PROMOTION RECOMMENDATION
The University of Michigan
College of Literature, Science, and the Arts

Victoria Booth, assistant professor of mathematics, College of Literature, Science and the Arts, and assistant professor of anesthesiology, Medical School, is recommended for promotion to associate professor of mathematics, with tenure, College of Literature, Science and the Arts, and associate professor of anesthesiology, without tenure, Medical School.

Academic Degrees:

Ph.D.	1993	Northwestern University
M.S.	1990	Northwestern University
B.A.	1986	Smith College

Professional Record:

2007 – present	Assistant Professor, Department of Mathematics and Department of Anesthesiology, University of Michigan
2004 – 2007	Non-tenure-track Assistant Professor, Department of Mathematics, and Assistant Research Professor, Department of Anesthesiology, University of Michigan
2002 – present	Associate Research Professor, Center Applied Mathematics and Statistics, New Jersey Institute of Technology
1996 – 2002	Assistant Professor, Department of Mathematical Sciences, New Jersey Institute of Technology
1993 – 1996	Post-doctoral Fellow, Mathematical Research Branch, National Institutes of Health

Summary of Evaluation:

Teaching – Professor Booth has an excellent record of teaching a variety of applied mathematics courses at the undergraduate and graduate levels and students have given her very strong ratings. Her major contribution to the teaching mission of her department has been a 500-level course entitled "Computational and Mathematical Neuroscience," which she developed and has been teaching since fall 2008. Professor Booth has done an unusual amount of supervision of undergraduate research projects, and two of these have resulted in publications in peer-reviewed journals. She is currently advising two Ph.D. students in the Department of Applied and Interdisciplinary Mathematics (AIM) graduate program.

Research – Professor Booth's research area is computational neuroscience, especially its applications to understanding sleep-wake mechanisms. She has achieved considerable prominence in her field as evidenced by her invited talks, funding, and publication record. Professor Booth has been very successful at getting her work published in the top journals in her field. She has had considerable success in attracting funding for her research program from diverse sources – she was the principal investigator (PI) on a large grant from the Air Force of Scientific Research and is currently the PI on an unusually large grant from the National Science Foundation.

Recent and Significant Publications:

"Fast-slow analysis of REM sleep dynamics," with C. Diniz Behn, *SIAM Journal on Applied Dynamical Systems*, 11, 2012, pp. 212-242.

"Cellularly-driven differences in network synchronization capacity are differentially modulated by firing frequency," with C. Fink and M. Zochowski, *PLOS Computational Biology*, 7: e1002062, 2011.

"Understanding effects on excitability of simulated Ih modulation in simple neuronal models," with A. Lippert, *Biological Cybernetics*, 101, 2009, pp. 297-306.

"Compartmental model of vertebrate motoneurons for Ca^{2+} dependent spiking and plateau potentials under pharmacological treatment," with O. Keihn and J. Rinzel, *Journal of Neurophysiology*, 78, 1997, pp. 3371-3385.

Service – Professor Booth has served in important positions and on important committees in her department and is currently a college representative to the University Senate Assembly. To the broader community she serves on the Program Committee for SIAM and is treasurer of the Organization for Computational Neurosciences. She is also a reviewer for many top journals in her field.

External Reviewers:

Reviewer (A)

"Victoria is a well-respected interdisciplinary mathematical/computational neuroscientist with particular strengths in dynamical systems theory and applied modeling. I would rank Victoria comparable to several researchers with tenure…"

Reviewer (B)

"Victoria's work has taken this idea and produced a mathematically plausible instantiation of the flip-flop switch that agrees with several key experimental observations. The REM analysis is a good example. Without Victoria's work, it is clear to me that the flip-flop switch model of REM-non-REM cycling did not have a credible leg to stand on. Her research is a significant contribution to the field of sleep medicine. For these reasons, I restate my strong support for her promotion to tenure as an associate professor."

Reviewer (C)

"Dr. Booth is one of the rare researchers who uses her deep mathematical knowledge to address important questions about neural systems – especially the sleep-wake regulatory system. Her recent publication in SIAM J. Applied Dynamical Systems is a particularly strong example of this."

Reviewer (D)

"Her joint appointment singles her out as a rare individual that can effectively translate ideas between disciplines. In this sense she has an almost unique standing, as I cannot think of others in a similar position."

Reviewer (E)

"She has accumulated an impressive vita and has shown that she can comfortably work in both the neuroscience and mathematics worlds. I recommend her with no reservations."

Reviewer (F)

"Victoria Booth is an excellent researcher who has made important contributions to the mathematical analysis of network dynamics in cortical structures. She has been highly successful both in publishing important peer-reviewed articles and obtaining substantial research funding from NIH and NSF. Her publications have had an important, positive impact on the field..."
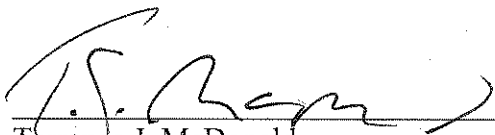
Reviewer (G)

"...Victoria is known most for her work on sleep-wake regulation. The mathematical understanding of this regulation was at a very unsophisticated level prior to the work of Victoria and Cecilia Diniz Behn. ... Their work has pioneered the use of dynamics of the eurotransmitters that are critical for the sleep-wake transitions."
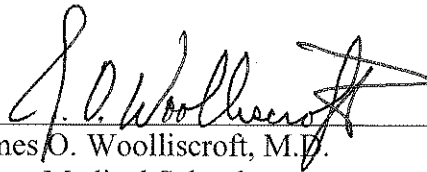
Reviewer (H)

"...Dr. Booth has worked on some of the deepest and most fascinating problems in neuroscience: sleep and how network dynamics arise from the properties of network neurons and their synaptic interactions."

Summary of Recommendation:

Professor Booth has a very active interdisciplinary research program in mathematical neuroscience, and is recognized as a leading researcher in her field. Her teaching record is consistently excellent and she has provided important service to her department and her discipline. The Executive Committees of the College of Literature, Science, and the Arts and the Medical School and we recommend that Assistant Professor Victoria Booth be promoted to the rank of associate professor of mathematics, with tenure, College of Literature, Science, and the Arts, and associate professor of anesthesiology, without tenure, Medical School.

Terrence J. McDonald
Arthur F. Thurnau Professor,
Professor of History and Dean
College of Literature, Science, and the Arts

James O. Woolliscroft, M.D.
Dean, Medical School

May 2013