

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

Julie S. Biteen-Johnsen, assistant professor of chemistry, and assistant professor of biophysics, College of Literature, Science, and the Arts, is recommended for promotion to associate professor of chemistry, with tenure, and associate 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:

2016 – present	Assistant Professor, Program in Biophysics, University of Michigan
2009 – present	Assistant Professor, Department of Chemistry, University of Michigan
2006 – 2009	Post-doctoral Scholar, Stanford University

Summary of Evaluations:

Teaching – Professor Biteen-Johnsen has successfully taught large service courses, advanced undergraduate courses, and a graduate course. Her breadth of courses is strong so that she is able to contribute at all levels of the curriculum. Student evaluations are at or exceed what other faculty have achieved for the same courses; therefore, Professor Biteen-Johnsen improves our teaching at all levels. Her thoughtfulness, dedication to pedagogical technology, and experimentation with new approaches has enabled her to connect with students regardless of the classroom size or level. Professor Biteen-Johnsen has been also been a successful mentor to 40 students, including 23 undergraduate students, in a research laboratory setting. Her work with undergraduates is notable in that five have been co-authors on publications. Professor Biteen-Johnsen is able to attract students to her group and mentor them through to their Ph.D. These students and post-doctoral scholars have moved on to good positions. Overall, Professor Biteen-Johnsen has become a highly valuable asset to chemistry's teaching mission.

Research – Professor Biteen-Johnsen is a biophysical chemist who has become well-recognized for her research into measuring the motion of single protein molecules in single, live microbial cells. She uses single molecule fluorescence microscopy and super-resolution microscopy in her work. These are truly cutting edge techniques. After the initial demonstrations over twenty years ago that single fluorescent molecules could be detected in controlled conditions, this technique has matured to the point that it can be used in cells. Superresolution refers to an even newer set of techniques that can be used to pinpoint the location of a molecule with greater accuracy than expected from standard microscopy limits, where resolution is limited to  $\frac{1}{2}$  of the wavelength of the light used. These techniques were pioneered by Betzig, Hell, and Moerner, who shared a 2014 Nobel Prize for their inventions. However, researchers in this field are still learning how to use these techniques and continuing to develop them for biological studies. Thus, Professor Biteen-Johnsen is working in an extremely active area of biophysical chemistry. She has published twenty papers in scientific journals and five in peer-reviewed conference proceedings or encyclopedias. Of her twenty papers, five were in the high impact journals and the remaining were in very well-respected journals. Her productivity and journal selection is very strong.

### Recent and Significant Publications:

“Resolving fast, confined diffusion in bacteria with image correlation spectroscopy,” with D. J. Rowland and H. H. Tuson, *Biophysical Journal*, 110, 2016, pp. 2241-2251.

“Single-molecule super-resolution microscopy reveals how light couples to a plasmonic nanoantenna on the nanometer scale,” with E. Wertz, et al., *Nano Letters*, 15, 2015, pp. 2662-2670.

“Single-molecule motions and interactions in live cells reveal target search dynamics in mismatch repair,” with Y. Liao, et al., *Proceedings of the National Academy of Sciences USA*, 112, 2015, E6898-E6906.

“Glycan catabolism by human gut symbionts involves dynamic protein interactions,” with K. S. Karunatilaka, et al., *mBio*, 5, 2014, e02172-14.

Service – Professor Biteen-Johnsen has provided valuable service at all levels. She has served on Department of Chemistry committees, including the Long Range Planning, Admissions, and Faculty Search committees. These commitments reflect her dedication and the high level of trust afforded her by the department. For the university, she has served on a variety of advisory panels, including the Dean Search Advisory Committee. Professor Biteen-Johnsen’s national service includes the typical grant and paper review panels, but also more advanced appointments such as chair of a Gordon Research Conference and membership on a White House Office of Science and Technology Policy Workshop. Finally, she has participated in several outreach activities to local schools with the goal of promoting women in science. This is an exceptional level of service.

### External Reviewers:

#### Reviewer (A)

“...let me first highlight her exceptionally outstanding stature as a community leader. She was elected as a co-chair of 2018 Gordon Research Conference on Single Molecule Approaches to Biology, and was elected as a chair of the Nanoscale Subgroup of the Biophysical Society. I cannot think of even a single junior faculty member who became chairs of such prominent meetings... She is also an editorial board member of *Biophysical Journal*, which is a rarity for junior faculty members. In addition, she gave a ‘New and Notable’ talk at the 2016 Biophysical Society Annual Meeting. All combined, these testify [to]...peer-recognition of her research abilities and effective communicator of biological research to other scientists and general public. She is an outstanding role model...”

#### Reviewer (B)

“...her work is very interesting, and she has certainly carved out a niche in terms of using plasmon-enhanced fluorescence for super resolution imaging, especially in living cells. This along with some of her computational approaches for analyzing single particle data that enables the distinction between small molecule diffusion and small molecule interactions, are very interesting and support the overall innovativeness of her research program. It’s notable that she is often invited to numerous conferences and has the large number of seminar invitations across the country and internationally as well.”

#### Reviewer (C)

“I am very happy to provide my most enthusiastic support for the promotion to Associate Professor with tenure... .Biteen’s demonstrated research track record shows that she is a highly talented biophysical chemist, materials scientist, super-resolution cellular microscopist, and optical physicist who is an influential leader in her research and teaching. She has attracted a strong team of...scientists to her lab, and as an excellent mentor, always generously highlights their work in conference presentations.”

Reviewer (D)

“Since starting her own lab in 2010, Julie has chosen to push the limits of super-resolution imaging in live cells – an excellent choice. She has been able to image DNA repair in live bacteria at the single molecule level (PNAS 2015) – combining the best of two recent Nobel Prizes in chemistry! This is the kind of measurement that chemists have been dreaming about for decades, and Julie is doing it. She is very careful and detailed in her work, and is responsible for developing new imaging algorithms that are used in the community.”

Reviewer (E)

“In the course of the past 6 years, she has built up a nationally and internationally recognized research program in molecular/cellular biophysics using super-resolution techniques, published some 20 papers on her work at the University of Michigan (plus more under review). Her work has made significant inroads into super-resolution imaging of single protein trafficking in live bacterial cells... she has also scored major national and international honors...”

Reviewer (F)

“I think it is clear from her CV that Julie is off to an excellent start... These results are at the leading edge of several subdisciplines, and for the most part they have been done with an eye on applications to the study of processes in live cells, which is one of the most important topics at the interface of physical chemistry and cell biology.”

Summary of Recommendation:

Professor Biteen-Johnsen has developed a well-recognized research program. She contributes high quality teaching in all areas of the Department of Chemistry and her exemplary service demonstrates her leadership potential. The Executive Committee of the College of Literature, Science, and the Arts and I recommend that Assistant Professor Julie S. Biteen-Johnsen be promoted to the rank of associate professor of chemistry, with tenure, and associate professor of biophysics, without tenure, College of Literature, Science, and the Arts.



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

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