

## CURRICULUM VITAE

NAME Fady T. Charbel, M.D., F.A.A.N.S., F.A.C.S

Head, Department of Neurosurgery  
Richard L. and Gertrude W. Fruin Professor  
Chief Clinical Service  
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### BOARD CERTIFICATION

May 1998 American Board of Neurological Surgery

### EDUCATION

1975 – 1977 Oriental College, Zahle, Lebanon Baccalaureate in Experimental Sciences  
1977 – 1984 St. Joseph University, Faculty of Medicine. Beirut, Lebanon. M.D. Degree  
2002, Jan Harvard School of Public Health: Program for Chiefs of Clinical Service

### CLINICAL TRAINING

1984 – 1985 Neurosurgery Microsurgery Research Fellow, Henry Ford Hospital,  
Detroit, MI  
1985 – 1986 Neurosurgery Clinical Fellow, Montreal Neurological Institute,  
McGill University, Montreal, Quebec, Canada  
1986 – 1987 Surgery Intern, Henry Ford Hospital, Detroit, MI  
1987 – 1991 Neurosurgery Resident, Henry Ford Hospital, Detroit, Michigan  
1991 – 1993 Neurosurgery Chief Resident, University of Illinois at Chicago

## AWARDS AND HONORS

1999	<b>Honorary Member</b> , Center for Neurology & Neurosurgery, BeloHorizonte, Brazil
1999	<b>Honorary Member</b> , Chilean Society of Neurological Surgeons
1999 – 2005	Membre du <b>Comite Directeur &amp; Scientifique</b> (Board of Directors), Societe de Neurochirurgie de Langue Francaise
2000 – 2001	<b>President</b> , the World Association of Lebanese Neurosurgeons
2001 –present	The Best Doctors in America, <b>Best Doctors®</b>
2002	<b>Inventor of the Year Award</b> . The University of Illinois at Chicago
2004	<b>The John R. Green Lecturer</b> . Barrow Neurological Institute
2004	<b>Fellow</b> , American College of Surgeons
2005	<b>President</b> , Chicago Neurological Society
2005	<b>Cedars Award</b> , Chicago Lebanese Club
2006	<b>Mentoring Award</b> , University of Illinois at Chicago College of Medicine
2006	<b>Wall Street Journal “Technology Innovation Award”</b> : Medical Devices, Runner-up
2006 –present	Marquis Who’s Who in Science and Engineering
2009	<b>Gurdjian-Thomas Visiting Professor Lecturer</b> . Wayne State University, MI
2010	<b>The Sidney A. Hollin, MD, Endowed Lecturer</b> . Mount Sinai, NY
2011	<b>Vice-Chairman</b> , Joint Section of Cerebrovascular Surgery
2012	<b>Career Achievement Award</b> . The Chicago Neurological Society
2012	<b>The 18<sup>th</sup> Charles A. Fager Lecturer</b> . Lahey Clinic, Burlington, MA
2012 –present	Castle Conolly, <b>America’s Top Doctors ®</b>
2013	<b>The Raymond M. Donaghy Lecturer</b> . American Association of Neurological Surgeons annual scientific meeting. AANS/CNS cerebrovascular section New Orleans.
2013	<b>The John Abele Honorary Lecturer</b> . 25 <sup>th</sup> congress of the International Society for Medical Innovations and Technology. Baden Baden, Germany.
2014	The <b>Dr. Richard L. and Gertrude W. Fruin Professorship</b> recipient
2015	<b>The 25<sup>th</sup> Sidney A. Hollin MD Memorial Lectureship</b> . Mount Sinai, NY

## ACADEMIC POSITIONS

1993 – 1998	Assistant Professor, Neurosurgery, University of Illinois at Chicago
1993 – 2001	Director, Clinical Service, Department of Neurosurgery, University of Illinois at Chicago
1993 – 2001	Director, Surgical Epilepsy Program, UIC Comprehensive Epilepsy Center
1994 – 2008	Medical Director, Neurosurgery Clinic, University of Illinois at Chicago

1994 – present	Medical Director, Neurosurgery Intensive Care Unit, University of Illinois at Chicago
1997 – present	Director, Computer-Aided Neurovascular, Analysis and Simulation (CANVAS) Program, University of Illinois at Chicago
1998 – 2001	Associate Professor (with tenure), Neurosurgery, University of Illinois at Chicago
1999 – 2006	Director, Residency Program, Department of Neurosurgery
1999 – present	Chief, Divisions of Cerebrovascular Surgery and Critical Care Department of Neurosurgery, University of Illinois at Chicago
2000 – 2001	Vice-Chairman, Department of Neurosurgery, University of Illinois at Chicago
2001	Acting Head, Department of Neurosurgery, University of Illinois at Chicago
2001 – present	Professor, Neurosurgery, University of Illinois at Chicago
2001 – 2002	Interim Head, Department of Neurosurgery, University of Illinois
2002 – present	Head, Department of Neurosurgery, University of Illinois at Chicago
2002 – present	Chief of Service, University of Illinois at Chicago Medical Centers

#### HOSPITAL APPOINTMENTS

1993 – present	University of Illinois Hospital and Health Sciences System
1996 – present	Rush University Medical Center
2001 – 2005	Franciscan St. Margaret Health Center
2003 – 2010	St. Alexius Medical Center
2003 – 2011	Advocate Christ Medical Center
2003 – present	Alexian Brothers Medical Center
2005 – present	Provena Saint Joseph Medical Center
2005 – present	St Mary of Nazareth Medical Center - Resurrection Health Care
2006 – present	Resurrection Medical Center
2009 – present	Saint Joseph Hospital – Resurrection Health Care
2009 – present	St Francis Medical Center – Resurrection Health Care
2009 – 2014	Advocate Illinois Masonic Medical Center

#### UNIVERSITY OF ILLINOIS ACADEMIC COMMITTEES

2012 – present	Visioning and Strategic Team, UIC research and city of Chicago economic initiatives
2012 – 2015	Board of Directors, Wood, Wolcott and Taylor (Billing and collections agency for the University of Illinois at Chicago Physicians Group)
2011 – 2012	College of Medicine Research Space Committee
2010 – 2011	Office of Vice Chancellor for Research Advisory Committee

2009 – present	Medical Malpractice Oversight Committee
2006 – present	Mentor, Clinical Research Training Program
2005 – 2012	Chairman of the Board of Directors, Wood, Wolcott and Taylor (Billing and collections agency for the University of Illinois at Chicago Physicians Group)
2005 – present	Founder and Director, Illinois Stroke Institute
2004 – present	Executive committee of the Medical Service Plan/Physician Group
2002 – 2010	College of Medicine Executive Committee
2001 – 2010	Faculty Senate
2000 – 2009	Intellectual Property Advisory Committee
1997 – present	Committee on the Operating Room
1996 – 2000	Medical Center Quality Management Committee
1994 – 2000	Adult ICUs CQI Committee
1994 – 1999	Medical Center Physicians' Directors Committee
1994 – 1996	College of Medicine Curriculum Committee

#### MAJOR SEARCH COMMITTEES

2015	Vice-Chancellor for Health Affairs – University of Illinois at Chicago (committee member)
2013	Chief Development Officer – College of Medicine and University of Illinois Hospital and Health Sciences System (committee Chair)
2012	Chair, Department of Neurology (committee member)
2009 – 2010	Associate Dean of Clinical Affairs (committee member)
2002	Chair, Department of Neurology and Rehabilitation Medicine (committee member)
1998	Chair, Department of Radiology (committee member)

#### Ph.D. ADVISORY COMMITTEES

June 2010	Thesis evaluation committee and Opponent: Tristan Van Doormaal. University Medical Center, Utrecht, The Netherlands Department of Neurosurgery Advisors: Dr. L. Regli, Dr. A. van der Zwan and Dr. B.H. Verweij.
June 2009	Thesis evaluation committee and Opponent: Johan Marjamaa. University of Helsinki, Finland, Department of Neurosurgery Advisors: Dr. Mika Niemela and Dr. Marko Kangasniemi

## PROFESSIONAL ORGANIZATIONS

American Academy of Neurological Surgeons (elected)  
American Association for the Advancement of Science  
American Association of Neurological Surgeons  
American College of Surgeons  
American Heart Association/American Stroke association  
American Medical Association  
Chicago Medical Society  
Chicago Neurological Society  
Congress of Neurological Surgeons  
Illinois Neurosurgical Society  
Institute of Electrical and Electronic Engineers/  
Society of Engineering in Medicine and Biology  
Institute of Medicine of Chicago (Elected)  
International Advisory Board of the Romanian Society of Neurosurgery  
Joint Section on Cerebrovascular Surgery - AANS & CNS  
Joint Section on Neurotrauma and Critical Care - AANS & CNS  
Neurosurgical Society of America  
Société de Neurochirurgie de Langue Française (Elected)  
Society of Critical Care Medicine  
Society of Neurological Surgeons (Elected)  
World Association of Lebanese Neurosurgeons

## VISITING PROFESSOR AND NAMED LECTURES

1. Visiting Professor, Department of Neurosurgery, Hotel Dieu de France Hôpital, “Management of complex intracranial aneurysms” Beirut, Lebanon; September 1994.
2. Visiting Professor, Department of Neurosurgery, University of Texas Southwestern School of Medicine. Dallas, Texas; March 21, 1997.
  - Monitoring temporary ischemia: new tools and new insights.
  - The development and applications of a computerized model of the cerebral circulation.
3. Visiting Professor, Service de Neurochirurgie and Service d’Anesthesie Reanimation, Hôpital de Hautepierre. “Monitoring intra- et postoperatoire de l’ischémie cérébrale” Strasbourg, France, November 29, 1997.
4. Visiting Professor: Department of Neurosurgery, University of Illinois College of Medicine at Peoria, Peoria, Illinois; February 18–19, 1999.
  - Computerized modeling of the brain circulation.
  - Management of complex aneurysms and the Transonic probe.

5. Visiting Professor: Department of Neurosurgery, Loyola University. "Computerized modeling and Phase Contrast MRI Flow Quantification in the Management of Complex Cerebrovascular Disorders" Maywood, Illinois; February 23, 1999.
6. Visiting Professor: Department of Neurosurgery, Northwestern University "Technological Advances in the management of cerebrovascular disorders" Chicago, Illinois, January 7, 2000.
7. Visiting Professor: Department of Neurosurgery, State University of New York at Buffalo, Buffalo, New York. September 19, 2002.
8. Visiting Professor: Department of Neurosurgery, University of California at San Francisco, San Francisco, California. November 19, 2002.
9. Visiting Professor: Department of Neurosurgery, Massachusetts General Hospital, Harvard University, Boston, Massachusetts. January 30-31, 2003.
10. Visiting Professor: Department of Neurosurgery, University of New York at Buffalo, Buffalo, New York. May 27, 2003.
11. Visiting Professor: Department of Neurosurgery, Weil Medical College of Cornell University. "Quantitative Cerebral MRA" November 10, 2003.
12. Visiting Professor: Department of Neurosurgery, Yale University Medical School. New Haven, Connecticut. January 7, 2004.
13. Visiting Professor: Department of Neurosurgery, Northwestern Medical Faculty Foundation. "Cerebral Blood Flow Measurements and Implications for Revascularization Surgery" Evanston, Illinois. February 6, 2004.
14. The John R. Green Visiting Professor: Department of Neurosurgery, Barrow Neurological Institute "Vertebro Basilar Ischemia (VBI), A Personal Journey" Phoenix, Arizona. September 16-17, 2004.
15. Visiting Professor: Department of Neurosurgery, Stanford University Medical Center, Stanford, California. December 16-17, 2004. "Vertebro Basilar Ischemia (VBI), A Personal Journey."
16. Visiting Professor: Department of Neurosurgery, University of Miami. "Bypass surgery for cerebral ischemia;" "The use of NOVA in the workup of Cerebrovascular disease" June 15, 2006.
17. Visiting Professor: Department of Neurosurgery, University of Massachusetts Medical School. Worcester, Massachusetts. "EC-IC Bypass: A revival?" June 24, 2008.
18. Visiting Professor: Department of Neurosurgery, Allegheny General Hospital, Pittsburgh, PA. "The Expanding Role of EC-IC Bypass for Ischemia and Aneurysms". October 8, 2008.
19. The Gurdjian-Thomas Visiting Professor: Wayne State University Department of Neurosurgery, "EC-IC Bypass: A Quarter Century Later, What Have We Learned?". Detroit, MI. May 26, 2009.

20. Visiting Professor: Department of Neurosurgery, David Geffen School of Medicine at UCLA, Ronald Reagan UCLA Medical Center, Los Angeles, CA. July 15, 2009.
  - “The Importance of Quantification of Blood Flow”
  - “Hemodynamic vertebrobasilar ischemia: Solving a clinical conundrum”.
21. Visiting Professor: Department of Neurosurgery, David Geffen School of Medicine at UCLA, Ronald Reagan UCLA Medical Center, Los Angeles, CA July 15, 2009.
22. Visiting Professor: University of Toronto, Division of Neurosurgery - City Wide Rounds. “Quantification of cerebral vessels flow: Is it relevant?” November 26-27, 2009.
23. Visiting Professor: Victor Horsley Department of Neurosurgery. The National Hospital for Neurology and Neurosurgery. “Vascular Neurosurgery: Past, Present & Future” Queen Square, London, United Kingdom. December 10, 2009.
24. Visiting Professor: Montefiore Medical Center, Department of Neurosurgery. “A Quantitative Flow Driven Approach to Vascular Neurosurgery” Bronx, NY February 1, 2010.
25. Visiting Professor: University of Pittsburgh, Department of Neurosurgery. Pittsburgh, PA July 7, 2010.
  - Management of Vertebrobasilar Ischemic Disease – A flow-based Algorithm
  - The Art and Science of ECIC Bypass Surgery
26. The Sidney A. Hollin, MD, Endowed Lecture - 20<sup>th</sup> Hollin Visiting Lecturer at the Mount Sinai Department of Neurosurgery, “Surgical Revascularization of the Brain: Why & How?”, New York, NY - October 26, 2010.
27. Visiting Professor: Mercy Hospital and Medical Center: “Update of Stroke and Acute Neurosurgical Emergencies”. Chicago, Illinois - March 17, 2011.
28. Visiting Professor: The University of Chicago Department of Surgery Section of Neurosurgery, “Intra & Perioperative Evaluation of Cerebral Hemodynamics”. Chicago, Illinois - March 23, 2011.
29. Visiting Professor and “Honored faculty” at The 6<sup>th</sup> National Yang Ming University-Taipei Veterans General Hospital – Lectures on Hands-on Cadaver Dissection Course for Cerebrovascular Microsurgery, Taipei, Taiwan – April 4-6, 2011.
  - Options for Bypass in Aneurysm Surgery
  - STA-MCA Bypass Technique
  - The F.A.S.T method for donor graft selection in flow replacement bypass
30. Visiting Professor and Invited Lecturer: The Third HuaShan International Conference on Surgery for Cerebral and Spinal Vascular Diseases. Shanghai, China – April 14-17, 2011.
  - Bypass in the Treatment of Aneurysms
  - Bypass for Ischemic Cerebrovascular Diseases

31. Visiting Professor: Mayo Clinic Department of Neurosurgery: “Surgical Revascularization of the Brain: Why & How”. Saint Marys Hospital, Rochester, MN – November 15, 2011.
32. Visiting Professor: Rush University Medical Center, Department of Neurosurgery: Grand Rounds. December 7, 2011.
33. Visiting Professor: Hokkaido University, Department of Neurosurgery: “The Utility and Applications of Vessel Flow Measurements”. Sapporo, Japan – March 21, 2012.
34. Visiting Professor: Tokyo Women’s Hospital, Department of Neurosurgery: “The Utility and Applications of Vessel Flow Measurements”. Tokyo, Japan – March 22, 2012.
35. The Charles A. Fager, MD, Endowed Lecture - 18<sup>th</sup> Annual Charles A Fager Lecture in Neurosurgery. “Vessel Flow Measurements-Current and Future Applications”. Lahey Clinic. Burlington, MA- September 5, 2012.
36. Visiting Professor: Centre Hospitalier Universitaire de Montreal, Department of Neurosurgery. “Update on EC-IC Bypass”. Hopital Notre-Dame, Montreal, Quebec, Canada – April 2, 2013.
37. The Raymond M. Donaghy, MD Lecture – 26<sup>th</sup> RM Peardon Donaghy, MD, Lecture. “Measures, Outcomes and the Pursuit of Perfection”. The 81<sup>st</sup> American Association of Neurological Surgeons Annual Scientific Meeting. New Orleans, LA – May 1, 2013.
38. Visting Professor: Nagasaki University, Department of Neurosurgery: “Vessel Flow Measurements in Cerebrovascular Neurosurgery”. Nagasaki, Japan – July 16, 2013.
39. Visiting Professor: Hiroshima University, Department of Neurosurgery: “Vessel Flow Measurements in Cerebrovascular Neurosurgery”. Hiroshima, Japan – July 17, 2013.
40. Visiting Professor: National Cerebral and Cardiovascular Center, Department of Neurosurgery: “IntraOperative Applications for Ultrasonic Blood Flowmeter”. Osaka, Japan – July 18, 2013.
41. Visiting Professor: Keio University, Department of Neurosurgery: “Vessel Flow Measurements in Cerebrovascular Neurosurgery”. Tokyo, Japan – July 19, 2013.
42. The John Abele Honorary Lecture. “Cerebral Revascularization: Simulations and Measurements in the Pursuit of Perfection”. 25<sup>th</sup> congress of the International Society of Medical Innovation and Technology. Baden Baden, Germany – September 5, 2013.
43. Distinguished Visiting Professor: The University of Arizona, Division of Neurosurgery: “Measurements, Outcomes and the Pursuit of Perfection”. Tucson, AZ. May 2, 2014.
44. UIC Bioengineering Clinician-Scientist Distinguished Lecture Series: “The Imperative for a Quantitative Approach to (Neurovascular) Medicine”. The University of Illinois at Chicago School of Bioengineering. Chicago, IL. October 24, 2014.



