

PROMOTION RECOMMENDATION
THE UNIVERSITY OF MICHIGAN
MEDICAL SCHOOL
DEPARTMENT OF ANESTHESIOLOGY
DEPARTMENT OF NEUROSURGERY

George A. Mashour, M.D., Ph.D., associate professor of anesthesiology, with tenure, Department of Anesthesiology, and associate professor of neurosurgery, without tenure, Department of Neurosurgery, Medical School, is recommended for promotion to professor of anesthesiology, with tenure, Department of Anesthesiology, and professor of neurosurgery, without tenure, Department of Neurosurgery, Medical School.

Academic Degrees:

M.D.	2001	Georgetown University
Ph.D.	1999	Georgetown University
B.A.	1991	St. John's College, Annapolis, MD

Professional Record:

2013-present	Associate Professor of Anesthesiology, University of Michigan
2013-present	Associate Professor of Neurosurgery, University of Michigan
2013-present	Adjunct Research Associate, Department of Philosophy, University of Michigan
2007-2013	Assistant Professor of Anesthesiology, University of Michigan
2007-2013	Assistant Professor of Neurosurgery, University of Michigan
2007-	Clinical Lecturer, Department of Anesthesiology, University of Michigan

Summary of Evaluation:

Teaching: Dr. Mashour's teaching excellence has been recognized with resident teaching awards in multiple clinical departments at the Medical School and a scientific mentoring award that spanned the university. Dr. Mashour has given educational lectures across numerous departments at the University of Michigan and has been invited to lecture nationally and internationally; he has also chaired and co-chaired major international conferences in his field. Dr. Mashour has played a leadership role nationally in terms of fellowship training for neuroanesthesiology, having published a study on neuroanesthesiology fellowship education that led to the drive for accredited and standardized fellowships. He also led the development and publication of a standardized curriculum for neuroanesthesiology fellowship training at the national level. Dr. Mashour is an active member of the Neuroscience Graduate Program at the University of Michigan and directs a course on consciousness, his field of expertise. He has mentored numerous graduate students, post-doctoral fellows, and faculty in the field of neuroscience and consciousness studies. He has served on Ph.D. dissertation committees for graduate students in neuroscience (including at the University of Oxford, UK), biomedical engineering, psychology (including at the University of Turku, Finland), and philosophy. In recognition of his accomplishments, he was selected as an

inaugural member of the League of Educational Excellence (2013) at the University of Michigan Medical School.

Research: Dr. Mashour has demonstrated excellence in basic, translational, and clinical neuroscience research, especially as it relates to anesthesiology. He is internationally recognized as an eminent scholar in the field of consciousness, the mechanisms by which general anesthetics suppress consciousness, and intraoperative awareness. He has published over 100 peer-reviewed articles, approximately 60 invited commentaries and chapters, and four major textbooks (Cambridge University Press and Oxford University Press) with another textbook in preparation (Oxford University Press). He has published extensively in major anesthesiology and neuroscience journals, but also in general medical journals such as the *New England Journal of Medicine* and multidisciplinary scientific journals such as the *Proceedings of the National Academy of Sciences*. He has frequently been invited to lecture on consciousness and the mechanisms of anesthesia at the national and international level, including multiple named lectureships. Dr. Mashour has funded his work through nationally competitive grant awards. As a junior faculty, he received a major foundation grant, followed by an NIH KL2 career development award, followed by an NIH R01. While in rank as an associate professor, Dr. Mashour has received a second NIH R01, successfully competed for a renewal of his first NIH R01, and received a prestigious foundation grant (>\$2,000,000). Notably, his grant awards reflect his breadth and expertise as a translational neuroscientist, with externally-funded studies that span computational brain models, rodents, non-human primates, healthy volunteers, and patients. In addition to his individual research grants since becoming associate professor, he was the co-PI of the first departmental NIH T32 award in anesthesiology and, most recently, led the development and submission of the institutional NIH U54 Clinical Translational Science Award (approximately \$60,000,000 with UL1, KL2, and TL1 components). Dr. Mashour has also been named to editorial boards for premiere journals in anesthesiology (e.g., *Anesthesiology*), sleep medicine and neurobiology (*SLEEP*), and translational science (*Science Translational Medicine* and the *Journal of Clinical and Translational Science* as a deputy editor); he has been an ad hoc reviewer for more than 35 journals in the fields of anesthesiology, neuroscience, biomedical engineering, and psychology.

Recent and Significant Publications:

Lee U, Ku SW, Noh GJ, Baek SH, Choi BY, Mashour GA: Disruption of frontal-parietal communication by ketamine, propofol, and sevoflurane. *Anesthesiology* 118:1264-1275, 2013.

Mashour GA, Alkire MT: The evolution of consciousness: phylogeny, ontogeny, and emergence from general anesthesia. *Proceedings of the National Academy of Sciences USA* 110:10357-10364, 2013.

