

Dr. Henry Brem
Harvey Cushing Professor of Neurosurgery
Director, Department of Neurosurgery
Neurosurgeon-in-Chief
Professor of Neurosurgery, Ophthalmology,
Oncology, and Biomedical Engineering

Department of Neurosurgery
The Johns Hopkins Hospital
Sheikh Zayed Tower, Room 6115A
Baltimore, MD 21287
410-955-2252 T
410-955-8263 F
hbrem@jhmi.edu



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Paul B. Rothman, M.D.
Dean of the Medical Faculty
The Johns Hopkins University School of Medicine
Medical Administration, Suite 100

Re: Ian Suk

Dear Dr. Rothman,

We are writing to request the promotion of Ian Suk to the rank of Professor of Neurosurgery with a Joint appointment as Professor in the Department of Art as Applied to Medicine.

Abstract

Ian Suk has been a full-time Associate Professor in the Department of Neurosurgery with a secondary appointment as Associate Professor in the Department of Art as Applied to Medicine since July 2009. He has been recognized both nationally and internationally as an educator and medical illustrator. He is an extraordinary gifted individual who combines his artistic genius with incredible knowledge of human anatomy and surgical perspective. Since his arrival at Johns Hopkins from M.D. Anderson Cancer Center in 2002, he has created illustrations that elucidate some of the most complex, novel neurosurgical and spinal procedures with unmatched clarity and precision. He truly plays a pivotal role in creating and disseminating the newly developed knowledge to our peers and indeed the world.

His international reputation by neurosurgeons, and his impact on changing the field of neurosurgery, has culminated in receiving the prestigious Theodore Kurze Lecture Award from the American Association of Neurological Surgeons in April 2011. In the presidential address, Dr. James T. Rutka affirmed Mr. Suk's important place in the world's history of "practical neurosurgical anatomy". [Rutka, JT. Discovering neurosurgery: new frontiers: The 2011 AANS Presidential Address. *J Neurosurg* 115:1053-1066, 2011]

In 2007, Mr. Suk was awarded 1st Prize in the Doctor Pascual Medical Illustration International Competition in Caceres, Spain (CV:p.14 *Awards, Honors*). His comprehensive illustration depicting a minimally-invasive odontoidectomy was considered to be the absolute best.

Over the years, Mr. Suk has collected and focused on the most important practical techniques used by his peers and in 2010, he embarked on the daunting task of outlining, illustrating, and defining the practicum. The landmark paper was published in 2010 and subsequently received the highest AMI Literary Award by the Association of Medical Illustrators the following year. [Suk I, Gokaslan ZL, Lees GP, Sandone C: The Art of the Critique: Techniques-based tools for critical thinking. *Journal of Biocommunication* Volume 36, Number 3, 2010.]

Mr. Suk is already well-recognized internationally in the field of neurosurgery through his illustrations, but within the last few years, his penchant for teaching, pursuits of excellence in the art realm, and keen historical perspective in his profession have enabled him to publish landmark papers that straddle equally the disparate worlds of art and science. Although the profession of Medical Illustration is largely one of a practitioner and often plays a supportive role with clinicians and scientists, he has managed to find time to author innovative

papers that educate clinicians, scientists, medical illustrator peers, and even art historians alike. His manuscript, "Concealed Neuroanatomy in Michelangelo's *Separation of Light from Darkness* in the Sistine Chapel" [Neurosurgery, 66 (5):851-861, May, 2010.] remains one of the most widely read and widely emailed articles in the *Neurosurgery* Journal, and is testament to its importance to the wide scope of disciplines and audience.

Working closely with a cerebrovascular neurosurgeon, Dr. Rafael Tamargo, Mr. Suk's unique paper explained in detail the discovery of Michelangelo's depiction of the brainstem in the Sistine chapel painting. They provided convincing evidence through dissections, digital overlays, and art history research, the concealed neuroanatomy imagery by the great artist Michelangelo. It is a fascinating degree of scholarship where neuroanatomy and the artworld merged with huge impact. The news attracted worldwide appeal and fueled wonderful dialogue amongst neurosurgeons, anatomists, art historians, and fine artists. The article even gained the attention of reviews published in New York Times, Frontiers in Human Neuroscience, Neurology Today, and radio interviews including NPR and CBC Radio. It captured and continues to promote tremendous visibility for the Neurosurgery Department and Johns Hopkins Medicine to the world.