45. The 2015 City-Wide Rounds Visiting Lecturer at Toronto Western Hospital: “A Flow-Based Algorithm for the Management of Steno-Occlusive Vertebro-Basilar Disease”. The University of Toronto, Division of Neurosurgery. Toronto, May 1, 2015.
46. The 25<sup>th</sup> Visiting Lecturer for the Department of Neurosurgery’s Sidney A. Hollin, MD, Memorial Lectureship: “Revascularization for Vertebro-Basilar Disease”. Mount Sinai Health System, Department of Neurosurgery. New York, NY. October 28, 2015.
47. Visiting Professor: Department of Neurosurgery, Barrow Neurological Institute “Vertebro Basilar Disease: A Story in Five Acts”. Phoenix, AZ. June 4, 2016.
48. Honored Guest of Neurology and Neurosurgery Resident Research Day: Judge and Awards Presenter.  
Visiting Professor and Clinical Neurosciences Grand Rounds: “Contemporary Management of Vetebro-basilar Disease: A Story in Five Acts”.  
University of New Mexico. Albuquerque, NM. June 10-11, 2016

#### EDITORIAL BOARDS

2012	The Journal of Cerebrovascular and Endovascular Neurosurgery
2010	Neurology Research International
2009-2016	Contemporary Neurosurgery
2006	Panarab Journal of Neurosurgery
2001	Annals of Neurosurgery

#### EDITORIAL REVIEWS (Ad hoc)

*Neurosurgery*  
*Acta Neurochirurgica*  
*Clinical Neurology and Neurosurgery*  
*Journal of Cerebral Blood Flow & Metabolism*  
*Journal of Stroke and Cerebrovascular Diseases*  
*Journal of Neuroimaging*  
*Microvascular Research*  
*Neurosurgical Review*  
*Stroke*  
*Surgical Neurology/International*

*World Neurosurgery*

RESEARCH SUPPORT (selected)

- 1996 – 2000                      UIC Neuroscience Programs/Project Development Committee  
Role: Principal Investigator  
Title: “Development of a Computerized Model of the Cerebral Circulation”.
- 1997 – 1998                      Diametrics Medical Ltd.  
Role: Principal Investigator  
Title: “Tissue gases and pH following subarachnoid hemorrhage”.
- 1997 – 1999                      Whittaker Foundation  
Role: Co-Principal Investigator  
Title: “Extraction and Registration of the Neurovascular Scaffold in Multimodal Images.
- 2001 – 2007                      Ralph and Marion Falk Medical Research Trust  
Role: Principal Investigator  
Title: “The CANVAS project”
- 2002 – 2011                      NIH/NINDS 5U01 NS42167-02  
Role: Site Principal Investigator (PI-William Powers, M.D.)  
Title: “Carotid Occlusion Surgery Study (COSS)”
- 2003 – 2006                      NLM/NIH NO1-LM-3-3507  
Role: Co-Investigator (PI: Zhuming Ai)  
Title: “A Tele-Immersive System for Surgical Consultation and Implant Modeling”
- 2004 – 2009                      NIH/NINDS R01 NS048212-01A1  
Role: Site Principal Investigator (PI Randolph Marshall, MD)  
Title: “Randomized Evaluation of Carotid Occlusion and Neurocognition” (RECON)
- 2006 – 2009                      CCTS Pilot Grant, University of Illinois at Chicago

Role: Co-Investigator (PI- Meide Zhao Ph.D.)  
Title: “Image-Based Patient-Specific Predictive Modeling of Cerebral Circulation”

2006 – 2011  
NIH/NINDS R01 NS051631-01A2  
Role: Site Subinvestigator (Site PI - Venkatesh Aiyagari, MD, PI - Colin Derdeyn, MD)  
Title: “The Role of Cerebral Hemodynamics in Moya Moya Disease”

2007 – 2010  
The Ralph and Marion Falk Medical Research Trust  
Role: Principal Investigator  
Title: “Quantitative Blood Flow Assessment in Evaluation and Treatment of Cerebrovascular Disease”

2007 – 2010  
NIH RO1 3HS017361  
Role: Co-Investigator. (PI – P. Banerjee, Ph.D.)  
Title: “Practice makes perfect , does practice on a virtual reality haptics simulator improve residents ability to perform ventriculostomy”

2007 – 2010  
UIC Grant G6592 - Leica Microsystems, Inc  
Role: Principal Investigator  
Title: “Development of Indocyanine Green Fluorescent Video-Angiography”

2008 – 2011  
NIH R21 EB007650  
Role: Co-Investigator (PI – P. Banerjee, Ph.D.)  
Title: “Spinal Surgical Simulation Translational Research Using Collocated Virtual Reality and Haptics”

2009 – 2011  
Actelion Clinical Research, Inc. - NCT00558311  
Role: Site Co-investigator (Site PI – Victor A. Aletich, MD)  
Title: “A Prospective Multi Center Double Blind Randomized Placebo Controlled Parallel Group Study to Assess the Efficacy and Safety of Clazosentan in Reducing vasospasm-related morbidity”

2009 – 2012  
U01NS062851-01A1  
(PI – Hanley)  
Title: “Clot Lysis: Evaluating Accelerated Resolution of Intraventricular Hemorrhage”.

2008 – 2014  
NIH/NINDS RO1 NS059745-02  
Role: Co-Investigator. (PI – Sepideh Amin-Hanjani, M.D.)  
Operations Committee Member  
Title: “Vertebrobasilar Flow Evaluation and Risk of Transient Ischemic Attack and Stroke (VERiTAS)”

## GRANT REVIEWS

1. Achieving Functional Health: An Innovative Approach to Caring for Patients with Chronic and Complex Disorders. Canada Foundation for Innovation. November 2007.
2. Improving vascular neurosurgery planning and navigation using virtual reality technology. National Medical Research Council –Ministry of Health – Singapore. July 2009.
3. Institutional mentored Research. University of Wisconsin Institute for Clinical and Translational Research. September 2011.

## DEPARTMENT REVIEWS

1. External Reviewer (with Christopher S. Ogilvy, MD): Department of Neurosurgery, Sidney Kimmel Medical College at Thomas Jefferson University. Philadelphia. Pennsylvania. September 29-30, 2014.
2. Internal Reviewer: Department of Physiology, University of Illinois at Chicago. November 2014

## PATENTS

1-Ultrasonic probe:

Inventors: **Charbel, Fady T;** Drost, Cornelis; Shkarlet, Yuri, Kopychev, Andrey; Ostergren, Lauren; Sergeeva, Irina. Assignee: Transonic, Systems. Appl. No.: 09/054,615. Filed: April 3, 1998. United States Patent: US6036645A. Issued: January 23, 2000.

2-Patient specific circulation model.

Inventors: **Charbel; Fady T.**, Clark; Marlyn E., Sadler; Lewis, Alperin; Noam, Loth; Francis, Zhao; Meide. Assignee: University of Illinois, Board of Trustees. Appl. No.: 09/400,365. Filed: September 20, 1999. United States Patent: 7,191,110. Issued: March 13, 2007.

3-Method and system for evaluating vertebrobasilar disease.

Inventors: **Charbel; Fady T.**, Charbel, II; Fady, Zhao; Meide, Curcio; Anthony, Amin-Hanjani; Sepideh. Assignee: Vassol Inc. Appl. No. 11/049,618. Filed: February 2, 2005. United States Patent: 7,333,848. Issued: Feb 19, 2008.

4-Immersive Touch Neurological Simulator.

Inventors: Banerjee; Pat, Luciano; Cristian, Lemole; Michael, **Charbel; Fady T.** Invention Disclosure CY084, University of Illinois at Chicago, May 2005

5-Optical microprobe for blood clot detection.

Inventors: **Charbel; Fady T.**, D'amico; Enrico, Mantulin; William W., Gratton; Enrico. Assignee: University of Illinois, Board of Trustees. Appl. No. 60/748,289. Filed: August 7, 2005.

6-Method and System for 3D blood vessel Localization.

Inventors: **Charbel; Fady T.**, Clark; Marlyn E., Zhao; Meide. Assignee: University of Illinois, Board of Trustees. Appl. No.: 11/324,126. Filed: December 30, 2005. United States Patent: 7,739,090. Issued: June 15, 2010..

7-Regional cerebral volume flow using quantitative magnetic resonance angiography.

Inventors: Zhao; Meide, Amin-Hanjani; Sepideh, Ruland; Sean, Curcio; Anthony, Ostergren; Lauren, **Charbel; Fady T.** Assignee: Vassol Inc. Appl. No. 11/858,424. Filed: September 20, 2007.

8-Haptic augmented and virtual reality system for simulation of surgical procedures.

Inventors: P. Pat Banerjee, Christian Luciano, Ali Alaraj, **Fady T Charbel.** Assignee: Immersive Touch, Inc. Appl. No. 13/628,841. Filed: September 27, 2012.

9-System and Methods for Treatment and Management of One or More Patients.

Inventors: Birk, Daniel; Buy, Ugo; Paul, Kevin; Wellman, Christa; **Charbel, Fady T.**; AminHanjani, Sepideh. Assignee: University of Illinois, Board of Trustees. Appl. No. 61784619. Filed: March 14, 2013.

## OTHER ACHIEVEMENTS

Founder Opticlot, Inc., 2007.

Co-Founder and Chief Medical Advisor, Immersive Touch, Inc., 2005

Co-Founder, NeuNeural, Inc., 2003

Founder and President, VasSol, Inc., 2001

Developer and co-inventor, The “Charbel Micro-flowprobe ®” Transonic Systems Inc., 2000

## CERTIFICATIONS

ECFMG #3741683

June 1983

FMGEMS #3741683

July 1985

Medical Council of Canada

Evaluating Exam

September 1985

FLEX

December 1990

## MEDICAL LICENSURE

Illinois 036-083843

Indiana 01052860A

Michigan 4301407612

1991 – present

August 2000 – June 2007

June 1986 – June 1911; October 2008 to January 2013

## PUBLICATIONS

### Peer-reviewed scientific articles

1. Dujovny M, **Charbel FT**, Bremen SK, Diaz FG, Malik GM, Ausman JI. Geriatric neurosurgery. *Surg Neurol* 1987; 28:10–6.
2. **Charbel FT**, Ausman JI, Malik GM, Diaz FG, Dujovny M, Sanders J. Temporary clipping in aneurysm surgery: technique and results. *Surg Neurol* 1991; 36:83–90.
3. **Charbel FT**, Seyfried D, Mehta B, Dujovny M, Ausman JI. Dominant A1: angiographic and clinical correlations in patients with anterior communicating artery aneurysms. *Neurol Res* 1991; 13:253–5.
4. Ausman JI, Malik GM, Adamson JR, Tomecek FJ, Balakrishnan G, Serwin J, Lewis Jr JW, Economopoulos G, **Charbel FT**. Hypothermic circulatory arrest and the management of giant and large cerebral aneurysms. *Surg Neurol* October 1993; 40:289–98.
5. Ghaly RF, Dujovny M, **Charbel FT**, Slavin K, Ausman JI. Monitoring the intracranial aneurysm patient. *Neurol Res* 1994; 16:12–17.
6. Hoffman WE, **Charbel FT**, Edelman G, Albrecht RF, Ausman JI. Nitrous oxide increases brain artery flow and low frequency brain electrical activity. *J Neurosurg Anes* 1995; 7:82–8.
7. Gomez-Tortosa E, Martin EM, Gaviria M, **Charbel FT**, Ausman JI. Selective deficits of one language in a bilingual patient following surgery in the left perisylvian area. *Brain and Language* 1995; 48:320–5.
8. Debrun GM, Ausman JI, **Charbel FT**, Aletich VA. Access to the cavernous sinus through the vertebral artery: technical case report. *Neurosurgery* 1995; 37:144–7.
9. Polley JW, Figueroa AA, **Charbel FT**, Berkowitz R, Reisberg D, Cohen M. Monobloc craniomaxillofacial distraction osteogenesis in a newborn with severe craniofacial synostosis: a preliminary report. *J Craniofac Surg* 1995; 6:421–3.
10. Hoffman WE, **Charbel FT**, Edelman G, Albrecht RF, Ausman J. Nitrous oxide added to isoflurane increases brain artery blood flow and low frequency brain electrical activity. *J Neurosurg Anesthesiology*. April 1995; 82-8.
11. Hoffman WE, **Charbel FT**, Edelman G, Ausman JI. Brain tissue acid-base response to hypercapnia in neurosurgical patients. *Neurol Res* 1995; 17:417–20.

12. Hoffman WE, **Charbel FT**, Edelman G. Brain tissue oxygen, carbon dioxide, and pH in neurosurgical patients at risk for ischemia. *Anesth Analog* 1996; 82:582–6.
13. Hoffman WE, **Charbel FT**, Edelman G, Hannigan K, Ausman JI. Brain tissue oxygen pressure, carbon dioxide pressure, and pH during ischemia. *Neurol Res* 1996; 18:54–6.
14. Polley JW, **Charbel FT**, Cohen MN. Open transnasal approach to the midline skull base. *J Craniofac Surg* 1996; 7:196–202.
15. Brint SU, Hier DB, Sychra J, Pavel D, Yoon WB, Martin E, **Charbel FT**. Bilateral language representation demonstrated by language-activated SPECT and Wada test. *Neurol Res* 1996; 18:209–11.
16. Misra M, Nijensohn E, Debrun GM, **Charbel FT**, Alp MS, Ausman JI. Transverse sinus dural fistula: combined surgical and endovascular approach. A case report. *Surg Neurol* 1996; 46:129–34.
17. Polley JW, Kim DE, Vigniswarin WT, Berkowitz R, **Charbel FT**. Heavy metal: beware. *J Craniofac Surg* 1996; 7:460–4.
18. Hoffman WE, **Charbel FT**, Edelman G, Ausman JI. Brain tissue oxygen pressure, carbon dioxide pressures, and pH during hypothermic circulatory arrest. *Surg Neurol* 1996; 46:75–9.
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38. Ausman JI, **Charbel FT**, Debrun GM, Aletich V, Dujovny M, Misra M. Management of pericentral arteriovenous malformations. 64th Annual Meeting of the American Association of Neurological Surgeons, April 1996.
39. **Charbel FT**, Clark ME, Misra M, Hannigan K, Hoffman W, Ausman JI. The applications of a computerized model of the cerebral circulation in skullbase surgery. 2nd International Skull Base Congress/7th Annual Meeting of the North American Skull Base Society (San Diego, California), July 1996.
40. Alperin N, Dujovny M, Misra M, Gonzalez PM, **Charbel FT**, Ausman JI. The role of CSF reversible flow into the spinal canal as an attenuator of intracranial pulsatile blood flow. 2nd International Skull Base Congress/7th Annual Meeting of the North American Skull Base Society (San Diego, California), July 1996.
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43. Hoffman WE, Edelman A, **Charbel FT**, Cunningham F, Misra M, Ausman JI. Outcome following temporary cerebral artery occlusion using etomidate or desflurane as neuroprotection. 46th Annual Meeting of the Congress of Neurological Surgeons (Montreal, Quebec, Canada), September/October 1996.
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45. Mafee MF, Ali AM, Villanueva E, Vaughn M, **Charbel FT**, Dujovny M. Imaging of less common sellar and parasellar pathology. 82nd Scientific Assembly and Annual Meeting of the Radiological Society of North America, December 1996.
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47. Gewirtz RJ, Marks MP, Steinberg GK. Clinical outcome of symptomatic patients with carotid artery occlusion and decreased hemodynamic reserve treated with STA-MCA bypass. Discussant: **Charbel FT**. 65th Annual Meeting of the American Association of Neurological Surgeons (Denver, Colorado), April 1997.
48. Aletich V, Debrun G, Ausman JI, **Charbel FT**, Dujovny M, Kehrli P, Misra M. Selection of cerebral aneurysms for treatment with Guglielmi detachable coils: Preliminary experience. 65th Annual Meeting of the American Association of Neurological Surgeons (Denver, Colorado), April 1997.
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50. Evenhouse R, Meyer D, Dujovny M, **Charbel FT**, Abood C, McConathy D, Sadler L, Ausman JI. Computer-designed cranioplastic prostheses. 65th Annual Meeting of the American Association of Neurological Surgeons (Denver, Colorado), April 1997.
51. Fernandez PM, Dujovny M, Ausman JI, **Charbel FT**, Alperin N, Mafee M. CSF quantitative MRI studies in syringomyelia associated with Chiari malformation. 65th Annual Meeting of the American Association of Neurological Surgeons (Denver, Colorado), April 1997.
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54. **Charbel FT**, Hoffman WE, Misra M, Ausman JI. Monitoring cerebral tissue PO<sub>2</sub>, PCO<sub>2</sub>, pH, and cortical blood flow during temporary ischemia. 10th International Symposium on Intracranial Pressure and Neuro-Monitoring in Brain Injury (Williamsburg, Virginia), May 1997.
55. **Charbel FT**, Hoffman WE, Misra M, Ausman JI. Brain tissue PO<sub>2</sub>, PCO<sub>2</sub>, pH, and blood flow during AVM resection. 10th International Symposium on Intracranial Pressure and Neuro-Monitoring in Brain Injury (Williamsburg, Virginia), May 1997.
56. **Charbel FT**, Hoffman WE, Misra M, Ausman JI. What does the measurement of brain tissue PO<sub>2</sub>, PCO<sub>2</sub>, and pH add to neuro-monitoring? Neuro-chemical Monitoring in the ICU. International Society on Neuromonitoring II Satellite Symposium (Williamsburg, Virginia), May 1997.
57. Dujovny M, Agner C, Aviles A, **Charbel FT**. CBF changes before and after cranioplasty. 4th International Conference on Xenon CT CBF, June 1997.
58. Foroutan M, Dujovny M, **Charbel FT**, Misra M. The anatomical basis of the third ventriculostomy: The pitfalls. 3rd International Congress on Minimally Invasive Neurosurgery (Paris, France), June 1997.

