

# Curriculum Vitae

## John C. Liu, MD

### Personal Information

Office Address: Keck Medical Center of USC  
Department of Neurological Surgery  
1520 San Pablo Street, Suite 3800  
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Keck Hospital of USC  
1500 San Pablo Street  
Los Angeles, CA 90033

LAC+USC Medical Center  
1200 N. State Street  
Los Angeles, CA 90033

Date of Birth: September 8, 1962

Place of Birth: Taiwan, China

Citizenship: USA

Marital Status: Married

Children: Jessica, Alex, Ryan, William

### Current Position

02/2013 – Current Professor of Neurosurgery  
Keck School of Medicine  
Co-Director, USC Spine Center  
Los Angeles, CA

### Education

09/1985 BS, Biochemistry  
University of California  
Los Angeles, CA

09/1985 – 06/1998 School of Pharmacy

University of California  
San Francisco, CA

09/1998 – 06/1990 School of Medicine  
University of Pittsburgh  
Pittsburgh, CA

09/1990 – 06/1992 Doctor of Medicine  
University of California School of Medicine  
Los Angeles, CA

### **Graduate Medical Education**

07/1992 -06/1993 Surgical Internship  
Department of Surgery  
Northwestern University Feinberg School of Medicine  
Chicago, IL

07/1993 – 06/1998 Residency  
Department of Neurological Surgery  
Northwestern University Feinberg School of Medicine  
Chicago, IL

07/1998 – 12/1998 Fellowship, Complex Spine Surgery  
Minimally Invasive Surgery  
Department of Neurological Surgery  
Northwestern University Feinberg School of Medicine  
Chicago, IL

### **Board Certification and Medical Licensure**

#### **Certification**

06/1993 Diplomat – National Board of Medical Examiners  
06/1997 Neurological Surgery National Boards – Part 1  
06/2003 Board Certified – American Board of Neurological Surgeons  
12/2013 Board Certified – American Board of Neurological Surgeons

#### **Medical Licensure**

State of Illinois, Department of Professional Regulation  
State of Illinois, Controlled Substance License

#### **Military Service**

Commissioned Officer – United State Army Reserves  
Rank: Captain  
Promotion to Rank of Major  
Promotion to Lieutenant Colonel

**Military Awards/Medal/Service**

Army Reserve Component Achievement Medal  
Army Service Ribbon  
National Defense Service Medal  
Global War on Terrorism Service Medal – 2004  
Operation Noble Eagle – 2004  
Brooke Army Medical Center Commanding General Award for  
Excellence – 2004  
Army Achievement Medal for Meritorious Service – 2005

**Faculty Appointments**

01/1999 – 10/2006    Assistant Professor  
Department of Neurological Surgery  
Northwestern University  
Feinberg School of Medicine  
Chicago, IL

10/2006 – 12/2010    Associate Professor  
Department of Neurological Surgery  
Northwestern University  
Feinberg School of Medicine  
Chicago, IL

01/2011 – 01/2013    Vice Chairman of Spine Services  
Department of Neurosurgery  
Co-Medical Director of the Spine Center  
Residency Director  
Cedars-Sinai Medical Center  
Los Angeles, CA

02/2013 – Current    Professor of Neurosurgery  
Department of Neurosurgery  
Co-Director, USC Spine Center  
Keck Medical Center of USC  
Los Angeles, CA

**Administrative Appointments**

09/1999 – 12/2010    Director of Minimally Invasive Spinal Surgery  
Department of Neurological Surgery  
Northwestern University  
Feinberg School of Medicine  
Chicago, IL

- 09/2000 – 12/2010 Director, Visiting Scholar Program  
Department of Neurological Surgery  
Northwestern University  
Feinberg School of Medicine  
Chicago, IL
- 09/2003 – 12/2010 Coordinator, Executive Committee  
Spine Column, Spinal Cord Injury Program  
Department of Neurological Surgery  
Northwestern University  
Feinberg School of Medicine  
Chicago, IL
- 09/2004 – 12/2010 Clinical Director of Spine Surgery  
Department of Neurological Surgery  
Northwestern University  
Feinberg School of Medicine  
Chicago, IL
- 09/2007 – 12/2010 Co-Director  
MIS Fellowship Coordinator
- 09/2009 – 12/2010 Neurosurgeon – NU Athletics
- 01/2014 – current Associate Residency Program Director  
Department of Neurosurgery  
Keck Medical Center of USC  
Los Angeles, CA

### **Committee Service**

- 09/2003 – 12/2010 Medical Faculty Senate, Northwestern University
- 09/2005 – 12/2010 Blood Transfusion Subcommittee, Medical Staff Committee,  
Northwestern Memorial Hospital
- 09/2006 – 12/2010 Infection Control Subcommittee, Medical Staff Committee, Northwestern  
Memorial Hospital
- 06/2015 – current Clinical Appointments and Promotions Committee (CAPC), Keck Medical  
Center of USC

### **Awards/Honors/Distinctions**

- 06/1987 University of California Regent Scholarship
- 06/1988 Rho Chi Honorary Society
- 2013 USC Teacher of the Year

### **Professional Society Memberships**

Congress of Neurological Surgeons  
American Association of Neurological Surgeons  
AANS/CNS Spine Joint Section Member  
North American Spine Society  
Illinois Society of Neurosurgeons  
American Spinal Injury Association  
National Medical Association  
Neurosurgical Society of America

### **Professional Services**

10/2000 & 10/2001 Volunteer Medical Mission to the Second Shanghai Medical College in China to provide surgical services for children afflicted with spinal deformity.

01/2001 Visiting Professor to Sao Paulo, Brazil

11/2007 Visiting Professor to University of Virginia

04/2009 Visiting Professor to University of Buffalo, New York

11/2009 Abstract Reviewer: North American Society 24<sup>th</sup> Annual Meeting San Francisco, CA

11/2014 Examiner: American Board of Neurological Surgery, Houston, TX

### **Teaching**

09/1999 – 12/2010 Instructor – M3 Clerkship Lectures (Quarterly)

09/1999 – 12/2010 Faculty Mentor – Neurosurgery Residency

09/2001 – 12/2010 Lecturer – Neurosurgery Resident Conferences; RIC; NMH Nursing Staff; 1 Academic day

09/2002 – 12/2010 Faculty – M3 Clerkship rotation (1 student/month)

09/2004 – 12/2010 Mentor – Minimally Invasive Spine Rotation of Complex Spine from the Department of Surgery

06/2005 “Outstanding” rating for resident and medical student teaching from the Department of Surgery

**Research Grants/Contracts**

- 01/1998 – 12/2007    Sponsor: Medtronic  
 Title: PhD Spine 2000 – Cervical/Low Back Surgical and Conservative Care Outcomes  
 Type of Study: Outcome Analysis  
 Role: Sub-Investigator (PI – Dr. Stephen Ondra)  
 Direct Cost: \$254,000.00  
 Status: Active
- 01/2003 -12/2007    Sponsor: Medtronic S-D  
 Title: Umbrella Agreement – 3 projects (FEA, Gait, C-S)  
 Type of Study: Basic Science Research  
 Role: Sub-Investigator (PI – Dr. Stephen Ondra; Co-PI – Brian Moran)  
 Direct Cost: \$990,000.00  
 Status: Active
- 01/2007 – 12/2010    Sponsor: Medtronic  
 Title: Adult Spinal Deformity Outcomes Analysis  
 Type of Study: Outcome Analysis  
 Role: Sub-Investigator (PI – Stephen Ondra)  
 Direct Costa: None  
 Status: Active
- 06/2004 – 01/2010    Sponsor: Orthovita  
 Title: CORTOSS Synthetic Cortical Bone Void Filter in Vertebral Augmentation  
 Type of Study: Clinical Trial: Device  
 Role: Sub-Investigator (PI – Bernard Bendok)  
 Direct Cost: \$107,463.00  
 Status: Active
- 01/2007 – 12/2007    Sponsor: Integra IDE  
 Title: Duragen Barrier Study for Lumbar Discectomy  
 Type of Study: Randomized Controlled Trial of Duragen Plus Adhesion Barrier Matrix to Minimize Adhesions Following Lumbar Discectomy (Protocol No. DURA-US-2006-1)  
 Role: PI  
 Budget: \$164,380.00
- 09/2009 – 08/2014    Sponsor: NIAMS, 1RO1AR055176-01A2  
 Title: A Multi-Centered Prospective Study of Quality of Life in Adult  
 Type of Study: Scoliosis (prospective, Outcomes-focused study to evaluate the effectiveness of nonsurgical and surgical treatments in

patients with adult symptomatic lumbar scoliosis and to identify important factors related to patient reported outcomes)  
Role: Other Significant Contributor

