Approved by the Regents
May 21, 2020

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

Kevin Wood, assistant professor of biophysics, and assistant professor of physics, College of Literature, Science, and the Arts, is recommended for promotion to associate professor of biophysics, with tenure, and associate professor of physics, without tenure, College of Literature, Science, and the Arts.

Academic Degrees:

Ph.D.	2007	University of California, San Diego
M.S.	2003	University of California, San Diego
B.S.	2001	Centre College, Danville, KY

Professional Record:

2013 – present	Assistant Professor, Biophysics Program and Department of Physics, University of Michigan
2008 – 2013	Postdoctoral Fellow, Applied Physics, Molecular and Cellular Biology, Harvard University
2007	Postdoctoral Fellow, Chemistry and Chemical Biology, Harvard University

Summary of Evaluation:
Teaching – Professor Wood is a dedicated teacher who has performed consistently at and above expectations with regards to course load and course assignments. He has taught a full load (in Biophysics this is one course per semester) with significant variety (five different courses during his pre-tenure assignments) across the undergraduate and graduate curriculum. His teaching evaluations are above average and increasing as he teaches a course more than once, now positioning him in the upper quartile of those teaching in Biophysics or comparable courses. He is an outstanding mentor to undergraduate, graduate, and post-graduate trainees.

Research – Professor Wood's laboratory combines theoretical approaches from statistical physics with experiments on living microbial (bacterial) colonies to understand the emergent cooperative behavior in response to antibiotics and the development of antibiotic resistance. Significant results are emerging from his work on bacterial biofilms and the influence of sub-inhibitory concentrations of antibiotics on these biofilms. These studies have potential for clinical importance. Professor Wood's laboratory also developed mathematical models based on their experiments demonstrating how cooperation between sensitive and resistant cells shapes the architecture of biofilms in response to antibiotics. In studies in this vein, Professor Wood's laboratory examined the origins of the inoculum effect, wherein cell density can modulate antibiotic inhibition and subsequently the evolution of resistance in bacterial populations, and extended these ideas to demonstrate how competition between the dynamics of bacterial subpopulations and the environment can shape community-wide resistance to antibiotic influx.

Recent and Significant Publications:

"Antibiotics can be used to contain drug-resistant bacteria by maintaining sufficiently large sensitive populations," with E. Hansen, et al., *PLoS Biology* (accepted pending format changes), 2020.

"Antibiotic interactions shape short-term evolution of resistance in E. faecalis," with Z. Dean, et al., *PLOS Pathogens*, 16 (3), e1008278, 2020.

"Using selection by non-antibiotic stressors to sensitize bacteria to antibiotics," with J. Maltas, et al., *Molecular Biology and Evolution*, DOI:10.1093/molbev/msz303 (2019).

"Evolution in alternating environments with tunable inter-landscape correlations," with J. Maltas, et al., Submitted, preprint bioRxiv, 2019, DOI: 10.1101/803619.

Service – Professor Wood's service to the department, university, and scientific community are excellent. He has served on numerous key departmental committees, including faculty searches, graduate admissions, and the curriculum committee, many student candidacy and thesis committees, and the Biophysics seminar committee. Significantly, Professor Wood has contributed to the college's and unit's DEI effort through the NextProf Science Program in LSA, by representing Biophysics at SACNAS, and through his involvement in the Conference for Undergraduate Women in Physics. Professor Wood remains an active member of the Biological Networks cluster. He also regularly reviews manuscripts and grant proposals for the journals and funding agencies relevant to his research foci.

External Reviewers:

Reviewer (A)

"…I consider him to be an intellectual leader in the quantitative study of microbial populations, and in collective dynamics in biophysics more generally… … I am really impressed that he is producing such a diverse array of high quality papers that address many of the most important questions in the field. Despite its challenges, I strongly believe that the path that Prof. Wood has taken is the right one…"

Reviewer (B)

"…what makes his work stand out to me is the way that over the last few years he has combined this rigorous quantitative / theoretical perspective with innovative new experimental tools. Examples of this work include his 2016 *PLoS Computational Biology* and 2017 *bioRxiv* pre-print that make high-throughput antibody dose-response measurements. These experimental approaches are novel and highly complementary to the modeling work, and I consider this integration of high-throughput measurement and careful modeling to be highly significant and important."

Reviewer (C)

"Kevin is one-of-a-kind in this field because of his unique theoretical approach to population genetics experiments. I would say that the originality of Kevin Wood's research lies in having broken from the classic population genetics directions as currently followed by more established groups… Because of his great command of phase-transition frameworks, Kevin has been able to shed new light on hard questions in this field, and in my opinion the work of these other groups cannot compete on the same level as Kevin's refined analyses."

Reviewer (D)
"…I would be thrilled to have Dr. Wood as a collaborator next door and would put him near the top of our list of potential recruits in our department of Microbiology and Molecular Genetics. His NIH MIRA and NSF CAREER awards make him absolutely one of the most recognized and awarded researchers at his career stage, and his exceptional collegiality ensures that he's greatly enriching the productivity of his entire UMich and international research communities."

Reviewer (E)
"I find the quality of Dr. Wood's work to be excellent. His papers include significant results, convey a complete story, and are published in high caliber journals. The powerful combination of experiments, theoretical models, and computer simulations produces models with predictive power that explain experimental observations and lead to fundamental insights."

Reviewer (F)
"…Dr. Wood has been a pioneer in the theoretical and experimental study of the ecoevolutionary response of microbial populations to external antibiotic stressors. This work is embedded within a broader theme of studying how local interactions … produce complex collective dynamics. This work is exciting, rigorous, novel and influential. Additionally, he is an outstanding communicator and an open, collegial person."

Summary of Recommendation:
Professor Wood is a dedicated scholar who is viewed as being creative and productive. He is a developing leader in the area of investigating emergent behavior within microbial populations in response to antibiotic threats. He is also a skilled mentor and teacher, and has been a key contributor to the function of the Biophysics undergraduate and graduate programs. I recommend that Assistant Professor Kevin Wood be promoted to the rank of associate professor of biophysics, with tenure, and associate professor of physics, without tenure, College of Literature, Science, and the Arts.

Susan M. Collins
Interim Provost and Executive Vice
President for Academic Affairs

May 2020