PROMOTION RECOMMENDATION
THE UNIVERSITY OF MICHIGAN
MEDICAL SCHOOL
DEPARTMENT OF NEUROSURGERY
DEPARTMENT OF ANESTHESIOLOGY
DEPARTMENT OF NEUROLOGY
MEDICAL SCHOOL AND COLLEGE OF ENGINEERING
DEPARTMENT OF BIOMEDICAL ENGINEERING

Parag G. Patil, M.D., Ph.D., assistant professor of neurosurgery, Department of Neurosurgery, assistant professor of anesthesiology, Department of Anesthesiology, assistant professor of neurology, Department of Neurology, Medical School, and assistant professor of biomedical engineering, Department of Biomedical Engineering, Medical School and College of Engineering, is recommended for promotion to associate professor of neurosurgery, with tenure, Department of Neurosurgery, associate professor of anesthesiology, without tenure, Department of Anesthesiology, associate professor of neurology, without tenure, Department of Neurology, Medical School, and associate professor of biomedical engineering, without tenure, Department of Biomedical Engineering, Medical School and College of Engineering.

Academic Degrees:

M.D.	1999	Johns Hopkins University
Ph.D.	1999	Johns Hopkins University
M.A.	1991	Magdalen College, Oxford University, Oxford, UK
B.S.	1989	Massachusetts Institute of Technology

Professional Record:

2012-present	Assistant Professor of Neurology, University of Michigan
2012-present	Assistant Professor of Anesthesiology, University of Michigan
2006-present	Assistant Professor of Biomedical Engineering, University of Michigan
2006-present	Assistant Professor of Neurosurgery, University of Michigan
2005-2006	Clinical Lecturer, Department of Neurosurgery, University of Michigan

Summary of Evaluation:

Teaching: Dr. Patil provides research mentorship and clinical teaching on multiple levels. He regularly teaches residents in the operating room and also provides mentorship to Ph.D. and M.D./Ph.D. students. Several of his students have now defended their thesis and he is currently primary research advisor to two Ph.D. students, one M.D./Ph.D. student, and co-research mentor to three neurosurgical residents. He lectures on a regular basis to students, house officers, engineering and LSA students and at the Medical School. His teaching evaluations have steadily improved during the time that he has been on our faculty. He has done this through a variety of programs including working to obtain better teaching skills through courses provided by UMHS, and also by working through the PULSE program for which he has gained important insight into teaching relationships, particularly in the operating room. On Dr. Patil's evaluations, residents have indicated that they appreciate the effort he takes in developing their academic and personal growth, he helps

explain his thought processes with respect to operating, and decision making in neurosurgery on a regular basis. He is viewed as a strong mentor. He has also been very dedicated to his patients by providing them with educational materials which he has written regarding Parkinson's disease and also working through community groups to provide community lectures related to his field. He is considered a strong advocate for the Parkinson's Support Group in the Washtenaw County area. Dr. Patil has been one of the individuals who has used his research time to bridge the gap between biomedical sciences and clinical neuro sciences. His approach to the engineering students has been thoughtful and he has managed to bring several residents into the fold of biomedical engineering by creating a space within his laboratory for these neurosurgery residents to function and work with Ph.D. students in biomedical engineering. He has also worked to educate neurologists with respect to movement disorders and has a joint clinic with both Neurology and Anesthesiology in which he mentors residents in these disciplines in functional neurosurgery.

