

PROMOTION RECOMMENDATION

The University of Michigan
School of Public Health
Department of Biostatistics

Lu Wang, associate professor of biostatistics, with tenure, Department of Biostatistics, School of Public Health, is recommended for promotion to professor of biostatistics, with tenure, Department of Biostatistics, School of Public Health.

Academic Degrees:

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| Ph.D. | 2008 | Harvard University |
| M.A. | 2007 | Harvard University |
| M.S. | 2004 | University of Michigan |
| B.S. | 2002 | Peking University |

Professional Record:

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| 2015-Present | Associate Professor, Department of Biostatistics, University of Michigan |
| 2015 | John G. Searle Assistant Professor, Department of Biostatistics, University of Michigan |
| 2008-2014 | Assistant Professor, Department of Biostatistics, University of Michigan |
| 2006-2008 | Graduate Student Teaching Fellow, Department of Biostatistics, Harvard University |
| 2006 | Graduate Student Research Assistant, Department of Biostatistics, Harvard University |
| 2004-2006 | Graduate Student Research Assistant, Center for Biostatistics in AIDS Research, Harvard University |
| 2002-2004 | Graduate Student Research Assistant, Department of Biostatistics, University of Michigan |

Summary of Evaluation:

Teaching – Professor Wang has taught courses in a variety of areas including introductory theory, longitudinal and categorical data analysis, missing data, causal inference, and dynamic treatment regimes. She has developed a Ph.D. level course on statistical methods in personalized medicine that combines causal inference and dynamic treatment regimes, which provides essential, fundamental training for biostatistics students in the era of precision medicine. She is greatly admired by her students, receiving excellent evaluations. In 2019, she was nominated for the coveted School of Public Health Excellence in Teaching Award. She has chaired or co-chaired dissertation committees for nine doctoral students. Professor Wang’s students have won several prestigious student paper awards. Beyond her doctoral advisees, Professor Wang has a number of graduate student advisees in biostatistics and in other disciplines. Professor Wang is one of the most popular instructors in the Department of Biostatistics.

Scholarship – Professor Wang is a leader in statistical inference with missing data and causal inference and machine learning, who has made important advances in personalized medicine. Professor Wang has made significant contributions to the missing data literature. For example, in her *Statistica Sinica* paper in 2016 with her student Peisong Han and collaborator Peter Song,

Professor Wang discovers a brilliant empirical likelihood based robust solution for outcome missingness in generalized linear models. Her *Biometrics* paper with student Fei Wang and Peter Song in 2015 delves into data fusion where different studies are missing different covariates. Her innovative and rigorous statistical work is always supported by compelling applications. Many of her collaborations stem in morphomics, generating massive amounts of data and issues with variable selection, pushing her methodological work in variable selection with fused LASSO (Wang, Wang and Song, *Biometrics*, 2016). This dialogue between methodology and collaboration has led Professor Wang to focus more recently on personalized medicine and machine learning. Her 2018 paper in the *Annals of Applied Statistics* uses tree-based reinforcement learning to determine optimal dynamic treatment regimes.

Professor Wang's strong research record resonates with her success in obtaining external funding as a co-investigator on collaborative grants, and her intramural awards as the PI. She is currently serving as a co-investigator on six National Institutes of Health (NIH) or Centers for Disease Control and Prevention (CDC) grants. She also has received support from industry partners including Eli Lilly and DiDi Chuxing. She has demonstrated quite clearly with her outstanding funding record that she is providing strong statistical leadership to biomedical research at the University of Michigan. Professor Wang also has several extramural submissions pending for supporting her methodological research as the PI. Professor Wang's overall research record is impressive, with 77 peer-reviewed publications in the eleven years since receipt of her Ph.D. Of these, 40 have been published since 2015 when she was promoted to associate professor. Approximately 25 of the 77 are methodological publications, and 11 of them have Professor Wang as first or senior author. Her papers have appeared in top notch statistical journals like the *Journal of the American Statistical Association*, *Biometrika*, *Biometrics*, *Annals of Applied Statistics*, and *Statistics in Medicine*. Her collaborative research has appeared in *JAMA Surgery*, *JAMA Network Open*, *Annals of Surgery*, *American Journal of Hypertension*, and *American Journal of Cardiology*. She has presented 54 invited talks and is a highly sought-after speaker on precision medicine.

