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

Bhramar Mukherjee, assistant professor of biostatistics, Department of Biostatistics, School of Public Health, is recommended for promotion to associate professor of biostatistics, with tenure, Department of Biostatistics, School of Public Health.

Academic Degrees:

Ph.D (Statistics)	2001	Purdue University, Purdue, Indiana
M.S. (Mathematical Statistics)	1999	Purdue University, Purdue, Indiana
M.Stat. (Applied Statistics & Data Analysis	1996	Indian Statistical Institute, Calcutta, India
B. Sc. (Statistics)	1994	Presidency College, Calcutta, India

Professional Record:

2006-Present	Assistant Professor, University of Michigan, Ann Arbor, Michigan
2002-2006	Assistant Professor, Dept. of Statistics, University of Florida
Summer 2002	Visiting Scholar, Dept. of Statistics, Stanford University Palo Alto, California
Summer 2004	Visiting Scholar, Applied Statistics Unit Indian Statistical Institute, Kolkata, India
Summer 2006	Visitor, Division of Cancer Epidemiology and Genetics The National Cancer Institute, (NCI/NIH), Bethesda, MD.
Summer 2006	Visiting Scholar, Dept. of Mathematics, Statistics and Computer Science, Victoria University, Wellington, New Zealand
Fall 2001	Visiting Assistant Professor, Dept. of Statistics
2004-2005	Purdue University, Purdue, Indiana
Summer 2000	Summer Intern, Statistics Division, Eli Lilly and Company Indianapolis, Indiana

Summary of Evaluation:

Teaching: Professor Mukherjee is an outstanding teacher. She received awards as a graduate student instructor at Purdue University, and has done a fantastic job teaching BIOS 503 at Michigan, a large, difficult-to-teach and important service course for non-majors in public health. Her teaching evaluations have been remarkable, and she has attracted so many students from other courses that the department 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 is a versatile teacher who is also fully capable of teaching more advanced courses.

Professor Mukherjee has also made an excellent start in mentoring graduate students. She co-advised three doctoral students at Florida, and at Michigan she has already developed close ties with graduate student research assistants and is currently supporting three GSRA positions with grant support on methodological and collaborative projects. She is also mentoring several graduate students and post-doctoral fellows in other SPH concentrations on the analytical aspects of their dissertation and research projects.

Research: Professor Mukherjee is a pioneer in the development of Bayesian methods for the analysis of case-control studies. In a series of papers with Sinha, she addressed the problem of handling missingness in exposure values in a matched case-control study, using a unified Bayesian non-parametric framework. More recently, she has devoted much of her research to case-control studies of gene-environment interaction. She extended the standard method for estimating the parameters from a case-control design to incorporate the scientifically plausible assumption that a subject's genetic susceptibility is independent of his/her environmental exposure, allowing for more efficient estimates than those from traditional logistic regression. She proposed a simple approach to correct for misclassification of exposures in studies of gene-environment interaction under gene-environment independence. With Chatterjee she proposed an empirical Bayes-type shrinkage approach to combine the robust prospective estimate and the efficient retrospective estimate of gene-environment interaction parameter in a data-adaptive way. A secondary research area is the analysis of case control data with subclassification of disease states provide theoretical characterization and practical applications. Professor Mukherjee has also developed creative applications of non-parametric Bayes techniques to areas other than epidemiology.

Professor Mukherjee's methodological work has been recognized by a number of grants. Based on her initial work, she received a junior investigator grant from the Mathematical Sciences Division of the National Security Agency in 2005 to develop Bayesian methods for design and inference in case-control studies. In 2007, she was sole PI on an NSF award, "Bayesian Analysis of Studies of Gene-Environment Interaction." A second proposal on "Synergism of Gene and Environment in Cancer Studies: A New Bayesian Approach," submitted to NIH/NCI was concurrently funded under the R03 mechanism for small grants in cancer epidemiology. She has presented 14 invited talks on her research in the last two years alone.