Research: Dr. Patil spends approximately 50% of his time in research. To that end, he has been applying engineering techniques in image processing, electrophysiology, mathematical modeling, and statistical analysis outcomes for the treatment of neurological diseases, particularly functional neurosurgical diseases. The principle focus of his research has been in the use of deep brain stimulation and functional neurosurgery. He has had ten foundation grants, seven UM based grants and two industry sponsored grants. He currently has a grant with Psychiatry looking at long-term follow up for the evaluation of patients who have deep brain stimulation systems for the adjunctive treatment of major depressive disorders. This is a grant that comes from the St. Jude Medical Inc. He has received a Coulter Translational grant examining targeting in DBS. He has looked at the use of various carbon microthread arrays for neural recording and has submitted a DARPA grant for model based multi-region nanotechnology platforms for adaptive closed loop diagnosis and treatment of neuropsychiatric disorders. He and Dr. Chestek have submitted a grant looking at brain waves and electrical and optical arrays for directing waves of activity in neural systems and have also submitted a grant looking at large scale neural recording with carbon microthread arrays. In addition, they have been looking at cortical controllers for electrically stimulated grasping. He has a significant interest in the brain machine interface and much of his research reflects his interest in creating bio compatible electrodes that are both accurate and long lasting. In the past, he has received funding from NeuroNexus Technologies and from a consortium from Duke University looking at coping skills training for spinal cord stimulators and has received funding as well from the Parkinson's Foundation. He has received a 2012 Young Friends Emerging Taubman Scholar Award for early career physician-scientist recognition of his great promise in biomedical engineering. In recognition of his scholarship, he has been asked to be a reviewer on multiple journals including: the *Journal of Neurosurgery, Journal of Neuroengineering, Neuromodulation, Journal of Neurochemistry, Brain Stimulation,* and *Neurosurgery*. He is asked to lecture at the major neurosurgical societies (AANS & CNS). He was a guest at the Alfred Taubman Forum on Public Policy at the Brookings Institution in 2012. He has been asked to be a guest lecturer and visiting professor at outside institutions such as local hospitals and schools, as well as other national and international venues such as Stanford University, The World Society for Stereotactic and Functional Neurosurgery and has been a featured presenter on the ABC television program, The Doctors. He has given a TED talk at Michigan.

Recent and Significant Publications:

Collins KL, Patil PG: Flat-panel fluoroscopy O-arm guided percutaneous radiofrequency cordotomy: A new technique for the treatment of unilateral cancer pain. *Neurosurgery* 71:27-34, 2013.

Chou KL, Taylor JL, Patil PG: The MDS–UPDRS tracks motor and non–motor improvement due to subthalamic nucleus deep brain stimulation in Parkinson disease. *Parkinsonism and Related Disorders* 19:966-969, 2013.

Patil PG, Conrad EC, Aldridge JW, Chenevert TL, Chou KL: The anatomical and electrophysiological subthalamic nucleus visualized by 3T MRI. *Neurosurgery* 71:1089-1095, 2012.

Chou KL, Persad CC, Patil PG: Change in fatigue after bilateral subthalamic nucleus deep brain stimulation for Parkinson's disease. *Parkinsonism Rel Disord* 18:510-513. 2012.

Rohatgi P, Langhals NB, Kipke DR, Patil PG: In vivo performance of a microelectrode neural probe with integrated drug delivery. *Neurosurg Focus* 27(1):E8. 2009.

Service: Dr. Patil has been actively involved in the service of his community through the outreach programs he has achieved for functional neurosurgery, in particularly through the Parkinson's Support Group. His efforts in functional neurosurgery have resulted in a sharp rise in the number of functional neurosurgical procedures done at the University of Michigan. The number of patients particularly in the Deep Brain Stimulation Program has more than doubled. In addition, he has served important national organizations including the Congress of Neurological Surgeons, SANS Lifelong Learning Committee. Within the AANS, he served on the Extra-Mural Subspecialty Item Writing Committee, the Goodman Board Review Course, the Practical Clinic in Deep Brain Stimulation and the NANS Spinal Cord Stimulation Workshop. He has been on a liaison committee for the ASSFN. He is a member of the board-at-large for the North American Neuromodulation Society and on the Executive Committee for the American Society of Stereotactic & Functional Neurosurgery. He is a member of the ETTN-10 study section which is tasked with reviewing grant proposals on the development and commercialization of medical devices and specifically neuroprosthetic devices. All of these are important organizations for his area of functional neurosurgery. Institutionally, he has been extremely active in multiple committees. Most notably, the IRB Committee for which he has been the neurosurgical member for several years. He served on the Bed Utilization Committee, the Neurosurgery Resident Journal Club as faculty advisor, the Rehab-Robotics Faculty Search Committee, the Neurosurgical OR Turnaround Committee, the Clinical Neuroscience Center Service Line Committee, and the OR PACU Hadoff Quality Improvement Team. Within the Department he is on the Clinical Operations Committee and has been a MiChart Physician Champion. He is an advisor on the Medical Scientist Training Program and has been neurosurgical director for the Neurology Residents Clinic Lecture Series. He currently serves on the OR Fire Safety Review Committee.

