PROMOTION RECOMMENDATION
THE UNIVERSITY OF MICHIGAN
MEDICAL SCHOOL
DEPARTMENT OF COMPUTATIONAL MEDICINE AND BIOINFORMATICS
DEPARTMENT OF HUMAN GENETICS

Ryan Mills, Ph.D., associate professor of computational medicine and bioinformatics, with tenure, Department of Computational Medicine and Bioinformatics, and associate professor of human genetics, without tenure, Department of Human Genetics, Medical School, is recommended for promotion to professor of computational medicine and bioinformatics, with tenure, Department of Computational Medicine and Bioinformatics, and professor of human genetics, without tenure, Department of Human Genetics, Medical School.

Academic Degrees:
Ph.D.   2006   Georgia Institute of Technology, Atlanta, GA
M.S.   2003   Georgia Institute of Technology, Atlanta, GA
A.B.   2000   Wabash College, Crawfordsville, IN

Professional Record:
2018 – Present   Associate Professor (with tenure), Department of Computational Medicine and Bioinformatics, University of Michigan
2018 – Present   Associate Professor (without tenure), Department of Human Genetics, University of Michigan
2012 – 2018   Assistant Professor, Department of Computational Medicine and Bioinformatics, University of Michigan
2012 – 2018   Assistant Professor, Department of Human Genetics, University of Michigan

Summary of Evaluation:
Teaching: Dr. Mills' teaching reflects his breadth of knowledge as an expert in his field of computational genomics and human genetics. He has a comprehensive and extensive record of teaching and mentoring trainees of varying levels including junior faculty members, post-doctoral fellows, graduate students, and undergraduate students. He has led or participated in ten different courses in computational genomics and human genetics. Together with Dr. Alan Boyle, he designed and has taught Bioinformatics Concepts and Algorithms (BIOINF529) since 2019. He is also a lecturer for Current Methods (HUMGEN803), and Computational Genomics (HUMGEN551), and a session leader for Responsible Conduct in Research (PIBS503). Teaching evaluations are overall very good to excellent. Dr. Mills has created a learning environment in which individuals from diverse backgrounds and at different career stages can grow and thrive.

Research: Dr. Mills is a bioinformatician whose work is focused on the analysis of whole genome sequence data to primarily identify structural variations and examine their potential functional impact on human disease phenotypes. He and his students developed automated algorithms for identifying insertion/deletion mutations from whole genome sequencing data and one of their methods, PALMER, has dramatically enhanced the ability to characterize variations in repetitive regions of the genome. Dr. Mills has been remarkably successful in obtaining funding with current

funding from the National Institutes of Health (NIH), Innovation in Cancer Informatics, and the Taubman Institute Innovation Program. He has an R01 in submission as a multi-principal investigator that received a 16th percental. Prior research funding included seven grant awards via the NIH R01 and R21 mechanisms, indicating a sustained record of funding success. He has authored 84 peer-reviewed manuscripts in high-impact journals such as *BMC Genomics*, *Nature Reviews Genomics*, and *Nature Communications*. He is internationally recognized for his computational algorithms and has been invited to deliver 20 extramural presentations nationally and internationally including in the Netherlands, the United Kingdom, Canada, Japan, South Korea, and Russia.

Recent and Significant Publications:

Pinatti LM, Gu W, Wang Y, Elhossiny A, Bhangale AD, Brummel CV, Carey TE, Mills RE, Brenner JC, "SearcHPV: A novel approach to identify and assemble human papillomavirus-host genomic integration events in cancer," *Cancer*. 2021 Oct 1;127(19):3531-3540. doi: 10.1002/cncr.33691. Epub 2021 Jun 23. PMID: 34160069; PMCID: PMC8454028.

McDonald TL, Zhou W, Castro CP, Mumm C, Switzenberg JA, Mills RE, Boyle AP, "Cas9 targeted enrichment of mobile elements using nanopore sequencing," *Nat Commun*. 2021 Jun 11;12(1):3586. doi: 10.1038/s41467-021-23918-y. PMID: 34117247; PMCID: PMC8196195.

Wang Y, Bae T, Thorpe J, Sherman MA, Jones AG, Cho S, Daily K, Dou Y, Ganz J, Galor A, Lobon I, Pattni R, Rosenbluh C, Tomasi S, Tomasini L, Yang X, Zhou B, Akbarian S, Ball LL, Bizzotto S, EmerySB, Doan R, Fasching L, Jang Y, Juan D, Lizano E, Luquette LJ, Moldovan JB, Narurkar R, Oetjens MT, Rodin RE, Sekar S, Shin JH, Soriano E, Straub RE, Zhou W, Chess A, Gleeson JG, Marquès-Bonet T, Park PJ, Peters MA, Pevsner J, Walsh CA, Weinberger DR, Vaccarino FM, Moran JV, Urban AE, Kidd JM, Mills RE, Abyzov A, "Comprehensive identification of somatic nucleotide variants in human brain tissue," *Genome Biol*. 2021 Mar 29;22(1):92. doi: 10.1186/s13059-021-02285-3. PubMed PMID: 33781308; PubMed Central PMCID: PMC8006362.

