

PROMOTION RECOMMENDATION  
The University of Michigan  
School of Public Health  
Department of Biostatistics

Walter Dempsey, assistant professor of biostatistics, without tenure, School of Public Health, is recommended for promotion to associate professor of biostatistics, with tenure, School of Public Health [also being promoted to research associate professor, Survey Research Center, Institute for Social Research].

Academic Degrees:

Ph.D.	2015	University of Chicago, Chicago, IL
B.S.	2009	University of Chicago, Chicago, IL

Professional Record:

2019-Present	Assistant Professor, Department of Biostatistics, University of Michigan, Ann Arbor, MI
2019-Present	Assistant Research Professor, Survey Research Center, Institute of Social Research, University of Michigan, Ann Arbor, MI
2019-Present	Affiliated Faculty, Michigan Institute for Data Science, University of Michigan, Ann Arbor, MI
2017-2019	Post-doctoral Research Fellow, Department of Statistics, Harvard University, Boston, MA
2015-2017	Post-doctoral Research Fellow, Department of Statistics, University of Michigan, Ann Arbor, MI

Summary of Evaluation:

Teaching: Professor Dempsey's teaching record is a testament to his excellence as an educator and his significant contributions to the academic mission of the University of Michigan. Professor Dempsey has taught BIOS 617: Theory and Methods of Sample Design (2020-2023) and BIOS 629: Case Studies in Health Big Data (2021-2023). His teaching effectiveness is underscored by consistently positive teaching evaluations, with instructor ratings (Q2, Q199, Q230) in the top range of 4.0-5.0 out of 5.0. Professor Dempsey has made a significant contribution to the biostatistics curriculum through his co-creation of the innovative course "Case Studies in Health Big Data (BIOSTAT629)." This project-based course serves as a culmination of the health data science curriculum, providing students with a comprehensive research experience. One key highlight of this course is Professor Dempsey's efforts to incorporate real-world mobile health (mHealth) studies into the curriculum, enabling students to work with large and authentic datasets. This practical exposure to diverse health data sources enriches the educational experience and prepares students for real-world research challenges. Professor Dempsey also taught BIOS 646, cross-listed with the joint program in survey methodology, and modernized its content to incorporate new ideas in non-probability sampling and randomization.

In addition to traditional classroom teaching, Professor Dempsey's teaching portfolio includes mentoring and advising doctoral students. He is currently advising four Ph.D. students; two more graduated in Summer 2023. One of his students was recently awarded an F31 grant from the National Institutes of Health (NIH) to support the remaining year and a half of her Ph.D. program. He has also served on 13 dissertation committees. He not only supports students in their academic

endeavors, but also aids in their professional and personal development. His guidance helps students navigate their academic journeys, make informed career choices, and develop the skills necessary for success in their chosen fields.

**Research:** Professor Dempsey has exhibited outstanding scholarly contributions in three major areas of biostatistics: micro-randomized trials (MRTs), causal inference, and network models. He is also beginning research in the area of selection bias and the Big Data Paradox for modern large datasets collected through non-probability samples. Professor Dempsey's work delves into an emerging interdisciplinary field that intersects mHealth, temporal dynamics, and causal inference, positioning him as a trailblazer in this rapidly evolving domain. Professor Dempsey's groundbreaking work on causal excursion effects has had a profound impact on the field of mHealth and MRTs, holding the potential to significantly enhance precision health. His recent endeavors in machine learning for network data, encompassing community detection and structured interaction networks, further underscore his innovative and vital contributions to the field. Beyond MRTs, his contribution to network analysis has been innovative. Professor Dempsey's more recent collaborations at the University of Michigan, including with his Ph.D. student Yuhua Zhang, showcase his independence and the evolution of his research in new directions. This adaptability and capacity for growth bode well for his future contributions.

Professor Dempsey's record of research productivity is outstanding. His prolific publication record contains a commendable blend of methodological and collaborative research published in high-impact journals. Professor Dempsey's portfolio contains 38 peer-reviewed papers, with one-third featuring him as the first or senior author. His publications appear in esteemed journals, including the *Journal of the American Statistical Association (JASA)* and *Biometrika*, demonstrating the caliber of his work. Several publications in journals like *Annals of Applied Statistics*, *Journal of Computational and Graphical Statistics (JCGS)*, *Statistica Sinica*, and *Statistical Science* further underscore the breadth of his scholarly excellence. His collaborative publications are in top journals, such as *Annals of Internal Medicine* and *JAMA Network Open*. According to Google Scholar, his publications have been cited over 694 times, with an h-index of 14 and i10-index of 17. While citation metrics are difficult markers for early career faculty, these metrics demonstrate signs of broad impact of his scholarly work.

Professor Dempsey has a strong record of funding. He successfully assumed the role of co-investigator on multiple research grants, attesting to his collaborative nature and ability to secure external funding for research projects. He is highly integrated with the key mHealth clinical researchers on campus with a focus on cardiac rehabilitation and mental health. Professor Dempsey has multiple pending awards as a principal investigator (PI), including an R01 from the NIH, which scored in the 8th percentile, and a grant from the National Science Foundation.

