Western Neurosurgical Society

American Association of Neurological Surgeons

Jointly Sponsored by AANS

CALENDAR OF EVENTS

Sunday, September 15, 2013

1:00PM – 4:00PM	Executive Committee Meeting	Pacifica
2:00PM – 5:30PM	Registration	Pacifica Foyer
7:00PM – 9:30PM	Opening Reception and Buffet	Gazebo Lawn

Monday, September 16, 2013

6:30AM – 7:30AM	Breakfast Members / Professional Guests	Miramar I-III
6:30AM – 12:00PM	Exhibitors	Miramar I-III
6:30AM – 12:00PM	Registration	Prefunction C-Salon IV
7:30AM – 12:30PM	Scientific Session	Salon III & IV
8:30AM – 10:00AM	Breakfast Spouses	Miramontes Rm/Terrace
9:55AM – 10:30AM	Break – Visit Exhibits	Miramar I-III
1:30PM – 6:00PM	Golf	Ocean Course
1:30PM – 4:30PM	Tennis	Tennis Courts
1:00PM – 5:00 PM	Kayak Tour	Meet in Lobby
1:00PM – 5:00 PM	Coastal Tour	Meet in Lobby
6:00PM – 10:00PM	Local's night	Half Moon Bay Golf Links

Tuesday, September 17, 2013

6:30AM – 7:30AM	Members Business Meeting & Breakfast	Miramontes Room
6:30AM – 7:30AM	Breakfast Professional Guests	Miramar I-III
6:30AM – 12:00PM	Exhibitors	Miramar I-III
6:30AM – 12:00PM	Registration	Prefunction C-Salon IV
7:30AM – 12:30PM	Scientific Session	Salon III & IV
9:10AM – 10:40AM	Break – visit exhibits	Miramar I-III
8:30AM – 10:00AM	Breakfast Spouses	Miramontes Rm/Terrace
1:30PM – 6:00PM	Golf	Old Course
1:30PM – 4:30PM	Tennis	Tennis Courts
1:00PM – 4:30 PM	Thomas Fogarty Wine Tour	Meet in Lobby
6:30PM – 7:15PM	Formal Reception	Prefunction B & Terrace
7:15PM – 10:30PM	Formal Banquet / Dance	Salon III & IV

Wednesday, September 18, 2013

6:30AM – 7:30AM	Breakfast Members / Professional Guests	Miramar I-III
6:30AM – 11:30AM	Exhibitors	Miramar I-III
6:30AM – 11:30AM	Registration	Prefunction C-Salon IV
7:30AM – 11:30AM	Scientific Session	Salon IV
8:30AM – 10:00AM	Breakfast Spouses	Miramontes Rm/Terrace
10:00AM – 10:30AM	Break – Visit Exhibits	Miramar I-III
11:30 AM	Scientific Meeting Adjourned	

See you at the 60th Meeting of the WNS
Sun Valley Lodge
Sun Valley, Idaho

Western Neurosurgical Society

59th Annual Meeting

2013 Learning Objectives

The purpose of this meeting is to provide an update in the basic and clinical sciences underlying neurosurgical practice through lectures, discussions, interactive sessions with neurological surgeons, neurologists, neuroradiologists, and other allied health personnel.

Upon completion of this program, participants should be able to:

1. Discuss how neurosurgeons can improve care in other areas that have fewer resources through "medical volunteerism".
2. Review the management of CNS neoplasms
3. Discuss the judicious use of surgical treatment for spinal disease

American Association of Neurological Surgeons

Jointly Sponsored by AANS

The Local Group of galaxies contains only 3 large spiral galaxies: the Milky Way, Andromeda, and the Triangulum Galaxy. The rest are dwarf and irregular galaxies.

2013 Officers and Committees

OFFICERS

President - Jeffery L. Rush
President Elect - Richard Wohns
Vice President - Marc Vanefsky
Historian - Randall Smith
Secretary-Treasurer - Charles Nussbaum

EXECUTIVE COMMITTEE

Jeffery L. Rush, Chairman
Richard Wohns
Marc Vanefsky
Charles Nussbaum
Randy Smith
John Bonner
Michael Lemole
Deborah Henry
Moustapha Abou-Samra
Tom Scully
David Pitkethly

COMMITTEES

Program
Michael Lemole, Chairman
Jeff Chen
Charles Nussbaum
Martin Weinand
Thomas Scully
Javed Siddiqi

Membership
Thomas Scully, Chairman
Marco Lee
Randall Smith
Ken Yonemura

Awards
Richard Wohns, Chairman
Moustapha Abou-Samra
Austin Colohan
Lawrence Shuer
Randall Smith

Site Selection
David Pitkethly, Chairman
Grant Gauger
Jeff Rush

By-Laws
Moustapha Abou-Samra, Chairman
Ben Blackett

Audit
Deborah Henry, Chairman
Tim Steege
Stephen Johnson

Nominating
John Bonner, Chairman
Austin Colohan
David Newell

Local Arrangements
Lawrence Shuer, Chairman
Charles Nussbaum
Robert Hood
Larry Tice

CME
Charles Nussbaum, Chairman
Deborah Henry
Michael Lemole

Web Master
Randy Smith, Chairman

Thank You to the following exhibitors for their generous support of the meeting.


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Nexstim


NICO
NEURO AND SPINE


VARIAN
medical systems
A partner for life

Special Guest Lecturer

Dr Pascal Lee
Mars Institute, SETI Institute, and NASA Ames Research Center

FROM EARTH TO MARS
Steps Toward the First Human Mission to the Red Planet

The first human mission to Mars will be humanity's greatest undertaking in space exploration in the 21st century. As with all expeditions, its success will depend on planning. The first steps towards a human journey to the Red Planet are already underway, as we achieve longer spaceflight missions, plan for new deep space journeys to Near-Earth Asteroids, and explore extreme environments on Earth viewed as Mars "analogs". Dr Pascal Lee will discuss progress being made around the world, from the Arctic to Antarctica, from basement labs to the International Space Station, to achieve the first voyage to Mars. He will examine in turn the what, why, how, when, and who of the first human mission to Mars.

Dr Pascal Lee is Co-founder and Chairman of the Mars Institute, Senior Planetary Scientist at the SETI Institute, and Director of the NASA Haughton-Mars Project at NASA Ames Research Center in Moffett Field, California. He holds a MS in geology & geophysics from the University of Paris, and a PhD in astronomy and space sciences from Cornell University. Dr Lee has worked extensively in the Arctic and Antarctica viewed as planetary "analogs". In 1988, he wintered over in Antarctica for 402 days, and has since led over 20 expeditions in the Arctic. He was first to propose the Cold model of Mars surface evolution based on his fieldwork in Earth's polar regions. Dr Lee is a recipient of the United States Antarctic Service Medal and of several NASA Group Achievement Awards.

Pascal Lee is internationally recognized for his efforts to advance the human exploration of Mars. He is an FAA-certified helicopter flight instructor and was scientist-pilot in the first field test of NASA's new Space Exploration Vehicle, a concept spacecraft currently under development for future human exploration of the Moon, Near-Earth Asteroids, and Mars. He also recently led the Northwest Passage Drive Expedition, a record-setting Mars simulation rover trek on sea-ice along the fabled Northwest Passage in the Arctic.

2013 Guests

David Adler	Member Candidate
Allyson Alexander	Resident Award, Basic Science
Farbod Asgarzadie	Austin Colohan
Linda Ashby	Jeff Rush
Dave Atteberry	Charles Nussbaum
Samuel Browd	David Pitkethly
Terry Burns	Resident guest
Joseph C.T. Chen	Member Candidate
Ciara Harraher	Member Candidate
Odette Harris	Member Candidate
Gary Heit	Minisymposium
Theodore Hole	Moustapha Abou-Samra
Darryl Lau	Praveen Mummaneni
Aleksandyr Lavery	Member Candidate
Pascal Lee	Society- Guest Speaker
John Ratliff	Moustapha Abou-Samra
Derek Southwell	Resident Guest
Eric Thompson	Resident Guest
Anand Veeravagu	Resident Award, Clinical Science
Samuel Eric Wilson	Society- Ablin Speaker

Did you know that Mars was named after the Roman god of war?

CONTINUING MEDICAL EDUCATION ACCREDITATION

This Activity has been planned and implemented in accordance with the Essential Areas and policies of the Accreditation Council for Continuing Medical Education through the joint sponsorship of the AANS and the Western Neurosurgical Society. The AANS is accredited by the ACCME to provide continuing medical education for physicians.

The AANS designates this live activity for a maximum of 11.75 *AMA PRA Category 1 Credits™*. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Joint Sponsorship Disclaimer

The material presented at the 59th annual meeting of the Western Neurosurgical Society has been made available by the WNS and the AANS for educational purposes only. The material is not intended to represent the only, nor necessarily the best, method or procedure appropriate for the medical situations discussed, but rather it is intended to present an approach, view, statement, or opinion of the faculty, which may be helpful to others who face similar situations.

Neither the content (whether written or oral) of any course, seminar or other presentation in the program, nor the use of a specific product in conjunction therewith, nor the exhibition of any materials by any parties coincident with the program, should be construed as indicating endorsement or approval of the views presented, the products used, or the materials exhibited by the WNS and jointly sponsored by the AANS, or its Committees, Commissions, or Affiliates.

Neither the AANS nor the WNS makes any statements, representations or warranties (whether written or oral) regarding the Food and Drug Administration (FDA) status of any product used or referred to in conjunction with any course, seminar or other presentation being made available as part of 59th meeting of the Western Neurosurgical Society Annual. Faculty members shall have sole responsibility to inform attendees of the FDA status of each product that is used in conjunction with any course, seminar or presentation and whether such use of the product is in compliance with FDA regulations.

DISCLOSURE INFORMATION

The AANS controls the content and production of this CME activity and attempts to ensure the presentation of balanced, objective information. In accordance with the Standards for Commercial Support established by the Accreditation Council for Continuing Medical Education (ACCME), speakers, paper presenters/authors and staff (and the significant others of those mentioned) are asked to disclose any relationship they or their co-authors have with commercial interests which may be related to the content of their lecture. The ACCME defines "relevant financial relationships" as financial relationships in any amount occurring within the past 12 months that create a conflict of interest.

Speakers, paper presenters/authors and staff (and the significant others of those mentioned) who have disclosed a relationship* with commercial interests whose products may have a relevance to their presentation are listed below.

