

Website: <http://www.columbia.edu/~bc2425/>
Email: bc2425@columbia.edu
Phone: 212-305-9107
Fax: 212-305-9408

Department of Biostatistics
Columbia University
722 West 168th Street
New York, NY 10032

Bibhas Chakraborty

Education

- 2009 PhD (Statistics), University of Michigan, Ann Arbor
Advisor: Prof. Susan A. Murphy
Thesis: *A Study of Non-regularity in Dynamic Treatment Regimes and Some Design Considerations for Multicomponent Interventions*
- 2007 MA (Statistics), University of Michigan, Ann Arbor
- 2003 MStat (with Distinction), Indian Statistical Institute, Calcutta, India
- 2001 BSc (Statistics Honors, First Class First)
R.K. Mission Residential College, Narendrapur
University of Calcutta, Calcutta, India

Appointments

- 08/2009 - Present Assistant Professor
Department of Biostatistics, Columbia University, New York
- 06/2006 - 08/2006 Summer Intern
IBM T.J. Watson Research Center, Yorktown Heights, New York
- 09/2003 - 07/2009 Teaching/Research Assistant
Department of Statistics & The Institute for Social Research,
University of Michigan, Ann Arbor

Research Interests

Dynamic Treatment Regimes and Evidence-based Personalized Medicine

Statistical Machine Learning, Data Mining and Reinforcement Learning

Design and Analysis of Adaptive Clinical Trials, Sequentially Randomized Trials and Multi-component Intervention Trials

Causal Inference Methods

Community-based Public Health and Behavioral Interventions

Grant Support

Ongoing:

- 08/23/10 - 07/31/12 1 R21 DE021187-01 (NIH/NIDCR)
Leveraging Opportunities to Improve Oral Health in Older Adults
Role: Subcontract PI
PI: Northridge
- 07/01/11 - 06/30/14 R01 NS072127-01A1 (NIH/NINDS)
Developing Optimal Dynamic Behavioral Intervention in Community-based Studies
Role: Co-Investigator
Co-PIs: Cheung & Boden-Albala

Completed:

- 09/15/09 - 04/30/11 4 U01 NS039143-08 (NIH/NINDS)
Warfarin vs. Aspirin in Reduced Ejection Fraction
Role: Biostatistician
PI: Thompson

Book (Upcoming)

Chakraborty, B., and Moodie, E.E.M. (2012). Statistical Methods for Dynamic Treatment Regimes: Reinforcement Learning, Causal Inference, and Personalized Medicine. *Under contract with Springer, Inc., New York.*

Journal Articles (Methodological)

1. Moodie, E.E.M., **Chakraborty, B.**, and Kramer, M. (2012). Q-learning for estimating optimal dynamic treatment rules from observational data. *Submitted.*
2. **Chakraborty, B.**, and Moodie, E.E.M. (2012). Estimating optimal dynamic treatment regimes with shared decision rules across stages: An extension of Q-learning. *Under Revision.*
3. Levin, B., Thompson, J.L.P., **Chakraborty, B.**, Levy, G., MacArthur, R.B., Haley, E.C., for the Tenecteplase in Stroke Investigators (2011). Statistical aspects of the TNK-S2B trial of tenecteplase versus alteplase: An efficient, dose-adaptive, seamless phase II/III design. *Clinical Trials, 8(4): 398 - 407.*
4. **Chakraborty, B.** (2011). Dynamic treatment regimes for managing chronic health conditions: A statistical perspective. *American Journal of Public Health, 101(1): 40 - 45.*
5. **Chakraborty, B.**, Murphy, S., and Strecher, V. (2010). Inference for non-regular parameters in optimal dynamic treatment regimes. *Statistical Methods in Medical Research, 19(3): 317 - 343.*
6. **Chakraborty, B.**, Collins, L., Strecher, V., and Murphy, S. (2009). Developing multicomponent interventions using fractional factorial designs. *Statistics in Medicine, 28(21): 2687 - 2708.*
7. Collins, L., **Chakraborty, B.**, Murphy S., and Strecher, V. (2009). Comparison of a phased experimental approach and a single randomized clinical trial for developing multicomponent behavioral interventions. *Clinical Trials, 6(1): 5 - 15.*

Journal Articles (Methodological) (continued)

8. Nair, V., Strecher, V., Fagerlin, A., Ubel, P., Resnicow, K., Murphy, S., Little, R., **Chakraborty, B.**, and Zhang, A. (2008). Screening experiments and the use of fractional factorial designs in behavioral intervention research. *American Journal of Public Health*, 98(8): 1354 - 1359.

