PROMOTION RECOMMENDATION
THE UNIVERSITY OF MICHIGAN
MEDICAL SCHOOL
DEPARTMENT OF ANESTHESIOLOGY

UnCheol Lee, Ph.D., assistant professor of anesthesiology, Department of Anesthesiology, Medical School, is recommended for promotion to associate professor of anesthesiology, with tenure, Department of Anesthesiology, Medical School.

Academic Degrees
Ph.D.   2006   Pohang University of Science and Technology, Republic of Korea
M.S.   1999   Inje University, Republic of Korea
B.S.   1994   Gyeongsang National University, Republic of Korea

Professional Record
2019 - present   Assistant Professor of Anesthesiology, University of Michigan
2014 - 2019   Research Assistant Professor of Anesthesiology, University of Michigan
2011 - 2014   Research Investigator of Anesthesiology, University of Michigan

Summary of Evaluation:
Teaching: Dr. Lee mentors post-doctoral fellows, undergraduate students, and graduate students. Among the graduate students, six visited his lab from South Korea to learn computational and analytic skills, funded by external grants. He has been recruited to participate in dissertation committees and as an external thesis examiner at the University of Michigan, Monash University, and the University of Queensland. Dr. Lee has provided collegial support to departmental faculty members and two visiting professors, helping them with manuscript and grant writing and transferring technologies and the know-how of his lab to extend their work. Earlier this year, he accepted an affiliated faculty position in the Center for Complex Systems, in the College of Literature, Science, and the Arts, and will teach undergraduate and graduate students in physics, math, and psychology, as well as in the neuroscience program. Dr. Lee has been invited to present at both domestic and international workshops and conferences, including keynotes at an international conference and a colloquium held by the Department of Physics and Astronomy at Western University in Ontario, Canada.

Research: Dr. Lee is viewed as a leader in the field of anesthesiology and consciousness with 42 publications in peer-reviewed journals and invitations to speak at national and international conferences and universities. Dr. Lee has secured his own grant funding and collaborates with many colleagues in the department, including support for their grant proposals. He has been a co-principal investigator and co-investigator on seven major grants during the past five years. As a co-principal investigator on one NIH R01 grant, he has been working to identify the role of brain connectivity during consciousness and anesthesia with a computational model and analytic tools. In another NIH R01 project where he serves as a co-principal investigator, he is attempting to identify the mechanism underlying the hypersensitivity associated with fibromyalgia and to find an effective brain stimulation method to reduce this hypersensitivity. He is also participating in two other R01 proposals contributing to the computational and analytic parts thereof that aim to

study the effect of anesthesia on the developing brain in adolescence and the effect of caffeine on delirium and the recovery of cognitive function. Beyond the scope of anesthesia study, the method he is developing will be applied to other systems such as financial markets and epileptic seizures to predict and modulate catastrophic crises. Dr. Lee has organized an interdisciplinary research team including an economist at Chosun University in South Korea and a neurologist at the McGovern Medical School at the University of Texas with a research proposal being submitted to the Catalyst Grant Program of the Michigan Institute for Computational Discovery and Engineering.

Recent and Significant Publications:
Kim M, Lee UC: Alpha oscillation, criticality, and responsiveness in complex brain networks. *Netw Neurosci* 4(1): 155-173, 2020. PM32043048/PMC7006877

Kaplan CM, Harris RE, Lee UC, DaSilva AF, Mashour GA, Harte SE: Targeting network hubs with noninvasive brain stimulation in patients with fibromyalgia. *Pain* 161(1): 43-46, 2020. PM31490327

Kim H, Lee UC: Criticality as a determinant of integrated information in human brain networks *Entropy* 21 (10): 981, 2019.

Lee H, Golkowski D, Jordan D, Berger S, Ilg R, Lee J, Mashour GA, Lee UC: RecCognition Study Group: Relationship of critical dynamics, functional connectivity, and states of consciousness in large-scale human brain networks *NeuroImage* 188: 228-238, 2019. PMID: 30529630

Kim JH, Moon JY, Lee UC, Kim S, Ko TW: Various synchronous states due to coupling strength inhomogeneity and coupling functions in systems of coupled identical oscillators *Chaos: An Interdisciplinary Journal of Nonlinear Science* 29(1): 011106, 2019. PM30709108

Service: Dr. Lee is the associate director at the Center for Consciousness Science (CCS) at the University of Michigan Medical School where he assists with organizing lectures, workshops, and conferences. He has served on two journal editorial boards, *Symmetry* and *Frontier Applied Mathematics*, is an ad hoc reviewer for numerous interdisciplinary journals and has been invited to serve as an external reviewer for the Discovery Grants Program of the Natural Sciences and Engineering Research Council of Canada.

External Reviewers:
Reviewer A: "My assessment is that Dr. Lee has had a substantial impact on anesthesiology. He uses sophisticated quantitative methods to describe brain states in various altered states of consciousness…This work has the potential to transform care and prognosis for millions of people suffering from chronic pathological pain…Dr. Lee has a unique combination of skills, and he is recognized within both anesthesiology and neuroscience as an exceptional innovator and contributor."

Reviewer B: "Dr. Lee is one of the brightest young neuroscientists in the field of anesthesia research today. He has made significant contributions to the field to date and is poised to be a leader in the field over the next several decades…Dr. Lee is an enormously talented scientist who

has wielded substantial impact on the field of anesthesia mechanisms research in a short amount of time. His research output has been prodigious, and his potential for future productivity and leadership is unusually high."
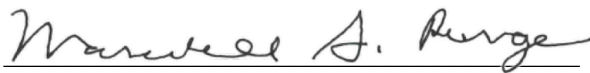
Reviewer C: "He [sic] successes in obtaining extramural funding are superb and he appears on a very strong trajectory. I consider quantity and quality of his academic work on par with science faculty granted tenure at peer institutions…I consider quantity and quality of his academic work on par with science faculty granted tenure at peer institutions."

Reviewer D: "Without a shadow of a doubt, Dr. Lee's work was nothing short of transformative. I strongly believe that Dr. Lee would have been tenured at my home institution…which has an extremely rigorous tenure process…I believe that altogether UnCheol's work fundamentally transformed our understanding of mechanisms of anesthetic-induced unconsciousness."

Reviewer E: "UnCheol's standing is very high, as he is respected for the originality and thoroughness of his ground-breaking analysis techniques…UnCheol's work is outstanding, and he would definitely be appointed to the position of Associate Professor with tenure at [my institution]."

Summary of Recommendation:
Dr. Lee is a talented scientist, and excellent mentor who has made a substantial impact on the field of anesthesia mechanisms research. I am pleased to recommend UnCheol Lee, Ph.D. for promotion to associate professor of anesthesiology, with tenure, Department of Anesthesiology, Medical School.

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Marshall S. Runge, M.D., Ph.D.
Executive Vice President of Medical Affairs
Dean, Medical School

May 2022