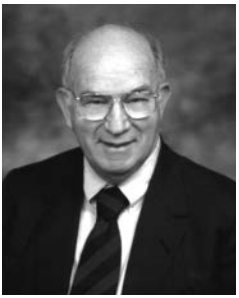
Name	Disclosure	Type of relationship
Samuel Browd	Aqueduct Neuroscience, Navisonics	Stockholder
Mark Hamilton	Codman Canada	Honorarium
	Medtronic Canada, Codman Canada	Consultant
Gary Heit	Nevro Corp	Consultant/Stockholder
	Penumbra Corp	Consultant
	Auntonomic Technologies	Consultant
	The Permanente Medical Group	Employee
	Johnson and Johnson	Honorarium
Michael Lawton	Stryker	Consultant
	Mizuho America	Royalty
*G. Michael Lemole	Brainlab	Consultant
	Community Foundation of Southern AZ	University Grants
	Lanx	Stockholder
	Yet2.com	Board Member
*Thomas Scully	Stryker Medical, Lifespine	Consultant
	Lifespine , Langford Systems	Shareholder
	Stryker Medical, BrainLab	Honorarium
Laligam Sekhar	SPI Surgical, Viket Medical	Stockholder
Gary Steinberg	Medtronic	Consultant
*Martin Weinand	NIH, Visualase Corp.	University Grant
	University of Michigan	Honorarium
	US Paten 61/828,596	Other
Richard Wohns	Nuvasive, LDR< Spineology, Symbion	Consultantship
	Ranier Scientific	Board
	Aqueduct Neuroscience	Board
	Ranier Technology, Nuvasive	Stockholder

*Relationship refers to receipt of royalties, consultantship, funding by research grant, receiving honoraria for educational services elsewhere, or any other relationship to a commercial interest that provides sufficient reason for disclosure.

Speakers, paper presenters/authors and staff (and the significant others of those mentioned) who have reported they do not have any relationships with commercial interests:

Moustapha Abou-Samra	Austin Colohan	Marco Lee	Gerald Silverberg
David Adler	Iman Feiz-Erfan	Pascal Lee	Randall Smith
Allyson Alexander	Grant Gauger	William Loudon	Derek Southwell
Marvin Bergsneider	Ciara Harraher	Paul Turner	Praveen Mummaneni
Terry Burns	Hector James	Hoi Sang U	*Charles Nussbaum
Melvin Cheatham	Phillip Kissel	David Pitkethly	Marc Vanefsky
*Jeff Chen	Darryl Lau	*Jeff Rush	Anand Veeravagu
Aleksandyr Lavery	Joseph Chen	*Javed Siddiqi	Samuel Eric Wilson

***Educational Content Planner of This Meeting**



Dr. George Ablin
1923-1999

In 2000, the members of the Western Neurosurgical Society inaugurated a new lectureship designed to honor, in a tangible and enduring manner, one of the Society's most outstanding members. In its long history, the Society has had no more devoted contributor than Dr. George Ablin. He brought to the group stunning ability and experience, especially in matters of local, national, and international organization, in which he had few peers. He contributed through service in many areas including a memorable term as President. He was a wise and thoughtful counselor whose advice concerning many professional and personal questions always included a careful analysis, given with words of encouragement. There was no more active and engaged participant in all of the Society's affairs.

George Ablin was raised in Chicago, received his BS and MD from the University of Michigan, interned at Charity Hospital, New Orleans, Louisiana, did his residency at the University of Wisconsin, later was Instructor at the University of Michigan, and also became a Clinical Professor at California State University, Bakersfield. Dr Ablin was Board Certified in Neurological Surgery, a Fellow of the American College of Surgeons, and a Diplomat of the National Board of Medical Examiners.

Dr Ablin began practice in neurosurgery in Bakersfield, California, in 1953, was President of the Kern County Medical Society in 1984, and was very active in the California Medical Association in various leadership positions. He was Treasurer of the California Medical Review Board and received Distinguished Service awards from the Congress of Neurological Surgeons and the American Association of Neurological Surgeons. He was named Honorary President of the World Neurological Society and in 1989 he was selected as the Kern County Physician of the Year. George was the devoted father of seven children, three of whom became physicians.

George combined an exceptionally perceptive understanding of others, including hundreds of fellow neurosurgeons, with warmth and gentleness and lively humor. He loved his colleagues and friends, and he loved this Society. With this permanent lectureship, the members of the Western Neurosurgical Society honor George Ablin and his cherished wife, Millie.

Samuel Eric Wilson, MD
Professor, Department of Surgery
University of California, Irvine

Samuel E. Wilson, MD, is Professor of Surgery at the University of California, Irvine. A native of Ireland, Dr. Wilson completed his undergraduate and medical school education at Wayne State University in Detroit.

From Michigan, he moved west to the Los Angeles County General—University of Southern California Hospital for internship. He subsequently received his training in general surgery at the Wadsworth Veterans Administration Medical Center, UCLA Medical Center and Childrens Hospital, Los Angeles. After 2 years in the U.S. Air Force as a surgeon, he returned to UCLA to join the faculty, working primarily at the Wadsworth VA and UCLA Medical Centers. In 1982, Dr. Wilson was appointed chair of the Department of Surgery at Harbor-UCLA Medical Center. In 1992, Dr. Wilson was recruited to Orange County to serve as chair of the Department of Surgery at University of California, Irvine until 2005, when he was appointed Associate Dean. Dr. Wilson is board-certified in general and vascular surgery, maintains an active surgical practice and is Chief, Surgical Service at VA Long Beach Regional Medical Center. He has served as President of the Pacific Coast Surgical Association.

Dr. Wilson has a long-standing professional commitment to clinical research. He has published extensively in two areas: the management of surgical infection and vascular disease. His current clinical trials investigate the role of EVAR in treatment of aortic aneurysm. He has also participated as a surgical chairperson in 3 national cooperative trials in peripheral vascular disease. Dr. Wilson's research is published in over 400 articles and 16 textbooks.

Ablin Lectures

2000 Arthur L. Day, MD, Professor of Neurosurgery, University of Florida
"Unruptured Intracranial Aneurysms and Sports Medicine in Neurosurgery"

2002 Tom Campbell, JD, PhD, Professor of Law, Stanford University
Former Congressman
"Is Freedom Possible in Medicine"

2003 Frederic H. Chaffee, PhD, Director, WM Keck Observatory, Hawaii
"The WM Keck Observatory at the Dawn of the New Millennium"

2004 Gerald Kooyman, PhD, Research Professor, Scripps Institute of Oceanography, San Diego
"Emperor Penguins: Life at the Limits"

2005 Lt. Col. Rocco Armonda, MD, Neurological Surgeon, U.S. Army
Bethesda, Maryland
"The Modern Management of Combat Neurotrauma Injuries: Battlefield to the Medical Center"

2006 August Turak, Spiritual and Business Consultant
"Spirituality and the Neurosurgeon"

2007 Donald Trunkey, MD, Internationally Renowned Trauma Surgeon
"The Crisis in Surgery with Particular Emphasis on Trauma"

2008 Michael Bliss, PhD, Emeritus Professor, University of Toronto
"Working Too Hard and Achieving Too Much? The Cost of Being Harvey Cushing"

2009 Michael A. DeGeorgia, MD, Professor of Neurology
Case Western Reserve University, Cleveland, Ohio
"Struck Down: The Collision of Stroke and World History"

2010 Chris Wood, PhD, Vice President for Administration, Santa Fe Institute
"What Kind of Computer Is The Brain?"

2011 Volker Sonntag, MD, Vice Chairman, Division of Neurological Surgery
Barrow Neurological Institute, Phoenix, Arizona
"Cervical Instrumentation: Past, Present & Future"

2012 Robert Schrier, MD, Professor of Medicine, University of Colorado
"Illnesses in the US Presidents in the 20th Century: Potential Impact on History"

Notes

(Or a page to doodle on)

The first rendezvous between two manned spacecraft occurred between Gemini 6 (Schirra and Stafford) and Gemini 7 (Borman and Lovell) on December 15, 1965. The spacecraft flew within 6 inches of each other.

Ralph B. Cloward
1908-2000

In 2002, the Western Neurosurgical Society established a Medal and Lecture to honor one of its most innovative and pioneering members, Ralph Bingham Cloward. With the gracious support of the Cloward family, this award honors both Ralph and his devoted wife, Florence.

Ralph Cloward was born in Salt Lake City, Utah, in 1908. He completed his undergraduate studies at the Universities of Hawaii and Utah and his medical education at the University of Utah and then at Rush Medical School in Chicago. He interned at St Luke's Hospital, Chicago, and then trained to become a neurosurgeon under Professor Percival Bailey, at the University of Chicago. He began his practice of neurology and neurosurgery in the Territory of Hawaii in 1938.

His academic accomplishments include visiting professorships at the University of Chicago, University of Oregon, University of Southern California, and Rush Medical School. He was Professor of Neurosurgery at the John A Burns School of Medicine at the University of Hawaii. He is the author of numerous papers and book chapters and has lectured and operated all over the world.

Dr Cloward's pioneering contributions encompass many areas of neurosurgery, but his enduring interest was the spine, where he devised three major operations. He first performed the posterior lumbar interbody fusion in 1943, reporting it in the Hawaiian Territorial Medical Association in 1945 and publishing it in the Journal of Neurosurgery in 1953. His unique approach for treating hyperhydrosis was reported in 1957. Independently, he conceived an anterior approach to the cervical spine, devised instruments for its implementation, and published his classic paper in the Journal of Neurosurgery on anterior cervical discectomy and fusion in 1958. He designed over 100 surgical instruments which continue to be used today by practicing neurosurgeons.

Throughout his career he educated the international community of neurosurgeons in the performance of the operations he devised. He contributed his time generously to patients who have been healed by his operations in the US and throughout the world. Hundreds of thousands of patients have benefited both directly and indirectly from his technical genius, insight, and enthusiasm as a teacher. Ralph loved the Western Neurosurgical Society and it's fitting that the WNS can now honor him with this Medal.

