Approved by the Regents
May 16, 2013

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

Bhramar Mukherjee, 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:

Ph.D.	2001	Purdue University
M.S.	1999	Purdue University
M.Stat.	1996	Indian Statistical Institute
B.Sc.	1994	Presidency College

Professional Record:

2009-present	Associate Professor, Department of Biostatistics, University of Michigan
2006-2009	Assistant Professor, Department of Biostatistics, University of Michigan
2002-2006	Assistant Professor, Department of Statistics, University of Florida

Summary of Evaluation:

Teaching – Professor Mukherjee taught Biostat 503 (perhaps the toughest SPH course based on the diversity in numeracy of the audience) for three years and did a superb job. Her teaching evaluations have been remarkable, and she has attracted so many students from other courses that the Department of Biostatistics has had to turn people away. She submitted a proposal on revising the data analysis modules associated with BIOSTAT 503, which was selected for a faculty development fund award by CRLT in 2007-08. She taught Biostat 695 and 699 for our Masters and Ph.D. students and again obtained fantastic student evaluations. In the fall of 2011 she taught 553 which is another introductory course for mostly epidemiology and environmental health sciences students needing more mathematical background. She again received excellent student evaluations. Over the years, the written comments have raved about her teaching style and how it motivated them to learn more biostatistics. In recognition of her teaching achievements, she was awarded the 2012 School of Public Health Excellence in Teaching Award. She regularly teaches courses in the Summer Program in Epidemiology as well as short courses for professional society annual meetings.

Professor Mukherjee was a recent recipient of a Gilbert Whitaker Fund award and is in the process of developing a cross-disciplinary course aimed at students from biostatistics, epidemiology and environmental health sciences. This effort will propel Michigan to the forefront of pedagogy in public health where such a cross fertilization of student backgrounds will occur in the same classroom towards understanding the modern statistical methods in the context of real applications.

Professor Mukherjee currently supervises three Ph.D. students and four have completed Ph.D. under her supervision since coming to Michigan in 2006. She serves on numerous dissertation committees within and outside the department. She also supports seven graduate student research assistants. She is a fantastic mentor.

Research – Professor Mukherjee has a superb record of scholarly research. She has 85 published articles, with 17 first author papers and 13 with her doctoral students as first author and Professor Mukherjee as the second or the last author (per departmental convention, we count these as equivalent to first author papers). Of the 85 published articles, 53 are methodological in nature and 32 are collaborative in nature.

Even the collaborative papers indicate real leadership on the design and analysis and have an associated methodological piece. This shows that Professor Mukherjee's methods development is well rooted in the substantive applications. She also has several first author substantive research articles appearing, for example, in *Gastroenterology* and *Journal of Clinical Epidemiology*. Her methodological articles have been published is top journals such *Biometrics*, *Statistics in Medicine*, and *Journal of the American Statistical Association*. She has several more articles submitted and under preparation as first author, or has a student as first author.

Professor Mukherjee's methodological research relates to the analysis of data from case-control studies with special focus on gene-environment interaction. She brings a Bayesian perspective in analyzing the data where one of the *priors* is the assumed independence of genetic susceptibility with the environmental exposure of the individual. This allows for an efficient approach to the estimation of the odds ratio with cases only, or with very few controls. She also developed methodology for correcting for misclassification in the exposure in the gene-environment interaction studies. Her articles on this topic have received considerable attention. Professor Mukherjee also has extended the traditional case-control study design options to ordinal case-control definitions such as stages of cancer versus control comparisons. Another area of research contribution is nonparametric Bayesian inference. Professor Mukherjee's methods development follow a pragmatic pattern where Bayesian formalism is used in structuring the problem but then the methods are designed to have desirable *frequentist* properties. Such approaches have a long history and are useful in practical applications. This pragmatic approach is a constant theme in all of her research accomplishments.

Professor Mukherjee's collaborative research is in two main substantive areas: cancer research and environmental health. In cancer research, she collaborated with Steve Gruber and an array of researchers in the Department of Environmental Health Sciences. She also works with numerous other researchers in the College of Pharmacy and the Medical School. She brings her methodological expertise in case-control studies, gene-gene and gene-environment interaction, measurement error and high dimensional regression problems to provide the best technology to answer substantive research questions.

Professor Mukherjee has been very successful in receiving grant support. She has received six grants as the PI from the National Institutes of Health and National Science Foundation. She has been a key investigator in numerous other grants. It is clearly evident that her research is of very high caliber, is relevant to practical problems, and is prolific.

Recent and Significant Publications:

Johnson, P.I., Stapleton, H.M., Mukherjee, B., Hauser, R., Meeker, J.D. (2013) Associations Between Brominated Flame Retardants in House Dust and Hormone Levels in Men. *Science of the Total Environment*, 445-446C:177-184.

