Approved by the Regents
May 17, 2018

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

Victoria Booth, associate professor of mathematics, with tenure, College of Literature, Science, and the Arts, is recommended for promotion to professor of mathematics, with tenure, College of Literature, Science, and the Arts [also 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:

2013 – present	Associate Professor, Department of Mathematics (with tenure) and Department of Anesthesiology (without tenure), University of Michigan
2007 – 2013	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 – 2004	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's teaching record is very good. Because her appointment is split between mathematics and anesthesiology, she teaches three course every two years in the Department of Mathematics. Student evaluations give her very strong scores on the "excellent instructor" question with median scores ranging from 4.25 to 4.90. These include high scores in service courses that are not always popular with students. In addition to the service courses, Professor Booth designed and taught a new course, "Mathematical and Computational Neuroscience." Since her last promotion, she has supervised a post-doctoral researcher, two doctoral students, a master's student, and five undergraduate researchers.

Research – Professor Booth has established herself as an international leader in a broad area of mathematical neuroscience. She is recognized for working with experimentalists to build accurate mathematical models of biological phenomena and for carrying out technically complex mathematical analyses of these models. Her research has produced valuable biological information, including results that surprised biologists. The value of Professor Booth's research is enhanced by her ongoing collaboration with experimentalists. Her work is held in high regard by the neuroscience community.

Recent and Significant Publication:

"One-dimensional map for the circadian modulation of sleep in a sleep-wake regulatory network model for human sleep," with I.J. Xique and C.G. Diniz Behn, *SIAM Journal on Applied Dynamical Systems*, 16, 2017, pp.1089–1112.

"Interplay between excitability type and distributions of neuronal connectivity determines neuronal network synchronization," with S. Mofakham, et al., *Physical Review E*, 2016, 94:042427.

"Synaptic loss and synaptic plasticity in heterogeneous neural networks," with S. Knudstrup and M. Zochowski, *Journal of Complex Networks*, 4(1), 2016, pp. 115–126.

"Neuronal model hand-tuning," in Encyclopedia of Computational Neuroscience-Volume1, D. Jaeger and R. Jung, co-eds., Springer, 2015.

Service – Professor Booth has carried out rather heavy service duties within the Department of Mathematics, the university, and in the broader community. Since her last promotion in 2013, she has served on the committee that oversees the progress of all Ph.D. students in mathematics, as a counselor for undergraduate students, on a search committee for an interdisciplinary faculty position, on four National Science Foundation grant review panels, and she has organized several workshops.

External Reviews:

Reviewer (A)

"…Victoria has built a solid and productive research program and indeed has made a name for herself as the primary theorist in her area of research. This success has been facilitated by the establishment of a solid collaboration with an experimental neuroscientist, and is reflected in her continued funding from the NSF."

Reviewer (B)

"Dr. Booth's scholarly accomplishments are of the highest order. …let me highlight two important aspects of it. First, the research program she has developed is logically consistent and constantly at the forefront of mathematical and computational neuroscience. Second, her work has been funded by both NSF and NIH over a large number of years, a notable and difficult achievement in this highly-competitive funding environment."

Reviewer (C)

"I would rank Victoria comparable to [a colleague] … who has recently been promoted to Full Professor at the Department of Mathematics… …I am very happy to support Victoria's promotion to Full Professor, particularly given the relative scarcity of successful joint appointments between mathematics and the life sciences."

Reviewer (D)

"In the 1970s and 1980s, modeling of sleep dynamics was an active area of research. … Despite the increase in the amount of new experimental data in sleep research, the modeling work has lagged considerably behind. Victoria's work has taken a fresh look at this problem. …it has revived this field. Victoria's research has focused specifically on developing models of the sleep-wake regulation that allow the inclusion of the recent details on neurotransmitters and realistic neuronal architectures in these circuits. … This work demonstrates the vital role that formal mathematical modeling can play in giving new insights into a network in which many neurophysiological experiments have already been done."

Reviewer (E)
"Dr. Booth's research contributions fall primarily into two realms: development of models to study specific neuronal networks, and numerical and mathematical studies of how synchronization properties depend on generic network/single cell properties. Her research in both areas is outstanding – as evidenced by publications in top journals…"

Reviewer (F)
"The quality of Victoria's work in Mathematical and Computational Neuroscience is high, and its interdisciplinary nature means that it is visible in experimental neuroscience. From the mathematical side, she is well known in the applied community for her work on a fast-slow analysis of the dynamics of REM sleep. From the physiological side, I fully expect that her work on sleep-wake regulatory networks will form the basis for further experimental work. …I have no doubt that Victoria will continue to develop novel interdisciplinary work…"

Reviewer (G)
"Dr. Booth has been stellar in her contributions to the community and her discipline. She has reviewed for many important journals as well as been on several review panels for grants. … She has contributed to several book volumes and encyclopedias. Her service to the University appears to be exemplary."

Reviewer (H)
"Prof. Victoria Booth is well known and respected on both a national and an international level. She is known for her high quality publications which present important and influential mathematical models."

Summary of Recommendation:
Professor Booth has built a reputation as an internationally recognized leader in her research area. She has contributed strongly to the teaching mission of her department, including research mentoring and the development of a new course, and she carried out heavy service responsibilities. The Executive Committee of the College of Literature, Science, and the Arts and I recommend that Associate Professor Victoria Booth be promoted to the rank of professor of mathematics, with tenure, College of Literature, Science, and the Arts.

Andrew D. Martin, Dean
Professor of Political Science and Statistics
College of Literature, Science, and the Arts

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

May 2018