CLOWARD AWARD

2003 George Ojemann, MD, Professor of Neurosurgery
University of Washington
"Investigating Human Cognition during Epilepsy Surgery"

2005 Donald Prolo, MD, Clinical Professor of Neurosurgery
Stanford University
"Legacy Giants in the Treatment of Spinal Disorders: Ralph Cloward and Marshall Urist"

2006 Martin Weiss, MD, Professor of Neurosurgery
University of Southern California
"A Historical Walk through Pituitary Surgery"

2007 Charles Wilson, MD, Past Chairman, Department of Neurosurgery
University of California, San Francisco
"The Future of Neuroscience

2008 Peter Jannetta, MD, Past Professor and Chairman
Department of Neurosurgery, University of Pittsburgh
"Vascular Compression in the Brainstem: Main Streaming Neurosurgery"

2009 L. Nelson Hopkins, MD, Professor and Chairman of Neurosurgery
University at Buffalo, State University of New York
"Neurosurgeons and Stroke: From Prevention to Treatment"

2010 Sean Mullan, MD, Professor Emeritus of Neurosurgery
University of Chicago
"Some Neurosurgical Fossils"

2011 John A. Jane, Sr., MD, PhD, Professor of Neurosurgery
University of Virginia Health System
"Anterior vs Posterior Approaches to the Cervical Spine"

2012 John R. Adler, Jr., MD
Stanford University
"Stepping-Out of the OR: A Surgeon's Foray into Entrepreneurship"

SCIENTIFIC PROGRAM

Monday, September 16, 2013

Day 1, Session I
Moderators: Charles Nussbaum, Tom Scully

7:30–7:35		***Welcome***, **Jeffery L. Rush**, WNS President 2012
7:35–7:50	1	***"Chiari I Malformation With Acute Neurological Deficit After Craniocervical Trauma: Case Report, Imaging and Anatomic Considerations"*** David Adler, Portland, OR (Member Candidate)
7:50–7:55		Discussion
7:55–8:10	2	***"Facet-Sparing Lumbar Foraminotomy Using Baxano IO-Flex: Initial Experience, A Case Series"*** Aleksandyr Lavery, Redwood City, CA (Member Candidate)
8:10–8:15		Discussion
8:15–8:30	3	***Neuropsychological Outcome After Endoscopic Third Ventriculostomy for Obstructive Hydrocephalus"*** Mark Hamilton, University of Calgary, AB (Member)
8:30–8:35		Discussion
8:35–8:50	4	***"Long-Term Angiographic Recurrence of Aneurysms Treated With Clipping"*** Ciara Harraher, Stanford, CA (Member Candidate)
8:50–8:55		Discussion
8:55–9:10	5	***"Microvascular Decompression With and Without Prior Radiosurgery For Trigeminal Neuralgia*** Joseph Chen, South Pasadena, CA (Member Candidate)
9:10–9:15		Discussion
9:15–9:30	6	***"Reactivating The Irradiated Neurogenic Niche With Exogenous Neural Progenitor Calls"*** Terry Burns, Stanford, CA (Resident Guest)
9:30–9:35		Discussion
9:35–9:50	7	***"Intrinsically Determined Cell Death of Developing Cortical Interneurons*** Derek Southwell, Stanford, CA (Resident Guest)
9:50–9:55		Discussion
9:55–10:30		Break - **Visit Exhibits**

Day 1, Session II
Moderators: Moustapha Abou-Samra, Richard Wohns

10:30–10:45	8	***"Pseudocapsular Resection Technique for Large Pituitary Macroadenomas"*** Marvin Bergsneider, Los Angeles, CA (Member)
10:45–10:50		Discussion
10:50–11:05	9	***"Dystextia: An Early Sign of Pregnancy-Associated Meningioma"*** Phillip Kissel, San Luis Obispo, CA (Member)
11:05–11:10		Discussion
11:10–11:25	10	***"Deep Arteriovenous Malformations In the Basal Ganglia, Thalamus, and Insula: Microsurgical Management, Techniques, and Results*** Michael Lawton, San Francisco, CA (Member)
11:25–11:30		Discussion
11:30–11:45	11	***"Surgical Resection of Brainstem and Deep Brain Cavernous Malformations: Evolution of a Minimally Invasive Surgical Technique"*** Laligam Sekhar, Seattle, WA (Member)
11:45–11:50		Discussion
11:50–12:05	12	***"Cavernous Malformations of Brainstem, Thalamus, and Basal Ganglia: A Series of 212 Patients"*** Gary Steinberg, Stanford, CA (Member)
12:05–12:10		Discussion
12:10–12:25	13	***"A Potential Quality Improvement Model: Initiating, Developing, and Structuring a Neurosurgery Health System"*** Hector James, Jacksonville, FL (Member)
12:25–12:30		Discussion

Laika, a dog on board the Sputnik 2, was the first living creature in space.

SCIENTIFIC PROGRAM

Tuesday, September 17, 2013
Day 2, Session III

Moderators: Austin Colohan, Marc Vanefsky

7:30–7:45 14 ***"Technological Advancements in Hydrocephalus: Our Vision of a Smart Shunt"***
Samuel Browd, Seattle, WA (Guest)

7:45–7:50 Discussion

7:50–8:05 15 **Resident Award – Basic Science**

"A Novel Mechanism for Network Hyperexcitability in the Stargazer Mouse"
Allyson Alexander, Stanford, CA

8:05–8:10 Discussion

8:10–8:25 16 **Resident Award –Clinical Science**

"The Use of Bone Morphogenetic Protein in Cervical Spine Procedures: Analysis of the Marketscan Longitudinal Database"
Anand Veeravagu, Stanford, CA

8:25–8:30 Discussion

8:30–8:45 17 ***"A New Age of Peer-Reviewed Scientific Journals"***
John Adler, Stanford, CA (Member) No CME for this presentation

8:45–8:50 Discussion

8:50–9:05 18 ***"Kaolin-Induced Hydrocephalus Accelerates Amyloid Deposition and Vascular Disease in Transgenic Rats Expressing High Levels of Human APP"***
Gerald Silverberg, Providence, RI (Member)

9:05–9:10 Discussion

9:10–9:40 Break - **Visit Exhibits**

SCIENTIFIC PROGRAM

Tuesday, September 17, 2013
Day 2, Session IV

Moderators: Marco Lee, Jeff Rush

9:40–9:45 Introduction of Ablin Lecturer
Jeff Rush

9:45–10:35 **Ablin Lecture**

"Between Scylla and Charybdis: Can Academic Surgery Survive?"
Samuel Eric Wilson

10:35–10:40 Introduction of Special Lecturer
Marco Lee

10:40–11:30 **Special Lecture**

"FROM EARTH TO MARS - Steps Toward the First Human Mission to the Red Planet"

Pascal Lee
Mars Institute, SETI Institute, and NASA Ames Research Center

11:30–11:35 Introduction of WNS President, Grant Gauger

11:35–12:30 **Presidential Address**

"Could Health Care Bankrupt America? Our Financial Predicament"
Jeffery L. Rush

The largest known volcano in the solar system is Olympus Mons, located on Mars.
(It is larger than any mountain on Earth.)

SCIENTIFIC PROGRAM

Wednesday, September 18, 2013

Day 3, Session V
Moderators: Michael Lemole, David Pitkethly

7:30–10:00 **Mini Symposium - Medical Volunteerism**

Introduction of Speakers - Randall W. Smith

"Making a Difference as a Neurosurgeon Volunteer"
Melvin Cheatham

"Medical Missions: My Changing Perspectives From Resident to Attending"
William Loudon

"Development of Locally Sustainable Neurosurgery at Hue University of Medicine and Pharmacy"
Gary Heit

"A FIENS Volunteer in Africa, Ghana, and Ethiopia"
Paul Turner

"Neurosurgery in Zambia"
Hoi-Sang U

10:00–10:30 Break - **Visit Exhibits**

The first spacewalk made by the United States was Ed White during the Gemini 4 mission.

SCIENTIFIC PROGRAM

Wednesday, September 18, 2013

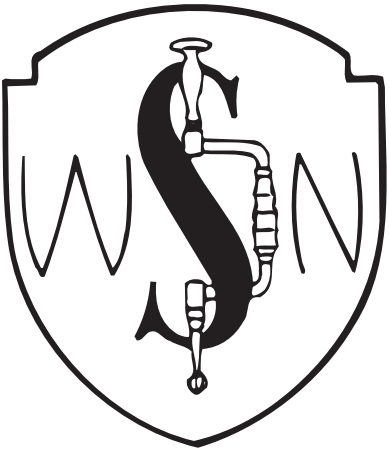
Day 3 , Session VI
Moderators: Charles Nussbaum, Michael Lemole

10:30–10:45	19	***"Management of Sacral Metastases at a Major Cancer Center versus a General Urban Community Hospital"*** Iman Feiz-Erfan, Phoenix, AZ (Member)
10:45–10:50		Discussion
10:50–11:05	20	***"Treatment of Cervical Kyphosis Using an Anterior Sequential Distraction Technique"*** Darryl Lau (Resident Guest) & Praveen Mummaneni (Member) San Francisco, CA
11:05–11:10		Discussion
11:10–11:25	21	***"Demographic, Safety, and Cost Differences Between Inpatient and Outpatient Conventional and Minimally Disruptive Posterolateral Fusion"*** Richard Wohns, Puyallup, WA (Member)
11:25–11:30		Discussion
11:30		Meeting Adjourn

60th Annual Meeting to be held August 16-19, 2014
SunValley, Idaho

MARS PLANET PROFILE:

Circumference at Equator: 21,296.9 km
Average Diameter: 6,792 km
Mass: 641,693,000,000,000 billion kg (0.107 x Earth)
Average Distance from Sun: 227,943,824 km (1.38 AU)
Notable Satellites: Phobus and Deimos
Length of Orbit: 686.98 Earth days (1.88 Earth years)
Surface Temperature: -87 to -5 ^{o}C



Abstracts

1. *"Chiari I Malformation With Acute Neurological Deficit After Craniocervical Trauma: Case Report, Imaging and Anatomic Considerations"*
   David E. Adler, Section of Neurological Surgery, Legacy Emanuel Hospital, Portland, Oregon

In patients with Chiari I malformation, the occurrence of acute neurological deficit after craniocervical trauma is rare. This case describes a 41-year-old male who sustained a single blow to the face, fell and struck the occiput. On admission, neurological exam revealed a profound paraparesis, upper extremity diplegia, a C4 sensory level and apnea which required intubation. Computerized axial tomography of the head showed a small amount of contrecoup left frontal traumatic subarachnoid hemorrhage. Magnetic resonance imaging of the brain and upper cervical spinal cord performed 19 hours after admission was negative except for the presence of a Chiari I malformation. All other radiographic studies at the time of admission were normal.

The constellation of severe neurological deficit in patients with Chiari I malformation after relatively minor craniocervical trauma has been well described. However, magnetic resonance imaging has not yet been able to clearly define the underlying pathoanatomy nor help understand the mechanism of injury. Here, we review similar cases from the literature, examine findings on magnetic resonance imaging and evaluate mechanisms of injury after craniocervical trauma in patients with Chiari I malformation.