59. **Charbel FT**, Clark ME, Hoffman WE, Misra M, Ausman JI. The role of computerized modeling in cerebrovascular surgery. 11th International Congress of Neurological Surgery (Amsterdam, Netherlands), July 1997.
60. **Charbel FT**, Clark ME, Misra M, Alp MS, Debrun G, Aletich V, Ausman JI. Tolerance of carotid artery sacrifice: A computerized predictor. 11th International Congress of Neurological Surgery (Amsterdam, Netherlands), July 1997.
61. **Charbel FT**, Hoffman WE, Misra M, Ausman JI. Changes in brain tissue O<sub>2</sub>, CO<sub>2</sub>, pH, and blood flow during AVM resection. 11th International Congress of Neurological Surgery (Amsterdam, Netherlands), July 1997.
62. **Charbel FT**, Ausman JI, Hoffman WE, Dujovny M. The role of a perivascular ultrasonic micro-flow probe in aneurysm surgery. 11th International Congress of Neurological Surgery (Amsterdam, Netherlands), July 1997.
63. **Charbel FT**, Hoffman WE, Misra M, Ausman JI. Brain tissue O<sub>2</sub>, CO<sub>2</sub>, pH, and temperature in cerebrovascular surgery. 11th International Congress of Neurological Surgery (Amsterdam, Netherlands), July 1997.
64. **Charbel FT**, Hoffman WE, Misra M, Ausman JI. New advances in monitoring during temporary arterial occlusion. 11th International Congress of Neurological Surgery (Amsterdam, Netherlands), July 1997.
65. **Charbel FT**. Critical care for the neurovascular surgeon. World Association of Lebanese Neurosurgeons Homecoming Meeting (Beirut, Lebanon), July 1997.
66. **Charbel FT**. Cerebral revascularization: An update. World Association of Lebanese Neurosurgeons Homecoming Meeting (Beirut, Lebanon), July 1997.
67. Hoffman WE, **Charbel FT**. Measurement of regional brain PO<sub>2</sub>, PCO<sub>2</sub>, pH, and temperature. 2nd Cerebral Oxygenation Conference (Würzburg, Germany), September 1997.
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69. Aletich VA, Debrun G, Shownkeen H, **Charbel FT**, Ausman JI. Incidence and endovascular approach to BAVMs with associated true intranidal fistulas. 47th Annual Meeting of the Congress of Neurological Surgeons (New Orleans, Louisiana), September/October 1997.
70. Dujovny M, Agner C, **Charbel FT**, Misra M, Gundamaraj NR, Gaviria M, Ausman JI. Intracranial hemodynamics in following large cranial defects. 47th Annual Meeting of the Congress of Neurological Surgeons (New Orleans, Louisiana), September/October 1997.
71. **Charbel FT**, Hoffman WE, Nabhani T, Agner C, Ausman JI. Global ischemia and hypoxia after subarachnoid hemorrhage. 47th Annual Meeting of the Congress of Neurological Surgeons (New Orleans, Louisiana), September/October 1997.

72. Agner C, Dujovny M, Misra M, **Charbel FT**, Aletich V, Debrun G, Ausman JI. CBF changes before and after interventional radiology management of vasospasm. 47th Annual Meeting of the Congress of Neurological Surgeons (New Orleans, Louisiana), September/October 1997.
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74. **Charbel FT**, Hoffman WE, Misra M, Hannigan K, Dujovny M, Ausman JI. The role of a perivascular ultrasonic micro-flow probe in aneurysm surgery. 47th Annual Meeting of the Congress of Neurological Surgeons (New Orleans, Louisiana), September/October 1997.
75. **Charbel FT**, Zhao M, Quek F, Nabhani T, Mafee M, Ausman JI. Phase contrast MR flow measurement system using volumetric flow constrained image interpolation and color-coded image visualization. 47th Annual Meeting of the Congress of Neurological Surgeons (New Orleans, Louisiana), September/October 1997.
76. Weinzweig N, Chin G, Polley J, **Charbel FT**, Shownkeen H. Multidisciplinary approach to management of an extensive arteriovenous malformation involving the anterior scalp, forehead, and nasal dorsum. American Society of Plastic and Reconstructive Surgery, 1997.
77. **Charbel FT**, Kehrl P, Pain L. La position assise en neurochirurgie: le point de vue du chirurgien. 19th Congres de l'Association de Neuroanesthesie-Reanimation de Langue Française. Strasbourg, France, 1997.
78. **Charbel FT**, Hoffman WE, Ausman JI. Le role d'un "micro-flow probe" perivascularaire ultrasonique dans la chirurgie des aneurysmes intracraniens. Societé de Neurochirurgie de Langue Française (Paris, France), December 1997.
79. **Charbel FT**, Misra M, Clark ME, Alp MS, Nabhani T, Aletich V, Debrun G, Ausman JI. Computational modeling of cerebral blood flow during carotid artery occlusion. American Society of Interventional and Therapeutic Neuroradiology/Section on Cerebrovascular Surgery of the AANS and CNS (Orlando, Florida), February 1998.
80. Aletich VA, Debrun G, Ausman JI, **Charbel FT**, Misra M. Criterion in selecting patients for GDC coiling: Aneurysm geometry. American Society of Interventional and Therapeutic Neuroradiology/Section on Cerebrovascular Surgery of the AANS and CNS (Orlando, Florida), February 1998.
81. Aletich VA, Debrun G, Ausman JI, **Charbel FT**. Incidence and endovascular approach to BAVMs with associated true intranidal fistulas, associated aneurysms, and venous outflow anomalies. American Society of Interventional and Therapeutic Neuroradiology/Section on Cerebrovascular Surgery of the AANS and CNS (Orlando, Florida), February 1998.
82. Slavin KV, Ausman JI, **Charbel FT**, Andrews C, Misra M, Muñoz LF. Results of the treatment of intraventricular hemorrhage with recombinant tissue plasminogen activator in a series of 10 patients. American Society of Interventional and Therapeutic Neuroradiology/Section on Cerebrovascular Surgery of the AANS and CNS (Orlando, Florida), February 1998.

83. **Charbel FT**, Clark ME, Misra M, Alp MS, Nabhani T, Aletich V, Debrun G. Computational fluid dynamic modeling of cerebral blood flow during carotid occlusion. 23rd International Joint Conference on Stroke and Cerebral Circulation (Orlando, Florida) February 1998.
84. **Charbel FT**, Zhao M, Quek F, Misra M, Nabhani T, Hoffman WE. Comparative analysis of phase contrast MR flow with intraoperative cerebral perivascular flow measurements. 66th Annual Meeting of the American Association of Neurological Surgeons (Philadelphia, Pennsylvania), April 1998.
85. **Charbel FT**, Misra M, Ausman JI. Extracranial-intracranial bypass using the cephalic vein as an interposition graft. 66th Annual Meeting of the American Association of Neurological Surgeons (Philadelphia, Pennsylvania), April 1998.
86. **Charbel FT**, Zhao M, Quek F, Misra M, Nabhani T, Hoffman WE. Assessment of bypass graft patency using phase contrast MR angiography. 66th Annual Meeting of the American Association of Neurological Surgeons (Philadelphia, Pennsylvania), April 1998.
87. **Charbel FT**, Zhao M, Quek F, Nabhani T, Hoffman WE. 3D pulsatile flow patterns from cine phase contrast MR angiography in carotid artery diseases. 66th Annual Meeting of the American Association of Neurological Surgeons (Philadelphia, Pennsylvania), April 1998.
88. Aletich V, Debrun G, Shownkeen H, Slavin KV, Misra M, **Charbel FT**, Ausman JI. Endovascular treatment of vertebrobasilar and basilar trunk aneurysms. 66th Annual Meeting of the American Association of Neurological Surgeons (Philadelphia, Pennsylvania), April 1998.
89. Ausman JI, **Charbel FT**, Debrun GM, Aletich V, Dujovny M. Management of pericentral arteriovenous malformations. 66th Annual Meeting of the American Association of Neurological Surgeons (Philadelphia, Pennsylvania), April 1998.
90. Slavin KV, Misra M, Andrews C, Muñoz L, **Charbel FT**, Ausman JI. Use of recombinant tissue plasminogen activator in the treatment of intraventricular hemorrhage: Results in a series of 10 patients. 66th Annual Meeting of the American Association of Neurological Surgeons (Philadelphia, Pennsylvania), April 1998.
91. Aletich V, Debrun G, Shownkeen H, **Charbel FT**, Ausman JI, Slavin KV. Endovascular treatment of cerebral vascular malformations in neonates and children. 66th Annual Meeting of the American Association of Neurological Surgeons (Philadelphia, Pennsylvania), April 1998.
92. Slavin KV, Misra M, Muñoz L, **Charbel FT**, Hahn Y, Ausman JI. Is there a place for infratentorial pressure monitoring in the management of neurosurgical patients? 66th Annual Meeting of the American Association of Neurological Surgeons (Philadelphia, Pennsylvania), April 1998.
93. Zhao M, **Charbel FT**, Loth F, Alperin N. Improved Phase Contrast Quantification by 3D Vessel Localization. Xth Annual International Workshop on Magnetic Resonance Angiography (Park City, Utah), 1998.

94. Aletich V, Debrun G, Shownkeen H, Misra M, **Charbel FT**, Ausman JI. Correlation of aneurysm geometry to occurrence of neck regrowth, residual remnant growth, and progression to occlusion in aneurysms treated with GDC coils. 48th Annual Meeting of the Congress of Neurological Surgeons (Seattle, Washington), October 1998.
95. Aletich V, Debrun G, Shownkeen H, Misra M, **Charbel FT**, Ausman JI. Remodeling technique in the treatment of wide neck intracerebral aneurysms. 48th Annual Meeting of the Congress of Neurological Surgeons (Seattle, Washington), October 1998.
96. Slavin KV, Misra M, Muñoz-Ruiz L, **Charbel FT**, Hahn YS, Ausman JI. Simultaneous supra- and infratentorial ICP monitoring in neurosurgical intensive care. 48th Annual Meeting of the Congress of Neurological Surgeons (Seattle, Washington), October 1998.
97. **Charbel FT**, Zhao M. 3D cerebral vessel reconstruction from magnetic resonance angiography using mathematical morphology and active contour. 48th Annual Meeting of the Congress of Neurological Surgeons (Seattle, Washington), October 1998.
98. **Charbel FT**, Gonzales-Portillo G, Hoffman WE, Misra M, Hannigan K, Ausman JI. El rol de la microsonda ultrasónica perivascular de flujo sanguíneo cerebral en la cirugía de aneurismas. 28th Congress of Latin American Neurosurgeons (Santiago, Chile), October 1998.
99. **Charbel FT**, Zhao M, Gonzales-Portillo G, Ausman JI. Computer-aided neurovascular simulation and phase-contrast MRI in the management of ischemic cerebrovascular diseases. 60th Annual Meeting of the American Academy of Neurological Surgery (Santa Barbara, California), November 1998.
100. Aletich V, Debrun G, **Charbel FT**, Ausman J. Incidence and endovascular approach to BAVMs with associated true intranidal fistulas, associated aneurysms, and venous outflow anomalies. Joint Meeting of the Section on Cerebrovascular Surgery/American Society of Interventional and Therapeutic Neuroradiology. Nashville, Tennessee; January 31–February 3, 1999.
101. Aletich V, Debrun G, **Charbel FT**, Misra M, Ausman J. Correlation of aneurysm geometry to occurrence of neck regrowth, residual remnant growth and progression to occlusion in aneurysms treated with GDC coils. Joint Meeting of the Section on Cerebrovascular Surgery/American Society of Interventional and Therapeutic Neuroradiology. Nashville, Tennessee; January 31–February 3, 1999.
102. Aletich V, Debrun G, **Charbel FT**, Ausman J. Intracranial transluminal angioplasty. Joint Meeting of the Section on Cerebrovascular Surgery/American Society of Interventional and Therapeutic Neuroradiology. Nashville, Tennessee; January 31–February 3, 1999.
103. Aletich V, Debrun G, **Charbel FT**, Ausman J. Remodeling technique in the treatment of wide neck intracerebral aneurysms. Joint Meeting of the Section on Cerebrovascular Surgery/American Society of Interventional and Therapeutic Neuroradiology. Nashville, Tennessee; January 31–February 3, 1999.



104. Yedavalli R, Zhao M, Loth F, Alperin N, **Charbel FT**. The section on cerebrovascular surgery: Wall shear stress in the cerebral vasculature. Joint Meeting of the Section on Cerebrovascular Surgery/American Society of Interventional and Therapeutic Neuroradiology. Nashville, Tennessee; January 31–February 3, 1999.
105. Aletich V, Debrun G, **Charbel FT**, Misra M, Gonzales-Portillo G, Ausman J. Multidisciplinary management of pericentral AVMs. Joint Meeting of the Section on Cerebrovascular Surgery/American Society of Interventional and Therapeutic Neuroradiology. Nashville, Tennessee; January 31–February 3, 1999.
106. **Charbel FT**, Zhao M, Clark ME, Gonzales-Portillo G, Du X, Ausman JI. The role of cine phase-contrast MR and computerized modeling in the diagnosis and choices of therapy for complex cerebrovascular disorders. Joint Meeting of the Section on Cerebrovascular Surgery/American Society of Interventional and Therapeutic Neuroradiology. Nashville, Tennessee; January 31–February 3, 1999.
107. Aletich V, Debrun G, **Charbel FT**, Misra M, Ausman J. Endovascular treatment of vertebral basilar and basilar trunk aneurysms (excluding basilar tip). Joint Meeting of the Section on Cerebrovascular Surgery/American Society of Interventional and Therapeutic Neuroradiology. Nashville, Tennessee; January 31–February 3, 1999.
108. **Charbel FT**, Gonzales-Portillo G, Du X, Ostergren L. Clip-related vessel flow compromise in aneurysm surgery. Joint Meeting of the Section on Cerebrovascular Surgery/American Society of Interventional and Therapeutic Neuroradiology. Nashville, Tennessee; January 31–February 3, 1999.
109. **Charbel FT**, Zhao M, Clark ME, Alperin N, Loth F, Sadler L, Ausman JI. The role of cine phase-contrast MR and computerized modeling in the diagnosis and choices of therapy for complex cerebrovascular disorders. 52nd Annual Meeting of the Neurosurgical Society of America. Scottsdale, Arizona; March 28–31, 1999.
110. Misra M, Hamilton R, O'Brien K, **Charbel FT**, Kumar SV, Ausman JI. Does embolization delay obliteration of AVMs following radiosurgery? 67th Annual Meeting of the American Association of Neurological Surgeons. New Orleans, Louisiana; April 24–29, 1999.
111. Aletich V, Shownkeen H, Debrun G, Misra M, **Charbel FT**, Ausman JI. Transluminal angioplasty for carotid and vertebral artery: review of 26 patients. 67th Annual Meeting of the American Association of Neurological Surgeons. New Orleans, Louisiana; April 24–29, 1999.
112. Aletich V, Shownkeen H, Debrun G, Misra M, **Charbel FT**, Ausman JI. Remodeling technique in the treatment of wide neck intracerebral aneurysms. 67th Annual Meeting of the American Association of Neurological Surgeons. New Orleans, Louisiana; April 24–29, 1999.
113. Aletich V, Shownkeen H, Debrun G, **Charbel FT**, Ausman JI. Endovascular management of vertebrobasilar aneurysms with Guglielmi detachable coils. 67th Annual Meeting of the American Association of Neurological Surgeons. New Orleans, Louisiana; April 24–29, 1999.

114. Gonzales-Portillo G, **Charbel FT**. The management of small distal ICA aneurysms. 67th Annual Meeting of the American Association of Neurological Surgeons. New Orleans, Louisiana; April 24–29, 1999.
115. **Charbel FT**, Zhao M, Gonzales-Portillo G, Aletich V, Du X, Alperin N, Jacobson B, Debrun GM, Ausman JI. The use of the peripheral gating cine phase contrast MRI in the evaluation of the CBF in patients with balloon occlusion of the ICA. 67th Annual Meeting of the American Association of Neurological Surgeons. New Orleans, Louisiana; April 24–29, 1999.
116. Foroutan M, **Charbel FT**, Ausman JI, Dujovny M, Sadler LL. Cranioplasty using implants made by stereolithography: a preliminary report of 12 cases. 67th Annual Meeting of the American Association of Neurological Surgeons. New Orleans, Louisiana; April 24–29, 1999.
117. Ausman JI, **Charbel FT**, Misra M, Alp MS, Gonzales-Portillo G. Image-guided surgery for intracranial metastasis. 67th Annual Meeting of the American Association of Neurological Surgeons. New Orleans, Louisiana; April 24–29, 1999.
118. Du X, **Charbel FT**, Hoffman WE. Changes in tissue PO<sub>2</sub>, PCO<sub>2</sub>, pH, and temperature after subarachnoid hemorrhage. 3rd Conference on Monitoring of Cerebral Oxygenation and Metabolism. Berlin, Germany; April 29–30, 1999.
119. Hoffman WE, Edelman G, **Charbel FT**. Local cerebral venous and tissue gases during hyper- and hypoventilation. 3rd Conference on Monitoring of Cerebral Oxygenation and Metabolism. Berlin, Germany; April 29–30, 1999.
120. Clark ME, Zhao M, Loth F, Alperin N, Sadler L, Guppy K, **Charbel FT**. A patient-specific computer model for prediction of clinical outcomes in the cerebral circulation using MR flow measurements. MICCAI. Cambridge, England; 1999.
121. **Charbel FT**, Flow-assisted techniques in cerebrovascular surgery. World Association of Lebanese Neurosurgeons 2nd Homecoming Program. Beirut, Lebanon; June 23–23, 1999.
122. **Charbel, FT**, Demonstration of a system for computer-aided neurovascular analysis and simulation (CANVAS) in the management of complex cerebrovascular lesions. World Association of Lebanese Neurosurgeons 2nd Homecoming Program. Beirut, Lebanon; June 20–23, 1999.
123. **Charbel FT**, Zhao M, Clark ME, Alperin N, Loth F, Sadler L, Ausman JI, Aletich VA, Debrun G. L'apport du système "CANVAS" (computer-aided neurovascular analysis and simulation) au traitement des pathologies cérébro-vasculaires complexes. 49th Congrès Société de Neurochirurgie de Langue Française. Montréal, Québec, Canada; June 27–30, 1999.
124. Alperin N, Loth F, Stelzig C, Lee S, **Charbel FT**, Lichtor T. Determination of intracranial pressure from MRI measurements of blood and CSF volumetric flow rates. 16th Annual Meeting of the European Society for Magnetic Resonance in Medicine and Biology. Seville, Spain; September 16–19, 1999.

