...we cover the exciting work being done in the Neurospinal Disorders Program at the UCSF Department of Neurological Surgery and introduce several new faculty members. We also announce the receipt of a generous grant provided to the Department by the Pediatric Brain Tumor Foundation of the United States to fund research on the treatment and biology of pediatric brain tumors.

Spinal Care at the University of California, San Francisco Department of Neurological Surgery

The spine surgeons at the Neurospinal Disorders Program at the University of California, San Francisco (UCSF) use the most recent technological advances and an interdisciplinary approach to patient care to treat every aspect of spinal diseases and disorders. At the UCSF Spine Center, patients can receive opinions from a variety of specialists including neurosurgeons, orthopedic surgeons, and radiation oncologists. Complex tumor cases referred to the Spine Center are now reviewed within 48 hours, making the tertiary referral center much more accessible and valuable to neighboring physicians. Recently, a spine tumor board was founded by Christopher Ames MD, co-director of the Neurospinal Disorders Program and the Spine Center, Serena Hu MD, professor and vice chair of Orthopedic Surgery, and David Larson MD, PhD, FACR, professor of neurological surgery and radiation oncology. The spine tumor board invites breast, colorectal, thoracic, and surgical oncologists to evaluate difficult and unusual cases, such as complex spinal tumors, for optimum management.

Intraspinal tumors of the anterior midline cervical and cervical thoracic region pose a significant surgical challenge and high surgical risk because of the severe neurological damage that can result when manipulating the spinal cord. Ames has developed a surgical technique to operate on these tumors, called a lateral transpedicular approach (see images). “It is basically skull base surgery for the spine,” says Ames. “It involves radical bone resection, effectively removing the entire spine on one side to provide direct access to the tumor while avoiding manipulation of neural elements.” A case series of 15 patients treated with the technique which was presented at the recent AANS-CNS Joint Section Spine meeting in Orlando, showed the patients to have no neurological deficit following surgery. Because of the need for extensive bone removal, Ames and his colleagues modified standard reconstructive surgery using a screw-rod construct that runs the continuous length of three columns, stabilizing all levels and reconstructing the cervical

The lateral transpedicular approach with corpectomy essentially “delivers” tumor out from underneath the spinal cord without any spinal cord retraction.

Continued on page 2
Over 80% of the population is expected to suffer from a spinal disorder in their lifetime, whether it is severe back pain caused by disc degeneration, a congenital deformity, or a central nervous system tumor. Historically, spinal disease has been an exceedingly complicated clinical problem. The delicate nature of spinal anatomy and the proximity of diseased areas to neural structures and nerve roots can severely limit treatment options and many patients are given no recourse for their symptoms. However, recent technological advances that allow neurosurgeons to repair the spine without damaging neural components have significantly improved the management of spinal disorders.

Notably, a new surgical approach to treating cervical and thoracic spinal tumors has been developed by Christopher Ames MD, assistant professor of neurological surgery and co-director of the Neurospinal Disorders Program. The procedure allows patients who were not previously candidates for surgery to undergo resection of their tumors (page 1). There are approximately 18,000 individuals who are diagnosed with new spinal metastases each year in North America, and advances such as these are giving new hope to patients with poor prognoses.

In addition to refining open surgical techniques, the Department of Neurological Surgery is beginning a new initiative for minimally invasive surgery that focuses on outpatient and short-stay spinal surgery. To lead this initiative, we are pleased to announce that Praveen Mummaneni MD has joined the Department as director of minimally invasive spine surgery and associate professor of neurological surgery. He also succeeds Philip Weinstein MD, professor of neurological surgery, as co-director of the Neurospinal Disorders Program. Mummaneni has completed fellowship training in complex spine surgery and has received advanced subspecialty training in adult spinal deformity surgery and in minimally invasive spine surgery. He completed his neurosurgical residency at the University of California, San Francisco (UCSF), and has been an assistant professor of neurosurgery and orthopedics at Emory University.

Minimally invasive surgeries have the potential to reduce surgical risk, pain, blood loss, and time to recovery; however, there have been relatively few trials comparing them to open surgical techniques. Specializing in the treatment of complex spinal disorders, Dean Chou MD, assistant professor of neurological surgery, uses minimally invasive thoracoscopic techniques to treat disorders of the thoracic spine and is currently leading studies on the use of minimally invasive techniques compared to other treatment modalities by analyzing the outcomes of patients.

While surgery is the mainstay of treatment for debilitating spinal disorders, the Department of Neurological Surgery focuses on a multidisciplinary strategy for managing patients. By collaborating with other departments at the UCSF Spine Center to form diagnoses and treatment plans, patients benefit from the expertise of a variety of specialists. With new faculty and less invasive surgeries, we continue to enhance a comprehensive program to treat all aspects of spinal disorders from the skull base to the sacrum.

