Approved by the Regents
May 20, 2021

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

Julie S. Biteen-Johnsen, associate professor of chemistry, with tenure, and associate professor of biophysics, without tenure, College of Literature, Science, and the Arts, is recommended for promotion to professor of chemistry, with tenure, and professor of biophysics, without tenure, College of Literature, Science, and the Arts.

Academic Degrees:

Ph.D.	2006	California Institute of Technology
M.S.	2003	California Institute of Technology
A.B.	2001	Princeton University

Professional Record:

2017–present	Associate Professor of Chemistry and of Biophysics, University of Michigan
2010–2017	Assistant Professor of Chemistry and of Biophysics, University of Michigan
2006–2009	Post-doctoral Scholar, Stanford University

Summary of Evaluations:

Teaching: Professor Biteen-Johnsen has successfully taught five different courses since promotion including a large service course, multiple undergraduate courses, and a graduate course. The diversity of course assignments is due to her willingness to step in where needed and an eagerness to take on several classes. Even with her exceptionally broad portfolio, she receives very good student evaluations. She has made a number of important content and methods innovations for these courses, and she has been deeply generous in her collaboration in team-taught large introductory courses. As a mentor she has graduated seven Ph.D. students since her last promotion with a variety of good placements. A notable feature of her mentoring is soliciting formal feedback from her students, with the aim of promoting an inclusive atmosphere.

Research: Professor Biteen-Johnsen is well-respected in multiple disciplines for her research developing and applying single molecule fluorescence microscopy. She has three main thrusts in her work: 1) developing single molecule and super-resolution fluorescence microscopy methods to measure proteins in microbial cells with the goal of answering questions about cell function; 2) studying nanoparticle-fluorophore interactions which may improve fluorescent imaging and are of fundamental interest; and 3) developing improved statistical methods for analyzing single-molecule and super-resolution microscopy data to allow improved tracking of movement by single molecules. Her emphasis on microbial cells sets her apart from most of the single-molecule imaging field and is timely due to the interest in the microbiome. She has used her approaches to shed light on how proteins bind to each other in the cell to perform functions such as DNA replication and starch utilization. These applications demonstrate the exciting potential of her novel methods to understand the biochemistry of microbes. The nanoparticle-fluorophore work involves detailed understanding of the interactions of the material and molecule with the goal of creating brighter fluorophores and better tracking their position. A notable technical

advance was development of intracellular fluorophores that function in anaerobes.

Recent and Significant Publications:
Fu, B., Isaacoff, B.P., and Biteen, J.S. (2017). Super-Resolving the Actual Position of Single Fluorescent Molecules Coupled to a Plasmonic Nanoantenna. *ACS Nano*, *11*(9), 8978-8987.

Tuson, H.H., Foley, M.H., Koropatkin, N.M., and Biteen, J.S. (2018). The Starch Utilization System Assembles around Stationary Starch-Binding Proteins. *Biophysical Journal*, *114*, 242-250.

Isaacoff, B.P., Li, Y., Lee, S.A., and Biteen, J.S. (2019). SMALL-LABS: An algorithm for measuring single-molecule intensity and position in the presence of obscuring backgrounds. *Biophysical Journal, 116*(6), 975-982.

Chia, H.E., Zuo, T., Koropatkin, N.M., Marsh, E.N.G., and Biteen, J.S. (2020). Imaging living obligate anaerobic bacteria with fatty-acid-binding fluorescent proteins. *Current Research in Microbial Sciences*, *1*, 1-6.

Service: Professor Biteen-Johnsen has an unusually extensive service record for this promotion. For the department, she served on the Executive (an elected position), Faculty Search, Graduate, and Diversity committees, among others. This year she started as the departmental ombuds. These are all significant time commitments and require a diverse set of skills and vision. For the university, she served on a variety of advisory panels including the Biological Science Scholars Program committee. Her national service includes chairing a Gordon Conference (an elected position), and serving on a DOE advisory committee and the Kavli Microbiome board. She has also served as an officer or on committees in national scientific societies. Finally, she participated in several outreach activities to local and national schools with the goal of promoting science to different groups. Her service on departmental committees was far above that expected for an associate professor. Her outreach activities, especially for women in science, are timely and well-done. With her visibility in the community, she is a valuable ambassador for the department and university.

External Reviewers:
Reviewer (A): "I cannot think of even a single faculty member of her years of independence who became chairs of such prominent meetings, and this is a strong illustration of how well she is received as a [junior] and dynamic leader … Her publication record continues to impress … she has continued to excel in all aspects of academics…"

Reviewer (B): "She is known for careful, technically well-implemented work. Among her peer group, I believe she would be considered a leading biophysical chemist … Professor Biteen is bright and her science is exciting, and I believe she strengthens your already impressive Chemistry program."

Reviewer (C). "… her contributions in tool development in microscopy and image analysis appear outstanding … I find her work rigorous and of high quality. Her single-molecule work on the DNA replisome has been particularly beautiful … I am also very impressed by the staggering

number of services and outreach activities in which she is involved inside and outside the University of Michigan. What a model of citizenship!"

Reviewer (D): "In a nutshell, Julie is a leader in her field who is already operating at the level of a full professor … Her papers are scholarly gems that shine with brilliance and clarity … She has produced important scholarship that the single-molecule community will build upon for years. She is performing an extraordinary amount of disciplinary service, and is widely recognized around the world for her outstanding work."

Reviewer (E): "Julie is regarded as one of the top [junior] leaders in the field of plasmonics with applications in high-resolution imaging and single molecule biology. Her work has developed an international reputation … She is a total go-getter and accurately perceived by the chemistry, biophysics, and plasmonics communities as an enthusiastic, committed, ambitious, and creative thinker."

Reviewer (F): "… Julie's lab initially focused on tool development and now successfully uses those tools to understand how molecular processes inside bacteria work … [Julie is] somebody who doesn't just do great work as a researcher, but as somebody who also fills a leadership role in that community … she has been productive in all areas that are important for success as an academic scholar…"

Summary of Recommendation:
Professor Biteen-Johnsen has developed a respected and well-funded research program that involves inventing and applying techniques for measuring protein dynamics at the single molecule level in living cells. She contributes high quality teaching in all areas of the chemistry department. Her service is exemplary and she has grown into an acknowledged leader in the department and the scientific community. The Executive Committee of the College of Literature, Science, and the Arts and I recommend that Associate Professor Julie S. Biteen-Johnsen be promoted to the rank of professor of chemistry, with tenure, and professor of biophysics, without tenure, College of Literature, Science, and the Arts.

Anne Curzan, Dean
Geneva Smitherman Collegiate Professor of
English Language and Literature, Linguistics,
and Education
Arthur F. Thurnau Professor
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