125. **Charbel FT**, Zhao M, Du X, Alperin N, Ausman JI. The use of peripheral gating cine phase-contrast MR in the management of subclavian steal syndrome. 11th European Congress of Neurosurgery. Copenhagen, Denmark; September 19–24, 1999.
126. Aletich V, Debrun G, **Charbel FT**, Ausman JI. Remodeling technique in the treatment of wide-necked aneurysms. 11th European Congress of Neurosurgery. Copenhagen, Denmark; September 19–24, 1999.
127. Ausman JI, **Charbel FT**, Misra M, Alp MS. Image-guided surgery for intracranial metastasis. 11th European Congress of Neurosurgery. Copenhagen, Denmark; September 19–24, 1999.
128. Aletich V, Debrun G, **Charbel FT**, Ausman JI. Angiographic outcome analysis of aneurysms treated with GDC coils. 11th European Congress of Neurosurgery. Copenhagen, Denmark; September 19–24, 1999.
129. Ausman JI, **Charbel FT**, Alp MS, Misra M. Clinical experience with Zeiss MKM stereotactic microscope. 11th European Congress of Neurosurgery. Copenhagen, Denmark; September 19–24, 1999.
130. **Charbel FT**, Zhao M, Clark ME, Alperin N, Loth F, Sadler L, Du X, Ausman JI. Choices of therapy using a circulation model and phase-contrast MR. 11th European Congress of Neurosurgery. Copenhagen, Denmark; September 19–24, 1999.
131. **Charbel FT**, Misra M, Du X, Ostergren LA. Clip-related vessel flow compromise in aneurysm surgery. 11th European Congress of Neurosurgery. Copenhagen, Denmark; September 19–24, 1999.
132. **Charbel FT**, CANVAS program for stroke and cerebral vascular disorders. Vascular Imaging Applications: GE Medical Systems Advisory Board Meeting. Lund, Sweden; September 21, 1999.
133. Thornton J, Aletich V, Misra M, Debrun G, Alazzaz A, **Charbel FT**, Ausman JI. Endovascular treatment of paraclinoid aneurysms. 11th European Congress of Neurosurgery. Copenhagen, Denmark; September 19–24, 1999.
134. Misra M, Hamilton RJ, **Charbel FT**, O'Brien K, Aletich V, Ausman JI. Does embolization delay obliteration of AVMs following radiosurgery? 11th European Congress of Neurosurgery. Copenhagen, Denmark; September 19–24, 1999.
135. Aletich V, Debrun G, **Charbel FT**, Ausman JI. Endovascular therapy of vertebral basilar and basilar trunk aneurysms. 11th European Congress of Neurosurgery. Copenhagen, Denmark; September 19–24, 1999.
136. Aletich V, Debrun G, **Charbel FT**, Ausman JI. BAVM intranidal fistulas, aneurysms, and venous outflow anomalies. 11th European Congress of Neurosurgery. Copenhagen, Denmark; September 19–24, 1999.

137. **Charbel FT**, Du X, Hoffman WE, Ausman JI, Edelman G. Early detection of vasospasm after SAH using brain tissue monitoring. 11th European Congress of Neurosurgery. Copenhagen, Denmark; September 19–24, 1999.
138. **Charbel FT**, Zhao M, Guppy KH, Clark ME, Loth F, Alperin N, Sadler L, Ausman JI, Aletich V, Debrun G. Verification of accuracy for a patient-specific mathematical model in predicting cerebral blood flow. Congress of Neurological Surgeons 49th Annual Meeting. Boston, Massachusetts; October 30–November 4, 1999.
139. Thornton J, Misra M, Dovey Z, Aletich V, Debrun G, Alazzaz A, **Charbel FT**, Ausman JI. Endovascular treatment with Guglielmi detachable coils and permanent balloon occlusion for paraclinoid aneurysms. Congress of Neurological Surgeons 49th Annual Meeting. Boston, Massachusetts; October 30–November 4, 1999.
140. **Charbel FT**, Du X, Hoffman WE, Ausman JI, Edelman G. Early detection of vasospasm after aneurysmal SAH using brain tissue PO<sub>2</sub>, PCO<sub>2</sub>, and pH monitoring. Congress of Neurological Surgeons 49th Annual Meeting. Boston, Massachusetts; October 30–November 4, 1999.
141. Massad MG, **Charbel FT**, Geha A, Ausman JI. Minimally Invasive Closed chest Hypothermic Circulatory arrest for the approach of complex cerebral aneurysms. Annual Meeting of the American College of Chest Physicians, Chicago, Illinois; 1999.
142. Alperin N, Loth F, Lee SH, **Charbel FT**, Lichtor T, Roitberg B. MRI-based method for intracranial pressure measurements. 85th Annual Meeting of the Radiological Society of North America. Chicago, Illinois; November 28–December 3, 1999.
143. Alperin N, Chuan B, **Charbel FT**, Loth F. Characterization of CSF dynamics in syringomyelia associated with Chiari malformation. 85th Annual Meeting of the Radiological Society of North America. Chicago, Illinois; November 28–December 3, 1999.
144. Raja A, **Charbel FT**. Intraoperative direct vessel flow measurement for complex intracranial aneurysms. 6<sup>th</sup> International workshop on Cerebrovascular surgery. Seoul, Korea; June 4-7, 2000.
145. AlShatoury H, **Charbel FT**, Zhao M, Debrun G, Ausman JI. Middle cerebral artery stenocclusive disease: Contemporary diagnosis and management. 6<sup>th</sup> International workshop on Cerebrovascular surgery. Seoul, Korea; June 4-7, 2000.
146. AlShatoury H, **Charbel FT**, Zhao M. Estimation of total cerebral blood flow using cine phase contrast MR angiography. 6<sup>th</sup> International workshop on Cerebrovascular surgery. Seoul, Korea; June 4-7, 2000.
147. Quek FHK, Kirbas C, **Charbel FT**. Neurovascular image interpretation with an attentionally-based interaction model (AIM). Computer Aided Radiology and Surgery (CARS). San Francisco, CA, June 28-July 1, 2000.
148. **Charbel FT**, Abdel Maksoud Y, Corsten L, Du XJ, Zhao M, Sun GF, Guppy K, Ausman JI. Breakthrough hemorrhage after EC-IC bypass surgery for cerebral ischemia. Congress of Neurological Surgeons 50th Annual Meeting. San Antonio, Texas; September 23-28; 2000.

149. Roitberg BZ, Khan N, Alp MS, Hersonsky T, **Charbel FT**, Ausman JI. Bedside ventriculostomy in the neurosurgical ICU for the treatment of acute hydrocephalus. Congress of Neurological Surgeons 50th Annual Meeting. San Antonio, Texas; September 23-28; 2000.
150. Raja AI, Al-Shatoury H, Corsten L, Zhao M, Ausman JI, **Charbel FT**. Contemporary management of middle cerebral artery steno-occlusive disease. Congress of Neurological Surgeons 50th Annual Meeting. San Antonio, Texas; September 23-28; 2000.
151. Roitberg BZ, Cochran EJ, Thornton J, **Charbel FT**. Giant anterior communicating artery aneurysm infiltrated with a primary cerebral lymphoma. Congress of Neurological Surgeons 50th Annual Meeting. San Antonio, Texas; September 23-28; 2000.
152. **Charbel FT**, Corsten L, Zhao M, Debrun G, Shatoury H, Guppy K, Raja A, Ausman JI. Phase contrast MR Flow quantification in the management of vertebrobasilar insufficiency. Congress of Neurological Surgeons 50th Annual Meeting. San Antonio, Texas; September 23-28; 2000
153. **Charbel FT**, Du XJ, Guppy K, Zhao M, Abdel Maksoud Y, Ausman JI. Improvement of Cerebrovascular reserve capacity in patients with symptomatic internal carotid occlusion after EC-IC bypass surgery. Congress of Neurological Surgeons 50th Annual Meeting. San Antonio, Texas; September 23-28; 2000.
154. **Charbel FT**, Corsten L, Zhao M, Guppy KH, Raja A, Al-Shatoury H, Debrun G, Ausman J. Revascularization for posterior circulation ischemia: A modern approach to an old problem. Joint Meeting of the Section on Cerebrovascular Surgery/American Society of Interventional and Therapeutic Neuroradiology. Hawaii; February 9-12; 2001.
155. **Charbel FT**, Abdel Maksoud Y, Corsten L, Du XJ, Zhao M, Guppy K, Ausman J. Breakthrough hemorrhage after EC-IC bypass surgery: Risk factors and avoidance strategy. Joint Meeting of the Section on Cerebrovascular Surgery/American Society of Interventional and Therapeutic Neuroradiology. Hawaii; February 9-12; 2001.
156. **Charbel FT**, Du XJ, Guppy K, Zhao M, Ausman J. EC-IC bypass for symptomatic carotid occlusion: A recent series. Joint Meeting of the Section on Cerebrovascular Surgery/American Society of Interventional and Therapeutic Neuroradiology. Hawaii; February 9-12; 2001.
157. Ausman J, **Charbel FT**, Corsten L, Abdel Maksoud Y, Guppy K, Raja A. Strategy and technical considerations in microsurgical resection of brainstem cavernomas. Joint Meeting of the Section on Cerebrovascular Surgery/American Society of Interventional and Therapeutic Neuroradiology. Hawaii; February 9-12; 2001.
158. Guppy KH, **Charbel FT**, Zhao M, Ausman J. Wall shear stress: Clinical use in Cerebrovascular surgery. Joint Meeting of the Section on Cerebrovascular Surgery/American Society of Interventional and Therapeutic Neuroradiology. Hawaii; February 9-12; 2001.
159. **Charbel FT**, Corsten L, Zhao M, Guppy K, Debrun G, Ausman J. Management of Vertebro-Basilar Ischemia: A Novel Approach, Cerebrovascular Disease in Hawaii, Big Island, Hawaii, February 9-12, 2001.

160. Guppy KH, **Charbel FT**, Al-Shatoury H, Zhao M, Raja A, Ausman J. Estimation of total cerebral blood flow using cine phase-contrast MR angiography in normal patients. Joint Meeting of the Section on Cerebrovascular Surgery/American Society of Interventional and Therapeutic Neuroradiology. Hawaii; February 9-12; 2001.
161. **Charbel FT**, Ausman J, Debrun G. Surgical retrieval of retained glued catheters during AVM embolization: Indications and techniques. Joint Meeting of the Section on Cerebrovascular Surgery/American Society of Interventional and Therapeutic Neuroradiology. Hawaii; February 9-12; 2001.
162. Guppy K, **Charbel FT**, Zhao M, Debrun G. The use phase-contrast MRA for evaluation of basilar-vertebral arteries pre and post angioplasty and stenting: Case studies. Joint Meeting of the Section on Cerebrovascular Surgery/American Society of Interventional and Therapeutic Neuroradiology. Hawaii; February 9-12; 2001.
163. Alperin N, Lee S, Loth F, Roitberg B, Lichtor T, **Charbel FT**. Non-invasive MR Imaging-based method for measurements of intra-cranial compliance and pressure. American Association of Neurological Surgeons annual meeting. Toronto, Ontario, Canada; April 21-26, 2001.
164. Keiler LC, Du XJ, Zhao M, Guppy KH, Hoffman W, Maksoud Y, **Charbel FT**. Total cerebral blood flow measured with magnetic resonance imaging correlates with Xenon computed tomography-determined regional cerebral blood flow in humans. American Association of Neurological Surgeons annual meeting. Toronto, Ontario, Canada; April 21-26, 2001.
165. **Charbel FT**, Debrun G, Ausman JI, Husain SG, Maksoud Y, Zhao M, Guppy K. Hemodynamic remodeling for the treatment of dolichoectatic basilar artery aneurysms. American Association of Neurological Surgeons annual meeting. Toronto, Ontario, Canada; April 21-26, 2001.
166. Carneiro C, Roitberg B, Barshes N, **Charbel FT**. Ischemic cardiac complications of Subarachnoid hemorrhage. American Association of Neurological Surgeons annual meeting. Toronto, Ontario, Canada; April 21-26, 2001.
167. **Charbel FT**, Husain S, Maksoud Y, Debrun G, Zhao M, Guppy K, Ausman J. Angioplasty for proximal vertebral artery stenosis: A time to reconsider. American Association of Neurological Surgeons annual meeting. Toronto, Ontario, Canada; April 21-26, 2001.
168. **Charbel FT**, Du XJ, Zhao M, Guppy K. Traitement de l'occlusion carotidienne symptomatique par pontage extra-intra crânien (PEIC): Une série récente. 51<sup>e</sup> congrès de la Société de Neurochirurgie de Langue Française. Beirut, Lebanon; May 16-19, 2001.
169. Quek FKH, Kirbas C, **Charbel FT**. AIM: An attentionally-based system for the interpretation of angiography. IEEE medical imaging and augmented reality conference. Hong Kong, China; June 10-12, 2001.
170. Guppy KH, **Charbel FT**, Wagner F. The use of Phase contrast MRI in Cerebrovascular surgery. Society of University Neurosurgeons annual meeting. Oregon Health and Science University. Portland, Oregon; June 17-20, 2001

171. Weldon N, Xinjian D, Zhao M, Hoffman WE, **Charbel FT**. Hemodynamics in EC-IC Bypass: Operative Blood Flow and Postoperative Cerebrovascular Reserve. AANS/CNS Section on Cerebrovascular Surgery and the American Society of Interventional & Therapeutic Neuroradiology. Phoenix, AZ. February 17, 2003.
172. **Charbel FT**, Hanjani S, Xinjian D, Mlinarevich N, Meglio G, Fhao M. The Cut Flow Index: An Intra-operative Predictor of the Success of EC-IC Bypass for Occlusive Cerebrovascular Disease. Annual Meeting of the Neurosurgical Society of America. Santa Fe, NM. June 6-9, 2004.
173. Hanjani S, Meglio G, Gatto R, **Charbel FT**. The Utility of Intraoperative Blood Flow Measurement in Aneurysm Surgery Using an Ultrasonic Flow Probe. 8<sup>th</sup> Joint Annual Meeting of the AANS/CNS Cerebrovascular Section. New Orleans, LA. February 2-4, 2005.
174. Hanjani S, Du X, Mlinarevich N, Meglio G, Zhao M, **Charbel FT**. The Cut Flow Index: An Intra-operative Predictor of Success of EC-IC Bypass. 8<sup>th</sup> Joint Annual Meeting of the AANS/CNS Cerebrovascular Section. New Orleans, LA. February 2-4, 2005.
175. Hanjani S, Du X, Zhao M, Walsh K, **Charbel FT**. Stroke Risk Stratification in Symptomatic Vertebrobasilar Disease. 8<sup>th</sup> Joint Annual Meeting of the AANS/CNS Cerebrovascular Section. New Orleans, LA. February 2-4, 2005.
176. Gaba R, Ansari SA, Sinha-Roy S, Marden FA, Viana MA, **Charbel FT**, Hanjani S, Malisch TW. Embolization of Intracranial Aneurysms with Hydrogel-Coated Coils Versus Inert Platinum Coils: Effects on Packing Density, Coil Length and Quantity, Procedure, Performance and Cost. 8<sup>th</sup> Joint Annual Meeting of the AANS/CNS Cerebrovascular Section. New Orleans, LA. February 2-4, 2005.
177. Goodrich JT, Stone JL, Lopez W, Brook A, Bello J, **Charbel FT**. The Induction of Venous Collateral Circulation By Staged Separation of Craniopagus Twins. 2005 AANS Annual Meeting. New Orleans, LA. April 16-21, 2005.
178. Amin-Hanjani, S, Shin J, Du X, Zhao M, **Charbel FT**. Evaluation of EC-IC Bypass Grafts Using Quantitative Magnetic Resonance Angiography. 2005 AANS Annual Meeting. New Orleans, LA. April 16-21, 2005.
179. Calderon-Arnulphi M, Gatto R, Alaraj A, Nersesyan H, Mantulin W, Michalos A, Gratton E, **Charbel FT**. Prediction of Cerebral Ischemia in Neurovascular Surgery. 2005 CNS Annual Meeting. Boston, MA. October 8-13, 2005.
180. Amin-Hanjani S, Shin JH, Meglio G, Malisch TW, **Charbel FT**. Extracranial-Extracranial Carotid to Vertebral Bypass for Vertebrobasilar Insufficiency: Novel Applications. 2005 CNS Annual Meeting. Boston, MA. October 8-13, 2005.
181. Calderon-Arnulphi M, Alaraj A, Gatto RG, Nersesyan H, Mantulin W, Michalos M, Gratton E, **Charbel FT**. Bedside Evaluation of Cerebral Autoregulation Using Frequency Domain Near Infrared Spectroscopy. 2005 CNS Annual Meeting. Boston, MA. October 8-13, 2005.