### **Research Projects**

- 09/2000 – 12/2010    Sponsor: Medtronic  
Title: Posterior Lateral Lumbar Fusion with Non-Compressible Carrier, INFUSE (Multicenter Clinical Trial)  
Role: Principal Investigator
- 09/2003 – 12/2010    Northwestern Memorial Hospital  
Title: Hyperdynamic Therapy for Acute Spinal Cord Injury (Randomized Study)  
Role: Co-PI
- 09/2004 -12/2010    Sponsor: Medtronic  
Title: Maverick Lumbar Artificial Disc (Multicenter Clinical Trial)  
Role: Co-PI
- 09/2005                Northwestern Memorial Hospital  
Title: North American Spine Clinical Trials Network  
Role: Co-PI
- 09/2006 – 12/2010    Northwestern Memorial Hospital  
Title: North America Spine Clinical Trials Network  
Role: PI
- 09/2007 – 12/2010    Sponsor: Medtronic  
Title: Prospective Spine Treatment Outcomes Study (ProSTOS)  
Role: PI
- 2013                    Sponsor: Medtronic  
Title: Biomechanical Study: Evaluation of Adjacent Level Degeneration Utilizing DLIF  
Role: Co-PI

### **Scholarly Bibliography**

#### **Peer Reviewed Articles**

#### **Submitted:**

1. Moller D, Liu JC, Fessler R, Koski T. Direct Lateral Interbody Fusion Transpsoas Muscle Access Morbidity. *Journal of Neurosurgery: Spine* (Submitted 2009)

2. Liu JC, Shafizadeh S. Metastatic adenoid cystic carcinoma: first reported case to cervical spine. *Journal of Neurosurgery: Spine* (Submitted November 2009)
3. Liu JC, Ondra S. Treatment Approaches to Tuberculosis of the Spine. *Techniques in Neurosurgery*, (Submitted 2000)
4. Liu JC, Ondra S. Usefulness of Laparoscopic Lumbar Fusion. *Neurosurgical Focus*, (Submitted 2001)
5. Moller D, Liu JC, Fessler RG, Koski T. Direct Lateral Interbody Fusion Transpsoas Muscle Access Morbidity. *Journal of Neurosurgery: Spine* (Submitted 2009)
6. Liu JC, Shafizadeh S. Metastatic adenoid cystic carcinoma: first reported case to cervical spine. *Journal of Neurosurgery: Spine* (Submitted 2009)
7. Sugrue PA, Moller DJ, Koski TR, Liu JC. High pelvic incidence and lumbar lordosis in anterior lumbar interbody fusion and minimally invasive transforaminal lumbar interbody fusion for spondylolisthesis: technical nuances. *Journal of Neurosurgery: Spine* (Submitted 2010)
8. Sugrue P, O'Shaughnessy B, Liu JC, Ondra S, Koski T. Occipital-cervical fusion using occipital hook fixation in spinal reconstruction: A technical and biomechanical analysis. *Journal of Spinal Disorders & Techniques* (Submitted 2010)
9. Acosta FL, Drazin D, Liu JC. Minimally invasive navigated lateral interbody fusion: Technical note. *Hindawi* (Submitted 2012)
10. Acosta FL, Drazin D, Liu JC. Computed tomographic navigated lateral interbody fusion: technical note. *Journal of Spinal Disorders & Techniques* (Submitted 2012)
11. Pham, M., Tuchman, A., Hsieh, P., Liu, JC. Transpedicular corpectomy and cage placement in the treatment of traumatic lumbar burst fractures. *Neurosurgical Focus* (Submitted 2014)
12. Platt, A., Pham, M., Tuchman, A., Spoonamore, M., Wang, J., Chen, T., Acosta, FL., Hsieh, P., Liu, JC. Gunshot wounds to the lumbar spine: A case series at high-volume Level One trauma center. *Neurosurgical Focus* (Submitted 2014)
13. Fung DA, Davis TT, MacMillan M, Kwon B, Liu JC, Acosta, FL, Drochner TE Retroperitoneal Oblique Corridor to the L2-S1 Intervertebral Discs in the Lateral Position: an Anatomic Study Decision/Letter. *Journal of Neurosurgery: Spine* (Submitted May 2014)



**Published:**

1. Iyer SB, DeGregorio MW, Asgari H, Keniry MA, Liu JC, Teicher BA, Benz C. Antitumor Mitochondrial Effects Induced by Platinum-RhodaAmine. *Molecular Pharmacology* 10:1-11, 1991
2. Liu JC, Ciacci JD, George TM. Brainstem Tethering in Dandy-Walker Syndrome: A complication of cystoperitoneal shunting. *Journal of Neurosurgery* 83:1072-1074, 1995
3. Ho H, Liu JC, Intocaso JH, Cluckman T, Batjer HH. Contemporary Management of the Patient with Intracranial Aneurysms. *Perspectives in Neurological Surgery* 7 (2):1-26, 1996
4. Liu JC, Ondra SL. Granulomatous Infection of the Spine: Current Treatment Strategies for Mycobacterium tuberculosis. *Techniques in Neurosurgery - TECH NEUROSURG.* 01/1999; 5(4):270-273.
5. Liu JC, Ondra SL, Angelos P, Ganju A, Landers ML. Is laparoscopic anterior lumbar interbody fusion a useful minimally invasive procedure? *Neurosurgery* 51 (5)S2: 155-158, 2002
6. Dumanian GA, Ondra SL, Liu JC, Schafer MF, Chao JD. Muscle flap salvage of spine wounds with soft tissue defects or infection. *Spine* 28 (11): 1203-1211, 3003
7. Salehi S, Tawk R, Ganju A, LaMarca F, Liu JC, Ondra S. Transforaminal lumbar interbody fusion: Surgical technique and results in 24 patients. *Neurosurgery* 54(2):1-7, 2004
8. Bendok BR, Halpin RJ, Rubin MN, Boco T, Przybylo JH, Liu JC. Percutaneous Vertebroplasty. *Contemporary Neurosurgery* 26(8): 1-5, 2004
9. O'Shaughnessy BH, Salehi SA, Saad A, Liu JC. Anterior atlas fracture following sub occipital decompression for Chiari I malformation. Report of two cases. *Journal of Neurosurgery (Spine)* 1:137-140, 2004
10. Halpin RJ, Bendok B, Liu JC. Minimally Invasive Treatments for Spinal Metastases: Vertebroplasty, Kyphoplasty, and Radiofrequency Ablation. *Journal of Supportive Oncology* 2(4):339-355, 2004
11. Bendok BR, Halpin RJ, Ruin MN, Boco T, Tibor BA, Przybylo J, Liu JC. Percutaneous Vertebroplasty. *Topics in Pain Management* 20(6):1-5, 2005
12. Parkinson R, Bendok BR, O'Shaughnessy BA, Tella M, Ondra S, Walker M, Adel J, Liu JC. Percutaneous Kyphoplasty. *Contemporary Neurosurgery* 27(11): 1-6, 2005

