Approved by the Regents
May 16, 2024

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

Yuanfang Guan, Ph.D., associate professor of computational medicine and bioinformatics, with tenure, Department of Computational Medicine and Bioinformatics, and associate professor of internal medicine, without tenure, Department of Internal Medicine, Medical School, is recommended for promotion to professor of computational medicine and bioinformatics, with tenure, Department of Computational Medicine and Bioinformatics, and professor of internal medicine, without tenure, Department of Internal Medicine, Medical School.

Academic Degrees:

Ph.D.	2010	Princeton University, Princeton, NJ
B.S.	2005	University of Hong Kong, Hong Kong, China

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 Internal Medicine, Division of Nephrology, University of Michigan
2013-2016	Assistant Professor, Electrical Engineering and Computer Science, Department of Computer Science and Engineering, University of Michigan
2012-2018	Assistant Professor, Department of Computational Medicine and Bioinformatics, University of Michigan
2012-2018	Assistant Professor, Department of Internal Medicine, University of Michigan
2011-2012	Research Investigator, Department of Computational Medicine and Bioinformatics, University of Michigan
2011-2012	Research Investigator, Department of Internal Medicine, University of Michigan

Summary of Evaluation:

Teaching: Dr. Guan is a devoted mentor and teacher, where she instructs learners through both research mentorship and didactic teaching. Learners include faculty members, post-doctoral fellows, graduate students, and undergraduate students. Many of her mentees have moved on to successful careers. She has participated in several dissertation committees and preliminary exam committees. She developed and taught the Deep Learning in Bioinformatics (BIOINF585) course, taught Machine Learning in Bioinformatics (BIOINF580), as well as several other bioinformatic courses. Teaching evaluations range from very good to excellent. Letters of support from prior mentees and trainees were extremely laudatory.

Research: Dr. Guan is an internationally renowned computational biologist who has won numerous computational competitions for her algorithms for the best solutions to complex biomedical problems such as outcome predictions. Her research centers on developing machine learning methods to generate algorithms to predict clinical outcomes and to analyze high-throughput data. In the past ten years, she and her research group have written most of the best performing algorithms in DREAM (Dialogue for Reverse Engineering Assessments and Methods) challenges, which is regarded as the largest series of benchmark studies in computational and systems biology. Since 2018, she has contributed 13 algorithms that ranked at the top in community-based benchmark studies or high-profile competitions, including academic DREAM and Neural Information Processing Systems (NIPS) challenges. She was awarded the "Consistent Best Technical Performer" award (thus far, the sole recipient), for her achievements in the DREAM challenges and the open-source software she has contributed. She is one of very few people internationally who earned multiple gold medals in the annual Data Science Bowl. Dr. Guan's cutting-edge research has been diversly funded with support from the National Institutes of Health (NIH), the National Science Foundation (NSF), Merck, Michael J. Fox Foundation, and the American Parkinson's Disease. Current funding as a principal investigator includes an R35 NIH grant, with a renewal in submission. She has authored 127 peer-reviewed manuscripts in high impact journals such as *Nature Machine Intelligence*, *Nature Computational Science*, *Nature Communications,* and *Genome Research*. Dr. Guan has been invited on 22 occasions to present her work nationally and internationally including in Finland and Germany.

Recent and Significant Publications:

Li H, Guan Y, "Asymmetric Predictive Relationships Across Histone Modifications," *Nat Mach Intell*. 2022 Mar;4(3):288-299. doi: 10.1038/s42256-022-00455-x. Epub 2022 Mar 21. PMID: 35529103; PMCID: PMC9075108.

Lu J, Bender B, Jin JY, Guan Y, "Deep learning prediction of patient response time course from early data via neural-pharmacokinetic/pharmacodynamic modelling," *Nat Mach Intell* 3, 696–704 (2021). https://doi.org/10.1038/s42256-021-00357-4.

Guan Y, Li H, Yi D, Zhang D, Yin C, Li K, Zhang P, "A survival model generalized to regression learning algorithms," *Nat Comput Sci*. 2021 Jun;1(6):433-440. doi: 10.1038/s43588-021-00083-2. Epub 2021 Jun 21. PMID: 34312611; PMCID: PMC8303029.

Zhou M, Li H, Wang X, Guan Y, "Evidence of widespread, independent sequence signature for transcription factor cobinding," *Genome Res*. 2021 Feb;31(2):265-278. doi: 10.1101/gr.267310.120. Epub 2020 Dec 10. PMID: 33303494; PMCID: PMC7849410.