2. *"Facet-Sparing Lumbar Foraminotomy Using Baxano IO-Flex: Initial Experience"*
   Aleksandyr W. Lavery

Lumbar foraminal stenosis remains a challenging entity to treat, with severe foraminal compromise often requires complete or partial facetectomy and fusion. Failure of simple lumbar decompression often relates to residual recess stenosis and/or foraminal stenosis. The IO-Flex system is a flexible over-the-wire MicroBlade Shaver instrument designed for facet-sparing foraminotomies, shaving from the inside out. This is a retrospective review of our initial cases and technique using Baxano IO-Flex shaving device threaded through the foramen. 16 cases are reviewed for early outcomes and safety. There were no incidences of nerve root injury or unintended durotomy from the device. Early outcomes are favorable and the procedure appears to be a safe alternative to multilevel fusion in select cases.

3. *"Neuropsychological Outcome after Endoscopic Third Ventriculostomy for Obstructive Hydrocephalus"*
Mark Hamilton, MD, FRCS,Brian Brooks, Phd, Lisa Partlo, PhD,
Walter J. Hader, MD, MSc, FRCS, University of Calgary, Calgary, Alberta, Canada

Introduction: Cognitive dysfunction is a common complaint at the time of clinical presentation of both acute and chronic obstructive hydrocephalus. Few studies have objectively assessed the response of cognitive dysfunction to treatment. The purpose of this study is to determine the effect of endoscopic third ventriculostomy (ETV) on the neuropsychological outcome in patients presenting with cognitive decline secondary to obstructive hydrocephalus.

Methods: A retrospective review of patients at the University of Calgary who underwent ETV and had both pre and postoperative neuropsychological testing, was completed. Patient demographics and outcome of the ETV including complications of the procedure were recorded. Detailed neuropsychological tests including measures of intelligence, attention and concentration, executive function, visual and verbal memory, language functions and fine motor skills was completed. Measures of post treatment change were determined utilizing Reliable Change Index (RCI).

Results: A total of 13 patients (9 male:4 female) were identified. Etiology of the hydrocephalus was aqueductal stenosis in 10, tectal glioma in 3 and a posterior fossa cyst in one. The primary symptoms at presentation included headache in 2 patients, an NPH-like syndrome in 4, and cognitive complaints alone in 6 patients. The majority of patients (11 of 13, 85 %) demonstrated cognitive dysfunction at the borderline or impairment level in at least one domain prior to surgery. Eleven of fourteen patients showed reliable improvement on at least one cognitive domain on postoperative testing. The greatest improvement in cognitive function was seen in verbal and visual memory (58 % and 60 %). Overall, one quarter to one third of patients demonstrated reliable improvement on tests of IQ, attention and concentration, and executive function. Two patients showed a reliable worsening of executive functioning, both after uncomplicated ETVs. Ten patients demonstrated improvement in ventricle size after ETV.

Conclusions: ETV is a safe effective procedure capable of producing reliable objective improvements in cognitive dysfunction related to obstructive hydrocephalus. Patients with cognitive dysfunction alone may benefit from ETV.

4. *"Long-term Angiographic Recurrence of Aneurysms Treated With Clipping"*
Ciara D. Harraher, MD, MPH, FRCSC, Stanford, California

Introduction: The recurrence rate of clipped aneurysms is 1-3% and the actual proportion of these that are symptomatic or require re-treatment is very low. The durability of this procedure has become increasingly relevant with advancing endovascular techniques. In this study, we reviewed clipped aneurysms with long-term angiograms to assess aneurysmal re-growth, the natural history of residual aneurysms and the formation of denovo aneurysms.

Methods: From a cohort of patients with ruptured and/or unruptured aneurysms treated with microsurgical clipping between 2004-2007, we included those with 3 year angiograms. In those with a residual on post-operative angiography, we determined if there was progression by comparing the post-operative and 3 year angiograms.

Results: There were 100 aneurysms in 85 patients that showed no evidence of re-growth or re-bleeding. A stable residual neck was demonstrated in 12 patients and 67% of these had complex aneurysms of the middle cerebral artery bifurcation or posterior communicating artery. 83% had a residual less than 3mm. All were asymptomatic and did not require re-treatment. There was one patient (1%) with a small recurrence (2mm) that did not require intervention and one patient (1%) with a denovo aneurysm.

Conclusion: Microsurgical clipping of aneurysms is a durable treatment with a low rate of recurrence and re-bleeding. In our study, we had one patient with recurrence who was asymptomatic and did not require intervention. Those with residual necks did not show angiographic progression or require treatment. The rate of denovo aneurysms was small. We plan to compare this with a similar cohort of endovascularly treated patients.

5. *"Microvascular Decompression With and Without Prior Radiosurgery for Trigeminal Neuralgia"*
   Joseph C. T. Chen, MD PhD, South Pasadena, CA

Background: Radiosurgery has emerged as an important primary treatment means of typical trigeminal neuralgia. Despite its high safety and efficacy, the likelihood of recurrence is significant, potentially requiring salvage treatment. Posterior fossa exploration and microvascular decompression is an option for salvage treatment. Results are presented regarding a single-surgeon experience, and a grading scale is proposed for postirradiation surgical findings.

Methods: A retrospective analysis of the author's experience with 109 consecutive trigeminal nerve posterior fossa explorations for typical trigeminal neuralgia performed over a period of 8 years is included in this analysis. There were 42 patients undergoing microvascular decompression following recurrence of pain after radiosurgery, and 67 patients underwent microvascular decompression without prior radiosurgery. Operative findings were reviewed and categorized. A 4-category typing system is proposed. The Barrow Neurological Institute Pain Scale Score was used to categorize post–microvascular decompression outcomes.

Results: Within the postradiosurgery group, 41 of 42 patients had initial treatment success (Barrow Neurological Institute score 1 to 3), comparing favorably with the nonirradiated group, in which 59 of 67 patients had initial successful treatment (P 0.15, Fisher exact test, 2-tailed). Findings of conflicting vessel atherosclerosis and adhesions between conflicting vessel and nerve were only seen in the postradiosurgery group, whereas arachnoid thickening requiring sharp dissection was seen in both postradiosurgery and non irradiated groups. Increased difficulty of dissection in either the radiosurgery or the nonirradiated groups did not appear to affect the likelihood of satisfactory outcome.

Conclusions: Microvascular decompression can be performed in the postradiosurgery setting safely with high efficacy. Dissection typically was not significantly more difficult in comparison to procedures performed without prior history of radiosurgery intervention.

6. *"Reactivating the Irradiated Neurogenic Niche with Exogenous Neural Progenitor Cells"*
Terry C Burns, Dominic Rodriguez, Kambiz Ansari, Matthew Li,
Jim Weimann, Theo D Palmer, Stanford University, Stanford, CA

Introduction: Irradiation-induced loss of hippocampal neurogenesis has been implicated in chronic cognitive deficits after irradiation for pediatric and adult brain malignancies. To date, no effective therapy exists to restore hippocampal neurogenesis after irradiation. We evaluated the feasibility of using ESC-derived neural progenitors to restore neurogenic capacity to the irradiated neurogenic niche.

Methods: C57Bl/6 mice were lesioned with 10G whole brain or sham irradiation. Three days later, animals received unilateral stereotactic injection of 50,000 GFP-expressing ESC-derived (d7) neural rosette cells into the dentate gyrus and lateral ventricle. Animals were sacrificed at 2 months and evaluated by confocal microscopy.

Results: Irradiated animals demonstrated near complete (>95%) loss of hippocampal neurogenesis, and partial (<70%) ablation of olfactory bulb neurogenesis. Transplanted animals demonstrated robust GFP+ grafts in or adjacent to the dentate gyrus and in scattered periventricular regions. At the edge of the dentate gyrus graft, GFP+ cells were seen in the subgranular zone and granule cell layer where graft-derived neurons displayed mature dendritic arborization. Strikingly, focal re-initiation of endogenous neurogenesis was observed with clusters of host (GFP-negative) DCX+ neurons found immediately adjacent to graft-derived dentate granule neurons.

Conclusions: Our findings provide proof of principle that the irradiated dentate gyrus is capable of both supporting and re-initiating neurogenesis after focal transplantation of ESC-derived cells. The spatially restricted re-initiation of neurogenesis adjacent to graft-derived neurons supports the emerging idea that newly integrated neurons are important positive regulators of ongoing adult neurogenesis.

7. *"Intrinsically Determined Cell Death of Developing Cortical Interneurons"*
Derek Southwell, Mercedes Paredes, Rui Galvao, Daniel Jones, Robert Froemke,
Joy Sebe, Clara Alfaro-Cervello, Yunshuo Tang, Jose Garcia-Verdugo,
John Rubenstein, Scott Baraban, Arturo Alvarez-Buylia, Stanford University

Background: Cortical inhibition is mediated by GABAergic interneurons, a cell population that originates outside the cortex in the embryonic ventral forebrain. When transplanted into postnatal cortex, embryonic interneurons disperse in the host tissue, develop into mature interneurons and modify native brain circuits. It has yet to be determined, however, which mechanisms establish the interneuron population size during development, nor is it known how these mechanisms regulate the engraftment of transplanted interneurons. One possibility, suggested by the neurotrophic hypothesis, is that excess interneurons are eliminated by developmental cell death through a competition for extrinsically derived survival signals.

Methods: To examine the basic mechanisms that determine the cortical interneuron population size, we characterized the developmental cell death of mouse cortical interneurons in vivo, in vitro and after transplantation. We also examined the relationship between interneuron population size and cortical inhibition after transplantation.

Results: We found that 40% of developing cortical interneurons are eliminated through Bax-dependent apoptosis during early postnatal life. When cultured in vitro or transplanted into the cortex, interneuron precursors died at a cellular age similar to that at which endogenous interneurons died during normal development. Over transplant sizes varying 200-fold, a constant fraction of the transplanted population underwent cell death. The death of transplanted neurons was not affected by the cell-autonomous disruption of TrkB (tropomyosin kinase receptor B), the main neurotrophin receptor expressed by neurons of the central nervous system. Transplantation expanded the cortical interneuron population by up to 35%, but the frequency of inhibitory events did not scale with the number of transplanted interneurons.

Conclusions: Interneuron cell death is determined intrinsically, either cell-autonomously or through a population-autonomous competition for survival signals derived from other interneurons. The level of cortical inhibition is not primarily determined by the number of cortical interneurons.

The Big Dipper is not a constellation, it is an asterism.