13. Halpin RJ, Bendok B, Sato K, Liu JC, Rosen S. Combination treatment of vertebral metastases using image-guided percutaneous radiofrequency ablation and vertebroplasty: a case report. *Surgical Neurology* 63:469-475, 2005
14. Said HK, Ondra SL, Ganju A, Liu JC, Few JW. Integrated Titanium and Vascular Bone: A New Approach for High Risk Thoracic Spine Reconstruction: P34. *Plastic and Reconstructive Surgery - PLAST RECONSTR SURG.* 01/2005; 116:160-162
15. Lippman CR, Salehi S, Liu JC, Ondra SL. Salvage technique of posterior iliac bolt placement in long-segment spinal constructs with a prior posterior iliac crest harvest: Technical note. *Neurosurgery.* PMID: 16462617
16. O'Shaughnessy BA, Ondra SL, Ganju A, Said HK, Few J, Liu JC. Anterior thoracic spine reconstruction using titanium mesh cage and pedicled rib flap. *Spine* 31(16) July 15: 1820-1827, 2006
17. O'Shaughnessy BA, Cumanian GA, Gregory A, Liu JC, Ganju A, Ondra S. Pedicled omental flaps as an adjunct in the closure of complex spinal wounds. *Spine* 32(26) December 15:3074-3080, 2007
18. Hsieh P, Koski TR, O'shaughnessy BA, Sugrue P, Salehi S, Ondra S, Liu JC. Anterior lumbar interbody fusion in comparison with transforaminal lumbar interbody fusion: implications for the restoration of foraminal height, local disc angle, lumbar lordosis, and sagittal balance. *Journal of Neurosurgery: Spine* 7(4): 379-386, 2007
19. Sugrue PA, Surdell DL, Foroohar M, Liu JC, Hage ZA, Bendok BR. Basilar Artery Occlusion Following C1 Lateral Mass Fracture Managed by Mechanical and Pharmacological Thrombolysis. *Neurocritical Care* PMID: 18956154
20. O'Shaughnessy B, Liu JC, Hsieh PC, Koski TR, Ganju A, Ondra SL. Surgical Treatment of Fixed Cervical Kyphosis with Myelopathy. *Spine* 33(7), April 1:771-778, 2008
21. Hsieh P, Koski TR, Sciubba DM, Moller DJ, O'Shaughnessy BA, Li KW, Gokaslan ZL, Ondra SL, Fessler RG, Liu JC. Maximizing the potential of minimally invasive spine surgery in complex spinal disorders. *Neurosurg Focus* 2008, 25(2):E19
22. Shih P, Yang BP, Batjer HH, Liu JC. Surgical management of superficial siderosis: A case illustration. *Spine J Aug; 9(8):e-16-19*
23. Liu JC, Patel A, Vaccaro AR, Lammertse DP, Chen D. Methylprednisolone after traumatic spinal cord injury? Yes or No? *PM R.* 2009 July; 1(7):669-73
24. Taghva A, Li KW, Liu JC, Gokaslan ZL, Hsieh PC. Minimally invasive circumferential spinal decompression and stabilization for symptomatic metastatic spine tumor: technical case report. *Neurosurgery* 03/2010; 66(3):E620-2

25. Shih P, Halpin RJ, Ganju A, Liu JC, Koski TR. Management of recurrent adult tethered cord syndrome. *Neurosurg Focus* 2010 July; 29(1):E5
26. Liu JC, Shih P, Simon PA, Pelzer H. Osteophyte formation following multilevel anterior cervical discectomy and fusion causing a delayed presentation of functional dysphagia. *The Spine Journal* (2010) 10:e1-e5
27. McClendon J, Sugrue P, Ganju A, Koski T, Liu JC. Management of ossification of the posterior longitudinal ligament (OPLL) of the thoracic spine. Case report and literature review. *Neurosurg Focus* 30 (3):E16, 2011
28. Sugrue P, McClendon J, Halpin R, Liu J, Koski T, Ganju A. Surgical management of cervical ossification of the posterior longitudinal ligament: natural history and the role of surgical decompression and stabilization. Case report and literature review. *Neurosurg Focus* 30 (3):E3, 2011
29. Cardoso M, Koski T, Ganju A, Liu JC. Approach-related complications after decompression for cervical ossification of the posterior longitudinal ligament. Case report and literature review. *Neurosurg Focus* 30 (3):E12, 2011
30. Acosta FL, Liu JC, Slimack N, Moller D, Fessler RG, Koski T. Changes in coronal and sagittal plane alignment following minimally invasive direct lateral interbody fusion for the treatment of degenerative lumbar disease in adults: a radiographic study. Case report and literature review. *Journal of Neurosurgery: Spine* 10.3171/2011.3SPINE10425
31. Slimack N, Moller D, Fessler RG, Koski T, Acosta FL, Liu JC. Minimally invasive lateral lumbar interbody fusion and trans-psoas approach related morbidity. *Neurosurg Focus* 2011, PMID:21961867
32. Slimack N, Liu JC, Koski T, O'Shaughnessy B. Metastatic GIST to the thoracic and lumbar spine: First reported case and surgical treatment. *Spine Journal* PMID: 22227175
33. Lee P, Fessler RG, Liu JC. Perioperative results following open and minimally invasive single-level lumbar discectomy. *Journal of Clinical Neuroscience* PMID:21944927
34. Drazin D, Shirzadi A, Rosner J, Eboli P, Safee M, Baron EM, Liu JC, Acosta FL. Complications and outcomes after spinal deformity surgery in the elderly; Review of the existing literature and future direction. *Neurosurg Focus* 2011 Oct;31 (4):E3
35. Savage JW, Weatherford BM, Sugrue PA, Nolden MT, Liu JC, Song JK, Haak MH. Efficacy of surgical preparation solutions in lumbar spine surgery. *J Bone Joint Surg AM* 2012 MAR 21;94(6):490-4
36. Shirzadi A, Birch K, Drazin D, Liu JC, Acosta F. Direct lateral interbody fusion (DLIF) at the lumbosacral junction L5-S1. *Journal of Clinical Neuroscience* 04/2012; 19(7):1022-5.

37. Shirzadi A, Drazin D, Jeswani S, Lovely L, Liu JC. Atypical presentation of thoracic disc herniation: Case series and review of the literature. *TDH PMID:23691393*
38. Rosner J, Avalos P, Acosta FL, Liu JC, Drazin D. The potential for cellular therapy combined with growth factor in spinal cord injury. *Hindawi PMID:23091499*
39. Acosta FL, Drazin D, Liu JC. Supra-psoas shallow docking in lateral interbody fusion: Technical Note. *Neurosurgery PMID:23361324*
40. Drazin D, Jeswani S, Lovely L, Liu JC, Shirzadi A. Atypical presentation of thoracic disc herniation: Case series and review of the literature. *Hindawi PMID:23691393*
41. Drazin D, Liu JC, Acosta FL. CT navigated lateral interbody fusion: Technical note. *Journal of Clinical Neurosciences PMID:23931938*
42. Liu JC, Varicella-Zoster-Mediated radiculitis reactivation following cervical spine surgery: case report and review of the literature. *Case Reports in Infectious Diseases vol. 2013, article ID 647486, 5 pages*
43. Patil CG, Sarmiento JM, Ugiliweneza B, Mukherjee D, Nuño M, Liu JC, Walia S, Lad SP, Boakye M. Interspinous device versus laminectomy for lumbar spinal stenosis: a comparative effectiveness study. *The spine journal: official journal of the North American Spine Society 10/2013*
44. Wong AP, Shih P, Smith TR, Slimack NP, Dahdaleh NS, Aoun SG, El Ahmadieh TY, Smith ZA, Scheer JK, Koski TR, Liu JC, Fessler RG. Comparison of Symptomatic Cerebral Spinal Fluid Leak Between Patients Undergoing Minimally Invasive versus Open Lumbar Foraminotomy, Discectomy, or Laminectomy. *World Neurosurgery 11/2013*
45. Christian, E., Lee, C., Yen, C., Acosta, FL., Chen, T., Liu, JC., Spoonamore, M., Wang, J., Hsieh, P. A Modified Gaines Approach for Lumbosacral Traumatic Spondyloptosis: A Historical Review and Case Illustration. *Journal of Spine (January 2014)*
46. Liu JC. Complication associated with posterior approaches in minimally invasive spine decompression: Article. *Neurosurgery Clinics of North America (April 2014)*
47. Graham RB, Wong AP, Liu JC. Minimally Invasive Lateral Transpsoas Approach to the Lumbar Spine: Pitfalls and Complication Avoidance. *Neurosurgery clinics of North America 04/2014; 25(2):219-231.*
48. Hsieh PC, Liu JC, Wang M. Introduction: Vertebral Osteomyelitis and Spinal Epidural Abscess. *Neurosurgical Focus (August 2014)*