182. Hoffman W, Gatto R, **Charbel FT**. Brain Oxyhemoglobin and Deoxyhemoglobin During Anesthetic Induction. 2006 STA Meeting. San Diego, CA. January 17-21, 2006.
183. Ai Z, Evenhouse R, Leigh J, **Charbel F**, Rasmussen M. New Tools for Sculpting Cranial Implants in a Shared Haptic Augmented Reality Environment. Medicine Meets Virtual Reality 14. San Diego, CA. January 24-26, 2006.
184. Luciano C, Banerjee P, Lemole Jr. GM, **Charbel F**. Second Generation Haptic Ventriculostomy Simulator Using the ImmersiveTouch™ System. Medicine Meets Virtual Reality 14. San Diego, CA. January 24-26, 2006.
185. Zhao M, Amin-Hanjani S, Ruland S, Curcio AP, Ostergren L, **Charbel FT**. Regional Cerebral Volume Flow Using Quantitative Magnetic Resonance Angiography. International Society for Magnetic Resonance in Medicine (ISMRM) 14<sup>th</sup> Scientific Meeting and Exhibition, SMRT 15<sup>th</sup> Annual Meeting. Seattle, WA. May 6-12, 2006.
186. **Charbel FT**, Shin JH, Zhao M, Du X, Amin-Hanjani S. Evaluation of EC-IC bypass using quantitative magnetic resonance angiography. Neurosurgical Society of America 59<sup>th</sup> Annual Meeting. Ojai, CA. June 4-7, 2006.
187. Amin-Hanjani S, Meglio G, Gatto R, Bauer A, **Charbel FT**. The utility of intraoperative blood flow measurement in aneurysm surgery using an ultrasonic perivascular flow probe. Presented by Dr. Amin-Hanjani. Neurosurgical Society of America 59<sup>th</sup> Annual Meeting. Ojai, CA. June 4-7, 2006.
188. Rossow MJ, D'Amico E, Gatto R, **Charbel FT**, Mantulin WW, Gratton E. Intra-operative blood flow measurement with near-infrared spectroscopy and a camera detection system. Biomedical Engineering Society Annual Meeting. Chicago, IL. October 11-14, 2006.
189. Mery Munoz FJ, Amin-Hanjani S, **Charbel FT**. Cerebral Revascularization Using Cadaveric Vein Grafts. 2006 CNS Annual Meeting. Chicago, IL. October 7-12, 2006.
190. Amoussou D, Gatto RG, Rousche P, **Charbel FT**. Neuro-trophic Electrode for Brain Recording and Stimulation. 2006 CNS Annual Meeting. Chicago, Illinois. October 7-12, 2006.
191. Rossow M, D'Amico E, **Charbel FT**, Gatto R, Matunlin WW, Gratton E. Intra-Operative Blood Flow Measurement with Near-Infrared Spectroscopy using a Camera Based Detection System. 2006 Biomedical Engineering Society Annual Meeting. Chicago, Illinois. October 11-14, 2006.
192. Mateo Calderon-Arnulphi, MD; Ali Alaraj, MD; Sepideh Amin-Hanjani, MD; Adam Wallace, BS; Goro Osawa, BS; Soma Sinha-Roy, MD; Rajeev Deveshwar, MD; Qasim Bashir, MD; Pawan Singh, BS; **Fady T. Charbel, MD**; Victor Aletich, MD. "Is Routine CT Scanning Indicated After Neuroendovascular Embolization?". Stroke 39:576 February 2008. International Stroke Conference 2008, Feb 20-22, New Orleans, LA, USA.



193. Mateo Calderon-Arnulphi, MD, Sepideh Amin-Hanjani, MD, Ali Alaraj, MD, Meide Zhao, PhD, Lauren Ostergren, Sean Ruland, DO, Xinjian Du, MD, William W. Ashley, M.D, PhD, **Fady T. Charbel, MD**. “Blood Flow Measurement In A Canine Carotid Stenosis Model Using Quantitative Magnetic Resonance Angiography”. *Stroke* 39:576 February 2008. International Stroke Conference 2008, Feb 20-22, New Orleans, LA, USA.
194. Romano GM, **Charbel FT**, Connolly ES, Marshall RS, Lazar RM. “Clinical Neuropsychological Presentation in North American Adults with Moyamoya Disease”. *International Journal of Stroke* Vol. 3, Suppl. 1, page 113, September 2008.
195. Alaraj A, Mander N, Emechebe-Kennedy O, **Charbel FT**, Amin-Hanjani S. Effect of Acute Cocaine Use on Vasospasm and Outcome in Aneurysmal Subarachnoid Hemorrhage. An *Abstract Select* at the *58<sup>th</sup> Congress of Neurological Surgeons Annual Meeting*. September 20 – 25, 2008. Orlando, FL.
196. Alaraj A, Mander N, Robin M, **Charbel FT**, Amin-Hanjani S. Outcome of Symptomatic Cerebral Vasospasm on Presentation in Aneurysmal Subarachnoid Hemorrhage. Poster presentation at the *58<sup>th</sup> Congress of Neurological Surgeons Annual Meeting*. September 20 – 25, 2008. Orlando, FL.
197. Alaraj A, Mander N, Wallace, A, Aletich, V, **Charbel FT**, Amin-Hanjani S. Risk Factors for Heparin-Induced Thrombocytopenia Type II in Aneurysmal Subarachnoid Hemorrhage. Poster presentation at the *58<sup>th</sup> Congress of Neurological Surgeons Annual Meeting*. September 20 – 25, 2008. Orlando, FL.
198. Alaraj A, Mander N, Wallace, A, Aletich, V, **Charbel FT**, Amin-Hanjani S. Risk Factors for Heparin-Induced Thrombocytopenia Type II in Aneurysmal Subarachnoid Hemorrhage. Oral presentation at *The 5<sup>th</sup> annual meeting of The Society of NeuroInterventional Surgery*, Lake Tahoe, CA, USA. July 28 - August 1, 2008 (oral presentation).
199. Schwarz L: Festa J, **Charbel F**, Amin-Hanjani S and Pliskin N. (in press). Examination of Cognitive Functioning of North American Adults with Moyamoya Disease with the RBANS. *Journal of the International Neuropsychological Society*. Jan 2009 (presentation)
200. Lemole GM Jr, Shin JH, Morgan JD, **Charbel FT**: Noninvasive Quantitative Assessment of Cerebral Arteriovenous Malformation Hemodynamics Following CyberKnife Radiosurgery. A Case Report. At CyberKnife Users’ Meeting, 7<sup>th</sup> Annual Meeting Hollywood, FL, February 4-8, 2009.
201. Amin-Hanjani S, Calderon-Arnulphi M, Alaraj A, Aletich V, **Charbel FT**: Detection of restenosis following intracranial stenting using quantitative magnetic resonance angiography. AANS/CNS Cerebrovascular Section Meeting & International Stroke Conference San Diego, CA. 16-17 Feb 2009.
202. Slavin K, Goellner E, Eboli P, Aydin S, Colpan E, Alaraj A, Mlinarevich N, Watson K, Deveshwar R, Amin-Hanjani S, **Charbel FT**. Epidural stimulation of cervical spinal cord for prevention of cerebral vasospasm in aneurysmal subarachnoid hemorrhage: Preliminary results of prospective study. Presented at Joint Annual Meeting EANS-SFNC, Marseille, France, March 27-31, 2009.

203. Lemole GM Jr, Banerjee PP, Luciano C, Alaraj A, **Charbel FT**, Yudkowsky R: Virtual Reality and Simulation in Neurosurgical Education. At XIV World Congress of Neurological Surgery of the World Federation of Neurosurgical Societies, 413 Virtual Reality and Robotics in Neurosurgery, Boston, MA, September 3, 2009.
204. Lemole GM Jr, **Charbel FT**, Haberkamp T, Joe S, Shin JH: Skull Base Approaches for Extraction of Clival/Brain Stem Nail. At XIV World Congress of Neurological Surgery of the World Federation of Neurosurgical Societies, Video Skull Base Session, Boston, MA, September 3, 2009.
205. Alaraj A, Munson T, Amin-Hanjani S, **Charbel FT**, Aletich VA. Balloon Remodeling Vs. Stent Assisted Techniques for Intracranial Aneurysms; Comparison of Immediate to Long Term Outcome and Complications in a Single Institution Experience. CNS Cerebrovascular Section Annual meeting Oct 26, 2009 New Orleans, LA.
206. Grysiewicz R, Watson K, Thulborn K, Amin-Hanjani S, Du X, Khaja A, Powers WJ, Videen TO, **Charbel FT**, Ruland S. Comparison of O<sup>15</sup> PET and MRI based Modalities to Assess Hemodynamic Compromise in Patients with Complete Carotid Occlusion. International Stroke Conference, San Antonio, TX. Feb 23-26, 2010.
207. Slavin K, Amin-Hanjani S, **Charbel FT**, Goellner E, Watson K, Mlinarevich N, Vannemreddy P, Walters L. Cervical Spinal Cord Stimulation for Prevention of Vasospasm after Aneurysmal Subarachnoid Hemorrhage: 1-year Follow-Up of Prospective Study. EANS 2010 Oral Presentation.
208. Slavin K, Alaraj A, Amin-Hanjani S, Aydin S, **Charbel FT**, Eboli P, Goellner E, Mlinarevich N, Watson K. Cervical Spinal Cord Stimulation for Prevention of Cerebral Vasospasm in Aneurysmal Subarachnoid Hemorrhage: Immediate Results and One-Year Follow Up. *Awarded Second Place at the 2010 AANS Annual Meeting in the category of Cerebrovascular.*
209. Alaraj A, Munson T, Amin-Hanjani S, **Charbel FT**, Aletich V. Balloon Remodeling Vs. Stent Assisted Techniques for Intracranial Aneurysms: Comparison of Immediate to Long Term Outcome and Complications in a Single Institution Experience. PLENARY session Oral presentation at the 2010 American Association of Neurological Surgeons annual meeting. Philadelphia, PA, May 1-5, 2010.
210. Alaraj A, Hage Z, Munson T, Amin-Hanjani S, **Charbel FT**, Aletich V: Single versus staged stent assisted coiling techniques for intracranial aneurysms: comparison of complication rates, and immediate and long term angiographic outcome in a single institution experience. J Neurointervent Surg 2010;2:A45, SNIS 7<sup>th</sup> Annual Meeting, July 2010. (*Poster Presentation*)
211. Chwajol M, Alaraj A, **Charbel FT**, Aletich VA, Amin-Hanjani S: Extracranial carotid-vertebral bypass for endovascular access to complex posterior circulation aneurysms: a novel management approach. AANS/CNS Cerebrovascular Section Annual Meeting, February 2011. Neurosurg Focus 30(2): A18 (161), 2011 (*Poster presentation*).

212. Qahwash O, Alaraj A, Aletich V, **Charbel FT**, Amin-Hanjani S: Safety of early endovascular catheterization and intervention through EC-IC bypass grafts. AANS/CNS Cerebrovascular Section Annual Meeting, February 2011. *Neurosurg Focus* 30(2): A22 (174), 2011. (*Poster presentation*).
213. Alaraj A, Qahwash O, Aletich V, **Charbel FT**, Ho W, Bulsara K, Amin-Hanjani S: Endovascular intervention for salvage of EC-IC bypass grafts. AANS/CNS Cerebrovascular Section Annual Meeting, February 2011. *Neurosurg Focus* 30(2): A15 (150), 2011. (*Poster presentation*).
214. Amin-Hanjani S, Aletich VA, Thulborn KR, **Charbel FT**: Hemodynamic effects of angioplasty and stenting for intracranial stenosis . International Stroke Conference, February, 2011. *Stroke* 42(3):e88 (151), 2011. (*Oral presentation*).
215. Amin-Hanjani S, Du X, Zhao M, Ruland S, Mlinarevich N, **Charbel FT**: Individual vessel and regional blood flow measurements: implications for flow and collateral assessment in cerebrovascular occlusive disease. International Stroke Conference, February, 2011. *Stroke* 42(3):e226 (P236), 2011. (*Poster presentation*).
216. Amin-Hanjani S, Du X, Mlinarevich N, Ruland S, Zhao M, **Charbel FT**: Effect of age and Circle of Willis anatomy on blood flow in major cerebral vessels. International Stroke Conference, February, 2011. *Stroke* 42(3):e196 (P126), 2011. (*Poster presentation*).
217. Amin-Hanjani S, Thulborn KR, Ruland S, Pandey DK, Richardson D, Zipfel GJ, Elkind MS, Liebeskind DS, Kramer J, Silver F, Kasner SE, Derdeyn CP, Gorelick PB, **Charbel FT** for the VERiTAS study group: The vertebrobasilar flow evaluation and risk of transient ischemic attack and stroke (VERiTAS) study. International Stroke Conference, February, 2011. (*Ongoing Clinical Trials Poster Presentation*).
218. Amin-Hanjani, S, Chwajol M, Alaraj A, **Charbel FT**, Aletich VA: Carotid-vertebral bypass for endovascular access to complex posterior circulation aneurysms. Joint EANS Annual Meeting – 4<sup>th</sup> ICH Conference, May, 2011. (*Oral poster*)
219. Amin-Hanjani S, Du X, **Charbel FT**: Effect of age and vascular anatomy on cerebral vessel blood flow: implications for interpretation in cerebrovascular occlusive disease. Joint EANS Annual Meeting – 4<sup>th</sup> ICH Conference, May, 2011. (*Oral presentation*)
220. Aletich V, Alaraj A, Amin-Hanjani S, **Charbel FT**: Single versus staged stent assisted coiling techniques for intracranial aneurysms: comparison of complication rates, immediate and long term angiographic outcome. Joint EANS Annual Meeting – 4<sup>th</sup> ICH Conference, May, 2011. (*Oral poster*)
221. Aletich V, Alaraj A, Amin-Hanjani S, **Charbel FT**: Balloon remodeling vs. stent assisted techniques for intracranial aneurysms: comparison of immediate to long term outcome and complications. Joint EANS Annual Meeting – 4<sup>th</sup> ICH Conference, May, 2011. (*Oral presentation*)

222. Yudkowsky R, Luciano C, Banerjee P, Alaraj A, Lemole M, Schwartz A, Charbel F, Smith K, Rizzi S: Ventriculostomy Practice on a Library of Virtual Brains using a VR/Haptic Simulator Improves Simulator and Surgical Outcomes. *Simulation in Healthcare* 2011; 6(6):395
223. Amin-Hanjani S, Singh A, Rifai H, Du X, Alaraj A, Aletich V, **Charbel FT**: Combined direct and indirect bypass for Moyamoya: quantitative assessment of relative contributions over time. AANS/CNS Cerebrovascular Section Annual Meeting, January 2012. (*Oral presentation*). Accepted., AANS Annual Meeting, April 2012 (*Poster presentation*) Accepted.
224. Amin-Hanjani S, Thulborn KR, Ruland S, Pandey DK, Richardson D, Zipfel GJ, Elkind MS, Liebeskind DS, Kramer J, Silver F, Kasner SE, Derdeyn CP, Gorelick PB, **Charbel FT** for the VERiTAS study group: The vertebrobasilar flow evaluation and risk of transient ischemic attack and stroke (VERiTAS) study. International Stroke Conference, February, 2012. (*Ongoing Clinical Trials Poster Presentation*).
225. Ivanov A, Alaraj A, **Charbel FT**, Aletich V, Amin-Hanjani S: Recurrence of cerebral arteriovenous malformations following pre-operative embolization and surgical resection. AANS, Annual Meeting, April 2012 (*Poster presentation*).
226. Alaraj A, Aletich V, Ivanov A, Carlson A, **Charbel FT**, Amin-Hanjani S: Correlation of AVM blood flow with angiographic features and clinical presentation. AANS Annual Meeting, April 2012 (*Poster presentation*).
227. Alaraj A, Aletich V, Ivanov A, Carlson A, Oh G, Amin-Hanjani S, **Charbel FT**: Effect of Pre-operative embolization on AVM blood flow. NSA annual meeting June 10-13. Park City, Utah. (*Oral presentation*)
228. Carlson AP, Alaraj A, Amin Hanjani S, **Charbel FT**, Aletich V: Continued concern of parent vessel steno-occlusive progression with Onyx HD-500 and the Utility of Quantitative MRI in Serial Assessment. CNS, Annual Meeting, October 6-10, 2012 (*Oral presentation*).
229. Langer D, Vajkoczy P, Chakrabarty S, Tymianski M, Amin-Hanjani S, **Charbel FT**, Welch BG, Samson D, Kivipelto L, Morcos J, Hanel R, Reinert M, Krisht A, Regli L, Lehecka M, Shneider U, Czabanka M, Kihlstrom L, Van Doomal T, Tulleken C, Van der Zwan B: Final Results of the ELANA FDA-IDE Study on High Flow Cerebral Bypasses for Surgical Treatment of Anterior Circulation Aneurysms. CNS, Annual Meeting, October 6-10, 2012 (*Oral presentation*).
230. Sophia F. Shakur, M.D., Tomas Hrbac, M.D., Ph.D., Ali Alaraj, M.D., Xinjian Du, M.D., Victor Aletich, M.D., **Fady Charbel, M.D.**, Sepideh Amin-Hanjani, M.D: Effects of Extracranial Carotid Stenosis on Intracranial Blood Flow. AANS, Annual Meeting, March31-April 3 2014 (*Oral presentation*).
231. Klodd D, Kyllonen R, Haberkamp T, Lemole GM Jr, Joe S, **Charbel FT**: A Deep Penetrating Brainstem Lesion. At AudiologyNow!, American Academy of Audiology, March 26-29, Orlando, FL, 2014

232. Bruneau M, Amin-Hanjani S, Koroknay P, Bijlenga P, Rezai J, Lehto H, Kivisaari R, Schaller K, **Charbel FT**, Kahn S, Melot C, Niemela MR, Hernesniemi JA: A Multicenter International Study of Surgical Clipping for Unruptured Very Small Intracranial Aneurysms. CNS Annual Meeting. Boston, Oct 21, 2014. (*Oral presentation*).
233. Esfahani DR, Stevenson M, Moss HE, Amin-Hanjani S, Aletich VA, **Charbel FT**, Alaraj A. Quantitative MRA is Correlated with Intravascular Pressures Before and After Venous Sinus Stenting: Implications for Treatment and Monitoring. CNS Annual Meeting. Boston, Oct 21, 2014.
234. **Charbel FT**: Bypass Selection for Aneurysm Surgery. The Society of University Neurosurgeons Annual Meeting. Shanghai, China July 2015.
235. **Charbel FT**: Management of Steno-occlusive Vertebro-Basilar disease in light of the Veritas Study. Richard Lende Winter Neurosurgery Conference. Snowbird, Utah. Jan 30- Feb 3, 2015.
236. Hussein AE, Esfehani DR, Amin-Hanjani S, Aletich VA, **Charbel FT**, Alaraj A: Reducing length of stay in aneurysmal subarachnoid hemorrhage: a three year institutional experience. AANS/CNS Joint Cerebrovascular Section Annual Meeting, Feb 2016. (Poster presentation).
237. Amin-Hanjani S, Turan T, Du X, Rose-Finnell L, Pandey DK, Richardson D, Elkind MSV, Zipfel GJ, Liebeskind DL, Silver FL, Kasner SE, Derdeyn CP, Gorelick PB, **Charbel FT** for the VERiTAS Study Group. Higher stroke risk with lower blood pressure in hemodynamic vertebrobasilar disease: analysis from the prospective multicenter VERiTAS study. International Stroke Conference, February 2016 (Oral presentation).
238. Amin-Hanjani S, Derdeyn CP, Du X, Rose-Finnell L, Pandey DK, Richardson D, Elkind MSV, Zipfel GJ, Liebeskind DL, Silver FL, Kasner SE, Gorelick PB, **Charbel FT** for the VERiTAS Study Group. Temporal changes in hemodynamics in patients with vertebrobasilar disease: results from the prospective multicenter VERiTAS study. International Stroke Conference, February 2016 (Oral presentation).
239. **Charbel FT**. Management of Steno-Occlusive Vertebro-Basilar Disease in light of the Veritas Study. Neurosurgical Society of America Annual meeting. Enniskerry, Ireland. June 19-22, 2016.
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#### **SEMINARS, SYMPOSIA, COURSES AND INVITED LECTURES (Selected)**