Journal Articles (Substantive)

1. Widener, M.J., Metcalf, S., Northridge, M., **Chakraborty, B.**, Marshall, S., and Lamster, I. (2012). Exploring the role of peer density in the self-reported oral health outcomes of older adults: A kernel density based approach. *Submitted*.
2. Northridge, M., **Chakraborty, B.**, Kunzel, C., Metcalf, S., Marshall, S., and Lamster, I. (2012). What contributes to self-rated oral health among community-dwelling older adults? Findings from the Elder-Smile program. *Journal of Public Health Dentistry*. First published online on February 7, 2012, as DOI: 10.1111/j.1752-7325.2012.00313.x
3. Northridge, M., Ue, F., Borrell, L., De La Cruz, L., **Chakraborty, B.**, Bodnar, S., Marshall, S., and Lamster, I. (2011). Tooth loss and dental caries in community-dwelling older adults in northern Manhattan. *Gerodontology*. First published online on July 1, 2011, as DOI: 10.1111/j.1741-2358.2011.00502.x.
4. Zick, S., Schwabl, H., Flower, A., **Chakraborty, B.**, and Hirschhorn, K. (2009). Unique aspects of herbal whole system research. *Explore: The Journal of Science and Healing*, 5(2): 97 - 103.
5. Strecher, V., McClure, J., Alexander, G., **Chakraborty, B.**, Nair, V., Konkell, J., Greene, S., Couper, M., Carlier, C., Wiese, C., Little, R., Pomerleau, C., and Pomerleau, O. (2008). The role of engagement in a tailored web-based smoking cessation program: Results of a randomized trial. *Journal of Medical Internet Research*, 10(5): e36.
6. Strecher, V., McClure, J., Alexander, G., **Chakraborty, B.**, Nair, V., Konkell, J., Greene, S., Collins, L., Carlier, C., Wiese, C., Little, R., Pomerleau, C., and Pomerleau, O. (2008). Web-based smoking cessation components and tailoring depth: Results of a randomized trial. *American Journal of Preventive Medicine*, 34(5): 373 - 381.

Conference Papers

1. **Chakraborty, B.**, Strecher, V., and Murphy, S. (2008). Bias Correction and Confidence Intervals for Fitted Q-iteration. *Selected for a verbal presentation at the Neural Information Processing Systems workshop on Model Uncertainty and Risk in Reinforcement Learning*.

Manuscripts under Preparation

1. **Chakraborty, B.**, and Laber, E.B. (2012). Inference for optimal dynamic treatment regimes using an adaptive m -out-of- n bootstrap scheme.

Invited Talks at Conferences

1. Estimating Optimal Dynamic Treatment Regimes with Shared Decision Rules across Stages: An Extension of Q-learning. *Causal Inference in Health Research Workshop, Centre de Recherches Mathématiques, Montréal, Canada. May 2011.*

Invited Talks at Conferences (continued)

2. Estimating Optimal Dynamic Treatment Regimes with Shared Decision Rules across Stages: An Extension of Q-learning. *IISA Conference on Probability, Statistics, and Data Analysis, Raleigh, North Carolina. April 2011.*
3. Estimating Optimal Dynamic Treatment Regimes with Shared Decision Rules across Stages: An Extension of Q-learning. *Invited session on "Recent Method Development on Reinforcement Learning and Personalized Medicine" at the ENAR Spring Meetings of the International Biometric Society, Miami, Florida. March 2011.*
4. Estimating Optimal Dynamic Treatment Regimes with Shared Decision Rules across Stages: An Extension of Q-learning. *Invited session on "Advances and Applications in Dynamic Treatment Regimes" at the Joint Statistical Meetings, Vancouver, Canada. August 2010.*
5. Inference for Non-regular Parameters in Optimal Dynamic Treatment Regimes. *IMS invited session on "Dynamic Treatment Regimes and Reinforcement Learning in Clinical Trials", ENAR Spring Meetings of the International Biometric Society, New Orleans, Louisiana. March 2010.*
6. Inference for Non-regular Parameters in Optimal Dynamic Treatment Regimes. *Special invited session on "Innovations of Statistics for Biology and Medicine" at the International Conference on Statistics, Probability, Operations Research, Computer Science and Allied Areas, Visakhapatnam, India. January 2010.*
7. Experimental Designs for Building and Refining CAM Interventions. *Workshop on Applying Principles from Complex Systems to Studying the Efficacy of CAM Therapies, Georgetown University School of Medicine, Washington, DC. October 2007.*
8. A Novel Approach for Developing Whole System Herbal Therapies. *International Congress on Complementary Medicine Research, Munich, Germany. May 2007.*
9. The Multi-phase Optimization Strategy: A Novel Way to Develop Multi-component Behavioral Interventions. *ENAR Spring Meetings of the International Biometric Society, Atlanta, Georgia. March 2007.*