49. Fung DA, Davis TT, Mejia DM, Clark S, Daily D, Liu JC. Is the Lateral Jack-Knife Position Responsible for Cases of Transient Neurapraxia? *Journal of Neurosurgery: Spine* (September 2014)
50. Liu JC. Assessment of Outcome Following the use of Recombinant Human Bone Morphogenetic Protein-2 for Spinal Fusion in the Elderly Population. *Journal of Neurosurgical Sciences* (July 2014)
51. Chopko B, Liu JC, Khan MK. Anatomic Surgical Management of Chronic Low Back Pain. *Neuromodulation* 10/2014; 17(S2).
52. Pham MH, Tuchman A, Chen TC, Acosta FA, Hsieh PC, Liu JC: Transpedicular corpectomy and cage placement in the treatment of traumatic lumbar burst fractures. *Journal of Spinal Disords & Techniques* (2015)
53. Pham MH, Tuchman A, Platt A, Chen TC, Acosta FL, Liu JC, Hsieh PC: Intracranial Complications Associated With Spinal Surgery. *Eur Spine J*, 2015."
54. Acosta, FA, Drazin, D, Nuno, M, Yan, K, Liu, JC, Emergency Room Resource Utilization by Patients with Low Back Pain. *Journal of Neurosurgery: Spine*, 2015
55. Buser, Z, Doro, A, Spoonamore, M, Yermier, C, Acosta F, Hsieh, P, Liu, JC, Chen, T, Wang, J. Effects of fusion and conservative treatment on disc degeneration and rates of subsequent surgery after thoracolumbar fracture. *Journal of Neurosurgery: Spine*, 2015
56. Metzger, Melodie, Robinson, S, Liu, JC, Svet, M, Acost, F. Biomechanical Analysis of the Proximal Adjacent Segment after Multi-level instrumentation of the Thoracic Spine: Do Hooks Ease the Transition? *Global Spine Journal*, 2015

### **Other Publications**

1. Liu, JC. Learn a lesson from aviation: Take a surgical time-out. *Spine Surgery Today*, July/August 2014
2. Liu, JC. Do not be an enabler to chronic opioid use in spine surgery. *Spine Surgery Today*, September/ October 2014
3. Liu, JC. Failed back surgery syndrome rates are likely to increase in the future. *Spine Surgery Today*, January/February 2015
4. Liu, JC. *Biomechanics of Spine Stabilization*, Third edition. *World Neurosurgery*, 2015
5. Liu, JC. Spine Surgeons need to learn, adapt to outpatient spine surgeries. *Spine Surgery Today*, July/August 2015

**Textbook Chapters**

1. Samartzis D, Liu JC. Osteoporosis and Percutaneous Vertebroplasty. In: Batjer HH, Loftus CM (eds). *Textbook of Neurological Surgery. Principles and practice. Philadelphia: Lippincott, Williams & Wilkins, pp. 1688-1702, Vol. 2, 2003*
2. Samartzis D. Liu JC. Ankylosing Spondylitis. In: Batjer HH, Loftus CM (eds). *Textbook of Neurological Surgery. Principles and Practice. Philadelphia: Lippincott, Williams & Wilkins, pp. 1713-1723, Vol. 2, 2003*
3. Tawk RG, Liu JC. Minimally Invasive Spine Surgery. In: Batjer HH, Loftus CM (eds). *Textbook of Neurological Surgery. Principles and Practice. Philadelphia: Lippincott, Williams & Wilkins, pp. 2181-2197, Vol. 2, 2003*
4. Liu JC, Bendok B. Osteoporosis and Percutaneous Vertebroplasty. In: Benzon, Raja, Molly, Liu & Fishman (eds): *Essentials of Pain Medicine and Regional Anesthesia (2<sup>nd</sup> Edition). Philadelphia: Elsevier pp. 494-515, September 2004*
5. Moller D, Liu JC. Thoracic Disc Herniation; Minimal Access Techniques for Deformity/Tumor: Future Direction. In: Bridwell (eds). *The Textbook of Spinal Surgery (3<sup>rd</sup> Edition). Philadelphia: Lippincott, Williams & Wilkins. Accepted 2008*
6. Neal CJ, Fessler RG, Liu JC. MIS Application in the lumbar spine: Decompression and Fusion. *Spine e-Handbook. Submitted April 2009*
7. Subbaiah S, Fessler RG, Liu JC. Minimally Invasive Cervical Endoscopic Foraminotomy/Discectomy and Decompression of Stenosis: *Spine e-Handbook. Submitted April 2009*
8. Acosta FL, Moller DJ, Liu JC. Posterior Thoracic Approaches for Disc Disease, Tumor or Trauma. Thieme Decision Making. *MIS Surgery Textbook. Submitted 2009*
9. Sugrue PA, Liu JC. Direct Lateral Trans-Psoas Interbody Fusion. In: Jandial R, McCormich P, Black P (eds). *Essential Techniques in Operative Neurosurgery. Elsevier.*
10. Liu JC, Sekhadia M. Osteoporosis and Percutaneous Vertebroplasty. In: Benzon, Raja, Molly, Liu & Fishman (eds). *Essentials of Pain Medicine and Regional Anesthesia (3<sup>rd</sup> Edition). Philadelphia. Lippincott, Williams & Wilkins. Elsevier. Accepted 2009*
11. Graham RB, Wong AP, Liu, JC. Minimally Invasive Lateral Transpsoas Approach to the Lumbar Spine: Pitfalls and Complication Avoidance. *Neurosurgery Clinics of North America: Minimally Invasive Spine Surgery (2014) 219-231*

12. Stadler JA, Wong AP, Graham RB, Liu JC. Complications Associated with Posterior Approaches in Minimally Invasive Spine Decompression. *Neurosurgery Clinics of North America: Minimally Invasive Spine Surgery (2014)* 233-245

### **Posters/Abstracts**

1. Iyer SB, Keniry MA, Liu JC, Asgari H, DeGregorio M, Teicher B, Benz C. Monitoring Platinum-Rhodamine Tumor Uptake and Mitochondrial Damage. *ASCO, Vol. 8, pp. 244, 1989*
2. Asgari H, Iyer S, Liu JC, Keniry M, Teicher B, Benz C. Mitochondrial Damage from Novel Chemotherapeutic Agent Platinum-Rhodamine. *AFCR, Vol. 37, 1163A, 1989*
3. Liu JC, Ondra S. Laparoscopic Lumbosacral Interbody Fusion. *Congress of Neurological Society Annual Meeting Proceedings: Vol. 47, pp. 412-413, 1997*
4. Liu JC, Ondra SL, Angelos P, Ganju A, Landers ML. Is laparoscopic anterior lumbar interbody fusion useful? *Oral poster at AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves, Phoenix, AZ. February 2001*
5. Salehi S, Ganju A, LaMarca F, Liu JC, Ondra SL. Transforaminal interbody fusion: surgical techniques and results in 24 patients. *Poster at AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves, Phoenix, AZ. February 2001*
6. Liu JC, Ondra S. Concurrent Vertebroplasty and Posterior Spinal Fusion. *Neurosurgical Society of America. June 2001*
7. Ganju A, Liu JC, Dumanian G, Ondra SL. The use of vascular autografts in the reconstruction of the infected spine. *Poster at CNS Annual Meeting. September 2001*
8. Ganju A, Few J, Liu JC. Thoracic spine reconstruction via combination rib vascular pedicle graft/titanium cage construct. *Poster at AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves. February 2002*
9. Liu JC, Salehi S, Jorge A. Sexton Percutaneous Lumbar Fusion-Initial Experience <http://www.mysticmamma.com/mercury-goes-retrograde-february-6th-28th/>
10. Said HK, Uzodinma O, Ganju A, Liu JC, Few JW. Integrated titanium and vascular bone: a new approach for high risk thoracic spine reconstruction. *Midwestern Association of Plastic Surgeons 42 Annual Meeting, Chicago, IL May 2004*
11. Liu JC. Osteoporotic spinal compression fractures: Percutaneous Vertebroplasty as an effective treatment. *National Medical Association Section of Neurology/Neurosurgery Program Abstract, pp. 9, July 2005*