8. *"Pseudocapsular Resection Technique for Large Pituitary Macroadenomas"*
Marvin Bergsneider, M.D. UCLA

Introduction: Pseudocapsular resection entails first defining the compressed reticular layer surrounding pituitary microadenomas, and then dissecting around this layer for en bloc resection. In Cushing's disease the technique has been associated with remission rates exceeding 90%. We developed a modified pseudocapsular technique that among other refinements included central tumor debulking if needed to allow an en bloc resection of pituitary macroadenomas.

Methods: Consecutive series from Jan-Sep 2012 of patients undergoing dual-surgeon endoscopic, endonasal surgery for pituitary macroadenomas. (n=33, age 53 ± 18. nonfunctional 23; prolactinoma 6; acromegaly 3; Nelsons 1). We analyzed the technical results as follows: 1. Complete en bloc resection without central debulking (n=5) 2. Complete en bloc resection with central debulking (n=16) 3. Probable complete resection, but unable to utilize en bloc resection (n=5) 4. Incomplete resection (n=7)

Results: We were able to achieve en bloc resection in the majority (64%) of macroadenomas up to 4.2 cm in size. Complete en bloc resection without debulking occurred with smaller tumors (13±3, range 10-16 mm) compared to debulking method (26±8, range 16-42 mm). Among the en bloc resections, endocrinologic deterioration was limited to one patient developing permanent diabetes insipidus. Reasons for inability to achieve pseudocapsule resection included cavernous sinus invasion, inability to identify/maintain a pseudocapsule, and redo operation (n=3). The intraoperative CSF leak rate was significantly lower in the complete en bloc resection compared to the other two groups (P=0.01).

Conclusion: Pseudocapsular dissection (video technique will be presented) is possible in the majority of pituitary macroadenomas with good outcomes. The more anatomic-based dissection results in a lower intra-operative CSF leak rate. The technique should be more widely considered for macroadenomas as it is feasible and theoretically may lead to higher cure rates.

9. *"Dystextia: an early sign of pregnancy-associated meningioma"*
Phillip Kissel, M.D., FACS Sierra Vista Regional Medical Center,
San Luis Obispo, CA

Growth of meningiomas can accelerate during pregnancy and the postpartum period due to expression of hormone receptors, particularly progesterone. Here we report a case of expressive dystextia in a 36-year-old right-handed female 7 months postpartum. This is the first study describing dystextia related to a brain tumor; previous cases of dystextia were associated with complex migraine and stroke. In this case, expressive dystextia preceded acute neurological signs by several months. Emergency room stabilization followed by emergent craniotomy resulted in a gross total tumor resection and reversal of all neurological deficits.

This report defines expressive dystextia as the inability to compose syntactically comprehensible text messages and describes it as a neurological deficit similar to but distinct from expressive dysphasia. Dystextia has been described only three times in the literature as an impairment of motor function and dexterity following ischemic stroke and as an extension of expressive aphasia associated with a complex migraine headache. Considering the rising importance of social networking, we as clinicians need to remain attentive to family observations about their loved ones change in texting patterns and content as a sentinel indication of neurological dysfunction.

Meningiomas are a frequently diagnosed primary brain tumor and have been routinely recognized in the context of pregnancy and the postpartum period. Pregnancy may contribute to rapid expansion of normally slow-growing intracranial meningiomas due to hormone receptor expression. Approximately half of benign meningiomas are progesterone receptor positive and the increase in serum progesterone levels during the second half of pregnancy may fuel the growth of these low-grade neoplasms. Meningioma expansion has also been reported with increased progesterone production during the luteal phase of the menstrual cycle. This presentation will review the relationship of progesterone receptors with tumor growth and progression to atypical or malignant meningioms.

Two pieces of metal without any coating on them will form in to one piece in the vacuum of space.

10. *"Deep Arteriovenous Malformations In the Basal Ganglia, Thalamus, and Insula: Microsurgical Management, Techniques, and Results"*
Michael T Lawton, MD, University of California San Francisco

Background: Arteriovenous malformations (AVMs) in the basal ganglia, thalamus, and insula are considered inoperable given their depth, eloquence, and limited surgical exposure. While many neurosurgeons opt for radiosurgery or observation, others have challenged the belief that deep AVMs are inoperable. Further discussion of patient selection, technique, and multimodality management is needed.

Objective: To describe and discuss the technical considerations of microsurgical resection for deep-seated AVMs.

Methods: Patients with deep AVMs who underwent surgery during a 14-year period were reviewed using a prospective AVM registry.

Results: Microsurgery was performed in 48 patients with AVMs in the basal ganglia (10), thalamus (13), or insula (25). The most common Spetzler-Martin grade was III-(68%). Surgical approaches included transsylvian (67%), transcallosal (19%), and transcortical (15%). Complete resection was achieved in 34 patients (71%), and patients with incomplete resection were treated with radiosurgery. Forty-five patients (94%) were improved or unchanged (mean follow-up 1.6 years).

Conclusion: This experience advances the notion that select deep AVMs may be operable lesions. Patients were highly selected for small size, hemorrhagic presentation, young age, and compactness –factors embodied in the Spetzler-Martin and Supplementary grading systems. Overall, 10 different approaches were used, exploiting direct, transcortical corridors created by hemorrhage or maximizing anatomical corridors through subarachnoid spaces and ventricles that minimize brain transgression. The same cautious attitude exercised in selecting patients for surgery was also exercised in deciding extent of resection, opting for incomplete resection and radiosurgery more than with other AVMs to prioritize neurological outcomes.

11. *"Surgical Resection of Brainstem and Deep Brain Cavernous Malformations: Evolution of a Minimally Invasive Surgical Technique"*
Sekhar LN, De Silva H, Tariq F, Mai J, Kim L
Department of Neurological Surgery, University Of Washington, Seattle, WA

Objective: To review the evolution of a less invasive technique for the removal of brain stem and deep seated brain cavernous malformations, and the results of the treatment.

Methods: Based on our experience, we have developed a less invasive approach to brain stem and deep seated brain cavernomas. The most direct approach to the vicinity of the lesion (skull base or otherwise) without traversing critical brainstem structures. When the cavernoma does not present to the pial surface, a narrow path is created (no larger than 1cm wide) to the lesion, which is then removed piecemeal. Endoscopic assistance is used when needed.

Results: From 2005 to March 2013, 34 brainstem and 18 deep seated cavernomas were removed with a mean volume of 21.9cm3. A complete removal was obtained in 95% of cases. Four patients needed reoperations (3 residual and 1 recurrent), 2 of these had rebleeds. Overall, compared to their presenting condition, 54% of patients improved, 38% were unchanged, and 10% were worse, during a mean follow-up of 20months (range=1-65m).

Conclusion: The less invasive technique of removal has improved, albeit with some risk of recurrence due to the reduced exposure.

12. *"Cavernous Malformations of Brainstem, Thalamus, and Basal Ganglia: A Series of 212 Patients"*
Gary K. Steinberg, MD, PhD, Paritosh Pandey, MD, Erick M. Westbroek, BS, Peter A. Gooderham, MD , Department of Neurosurgery and Stanford Stroke Center Stanford University School of Medicine, Stanford, CA

Background: Cavernous malformations (CMs) in deep locations account for 9% to 35% of brain malformations and are surgically challenging.

Methods: Between 1990-2013, 212 patients with 221 brainstem, thalamic and basal ganglia (BG) CMs underwent microsurgical resection. Clinical records, radiological findings, operative details, and complications were reviewed retrospectively, with detailed analysis of the first 176 patients (179 deep CMs).

Results: Of the 221 deep CMs, 165 were in the brainstem, 33 in the BG, and 23 in the thalamus. Age was 3 mos-72 y (20< 18 yo). Cranial nerve deficits (51.1%), hemiparesis (40.9%), numbness (34.7%), and cerebellar symptoms (38.6%) presented most commonly. 172/176 patients presented with clinical hemorrhage (70 single, 102 multiple). The annual retrospective hemorrhage rate was 5.1% (assuming CMs are congenital with uniform hemorrhage risk throughout life); the rebleed rate was 31.5%/patient per year. Surgical approach depended on the proximity of the CM to the pial or ependymal surface. Postoperatively, 121 patients (68.8%) had no new neurological deficits. Long term follow-up (> 6 mos) was obtained in 170/176 patients. Delayed postoperative HOD developed in 9/134 (6.7%) patients with brainstem CMs. HOD occurred predominantly following surgery for pontine CMs (9/10 patients). Three patients with HOD had palatal myoclonus, nystagmus, and oscillopsia, whereas 1 patient each had limb tremor and hemiballismus. At follow-up, 105 patients (61.8%) improved, 44 (25.9%) were unchanged, and 19 (11.2%) worsened neurologically. Good preoperative modified Rankin Score (98% vs 55%, P <.001), single hemorrhage (89% vs 77%, P =.05) and surgery ≤ 8 weeks of clinical hemorrhage (89% vs 77%, p = .03) were predictive of good long-term outcome.

Conclusion: Symptomatic deep CMs can be resected with acceptable morbidity and outcomes. Good preoperative modified Rankin Score, single hemorrhage, and surgery within 8 weeks of hemorrhage are predictors of good long-term outcome.

13. *"A Potential Quality Improvement Model: Initiating, Developing and Structuring a Neurosurgery Health System"*
Hector E. James, M.D. Division of Pediatric Neurosurgery/Lucy Gooding Pediatric Neurosurgery Center,University of Florida College of Medicine Jacksonville & Wolfson Children's Hospital, Jacksonville, Florida,

Introduction: The Division of Pediatric Neurosurgery at the University of Florida College of Medicine Jacksonville (UFCOMJ) was initiated in September 2003 with one pediatric neurosurgeon, physician assistant and secretary, and has developed into an interdisciplinary and multi-institutional service providing care for the child with a neurosurgical condition.

Methods: The initiation, development and structuring of a healthcare system, with emphasis on quality improvement, will be provided. The stepwise procedure in preparing, developing and structuring a pediatric neurosurgery system will be delineated as a clinical experience maximizing resource utilization in a horizontal matrix model.

Results: The division has grown into an interdisciplinary and multi-institutional service consisting of four pediatric neurosurgeons, three allied health personnel, and five administrative professionals. Participating institutions are UFCOMJ, Mayo Clinic Jacksonville, Nemours Children's Clinic, Wolfson Children's Hospital/Baptist Health of Northeast Florida. Outpatient visits have grown from 140 in 2003 to 1748 in 2011, and operative procedures have increased from 37 in 2003 to 324 performed in 2011. Multidisciplinary programs created include, but are not limited to: Fetal Diagnosis and Therapy Center, Spinal Defects Clinic, Pediatric Neurosciences Clinic, Craniofacial Clinic, Spasticity Clinic and Telemedicine Clinic. Programs developed include oncology, radiosurgery, proton beam therapy, spasticity management, and minimally invasive craniofacial surgery.

