CA, Beverly S, Asadi-Moghaddam K, Colen CB, Ashley WW, **Steinmetz MP**. Current exposure to neurosurgery and neurosurgical concepts in medical school curriculums. Congress of Neurological Surgeons Annual Meeting. Washington DC 2011. (oral poster presentation)

**PRESENTATIONS (continued)**

63. Lubelski D, Abdullah KG, **Steinmetz MP**, Alvin MD, Nowacki AS, Chakka S, Benzel EC, Mroz TE. Complications with the use of BMP-2 in thoracolumbar and lumbar spine fusions: a nine-year institutional analysis. AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves Annual Meeting. Orlando, FL 2012. (oral presentation)
64. **Steinmetz MP (Discussant)**. Coric D, Pettine K, Boltes M. Prospective study of disc repair with NuQu injectable allogeneic chondrocytes. AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves Annual Meeting. Orlando, FL 2012.
65. Moore TA, **Steinmetz MP**, Vallier H. Early stabilization of thoracolumbar injuries in polytraumatized patients. AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves Annual Meeting. Orlando, FL 2012. (poster presentation)
66. Lubelski D, Abdullah KG, Alvin MD, **Steinmetz MP**, Benzel EC, Mroz TE. Complications following use of rhBMP-2 in anterior lumbar interbody fusion: an institutional cohort controlled study. AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves Annual Meeting. Orlando, FL 2012. (oral presentation)
67. **Steinmetz MP**, Lubelski D, Moore TA. Odontoid fractures. Effect of the Second Fall. Cervical Spine Research Society Annual Meeting. Chicago, IL. 2013. (oral presentation)
68. Awad BI, Carmody M, Anderson JA, Moore T, Mroz T, **Steinmetz MP**. Cervical Pedicle Fractures: Surgical vs. Conservative Treatment. AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves Annual Meeting. Phoenix, AZ 2013. (oral presentation)
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81. Discussant: Elder et al. Comparing the efficacy of adipost-derived versus bone marrow derived stem cells in combination with a clinical grade bone graft substitute in a rat model of spinal fusion. AANS/CNS Section on Disorders of the Spine and Peripheral Nerves. Las Vegas, NV 2017.
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84. Levin JM, Winkelman R, Smith GA, Mroz TE, **Steinmetz MP**. The association between patient satisfaction and clinical outcomes in spine surgery. AANS/CNS Section on Disorders of the Spine and Peripheral Nerves. Las Vegas, NV 2017.
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