12. Liu JC. Advances in minimally access spinal surgery. *National Medical Association, Section of Neurology/Neurosurgery Program Abstract, Page 9, July 2009*
13. Hsieh P, Liu JC. Anterior lumbar interbody fusion in comparison with transforaminal lumbar interbody fusion in the restoration of foraminal height. *Joint Section AANS/CNS Spine Meeting, Orlando, FL, March 2006*
14. Liu JC, Hsieh P. Thoroscopic sympathectomy for primary palmer hyperhidrosis: Long-term outcomes and complications. *Abstract #39: Section on Disorders of the Spine and Peripheral Nerves. Congress of Neurological Surgeons Annual Meeting, Chicago, IL, October 2006*
15. Mindea S, Liu JC. Minimally invasive S1 pedicle screw placement: Without need for bicortical purchase. *Congress of Neurological Surgeon Annual Meeting, San Diego, CA, October 2007*
16. Liu JC, Moller D. Biomechanical evaluation of a direct lateral procedure: What are the effects when paired with pedicle screw or posterior interspinous fixation? *Abstract #304: Joint AANS/CNS Section on Disorders of the Spine and Peripheral Nerves Annual Meeting, Orlando, FL, February 2008*
17. Acosta FA, Liu JC, Slimack N, Moller D, Ondra S, Fessler R, Koski T. Changes in coronal and sagittal plane alignment following minimally invasive direct lateral interbody fusion for the treatment of adult degenerative lumbar disease. *Oral Abstract. 16<sup>th</sup> International Meeting on Advanced Spine Techniques (IMAST), Vienna, Austria, July 2009*
18. Hsieh P, Gokaslan Z, Liu JC. Posterolateral approach for thoracic corpectomy with circumferential decompression and instrumented fusion using expandable cages: A prospective case series of 15 consecutive patients. *Oral Abstract. 16<sup>th</sup> International Meeting on Advanced Spine Techniques (IMAST), Vienna, Austria, July 2009*
19. Sugrue P, O'Shaughnessy B, Liu JC, Ondra S, Koski T. Occipital cervical fusion using occipital hook fixation in spinal reconstruction: A technical and biomechanical analysis. *E-Poster, IMAST, Vienna, Austria, July 2009*
20. Sugrue PA, Moller DJ, Koski TR, Liu JC. High pelvic incidence and lumbar lordosis in anterior lumbar interbody fusion and minimally invasive transforaminal lumbar interbody fusion for spondylolisthesis: Technical Nuances. *Digital abstract poster. Congress of Neurological Surgeons Annual Meeting, New Orleans, LA, October 2009*
21. Slimack NP, Liu JC, Acosta FL, Moller DJ, Ondra SL, Fessler RG, Koski TR. Successful fusion following minimally invasive direct lateral interbody fusion for the treatment of adult lumbar degenerative scoliosis. *E-Poster, Congress of Neurological Surgeons Annual Meeting, New Orleans, LA, October 2009*



22. Acosta FA, Liu JC, Koski T, Ondra S, Fessler R, Moller D, Slimack N. Changes in coronal and sagittal plane alignment following minimally invasive direct lateral interbody fusion for the treatment of adult degenerative lumbar disease. *Oral poster presentation, AANS/CNS Section of Disorders of the Spine and Peripheral Nerves Annual meeting Orlando, Florida, February 2010*
23. Acosta FA, Liu JC, Koski T, Ondra S, Fessler R, Moller D, Slimack N. Changes in sagittal and coronal plane alignment following minimally invasive direct lateral interbody fusion for the treatment of adult lumbar degenerative scoliosis. *Oral poster presentation, Annual Meeting for Neurosurgical Society of America, Pebble Beach, CA, April 2010*
24. Slimack N, Liu JC. Minimally invasive trans-diaphragm DLIF for thoracolumbar degenerative scoliosis. *Oral poster presentation, American College of Spine Surgery, Contemporary Concepts in Spine Surgery Course, Newport Beach, CA, June 2010*
25. Nicholas Slimack, Patrick Shih, Smith T.R., John Liu, Albert Wong, Richard Fessler, Tyler Koski. Incidence and Outcomes of CSF Leak in Open Versus Minimally Invasive Lumbar Surgery: Conference Paper. *International Meeting on Advanced Spine Techniques, USA; January 2012*
26. Patrick Sugrue, Nicholas Slimack, Smith T.R., Jamal McClendon, John Liu, Tyler Koski, Richard Fessler. Radiographic Comparison of Direct Lateral Transpsoas Lumbar Interbody Fusion and Transforaminal Lumbar Interbody Fusion: Conference Paper. *International Meeting on Advanced Spine Techniques, USA; January 2012*
27. Pham, M, Acosta, FA, Hsieh, P, Liu, JC. A Portable Shoulder-Mounted GoPro Camera System for Surgical Education in Minimally Invasive and Complex Spine Surgery: Abstract. *CNS Meeting; March 2015*

### **Presentations**

1. Intraspinal Ependymomas. Northwestern University Medical School, Neurosurgery Grand Rounds, April 1994
2. Management of posterior fossa intracerebral hematoma. Northwestern University Medical School, Neurosurgery Grand Rounds, February 1995
3. Phakomatosis. Northwestern University Medical School, Neurosurgery Grand Rounds, November 1995
4. Anterior laparoscopic interbody fusion. Inter-Chicago Neurosurgical Society Meeting, March 1997
5. Brain Tumor Management. Neurosurgical/Neurology Nursing Meeting, October 1997

6. Spinal fusion indication. American Association of Spine Physicians, National Meeting, Chicago, May 1998
7. Current Management of Metastatic Spine Tumors. Northwestern University Medical School, Neurosurgical Grand Rounds, October 1998
8. Considerations in lumbar spine surgery. HealthSouth Physical Therapy Lecture Series, Chicago, March 2010
9. Spinal surgery in osteoporotic patients. Northwestern University Medical School, Rheumatology Grand Rounds, April 2000
10. Is laparoscopic lumbar fusion useful? AANS/CNS Joint Section on Spine National Meeting, Phoenix, February 2001
11. Principles of sagittal plane deformity. AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves, February 2001
12. Lumbosacral and sacral resection and reconstruction. Neuro-Oncology 2001: Current Concepts, February 2001
13. Spinal Surgery in Osteoporotic Patients. Northwestern University medical School Anesthesiology Ground Rounds, April 2001
14. Advanced minimally invasive spine surgery. American Association of Neurological Surgeons National Meeting, Course Director, Toronto, April 2001
15. Virtual Fluoroscopy: Current uses in Spine Surgery. Central Illinois Neuroscience Foundation Spring Symposium, May 2001
16. Concurrent vertebroplasty and posterior spinal fusion. Neurosurgical Society of America meeting, June 2001
17. Percutaneous lumbar fusion techniques. Conference on Endoscopic Spinal Surgery, Sao Paulo, Brazil, September 2001
18. Advances in lumbar spine surgery. Northwestern University Medical School Radiology Grand Rounds, Chicago, October 2001
19. New Techniques: Antares anterior lumbar dural rod system. AANS/CNS Joint Section Spine National Meeting, February 2002
20. Innovative minimally invasive spine surgery. American Association of Neurological Surgeons National Meeting, Practical Course Director and Speaker, Chicago, April 2002

