

Curriculum Vitae: Benson P. Yang, MD

Education

1993 to 1997 Bachelor of Science, Electrical Engineering & Computer Science, Massachusetts Institute of Technology, Cambridge, MA.

1993 to 1997 Bachelor of Science, Humanities and Science, Massachusetts Institute of Technology, Cambridge, MA.

1993 to 1997 Master of Engineering, Electrical Engineering & Computer Science, Massachusetts Institute of Technology, Cambridge, MA.

1997 to 2001 Doctor of Medicine, Yale University School of Medicine, New Haven, CT.

Residency Training

2001 to 2002 Intern, Department of Surgery, McGaw Medical Center of Northwestern University, Chicago, IL.

2001 to 2007 Resident and Chief Resident, Department of Neurological Surgery, McGaw Medical Center of Northwestern University, Chicago, IL. H. Hunt Batjer, MD, Chairman.

2005 to 2006 Complex Deformity & Minimally Invasive Spine Surgery Fellow, Section of Spine Surgery, Department of Neurological Surgery, McGaw Medical Center of Northwestern University, Chicago, IL. Stephen L. Ondra, MD and John C. Liu, MD, Program Directors.

Experience

1992 Researcher, Department of Biophysics, Rutgers University, Piscataway, NJ. Devised machine-learning programs in LISP and constructed electron density maps from X-ray crystallographic data.

1993 to 1994 Researcher, Department of Nuclear Engineering, Massachusetts Institute of Technology, Cambridge, MA. Researched neutron activation analysis of heavy metals for amyotrophic lateral sclerosis.

1994 Researcher, Biotech Process Development, Schering-Plough Research Institute, Union, NJ. Devised experiments related to purification of antibiotics using liquid chromatography and cross-flow filtration.

1996 Researcher, Congressional Research Service, Library of Congress, Washington, DC. Researched Medicare restructuring and developed an econometric model for Medicare beneficiaries using SAS.

1995 to 1997 Researcher, Department of Brain & Cognitive Sciences, Massachusetts Institute of Technology, Cambridge, MA. Researched neurotransmitter regulation and genetic expression of APP in AD.

1998 Researcher, Department of Pediatrics, Yale University School of Medicine, New Haven, CT. Examined relation between cognitive/behavioral measures and catecholamine levels in ADHD.

1999 Researcher, Department of Radiation Oncology, Thomas Jefferson University Hospital, Philadelphia, PA. Researched use of stereotactic radiotherapy for optic nerve sheath meningiomas.

2006 Project Mentor, Department of Biomedical Engineering, Northwestern University, Evanston, IL. Proposed design project and advised senior undergraduates in BMD ENG 390: Biomedical Engineering Design.

2007 to present Attending Neurological Surgeon, Northwestern Neurosurgical Associates, Chicago, IL

2007 to present Assistant Professor of Clinical Neurological Surgery, Northwestern University Feinberg School of Medicine, Chicago, IL.

Editorial Positions

1997 to 2001 Board of Editors, Yale Journal of Biology and Medicine.

Certification

- 2010 American Board of Neurological Surgery Board Certification
- 2007 State of Illinois Licensed Physician and Surgeon
- 2007 State of Illinois Controlled Substance Registration
- 2007 Federal DEA License
- 2005 American Board of Neurological Surgery Primary Examination
– 99th percentile

Honors and Awards

Finalist, 2007 Chicago MITEF/RPX Group Innovation Whiteboard Challenge.

Winner (5th author), 2007 Steven M. Pinsky Resident Research Award presented by the Illinois Radiological Society for outstanding research paper.

2nd Place (3rd author), 2007 Murphy Society Prize presented by the Graduate School at Northwestern University for best applied research study.

1st Place (team of 2), 2006 Congress of Neurological Surgeons SANS Resident Challenge.

Winner (1st author), 2006 Mayfield Clinical Science Award presented by the Joint Section on Disorders of the Spine and Peripheral Nerves for outstanding manuscript detailing a clinical investigation in the area of spinal or peripheral nerve disorders.

“Digital Water Lily,” watercolor on paper, selected for exhibition at 2004 Northwestern University Art in the Atrium. Exclusively featured in article.