1. Lecture series: Neuroscience nursing orientation course. UIC Hospitals and Clinics, 1993–1996.

2. Grand Rounds, Department of Critical Care Nursing, UIC College of Nursing “Hypothermic circulatory bypass in the treatment of giant cerebral aneurysms” Chicago, Illinois, October 28, 1993.
3. Featured Speaker, American Association of Neuroscience Nursing, Northern Illinois Chapter, “Surgical advances in the treatment of pituitary tumors” Chicago, Illinois, October 19, 1994.
4. Surgeon/Live Surgery Demonstration: Operative Neurosurgery course. Frontiers in Neuroscience Seminar. Chicago, Illinois, January 27, 1994. “Live demonstration of MCA aneurysm surgery”.
5. Speaker: Frontiers in Neuroscience Seminar: Chicago, Illinois, January 28, 1994.
  - Perioperative management of cerebral aneurysms
  - Diagnosis of the patient with cerebral ischemia: Old and New methods. Chicago
  - Pituitary tumors: operative set-up and surgical approaches.
6. Grand Rounds, Department of Endocrinology, UIC College of Medicine “Old and new methods neurosurgical management of pituitary tumors” Chicago, Illinois, March 29, 1994.
7. Grand Rounds, Department of Surgery, UIC College of Medicine “Critical care issues in neurosurgery” Chicago, Illinois, January 4, 1995.
8. Panelist: AANS Orlando, Florida, April 1995. Image-Guided Surgery Workshop: Experience with the Zeiss MKM system.
9. Round table discussion: Meningiomas. American Brain Tumor Association Symposium. Chicago, Illinois, June 9–11, 1995.
10. Chairman, local arrangements: Fourth International Workshop on Cerebrovascular Surgery.. Chicago, Illinois, June 11–14, 1995.
11. Luncheon seminar: Operative adjuncts in aneurysm surgery. 4th International Workshop on Cerebrovascular Surgery. Chicago, Illinois, June 11–14, 1995.
12. Keynote Speaker: 4th International Workshop on Cerebrovascular Surgery. “The development, validation, and potential applications of a computerized model of the cerebral circulation” Chicago, Illinois, June 13, 1995.
13. Faculty AANS Professional Development Course. Chicago, Illinois, June 22–24, 1995. : Neurosurgical Critical Care Course.
14. Invited Speaker, 8th European Congress of Intensive Care Medicine “Potential applications of a cerebral tissue O<sub>2</sub>, CO<sub>2</sub>, and pH sensor in neurological monitoring” Athens, Greece, October 1995.
15. Grand Rounds, Department of Endocrinology, UIC College of Medicine “Unusual lesions of the pituitary region” Chicago, Illinois, November 7, 1995.

16. Experience with the Zeiss MKM stereotactic microscope. Leibinger's Users Group Meeting. Chicago, Illinois, November 10–11, 1995.
17. Hospital Preceptor Program, Phosphenytoin: a Neurosurgeon's Perspective. UIC Colleges of Medicine & Pharmacy. Chicago, Illinois; November 1995.
18. Invited Speaker: AANS Annual Meeting. Minneapolis, Minnesota; April 1996. Breakfast seminar: Hypothermic circulatory arrest: Technique, indications, and pitfalls.
19. Faculty: AANS Professional Development Course. Chicago, Illinois; June 20–22, 1996. Neurosurgical Critical Care Course.
20. Grand Rounds, Division of Neuropsychiatry, UIC College of Medicine "Cerebral metabolism and ischemia" Chicago, Illinois, July 1996.
21. Course organizer: Neuro-Endoscopy Symposium: Intraventricular neuroendoscopy: Hands-on. Montreal, Quebec, Canada; September 1996.
22. Invitados Especial, 27th CLAN/FLANC Congress, San Pedro Sula, Honduras; October 1996.
  - Third ventriculostomy and its place in the treatment of obstructive hydrocephalus.
  - Surgical management of cerebral vascular disease: the impact of computerized modeling.
  - Guidelines for the management of head injury.
  - Cerebral physiology and metabolism.
  - Surgical treatment of giant arteriovenous malformations.
23. Stroke Grand Rounds, Department of Neurology, Rush-Presbyterian-St. Luke's Medical Center. "Computer modeling of the cerebral circulation: basic research and therapeutic applications" Chicago, Illinois, November 7, 1996.
24. Faculty: AANS Professional Development Course. Snowbird, Utah; January 26–30, 1997. Neurosurgical Critical Care Course.
25. Course organizer: Neuro-Endoscopy Symposium: Neuroendoscopy hands-on. Denver, Colorado; April 1997.
26. Invited speaker and panelist: 10th International Symposium on Intracranial Pressure and Neuromonitoring in Brain Injury. Williamsburg, Virginia; May 1997. Seminar on Monitoring of brain oxygen and jugular oximetry: Can they replace CBF?
27. Grand Rounds, Division of Neurological Surgery, Northwestern University Medical School "The role of computerized modeling in cerebrovascular surgery" Chicago, Illinois, May 12, 1997.
28. Faculty: AANS Professional Development Course. Philadelphia, Pennsylvania; June 5–7, 1997. Neurosurgical Critical Care Course.
29. Invited Speaker: 11th International Congress of Neurological Surgery. Amsterdam, Netherlands; July 6–11, 1997. Luncheon seminar: Cerebral Revascularization 12 years later: What have we learned?

30. Neurosurgical emergencies. UIC Hospital and Clinics. Chicago, Illinois; September 9, 1997.
31. Invited Lecturer, Henry Ford Medical Group Reunion. “Cerebral revascularization: the state of the art” Detroit, Michigan, September 13, 1997.
32. Faculty and conference organizer (with J Meixensberger): 2nd Conference on Cerebral Oxygenation. Würzburg, Germany; September 25–26, 1997.
33. Faculty: Neuroscope 1997 Workshop: Intraventricular neuroendoscopy. New Orleans, Louisiana; September 30, 1997.
34. Faculty: Neurological surgery Oral Boards review course. The Osler Institute. Chicago, Illinois; October 11, 1997.
35. Monthly Neuroscience Conference, Department of Neurosurgery, UIC College of Medicine. “Computer analysis of brain circulation for treatment planning: a report on CANVAS, a multidisciplinary collaborative research’ project” Chicago, Illinois, November 19, 1997.
36. Faculty: AANS Professional Development Course. Puerto Rico; January 24–27, 1998. Topics in Neurosurgical Critical Care.
37. Workshop panelist: American Brain Tumor Association Wellness Symposium. Rosemont, Illinois; March 28, 1998. Answers to your questions about adult benign/low grade brain tumors.
38. Invited Lecturer: 19th Educational Course in Neurosurgery of Santa Casa de Riberão Preto. Riberão Preto, Brazil; April 3–5, 1998.
  - Neurosurgical critical care: principles and practice.
  - Stroke: an update.
39. Faculty: AANS Professional Development Course. Chicago, Illinois; June 4–6, 1998. Reintroduction to Neurosurgical Critical Care.
40. Faculty: CNS Annual Meeting. Seattle, Washington; October 3–8, 1998. Microvascular Reconstruction: Practical Course.
41. Invited Speaker: CNS Annual Meeting. Seattle, Washington; October 3–8, 1998. Luncheon seminar: Computerized modeling: Impact on patient selection and choice of revascularization strategy.
42. Invitados Especial, Special lecturer, Chairman, (with H Valladares). 28th Congress of Latin American Neurosurgeons/FLANC. Santiago, Chile; October 10–15, 1998.
  - Endoscopy and neuronavigation
  - Hands-on course in Endoscopy in adults
  - Luncheon seminar: Neuronavigation
  - Luncheon seminar: Utility of brain monitoring
  - Head injury: brain monitoring.
  - Brain attack: cerebral revascularization.



43. Invited Lecturer: 9th International Symposium of Interventional Neuroradiology (2nd Mexican Meeting of Minimally Invasive Neurosurgery/Joint Meeting of Comprehensive Endovascular Therapy/3rd Mexican Stroke Meeting). Mexico City, Mexico; January 27–30, 1999.
  - Computer modeling and phase-contrast MRI for cerebral vascular surgery.
  - The use of vessel flow measurements in complex aneurysm surgery.
44. Invited Speaker: Joint Meeting of the Section on Cerebrovascular Surgery/American Society of Interventional and Therapeutic Neuroradiology. Nashville, Tennessee; January 31–February 3, 1999. Luncheon seminar: Cerebral Revascularization for Non-Ischemic Cerebrovascular disease.
45. Faculty: AANS Professional Development Course. San Juan, Puerto Rico; February 4–7, 1999. “Topics in Critical Care”.
46. Faculty: Neurological surgery review course. Osler Institute, Chicago, Illinois, April 10-11, 1999.
47. Chairman (with A Maas): 3rd Conference on Monitoring of Cerebral Oxygenation and Metabolism. Berlin, Germany; April 29–30, 1999. Head injury seminar.
48. World Association of Lebanese Neurosurgeons meeting: Chairman, Scientific program. Beirut, Lebanon, June 20-23, 1999.
49. Moderator: Point-counterpoint in vascular neurosurgery: Should endovascular therapy or microsurgery be the first line of treatment? World Association of Lebanese Neurosurgeons 2nd Homecoming Program. Beirut, Lebanon; June 20–23, 1999.
50. Moderator: ABTA Brain Tumor Symposium. Chicago, Illinois; July 23–25, 1999. Adult benign brain tumor seminar.
51. Invited Speaker and Moderator: 13th Congresso de Neurologia e Neurocirurgia Centro de Estudos Santa Casa de Belo Horizonte. Belo Horizonte, Brazil; July 28–31, 1999.
  - Brain attack.
  - New methods in the management of cerebral ischemia
52. Grand Rounds, Department of Surgery, UIC College of Medicine. “The UIC CANVAS program for stroke and cerebrovascular disorders” Chicago, Illinois, September 8, 1999.
53. Invited Speaker, Medical Staff Lecture. South Shore Hospital “What’s new in the diagnosis and treatment of stroke? What every physician should know” Chicago, Illinois; September 10, 1999.
54. Invited Speaker, Saint Mary of Nazareth Hospital. “Stroke: What’s new in diagnosis and treatment”, Chicago, Illinois, September 28, 1999.
55. Course Director (with C. Ogilvy): Congress of Neurological Surgeons 49th Annual Meeting. Boston, Massachusetts; October 30–November 4, 1999. Practical Course on Anterior Circulation Aneurysms.

56. Invited Lecturer: 42nd Congress of the Chilean Society of Neurosurgery. Renaca Vina del Mar, Chile; November 18–20, 1999.
  - ICU management of acute cerebrovascular disorders: the first hours.
  - Pathophysiology of secondary injuries and advanced therapies in neurosurgical critical care.
  - Cerebral physiology and metabolism: the essentials of neurosurgical critical care.
  - Flow measurement assisted surgical techniques for the treatment of complex cerebrovascular aneurysms.
  - Management of patients with severe cerebral ischemia: the indications for EC-IC bypass.
57. Invited Speaker, St. James Hospital. “Stroke: What’s new in diagnosis and treatment” Chicago Heights, Illinois, December 16, 1999.
58. Invited Speaker: Joint meeting of the section on Cerebrovascular Surgery/ AANS/ CNS/ ASITN. New Orleans, Louisiana; February 8, 2000. Luncheon Seminar: Cerebral Revascularization for Non-Ischemic Cerebrovascular Disease.
59. Invited Speaker: American College of Surgeons (Chicago chapter) annual meeting. Chicago, Illinois, March 18, 2000. “Computer aided advances in surgery”
60. Faculty: Neurological surgery oral board review course– Osler Institute, Chicago, IL, April 15-16, 2000.
61. International invited lecturer: 20<sup>th</sup> Educational Course in Neurosurgery of Santa Casa de Riberão Preto, Riberão Preto, Brazil, April 28-May 1, 2000.
  - Surgery for Extracranial Vertebral Artery Disease.
  - New advances in the diagnosis and management of Subarachnoid Hemorrhage and Vasospasm: The monitoring of Brain tissue O<sub>2</sub>, CO<sub>2</sub>, pH, and temperature.
  - Flow Assisted Surgical Techniques for Complex Cerebral Aneurysms.
  - Revascularization for Non-Ischemic Cerebrovascular Disease.
  - Revascularization for Ischemia: The state of the art.
  - Modern management of Vertebro-Basilar Ischemia.
62. Course Director (with C. Ogilvy): Congress of Neurological Surgeons 50th Annual Meeting. San Antonio, Texas; September 23-28, 2000. Practical Course on Anterior Circulation Aneurysms.
63. Moderator (with Akira Takahashi): Joint Meeting of the Section on Cerebrovascular Surgery/American Society of Interventional and Therapeutic Neuroradiology. Hawaii; February 9-12, 2001. Luncheon Seminar: Revascularization techniques in acute cerebral ischemia.
64. Invited Speaker, Northern Indiana education foundation continuing medical education program Michigan City, Indiana; February 27, 2001. “Advances in stroke diagnosis and treatment”
65. Invited Speaker: Workshop on simulation in hemodynamics: Organized by Argonne national laboratory mathematics and computer science division, the University of Illinois at Chicago Department of mechanical engineering and the University of Chicago, Department of Surgery. Argonne and Chicago, Illinois, March 20-23, 2001. “The hemodynamic basis for cerebral Revascularization: An interdisciplinary approach”

66. Invited Speaker: American Association of Neurological Surgeons annual meeting. Toronto, Ontario, Canada; April 21-26, 2001. Breakfast Seminar: Brain Attack.
67. Organizer and Moderator (with Philippe Decq): Web-based Neurosurgery International Grand Rounds: University of Illinois, Chicago, USA- Hopital Henri Mondor, Creteil, France. June 16, 2001.
68. International Invited Faculty Speaker: IVth Annual Scientific Meeting of the Lebanese Society of Endocrinology, Diabetes and Lipids. Brummana, Lebanon, June 29-July 1<sup>st</sup>, 2001.
  - Unusual lesions of the sella region
  - Surgical approaches to the pituitary fossa: Selection rationales.
69. Invited Speaker: International Symposium on Neurovascular Surgery. Niteroi, Rio de Janeiro, Brazil. August, 9-11, 2001.
  - Management strategies for complex cerebral aneurysms: Role of Arterial Intraoperative Flow Measurements.
  - Hemodynamic evaluation and Revascularization options for occlusive carotid artery disease.
  - Post-operative Intensive care management of patients with cerebral aneurysms.
70. Invited Speaker: “Medicine for Today” program, Illinois Academy of Family Physicians. St. Anthony Hospital “What is new in the diagnosis and treatment of stroke?” Chicago, Illinois, September 19, 2001.
71. Course Director (with C. Ogilvy): Congress of Neurological Surgeons 51th Annual Meeting. San Diego, California; September 29-October 4, 2001. Practical Course on Anterior Circulation Aneurysms
72. Invited Speaker: Congress of Neurological Surgeons 51th Annual Meeting. San Diego, California; September 29-October 4, 2001. Luncheon Seminar: Vascular augmentation techniques for cerebral ischemia.
73. Moderator: Section on Cerebrovascular Surgery - Neurovascular Critical care. Congress of Neurological Surgeons 51th Annual Meeting. San Diego, California; September 29-October 4, 2001.
74. Invited Speaker: Copley-Mercy CME consortium. Provena Mercy Center “What’s new in the Treatment of Stroke?” Aurora, Illinois October 12, 2001.
75. International Invited Guest Speaker: The 2<sup>nd</sup> International Mt. Bandai Symposium for Neuroscience. Koryiama, Japan. October 26-29, 2001.
  - The importance of vessel flow measurements in the management of complex cerebral vascular lesions.
76. Faculty: 2<sup>nd</sup> Annual Midwest regional brain aneurysm workgroup. Chicago, Illinois, December 1, 2001. “Defining the aneurysm treatment strategy: A neurosurgeon’s perspective”.

77. Faculty: The 2<sup>nd</sup> annual International Symposium and Hands-on Course on Cerebral Revascularization. Practical Anatomy Workshop, Saint Louis University. St Louis, Missouri, December 2, 2001.
78. Faculty: The 3<sup>rd</sup> Annual International Symposium on Cerebral Revascularization & Hand-On Course on Microanastomosis and EC-IC Bypass Techniques. Practical Anatomy Workshop of Saint Louis University School of Medicine. St. Louis, Illinois; September 12-September 15, 2002.
79. Faculty: American Academy of Neurology and Acute Stroke Advisory Panel. Chicago, Illinois; September 21, 2002. Acute Stroke: Principles of Modern Management Course.
80. Invited Lecturer: The IVth Pan Arab Congress of Neurosurgery. Fez, Morocco. October 9-13, 2002.
  - Up to date techniques of diagnosis and treatment of occlusive cerebrovascular disease
  - Management of complicated cerebral aneurysms
81. Panelist: The 6<sup>th</sup> Joint Meeting of the AANS/CNS Section on Cerebrovascular Surgery and the American Society of Interventional & Therapeutic Neuroradiology. Management of Intracranial Occlusive Disease: Surgical and Endovascular Options. Phoenix, Arizona. February 15-19, 2003.
82. Faculty: AANS Annual Meeting 2003. San Diego, California; April 26, 2003. Course on Cerebrovascular Disease. “Bypass Surgery for Cerebral Ischemia”.
83. Invited Speaker: AANS Annual Meeting 2003. San Diego, California; April 30, 2003. Brain Attack: Revolutionary Strategies in the Prevention and Treatment of Strokes Seminar. “Vessel Flow Hemodynamics in the Management of Intracranial Atherosclerosis”.
84. Invited Speaker: 5<sup>th</sup> Annual Interventional Neuroradiology Symposium. Toronto, Ontario-Canada. September 19-20, 2003. “Volumetric blood flow calculations as guidance for cerebral vascular reconstruction techniques”
85. Invited Lecturer: International Symposium on Advances in Management of Neurovascular Disease. Academic & Training Affairs Neurosciences Department, King Faisal Specialist Hospital & Research Center. Jeddah, Saudi Arabia. September 30, 2003 – October 1, 2003.
  - Selection and surgical management of complex aneurysms not treatable with coils
  - Neurotrend and its applications
  - Revascularization for cerebral ischemia: current indications and techniques
86. Faculty: The 4<sup>th</sup> Annual International Meeting on Cerebral Revascularization & Hand-On Course on Microanastomosis and EC-IC Bypass Techniques.
  - Overview of Cerebrovascular Hemodynamics, Cerebral Blood Flow, and Vascular Reserve
  - Carotid Endarterectomy
  - 3-D Demonstration Cadaver Hands-on Laboratory Session: STA-MCA Bypass Techniques
  - STA-MCA Bypass: Indications & Technical Nuances.