21. Osteoporotic spine fracture, percutaneous vertebroplasty. Osteoporosis and Metabolic Bone Disease Symposium, Northwestern Memorial Hospital, Chicago, April 2002
22. Percutaneous vertebroplasty, a neurosurgeon's perspective. Neurosurgery Grand Rounds, Evanston Hospital, Evanston, May 2002
23. Minimally invasive spinal surgery. Rheumatology Grand Rounds, Northwestern University Feinberg School of Medicine, Chicago, February 2003
24. Treatment of osteoporotic compression fractures. Spine and Scoliosis Conference, Northwestern University Feinberg School of Medicine, Chicago, June 2003
25. Minimally invasive spinal surgery – current developments. The Midwest Pain Society Annual meeting, Chicago, September 2003
26. Anterior lumbar interbody fusion techniques. Practical Course 13, Congress of Neurological Surgeons Annual Meeting, Denver, October 2003
27. Current developments in minimally invasive spine surgery. Neurosurgery Lecture Series, Brooke Army Medical Center, San Antonio, March 2004
28. Minimally invasive surgery application in deformity spine surgery – the next frontier. Chicago Region Spine Conference, Chicago, October 2004
29. Minimally invasive spinal surgery. AANS Minimally Invasive Spinal Techniques Course, Memphis, December 2004
30. Percutaneous vertebroplasty: Current indications and future advances. American College of Rheumatology, Chicago, April 2005
31. Problems encountered with vertebroplasty/kyphoplasty. Complications of Neurosurgical Operations Course, Illinois Neurological Society Annual Meeting, Rosemont, IL, June 2005
32. Complications seen with endoscopic/laparoscopic spinal operation. Complications of Neurosurgical Operation Course, Illinois Neurological Society Annual Meeting, Rosemont, IL, June 2005
33. Current minimally invasive surgical techniques in the treatment of spine disorders. Annual Meeting, National medical Association, New York City, July 2005
34. Percutaneous vertebroplasty in the treatment of osteoporotic compressive fractures. Annual Meeting, National medical Association, New York City, July 2005
35. Spinal Instrumentation: History, current indication, and future developments. Northwestern Spine Surgical Nurse Symposium, Chicago, August 2005

36. Moderator – Seminar: Spinal Motion Preservation Technology. Congress of Neurological Surgeons Annual Meeting, Boston, October 2005
37. Acute non-surgical management of the spinal cord and column injured patient. Chicago Region Spine Conference, Chicago, October 2005
38. Current advancements in lumbar spine surgery. Northwestern University Feinberg School of Medicine, Department of Neurological Surgery Academic Day, Chicago, March 2006
39. Maverick lumbar disc arthroplasty: A review of current indications. AANS Practical Course: AANS Annual Meeting, San Francisco, April 2006
40. Anterior approaches to lumbar spine. AANS Practical Course, AANS Annual Meeting, San Francisco, April 2006
41. Minimally invasive lumbar discectomy and stenosis surgery. Course Director: Minimally invasive surgery, DePuy Spine Surgeon Teaching, April 2006
42. Direct lateral interbody fusion. Technique Course, Medtronic Spine Surgeon Course, Memphis, May 2006
43. Cervical minimally invasive surgery applications. Bethesda Spine Workshop, Uniformed Services University of the Health Science, May 2006
44. Direct lateral interbody fusion. Surgical Technique: Medtronic Surgeon Course, Atlanta, June 2006
45. Minimally invasive surgery. DePuy Spine Surgeon Course, Chicago, August 2006
46. Complications of MIS surgery. DePuy Spine MIS Advanced Course, Denver, August 2006
47. Role of MIS in cervical spine. DePuy Spine MIS Advanced Course, Denver, August 2006
48. Moderator: Direct lateral interbody fusion. Surgical Technique: Medtronic Surgeon Training, NASS Annual Meeting, September 2007
49. Operative approaches for spine trauma: Neurological Complications. Complications of Spine Operations Course, Illinois Neurological Society Annual Meeting, Rosemont, September 2006
50. Challenges in anterior spinal access. Practical Course: CNS Annual Meeting, Chicago, October 2006

51. Motion preservation alternative to fusion. Moderator: Special Course, CNS Annual Meeting, Chicago, October 2006
52. A/P approaches for cervical radiculopathy. Luncheon Seminar Lecture: Multilevel Discectomy vs. Corpectomy for Cervical Disease, CNS Annual Meeting, Chicago, October 2006
53. Advances in minimally invasive spine surgery. Rheumatology Grand Rounds, Northwestern University, December 2006
54. Direct lateral approach applications in degenerative scoliosis in the aging spine. Medtronic Aging Spine Symposium, Las Vegas, January 2007
55. Anterior cervical fusion: Dynamized vs. Static Plating. DePuy Spine Neurosurgery Residents Spine Education Summit, Las Vegas, February 2007
56. Minimally invasive techniques for microdiscectomy & laminectomy. DePuy Spine Neurosurgery Residents MIS Bioskills Workshop, Las Vegas, February 2007
57. Minimally access spinal technology: Direct Lateral. Faculty, Medtronic Course, Memphis, March 2007
58. Direct lateral approach for interbody fusion. Medtronic Course, Miami, March 2007
59. Aging Spine Care: Cases in Surgical and non-surgical management. Moderator: New Technology, Medtronic, Chicago, April 2007
60. Minimal access spinal technologies: Direct lateral approach and spondylolisthesis reduction techniques. Medtronic, Chicago, April 2007
61. Anterior lumbar trans and retroperitoneal approach. AANS Practical Course, Washington, D.C., April 2007
62. Maverick artificial disc update. AANS Practical Course, Washington, D.C., April 2007
63. Minimally invasive spine surgery: Cervical applications. Lecture: Bethesda International Cervical Spine Course, Bethesda, May 2007
64. Indications and rationale for spinal augmentation. Lecture: Bethesda International Lumbar Spine Course, Bethesda, May 2007
65. Direct lateral interbody fusion. Surgeon Course, Faculty: Medtronic, Memphis, June 2007

66. DLIF application in scoliosis surgery. Medtronic Training for Tomorrow's Deformity Surgeon, June 2007
67. Round table discussion MIS panel. IMAST, Atlantis, July 2007
68. Panel discussion general session deformity surgery. IMAST, Atlantis, July 2007
69. MIS advanced topics: DLIF lecture, IMAST, Atlantis, July 2007
70. MAST deformity application lecture early results. Medtronic MAST Deformity, Memphis, July 2007
71. Medtronic Sales Lecture: Longitude, San Francisco, August 2007
72. Minimally Invasive Surgeon Course: Medtronic Training Course, San Francisco, August 2007
73. Prestige Cervical Disc Training Course: Medtronic, San Francisco, August 2007
74. Prestige Cervical Disc Training Course: Medtronic, Chicago, August 2007
75. Challenges in anterior spinal surgery. Moderator: Practical Course 24, CNS Annual Meeting, San Diego, September 2007
76. Anterior retroperitoneal and transperitoneal lumbar spine access. Lecture: Practical Course 24, CNS Annual Meeting, San Diego, September 2007
77. DLIF Lecture: Medtronic Course. San Diego, September 2007
78. Nuances of minimally invasive spine surgery, minimally invasive spine surgery application in deformity and trauma: A new technique for an old problem. CNS Annual Meeting, San Diego, September 2007
79. Direct lateral application in spine surgery. Lecture, Faculty: Medtronic Minimally Access Spinal Technologies Course, Memphis, September 2007
80. Complications with minimally invasive spine surgery. Lecture, Chicago Neurological Society Meeting: Complications of Operations on Brain and Spine, Rosemont, September 2007
81. MIS application in deformity and trauma. University of Virginia Grand Rounds and Visiting Professor, Charlottesville, November 2007
82. DLIF surgical technique. University of Virginia Grand Rounds and Visiting Professor, Charlottesville, November 2007