There are very few in his chosen profession who have accomplished as much in educational contributions to clinicians, elevated the level of craftsmanship amongst his peers, and disseminated knowledge in the highest levels of neurosurgery, and indeed all aspects of surgery, science, and basic research to the world. His productivity and contributions have long been at the apex of his profession and his national and international recognition within neurosurgery are a source of pride within our department. For these reasons, I am confident that Mr. Suk's level of achievement meets or exceeds the strictest measures of promotional standards, and therefore, it is a pleasure to recommend Mr. Ian Suk to be promoted to Full Professor.

Introduction

Mr. Suk is a graduate of the University of Toronto Biomedical Communications Department-one of the oldest and most respected in North America in this profession. Just before completing his B.Sc.,B.M.C. degree there, Mr. Suk was accepted into Johns Hopkins Art as Applied to Medicine Department for the intensive Ophthalmological Illustration training in the spring of 1993. Subsequently, Mr. Suk accepted a position as a Medical Illustrator in the Medical Graphics Department of UT M.D. Anderson Cancer Center where he worked for 7 years before he was recruited to the Department of Neurosurgery to exclusively illustrate and study neurosurgical procedures and clinical anatomy. In July 2002, he continued his work at the Department of Neurosurgery at Johns Hopkins School of Medicine with a joint appointment in the Department of Art as Applied to Medicine.

At UT M.D. Anderson Cancer Center, Mr. Suk worked very closely with head & neck surgeons, vascular surgeons, thoracic and cardiovascular surgeons, pathologists, anesthesiologists, basic researchers, plastic surgeons, and neurosurgeons, particularly with Dr. Ziya L. Gokaslan-Professor of Neurosurgery, Oncology, and Orthopaedic Surgery. The illustrations covered a wide spectrum of subject matter including tumors of the spine, sacral reconstructive procedures, spinal cord tumor resections and various brain tumor procedures. He has contributed to every facet of clinical neurosurgery at Johns Hopkins and collaborated with Departments of Orthopedics, Head & Neck Surgery, Pediatrics, Plastic Surgery, Ophthalmology, Neuroradiology, and Neuropathology. His illustrations are so well received and so stunning, that over 50 of his articles were chosen to grace the cover of numerous journals. To date, his artwork has appeared in 117 papers and 41 medical textbook chapters.

Scholarship

Research Scholarship

Although his earlier work was done using traditional methods, i.e. watercolors and acrylics applied by conventional brushes and airbrushes, later on, he mastered the digital realm with the use of *Adobe Photoshop*-the leading imaging program that allows combining multiple traditionally drawn images with digital color

rendering techniques. This technology enables Mr. Suk to scan in several layers and render color in each layer distinctly to simulate the different tissue layers in the human body. The overall effect has an incredible clarity, realistic appearance, and three-dimensional perspective. He has truly mastered, and has pushed the forefront of ultra-realism through *multilayering*. This also provides the ability for medical illustrators to revise and alter individual layers without disturbing others - a feature impossible to achieve using solely traditional methods.

He has aggregated this along with the most useful techniques and initially devised a condensed 'manual' of sorts for teaching purposes. Subsequently, he wrote a landmark paper, in order to make it accessible for all the schools of Medical Illustration/Biocommunication and practicing Medical Illustrators.

[Suk I, Gokaslan ZL, Lees GP, Sandone C: The Art of the Critique: Techniques-based tools for critical thinking. Journal of Biocommunication Volume 36, Number 3, 2010.]

One of the schools has adopted the article, not only as a teaching tool but also as required curriculum reading for the senior Surgical Illustration class. Not surprisingly, the manuscript was considered to be the best written contribution to the Journal of Biocommunication, and garnered the prestigious AMI Literary Award by the Association of Medical Illustrators in 2011. (CV:p. 14 *Awards, Honors*)

Mr. Suk has been the principal medical illustrator in at least 114 peer-reviewed publications (CV:p.2-3 *Research Activities*, 1-25, and p.3-8 *Educational publications*, 1-92), 41 book chapters (CV:p.8-10 *Medical Textbooks*, 1-41), and 6 online journals (CV:p.8 *Online Journals*).