The bone removal, vertebral artery mobilization and table tilt of the new approach transform the poor tumor visualization achieved with traditional approaches into a wide access corridor with easy visualization and ample, safe working space.
Anna Frankfurt RN graduated from the Hospital of the University of Pennsylvania School of Nursing with a diploma in nursing in 1970, and attended the BSN program at the University of Pennsylvania for one year prior to moving to California. She completed her bachelor's degree in Health Sciences at Chapman College. Frankfurt began work at UCSF at the Moffitt Hospital in 1983 and transferred to the neuro intensive care unit (NICU) several months later. She worked as staff nurse in NICU then became assistant manager of the NICU – a position she held for nine years. In 1995, she received the Helen Ripple Neuroscience Award, and in 2000 she was a co-investigator on the nursing research project “Gastric vs. Duodenal Tube Feedings.” While serving as assistant manager in the NICU, she helped open the 8 South Neuro Close Observation Room (NCOR) unit (named for its location on the 8th floor of Moffitt Hospital’s south wing). In January of 2002, Frankfurt transferred to the Department of Neurological Surgery. What she enjoys most about her current position is seeing the advances in the management of adult brain tumors both surgically and medically. She especially enjoys the contact with patients and families before and after surgery, which she did not experience while working in the ICU.

Frankfurt has served as president of the Bay Area Chapter of Neuroscience Nurses for two years. She has also participated in several community stroke education projects in conjunction with the neurovascular service and coordinated an informal stroke awareness survey with the Quality Improvement Group of the NICU and 8 South NCOR, which was presented as a poster at the UCSF/Stanford Research day in 2000.

Lisa T. Hannegan RN, MS, Clinical Nurse Specialist is both a supervisor and clinical nurse specialist within the Department of Neurological Surgery, as well as an assistant clinical professor at the UCSF School of Nursing. She received her nursing degree from Montana State University and her MS in Neuroscience Nursing from UCSF. In her 23-year nursing career, Hannegan has worked directly with thousands of neurosurgical patients with tumors, and more recently with vascular diseases. She is currently a co-leader of the San Francisco Brain Aneurysm and Vascular Malformation Support Group and co-president of the Aneurysm and AVM Foundation. Hannegan has also worked as a study coordinator for several NIH-funded clinical trials dealing with aneurysms, strokes, and cerebrovascular drugs.
Christopher Ames MD is an associate professor of neurological surgery at the University of California, San Francisco (UCSF), co-director of the Neurospinal Disorders program, and co-director of the UCSF Spine Center. He received his medical degree from the University of California Los Angeles and completed his neurosurgical residency at the University of California San Diego, as well as a spine fellowship at Barrow Neurological Institute. At UCSF, Ames’ clinical practice focuses on complex spinal reconstructive surgery for tumor resection and correction of adult spinal deformity, and he is currently the principal investigator of five randomized prospective clinical trials evaluating novel mechanisms of spinal reconstruction in neoplastic and degenerative disease. His work on spinal tumors includes the development of the transpedicular approach for previously unresectable cervical and cervical thoracic tumors (see page 1), as well as the first multilevel en bloc spondylectomy on the lumbar region of the spine. Although multilevel en bloc spondylectomy has been shown to effectively cure some spinal metastases, it requires a high level of technical expertise and has not previously been reported outside of the thoracic spine. The results of that surgery will be published in an upcoming issue of the Journal of Clinical Neuroscience, and Ames has been invited to speak to the Australian Neurosurgery Society about the technique. In 2005, he received the prestigious International Society for Study of the Lumbar Spine research award for his work on spinal fusion in tumor reconstructions requiring radiation therapy. Radiation therapy is a common therapeutic strategy for spinal metastases, but often severely inhibits bone-healing, making it difficult or impossible to perform spinal decompression or vertebral reconstruction. Ames and his colleagues showed that the use of the recombinant human bone morphogenetic protein-2 in a rabbit model significantly improved the fusion rate after radiation therapy.

Ames also specializes in treating disorders that disrupt the natural curve of the spine. He performs trans-pedicular osteotomy for restoration of the lumbar lordosis, as well vertebral column resection to treat severe rigid deformity. He was the first surgeon in the state of California to perform the TRANS1 percutaneous minimally invasive fusion procedure, which allows access to the L5-S1 vertebral bodies of the spine to enable lumbar fusion. Recently Ames’ work in complex deformity was featured on a special edition of the NBC primetime show Three Wishes.

Dean Chou MD is an assistant clinical professor of neurological surgery at UCSF and a member of the UCSF Spine Center. He received his medical degree from UCSF and completed his residency in the Department of Neurosurgery at Johns Hopkins University. He has also completed a fellowship in complex spine surgery at Barrow Neurological Institute. Chou is a member of the North American Spine Society, the American Association of Neurological Surgeons (AANS), the Congress of Neurological Surgeons (CNS), and the AANS/CNS Section on Disorders of Spine and Peripheral Nerves. He is also an AO faculty member and has been the recipient of several awards, including a Neurosurgery Research and Education Foundation grant by the AANS.