Recent and Significant Publications:

- Wang, F., Wang, L., and Song, P. (2016). Fused Lasso with the Adaptation of Parameter Ordering in Combining Multiple Studies With Repeated Measurements. *Biometrics*, 72(4): 1184-1193.
- Han, P., Wang L, and Song P. (2016). Doubly Robust and Locally Efficient Estimation with Missing Outcomes. *Statistica Sinica*, 26: 691-719.
- Tao, Y., and Wang, L. (2017). Adaptive Contrast Weighted Learning for Multi-Stage Multi-Treatment Decision-making. *Biometrics*, 73(1): 145-155.
- Shen, J., Wang, L., and Taylor, J. M. G. (2017). Estimation of the Optimal Regime in Treatment of Prostate Cancer Recurrence from Observational Data Using Flexible Weighting Models. *Biometrics*, 73(2): 635-645.
- Tao, Y., Wang, L., and Armirall, D. (2018) Tree-based Reinforcement Learning for Estimating Optimal Dynamic Treatment Regimes. *Annals of Applied Statistics*, 12 (3): 1914-1938.

Service – Professor Wang’s record of professional service is outstanding, both at the University of Michigan as well as to the profession at large. Her contribution to the Council on Education for Public Health (CEPH) accreditation process as the departmental representative and to the University Faculty Senate as a school representative is highly valued. Professor Wang serves or has served on multiple committees, and on a scientific review board that evaluates grant applications from collaborative groups at the University of Michigan and Peking University as part of the Joint Institute for Translational and Clinical Research. She is a frequent organizer of invited sessions at major statistical conferences and receives many invitations to present her work at professional society conferences and in academic seminars and colloquia. Her editorial service is considerable as she serves routinely as a referee for top tier journals in the field, and has been appointed as associate editor for two major journals in biostatistics (*JASA* and *Biometrics*).

External Reviewers:

Reviewer A: “Her 2016 *Statistica Sinica* paper with her student Han and Peter Song is very innovative and strong...The solution they discovered is brilliant, and the technical analysis of it is impressive.”

Reviewer B: “I am very familiar with her work on methodology for dynamic treatment regimes and can attest to its importance and originality. I am currently, with three colleagues, finishing a comprehensive book on this topic, and Dr. Wang is frequently cited.”

Reviewer C: “Her publication record is an impressive mix of methods development and applications with clinical and other scientific collaborators. The methods papers in particular, many highlighting work of her students (and many of which earned student paper awards at the statistical meetings at which the work was presented), have appeared in the top rank of biostatistics journals such as *Biometrika* and *Biometrics*.”

Reviewer D: “...she is regarded as one of the world’s leading researchers in precision medicine... Dr. Wang is one of the top biostatisticians of her generation, a leader in data science and machine learning, and a consummate professional in every dimension.”

Reviewer E: “Dr. Wang’s publication record is not only extensive but also displays a wide range of collaborative relationships, indicating flexibility, strong interpersonal skills, and the ability to translate theoretical concepts into rigorous clinical and public health research. Not all strong statisticians have this ability, and I am quite sure that, as a result, Dr. Wang, is quite a valuable member of your academic community.”

Reviewer F: “...the quality, quantity, independence, rigor, and nature both of Dr. Wang’s methodological and collaborative biostatistical scholarly output places her in the top tier of her peer group in the area of clinical biostatistics.”

Reviewer G: “Professor Wang has a distinguished national reputation, with numerous publications in the leading statistical journals, including the *Journal of the American Statistical Association*, *Biometrika*, *Biometrics*, and the *Annals of Applied Statistics*. Additionally, she has extensive collaborative publications in the health sciences.”

Reviewer H: “Dr. Wang has extensive expertise in missing data and has published a series of impactful papers on this topic. Dr. Wang’s work on causal inference is remarkable with a number of influential contributions to the field. Her published work is extremely well motivated, creative and of high quality.”

Summary of Recommendation: Professor Wang is an accomplished biostatistician with an impressive record of research, teaching and service to the profession. Her scholarly achievements and contributions to the broader statistical community are outstanding. Her collaborative record is stellar with collaborations spanning across environmental health, morphomics, surgery and autoimmune diseases. She is a much-admired educator and mentor for graduate students in biostatistics and beyond. Her citizenship and service to the department, school and the institution is extensive and impressive. Her service to the broader profession is substantial. It is with the support of the School of Public Health Executive Committee that we recommend Lu Wang for promotion to professor of biostatistics, with tenure, Department of Biostatistics, School of Public Health.



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

May 2020