He consistently wins top awards from his peers (CV:p.13-14 *Awards, Honors*).

- Award of Excellence-Student Medical Color, Association of Medical Illustrators 1992, *The Sertoli Cell & Spermatoocytes*
- Orville Parkes Award for Student Best of Show, Association of Medical Illustrators 1992, *The Sertoli Cell & Spermatoocytes*
- Certificate of Excellence, Art Director's Club of New Jersey, 1992
- Certificate of Excellence, Art Director's Club of New Jersey, 1993
- Keith L. Moore Award for conceptual illustration, Biomedical Communications, University of Toronto, 1993
- DESI Award for excellence, Graphic Design USA, 1993
- Award of Excellence, Rx Club, 1993
- Award Gallery of Excellence (1st, 2nd, 3rd place), Management Graphics, 1995
- Award Gallery of Excellence (1st, 2nd, 3rd place), Management Graphics, 1996
- Honorable Mention, Association of Medical Illustrators, 1996, *Clinical Manifestations of Panic Disorder*
- Awards of Merit, Association of Medical Illustrators, 2000, *Surgical Management of Clival Chordomas & Anatomic Course of the Great Auricular Nerve*
- Bill Dore Award, Department of Neurosurgery, M. D. Anderson Cancer Center, Houston, Texas, 2001
- Certificate of Merit, Association of Medical Illustrators, 2002, *Dissection of Spinal Cord Ependymoma*
- Members Choice Award, Mid-Atlantic Biocommunicators Regional Conference, 2003, *Neurovascular anatomy of the lumbosacral junction*
- Will Sheppard Award of Excellence, Association of Medical Illustrators, 2003, *Stereotactic biopsy of contralateral pontine tumor*
- Will Sheppard Award of Excellence, Association of Medical Illustrators, 2004, *Pedicle screw trajectories of thoracic vertebrae*
- Will Sheppard Award of Excellence, Association of Medical Illustrators, 2005, *Neurovascular anatomy surrounding an acoustic neuroma*
- Certificate of Merit, Association of Medical Illustrators, 2006, *Total Sacrectomy in Resection of Giant Sacral Chordoma*
- Doctor Pascual Award-1st Medical Illustration International Competition-First Place, Caceres, Spain, 2007, *Endoscopic image-guided odontoidectomy for decompression of basilar invagination via a standard anterior cervical approach*

- Certificate of Merit, Association of Medical Illustrators, 2007, *All-posterior En bloc T9 spondylectomy*
- Certificate of Merit, Association of Medical Illustrators, 2009, *Combined Distraction/Compression Technique to Correct Extreme Basilar Invagination*
- American Association of Neurological Surgeons Theodore Kurze Lectureship, AANS Meeting, Denver, CO, April 12, 2011, *Illustrating a Neurosurgical Manuscript: From O.R. to the Sistine Chapel*
- AMI Literary Award, Association of Medical Illustrators, July 2011. Best written contribution to Journal of Biocommunication, *The Art of the Critique: Techniques-Based Tools for Critical Thinking*
- Will Sheppard Award of Excellence, Association of Medical Illustrators, July 2011, *Transorbital approach to access anterior cranial fossa pathology*
- Will Sheppard Award of Excellence, Association of Medical Illustrators, July 2012, *All-posterior en bloc sacral window resection*
- Certificate of Merit, Association of Medical Illustrators, July 2013, *Skullbase reconstruction following Paranasal sinus tumor resection*

His illustrations have also appeared in educational medical videos:

1. Implant and Pump Preparation Procedures For Hepatic Arterial Infusion Therapy, Medtronic IsoMed, Minneapolis, MN, 2000. **Series of step-by-step surgical illustrations.**
2. Cancer Newslines: Total Sacrectomy, M.D. Anderson Cancer Center, Houston, TX, 2001. **Series of step-by-step surgical illustrations.**
3. Gokaslan ZL, Weinberg JS. Surgical Management of Spinal Cord Ependymomas. (Video recording), CNS Meeting, Denver, CO 2003. **Series of step-by-step surgical illustrations.**
4. Gokaslan Z, Suk I. Transmandibular approach to cervical chordomas. (Video recording), AANS Meeting, New Orleans 2005. **Series of step-by-step surgical illustrations.**

The visual research involves studying clinical human anatomy from intra-operative photographs, using available literature, carefully observing surgical procedures, reviewing details of OR setup, patient position and instruments, cadaveric dissections, and tedious analysis of underlying skeletal structures. A great deal of planning and research is required to create a clear and didactic, original illustration of a complex surgical procedure. It is the self-directed integration of all this academic material that is the basis for developing a completely original, pedagogic image.