In his clinical practice as a neurosurgeon, Chou performs surgery for spinal conditions ranging from disc degeneration to spinal tumors. He has particular expertise in treating adult spinal deformities, including severe scoliosis and kyphosis, as well as failed back syndrome. To treat kyphosis, Chou may perform an osteotomy, wedge resection, or vertebral column resection, depending on the type and severity of the deformity. Management of adult scoliosis ranges from conservative treatment to minimal decompression to full correction. Chou also frequently performs “re-do” operations and revision surgery. For degenerative conditions, Chou performs minimally invasive surgeries, including use of an endoscope attached to a robotic arm, called AESOP, for thoracoscopic procedures. In his research, Chou focuses on studying the outcomes of patients in order to evaluate surgical techniques and determine optimal management procedures. Currently, he is studying the use of minimally-invasive surgical techniques and comparing them to open surgical techniques to determine which methods result in better outcomes for patients.

Chou’s tumor practice focuses on all types of tumors, and he frequently utilizes the transpedicular corpectomy technique. This technique allows him to perform an anterior and posterior operation simultaneously, sparing the patient an additional surgery and the morbidity that can result from an anterior approach. Chou is also involved in a clinical trial studying radiographic correlations with metastatic spine tumors to determine if there are prognostic markers that might indicate whether or not a patient will respond well to a given therapy (see page 2).
The Department of Neurological Surgery has been awarded a research grant by the Pediatric Brain Tumor Foundation of the U.S. (PBTFUS) — a nonprofit organization devoted to finding causes and cures of childhood brain tumors. Contributing and matching funds will total close to $200,000 per year and will support a research program focused on pediatric brainstem glioma and medulloblastoma. The PBTFUS grant is intended to allow investigators to obtain preliminary data that will serve as the foundation for a more comprehensive program. Such a program could be funded in the next 2 years, depending on results of the current studies, and would be a large step towards the Department’s objective of expanding its pediatric brain tumor research program.

The biology of pediatric brain tumors is not as well understood as that of adult brain tumors, mostly due to the rarity of tissue samples, and as a result new therapies have been slow to develop. This research program aims to address some of these challenges with innovative, biologically-based strategies that compose five main projects and two core facilities, led by principal investigator Mitchel Berger MD. Investigators from the Department of Neurological Surgery will also collaborate with other institutions, including the PBTF Institute at Duke University.

The first three projects include studying the origin of brainstem gliomas by examining central nervous system development and neural stem cells; investigating the role of the MYCN oncogene in the formation of pediatric medulloblastoma; and using siRNAs to activate genes in pediatric brain tumors that induce an apoptotic response when down-regulated. To address the need for more effective methods of drug delivery, another project will study convection-enhanced and intra-nasal delivery of therapeutic agents into the rodent brainstem. Finally, a fifth project will develop a xenograft panel of human pediatric brain tumors in nude mice. These xenografts will be established from a variety of brain tumor types and will create a vital resource for the other studies and for the greater neuro-oncology community.


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**DR. CHOU’S SELECTED PUBLICATIONS**


Christopher Ames MD, assistant professor of neurological surgery, will serve as an investigational device site for a new lumbar disc replacement known as activ L™.

John Chi, resident in the Department of Neurological Surgery, received the Henry Newman Award for excellence in clinical neuroscience from the San Francisco Neurological Society for his research “Pre-hospital hypoxia predicts outcome in patients with traumatic brain injury: a multicenter, prospective study.” He has also been awarded the Congress of Neurological Surgeons/DePuy Spine Clinical Research Fellowship for 2006-2007.

Edward Chang MD, resident in the Department of Neurological Surgery, received the Kaiser Research Award from the San Francisco Neurological Society for his research that characterized the functional ontogeny of the auditory cortex.

Daniel Lim, resident in the Department of Neurological Surgery, received the Edwin Boldrey Award in basic neuroscience from the San Francisco Neurological Society for the research paper “In vivo transcriptional profile analysis reveals RNA splicing and chromatin remodeling as prominent processes for adult neurogenesis,” published in Molecular and Cellular Neurosciences.

Geoffrey Manley MD, PhD, associate professor of neurological surgery, was nominated for a Heroes & Hearts Award, sponsored by the San Francisco General Hospital Foundation, for saving the life of a San Francisco policeman. The Heroes & Hearts Award is given to salute community heroes who have demonstrated exceptional and inspirational behavior. Visit http://sfghf.net/heroes.php.

Manley will also be hosting the 13th International Symposium on Intracranial Pressure and Brain Monitoring on July 20-26, 2007 at the Palace Hotel in San Francisco.