Invited Colloquia

1. Estimating Optimal Dynamic Treatment Regimes with Shared Decision Rules across Stages: An Extension of Q-learning. *Causal Inference Working Group, Department of Biostatistics, Johns Hopkins University, Baltimore. September 2011.*
2. Inference for Optimal Dynamic Treatment Regimes. *Applied Statistics Unit, Indian Statistical Institute, Kolkata, India. May 2011.*
3. SMART Designs for Developing Dynamic Treatment Regimes. *Division of Biostatistics, New York State Psychiatric Institute, New York. February 2011.*
4. Dealing with Non-regularity in Optimal Dynamic Treatment Regimes. *Department of Biostatistics & Epidemiology, University of Pennsylvania, Philadelphia, Pennsylvania. February 2010.*
5. Dealing with Non-regularity in Optimal Dynamic Treatment Regimes. *Department of Epidemiology, Biostatistics & Occupational Health, McGill University, Montréal, Canada. September 2009.*
6. Dealing with Non-regularity in Optimal Dynamic Treatment Regimes. *Department of Preventive Medicine, Northwestern University, Chicago. March 2009.*
7. Dealing with Non-regularity in Optimal Dynamic Treatment Regimes. *Department of Biostatistics, Columbia University, New York. March 2009.*

Invited Colloquia (continued)

8. Dealing with Non-regularity in Optimal Dynamic Treatment Regimes. *Department of Statistics, Purdue University, West Lafayette, Indiana. March 2009.*
9. Dealing with Non-regularity in Optimal Dynamic Treatment Regimes. *RAND Statistics Group, Santa Monica, California. March 2009.*
10. Dealing with Non-regularity in Optimal Dynamic Treatment Regimes. *Department of Biostatistics, University of North Carolina, Chapel Hill, North Carolina. February 2009.*
11. Multistage Decision Policies via Q-learning: Bias Correction and Confidence Intervals. *Bell Labs, Murray Hill, New Jersey. January 2009.*
12. Inference for Multistage Decision Policies via Regularized Q-Learning. *Yahoo! Research Lab, Santa Clara, California. March 2008.*
13. Forever Free: Preliminary Analysis. *Center for Health Communications Research Seminar Series, University of Michigan, Ann Arbor, Michigan. March 2006.*
14. Design Strategies for Behavioral Intervention Research: A New Direction. *The Methodology Center Brownbag Seminar Series, Pennsylvania State University, State College, Pennsylvania. March 2005.*

Contributed Talks

1. Estimating Optimal Dynamic Treatment Regimes with Shared Decision Rules across Stages: An Extension of Q-learning. *XXVth International Biometric Conference, Florianópolis, Brazil. December 2010.*
2. Inference for Nonregular Parameters in Optimal Dynamic Treatment Regimes. *ENAR Spring Meetings, San Antonio, Texas. March 2009.*
3. Bias Correction and Confidence Intervals for Fitted Q-iteration. *Neural Information Processing Systems workshop on Model Uncertainty and Risk in Reinforcement Learning, Whistler, Canada. December 2008.*
4. Inference for Dynamic Treatment Regimes via Q-Learning. *Joint Statistical Meetings, Salt Lake City, Utah. July 2007.*
5. Forecasting Future Capital Expenditures of IBM Research. *Mathematical Sciences Division Seminar Series, IBM T.J. Watson Research Center, Yorktown Heights, New York. August 2006.*
6. The Multi-phase Optimization Strategy: A New Way to Develop Multi-component Interventions. *ENAR Spring Meetings, Tampa, Florida. March 2006.*

Poster Presentations

1. Dealing with Non-regularity in Optimal Dynamic Treatment Regimes. *Causal Inference in Statistics and the Quantitative Sciences Workshop, Banff, Canada. May 2009.*
2. Dealing with Non-regularity in Optimal Dynamic Treatment Regimes. *Michigan Student Symposium for Interdisciplinary Statistical Sciences, Ann Arbor, Michigan. April 2009.*
3. Estimation and Inference for Optimal Dynamic Treatment Regimes. *Michigan Student Symposium for Interdisciplinary Statistical Sciences, Ann Arbor, Michigan. March 2007.*