- 3-D Demonstration: Occipital Artery to PICA Bypass, PICA to PICA Bypass
  - Panel Discussion: EC-IC Bypass
87. Faculty: CNS 53<sup>rd</sup> Annual Meeting. Denver, Colorado. October 18-23, 2003. Carotid Disease: Surgical and Endovascular Management.
  88. Invited Lecturer: International Education Week-Panel Discussion at the University of Illinois at Chicago. "Healthcare in a global age: innovation meets internationalization" November 19, 2003.
  89. Organizer, speaker and moderator: Societe de NeuroChirurgie de Langue Francaise Annual Meeting. Paris, France, November 30-December 3, 2003. "Revascularization Cerebrale: Table Ronde".
  90. Moderator: AANS/CNS Joint Section on Cerebrovascular Surgery 7<sup>th</sup> Annual Meeting.. San Diego, California, February 1-4, 2004. "Management of Intracranial Occlusive Disease: Surgical and Endovascular Options".
  91. 29<sup>th</sup> International Stroke Conference. San Diego, California. February 5, 2004.
  92. Featured Speaker: Stroke an Update on Diagnosis, Prevention, and Treatment (faculty). Chicago Neurological Society & the Univeristy of Illinois at Chicago. February 28<sup>th</sup>, 2004.
  93. Invited Lecturer: Sherman Health Systems. "Hemorrhagic Stroke: What every physician should know" Elgin, Illinois. May 21, 2004.
  94. Invited Lecturer: Neurovascular Update, Harvard Medical School/Massachusetts General Hospital. Intracranial Aneurysms-Current Challenges and Future Directions. Boston, Massachusetts. June 17, 2004.
  95. Executive Committee: Computer Asisted Radiology and Surgery 18<sup>th</sup> International Congress and Exhibition. Chicago, Illinois. June 23-26, 2004.
  96. Invited Lecturer: LINC Course. MR-Based Quantification of Blood Flow Using the NOVA. Houston, Texas. October 12, 2004.
  97. Invited Speaker: University of Padua, Department of Neurosurgery: Live symposium and course in Microneurosurgery. Padua, Italy. November 12, 2004. "Nuove Technologie Nella Chirurgia Degli Aneurismi Cerebrali: Flussimetria Intraoperatoria".
  98. Invited Lecturer: Alexian Brothers Medical Center Elk Grove Village, Illinois. December 9, 2004. "NOVA"
  99. Faculty: 5<sup>th</sup> Annual International Meeting on Cerebral Revascularization & Hands-On Course on Microanastomosis and EC-IC Bypass Techniques. St. Louis, Missouri. January 19-23, 2005.
  100. Invited Speaker: 8<sup>th</sup> Joint Annual Meeting of the AANS/CNS Cerebrovascular Section. New Orleans, Louisiana. February 2-4, 2005.

- Management of Intracranial Occlusive Disease: Surgical and Endovascular Options
  - Stroke Risk Stratification in Symptomatic Vertebrobasilar Disease
101. Invited Lecturer: ESNS 30<sup>th</sup> Annual Conference, Cairo, Egypt. March 23- 25<sup>th</sup>, 2005
- Advanced Surgical Techniques for Complex Intracranial Aneurysms
  - Anterior and Posterior Circulation Bypass: From Basic Technique to Operative Nuances
102. Panelist: AANS Annual Meeting. New Orleans, Louisiana. April 16-21, 2005. “Brain Attack: Revolutionary Strategies in the Prevention and Treatment of Strokes”.
103. Invited Speaker: SNS 96<sup>th</sup> Annual Meeting. Stanford, CA. May 22-24<sup>th</sup>, 2005. “Training and Neurosurgical Virtual Simulators”.
104. Panelist: CNS Annual Meeting. Advanced Strategies for the Treatment of Intracranial Aneurysms. Boston, Massachusetts. October 8-12, 2005. “Advanced Surgical Aneurysm Treatment”
105. Faculty: 6<sup>th</sup> Annual International Congress on Cerebral Revascularization & Hands-On Course on Microanastomosis and EC-IC Bypass Techniques. St. Louis, Missouri. January 12-15, 2006.
106. Invited participant: AANS/CNS Cerebrovascular Section and The American Society of Interventional and Therapeutic Neuroradiology 9<sup>th</sup> Joint Annual Meeting. Orlando, Florida. February 17-20, 2006.
- Neurovascular Surgery Training Simulators (Lecturer).
  - New Technologies in the Treatment of Intracranial Artherosclerosis (Panelist)
  - Intracranial Atherosclerosis, Surgical Treatment (Lecturer)
  - Management of Intracranial Occlusive Disease. Surgical and Endovascular Options (Moderator)
107. Symposium Director and Speaker: International Symposium on Flow Measurement in Cerebrovascular Surgery. Chicago, IL. October 6, 2006.
- Bypass for Ischemia (Anterior Circulation) – Intraoperative Flow Measurement.
  - Bypass for Ischemia (Posterior Circulation) – Intraoperative Flow Measurement
108. Course Director: CNS Annual Meeting. “Cerebral Revascularization Surgery: A Hands-On Course”. Chicago, Illinois. October 7-12, 2006.
109. Faculty: CNS Annual Meeting. “Live 3-D Cadaveric Demonstration” Chicago, Illinois. October 7-12, 2006.
110. Invited Speaker: CNS Annual Meeting. Chicago, Illinois. October 7-12, 2006.

- Computer Assisted Surgery and Surgical Simulators: Their Potential Role in Patient Care and Surgical Education
  - Management of Unruptured Intracranial Aneurysms: Understanding and Developing Treatment Options
  - Cerebral Revascularization in Symptomatic Patients: Current and Future Treatments
111. Faculty speaker: Third NYU Cerebrovascular Disease Update. New York, New York. November 2-3, 2006.
- Carotid Endarterectomy vs. Stenting.
  - Aneurysms: To Clip or Coil
112. Featured Honored Guest: Asia Symposium on Flow Measurement in Cerebrovascular Surgery. Taipei, Taiwan. November 30, 2006.
- “Bypass for ischemia (posterior circulation) – intraoperative flow measurements”
  - “Aneurysm surgery – Intraoperative flow measurements”
113. Invited Speaker: 8<sup>th</sup> International Conference on Cerebrovascular Surgery (ICCVS). Symposium (VI): Taipei, Taiwan. November 30 – December 3, 2006.
- Operative Techniques in Aneurysm Surgery. “Advanced strategies and techniques for surgical aneurysm treatment.”
  - Surgical treatment of intracranial atherosclerosis
  - Intracranial Stenosis and Dissection
114. Grand Rounds: Sherman Hospital/Provena Saint Joseph, Elgin, Illinois. “Incidental Intra-cranial Aneurysms” December 8, 2006.
115. Faculty: 7<sup>th</sup> Annual International Congress on Cerebral Revascularization & Hands-On Course on Microanastomosis and EC-IC Bypass Techniques. St. Louis, Missouri. January 11-14, 2007.
116. Invited Speaker: 98<sup>th</sup> Meeting of the Society of Neurological Surgeons. San Francisco, California. May 6-8, 2007. “Evaluation of Surgical Skills Using Simulators”.
117. Invited Lecturer: Seoul National University College of Medicine. 50<sup>th</sup> Anniversary Celebration Symposium. “Clinical Implication of Quantitative MRA-NOVA System” Seoul, Korea. September 1, 2007.
118. Symposium Director and Speaker: Second International Symposium on Flow Measurement in Cerebrovascular Surgery. Quantitative Cerebral Blood Flow Measurement in Revascularization for Atherosclerotic Disease. San Diego, September 14, 2007.

119. Course Director: CNS Annual Meeting. "Cerebral Revascularization Surgery: A Hands-On Course". San Diego, California. September 15, 2007.
120. Invited Speaker: Congress of Neurological Surgeons Annual Meeting- San Diego, California. September 19, 2007. "Surgical Treatment of Acute Stroke"
121. Invited Lecturer: The University of Chicago. Complications of Operations on Brain and Spine. Chicago, Illinois. September 29, 2007.
122. Syposium Director and Speaker: Neurovascular Symposium 2007. Chicago, October 20, 2007. Lecture: "EC-IC Bypass for Aneurysms, Moya Moya and Atherosclerosis: State of the art and future directions".
123. Faculty: The 1<sup>st</sup> World Congress on Cerebral Revascularization. "How to Use CBF Data in Clinical Decision Making". St. Louis, Missouri. January 10, 2008.
124. Faculty: The 8<sup>th</sup> Annual Hands-on Workshop: ECIC Bypass and Microanastomosis Techniques. St. Louis, Missouri. January 10-13, 2008.
125. Invited Lecturer: Kai Chong Tong, Postgraduate Education Centre Prince of Wales Hospital. The fifth Asia Pacific multidisciplinary meeting for nervous system diseases. Shatin, Hong Kong. January 18-19, 2008. "Symptomatic Chronic Internal Carotoid Occlusion: On whom, when and how to Intervene?"
126. Invited Lecturer: International Stroke Conference - AANS/CNS Cerebrovascular Section meeting New Orleans. February 18-22, 2008. "Surgical Treatment for Intracranial Atherosclerosis"
127. Invited Lecturer: Centenary of the Swiss Neurological Society. Montreux, Switzerland. April 23-25, 2008. "Brain Perfusion and Revascularization"
128. Invited Speaker: AANS Annual Meeting. Chicago, Illinios. April 26-May 1, 2008. Neurosurgery with the Chicago Masters: "EC-IC Bypass, a revival?"
129. Faculty: Cerebrovascular Surgery Course. Extracranial-Intracranial Bypass. St. Louis, Missouri. May 30-June 1, 2008.
130. Invited Speaker: InTouch Health Remote Presence Clinical Innovations Forum. A current and Future Framework for the Management of Neuroscience Disorders. Santa Barbara, California. July 18-19, 2008.
131. Course Director: CNS Annual Meeting Orlando, Florida. September 20, 2008. "Cerebral Revascularization Surgery: A Hands-On Course"
132. Symposium Director and Speaker: Neurovascular Symposium. Chicago, October 4, 2008.
133. Invited Speaker: The 7<sup>th</sup> Pan Arab Neurosurgical Society Congress & Hands-On Workshops: National Guard Hospital, Riyadh, Saudi Arabia, November 4-6, 2008.



- Surgical treatment of complex aneurysms.
  - Bypass for cerebral ischemia – A review.
134. Invited Speaker: The 3<sup>rd</sup> International Congress, Emirates Neurosciences Society: Intercontinental, Dubai Festival City, December 18-20, 2008.
- EC-IC Bypass for Cerebral Ischemia: What is new in 2008?
  - Surgical Management of Intracranial Aneurysms.
  - Guidelines for the Management of Unruptured Intracranial Aneurysms
135. Symposium Director and Speaker: 3<sup>rd</sup> International Symposium on Flow Measurement in Cerebrovascular Surgery. Stanford, California, Feb 15<sup>th</sup>, 2009.
136. Invited Speaker: 2009 Stroke Intervention: A Symposium on Stroke Prevention and Treatment – “The Importance of Quantification of Blood Flow”. Winthrop University Hospital Department of Neurosurgery, Melville, NY, May 13, 2009.
137. Lecturer and Live Surgery Demonstration Faculty: “The 9<sup>th</sup> Helsinki Live Demonstration Course in Operative Microneurosurgery”. Helsinki, Finland. June 1-6, 2009.
- Lecture: Surgical revascularization for complex aneurysms
  - Live surgical demonstration: PICA to PICA Bypass for Giant vertebral artery aneurysm
138. Invited Speaker: 2009 Neurosymposium: Cerebral Revascularization NYC Roosevelt Hospital Conference Center. Moderator – “Surgical Treatment of Cerebral Ischemic Disease” New York, NY, August 27, 2009.
139. Invited Speaker: 4<sup>th</sup> ELANA User Meeting. “Issues starting up ELANA” New York, NY, August 29, 2009.
140. Invited Speaker: XIV World Congress of Neurological Surgery – The Acute Stroke: Indications for Surgical and Endovascular Intervention. Boston, MA, August 30 – September 4, 2009.
141. Invited speaker: The 4<sup>th</sup> Live Workshop in Neurological Surgery. Padua, Italy. September 30 – October 2, 2009.
142. Faculty: Microscopic and Endoscopic Approaches for Skull Base Lesions (Cerebrovascular Bypass Session). Allegheny General Hospital. Pittsburgh, PA. October 1 – 4, 2009.
143. Course Director: CNS Annual Meeting. “Cerebral Revascularization Surgery: A Hands-On Course”. New Orleans, LA. October 25, 2009.
144. Faculty: CNS Annual Meeting. “Open Aneurysm Surgery: A 3-D Practical Course”. New Orleans, LA. October 25, 2009.

145. Invited speaker: CNS Annual Meeting. “Cerebral Ischemic Disease: Management Options”. New Orleans, LA. October 25, 2009
146. Faculty: Microsurgery of Aneurysms, Recent Advances-A Hands-On Cadaver Workshop. Practical Anatomy & Surgical Education-Saint Louis University School of Medicine, St. Louis, Missouri, March 1-5, 2010.
- Options for Bypass in Aneurysm Surgery
  - STA-MCA Bypass Techniques
147. Invited Speaker: AANS Annual Meeting. “Update on Microsurgical Treatment of Cerebral Ischemia” Philadelphia, PA, May 4, 2010.
148. Invited Speaker: Symposium for the Official Inauguration of the Neurocenter of Southern Switzerland Stroke 2010. “Future of Vascular Neurosurgery”, May 6, 2010.
149. Lecturer and Live Surgery Demonstration Faculty: “The 10<sup>th</sup> Helsinki Live Demonstration Course in Operative Microneurosurgery”. Helsinki, Finland. June 6-11, 2010.
- Lectures:
    - Trends and future of bypass surgery
    - Revascularization for complex aneurysms
  - Live surgical demonstration: Carotid to MCA, EC-IC venous bypass graft for a Giant cavernous carotid aneurysm.
150. Invited Speaker: Symposium on Cerebral Revascularization, UMC Utrecht. “Pre and intra-operative evaluation of cerebral Hemodynamics and flow” The Netherlands, June 25, 2010.
151. Faculty: Clinical Integration of Tomographic Physiological Imaging and Multimodal Monitoring – Present and Future Symposium - Sante Fe, New Mexico, August 26-28, 2010.
- MRI Flow Imaging (*presentation*)
  - What imaging tools do we need in/near the NICU? Are Pictures Enough? Is Relative Information Enough? (*panelist*)
152. Invited Lecturer: Third Annual Neuroscience Symposium – Saving the Brain, “Evaluation and management of symptomatic vertebrobasilar disease: A flow-based algorithm”, Santa Barbara, CA October 2, 2010.
153. Faculty: Advances in Vascular Microneurosurgery – 3D Live Microneurosurgery Course Arkansas Neuroscience Institute. Little Rock, Arkansas October 10-12, 2010.
- Bypass Options for Treatment of Aneurysms.
154. Course Director: “Hands-On: Cerebral Revascularization”. CNS Annual Meeting, San Francisco, CA. October 17, 2010.