Dayama G, Zhou W, Prado-Martinez J, Marques-Bonet T, Mills RE, "Characterization of nuclear mitochondrial insertions in the whole genomes of primates," *NAR Genom Bioinform*. 2020 Nov 16;2(4):lqaa089. doi: 10.1093/nargab/lqaa089. PMID: 33575633; PMCID: PMC7671390.

Zhou W, Emery SB, Flasch DA, Wang Y, Kwan KY, Kidd JM, Moran JV, Mills RE, "Identification and characterization of occult human-specific LINE-1 insertions using long-read sequencing technology," *Nucleic Acids Res*. 2020 Feb 20;48(3):1146-1163. doi: 10.1093/nar/gkz1173. PMID: 31853540; PMCID: PMC7026601.

Service: Dr. Mills is a tremendous contributor to service at all levels. Internationally, he is a member of the Program Committee of the International Conference on Algorithms for Computational Biology. Nationally, he serves on the Abstract Committee for the American Society of Human Genetics annual meetings and on the Board of Directors for the Wabash College National Association of Wabash Men and is a member of the Program Committee for the Great Lakes Bioinformatics Conference. He has been an ad hoc reviewer on many NIH study sections. He was on the editorial board for two journals and is an ad hoc reviewer for several journals including the *European Journal of Human Genetics*, *BMC Bioinformatics*, and *Nature Genetics*. Institutionally, he has served as a member and chair of the Medical School's Advisory Committee for Appointments, Promotions, and Tenure and is the program director of DCMB Computing

Infrastructure. He is the co-chair of the Ph.D. Admission Committee, chair of the IT and Retreat Committees, and is a member of the Chair's Advisory, Faculty Search, and Space Committees. He has recently served as a member of the Grievance Hearing Board of the Advisory Board, the Pedagogy and Interdisciplinary Science Education Training Program, the PIBS Curriculum Committee, and the HITS Learning Services Governance Committee. Notably, has served on numerous doctoral preliminary exams and dissertation committees.

External Reviewers:
Reviewer A: "Ryan has made seminal contributions to the characterization of human structural genetic variation. Evidence of these contributions can be seen based on his participation in large consortia (the 1000 Genomes Project in particular) as well as his own group's contributions to the field. The quality and quantity of this work are outstanding…Ryan ranks at the very top of his peer group in human genomics. He has been and remains a leader in the study of human genetic variation overall and for structural variation in particular."

Reviewer B: "First, I am very impressed with the depth and breadth of his research accomplishments. He has a nice mix of bioinformatics, human genetics, and genomics experience and expertise with more than 80 total peer reviewed publications which is very impressive for an Associate Professor. Many of these papers are in top journals such as [the] American Journal of Human Genetics, Cell, Genome Biology, Nature, Nature Biotechnology, Nature Communications, Nucleic Acids Research, and Science. This is a testimony to his scientific expertise, productivity, and rigor."
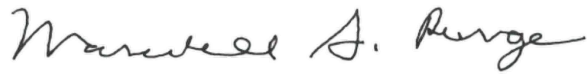
Reviewer C: "I deeply respect Ryan's intellect and passion for genome biology research. I am not alone: he is well-known in the human genetics community and widely regarded as an expert. He is an active American Society of Human Genetics member and played key roles in the 1000 Genomes Project and the Brain Somatic Mosaicism Network. The caliber of his research vision is demonstrated by his recent UG3 award from the NHGRI… Ryan is truly a leader in his field, and I do not doubt that his research program will continue to grow at the University of Michigan."

Reviewer D: "Dr. Mills is also well poised for continued outstanding scientific results. Quantitively, he has been extremely productive, with 84 peer reviewed journal manuscripts including several at the highest level of impact and visibility. According to Google Scholar, he has been cited 47955 times, with an h-index of 52. This is an elite level of scholarship, meeting or exceeding many other full Professors at top institutions. Finally, he has been very active presenting at conferences and teaching, as well as an active reviewer for several top journals, conferences, and study sections."

Reviewer E: "Dr. Mills has mentored three postdoctoral fellows and a large number of graduate students, and served on thesis committees for dozens of students. Dr. Mills has participated as lecturers in over 10 courses related to Computational Genomics and Human Genetics, and as an examiner for 38 Doctoral Preliminary Exams."

Summary of Recommendations:

Dr. Mills has established himself as an internationally renowned expert for his work on structural variation in human genomes. He is internationally recognized as a leader and has pioneered advancements in the field of human genomics through his groundbreaking work with large human genomic variation consortia and the development of innovative long-read sequencing techniques for transposable element discovery. Dr. Mills is an accomplished scientist, productive and engaged teacher, and exceptional institutional citizen. I am pleased to recommend Ryan Mills, Ph.D. for promotion to professor of computational medicine and bioinformatics, with tenure, Department of Computational Medicine and Bioinformatics, and professor of human genetics, without tenure, Department of Human Genetics, Medical School.

Marschall S. Runge, M.D., Ph.D.
Executive Vice President for Medical Affairs
Dean, Medical School

May 2024