Xiao Y, Wang X, Zhang H, Ulintz PJ, Li H, Guan Y, "FastClone is a probabilistic tool for deconvoluting tumor heterogeneity in bulk-sequencing samples," *Nat Commun*. 2020 Sep 8;11(1):4469. doi: 10.1038/s41467-020-18169-2. PMID: 32901013; PMCID: PMC7478963.

Service: Dr. Guan has a strong service record at the international and national levels. Internationally, she has been an ad hoc grant reviewer for the Natural Science and Engineering Research Counsel of Canada, Weston Brain Institute, Alzheimer's Research in the United Kingdom, and the Michael J. Fox Foundation. Nationally, she has volunteered as the chief scientist for the FDA Artificial Intelligence (AI) Campus, an online community devoted to educating the public about deep learning. This campus is a nexus connecting minority-serving universities and Historically Black Colleges and Universities, teaching the latest topics in AI technology. The AI Campus involves researchers from 19 states and creates an exchange network with the FDA and

leading corporations in pharmaceutics and machine learning. Dr. Guan has been an ad hoc grant reviewer for the Department of Defense Peer Reviewed Medical Research Program and the Natural Sciences Foundation Biological Sciences. She serves on the editorial board and is the Commissioning Editor of *iScience*. She is an ad hoc reviewer for many journals in her field such as *Cell*, *Genome Biology*, and *Nature Machine Intelleigence*. She serves as a scientific advisor to several high profile pharmaceutical companies such as Eli Lilly, Merck, Roche, Genentech, and Novo Nordisk. Institutionally, within the Department of Computational Medicine and Bioinformatics, she has served as a member of the department's recruitment committee for new faculty.

External Reviewers:

Reviewer A: "It is evident that her research will offer ground-breaking opportunities for many scientific and medical applications, ranging from better molecular characterization of cancer subtypes, to improved reproducibility of pre-clinical treatment response results, to better understanding of drug mechanisms behind personalized treatment responses, and all the way to guiding clinical decision making by predictive models of treatment outcomes. The quality, quantity, and scholarly impact of Dr. Guan's work exceed by far 90% of the researchers working in the same field."

Reviewer B: "I am very impressed that Dr. Guan and her lab not only have actively participated in the international data analysis challenges and competitions in the past 10 years, but also have achieved so many First-Place awards and medals. One would expect that many strong teams over the world competed for these challenges, and it is amazing seeing that Dr. Guan and her lab have been consistently placed among the top teams. This may indicate the methods and algorithms developed by Dr. Guan can be efficiently applied to clinical, medical, and genomic data with meaningful applications."

Reviewer C: "...Dr. Guan is well established as a leader in the fields of Biomedical Informatics and Computational Science scholarship and practice and is recognized as such by her peers throughout the globe."

Reviewer D: "Dr. Guan's funding record is impressive. She is currently PI or Co-PI on four NIH research grants, including PI on a $1.7M R35 award examining machine learning for drug response prediction. In total, current awards total over $15M. Past support active during her current appointment totals over an additional $20M. This total includes a prestigious NSF CAREER award, which although was awarded in 2015, was active up until 2022. Clearly this funding has allowed Dr. Guan to operate a very active research lab, graduating 3 PhD students and 18 MS students since 2018. Dr. Guan has also mentored a number of undergraduate students, which I consider a very valuable activity that often does not receive the recognition deserved."

Reviewer E: "Her list of publications speaks to the overall quality and mass of her work. She clearly works as both a methodologist and valued collaborator."

Reviewer F: "…Dr. Guan's commitment to service is evident through her involvement in the AI campus activities, where she has served as the chief scientist for over five years. This initiative acts as a nexus connecting minority serving universities and Historically Black Colleges and Universities, fostering collaboration and knowledge exchange in the field of artificial intelligence."

Summary of Recommendations:
Dr. Guan is internationally recognized for her record of winning the majority of the best-performing algorithms in DREAM (Dialogue for Reverse Engineering Assessments and Methods) challenges, the largest series of benchmark studies in computational and systems biology. This record of achievement sets Dr. Guan apart as an international superstar—to our knowledge she has won more of these competitions, by an order of magnitude, than anyone in the world. She is a highly accomplished scientist, a dedicated teacher, and a strong institutional citizen. I am pleased to recommend Yuanfang Guan, Ph.D. for promotion to professor of computational medicine and bioinformatics, with tenure, Department of Computational Medicine and Bioinformatics, and professor of internal medicine, without tenure, Department of Internal Medicine, Medical School.

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

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