155. Faculty: “Open Aneurysm Surgery: A 3-D Practical Course”. CNS Annual Meeting. San Francisco, CA, October 17, 2010.
156. Invited Speaker: 4<sup>th</sup> International Congress of Emirates Neuroscience Society 6-8. November 2010, Raffles Hotel – Dubai.
- Surgical Revascularization for Ischemia
  - Technical Notes in Aneurysms Approach (Anterior Circulation)
  - Pitfalls and Complications Avoidance in Aneurysm Surgery
  - Controversies in the Management of Intracerebral Hematomas
157. Lecturer and Live Surgery Demonstration Faculty: 5<sup>th</sup> Workshop di Neurochirurgia dal Vivo “Brainhouse”. Azienda Ospedaliera Universita Padova, November 30 - December 3, 2010.
- Lectures:
    - Utilizzo della flussimetria negli aneurismi cerebrali
    - FAST method for cerebral revascularization in aneurysm surgery
    - Ruolo di NOVA-RM nel management dell’ischemia vertebrobasilare
  - Live Surgical demonstration:
    - STA-MCA Bypass for Giant Middle Cerebral Artery Aneurysm
158. Invited keynote Speaker: Cerebral Revascularization: Aneurysms and beyond. “Cerebral revascularization: tips and tricks”, Azienda ULSS 12 Veneziana Scuola di Sanita’ Veneta, Venezia – Mestre, Italy, December 3, 2010.
159. Invited Speaker: Istituto Neurologico Carlo Besta “Technical Advances in Patients Selection for Brain Revascularization”, Milan, Italy, January 27, 2011.
160. Invited Speaker: AANS/CNS Cerebrovascular Section Annual Meeting: “Surgical management of intracranial Occlusive disease: What works and what doesn’t”. Los Angeles, CA, February 7-8, 2011.
161. Faculty: CNS University Webinar Series – ECIC Bypass. “Preoperative evaluation and Modern indications for ECIC Bypass”, February 24, 2011.
162. Faculty: Microsurgery of Aneurysms, Recent Advances-A Hands-On Cadaver Workshop. Practical Anatomy & Surgical Education-Saint Louis University School of Medicine. St. Louis, Missouri, March 7-11, 2011.
163. Lecturer and Live Surgery Demonstration Faculty: “The 11<sup>th</sup> Helsinki Live Demonstration Course in Operative Microneurosurgery”. Helsinki, Finland. June 5-11, 2011.
- Lecture: Trends and future of Bypass surgery
  - Live surgical demonstration: STA-MCA Bypass for Moya Moya Disease
164. Invited Lecturer: The International Conference on Surgery for Cerebral and Spinal Vascular Diseases. Nanjing, China, April 17, 2011.
- Q-MRA NOVA for the management of Intracranial Atherosclerosis

165. Invited Keynote Lecturer: The National Congress of the “Societa Italiana dei Neurologi, Neurochirurghi e Neuroradiologi Ospedalieri.” Cagliari, Italy, May 21, 2011.
- Technical advances in patients selection for brain revascularization
166. Invited Speaker: World Association of Lebanese Neurosurgeons (WALN) Sixth Homecoming Congress. Beirut, Lebanon. June 19-22, 2011.
- The “F.A.S.T.” Bypass for a Giant Ophthalmic Aneurysm
  - Choice of Revascularization Techniques for Complex Cerebral Aneurysms.
167. Invited Speaker: The 11<sup>th</sup> Argentina Association of Neurosurgery Conference, Pontifical Catholic University. Puerto Madero, Buenos Aires August 11-13, 2011.
- Surgical approaches to the vertebral artery
  - Modern algorithm for the management of vertebrobasilar ischemia
  - Technical aspects of surgery of intracranial aneurysm, with special emphasis on avoidance of complications
168. Faculty: Congress of Neurological Surgeons Annual Meeting. October 1-6, 2011. Washington, DC.
- Open Aneurysm Surgery: A 3-D Practical Course: “Flow replacement Bypass for Complex Carotid Aneurysms”
169. Invited Speaker: 14<sup>th</sup> European Congress of Neurosurgery. Rome, Italy. October 9-14, 2011.
- Surgical Treatment of Cerebral Vasospasm
  - Revascularization Strategies for complex Intracranial Aneurysms
170. Invited Speaker: Bridging the Gap: Emerging Health Issues in Underrepresented Minorities at the University of Illinois at Chicago, October 26, 2011.
- Addressing disparities in the management of Hemorrhagic Stroke and Brain Aneurysms
171. Invited Speaker: Annual Congress of the Czech Neurosurgical Society. Frymburk, Czech Republic. Nov 2-4, 2011.
- Revascularization Strategies for Complex Intracranial Aneurysms
172. Invited Speaker: Seoul National University-Bundang Hospital. International Symposium on Flow Measurement in Cerebrovascular Disease-Management of Hemodynamic Stroke. Seoul, South Korea. November 11-12, 2011.
- Development and basic principles of NOVA
  - Overview of NOVA
173. Faculty: Microsurgery of Aneurysms, Recent Advances-A Hands-On Cadaver Workshop. Practical Anatomy & Surgical Education-Saint Louis University School of Medicine, St. Louis, Missouri, Feb 27-March 2, 2012.
- Options for Bypass in Aneurysm Surgery
  - STA-MCA Bypass Techniques

174. Invited Speaker: The 10<sup>th</sup> International Conference on Cerebrovascular Surgery. Beijing, China, April 20-22, 2012.
- FAST Method for Revascularization of Complex Aneurysms
  - Bypass Reconstruction for Complex Aneurysms (surgery video show with master's comments)
  - Evaluation and Treatment of Intracranial Arterial Occlusion
175. Invited Speaker: The first annual neurocritical care and stroke symposium. Chicago Neurological Society. Loyola University School of Medicine. Maywood, Illinois, May 12, 2012.
- Surgical management of Ischemic stroke
176. Lecturer and Live Surgery Demonstration Faculty: "The 12<sup>th</sup> Helsinki Live Demonstration Course in Operative Microneurosurgery". Helsinki, Finland. June 3-8, 2012.
- Lecture: Trends and future of Bypass surgery
  - Live surgical demonstration: STA-MCA Bypass for Moya Moya Disease
177. Invited Speaker: The 30<sup>th</sup> annual Michigan Association of Neurological Surgeons conference. Boyne Falls, Michigan, June 10<sup>th</sup>, 2012.
- Surgical Cerebral Revascularization, an update
178. Course Director: The Bern-Chicago Cerebral Revascularization and Endovascular course. Chicago, IL, October 3-5, 2012. (*with Alaraj A, Aletich V, Amin-Hanjani S, Gralla J, Reinert M*)
- Bypass Concepts - Flow replacement v. Flow augmentation
  - Aneurysm – Surgical Bypass
179. Symposium Director: 4<sup>th</sup> International Symposium on Flow Measurement in Cerebrovascular Surgery. Chicago, IL, October 6, 2012. (*with Sepideh Amin-Hanjani, MD*)
- Flow Assisted Surgical Technique
180. Faculty: Congress of Neurological Surgeons Annual Meeting. October 6-10, 2012. Chicago, IL.
- Open Aneurysm Surgery: A 3-D Practical Course: "Flow replacement Bypass for Complex Carotid Aneurysms"
181. Invited Speaker: The 55<sup>th</sup> annual congress of the Chilean Congress of Neurological Surgery. Puerto Varas, Chile. October 24-27, 2012.
- Comprehensive management of intracranial aneurysms
  - Flow assisted surgery for cerebral aneurysms
  - Update on EC-IC bypass
  - Surgical approaches to the vertebral artery
182. Invited Speaker: The 5<sup>th</sup> International Congress of Emirates Neurosciences Society. Dubai, UAE. November 4-6, 2012.
- Basic Principles in Aneurysm Surgery
  - Tips and Tricks in Anterior Circulation Aneurysm Surgery
  - Cerebral Aneurysms: When to Coil and When to Operate (moderator)
  - Carotid and Intracranial Arterial Stenosis (debate with Moret, Jacques, MD)

183. Honorary Speaker: The Chicago Oodontographic Society. Chicago, IL. December 1, 2012.
- Neurosurgery and Dentistry: Worlds apart or closer than we think?
184. Invited Speaker: The 9<sup>th</sup> Pan Arab Neurosurgical Congress. Kuwait City, Kuwait. December 9-12, 2012.
- Surgical Revascularization for Large Aneurysms (How I do it)
  - Surgical Approaches to the Vertebral Artery
  - Cerebral Bypass for Ischemia: Current Status
185. Speaker: Campus Insights Program. Presentation to University of Illinois Board of Trustees, President, UIC Chancellor and guests. “NOVA”. January 23, 2013.
186. “Special Lecture” Speaker: Joint Neurosurgical Convention of the 6<sup>th</sup> International Mt. Bandai Symposium and the 7<sup>th</sup> Pan-Pacific Neurosurgery Congress. Hawaii. Jan 29-Feb 3, 2013.
- Cerebral Revascularization for Complex Cerebral Aneurysms: the FAST Method
187. Invited Speaker: 5<sup>th</sup> International Neurosurgical Winter Congress. Chamonix, France. Feb 10-13, 2013.
- Surgical Revascularization for large aneurysms: Techniques and pitfalls
188. Speaker: Neurosurgery at Jackson Hole. Teton Village, Wyoming. March 3-6, 2013.
- Revascularization Strategies for Intracranial Aneurysms
189. Lecturer and Live Surgery Demonstration Faculty: 8<sup>th</sup> Brainhouse Workshop: Live Surgery and Blood Flow. Azienda Ospedaliera Universita Padova, April 15-17 2013.
- Lectures:
    - FAST Principles for Revascularization in Complicated Aneurysms
    - Emerging Applications of NOVA for Cerebral AVMs
    - Bypass: Surgical Techniques
  - Live Surgical demonstrations:
    - STA-MCA Bypass for a Middle Cerebral Artery Aneurysm
    - Clipping of a Middle cerebral aneurysm
    - Clipping of a Middle cerebral, Anterior Temporal and Anterior Choroidal aneurysms.
190. Panelist: Breakfast seminar-Bypass Graft Indications and Techniques. AANS annual meeting. Apr 27-May 1. New Orleans, LA.
- Revascularization for aneurysms: Indications and use of flow assessment to guide bypass technique.
191. Lecturer and Live Surgery Demonstration Faculty: “The 13<sup>th</sup> Helsinki Live Demonstration Course in Operative Microneurosurgery”. Helsinki, Finland. June 2-7, 2013.
- Lecture: Trends and future of Bypass surgery
  - Live surgical demonstration: Clipping of a Superior Hypophyseal Aneurysm

192. Invited Speaker: Neurovascular care at the Crossroads. The University of Chicago Section of Neurosurgery, Department of Surgery. Chicago, Illinois, May 8, 2013.
- Assessing and Optimizing Cerebral Hemodynamics in Stroke Prevention and Treatment
193. Faculty: International Perspectives in Neurovascular Disease: Past, Present and Future. Lennox Hill Hospital. New York, NY. Oct 4, 2013.
- Cerebral Revascularization: Purposeful Endeavor or Irrelevant Exercise?
194. Faculty: Advanced Residents Aneurysm Course. Arkansas Neurosciences Institute. Little Rock, AK. Oct 5-7, 2013
- Principles of Aneurysm surgery
  - Principles of cerebral revascularization
195. Faculty: Microsurgery of Aneurysms, Recent Advances-A Hands-On Cadaver Workshop. Practical Anatomy & Surgical Education-Saint Louis University School of Medicine, St. Louis, Missouri, October 14-18, 2013.
- Options for Bypass in Aneurysm Surgery
  - STA-MCA Bypass Techniques
196. Faculty: Congress of Neurological Surgeons Annual Meeting. October 19, 2013. San Francisco, CA.
- Open Aneurysm Surgery: A 3-D Practical Course: “Flow replacement Bypass for Complex Carotid Aneurysms”
197. Lecturer: Università politecnica delle Marche. Facoltà di Medicina. Department of Neurosurgery. October 28, 2013. Ancona, Italy.
- Future trends in Vascular Neurosurgery
198. Faculty: Course on Surgery for Cerebral Aneurysms. (*Corso chirurgia degli aneurismi cerebrali*). Azienda Ospedaliera Universitaria Integrata Verona. Verona, Italy. October 28-30, 2013.
- Principles of aneurysm surgery
  - Concepts of revascularization: the Cut-Flow Index
  - Video Surgical demonstrations: Bypass surgery for complex aneurysms-The Chicago experience
199. Live Surgery Demonstration: Azienda Ospedaliera Università Padova, October 31, 2013.
- Double STA-MCA Bypass for Middle Cerebral Artery Aneurysm
200. Faculty: Chicago Microsurgery and Skull Base course. Rush University Medical Center. Chicago, February 22<sup>nd</sup> 2014.
- STA-MCA bypass Technique
201. Invited Speaker: Interurban Neurosurgical Society, March 7<sup>th</sup>, 2014.
- Measurements, Outcomes and the Pursuit of Perfection

202. Invited Speaker: The 28<sup>th</sup> Annual Congress of Turkish Neurosurgical Society. Antalya, Turkey. April 4-8, 2014.
- Surgical Management of Complex Aneurysms
  - Cerebral Revascularization: Purposeful endeavor or irrelevant exercise?
  - Q&A session with young neurosurgeons
203. Invited Speaker: The 2<sup>nd</sup> International Congress on Minimally Invasive Technique in Neurosurgery. Xi'an, China. September 12-14, 2014.
- FAST: A Minimally Invasive Method for Bypass in Aneurysm Surgery
204. Invited Speaker: University of Illinois College of Medicine Homecoming. Chicago. September 20<sup>th</sup>, 2014.
- History of Neurosurgery
205. Faculty: Microsurgery of Aneurysms, Recent Advances. Practical Anatomy & Surgical Education- Saint Louis University School of Medicine, St. Louis, Missouri, Sept 24-27, 2014.
- Selection of Donor Vessel for Bypass in Aneurysm Surgery
206. Invited Speaker: EANS Congress. Prague, Czech Republic. Oct12-17, 2014.
- Flow Measurements for Bypass in Moyamoya Disease
  - Cerebral Revascularization: Purposeful Endeavor or Irrelevant Exercise?
207. Faculty: Practical course 10: "Open Aneurysm Surgery: A 3-D Practical Course: Bypass for Aneurysms". CNS Annual Meeting. Boston, MA, October 19, 2014.
208. Moderator: (with Fredric Meyer MD) Live surgery-Sylvian fissure dissection. Robert Spetzler MD, operating surgeon. CNS Annual Meeting. Boston, MA, October 21, 2014.
209. Invited Speaker: Innovation in Neurosurgery Symposium. Munster, IN. Nov 1, 2014.
- Advances in Cerebral Vascular Surgery
210. Invited Speaker: International Conference on Medical Education. Catalyzing Change to Improve the Quality of Health Care. LAU School of Medicine. Beirut, Lebanon. November 21-22, 2014.
- Measurements, Outcomes and the Pursuit of Perfection.
211. Invited Speaker: Richard Lende Winter Neurosurgery Conference. Snowbird, Utah. Jan 30- Feb 3, 2015.
- Donor Selection in Bypass for Aneurysm Reconstruction
212. Faculty: 25<sup>th</sup> North American Skull Base Society Annual Meeting, Pre-Meeting Course. Tampa, FL. Feb 19, 2015
- Bypass Selection for Aneurysm Surgery
213. Invited Honored Faculty: The 10<sup>th</sup> National Yang-Ming University Taipei Veterans General Hospital Lectures and Hands-on Dissection Course: April 8-13, 2015. Taipei Veterans General Hospital. Taipei, Taiwan
- Prevention of Vasospasm Following Subarachnoid Hemorrhage



- The Utility of Intraoperative Blood Flow Measurement during Aneurysm Surgery
  - Flow Replacement for Complex of Giant Aneurysms
214. Lecturer and Live Surgery Demonstration Faculty: 10<sup>th</sup> Brainhouse Workshop: Live Surgery and Blood Flow. Azienda Ospedaliera Universita Padova. Padova, Italy. April 19-23, 2015.
- Live Surgical demonstrations:
    - STA-MCA Bypass and trapping of MCA/M2 Aneurysm
    - STA-MCA Bypass and trapping of MCA/M4 Aneurysm
    - STA-MCA Bypass for Moya Moya
    - Clipping of a Middle cerebral aneurysm
215. Panel Participant: Meeting of the University of Illinois College of Medicine Thought Leaders Assembly. Chicago, IL, April 24, 2015.
- The role of Venture Philanthropy for medical technology.
216. Guest Faculty: The 50<sup>th</sup> William Lougheed Microsurgical Course. Division of Neurosurgery, University of Toronto. Toronto, April 30, 2015.
- Bypass selection for aneurysm surgery
217. Neuroscience Grand Rounds: Spectrum Health. Grand Rapids, MI, June 3, 2015.
- A Flow-Based Algorithm for the Management of Vertebral Basilar Disease.
218. Keynote Speaker: WALN Congress. Beirut, Lebanon. June 12, 2015
- Understanding Cerebral Blood Flow: A Personal Journey”
219. Invited Speaker: 4<sup>th</sup> International Moyamoya Meeting. Berlin. July2-4, 2015.
- Double anastomosis using only one branch of STA
  - Utilizing Flow Measurements to Optimize Donor Flow and Extent of Revascularization in Moyamoya Disease
220. Invited Lecturer: 15<sup>th</sup> Interim Meeting of the World Federation of Neurosurgical Societies. Rome. Italy. Sep 8-12.
- Surgical Reconstruction of Giant and Complex Aneurysms: Tips and Tricks.
221. Invited Faculty and Speaker: CNS Annual Meeting. New Orleans, LA. September 26-30, 2015
- PC 06: Open Aneurysm Surgery: A 3-D Practical Course: “Bypass for Aneurysms”.
  - PC 23: Leaders Are Not Born, They Are Made: Executive Leadership Training for the Medical Professional: “ Leadership in Innovation”
  - M06: Managing and Preventing Intraoperative Vascular Complications
  - Global Neurosurgery in 3-D: A Tribute to Yasargil: “STA-MCA bypass for Moya Moya”
222. Faculty: Microsurgery of Aneurysms, Recent Advances. Practical Anatomy & Surgical Education- Saint Louis University School of Medicine, St. Louis, Missouri, Oct 21-24, 2015.
- Options for Bypass in Aneurysm Surgery
  - Unusual, Distal and Giant Aneurysms

223. Keynote Speaker: New York Neurosurgery II. Cushing Neuroscience Institute and Lenox Hill Neurosurgery Symposium. New York, NY. Nov 6, 2015
- A Flow-Based Algorithm for the Management of Vertebro-Basilar Disease.
224. Invited Speaker: International symposium “VASCULAR EXPERTS-2015”. The Burdenko Neurosurgical Institute. Moscow. Russia. December 10-11, 2015.
- Surgical Revascularization Strategies for Complex Aneurysms
  - A Flow-Based Algorithm for the Management of Steno-Occlusive Vertebro-Basilar Disease.
225. Invited Speaker: International Stroke Conference. Invited Symposium: Vertebrobasilar Disease: Update on Evaluation and Treatment Options. Los Angeles, CA. February 2016.
- Surgical Revascularization for Vertebrobasilar Disease
226. Invited Speaker: AANS Annual Meeting. International Symposium. Chicago, IL. May 1<sup>st</sup> 2016.
- Bypass Surgery for Ischemia: Update for 2016
227. Live Surgery Demonstration Faculty: 11<sup>th</sup> Microneurosurgery Live Course: Brainhouse 2016. Azienda Ospedaliera Universita Padova. Padova, Italy. May 23-25, 2016.
- Live Surgical demonstrations:
    - STA-MCA Bypass, M2 Reimplantation and clipping of MCA Aneurysm
    - Revision of previously clipped carotid terminus aneurysm
228. Invited Speaker: The 25<sup>th</sup> Congress of the Moroccan Society of Neurosurgery. Essaouira, Morocco. May 26-28, 2016.
- Revascularization Strategies for Complex Aneurysms
  - Future Opportunities for Neurosurgical Residency Training
229. Invited Speaker: Society of Neurological Surgeons 107<sup>th</sup> meeting. Indianapolis, IN. June 5, 2016.
- Problem Resident: Case vignettes and panel discussion.