Medical School:

Second Place 2000 RISK Writing Competition

Simon Kramer Society Externship

Scaife Advanced Medical Student Clerkship/Assistanceship

China Medical Board of New York Fellowship

Chinese American Medical Society Scholarship

Betty Ford Scholarship

Scaife Family Foundation Scholarship

Vernon W. Lippard Research Training Fellowship

Institute for Humane Studies Fellowship

Honor Societies:

Sigma Xi (The Scientific Research Society of North America)

Tau Beta Pi (National Engineering Honor Society)

Eta Kappa Nu (National Electrical Engineering Honor Society)

Post-Secondary:

MIT Political Science Scholarship to Washington

Michigan State University Overseas Study Scholarship to London

MIT Letter of Commendation (top 5%)

Founder of MIT Medical Congress

New Jersey Senate Resolution for Scholarship

Secondary:

Watchung-Hills Regional High School Valedictorian (class of 300)

National Merit Finalist

AP Scholar with Distinction

Robert Byrd Scholar

Edward J. Bloustein Scholar

New Jersey Garden State Scholar

Liberty Science Center Partners in Science Scholarship

1st place (state) in New Jersey Chemistry Olympics and New Jersey

Math League

Professional Societies

Active Provisional Member, American Association of Neurological Surgeons

Active Provisional Member, Congress of Neurological Surgeons

Peer-Reviewed Publications

1. O'Sullivan J, Lee JS, and Yang BP (1996). Medicare: the role of supplemental health insurance. Congressional Research Service Report for Congress, October 10.

2. Anderson GM, Dover MA, Yang BP, Holahan HM, Shaywitz SE, Marchione KE, Hall LM, Fletcher JM, and Shaywitz BA (2000). Adrenomedullary function during cognitive testing in attention-deficit/hyperactivity disorder. Journal of the American Academy of Child and Adolescent Psychiatry 39: 635-643.

3. Yang BP (2001). The breast implant controversy: a prism for reform. *Risk: Health, Safety & Environment* 12: 121-132.
4. Andrews DW, Faroozan R, Yang BP, Hudes RS, Werner-Wasik M, Kim SM, Sergott RC, Savino PJ, Shields J, Shields C, Downes MB, Simeone FA, Goldman HW, Curran WJ Jr (2002). Fractionated stereotactic radiotherapy for the treatment of optic nerve sheath meningiomas: preliminary observations of 33 optic nerves in 30 patients with historical comparison to observation with or without prior surgery. *Neurosurgery* 51: 890-902.
5. Yang BP (2003). Traumatic retroclival epidural hematoma in a child. *Pediatric Neurosurgery* 39: 339-340.
6. Yang BP, Navarro R (2004). Ventricular catheter coiling during insertion. *Pediatric Neurosurgery* 40: 47-48.
7. Yang BP, McLone DG (2004). Blood vessel mimicking dermal sinus tract. *Pediatric Neurosurgery* 40: 88-89.
8. Yang BP, Yang CW (2005). Remote cerebellar hemorrhage after craniotomy. *Pediatric Neurosurgery* 41: 52-53.
9. Yang BP, Yang CW, Mindea SA, Alden, TD (2005). Reduplication of ventriculoperitoneal shunt catheter tip back through shunt tract. *Pediatric Neurosurgery* 41: 168-169.
10. Yang, BP, Yang CW, Mindea SA, Tomita T (2005). Pituitary apoplexy. *Pediatric Radiology* 35: 830-831. Epub 2005 April 29.
11. Yang CW, Carr JC, Futterer SF, Morasch MD, Yang BP, Shors SM, Finn JP (2005). Contrast-enhanced MR angiography of the carotid and vertebrobasilar circulations. *AJNR American Journal of Neuroradiology* 26: 2095-2101.
12. Yang CW, Yang BP (2005). Massive cerebral arterial air embolism following arterial catheterization. *Neuroradiology* 47: 892-894. Epub 2005 Sep 2.
13. Yang BP (2005). Abandoned lighthouse, Klein Curaçao, Netherlands Antilles. *Spine* 30(24): i.
14. Yang BP (2006). Falling from grace, St. Louis, Missouri. *Spine* 31(6): i.
15. Yang BP, Mindea SA, DiPatri AJ (2006). Cervical spinal cord compression in chondrodysplasia punctata. *Journal of Neurosurgery* (3 Supplement Pediatrics) 104: 212.

