

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

Alan P. Boyle, Ph.D., assistant professor of computational medicine and bioinformatics, Department of Computational Medicine and Bioinformatics, and assistant professor of human genetics, Department of Human Genetics, Medical School, is recommended for promotion to 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.

Academic Degrees:

2009	Ph.D.	Duke University
2005	B.S.	Biochemistry, Molecular Biology, and Computer Science Mississippi State University

Professional Record:

2014 - present	Assistant Professor of Computational Medicine and Bioinformatics University of Michigan
2015 - present	Assistant Professor of Human Genetics, University of Michigan

Summary of Evaluation:

Teaching: Dr. Boyle has mentored 16 Ph.D. Students in his laboratory. He has served on 14 dissertation committees and 16 preliminary examination committees. He has been highly active in teaching courses in computational medicine and bioinformatics and human genetics. Dr. Boyle was instrumental in co-designing a new course, BIOINF 529 Bioinformatics Concepts and Algorithms, and has also served as the course master for BIOINF 602/603 Bioinformatics Journal Club. Dr. Boyle lectures in BIOINF 527, Introduction to Bioinformatics and Computational Biology, and Bioinformatics 606, Introduction to Biocomputing. In the Department of Human Genetics, he has taught in HUMGEN 632, Experimental Genetics Systems, and in HUMGEN 541, Gene Structure and Regulation. Dr. Boyle received the Endowment for the Basic Sciences Teaching Award in 2018-2019. This is in recognition of the massive amount of preparation and energy he contributed to get this very much needed course launched as a key new element of the evolving Bioinformatics graduate curriculum.

Research: Dr. Boyle's research expertise is in genomic analysis to the study of personalized medicine to try to understand how human variation can lead to dysregulation of genes, leading to the conceptualization of the Regulome concept. His work has had worldwide impact, as much of the developed methods are now part of the standard analysis pipelines used by ENCODE data users and many other biological/biomedical researchers today. RegulomeDB is one of the default tools for prioritization of non-coding variants for functional effect in the genome with more than 1,500 citations and 20,000 hits monthly from most of the world. In 2018, his new scoring system for RegulomeDB was awarded first place in the annotation of non-coding variation at the CAGI5 challenge. Dr. Boyle has been well funded through the National Institutes of Health, the National Science Foundation, institutionally and through foundation grants. Dr. Boyle is also building and sustaining excellent

collaborations institutionally and nationally. He has published 40 peer-reviewed articles, and has been invited to present his research on 20 occasions regionally, nationally and internationally.

Recent and Significant Publications:

Nishizaki SS, Ng N, Dong S, Porter RS, Morterud C, Williams C, Asman C, Switzenberg JA, and Boyle AP: Predicting the effects of SNPs on transcription factor binding affinity. *Bioinformatics* 50: 2434, 2019.

Amemiya HM, Kundaje A, Boyle AP: The ENCODE Blacklist: Identification of Problematic Regions of the Genome. *Sci Rep* 9(1): 9354, 2019.

Dong S, Boyle AP: Predicting functional variants in enhancer and promoter elements using RegulomeDB. *Hum Mutat*: 2019. PM31228310.

Diehl AG, Boyle AP: Conserved and species-specific transcription factor co-binding patterns drive divergent gene regulation in human and mouse: *Nucleic Acids Res* 46(4): 1878-1894, 2018.

Spadafore M, Najarian K, Boyle AP: A proximity-based graph clustering method for the identification and application of transcription factor clusters. *BMC Bioinformatics* 18(1): 2017.

Service: Dr. Boyle serves on the program committee for International Society for Computational Biology/European Conference on Computational Biology and Great Lakes Bioinformatics Conference. He is an academic editor for *PLOS One*, and a review editor for *Bioinformatics and Computational Biology in Frontiers in Genetics*, *Frontiers in Plant Science*, and *Frontiers in Bioengineering and Biotechnology*. Dr. Boyle is a reviewer for 15 journals including *Nature Genetics*, *Genome Research*, and *Genome Biology*. Institutionally, he serves on five departmental committees, including Diversity, Equity and Inclusion. In this capacity, he taught at the NSF-supported Mathematical and Theoretical Biology Institute currently hosted at Arizona State University to attract minority students. Dr. Boyle is currently working with a RISE scholar in our program on the Pedagogy of Interdisciplinary Science Education training program where they will focus on recruitment at institutions lacking the exposure to Bioinformatics that is prevalent at the University of Michigan.

External Reviewers:

Reviewer A: “Dr. Boyle is an outstanding computational bioinformatician focused on the pursuit of a deeper understanding of biological processes using high-dimensional data and genomics. He has distinguished himself as a leading academic of the next generation, who works at the intersection of computational approaches to solving challenging biological problems.”

Reviewer B: “Alan is certainly well-known and can scientifically compete with most any lab in his field. Obviously it is a fast moving field and there are bigger groups that seem to dominate, but Alan has done a nice mix of consistently producing his own computational papers, collaborating with groups such as Mike Beer at Johns Hopkins on bigger papers, and contributing to gene or disease specific manuscripts. It’s not easy to do all three of these, and Alan so far is managing it quite well...Alan would certainly meet the requirements for tenure at my institutions. He is getting funding from multiple sources and on multiple projects, but [sic] as a lead PI and as a co-Investigator. His publications have been consistent and increasing in frequency. He has a bright future ahead of him and I’m excited to see what comes out of his lab.”

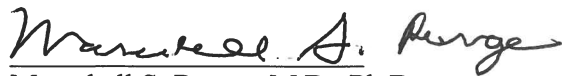
Reviewer C: "...I can state with the highest levels of confidence that: 1) Dr. Boyle's body of scholarship and service to the broad Biomedical Informatics and Human Genetics communities is both highly impactful and serves to position him as an internationally recognized thought leader in such settings, with particular relevance in the areas of transcriptomics, genome sciences, and precision medicine; and 2) ... Dr. Boyle has clearly established himself as a leader in team and collaborative science paradigms as a means of achieving large-scale impact and collaboration as they relate to complex and critical biomedical research problems, a capacity that is regularly recognized by his academic peers at a national and international level."

Reviewer D: "In sum, Dr. Boyle's contributions in scholarship and research, teaching and service are all exceptional – I think that his is much stronger than most researchers at his career stage. I strongly recommend that he be promoted to the rank of Associate Professor with Tenure (Instructional Track) and would strongly endorse his promotion to Associate Professor if he were at my own institution."

Reviewer E: "I recommend Dr. Boyle for promotion because I think he is an excellent researcher and scholar. His group is focused on development of computational methods, with a specific emphasis on approaches that model transcription factor binding. Dr. Boyle's approach to these questions has especially benefitted from two key aspects of his work: his computational innovations and making them available to the broader biomedical community, such as through RegulomeDB...I think it is important to note that Dr. Boyle has a very strong funding record, with funds obtained with PI and co-PI roles. His publication record is also strong, with multiple publications in top specialist journals in computational biology (e.g. *Bioinformatics*) and in biology journals (e.g. NAR and Am J Hum Genet). Given his impact, productivity, and vision, I am confident he will continue addressing important biomedical problems with innovative computational approaches. Therefore, I highly recommend him for promotion to the rank of Associate Professor with tenure."

Summary of Evaluations:

Dr. Boyle is a very active laboratory mentor who is making a substantial effort to enhance the classroom experiences of bioinformatics students. His research is respected and well supported by grant funding. Dr. Boyle is active in diversity, equity and inclusion locally and nationally. I am pleased, therefore, to recommend Alan P. Boyle, Ph.D. for promotion to 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.



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