External Reviewers:

Reviewer A: "He is recognized as a resource in the field of neuromodulation, and his innovative work and publications on brain-machine interface-with implications for the field of neuroprosthetics-have had a significant impact on the field....Parag's experience with the medical devices industry and regulatory process, lend him a perspective that is extremely valuable in academic medicine and within the field of stereotactic and functional neurosurgery. His expertise and teaching ability make Parag a much-sought-after speaker, panelist, and moderator at national and international conferences, and an excellent mentor to those who are junior to him."

Reviewer B: "Since joining the University of Michigan full-time in 2006, Dr. Patil founded and directed three successful cross-disciplinary programs in functional neurosurgery and

neuromodulation, in addition to growing an active general neurosurgical practice. Truly, he embodies the full-fledged clinician-scientist who is exceptionally bright, exceedingly driven, caring and compassionate."

Reviewer C: "Dr. Patil in my opinion occupies an important niche in the neurosurgical community, being one of only a handful of MD PhD functional neurosurgeons with an engineering background. With these skills, he conducts translational research in the field of neurological implants used to treat neurological disease and disability and lends unique perspective to our field."
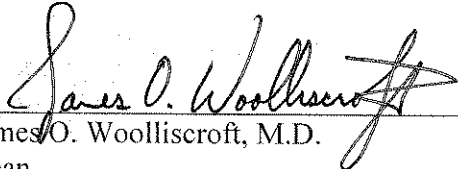
Reviewer D: "His prospects for continued success are tremendous--I see him as a future leader in the field of neurosurgery for pain for decades to come!"
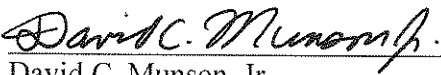
Reviewer E: "Dr. Patil has continued to make strong contributions to national organizations representing functional neurosurgery. His presentations at major neurosurgical meetings are reliably clear, concise, accurate, and insightful. He was elected to the governing board of the American Society for Stereotactic and Functional Neurosurgery, the major professional group representing our subspecialty."

Reviewer F: "He has earned the respect of his colleagues in deep brain stimulation and functional neurosurgery and is seen as someone who can break technological barriers and create solutions."

Summary of Recommendation:

Dr. Patil is a leader in the field of functional neurosurgery. He has contributed to the understanding of Parkinson's disease and the use of deep brain stimulation as an important therapy and has published technical advances in the management of pain and other disorders. His development of microelectrodes to improve neural interface has been significant. He is also an extremely busy surgeon who has maintained a significant practice along with a strong academic career. We are pleased to recommend Parag G. Patil, M.D., Ph.D. for promotion to associate professor of neurosurgery, with tenure, Department of Neurosurgery, associate professor of anesthesiology, without tenure, Department of Anesthesiology, associate professor of neurology, without tenure, Department of Neurology, Medical School, and associate professor of biomedical engineering, without tenure, Department of Biomedical Engineering, Medical School and College of Engineering.

James O. Woolliscroft, M.D.
Dean
Lyle C. Roll Professor of Medicine

David C. Munson, Jr.
Robert J. Vlasic Dean of Engineering
College of Engineering

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