Borjigin J, Lee U, Liu T, Pal D, Huff S, Klarr D, Sloboda J, Hernandez J, Wang MM, Mashour GA: Surge of neurophysiological coherence and connectivity in the dying brain. *Proceedings of the National Academy of Sciences USA* 110:14432-14437, 2013.

Moon JY, Lee U, Blain-Moraes S, Mashour GA: General relationship of global topology, local dynamics, and directionality in simulated and empirical brain networks. *PLoS Computational Biology* 11:e1004225, 2015.

Schroeder KE, Irwin ZT, Gaidica M, Bentley JN, Patil PG, Mashour GA* Chestek C*: Disrupted corticocortical communication during ketamine anesthesia in the primate brain. *Neuroimage* 134:459-465, 2016. (*equal contribution as senior authors)

Service: Dr. Mashour has held a number of leadership positions in the Department of Anesthesiology, including: director of neuroanesthesiology, Neuroanesthesiology Fellowship program director, director of clinical neuroscience research, associate chair for faculty affairs, and (most recently) associate chair for research. Since his last promotion, Dr. Mashour has taken on major institutional leadership roles, including: director of the Center for Consciousness Science (a multidisciplinary center he founded in 2014), associate dean for clinical and translational research, director of the Michigan Institute for Clinical and Health Research, and executive director of translational research (spanning all schools and campuses). Dr. Mashour has served on multiple institutional committees and national committees and has been elected president (October 2016) of the premier international subspecialty society of neuroanesthesiology (Society for Neuroscience in Anesthesiology and Critical Care).

Professional Work: Dr. Mashour is a fellowship-trained neuroanesthesiologist who has recognized expertise in the perioperative care of neurosurgical patients. He is consulted for the most complex cases in neurosurgery, especially complex intracranial aneurysms and major spine surgery. As the former director of neuroanesthesiology, Dr. Mashour facilitated the care of patients with neurologic disease by establishing a number of perioperative protocols, including care plans for subarachnoid hemorrhage patients, deep brain stimulator cases, spinal cord stimulator cases, delayed emergence guidelines, neurocritical care policies and others. Recently, he led a national consensus statement on the care of surgical patients at high risk of stroke. Dr. Mashour expanded the scope of neuroanesthesiologist practice at the University of Michigan by being the first to rotate regularly as an attending neurointensivist in the neurosurgical intensive care unit. Dr. Mashour's expertise as a clinical neuroanesthesiologist is recognized nationally and internationally, as evidenced by his invited lectures on topics related to clinical neuroanesthesia.

External Reviewers:

Reviewer A: "To cut to the chase, Dr. Mashour is one of the most outstanding academic anesthesiologists in our field today. I would rank him certainly in the top ten...He has had and continues to have unsurpassed impact on our fundamental understanding of consciousness and the mechanisms whereby anesthetics ablate consciousness. His work in this area has not only led to important fundamental scientific advances but has also had direct clinical impact on how anesthesiologists monitor levels of consciousness under anesthesia in order to avoid the potentially devastating complication of intraoperative awareness."

Reviewer B: "To say that he is a star in systems neuroscience is an understatement, and I am confident he will be recognized in the next decade as an international leader in science by awards including the National Academy of Medicine and major prizes in science in general and

neuroscience in particular...His NIH funding is outstanding and his ability to organize large projects and promote careers has been recognized by the University of Michigan with academic leadership appointments at the very highest level of your institution.”

Reviewer C: “He is among the top 1-3% of all of physician scientists in anesthesia departments in his generation.”

Reviewer D: “My overall impression of Dr. Mashour and his academic output is outstanding. He is a leader in the field and has an international reputation both within anesthesiology and beyond. He is one of the stars in the science of anesthesia with landmark contributions in the basic science, translational and clinical arenas. There are few that can match these accomplishments in academic medicine as a whole, much less in anesthesiology. The sustained quality, quantity, focus and scholarly impact of Dr. Mashour’s work as a physician-scientist in his 9 years as a faculty member is truly amazing....He is an outstanding and respected clinician-scientist who will continue to be a leader in anesthesiology.”

Reviewer E: “The breadth of his published work shows that he is in the forefront of international scientific and clinical research into the many facets of anesthesia, sleep, and consciousness. His standing in this research community is unequalled.”

Reviewer F: “George’s scholarly work is not only substantial, but transformative. He has made invaluable contributions in how we understand the actions of anesthetics on the brain and consciousness....His work on anesthetic mechanisms on large scale brain networks is, in my opinion, iconic.”

Summary of Recommendation:

Dr. Mashour is recognized nationally and internationally as a star in the field of anesthesiology who has made invaluable contributions to many areas of medicine. He is an enormous asset to both his department and our institution. I am, therefore, delighted to highly recommend George A. Mashour, M.D., Ph.D. for promotion to professor of anesthesiology, with tenure, Department of Anesthesiology, and professor of neurosurgery, without tenure, Department of Neurosurgery, Medical School.



Marschall S. Runge, M.D., Ph.D.
Executive Vice President for Medical Affairs
Dean, Medical School

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