Approved by the Regents May 21, 2015

PROMOTION RECOMMENDATION
THE UNIVERSITY OF MICHIGAN
COLLEGE OF LITERATURE, SCIENCE, AND THE ARTS

Orie Shafer, assistant professor of molecular, cellular, and developmental biology, College of Literature, Science, and the Arts, is recommended for promotion to associate professor of molecular, cellular, and developmental biology, with tenure, College of Literature, Science, and the Arts.

Academic Degrees:

Ph.D.	2003	University of Washington
B.S.	1996	Purdue University

Professional Record:

2009 – present	Assistant Professor, Department of Molecular, Cellular, and Developmental Biology, University of Michigan
2003 – 2009	Post-doctoral Fellow, Washington University Medical School

Summary of Evaluation:

Teaching – Professor Shafer has established himself as a dedicated and successful educator. He has been a leader in the development of novel learning approaches for undergraduate education, and has worked closely with the Center for Research on Learning and Teaching to develop active learning methods using Google's suite of online applications. As a result, he was invited to present these efforts at the Provost's Seminar on Teaching (2012, 2014). His primary teaching assignments have been the large enrollment course, "Principles of Animal Physiology and Neurobiology," which is a core requirement for neuroscience majors, and a small enrollment upper level specialty course that he developed, "Genes, Circuits, and Behavior." He has been an excellent mentor to trainees in his laboratory and they have been deeply influenced by his positive and careful approach to their training and personal development.

Research – Professor Shafer's research seeks to understand how the neural circuitry that governs circadian activity in animals is organized. Using the fruit fly *Drosophila melanogaster*, he developed a novel method for observing active neural circuits in the living fly brain that is now widely used by the fly neurobiology community. In recent work published in *Science,* Professor Shafer used this approach to challenge the doctrine that circadian rhythms were driven by a single oscillator in the brain. Instead, he showed that there are multiple oscillators that interact to coordinate rhythms. These and other findings will have far reaching impact on our understanding of how neural circuits function to control behavioral and physiological rhythms timed to light-dark cycles in diverse species including humans. His level of productivity is excellent. He has major grants from the National Institutes of Health and the National Science Foundation, and has been an invited speaker at several international conferences and universities. He is clearly considered to be one of the top investigators of his cohort in the circadian biology field.

Recent and Significant Publications:

"The *Drosophila* circadian clock is a variably coupled network of multiple peptidergic units," with Z. Yao, *Science*, 343(6178), 2014, pp. 1516-1520.

"Remote control of renal system function by the intestinal neuropeptide pigment-dispersing factor in *Drosophila*," with A. Talsma, et al., PNAS USA, 109, 2012, pp. 12177-12182.
"Analysis of functional Connectivity in the *Drosophila* brain," with Z. Yao, et al., *Journal of Neurophysiology*, 108, 2012, pp. 684-696.
"Reciprocal cholinergic and GABAergic modulation of the Small ventrolateral pacemaker neurons of *Drosophila*'s circadian clock neuron network," with K. R. Lelito, *Journal of Neurophysiology*, 107, 2012, pp. 2096-2108.

Service – Professor Shafer has participated in significant service at local and national levels. He served on the departmental Graduate Studies Committee where he advised beginning graduate students and helped set policy for the graduate program. He was also a member of the Neuroscience Graduate Program Graduate Admissions Committee and served on two faculty search committees. At the national level, he was a member of three grant proposal review panels for the National Science Foundation.

External Reviewers:
Reviewer (A)
"Orie has something extra to bring to the table – a really incredible knack for getting to important and unexplored questions. … He has redirected our thinking on the structure of the clock oscillators, he has found new peripheral tissue roles for peptides thought to function only in particular central circuits and he has made technical contributions that will materially aid everyone working in the fly brain."

Reviewer (B)
"…[circadian clock circuitry] is a highly competitive area within the circadian rhythms field, yet Dr. Shafer has established himself as an important player over the last few years. … This [2014 Yao et al., *Science*] paper would certainly hit my list of the most significant articles published recently in my field, and will undoubtedly be highly cited."

Reviewer (C)
"…I believe that the prospects for the future are excellent. … While most of the genes involved in the central clock have probably been identified, the analysis of the neural circuits and their complicated interrelationships is relatively new and I have confidence that the Shafer lab will be among the leaders in the field making significant contributions."

Reviewer (D)
"His most recent paper that appeared in *Science* is a masterpiece of careful research demonstrating how the clock neurons talk to each other. This paper is on the top of my list of the most significant papers in the field."

Reviewer (E)
"Not only has his work made…contributions to our understanding of the fly circadian system but the methods he has introduced have also been adopted by neuroscientists working in other areas. … Although his independent publication record is well above the quantitative bar for tenure in my opinion (number of independent papers), it is qualitatively that it really shines. His *Science*

paper is a real landmark for the field. Conceptually and methodologically, it has had a remarkable impact in the short time since publication."

Reviewer (F)
"I have always thought highly of Orie, and that opinion has only improved over time. He has distinguished himself as a circadian neurobiologist, and is known for his expertise and his accomplishments in the area of clock circuits."

Reviewer (G)
"Orie put these all together in his recent *Science* paper, which was a technical tour-de-force, and a landmark in fly circadian rhythms. … This is some of the best work in the field of aggregate cellular pacemakers that has been published to date. … Orie's work is marked by thoughtful design, exquisite prosecution…and clear and thoughtful discussions. He is clearly among the emerging leaders in this field…"

Summary of Recommendation:
Professor Shafer has made important discoveries in his research and is a respected leader in his field. He has also demonstrated an exceptional commitment to undergraduate teaching and mentorship, and his service to his department and the university is exemplary. The Executive Committee of the College of Literature, Science, and the Arts and I recommend that Assistant Professor Orie Shafer be promoted to the rank of associate professor of molecular, cellular, and developmental biology, with tenure, College of Literature, Science, and the Arts.

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

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