Conclusions: A comprehensive healthcare delivery system for the child with a neurosurgical condition can be developed with dedicated professionally trained personnel providing care from initial contact through diagnostic procedures, medical/surgical management, rehabilitation, recovery and long-term care.

14. *"Technological Advancements in Hydrocephalus: Our Vision of a Smart Shunt"*
Samuel R. Browd, M.D.,Ph.D. University of Washington

Introduction: The most common treatment for hydrocephalus is placement of a cerebrospinal fluid shunt. Shunts are life saving devices but are notorious for high failure rates, difficulty of diagnosing failure, and limited control options. Shunt designs have changed little since their introduction in 1950's, and the few changes introduced have had little to no impact on these long-standing problems. For decades, the community has envisioned a "smart shunt" that could provide advanced control, diagnostics, and communication based on implanted sensors, feedback control, and telemetry.

Methods: We will review the current state of "smart shunt" development with an emphasis on developed and needed critical technologies such as advanced control algorithms, implanted pressure sensors and advances in telemetry.

Results: We will discuss our development of a complete "smart" shunt and the technological advances we have made and detail the remaining challenges faced in bring a true smart shunt to market.

Conclusion: Despite the long history and increasing development activity in the last decade, patients are yet to see a commercialized smart shunt. Most smart shunt development focuses on concepts or on isolated technical features, but successful smart shunt designs will be a balance between technical feasibility, economic viability, and acceptable regulatory rik. We will update the status of our efforts to develop a complete "smart shunt" and provide a framework for understanding the challenges and opportunities that will guide the introduction of smart shunts into patient care.

15. *"A Novel Mechanism for Network Hyperexcitability in the Stargazer Mouse"*
Allyson Alexander, Stanford University

Introduction: Absence seizures arise from disruptions of normal thalamocortical oscillations. Stargazer mice exhibit spontaneous absence seizures due to the loss of stargazin. This protein plays a role in trafficking AMPA-type glutamate receptors to the synapse. We examined synaptic signaling in the neocortex of stargazer mice to investigate the apparent paradox of decreased synaptic glutamate receptors in the presence of hyperexcitability and seizures. We studied regular-spiking (RS, excitatory) cells and fast-spiking (FS, inhibitory) cells of layer IV, which both receive direct excitatory input from thalamocortical cells.

Methods: We performed whole-cell patch-clamp recordings in acute slices of somatosensory cortex from stargazer mutants and wild-type litter mates using standard electrophysiological techniques. For the optogenetic experiments, we injected viruses carrying genes for yellow fluorescent protein and channelrhodopsin-2 into the thalamus of wild-type and stargazer mice in vivo 5-9 weeks prior to preparing slices.

Results: Spontaneous excitatory postsynaptic currents in FS cells are smaller and less frequent in stargazer mice than in wild-types. RS cells from stargazer mice do not exhibit similar changes. FS cells are known to mediate powerful feed-forward inhibition from the thalamus onto RS cells, which acts as a brake to prevent runaway cortical excitation. Since FS cells demonstrate specific changes, we directly measured feed-forward inhibition using optogenetic techniques. We selectively activated channelrhodopsin-2-expressing thalamocortical fibers with a blue laser, evoking a monosynaptic exctitatory current followed by a disynaptic inhibitory current in the RS cell. We discovered that the ratio of inhibitory to exctitatory charge transfer was decreased in stargazer mice.

Conclusions: In the stargazer mouse, we demonstrate a specific decrease in excitatory drive onto FS neurons, leading to decreased feed forward inhibition onto excitatory RS neurons. The loss of this powerful form of inhibition represents a novel mechanism by which a defect in AMPA-mediated glutamatergic signaling may contribute to the generation of absence seizures.

16. *"The Use of Bone Morphogenetic Protein in Cervical Spine Procedures: Analysis of the Marketscan Longitudinal Database"*
Anand Veeravagu, MD Stanford University

Introduction: Recombinant human bone morphogenetic protein (BMP) is used within the lumbar spine at substantial rates, with most utilization off label. BMP use in anterior cervical discectomy and fusions (ACDF) is controversial. Studies suggest increased rates of dysphagia, soft-tissue hematoma, and severe airway compromise in cervical procedures using BMP. An FDA "black box" warning cautioning the use of BMP in cervical cases was issued in 2008. This study describes national utilization trends and incidence of complications associated with BMP use in anterior cervical spine procedures.

Methods: Between 2006-2010, 91,543 patients were recorded for ACDF and/or cervical corpectomy in the Thomson Reuters Marketscan database. Patient selection and outcome measures were ascertained using ICD-9 and CPT coding. 3,197 patients were treated with BMP intra-operatively. Mean follow-up was 588 days in the non-treated group and 591 days in the BMP-treated group.

Results: BMP was utilized at higher rates in multi-level (OR:1.2,95%CI 1.1-1.8,p<0.0001)and instrumented cervical procedures (OR:1.7,95%CI 1.4-2.1,p<0.0001). At 30-days post-operation BMP utilization increased the risk of any complication (OR:1.4,95%CI 1.2-1.5,p<0.0001) and specific complications such as wound hematoma (OR1.7 95%CI 1.3-2.3, p=0.0007), dysphagia (OR:1.3,95%CI 1.1-1.6,p=0.002), new chronic pain (OR:1.4,95%CI 1.0-1.9,p=0.04), and any pulmonary complication (OR:1.5,95%CI 1.2-1.8,p=0.0005). There was no statistical difference in re-admission rates, mortality, referrals to pain management, new malignancies or overall re-operation rates between the two groups. The BMP-treated group demonstrated higher rates of pseudoarthrosis (OR:1.5,95%CI 1.3-1.8,p<0.0001) and a mean increase in total case payment of $5,546 (19% increase, p<0.001)

Conclusions: In this national database study on cervical spine procedures, we report higher rates of post-operative complications in ACDF patients receiving BMP. Adverse events including pseudoarthrosis, wound hematoma, and dysphagia were more common in the BMP cohort. BMP did not reduce the need for revision procedures. BMP effectiveness in the cervical spine remains controversial, although increased costs with its use appear clear..

17. *"A New Age of Peer-Reviewed Scientific Journals"*
John R. Adler, Jr., MD Stanford University

The principles of peer-reviewed scientific publications date back two and one-half centuries to the origins of Medical Essays and Observations published by the Royal Society of Edinburgh (1731). Meanwhile, in 2012 the most prestigious and best known medical journal, the New England Journal of Medicine, crossed the second century mark. The methodologies of peer review have undeniably served medicine well and helped to usher in unimaginable advances in human health. Despite such illustrious history, the winds of change are in the air.

A new medical journal Cureus.com (pronounced Curēus) launched in the past year is attempting to forge a new model of peer-reviewed journalism. By fully harnessing the power of the internet, Cureus seeks to accelerate the curation, dissemination, and discovery of scientific knowledge among flexible networks of medical researchers. In lieu of using the traditional peer review and rejection process to discern paper quality, Cureus utilizes the internet principle of crowd-sourcing. An algorithm selectively weights the opinions of large numbers of users to arrive at a proprietary quality measure termed "Scholarly Impact Quotient" or "SIQ" which we hope will prove to be a more accurate measure of paper importance. It is hypothesized that SIQ might someday predict citation index. Cureus is intended for all physicians in all specialties, academic or not, and by design intends to attract those patients who are motivated to read the primary medical literature. An introduction to Cureus will be provided during this lecture.

18. *"Kaolin-Induced Hydrocephalus Accelerates Amyloid Deposition and Vascular Disease in Transgenic Rats Expressing High Levels of Human APP"*

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Rhode Island Hospital, Providence, Rhode Island

Background: Normal pressure hydrocephalus (NPH) is characterized by magnetic gait, incontinence and dementia associated with enlarged cerebral ventricles. It is most common in the elderly. NPH has a high co-morbidity with Alzheimer's disease (AD) and cerebrovascular disease (CVD). To understand the relationship between NPH and AD, CVD and normal aging, we investigated how chronic hydrocephalus impacts brain amyloid (A-beta) accumulation and vascular pathology in an AD transgenic rodent model. We have previously shown that the CSF stagnation produced by kaolin-hydrocephalus in older wild-type Sprague-Dawley rats caused an increase in A-beta and hyperphosphorylated Tau [1], so it was important to see how decreased CSF production and turnover affected an AD rat model.

Methods: Twenty-four transgenic rats (tgAPP21) that express high levels of human APP and naturally overproduce A-beta40, but not A-beta42, were used. Six (n=7) and twelve-month-old (n=6) rats had hydrocephalus induced by cisternal kaolin injection. We analyzed A-beta burden (A-beta40, A-beta 42 and oligomeric A-beta) and vascular integrity (smooth muscle actin, Masson trichrome, and Congo red) by immunohistochemistry and chemical staining at 10 weeks (n=8) and 6 months (n=5) post hydrocephalus induction. We also analyzed whether the vascular pathology seen in tgAPP21 rats, who develop amyloid angiopathy, was accelerated by hydrocephalus. Age matched native and sham-operated tgAPP 21 rats served as controls (n=11).

Results: In hydrocephalic tgAPP21 rats, compared to controls, there was increased A-beta40 and oligomeric A-beta immunoreactivity in hippocampal and cortical neurons at 10 weeks and 6 months post-hydrocephalus induction. A-beta42 did not significantly increase. No dense-core amyloid plaques were seen, but diffuse A-beta immunoreactivity was evident in the amygdala and fronto-parietal cortex. Vascular pathology was accelerated by the induction of hydrocephalus compared to controls. In the six-month-old rats, subtle degenerative changes were noted in vessel walls at 10 weeks post-kaolin, whereas at six months post-kaolin and in the 12-month-old hydrocephalic rats more pronounced amyloid angiopathic changes were seen, with more frequent and larger areas of infarction noted.

Conclusions: These results suggest that kaolin-induced hydrocephalus can accelerate intraneuronal Aβ accumulation and vascular pathology in tgAPP21 rats. In addition, it appears that disrupted CSF flow and reduced CSF turnover directly impairs A-beta clearance and accelerates vascular pathology in chronic hydrocephalus. The high co-morbidity seen in NPH, AD and CVD is likely not to be an age-related coincidence, but rather a convergence of pathologies related to diminished CSF clearance. 1. Silverberg et al. Brain Research 2010; 1317:286–96. Acknowledgement: The authors thank Petra M. Klinge, MD PhD, Ilias Caralopoulos, MD and Crissey Pascale, MA for inducing the kaolin-hydrocephalus, doing the sham surgery and caring for the animals until they were euthanized.

