

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

Erik E. Nielsen, associate professor of molecular, cellular, and developmental biology, with tenure, College of Literature, Science, and the Arts, is recommended for promotion to professor of molecular, cellular, and developmental biology, with tenure, College of Literature, Science, and the Arts.

Academic Degrees:

Ph.D. 1997 Michigan State University  
B.S. 1992 Purdue University

Professional Record:

2012-present Associate Professor, Department of Molecular, Cellular, and Developmental Biology, University of Michigan  
2017-present Adjunct Professor, Department of Forestry and Landscape Architecture, South China Agricultural University, Guangzhou, China  
2017-present Associate Chair for Research and Facilities, Department of Molecular, Cellular, and Developmental Biology, University of Michigan  
2007-2012 Assistant Professor, Department of Molecular, Cellular, and Developmental Biology, University of Michigan  
2001-2007 Assistant Member, Donald Danforth Plant Science Center, St. Louis, Missouri.  
Adjunct Assistant Professor (adjunct appointment), Biology Department, Washington University, St. Louis, Missouri.  
1997-2000 Post-doctoral Fellow, European Molecular Biology Laboratory, Heidelberg, Germany

Summary of Evaluation:

Teaching: Professor Nielsen is a passionate educator who has made numerous contributions to the teaching mission of Molecular, Cellular, and Developmental Biology (MCDB) and had an overwhelmingly positive impact on the MCDB curriculum. While in rank, he has taught seven courses, including the large enrollment upper-level course Cell Biology (MCDB 428). In addition, he teaches upper-level literature reading courses in Plant Molecular (MCDB 430) and special topics (MCDB 401), as well as Plant Physiology (MCDB 321), a core course in the Plant Biology major. Of special note, Professor Nielsen co-developed a new course, Fundamentals of Cell Biology (Biology 272), which serves to bridge the gap between introductory and upper-level cell biology courses. At the graduate level, he has taught a literature reading (MCDB 614) and a seminar course (MCDB 800) for masters and beginning doctoral students. In this diverse array of courses, Professor Nielsen's performance has been very strong. He also has an impressive record of mentoring undergraduate, graduate, and post-doctoral trainees.

Research: Professor Nielsen is a plant cell biologist studying polarized cell growth in the flowering plant *Arabidopsis*. He has pioneered the use of live imaging to study intracellular transport of plant proteins, and his research program also uses genetics and biochemical approaches to understand how specialized plant cells, e.g., pollen grains and root hair cells, extend membrane protrusions. Because the cellulose-rich cell walls that surround plant cells are normally very rigid, cells undergoing shape changes must have mechanisms for remodeling this barrier in a dynamic fashion. His lab has made

fundamental discoveries in the role of small GTPases in transporting materials in extending and dividing cells, and has provided definitive evidence that a family of proteins called CSLDs are enzymes that synthesize cellulose components in cells with dynamic cell walls. His federally-funded research program is well positioned to continue to make fundamental advances in the future.

#### Recent and Significant Publications:

Nielsen, E. (2020). "The Small GTPase Superfamily in Plants: A Conserved Regulatory Module with Novel Functions." *Annual Review of Plant Biology*, 71: 247-272. doi:10.1146/annurev-arplant-112619-025827.

Yang, J., Bak, G., Burgin, T., Barnes, W.J., Mayes, H.B., Peña, M.J., Urbanowicz, B.R., and Nielsen, E. (2020). "Biochemical and Genetic Analysis Identify CSLD3 as a beta-1,4-Glucan Synthase that Functions during Plant Cell Wall Synthesis." *Plant Cell*, 32(5): 1749-1767. doi:10.1105/tpc.19.00637.

Gu, F., Bringmann, M., Combs, J.R., Yang, J., Bergmann, D.C., and Nielsen, E. (2016). "Arabidopsis CSLD5 Functions in Cell Plate Formation in a Cell Cycle-Dependent Manner." *Plant Cell*, 28(7): 1722-1737. doi:10.1105/tpc.16.00203.

Antignani, V., Klocko, A.L., Bak, G., Chandrasekaran, S.D., Dunivin, T., and Nielsen, E. (2015). "Recruitment of PLANT U-BOX13 and the PI4Kb1/b2 phosphatidylinositol-4 kinases by the small GTPase RabA4B plays important roles during salicylic acid-mediated plant defense signaling in Arabidopsis." *Plant Cell*, 27(1): 243-261. doi:10.1105/tpc.114.134262.

Service: Professor Nielsen has served as the associate chair of facilities since 2017 and played a pivotal role in the department's move from the Kraus Natural Science Building to the newly constructed Biological Sciences Building (BSB). His efforts enabled this complicated process to proceed in an orderly and successful manner, and he continues to help lead the department during the COVID-19 pandemic. While in rank, Professor Nielsen has also served on MCDB's Graduate Admissions Committee, where he spearheaded efforts to increase the diversity of our graduate student population. He also served on the UM Faculty Senate from 2013-2016. At the national/international level, Professor Nielsen has served and serves as an editor for several prominent scientific journals, has participated in several grant panels, and co-organized scientific meetings. His commitment to service at all these levels has been exemplary.

#### External Reviewers:

Reviewer (A): "Dr. Nielsen will continue to make significant advances in the fields of cell biology and cell wall biochemistry for many years to come. It is also my strong opinion that in addition to being a top-level scientist, he will continue to be a great asset in terms of teaching and service to the students and faculty to your department and university."

Reviewer (B): "I rank Dr. Nielsen one of the top scientists in the field of plant cell wall biology currently, and as mentioned earlier, he was one of the pioneers in the study of plant endomembranes in live cells."

Reviewer (C): "His contributions and commitment to teaching are seen in the many successful students, postdocs, and visiting scientists who have benefitted from his robust lab environment. Perhaps more notable to commitment to education is his work with the numerous undergraduate

students he has mentored in the lab. His service to his department, college and university are exemplary.”


Reviewer (D): “[Professor Nielsen’s] group used a wide array of approaches to demonstrate the activity of CSLD3 both in vitro and in vivo and demonstrated that CSLD5 has an unexpected role to play in the deposition of the cell plate during plant cell division. These discoveries really do represent pioneering observations and paradigm shifts that will point the way for other researchers to clarify the roles of related proteins in the years to come.”

Reviewer (E): “...Nielsen does careful, high quality work and does not rush to publication. His 2020 Plant Cell article ... is very insightful ... I expect this paper to be viewed as a classic landmark in the future.”

Reviewer (F): “[Professor Nielsen] is considered a world authority on small GTPases in plants. His work also informs the study of other eukaryotes, both by discovering what turn out to be conserved aspects as well as instances in which plants are unique among eukaryotes.”

Summary of Recommendation:

Professor Nielsen is considered a world leader in the areas of plant cell biology and cell wall remodeling. His well-funded research program continues to make fundamental advances in these fields. His contributions to MCDB’s teaching mission, including teaching a variety of undergraduate and graduate courses and developing a new course to serve students’ needs, are exemplary. His service to the department, university, and wider academic community has been outstanding and deeply valued by his colleagues. The Executive Committee of the College of Literature, Science, and the Arts and I recommend that Associate Professor Erik E. Nielsen be promoted to professor of molecular, cellular, and developmental biology, with tenure, College of Literature, Science, and the Arts.



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

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