For a statistician with a strong theoretical background, Professor Mukherjee is greatly in demand as a collaborator. She is currently involved in six federally funded collaborative grants as the lead biostatistician and in one as an external consultant. She is one of the core biostatistics faculty in the Occupational and Environmental Epidemiology Concentration in the Department of Environment Health Sciences and a member of the UM Comprehensive Cancer Center, and is also a member of the Biostatistics core of the Michigan Institute for Clinical and Health Research (MICHR).

Recent and Significant Publications:

Ghosh M and Mukherjee B. (2006) Data adaptive sequential design for case-control studies. *Statistica Sinica*, Vol 16, Number 3, 697-719.

Mukherjee B, Zhang L, Ghosh M, and Sinha S. (2007) Bayesian semiparametric analysis of case-control data under conditional gene-environment independence *Biometrics*, 63, No 3, 834-844.

Mukherjee B, Liu I, and Sinha S. (2007) Analysis of Matched case-control data with ordinal disease states: possible choices and comparisons, *Statistics in Medicine*, No 17, 3240–3257.

Mukherjee B and Chatterjee N. (December 20, 2007) Exploiting gene-environment independence for analysis of case-control studies: An empirical-Bayes type shrinkage estimator to trade off between bias and efficiency. *Biometrics*, Online Publication.

Mukherjee B, Ahn J, Rennert G, Gruber S, Moreno V, and Chatterjee N. Testing gene-environment interaction from case-control data: A novel study of Type-1 error, power and designs. (To appear in *Genetic Epidemiology*)

Mukherjee B, Ahn J, Liu I, Rathouz P, and Sanchez B. On elimination of nuisance parameters in a stratified proportional odds model by amalgamating conditional likelihoods. (To appear in *Statistics in Medicine*)

Mukherjee B and Liu I. A characterization of bias for fitting multivariate generalized linear models under choice-based sampling. (To appear in *Journal of Multivariate Analysis*)

<u>Service</u>: Professor Mukherjee has also excelled in terms of service to the school and profession. She is an associate editor for *Biometrics* and co-editor of *Sankyha,* has served on several national committees including the committee for Minorities in Statistics of the American Statistical Association (ASA), the David P. Byar student paper award committee organized by the Biometrics section of the ASA and in many organizational aspects of the International Indian Statistical Association (IISA). She was recently elected to serve as the treasurer/secretary of the ASA section on nonparametric statistics. She has organized several sessions related to my research interest at various conferences and offered short courses at national meetings. She was very involved with numerous committees at Florida, and has actively participated in student recruiting events and faculty search committees at Michigan. She recently led a section of the departmental retreat on faculty mentoring.

<u>External Reviewers:</u>

Reviewer (A): "All in all, it seems to me that Professor Mukherjee is a rising star and most definitely deserving of promotion to Associate Professor. There is no question that someone with such a record would be promoted at my own institution."

Reviewer (B): "She is an outstanding young biostatistician who has made many important contributions already and has wonderful promise for the future."

Reviewer (C): "In summary, Dr. Mukherjee has done some very fine work in statistics since her Ph.D… Remarkably, although she has only been working in the area for two years, I believe she is on the path to obtaining international recognition in statistical genetics. I support her case for tenure at the associate professor level."

Reviewer (D): "Bhramar, in my opinion, is a recognized member of our profession and ranks head and shoulder above her peers. I recommend her promotion and tenure enthusiastically."

Reviewer (E): "Her research is on the cutting edge of statistical methods… She is a highly effective teacher and mentor. She has a national and emerging international reputation; is a valued and valuable colleague and professional citizen."

Reviewer (F): "In summary, Bhramar is one of the leading researchers in her cohort."

<u>Summary of Recommendation:</u>

Professor Mukherjee is an outstanding candidate for promotion in every respect. She is a superb teacher, is strong in methodological and applied research, is active and highly respected on the national scene, and is an excellent citizen in terms of service at Michigan. I enthusiastically recommend that Professor Bhramar Mukherjee be promoted to associate professor of biostatistics, with tenure, Department of Biostatistics, School of Public Health.

Kenneth E. Warner
Dean, School of Public Health

May 2009