Special Topic Workshops Attended

- December 2009 Understanding and Solving Complex Business Problems. *MIT Sloan School of Management, Cambridge, Massachusetts.*
- November 2009 Scientific Advances in Adaptive Clinical Trial Designs Workshop. *Bethesda, Maryland.*
- December 2008 Neural Information Processing Systems (NIPS-08) Workshop on Model Uncertainty and Risk in Reinforcement Learning. *Whistler, Canada.*
- October 2007 Workshop on Applying Principles from Complex Systems to Studying the Efficacy of CAM Therapies. *Georgetown University School of Medicine, Washington, DC.*
- June 2007 Workshop on Challenges in Dynamic Treatment Regimes and Multistage Decision-Making. *SAMSI, Research Triangle Park, North Carolina.*
- September 2005 Workshop on Methodology for Adaptive Treatment Strategies. *Institute for Social Research, University of Michigan, Ann Arbor, Michigan.*

Awards and Honors

- 2011 Calderone Research Award for Junior Faculty – Awarded by the Mailman School of Public Health, Columbia University
- 2010 Biography selected for Marquis Who's Who in America (2011, 65th Ed.)
- 2008 Rackham Conference Travel Grant, University of Michigan
- 2007 Rackham Conference Travel Grant, University of Michigan
- 2007 Conference Travel Grant, International Society for Complementary Medicine Research
- 2006 Rackham Conference Travel Grant, University of Michigan
- 2005 Rackham Conference Travel Grant, University of Michigan
- 2003 - 2004 Fellowship for First Year Graduate Students, Department of Statistics, University of Michigan
- 2003 Dewesh-Kamal Scholarship to pursue higher studies in the United States – Awarded by the Ramakrishna Mission Institute of Culture, Calcutta, India
- 2001 Prof. Anil Bhattacharya Memorial Award, for obtaining the highest grade in Statistics in the B.Sc. Examination (Part II) of the University of Calcutta – Awarded by R.K. Mission Residential College, Narendrapur, India
- 2000 Swami Lokeswarananda Memorial Gold Medal, for obtaining the highest grade in Statistics in the B.Sc. Examination (Part I) of the University of Calcutta – Awarded by R.K. Mission Residential College, Narendrapur, India

Teaching Experience

As Instructor:

Department of Biostatistics, Columbia University

Spring 2010, Spring 2011, Spring 2012

Linear Regression Models (MS Level)

As Invited Guest Instructor:

Spring 2011

Randomized Clinical Trials I (MS Level, 2 Lectures)
Department of Biostatistics, Columbia University

Spring 2011

Basic Statistics for Dermatology Residents (1 Lecture)
Department of Dermatology, Columbia University

As Teaching Assistant:

Department of Statistics, University of Michigan

Fall 2008

Linear Models (PhD Level)

Fall 2008

Design of Experiments (MS Level)

Fall 2006, Winter 2007, Fall 2007, Winter 2008

Applied Statistics (MS Level)

Fall 2003

Introduction to Statistics and Data Analysis
(Undergraduate Level, Pre-calculus)

Professional Affiliations and Services

Departmental Services at Columbia University:

Member (2010 - Present)

Theory Qualifying Exam Committee, PhD Program
in Biostatistics

Member (2011 - Present)

Admissions Committee, Doctor of Public Health
(DrPH) Program in Biostatistics

Member (2012 - Present)

Applications Qualifying Exam Committee, PhD
Program in Biostatistics

Services to the Profession:

Consulting Editor in Statistics

Journal of Cardiovascular Pharmacology

Journal Reviewer

American Journal of Public Health
Biometrics
Journal of the American Statistical Association
Journal of the Royal Statistical Society
Statistical Science

External Grant Reviewer

Alzheimer's and Related Diseases Research Award
Fund, Virginia Commonwealth University Medical
Center

Professional Affiliations and Services (continued)

Clinical Trial Protocol Reviewer
Rare Disease Clinical Research Network (RDCRN),
National Institute of Neurological Disorders and
Stroke (NIH/NINDS)

Session Organizer at ENAR Spring Meetings 2012
*Recent Advances in Dynamic Treatment Regimes
Research*

Session Organizer at the SCT Annual Meeting 2012
*Developing Evidence-based Multistage Treatment
Policies from Clinical Trials Data*

Professional Memberships:

Member (2004 - Present)
American Statistical Association

Member (2005 - Present)
Eastern North American Region (ENAR), Interna-
tional Biometric Society

Member (2010 - Present)
International Indian Statistical Association