Lewis, T.C., Robins, T.G., Mentz, G.B., Zhang, X., Mukherjee, B., Lin, X., Dvonch, J.T., Keeler, G.J., Yip, F., O'Neill, M.S., Parker, E.A., Israel, B.A., Max, P.T., Reyes, A. Community Action Against Asthma (CAAA) Steering Committee. Air Pollution and Respiratory Symptoms Among Children With Asthma: Vulnerability by Measures of Asthma Severity and Residence Area. *Science of the Total Environment*, 2012 Dec. 26 [Epub ahead of print].

Ahn, J., Mukherjee, B., Ghosh, M., Gruber, S.B. Bayesian Semiparametric Analysis of Two-phase Studies of Gene-environment Interaction. *The Annals of Applied Statistics* (in press).

Boonstra, P.S., Taylor, J.M.G., Mukherjee, B. Incorporating Auxiliary Information for Improved Prediction in High dimensional Data Sets: An Ensemble of Shrinkage Approaches. *Biostatistics*, 2012 Nov. 7 [E-pub ahead of print].

Mentz, G., Schulz, A., Mukherjee, B., Raghunathan, T.E., White-Perkins, D., Israel, B. (2012) Hypertension: Comparison of Self-reported Data on Hypertension and Measured Blood Pressure in a Tri-ethnic Community. *BMC Health Services Research.* 12: 312.

Li, S., Mukherjee, B., Batterman, S. (2012) Point Source Modeling of Matched Case-control Data with Multiple Disease Sub-types. *Statistics in Medicine*, 31: 3617-37.

Mukherjee, B., Rennert, G., Ahn, J., Dishon, S., Lejbkowicz, F., Rennert, H., Shirovitz, S., Moreno, V., Gruber, S.B. (2011) Risk of Colorectal and Endometrial Cancer in Ashkenazi Families With the MSH2 A636P Founder Mutation. *Gastroenterology*, 140:1919-26.

Ahn, J., Mukherjee, B., Gruber, S.B., Sinha, S. (2011) Missing Exposure Data in Stereotype Regression Model: Application to Matched Case-Control Study with Disease Subclassification. *Biometrics*, 67:546-58.

Service – Professor Mukherjee's contributions to the department, school, and profession are outstanding. She has been a member of numerous departmental and school committees, including the department's new faculty search committee, curriculum committee, and graduate student admissions committee. She has also served on the school's diversity committee and committee on global public health. Since 2009, she has served as a member of over fifteen committees providing service to the profession, and has organized eight sessions at professional meetings. In addition, she has served as a reviewer for over 25 journals, including some of the most highly regarded in the field, and she has served/is serving on the editorial boards of four journals, and as associate editor of another three journals.

External Reviewers:

Reviewer (A): "Professor Mukherjee has an impressive record of important methodological and collaborative research. Overall, I would classify Professor Mukherjee as one of the top ten statistical scientists working in the area of genetic epidemiology."

Reviewer (B): "Dr. Mukherjee's career progression has been remarkable… She successfully obtained funding from the NSA to help with this research transition and has been a great success, with first-authored papers not only in leading biostatistics journals but also in leading journals in genetic epidemiology and medicine more generally."

Reviewer (C): "I can see that she has not only paved a path, but burned one in such a way that she is now surely recognized as one of the world's experts in the analysis of retrospective data. Dr. Mukherjee has surely achieved more than would be necessary to be promoted to full professor at virtually all high level research institutions, like the University of Michigan."

Reviewer (D): "Within statistical genetics, Dr. Mukherjee is a leader in the field of methods development. Her methods are mathematically sound, but at the same time applicable by other researchers. Dr. Mukherjee's methods actually have impact. Sometimes this impact results in these methods being directly used, but in addition, I am aware of quite a few innovative approaches by other researchers that are building on Dr. Mukherjee's work."

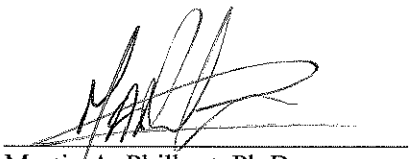
Reviewer (E): "Professor Mukherjee's reputation and impact are most assuredly international in scope. She is a complete professional who is highly productive and effective in research, education and service….Consequently, in my view the case for promotion to Full Professor is crystal clear, and I recommend promotion enthusiastically and without reservation."

Reviewer (F): "She [Professor Mukherjee] would certainly be promoted [at my institution]…What we hope to see in a promotion case is quality that goes far beyond the paper case. Bhramar's work has that quality."

Reviewer (G): "I could go on with further descriptions of her methodological contributions, but suffice it to say that she has an enviable publication record in the top statistical journals and has been very successful in getting grants for methodological research. She is much in demand as an invited speaker. I would rank her as one of the top mid-career biostatisticians in these dimensions. In short, I support her promotion enthusiastically. She is one of your institutions stars and we would love to be able to attract her to come to our own!"

Summary of Recommendation:

Given Professor Mukherjee's excellent research record and productive collaborations, her outstanding success as a teacher and mentor, and her exceptional record of service to her department, school and profession, I am pleased to recommend Professor Bhramar Mukherjee for promotion to professor of biostatistics, with tenure, Department of Biostatistics, School of Public Health.



Martin A. Philbert, Ph.D.
Dean, School of Public Health

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