16. Yang BP (2006). Shipwreck, Klein Curaçao, Netherlands Antilles. *Spine* 31(9): i.
17. Yang BP, Ondra SL, Chen LA, Jung H, Koski TR, Salehi SA (2006). Outcomes of thoracic and lumbar pedicle subtraction osteotomy for fixed sagittal imbalance. *Journal of Neurosurgery* (2 Supplement Spine) 5: 9-17.
18. Yang BP, Das S, Yang CW, Cozzens JW (2006). Images in neuro-oncology. Selective invasion of the anterior commissure in glioblastoma multiforme. *Journal of Neuro-Oncology* 80: 275-276. Epub 2006 Jun 14.
19. Mindea SA, Yang BP, Shenkar R, Bendok BR, Batjer HH, Awad IA (2006). Cerebral cavernous malformations: clinical insights from genetic studies. *Neurosurgical Focus* 21(1): E1, 1-7.
20. Mindea SA, Yang BP, Bendok BR, Miller JW, Batjer HH (2006). Endovascular treatment strategies for cerebral vasospasm. *Neurosurgical Focus* 21(3): E13, 1-7.
21. Yang BP, Ondra SL (2006). Method for calculating the exact angle required during pedicle subtraction osteotomy for fixed sagittal deformity: comparison with trigonometric method. *Neurosurgery* 59 (ONS Suppl 4): ONS-458-ONS-463.
22. Yang BP, Ondra SL (2006). Imaging Corner: Unknown case: Clinical Presentation. *Spine* 31(23): 2756-2757.
23. Yang BP, Ondra SL (2006). Unknown case: Part II. Soft tissue herniation through a thoracic laminectomy defect. *Spine* 31(24): 2871-2872.
24. Yang BP (2006). Santa Cova clinging to mountainside, Montserrat, Spain. *Spine* 31(26): i.
25. Yang BP (2007). Ancient Roman Mosaics at the Baths of Neptune, Ostia Antica, Italy. *Spine* 32(3): i.
26. Yang BP, Yang CW, Ondra SL (2007). A novel mathematical model of the sagittal spine. *Spine* 32(4): 466-470.
27. Mindea SA, Yang BP, Batjer HH (2007). Unruptured arteriovenous malformation in a patient presenting with obstructive hydrocephalus: case report and review of the literature. *Neurosurgical Focus* 22(4): E11, 1-4.
28. Yang BP, Chen LA, Ondra SL (2008). A novel mathematical model of the sagittal spine: application to pedicle subtraction

osteotomy for correction of fixed sagittal deformity. *The Spine Journal* 8: 359-366. Epub 2007 Jun 21.

29. Shih P, Yang BP, Batjer HH, Liu JC (2009). The surgical management of superficial siderosis: A case illustration. *The Spine Journal* 9: e16-19.

30. O'Shaughnessy BA, Kuklo TR, Hsieh PC, Yang BP, Koski TR, Ondra SL (2009). Thoracic pedicle subtraction osteotomy for fixed sagittal spinal deformity. *Spine* 34(26): 2893-2899.

31. Yang BP, Wahl MM, Idler CS (2011). Percutaneous Lumbar Pedicle Screw Placement Aided by Fluoroscopy-Based Navigation: Results of a Prospective Multicenter Randomized Study. NuVasive, Inc. [White Paper].

32. Yang BP, Wahl MM, Idler CS (2012). Percutaneous Lumbar Pedicle Screw Placement Aided by Computer-Assisted Fluoroscopy-Based Navigation: Perioperative Results of a Prospective, Comparative, Multicenter Study. *Spine* 37(24): 2055-2060.

Abstracts/Oral and Poster Presentations

1. Lee RKK, Wurtman RJ, Yang BP, and Neve R. Increased tau protein in primary cortical neurons expressing human A β 1-42 and APP751. Abstract and research poster, Society for Neuroscience, Washington, D.C., November 1996.

2. Fung CW, Carr JC, Futterer SF, Morasch MD, Shors SM, Yang BP, Finn JP. Contrast-enhanced MR angiography of the vertebrobasilar circulation. Abstract and research poster, International Society for Magnetic Resonance in Medicine, Toronto, Canada, July 2003.

3. Yang BP, Ondra SL. A mathematical model of the sagittal spine. Abstract and research poster, Congress of Neurological Surgeons, Boston, MA, October 2005.

4. Yang BP, Ondra SL. A mathematical model of the sagittal spine. Research poster, Northwestern University Joint Neurosurgery - Bioengineering Research Day, Evanston, IL, October 2005.