#### **Recent and Significant Publications:**

- Dempsey, W. (2023) Addressing selection bias and measurement error in COVID-19 case count data using auxiliary information. *The Annals of Applied Statistics*, 17(4), 2903-2923. <https://doi.org/10.1214/23-aos1744>
- Shi, J., Wu, Z., & Dempsey, W. (2023). Assessing time-varying causal effect moderation in the presence of cluster-level treatment effect heterogeneity and interference. *Biometrika*, 110(3), 645–662. <https://doi.org/10.1093/biomet/asac065>
- Dempsey W. (2021). Exchangeable Markov multi-state survival processes. *Statistica Sinica*, 31(4), 1807–1828. <https://doi.org/10.5705/ss.202018.0403>
- Dempsey, W., Oselio, B., & Hero, A. (2022). Hierarchical network models for exchangeable

structured interaction processes. *Journal of the American Statistical Association*, 117(540), 2056–2073. <https://doi.org/10.1080/01621459.2021.1896526>

Dempsey, W., Liao, P., Kumar, S., & Murphy, S. A. (2020). The stratified micro-randomized trial design: sample size considerations for testing nested causal effects of time-varying treatments. *The annals of applied statistics*, 14(2), 661–684. <https://doi.org/10.1214/19-aos1293>

Service: Professor Dempsey’s administrative and service contributions to the department, school, university, and the broader scientific community have been exemplary. Within his department, Professor Dempsey has served on the Ph.D. Qualifying Exam Committee (2021-2022), the Faculty Search Committee (2021-2022), the Junior Faculty Search Committee (2022-2023), and the M.S. in Data Science Admissions Committee (2023-2024). He has held committee leadership roles, serving as the co-chair of the Seminars/Brown Bag Committee (2020-2022) and as the chair of the Faculty Retreat Planning Committee (2023-2024). At the school level, Professor Dempsey was a member of the Bank of America-funded Health Equity Initiative (2022-2023) as well as the Sharpening Our Competitive Edge Working Group (2022-2023).

Professor Dempsey’s extensive record of 40 invited presentations highlights his active engagement in sharing knowledge and research findings. These presentations not only reflect the quality and significance of his work but also indicate his commitment to disseminating research outcomes to a wider audience. Such presentations contribute to the reputation of the university and the department by showcasing the expertise and research excellence of its faculty.

In addition to his presentations, Professor Dempsey’s contributions to service within the academic community have been noteworthy. His willingness to take on assigned tasks within the department and university demonstrates his strong sense of responsibility and his eagerness to contribute to the institution's well-being. Professor Dempsey's substantial involvement in journal reviewing is another testament to his service-oriented mindset. His contributions as a reviewer significantly contribute to the quality and rigor of research published in these journals, reflecting positively on both him and the University of Michigan.

Professor Dempsey’s prestigious role as an associate editor at the *Harvard Data Science Review* since 2019 underscores his leadership and expertise in his field. Starting in January 2024, he will also hold a role as an associate editor for the *Annals of Applied Statistics*. Professor Dempsey actively engages in service to the Eastern North American Region of the International Biometric Society Regional Advisory Board, highlighting his dedication to service beyond the university.

#### External Reviewers:

Reviewer A: “Dempsey has published extensively and has very good combination of methods and collaborative publications in high impact journals. He is working in an emerging area of research that combines multiple areas of research including mHealth, temporal dynamics, and causal inference...his papers...are of high quality, contribute substantially to the existing literature, and have the potential to open up new avenues of research.”

Reviewer B: “Dr. Walter Dempsey is a serious statistician/biostatistician. He writes high-quality research papers and publishes many of them in leading statistics journals...He is above the bar of tenure at my university.”

Reviewer C: “Dr. Dempsey is a leader in the design and analysis of micro-randomized trials for mHealth as well as in the analysis of structured interaction networks (as well as in other areas in

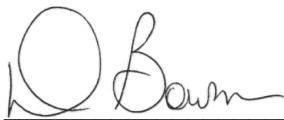
biostatistics...). He is the complete package: he easily meets and exceeds the expectations for promotion to associate professor with tenure for any biostatistics program nationally or internationally, including here at [my university].”

Reviewer D: “Dr Dempsey’s work covers a variety of topics – touching on classical survival analysis to cutting edge trial designs for wearables (‘micro-randomized trials’) and contributing to pressing topics in public health such as accurate inference from available data in the context of surveillance of the COVID-19 pandemic. I have no doubt that Dr Dempsey would be granted promotion with tenure at my university.”

Reviewer E: “Dr. Dempsey has made exceptional contributions to the field of micro-randomized trials (MRTs) and their potential to revolutionize mobile health interventions. Given this substantial and demonstrated track record, there is no doubt that Dr. Dempsey is more than qualified for promotion to the rank of Associate Professor, with tenure, at my institute.”

Reviewer F: “His package is indicative of a very productive and creative researcher, with well-established collaborations and a clear ongoing trajectory for future research. If he were up for tenure at my institution (or indeed any major Statistics department at an R1 university), I would expect his candidacy to sail through with no problems.”

Summary of Recommendation: Professor Dempsey’s specific expertise in precision medicine and mHealth is of critical importance in advancing cutting-edge medical research. His impressive publication and funding records solidify his position as a top researcher in the field. He has an excellent record in research, teaching, and service. It is with the support of the School of Public Health Executive Committee that I recommend Walter Dempsey be promoted to the rank of associate professor, with tenure, School of Public.



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F. DuBois Bowman, Ph.D.  
Dean, School of Public Health

May 2024