83. O-Arm Lecture: Medtronic Surgeon Course, New Orleans, November 2007
84. MIS surgery panel discussion. Medtronic Surgeon Course, New Orleans, November 2007
85. DLIF Surgeon Course Medtronic Training, Memphis, January 2008
86. DLIF Application in Deformity. Medtronic Think Tank, January 2008
87. Evolution of minimally invasive spine surgery techniques. Course Director: Luncheon Symposium II – Joint Sections on Disorders of the Spine and Peripheral Nerves Annual Meeting, Orlando, February 2008
88. MIS applications in deformity and trauma spine surgery. Lecture: Luncheon Symposium II – Evolution of Minimally Invasive Spine Surgery Techniques, Joint Spine Section Annual Meeting, Orlando, February 2008
89. Complication in minimally invasive spine surgery. DePuy Course for Senior Neurosurgery Residents, Las Vegas, March 2008
90. Direct lumbar interbody fusion. Medtronic Surgeon Course, Tampa, March 2008
91. Nonsurgical vs. surgical intervention decision making literature review for cervical myelopathy. Aging Spine Course, Chicago, April 2008
92. MAST deformity, a new technique to treat an old problem. Aging Spine Course, Chicago, April 2008
93. Minimally invasive application in cervical spine. Bethesda International Spine Course, Bethesda, April 2008
94. Minimally invasive applications in deformity surgery. Bethesda International Spine Course, Bethesda, April 2008
95. Update maverick lumbar artificial disc IDE 2 year results. AANS Practical Course, AANS Annual Meeting, Chicago, April 2008
96. “Sharpening your spine surgery skills” workshop. Faculty: MIS TLIF, North American Spine Society, Chicago, April 2008
97. Anterior lumbar access and approaches and avoidance of complications. AANS Practical Course, AANS Annual Meeting, Chicago, April 2008
98. Surgical technique DLIF, Medtronic Surgeon Training, Chicago, April 2008
99. DLIF Surgeon Training. Medtronic Faculty, Chicago, April 2008

100. Longitude Surgeon Training Course. Medtronic Faculty. Chicago, April 2008
101. Direct Lateral Training Course. Medtronic Faculty. Indianapolis, July 2008
102. Minimal Access Spinal Technologies Course; “Evidence Based Approach to Bone Grafting”. Medtronic Faculty. St. Louis, August 2008
103. Direct lateral techniques review with NIM-SPINE neuromonitoring system. Minimal Access Spinal Technologies Course. Medtronic Faculty. St. Louis, August 2008
104. MAST Deformity Design Team Meeting. Medtronic. Memphis, August 2008
105. MAST Regional Training Program; DLIF – Longitude – Sextant Course. Medtronic Faculty. Annapolis, September 2008
106. Advanced surgical suite and its role in minimally invasive spine surgery. Lecture, NAMA. Chicago, September 2008
107. Challenges in anterior spine surgery. Director, Practical Course: CNS Annual Meeting. Orlando, September 2008
108. Anterior and direct lateral interbody fusion. Lecture, CNS Annual Meeting. Orlando, September 2008.
109. Minimally invasive correction of spine deformity. Moderator: OR – Live Webcast, Northwestern Memorial Hospital. Chicago, October 2008
110. MAST Deformity Design Team Meeting. Medtronic. Memphis, October 2008
111. Spine + Science + Management Course. Medtronic Faculty: Lecture – 3D Intraoperative Imaging. New Orleans, November 2008
112. Degenerative Spine Study Group Meeting. Medtronic. Chicago, November 2008
113. Leaders in Spine Surgery Series: Clinical solutions for the mature and aging spine. Medtronic Faculty. Chicago, December 2008
114. Lumbar Stenosis; Non-surgical and surgical treatment options. Lecture. Aging Spine Course. Medtronic Faculty. Chicago, March 2009
115. Minimally invasive application for spinal deformity. Neurosurgery Grand Rounds: Lecture. University of Buffalo. New York, April 2009
116. DLIF Surgical Techniques. Neurosurgery Grand Rounds: Resident Lab. University of Buffalo. New York, April 2009



117. MIS application for cervical spine: Cervical Foraminotomy. Lecture: 21<sup>st</sup> Annual International Bethesda Spine Workshop: Cervical Course. Bethesda, April 2009
118. MIS application for spinal deformity and trauma. Lecture: 21<sup>st</sup> Annual International Bethesda Spine Workshop: Thoraco-Lumbar Course. Bethesda, April 2009
119. MIS TLIF surgical technique. Lecture: 21<sup>st</sup> Annual International Bethesda Spine Workshop: Thoraco-Lumbar Course. Bethesda, April 2009
120. Current surgical techniques & approaches to MIS spine surgery, DLIF. Practical Course: American Association of Neurological Surgeons Annual Meeting. San Diego, May 2009
121. Lumbar Arthroplasty Symposium: Artificial lumbar disc arthroplasty: Biomechanics & Clinical Application. Maverick Disc Update. Faculty and Lecture. American Association of Neurological Surgeons Annual Meeting. San Diego, May 2009
122. 4<sup>th</sup> Annual Course on: Sharpening Your Spine Surgery Skills. Lecture and Faculty. Cervical Arthroplasty: Indications, Options, Outcomes. North American Spine Society. Burr Ridge, May 2009
123. DLIF Surgeon Training Course. Chairman: Medtronic. San Diego, July 2009
124. DLIF Surgeon Training Course. Faculty: Medtronic. Chicago. August 2009
125. DLIF and Applications in Deformity and Trauma. Ortho Indianapolis Monthly Journal Club. Indianapolis, August 2009
126. DLIF Surgeon Training. Chairman: Medtronic. Milwaukee, September 2009
127. Chicago Foundations in Neurosurgery. Lecture: Stryker. Chicago, September 2009
128. DLIF Training Course. Medtronic. Chicago, September 2009
129. DLIF Surgeon Training Course. Chairman: Medtronic. San Francisco, November 2009
130. DLIF Training Course. Medtronic. New York City, December 2009
131. Tom Lowe Spine Course. Faculty & Moderator: Sacral Fixation. Beaver Creek, January 2010
132. Neurosurgery Grand Rounds. Lecture: "MIS Techniques in Deformity Surgery". Northshore University Health System. Evanston, March 2010
133. DLIF Course. Faculty: Medtronic. Historical Background: Minimally Invasive Access Direct Lateral. San Antonio, March 2010