Conventional medical illustration only depicts superficial gross structures from a fixed angle, which makes it difficult to follow by surgeons. Ian Suk, however, by building the image in layers (often in oblique views) starting from the underlying skeletal structures and henceforth adding muscles, vasculature, nerves, and skin - akin to the layered glazing techniques used by Renaissance masters, he is able to convey unmatched three-dimensional surgical anatomy. In addition, by using various masks and shading methods, the field of interest remains as the focal point whereas the peripheral structures are hidden while still maintaining this dimensional transparency. This unique way of illustration revolutionizes the medical arts-one whose impact has not yet been fully realized.

Teaching Scholarship

Mr. Ian Suk teaches our graduate students in the Art as Applied to Medicine department, acts as mentor, and trains them in using *Adobe Photoshop* and other digital illustrative media. He has an integral role, not only in teaching, but also in the design of the curriculum (CV:p.12 *Curriculum Discussion and Development*). He is constantly trying to find ways of enhancing and updating the courses by integrating more digital software and trying to cut back antiquated methods in order to keep the students ahead in the digital marketplace upon graduation. Through numerous collaborations with other faculty, assessing student course feedback in Faculty Retreats, and contributing novel ideas for curriculum advancement, Mr. Suk's level of teaching and curriculum development and dedicated time are unsurpassed compared with any other adjunct or jointly-appointed faculty in AAM.

Due to the hectic pace of computer and software advancement, Mr. Suk's intimate technical knowledge of graphics software and peripheral hardware equipment is essential in keeping the students abreast of the latest technical advancements on both the Macintosh and PC platforms. His role as a teacher has many components.

He teaches not only the software and hardware components, applied art techniques-both traditional (such as pen & ink) and new (such as *Adobe Photoshop* and *Illustrator*), but also helps devise and refine technical exercises on the computer that help ease the transition for the students to feel comfortable using cutting edge technology to render anatomical/surgical images.

Anatomical and surgical accuracy aside, another component is the *Critique*, which is at the heart of the evaluation process for the students. Every aspect of the illustrations and interim exercises are analyzed by Mr. Suk, not only for anatomical accuracy but also for technical proficiency and aesthetic merits. He explains that “this enables the students to learn from not only their mistakes, but also encourages self-evaluation and critical thinking.”

Although Mr. Suk’s professional abilities as a practicing medical illustrator is already well recognized, his significant contribution to teaching has been a tremendous asset to Hopkins. Since his arrival here at Hopkins, he has taught 36 courses and has mentored more than 90 students (CV:p.10-12 *Teaching*). He is the most sought after medical illustrator in the field. In my opinion, he is a true genius with a potential to match, and perhaps exceed, the reputation of giants such as Max Brodel and Frank Netter.

Organizational and Administrative Activities

Since 1995, Mr. Suk has been a Professional member of the Association of Medical Illustrators, the most active and prestigious organization for medical illustrators in the world. He continues to devote time and energy to the group, serving in many capacities, from organizational duties, to holding workshops and talks, and has served many years as a judge of the Salon, that visually showcases some of the world’s best in medical and scientific illustration. In 2007, he founded an Ad-hoc study group “Neuro Focus Group” to further educate and enhance learning amongst his peers who specialize in Neurosurgical Illustration. (CV:p.15-16 *Organizational Activities*)

Although not noted in his CV, Mr. Suk’s keen ability to accurately depict neuroanatomy is occasionally recruited to teach and educate in the medical-legal setting. This is not an easy task as the audience can vary, from clinicians, to barristers, to lay audience. It is absolutely critical to depict accurate anatomy and science to protect patients, physicians, and academic institutions. In 2008, Mr. Suk’s prodigious talents helped visually explain and educate a litigious audience about a complex series of chronological surgical events that subsequently helped protect a team of Hopkins caregivers to reveal the scientific and factual occurrences.