5. Yang BP, Ondra SL, Chen LA, Jung H, Koski TR, Salehi SA. Clinical and radiographic outcomes of thoracic and lumbar pedicle subtraction osteotomy for fixed sagittal imbalance. Abstract and research poster, AANS/CNS Section on Disorders of the Spine

and Peripheral Nerves, Lake Buena Vista, FL, March 2006. Winner, 2006 Mayfield Clinical Science Award.

6. Yang BP, Yang CW. Massive cerebral arterial air embolism following arterial catheterization. Abstract and research poster, American Association of Neurological Surgeons, San Francisco, CA, April 2006.

7. Yang BP, Mindea SA, DiPatri AJ. Cervical spinal cord compression in chondrodysplasia punctata. Abstract and research poster, American Association of Neurological Surgeons, San Francisco, CA, April 2006.

8. Yang BP, Mindea SA, Koski TR, Ondra SL. Selective C1 to C3 reconstruction after circumferential complete C2 resection for an enchondroma. A strategy to spare the occipitocervical junction. Abstract and research poster, American Association of Neurological Surgeons, San Francisco, CA, April 2006.

9. Mindea SA, Yang BP, Ondra SL. Vascularized fibular strut grafts for anterior column reconstruction after transoral tumor resection. Abstract and research poster, American Association of Neurological Surgeons, San Francisco, CA, April 2006.

10. Yang BP, Ondra SL, Chen LA, Jung H, Koski TR, Salehi SA. Clinical and radiographic outcomes of thoracic and lumbar pedicle subtraction osteotomy for fixed sagittal imbalance. Abstract, oral presentation, and research poster, International Meeting on Advanced Spine Techniques, Athens, Greece, July 2006.

11. Yang BP, Ondra SL. Method for calculating the exact angle required during pedicle subtraction osteotomy for fixed sagittal deformity: comparison with trigonometric method. Abstract and research poster, International Meeting on Advanced Spine Techniques, Athens, Greece, July 2006.

12. Yang BP, Mindea SA, Koski TR, Ondra SL. Selective C1 to C3 reconstruction after circumferential complete C2 resection for an enchondroma. A strategy to spare the occipitocervical junction. Abstract and research poster, International Meeting on Advanced Spine Techniques, Athens, Greece, July 2006.

13. Yang BP, Ondra SL. Symptomatic spinal cord compression from post-laminectomy soft tissue herniation. Abstract and research

poster, International Meeting on Advanced Spine Techniques, Athens, Greece, July 2006.

14. Yang BP, Chen LA, Ondra SL. A novel mathematical model of the sagittal spine: application to pedicle subtraction osteotomy for correction of fixed sagittal deformity. Abstract and research poster, International Meeting on Advanced Spine Techniques, Athens, Greece, July 2006.

15. Yang BP, Yang CW, Ondra SL. A novel mathematical model of the sagittal spine. Abstract and research poster, International Meeting on Advanced Spine Techniques, Athens, Greece, July 2006.

16. Yang BP, Ondra SL, Chen LA, Jung H, Koski TR, Salehi SA. Clinical and radiographic outcomes of thoracic and lumbar pedicle subtraction osteotomy for fixed sagittal imbalance. Abstract and research poster, Scoliosis Research Society, Monterey, CA, September 2006.

17. Yang BP, Ondra SL. Method for calculating the exact angle required during pedicle subtraction osteotomy for fixed sagittal deformity: comparison with trigonometric method. Abstract and research poster, Congress of Neurological Surgeons, Chicago, IL, October 2006.

18. Yang BP, Chen LA, Ondra SL. A novel mathematical model of the sagittal spine: application to pedicle subtraction osteotomy for correction of fixed sagittal deformity. Abstract and research poster, Congress of Neurological Surgeons, Chicago, IL, October 2006.

19. Yang BP, Evans K, Lam CK, Radwanski KN, Sanders DE, Wang HH, Messersmith PB. In vitro testing of a mesh-based non-occluding ventricular catheter. Abstract and select oral poster, Congress of Neurological Surgeons, Chicago, IL, October 2006.

20. Lam CK, Radwanski KN, Yang BP, Messersmith PB. Application of biocompatible materials to improve implanted devices in the treatment of disease. Oral presentation and research poster, Northwestern University InNUvation Applied Research Day, Evanston, IL, February 2007. 2nd Place, 2007 Murphy Society Prize.

