

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

Anthony Vecchiarelli, assistant professor of molecular, cellular, and developmental biology, and assistant professor of biophysics, College of Literature, Science, and the Arts, is recommended for promotion to associate professor of molecular, cellular, and developmental biology, with tenure, and associate professor of biophysics, without tenure, College of Literature, Science, and the Arts.

Academic Degrees:

Ph.D.	2010	University of Toronto
B.Sc.	2003	University of Toronto

Professional Record:

2017-present	Assistant Professor, Department of Molecular, Cellular, and Developmental Biology, University of Michigan
2010-2016	Post-doctoral Fellow, National Institutes of Health

Summary of Evaluation:

Teaching: Professor Vecchiarelli is a dedicated educator who has provided valuable contributions to the teaching mission of Molecular, Cellular, and Developmental Biology (MCDB). Since joining the UM faculty, he has taught large enrollment courses, including the large enrollment course “Microbiology” (Biology 207), which is a gateway course for the Microbiology major and a popular choice for several other majors administered or co-administered by MCDB. Professor Vecchiarelli was instrumental in revamping the curriculum for this course, which has resulted in a 70% increase in enrollment since 2018. In addition, Professor Vecchiarelli has created a new upper-level course for undergraduates, “Building a Synthetic Cell” (MCDB 472), focused on critical analysis and writing. One project resulted in a published review authored by MCDB 472 students. Professor Vecchiarelli has also taught in two graduate-level classes (“Microbial Physiology,” MCDB 600; “Experimental Models in MCDB,” MCDB 614), and has also been an exceptional mentor for post-doctoral fellows, graduate students, and undergraduate researchers. His public outreach activities are also noteworthy, many of which are in conjunction with the UM Museum of Natural History. Professor Vecchiarelli has made important contributions to MCDB’s educational mission at multiple levels.

Research: Professor Vecchiarelli is a microbiologist who utilizes biochemistry, real-time imaging, and genetics to understand how bacteria evenly distribute their cellular components during cell division, most notably carbon-fixing organelles known as carboxysomes in photosynthetic bacteria. He is a world leader in the study of how two-component McdAB systems achieve even partitioning in multiple bacterial species. He is also becoming a leader in the study of biomolecular condensates in bacteria, where biomolecules phase-separate from the surrounding liquid to promote cellular processes. Professor Vecchiarelli has been the recipient of several extramural grants to fund his research program and has been invited to speak at

numerous national and international meetings. He was recently elected by the researchers in his field to be the next chair of a Gordon Research Conference (GRC) on Bacterial Cell Biology and Development, a rare honor at his early career stage. His multi-disciplinary approach to understanding how bacterial cells partition their contents and the role of phase separation in this process places him at the forefront of this research area. His research program is on an upward trajectory and he is well-positioned to make important discoveries for the foreseeable future.

Recent and Significant Publications:

- Pulianmackal, L.T., Limcaoco, J.M., Ravi, K., Yang, S., Zhang, J., Tran, M.K., Ghalmi, M., O'Meara, M.J., Vecchiarelli, A.G. (2023). Multiple ParA/MinD ATPases coordinate the positioning of disparate cargos in a bacterial cell. *Nature Communications*, 14(1), 3255. doi: 10.1038/s41467-023-39019-x.
- Hakim, P., Hoang, Y., Vecchiarelli, A.G. (2021). Dissection of the ATPase active site of McdA reveals the sequential steps essential for carboxysome distribution. *Molecular Biology of the Cell*, 32(20), ar11. doi: 10.1091/mbc.E21-03-0151.
- MacCready, J.S., Tran, L., Basalla, J.L., Hakim, P., Vecchiarelli, A.G. (2021). The McdAB system positions α -carboxysomes in proteobacteria. *Molecular Microbiology*, 116(1), 277-297. doi: 10.1111/mmi.14708.
- MacCready, J.S., Hakim, P., Young, E.J., Hu, L., Liu, J., Osteryoung, K.W., Vecchiarelli, A.G., Ducat, D.C. (2018). Protein gradients on the nucleoid position the carbon-fixing organelles of cyanobacteria. *eLife*, 7, e39723. doi: 10.7554/eLife.39723

Service: Professor Vecchiarelli has performed valued service at multiple levels. Within MCDB, he has served on the graduate admissions committee for several years, as well as a faculty search committee. His level of service on these committees is widely recognized as outstanding by his colleagues. He has served on several career development panels at UM, including the NextProf and NSF CAREER workshops and the Future in Research, Science and Teaching (FIRST) program for undergraduates. Beyond the university, he has served as a reviewer for many journals, and as the vice chair for an American Society for Microbiology conference. He has also served as a poster judge at a recent Annual Biomedical Research Conference for Minoritized Scientists (ABRCAMS) and is an active proponent for making MCDB's culture more inclusive. Overall, he has performed an outstanding level of service to his department, the university, and the wider scientific community.

External Reviewers:

Reviewer (A): "Dr. Vecchiarelli has made major contributions to our understanding of the molecular machines that partition and distribute different cargo in bacterial ever since his graduate student days. He is clearly a leader in this area."

Reviewer (B): "I have come to appreciate Anthony Vecchiarelli greatly as a thorough, independent, and creative scientist and I hold him in the highest regards. I consider him one of the leading [junior] scientist [sic] in the field of bacterial cell biology (certainly within the top 10 of peers worldwide)."

Reviewer (C): "I am very impressed by Dr. Vecchiarelli's research contributions. He is making significant progress both in understanding the cell biology of bacteria, a still under-studied

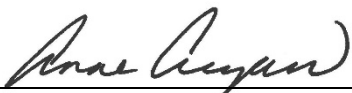
problem, and in developing synthetic approaches that may enable the rational design of bacterial microcompartments for biotechnological purposes.”

Reviewer (D): “Dr. Vecchiarelli is highly productive and extremely well regarded by his peers, the evidence of which can be seen in his recent election as upcoming chair of the Bacterial Development and Cell Biology Gordon Research Conference and many speaking invitations. He is an excellent colleague and a social center of the community.”

Reviewer (E): “Dr. Vecchiarelli is one of the [junior] stars of the bigger field of bacterial cell biology and an undisputed leader in the study of carboxysomes and other bacterial organelles.”

Reviewer (F): “Dr. Vecchiarelli’s strength lies in his ability to pull from very different disciplines including single molecule analysis, bacterial genetics, cell biology, and quantitative biology to understand complex phenomena.”

Summary of Recommendation: Professor Vecchiarelli is a world leader in the study of how bacterial organelles are evenly distributed throughout the cells. His well-funded research program will continue to make important discoveries in bacterial cell biology and phase separation. He is a passionate and innovative educator at both the undergraduate and graduate level. His record of service at the departmental, university, and national/international level is also impressively high, and he is highly valued as a mentor and colleague by his MCDB colleagues. The Executive Committee of the College of Literature, Science, and the Arts and I recommend that Assistant Professor Anthony Vecchiarelli be promoted to the rank of associate professor of molecular, cellular, and developmental biology, with tenure, College of Literature, Science, and the Arts.



Anne Curzan, Dean
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