Michael McDermott MD, professor of neurological surgery, was invited to give the lecture “Meningiomas of the Orbit: Surgical Approaches and Outcomes” to the American Society of Ophthalmic Plastic and Reconstructive Surgery in 2005.

Ken Monson, assistant researcher in the Department of Neurological Surgery, has received a Mentored Quantitative Research Development Award (K25) from the National Institutes of Health for his project “Vascular mechanotransduction in traumatic brain injury,” which explores the hypothesis that mechanical trauma instigates changes in the biological activity of the cerebral blood vessels.

Scott Panter PhD, assistant professor of neurological surgery, has recently been awarded a three-year grant by the Veteran's Affairs Hospital for his project “Direct delivery of neurotoxins to the brain by an intranasal route.” He will also begin testing an experimental device in swine that is intended to reduce tissue edema following traumatic brain injury. This work is part of a two-year contract with Twin Star Medical, Inc.

Victor Perry MD, assistant professor of neurological surgery, has been honored by Support for Families of Children with Disabilities – an organization dedicated to ensuring that families of children with any kind of disability or special health care need have the knowledge and assistance they need to make informed choices that support their child’s health, education, and development. Each year the organization honors professionals who demonstrate a true understanding of children with disabilities and their families. The families nominated Perry noted that “he is a physician who treats each of his patients – no matter what their disability – as an individual worthy of respect and care.”

Rene Sanchez-Mejia MD, resident in the Department of Neurological Surgery, has received the Kaiser Award for clinical research from the San Francisco Neurological Society for the research “Retreatment of medically refractory trigeminal neuralgia.”

Philip Star MD, associate professor of neurological surgery, has been appointed the Dolores Cakebread Chair in Neurological Surgery.

UCSF's neurosurgery service ranked in the top ten of U.S. News and World Report's 2006 roster of the best neurosurgery and neurology services in the United States.

The Department of Neurological Surgery has welcomed five new faculty members. C. David James PhD, professor of neurological surgery, has been named the new associate director of the Brain Tumor Research Center and specializes in the molecular biology of central nervous system cancer. David Rowitch MD, PhD, professor of neurological surgery, specializes in central nervous system development and tumorigenesis, and retains a joint appointment with the Department of Pediatrics, where he now serves as chief of neonatology. Shirley Stiver MD, PhD will be specializing in cerebrovascular and traumatic central nervous system injury at San Francisco General Hospital. Shichun Zheng MD has become assistant adjunct professor in the Division of Epidemiology. His research focuses on genetic and epigenetic mechanisms in brain tumors and the development of new approaches for molecular epidemiological studies of cancer in different populations. Praveen Mummaneni MD, associate professor of neurological surgery, will serve as co-director of the Neuropyscal Disorders Program and director of the Department’s new initiative for minimally invasive spine surgery.
Rose Du MD, PhD received her bachelor's degree in Physics summa cum laude from Harvard University in 1993. She then completed the MD/PhD program at Harvard Medical School in 2000 and was a student in the Harvard-Massachusetts Institute of Technology (MIT) Health Sciences and Technology Program (HST). She obtained her PhD in Physics at MIT in 1999. After an internship at the University of California San Francisco (UCSF), she began her residency in the Department of Neurological Surgery at UCSF in 2001.

Du’s interest in research began in high school where she studied the theoretical properties of optical fibers with Fares Mattar, PhD at New York University, a project which was a finalist in the Westinghouse Science Talent Search. As an undergraduate, she continued to be actively involved in physics research projects, including a study on highly ionizing particles with Kay Kinoshita, PhD and on the fractal properties of crystal trees with Howard Stone, PhD. In graduate school, she studied the theoretical basis of the kinetics and thermodynamics of protein folding with Toyoichi Tanaka, PhD and Alexander Yu. Grosberg, PhD, while funded by the Medical Scientist Training Program, Forum, and Whitaker Health Sciences Fund Fellowships.

At UCSF, she was introduced to research techniques in the biological sciences in the laboratory of Gabriele Bergers PhD where she studied the role of matrix metalloproteinases on angiogenesis and invasion in a mouse glioma model. Clinically, Du has an avid interest in cerebrovascular surgery. In addition to numerous clinical studies with Michael Lawton MD on cerebrovascular diseases, particularly arteriovenous malformations, she investigated the expression of angiogenic factors in a rat model of arteriovenous fistulas with Lawton, Guo-yuan Yang MD, PhD, and William Young MD. Last year, Du received the Nafziger Resident Award from the Department of Neurological Surgery at UCSF. She is now pursuing a career in academic neurosurgery with an emphasis on cerebrovascular diseases. She completed her residency in June 2006, and has begun a fellowship in cerebrovascular surgery with Arthur Day at the Brigham and Women’s Hospital at Harvard Medical School.

### SELECTED PUBLICATIONS