134. Department of General Surgery Resident Lecture. "Spine Surgery Non Traumatic. What you need to know". Northwestern University. Chicago, March 2010
135. Department of General Surgery Resident Lecture. "Brain Surgery Non Traumatic. What you need to know". Northwestern University. Chicago, March 2010
136. "Changes in sagittal and coronal plane alignment following minimally invasive direct lateral interbody fusion for the treatment of adult lumbar degenerative scoliosis." Lecture: Neurosurgical Society of America Annual Meeting. Pebble Beach, April 2010
137. Lumbar stenosis and MIS spondylolisthesis. Lecture: Medtronic Aging Spine Course. Washington, April 2010
138. MIS deformity. Lecture: Medtronic Aging Spine Course. Washington, April 2010
139. Cervical myelopathy literature review. Lecture: Medtronic Aging Spine Course. Washington, April 2010
140. Indications, complications and future of DLIF. Chair: Medtronic. DLIF Focus Group. Memphis, April 2010
141. Minimally direct lateral access to lumbar spine. Lecture: Practical Course. AANS Annual Meeting. Philadelphia, May 2010
142. Anterior lumbar access and direct lateral access to lumbar spine. Lecture: Breakfast Meeting, AANS Annual Meeting. Philadelphia, May 2010
143. DLIF Meeting. Chair: Medtronic. Washington DC, May 2010
144. Minimally invasive access to lumbar spine. Lecture: AANS lateral Spine Course. Burr Ridge, May 2010
145. MIS applications in deformity surgery. Lecture: Grand Rounds, Department of Neurosurgery. Cedars Sinai Hospital. Los Angeles, May 2010
146. Minimally invasive trans-diaphragm DLIF for thoracolumbar degenerative scoliosis. Oral Poster Presentation: America College of Spine Surgery Course. Contemporary concepts in spine surgery. Newport Beach, June 2010
147. Spinal Cord Injury: A devastating consequence of the Haiti earthquake. Lecture: Seventh Annual Neuroscience Nursing Symposium: Pursuit of Excellence in Neuroscience Nursing. Northwestern Memorial Hospital. Chicago, August 2010
148. Minimal access to the lateral lumbar spine. Lecture: Pre-Annual Meeting North American Spine Society. Orlando, September 2010

149. Cervical Think Tank. DePuy Spine. Raynham, October 2010
150. Minimal access to the lateral lumbar spine. Lecture: CNS Annual Meeting. San Francisco, October 2010
151. Spinal cord injury: A devastating consequence of the Haiti earthquake. Lecture: Nurses Association. Elmhurst Hospital. Elmhurst, November 2010
152. Posterior minimally invasive surgery approach. Lecture. John Hopkins Course. Baltimore, September 2011
153. Minimally invasive lateral lumbar spine access. Lecture. NASS. Chicago, October 2011
154. MIS Section. Course Director & Lecture: Cedars Sinai Spine Course. Las Vegas, 2012
155. Minimally invasive lateral access technique. Lecture. AANS practical Course 015. April 2012
156. MIS lateral indication lecture. Lecture. AANS Practical Course 031. April 2012
157. MIS lateral technique and complications avoidance. Lecture. AANS. April 2012
158. Minimally invasive lateral lumbar spine complication incidence and avoidance. Panelist & Lecture. CNS University of Neurosurgery Webinar Minimally Invasive Spine. May 2012
159. Meeting Committee Planning Member. NASS Spine Across the Sea. Kauai, July30 – August 2, 2012
160. MIS lateral Approach. Symposium Moderator. NASS Spine Across the Sea. Kauai, July 2012
161. History of MIS lateral approach. Lecture. NASS Spine Across the Sea. Kauai, July 2012
162. MIS and new procedure. Co-Moderator: Scientific General Session. NASS Spine Across the Sea. Kauai, July 2012
163. MIS review fact or fictions lecture. Lecture. AANS Mid-Level Practitioner Course. Las Vegas, September 2012
164. Moderator for spine case review. AANS Mid-Level Practitioner Course. Las Vegas, September 2012

165. Posterior MIS approach. Lecture. John's Hopkins Spine Course. Las Vegas, September 2012
166. Lateral MIS approach. Lecture. John's Hopkins Spine Course. Baltimore, September 2012
167. Evidence based lateral minimally invasive lumbar fusion. Lecture. AANS/CNS Joint Section Spine Meeting Luncheon Seminar. Phoenix, March 2013
168. Point/Counterpoint: Cervical myelopathy posterior approach. NSA Sea Island. Georgia, April 2013
169. Scientific spine session. Moderator. NSA Sea Island. Georgia, April 2013
170. Evidence lateral interbody fusion. Lecture. AANS. New Orleans, April 2013
171. Anatomy and pearls of lateral interbody fusion. Lecture. AANS. New Orleans, April 2013
172. Spine Oral Boards Review. Moderator. CNS Webinar. Beverly Hills, May 2013
173. Co-Moderator. CNS Lumbar Fusion Guidelines Update Webinar. Beverly Hills, September 2013
174. Minimally invasive posterior approaches (discectomy, laminectomy, TLIF, percutaneous screws). Lecture. John's Hopkins Third Annual Spine Workshop. Baltimore, September 2013
175. Minimally invasive spine surgery, fact or fiction. Lecture. AANS Mid-Level Practitioner Course. Las Vegas, September 2013
176. Moderator for panel discussion with spine cases. AANS Mid-Level Practitioner Course. Las Vegas, September 2013
177. Spine cause of chronic disability in the population. Panelist & Lecture. City of Los Angeles City Hall. Los Angeles, October 2013
178. MIS surgical technique and lecture lateral access MIS. Moderator. CNS Practical Course Pc3. San Francisco, October 2013
179. Innovations in spine surgery. Moderator. CNS Luncheon Seminar. San Francisco, October 2013
180. Surgeon education lecture OLIF. Lecture. Medtronic. San Francisco, October 2013

181. Thoracic disc surgical management. Lecture. CNS Luncheon Seminar. San Francisco, October 2013
182. XLIF. Lecture. COA/AOSpine Advances Seminar. China, November 2013
183. Navigation. Lecture. COA/AOSpine Advances Seminar. China, November 2013
184. How to Avoid Facet Injury in Percutaneous Screw Placement. Lecture. COA/AOSpine Advances Seminar. China, November 2013
185. Clinical Case #1: Trauma. Case Presentation. COA/AOSpine Advances Seminar. China, November 2013
186. Clinical Case #10: Latrogenic Sagittal Imbalance Case: XLIF vs. PSO. Case Presentation. COA/AOSpine Advances Seminar. China, November 2013
187. Faculty Panel and Participant Discussion. Discussion. COA/AOSpine Advances Seminar. China, November 2013
188. OLIF51 Technique “Train the Trainer”. Lecture. Medtronic Spine Course. Florida, November 2013
189. OLIF 25: Think Outside of the Muscle. Lecture. AANS/CNS Joint Section Meeting. Florida, March 2014
190. Luncheon Symposium III: Lateral Retroperitoneal Interbody Fusion: Techniques & Outcomes. Lecture. AANS/CNS Joint Section Meeting. Florida, March 2014
191. Breakfast Seminar 309 Lumbar Interbody Fusion: Direct Lateral Retroperitoneal Transpsoas Fusion. AANS. San Francisco, April 2014
192. MIS Application in Spine Deformity. Lecture. KASS Annual Meeting. Santa Monica, June 2014
193. Minimally Invasive Spine Surgery. Practical Course Director. CNS, Boston, October 2014
194. Interbody Biomechanics. Practical Course Lecture PC9. CNS, Boston, October 2014
195. Interactive Luncheon Seminar. Spine Course Moderator. CNS, Boston, October 2014
196. Oral Boards Review: Spine. Moderator. CNS Webinar, October 2014
197. Cervical and Degenerative Spine Course. DAVOS, Switzerland, December 15 – 17, 2014

198. Lateral Complication Ureter Injury Prevention. Breakfast Seminar Lecture. AANS, Washington D.C., May 4, 2015
199. Oral Boards Review. Spine Moderator. CNS Webinar, May 6, 2015
200. First China Spine Cadaveric Spine Course. Moderator. NASS/Chinese Association Orthopedic Surgeons, Beijing, China, May 8, 2015
201. International Spine Fellowship Selection. Committee. AO Spine, Beijing, China, May 7, 2015
202. Neurosurgery, Earthquake, Spine, Family: Life Lessons Learned of a Northwestern Graduate. Lecture. Northwestern Neurosurgery Graduation. Chicago, IL, June 2015
203. MIS Applications in Spinal Deformity. 6<sup>th</sup> International Summit Forum on Spinal Deformity and Minimally Invasive Techniques. Shanghai, China, July 2015
204. Intraoperative Navigation Application During Minimally Invasive Spine Surgery. 6<sup>th</sup> International Summit Forum on Spinal Deformity and Minimally Invasive Techniques. Shanghai, China, July 2015