19. *"Management of Sacral Metastases at a Major Cancer Center versus a General Urban Community Hospital"*

Iman Feiz-Erfan, MD[1], Ganesh Rao, MD[2], and Laurence D. Rhines, MD[2]
1 Division of Neurosurgery, The University of Arizona, College of Medicine Phoenix, Maricopa Medical Center, Phoenix, Arizona
2 Department of Neurosurgery, The University of Texas, M D Anderson Cancer Center, Houston, Texas

Introduction: Hematogenous metastatic disease to the sacrum can be the cause of significant morbidity and remains a complex disorder to address. Differences in demographics and surgical management at major cancer centers versus general community hospitals have not been examined.

Methods: Retrospective chart reviews of surgical outcomes for hematogenous sacral metastases were conducted at a major cancer center between the years 1993-2005. Retrospective chart review of neurosurgical consultations by the senior author (IFE) at a general urban community hospital for hematogenous spinal disease was conducted from 2007-2013.

Results: Of all spinal surgeries done for metastatic disease, 3% (25) were directed toward a sacral lesion at a major cancer center, with 15 (60%) suffering from metastatic kidney cancer. Sixteen patients underwent surgery for salvage. Twelve had the sacral lesion as the sole site of disease. In contrast, a total of 60 patients with metastatic spinal disease were neurosurgically evaluated with 8 (13%) receiving surgery. Three patients (5%) presented with complaints related to a sacral metastasis. Only 1 patient (12.5%) was treated operatively for a sacral metastasis.

Conclusions: Neurosurgical evaluation for hematogenous sacral metastatic disease is a small proportion amongst all assessed spinal metastases. At major cancer centers, the individual neurosurgeon treating spinal disorders is likely to evaluate these lesions more frequently as compared to the general community neurosurgeon. Due to the highly individual nature of each patient, decision making and establishing diagnosis and therapy is key to successful treatment. Therefore, community general neurosurgeons in particular should be familiar with this complex disorder to manage their patients adequately

20. *"Treatment of Cervical Kyphosis Using an Anterior Sequential Distraction Technique"*
Praveen V. Mummaneni MD, Darryl Lau BS, Sanjay Dhall MD,
John Ziewacz MD, MPH, Hai Le BS
University of California, San Francisco

Objectives: The treatment of cervical kyphotic deformity is challenging. The authors present their results with cervical kyphosis correction using an anterior sequential distraction technique.

Methods: The authors retrospectively reviewed the charts of 53 patients with cervical kyphotic deformity who underwent circumferential spine surgery between 2001 and 2011 by a single surgeon (PM) (Fig 1). Anterior procedures included discectomies and corpectomies/ osteotomies at 1 or more levels with fusion. Posterior operations included decompression and/or osteotomies with lateral mass or pedicle fixation. Preoperative and postoperative radiographic parameters and Nurick grades were analyzed. Arthrodesis was assessed via dynamic radiographs, and CT scans were used to assess fusion in questionable cases.

Results: The follow-up period was minimum one year. The mean Nurick grades improved by nearly one grade postoperatively. The overall rate of complications (major and minor) was 1/3.

Conclusions: In cases of cervical kyphosis, management with decompression, osteotomy, and stabilization from both anterior and posterior approaches can restore cervical lordosis. Furthermore, such surgical techniques can produce measurable improvements in neurological function (as measured with Nurick grades) and achieve high fusion rates. However, there is a significant rate of complications.

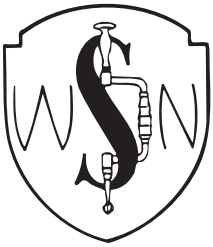
21. *"Demographic, Safety, and Cost Differences Between Inpatient and Outpatient Conventional and Minimally Disruptive Posterolateral Fusion"*
Richard Wohns, MD, JD, MBA South Sound Neurosurgery, Puyallup, WA

Introduction: Outpatient spine surgery, in appropriate patients and with appropriately selected procedures, offers an improved patient experience and obviates hospital-borne illness at significantly reduced costs compared to inpatient treatment. Traditionally, lumbar fusion procedures have not been considered in the outpatient setting as approach-related morbidity and medical resource utilization needs in conventional approaches were elevated, thus necessitating inpatient treatment. Modern minimally disruptive approaches (MIS) for lumbar fusion, however, largely eliminate these concerns while fulfilling the goals of conventional procedures. The purpose of this study was to compare patient characteristics, early safety outcomes, and costs of inpatient conventional posterolateral fusion (PLF), inpatient MIS PLF, and outpatient PLF.

Methods: Data were collected prospectively through the Prospective Spine Treatment Outcomes Study (ProSTOS) and analyzed retrospectively. All patients were treated at either an inpatient or outpatient facility with single- or two-level PLF for a variety of degenerative conditions. Conventional PLF was carried out using an open-exposure for bilateral pedicle screw fixation while the MIS PLF group underwent a medialized exposure for interlaminar lumbar instrumented fusion (ILIF). Patient demographics, treatment characteristics, complications, and costs were collected through at least 30 days postoperative. Costs were determined through actual or expected payments (charges) to the outpatient facility, with inpatient costs estimated based on the CMS fee schedule, modified for patients with private insurance based on contracted payment rates above Medicare. All costs were modeled to both Medicare and private payer scenarios to normalize costs between the in- and outpatient groups. A total of 42 consecutive patients treated between October 2009 and December 2012 met inclusion criteria and were included in the analysis. Seventeen (40%) patients were included in the inpatient conventional PLF group, while 12 (29%) patients were in the inpatient MIS PLF group, and 13 (31%) were in the outpatient MIS PLF group.

Results: Inpatients tended to be younger than outpatients (mean age 56 vs. 62, respectively), with a lower body mass index (BMI)(28 vs. 31), and had a lower incidence of prior spine surgery (15% vs.69%). Otherwise, baseline medical comorbidities, levels treated, and mean number of levels treated per patient were statistically similar between the groups. No intraoperative complications in any group or transfers from out- to inpatient facilities occurred. Complications through at least 30 days postoperative occurred in two patients, both postoperative infections in the inpatient PLF group. The relative costs for PLF, MIS PLIF, and outpatient MIS PLIF were $37,755, $34,935, and $16,641, respectively. Outpatient costs were significantly lower than inpatient costs ($p<0.001$), though the difference between inpatient groups was not statistically significant ($p=0.232$).

Conclusions: Clinical benefits of MIS PLF (both in- and outpatient) compared to conventional PLF were evidenced in this study by the two instances of postoperative infection in the PLF group, with no complications in either MIS PLF group. The presence of these complications was the driver of increased costs for the PLF group compared to the inpatient MIS PLF group, though this difference did not reach statistical significance. While similar benefits of minimized surgical morbidity were evidenced in both the inpatient and outpatient MIS PLF groups, the outpatient group resulted in a 52% cost savings. A 56% cost-savings was realized in the outpatient compared to the inpatient conventional PLF group. Recent advancements in minimally disruptive lumbar fusion technology may warrant re-evaluation for treatment in an outpatient facility. Such treatment models have the potential to both more efficiently and effectively (e.g., eliminating hospital-borne disease) treat select patients while providing significant savings to society



ORGANIZATIONAL COMMITTEE

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Howard A. Brown*
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David L. Reeves*
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Robert H. Pudenz*
Robert W. Rand
Rupert B. Raney*
C. Hunter Sheldon*
Frank Turnbull*
Arthur A. Ward, Jr.*
Ward W. Woods*

*deceased

DECEASED SOCIETY MEMBERS

(expired while a member, non-officers or founders)

Kenneth H. Abbott

Eben Alexander, Jr.

James R. Atkinson

Thomas S. Bennett

Irvin H. Betts Jr.

David Brown

John D. Camp

Norman L. Chater

Cyril B. Courville

John B. Doyle

Charles W. Elkins

Attilla Felsoory

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Alexander Johnson

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Richard Newquist

William A Newsom

Hal Pittman

John C. Oakley

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Aidan Raney

Nat D. Reid

Ted Roberts

Adolf Rosenauer

Alan W. Rosenberg

Robert L. Scanlon

Harry F. Steelman

A. Earl Walker

W. Keasley Welch

William Wright

Eric Yuhl

Edward Zapanta

Michael Robbins

Peter Allen

Deane B. “Skip” Jacques

PAST SECRETARY-TREASURERS

Herbert. Crockett*	1955, 1956, 1957
Ernest W. Mack*	1958, 1959, 1960
Samuel W. Weaver*	1961, 1962, 1963
James R. St. John*	1964, 1965, 1966
Robert W. Porter	1967, 1968, 1969
William A. Kelly	1970, 1971, 1972
John S. Tytus	1973, 1974, 1975
Theodore S. Roberts*	1976, 1977, 1978
Ulrich Batzdorf	1979, 1980, 1981
John A. Kusske	1982, 1983, 1984
W. Ben Blackett	1985, 1986, 1987
Francis E. LeBlanc	1988, 1989, 1990
Melvin L. Cheatham	1991, 1992, 1993
Grant E. Gauger	1994, 1995, 1996
Randall W. Smith	1997, 1998, 1999
Moustapha Abou-Samra	2000, 2001, 2002
Hector E. James	2003
Austin R. T. Colohan	2004, 2005, 2006
Jeffery L. Rush	2007, 2008, 2009
Charles E. Nussbaum	2010, 2011, 2012

PAST HISTORIANS

Henry M. Cuneo*	1962-1966
Ernest W. Mack*	1967-1971
Donald B. Freshwater*	1972-1976
George Ablin*	1977-1982
Gale C. Clark*	1983-1984
Robert Rand	1985-1990
Frank P. Smith*	1991-1995
John C. Oakley*	1996-1999
John P. Slater	1999-2002
John T. Bonner	2002-2008
Randall Smith	2009-2012