21. Yang CW, Carr JC, Futterer SF, Morasch MD, Yang BP, Shors SM, Finn JP. Contrast-enhanced MR angiography of the carotid and vertebrobasilar circulations. Oral presentation, Illinois Radiological

Society, Chicago, IL, March 2007. Winner, 2007 Steven M. Pinsky Resident Research Award.

22. O'Shaughnessy B, Kuklo T, Yang B, Koski T, Ondra S. Thoracic pedicle subtraction osteotomy for fixed sagittal deformity: clinical and radiographic outcomes. Abstract and research poster, North American Spine Society, Austin, TX, October 2007.

23. Yapor WY, Yang BP. Anterior cervical fusion using poly(L-lactide-co-D,L-lactide) bioabsorbable implants: series of 38 consecutive cases. Select abstract and research poster, Congress of Neurological Surgeons, Orlando, FL, September 2008.

24. Yang BP, Yapor WY. Anterior cervical fusion using poly(L-lactide-co-D,L-lactide) bioabsorbable implants: series of 38 consecutive cases. Abstract and research poster, International Meeting on Advanced Spine Techniques, Vienna, Austria, July 2009.

25. Yang BP, Yapor WY. Anterior cervical fusion using poly(L-lactide-co-D,L-lactide) bioabsorbable implants: series of 38 consecutive cases. Abstract and research poster, Congress of Neurological Surgeons, New Orleans, LA, October 2009.

26. Yang BP, Wahl MM, Idler CS. A multi-center evaluation of percutaneous lumbar pedicle screw placement aided by fluoroscopy-based navigation. Abstract and research poster, International Meeting on Advanced Spine Techniques, Copenhagen, Denmark, July 2011.

Theses

1. Yang BP. Regulation of tau gene expression by Ab and the amyloid precursor protein in cultured cortical neurons. Master of Engineering Thesis, Massachusetts Institute of Technology, 1997.

2. Yang BP. Correlates between attention-deficit/hyperactivity disorder dimensional scales and urinary neurochemical excretion. Doctor of Medicine Thesis, Yale University School of Medicine, 2000.

Institutional Review Board Approved Clinical Trials

1. The Clinical Utility of NeuroVision® Guidance in the Placement of Percutaneous Pedicle Screws: A Prospective Evaluation. Principal Investigator, Resurrection Medical Center.

Invited Presentations

1. "Spinal trauma, tumors, and deformity." Making Sense of Spinal Surgery, Medtronic Sofamor Danek Headquarters, Westchester, IL. February 26, 2005.
2. "Anterior approaches to the cervical spine." Department of Neurological Surgery Grand Rounds, Northwestern Memorial Hospital, Chicago, IL. September 8, 2005.
3. "The pterional craniotomy: techniques and modifications." Department of Neurological Surgery Grand Rounds, Evanston Hospital, Evanston, IL. August 11, 2006.
4. "The failed spine: a historical case study." Department of Neurological Surgery Graduation, Northwestern Memorial Hospital, Chicago, IL. June 15, 2007.
5. "Minimally-invasive spine surgery: new approaches to old dilemmas." President's Future Leaders Council, Swedish Covenant Hospital, Chicago, IL. October 16, 2007.
6. "Lumbar spinal stenosis." Grand Rounds, Swedish Covenant Hospital, Chicago, IL. November 12, 2008.
7. "Subarachnoid hemorrhage, triple-H therapy, and sodium management." Resurrection Medical Center, Chicago, IL. December 11, 2008.
8. "Aneurysmal subarachnoid hemorrhage – diagnosis and treatment." Resurrection Medical Center, Chicago, IL. February 10, 2009.
9. "Acute management: hemorrhagic stroke." 2nd Annual Resurrection Health Care Stroke Center Symposium, Des Plaines, IL. May 5, 2009.
10. "Aneurysmal subarachnoid hemorrhage – diagnosis and treatment." Resurrection Medical Center, Chicago, IL. July 29, 2009.
11. "Aneurysmal subarachnoid hemorrhage – diagnosis and treatment." Saints Mary and Elizabeth Medical Center, Chicago, IL. November 12, 2009.
12. "Vestibular Schwannoma." Resurrection Medical Center, Chicago, IL. December 14, 2010.

