

George A. Mashour, M.D., Ph.D., Recipient of the 2011 Presidential Scholar Award

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APPROXIMATELY 5 yr ago I received an e-mail from a senior resident at the Massachusetts General Hospital inquiring about our fellowship in neuroanesthesiology and the possibility of a faculty position to follow. As I quickly reviewed the writer's curriculum vitae, it was evident that this was not a typical resident applying for a fellowship nor even a typical academic faculty applicant. If the "M.D., Ph.D." and two Fulbright Scholarships didn't give it away, the solo-authored paper in *ANESTHESIOLOGY* as a Clinical Anesthesia-1 resident surely did; this was an exceptional person. I am very proud to have the opportunity to write this letter of notification informing you that Dr. George Mashour is the recipient of the 2011 Presidential Scholar Award. I was once told by my Ph.D. advisor, "Don't sharpen needles for a career." In other words, dedicate your academic career to exploring an important unanswered question. George Mashour has done exactly that—his focused area of interest is the fundamental understanding of consciousness.

After studying philosophy as an undergraduate, George began his medical and scientific training in the combined M.D./Ph.D. program at Georgetown University. George studied neurooncology under Dr. Robert Martuza, M.D., F.A.C.S. (currently Professor and Chair of Neurosurgery, Massachusetts General Hospital and Harvard Medical School), who is internationally renowned for his work on the molecular genetics of nervous system tumors. For his doctoral dissertation, George characterized the angiogenic phenotype of Schwann cells lacking the tumor suppressor gene neurofibromin in both animal models and humans and was also the first to investigate experimental viral therapy for peripheral nerve sheath tumors.¹⁻³ George served two fellowships at the National Institute of Neurological Disorders and Stroke (Bethesda, Maryland) during graduate school and was the recipient of several research awards.

Between his doctoral work and clinical years of medical school, George was a Fulbright Scholar in Neuroscience at the Max Delbrück Center for Molecular Medicine in Berlin, Germany, where he studied Schwann cell development. He



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then returned to Georgetown to complete his medical studies and subsequently graduated, receiving the Francis L. Clark Award in Psychiatry and the Stacey L. Rollins Award in Neurosurgery. After his internship at Harvard Medical School, he completed a second Fulbright Scholarship in Neuroscience at the University of Bonn, Germany, where he identified a novel role of fatty acid signaling in malignant peripheral nerve sheath tumors.⁴ He then completed his residency in anesthesiology at Massachusetts General Hospital and Harvard Medical School, finishing his clinical training as a Chief Resident. After his chief residency, George came to the University of Michigan as a Fellow in Neuroanesthesiology and joined our faculty as an Assistant Professor in July 2007. He is currently the Director of Neuroanesthesiology at our institution and holds secondary faculty appointments in neurosurgery and neuroscience.

As stated, George has dedicated his investigations to the understanding of consciousness. This began with his special article in *ANESTHESIOLOGY*, "Consciousness Unbound: Toward a Par-

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Submitted for publication June 29, 2011. Accepted for publication June 29, 2011.

One or more authors of this peer-reviewed article have been supported by FAER. In conjunction with the FAER 25th anniversary, articles and editorials in the *ANESTHESIOLOGY* October 2011 issue celebrate the accomplishments of FAER. For additional information visit www.FAER.org.

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adigm of General Anesthesia” as a Clinical Anesthesia-1 resident, and was followed by a solo-authored article on consciousness published in *Anesthesia & Analgesia* during his chief residency.^{5,6} What has impressed me most about his career to date is his ability to address the very fundamental question of consciousness from the theoretical, computational, experimental, and clinical research perspectives.

How would one actually go about trying to understand the mechanisms of human consciousness? George has approached this question by collaborating with physicists and anesthesiologists in both the United States and South Korea to use graph theory as a method for studying the brain networks of humans undergoing anesthetic state transitions.^{7,8} According to an editorial accompanying one of his recent articles, the work from George’s research group has “introduced a novel quantitative method that promises to provide a framework for mechanistic studies over the coming years” and furthermore “has moved us one step closer to directly measuring the neural substrate of consciousness.”⁹ In his animal research, he explores sleep and general anesthesia; George’s work has demonstrated that the functional relationship between the two is state-specific and drug-specific.^{10,11} Finally, at the clinical research level, he has conducted major studies of intraoperative awareness, in close collaboration with Dr. Michael Avidan, M.B.B.Ch., D.A., F.C.A., of Washington University (St. Louis, Missouri). Together, George and Michael have conducted two randomized controlled trials in more than 25,000 patients at six hospitals across four institutions in a research program supported by the Foundation for Anesthesia Education and Research (FAER), the American Society of Anesthesiologists (ASA), and the National Institutes of Health (NIH).^{12,13} During the course of these trials, George has published numerous articles on awareness,^{14–20} but the first major paper resulting from the Avidan-Mashour collaboration will appear in the *New England Journal of Medicine*. George has been invited to lecture nationally and internationally on the subject of consciousness, awareness, and anesthesia. In total, he has more than 90 articles, reviews, invited commentaries, and book chapters either published or in press. Since starting as a faculty member, he has also edited three textbooks related to anesthesia and the neurosciences (published by Cambridge University Press and Oxford University Press).^{21–23}

In addition to these impressive accomplishments at the bench and bedside as a true translational researcher, George is also a superb clinician, teacher, and administrator. If there ever was a “quadruple threat,” George Mashour is that individual. George has received resident teaching awards in both the Department of Anesthesiology and the Department of Neurosurgery at the University of Michigan and conducts a course on consciousness for the Neuroscience Graduate Program. Although he is a relatively junior faculty member, he has mentored numerous students, residents, postdoctoral fellows, clinical anesthesia fellows, and faculty. In the past several years he has helped his mentees publish peer-reviewed

articles and win national research awards. He serves on the editorial boards of *Anesthesia & Analgesia*, *Journal of Neurosurgical Anesthesiology*, and *Science Translational Medicine* (sister journal of *Science*) and has been an *ad hoc* reviewer for more than 20 journals in the fields of anesthesiology, psychology, and neuroscience. He also serves on the Board of Directors of the Society for Neuroscience in Anesthesiology and Critical Care and on numerous American Society of Anesthesiologists committees related to clinical and experimental neuroscience. Along with all of these accomplishments, George is an excellent lecturer, with an engaging style and a disarming sense of humor.

I feel very fortunate to have Dr. Mashour as a member of our faculty—and a member of our specialty.

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