*deceased

PAST MEETINGS OF THE SOCIETY

1.	Biltmore Hotel, Santa Barbara, CA	Nov 25-26, 1955
2.	Timberline Lodge, OR	Dec 9-11, 1956
3.	Holiday Hotel, Reno, NV	Sept 29-Oct 1, 1957
4.	Del Monte Lodge, Pebble Beach, CA	Oct 19-22, 1958
5.	La Valencia Hotel, La Jolla, CA	Sept 27-30, 1959
6.	Del Monte Lodge, Pebble Beach, CA	Oct 23-26, 1960
7.	Bayshore Inn, Vancouver, BC	Oct 29-Nov 1, 1961
8.	Camelback Inn, Phoenix, AZ	Oct 28-31, 1962
9.	El Mirador Hotel, Palm Springs, CA	Oct 20-23, 1963
10.	Fairmont Hotel, San Francisco, CA	Oct 18-21, 1964
11.	Olympic Hotel, Seattle, WA	Oct 3-6, 1965
12.	Hotel Utah, Salt Lake City, UT	Nov 6-9, 1966
13.	Kona Kai Club, San Diego, CA	Oct 15-18, 1967
14.	Mauna Kea Beach Hotel, Kamuela, HI	Nov 16-19, 1968
15.	Del Monte Lodge, Pebble Beach, CA	Oct 15-18, 1969
16.	Bayshore Inn, Vancouver, BC	Oct 4-7, 1970
17.	The Broadmoor, Colorado Springs, CO	Oct 31 -Nov 3, 1971
18.	The Skyline Country Club, Tucson, AZ	Oct 29-Nov 1, 1972
19.	Airport Marina Hotel, Albuquerque, NM	Sept 16-19, 1973
20.	Santa Barbara Biltmore Hotel, CA	Oct 27-30, 1974
21.	Mauna Kea Beach Hotel, Kamuela, HI	Sept 28-Oct 1, 1975
22.	Harrah's Hotel, Reno, NV	Sept 26-29, 1976
23.	La Costa Resort Hotel, Carlsbad, CA	Sept 18-21, 1977
24.	The Lodge, Pebble Beach, CA	Oct 8-11, 1978
25.	Camelback, Inn, Scottsdale, AZ	Sept 23-26, 1979
26.	Mauna Kea Beach Hotel, Kamuela, HI	Sept 21-24, 1980
27.	The Empress Hotel, Victoria, BC	Sept 20-23, 1981
28.	Jackson Lake Lodge, Jackson Hole, WY	Sept 12-15, 1982
29.	Hotel del Coronado, Coronado, CA	Oct 2-5, 1983
30.	The Broadmoor, Colorado Springs, CO	Sept 9-12, 1984
31.	Silverado Country Club & Resort, Napa, CA	Sept 22-25, 1985
32.	Maui Intercontinental, Wailea, Maui, HI	Sept 28-Oct 1, 1986

PAST MEETINGS OF THE SOCIETY

33. Banff Springs Hotel, Banff, AB	Sept 6-9, 1987
34. The Ritz-Carlton, Laguna Niguel, CA	Sept 11-14, 1988
35. The Lodge, Sun Valley, ID	Sept 10-13, 1989
36. Mauna Lani Bay Hotel, Kawaihae, HI	Sept 9-12, 1990
37. The Pointe, Phoenix, AZ	Sept 22-25, 1991
38. The Whistler, Whistler, BC	Sept 20-23. 1992
39. Mauna Lani Bay Hotel, Kawaihae, HI	Sept 19-22, 1993
40. Le Meridien Hotel, SanDiego, CA	Sept 18-21, 1994
41. Salishan Lodge, Gleneden Beach, OR	Sept. 9-12, 1995
42. Manele Bay, Island of Lanai, HI	Sept 14-17, 1996
43. Ojai Valley Inn, Ojai, CA	Sept 20-23, 1997
44. Silverado Resort, Napa, CA	Sept 12-15, 1998
45. Coeur d'Alene Resort, Coeur d'Alene, ID	Sept 18-21, 1999
46. Mauna Lani Bay Hotel, Hawaii, HI	Sept 9-11, 2000
47. Ocean Pointe Resort, Victoria BC (Cancelled)	Sept 15-18, 2001
48. Delta Victoria Resort, Victoria, BC	Oct 12-15, 2002
49. Hapuna Beach Prince Hotel, Kamuela, HI	Sept 20-24, 2003
50. Rancho Bernardo Inn, San Diego, CA	Sept 11-14, 2004
51. Squaw Creek Resort, Lake Tahoe, CA	Sept. 17-20, 2005
52. Semiahmoo Resort & Spa, Blaine, WA	Sept. 16-19, 2006
53. Mauna Lani Bay Hotel, Kawaihe, HI	Sept. 8-11, 2007
54. Hotel Captain Cook, Anchorage, AK	Aug. 16-19, 2008
55. Sun River Resort, Bend, OR	Sept. 11-14, 2009
56. Eldorado Hotel, Santa Fe, NM *In Memory of L. Philip Carter*	Oct 8-11, 2010
57. The Grand Hyatt Kauai Resort & Spa , Island of Kauai, Hawaii	Sept. 10-13, 2011
58. Broadmoor Hotel, Colorado Springs, CO	September 7-10, 2012

FUTURE MEETINGS

SunValley Lodge, Sun Valley, Idaho	August 16-19, 2014
The Grand Hyatt Kauai Resort & Spa, Island of Kauai, Hawaii	September 11-14, 2015
Park Hyatt Aviara Resort, Carlsbad, CA	September 9-12, 2016

PAST VICE-PRESIDENTS

John Raaf*	1955
Frank Turnbull*	1956
Howard A. Brown*	1957
Rupert R. Raney*	1958
Edmund J. Morrissey*	1959
C. Hunter Sheldon*	1960
Ernest W. Mack*	1961
Hale A. Haven*	1962
Frank M. Anderson*	1963
Edwin B. Boldrey*	1964
Herbert C. Crockett*	1965
Karl O. Von Hagen*	1966
Samuel W. Weaver*	1967
Chester B. Powell*	1968
Peter O. Lehman*	1969
Charles W. Elkins*	1970
Nathan C. Norcross*	1971
James R. St. John*	1972
Edward K. Kloos*	1973
Ralph B. Cloward*	1974
Thomas K. Craigmile*	1975
Lyman Maass*	1976
Gale C. Clark*	1977
William A. Kelley	1978
Byron C. Pevehouse	1979
Robert W. Rand	1980
Theodore S. Roberts*	1981
Ulrich Batzdorf	1982
George Ablin*	1983
George A. Ojemann	1984
Gale C. Clark*	1985
Robert Weyand	1986
Robert Florin	1987
John A. Kusske	1988
Basil Harris*	1989
W. Ben Blackett	1990
Ronald F. Young	1991
Edward Reifel	1992
Grant E. Gauger	1993
Ralph F. Kamm	1994
Steven L. Giannotta	1995
Randall W. Smith	1996
Gail A. Magid	1997
Donald Prolo	1998
Lawrence Shuer	1999
John C. Oakley*	2000
L. Philip Carter*	2001, 2002
William L. Caton III	2003
Gerald Silverberg	2004
Kim Burchiel	2005
John Adler	2006
Philip Weinstein	2007
Betty MacRae	2008
Linda Liau	2009
David W. Newell	2010
J. Paul Muizelaar	2011
Richard Wohns	2012

*deceased

PAST PRESIDENTS

David L. Reeves*	1955
John Raaf*	1956
Frank Turnbull*	1957
Howard A. Brown*	1958
Rupert R. Raney*	1959
Edmund G. Morrissey*	1960
C. Hunter Sheldon*	1961
Ernest W. Mack*	1962
Hale A. Haven*	1963
Frank M. Anderson*	1964
Edwin B. Boldrey*	1965
John R. Green*	1966
Arthur A. Ward, Jr.*	1967
Lester B. Lawrence*	1968
John D. French*	1969
Chester B. Powell*	1970
Robert W. Porter	1971
Henry M. Cuneo*	1972
Charles W. Elkins*	1973
Edward K. Kloos*	1973
W. Eugene Stern	1974
Ralph B. Cloward*	1975
James R. St. John*	1976
Eldon L. Foltz	1977
John Tytus*	1978
Donald B. Freshwater*	1979
William A. Kelly	1980
Byron C. Pevehouse*	1981
Robert W. Rand	1982
Theodore S. Roberts*	1983
Thomas K. Craigmile*	1984
Ulrich Batzdorf	1985
Gale C. Clark*	1986
Lyman Maass*	1987
Gordon B. Thompson	1988
George Ablin*	1989
Robert Weyand	1990
Basil Harris*	1991
W. Ben Blackett	1992
Francis E. LeBlanc	1993
Ronald F. Young	1994
John A. Kusske	1995
Melvin L. Cheatham	1996
Robert Florin	1997
Frank P. Smith*	1998
Ralph F. Kamm	1999
Steven L. Giannotta	2000
Donald J. Prolo	2001, 2002
Grant E. Gauger	2003
Randall W. Smith	2004
John P. Slater	2005
Moustapha Abou-Samra	2006
Kim Burchiel	2007
Gerald Silverberg	2008
Lawrence Shuer	2009
L. Philip Carter*	2010
David W. Newell	2010
Austin R.T. Colohan	2011
John T. Bonner	2012

*deceased

PAST RESIDENT AWARD RECIPIENTS

Ralph Kamm, OHSU**	1966
Jerry Greenhoot, UW	1968
L. Philip Carter, BNI**	1971
Ronald J. Ignelzi, U. of Colorado	1972
Henry G. Fieger, Jr., U. of Colorado	1973
Peter F. Schlossberger, UCLA	1974
Paul Steinbok, UBC	1975
Arden F. Reynolds, Jr., UW	1976
John W. Hutchison, UCI	1977
Kim J. Burchiel, UW**	1978
Roy A.E. Bakay, UW	1979
Herbert Fried, UCLA	1980
Linda M. Liau, UCLA **	1997
Sean D. Lavine, USC	1998
Sooho Choi, USC	1999
Michael Y. Wang, USC	2000
Odette Harris, Stanford	2001
Raymond Tien, OHSU	2002
Michael Sandquist, OHSU	2003
Iman Feiz-Erfan, BNI	2004
Johnathan Carlson, OHSU	2005
Mathew Hunt, OHSU	2005
Kiarash Golshani, OHSU	2006
Edward Chang, UCSF	2006
Jonathan Miller, OHSU	2007
Kenneth Liu, OHSU	2007
Justin Cetas, OSHU	2008
Edward Chang, UCSF	2008
Zachary Litvack, OHSU	2009
Kiran Rajneesh, UCI	2009
Justin Dye, UCLA	2010
Isaac Yang, UCSF	2010
Terry Burns, Stanford	2011
Gabriel Zada, USC	2011
Walavan Sivakumar, U. of Utah	2012
David Stidd,U. of Arizona	2012

**WNS Member

Western Neurosurgical Society

60th Annual Meeting

August 16-19, 2014

Sun Valley Lodge

Sun Valley, Idaho

Ritz Carlton Half Moon Bay
September 15-18, 2013