Mr. Suk’s expertise is often recruited to effectively communicate novel advances in neurosurgery to potential philanthropists and large grant proposals. His invaluable input and collaboration with the clinical Faculty and the Neurosurgery Development office have produced striking visuals that effected tremendous impact for the

Neurosurgery Department and Johns Hopkins University. Similarly, he worked with the Marketing team to develop patient education images for the Department to inform, enhance and increase patient-related web presence. At Johns Hopkins Meyer 7 and Zayed 6 hallways, some of Mr. Suk’s work published in seminal neurosurgery papers are prominently displayed alongside contributions from giants of neurosurgery including Harvey Cushing, M.D., Walter Dandy M.D., A. Earl Walker M.D., and Donlin M. Long, M.D.,Ph.D.

National/International Recognition

In 2007, he was awarded 1st Prize in the Doctor Pascual Medical Illustration International Competition in Caceres, Spain (CV:p.14 *Awards, Honors*) This was a truly international competition and Mr. Suk’s singular illustration depicting a minimally invasive odontoidectomy procedure was deemed to be the absolute best. He has worked with physicians from around the world. In a recent cross-cultural neurosurgical academic exchange with major academic hospitals in China, Mr. Suk’s illustrations have even appeared as emblematic clinical posters to represent their teaching centers.

His talents have been recruited by neurosurgeons from around the world, including Canada, Italy, Spain, U.K, and France. His international reputation has culminated in garnering the prestigious Theodore Kurze Lecture Award from the American Association of Neurological Surgeons in April 2011. (CV:P.14 *Awards, Honors*) In his presidential AANS address, Dr. James T. Rutka noted Mr. Suk as “arguably the most famous neurosurgical illustrator in the world” and considers him as one of three most influential individuals in the world’s development of practical neurosurgical anatomy. [Rutka, JT. Discovering neurosurgery: new frontiers: The 2011 AANS Presidential Address. J Neurosurg 115:1053-1066, 2011]

He has also shared his novel rendering techniques to neurosurgeons in a manuscript, outlining plainly the sequential steps required in creating a complex neurosurgical illustration. For the first time, in a high-ranking peer-reviewed journal, the paper provides an elegant visual synopsis of this technique that Mr. Suk has developed over his career of two decades. [Suk I: Dissecting a complex neurosurgical illustration: step-by-step development. World Neurosurgery, 76 (6):497-507, Dec, 2011.]

The enclosed Educator’s Portfolio is a small sampling of Mr. Suk’s published work that demonstrates the highest levels of illustrative proficiency. It helps visually explain complex procedures, surgical anatomy, and biochemical cascades. His body of work is a tour-de-force that educates the world about complex neurosurgery, raises the bar for his colleagues, and exemplifies the best in achievements for Johns Hopkins Medicine in Neurosurgery, Science, Art and Art history.

Anticipated future progress

The future is very bright for Mr. Ian Suk and he will continue to produce and educate the world through his stunning visuals. He will continue to teach and mentor graduates who will occupy prominent positions including National Institutes of Health, medical-legal firms, neurosurgical and other clinical and basic science departments. Despite the paucity of technically relevant manuscripts and original papers produced by peers in his profession, Mr. Suk continues to investigate, write, and contribute to significant articles that affect his peers, our surgical peers, basic scientists, and knowledge for the world, thus fulfilling the mission of Johns Hopkins Medicine.

Summary Statement

We are mindful that Mr. Ian Suk is not a physician faculty member and therefore it may be difficult to judge the contribution of a medical illustrator, or the work of an artist, by using our conventional academic criteria. The final renderings are as superb as any well-composed photograph or fine art painting. However, its aesthetics truly belie the innovative genius, effort, time, and anatomical expertise required to create these standalone educational modules. It may take weeks or sometimes months to complete an enduring series of pedagogic illustrations that he essentially creates independently. The inherent value and quality of visual education is hard to quantify by our current indexes. However, we believe that even by the strictest application of such evaluation, Mr. Suk’s original scholarly work, his role in education, teaching and research, as well as his national and international reputation will meet the requirements for promotion to full Professor.

Sincerely,

Henry Brem, MD
Professor and Director
Department of Neurosurgery

Gary P. Lees, MS, CMI, FAMI
Associate Professor and Director
Department of Art as Applied to Medicine