Arka P. Ghosh

Assistant Professor
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(I) Degrees:

Ph.D.	University of North Carolina (UNC), Chapel Hill (USA) (Thesis: Control problems for queueing networks in heavy traffic, Advisor: A. Budhiraja)	Statistics	Aug. 2005
M.S.	University of North Carolina (UNC), Chapel Hill (USA)	Statistics	May 2005
M.Stat.	Indian Statistical Institute (ISI), Calcutta (India) (Specialization: Mathematical Statistics and Probability)	Statistics	June 2000
B.Stat.	Indian Statistical Institute (ISI), Calcutta (India)	Statistics	June 1998

(II) Professional Experience:

Iowa State University appointment:

Assistant Professor	Statistics	Aug. 2005 - present

Other appointments:

Graduate Fellow	Statistical and Applied Mathematical Sciences Institute (SAMSI), Research Triangle Park, NC	Aug. 2003 - May 2004
Math. Instructor	Summer Bridge Program, Dept of Mathematics, UNC-Chapel Hill	Summer 2002, 2003, 2004
Stat. Instructor	Dept of Statistics, UNC-Chapel Hill (as a TA, with full course responsibility)	Spring 2002- Fall 2004.

(III) Teaching:

(a) Courses: (averages shown)

Course # & Title	**Sem.**	**Enrol.**	**Eval.**
Iowa State:			
Stat 430X: Empirical Methods for Comp. Sc. Research	S07, S06	16	4.32/5
Stat 642: Measure Theory and Probability Theory	F06	20	4.58/5
Stat 322: Probabilistic Methods for Electr. Engineers	F05	56	4.50/5
UNC-Chapel Hill:			
Stat 011: Introduction to Statistics	F04, S03, F02, S02	55.75	3.75/5
Math 010: College Algebra	Sum02, Sum03, Sum04	13	4.33/5

(b) Course and curriculum development activity:

Stat 430X: Developed the new course, STAT 430X: *Empirical Methods For Computer Science Research* and taught this experimental course in Spring of 2006 and 2007. The objective of this course was to provide a sound foundation in statistical thinking and methodologies that are relevant for the research of the graduate students in computer science (and students from other graduate programs like Electrical Engineering, Human Computer Interaction (HCI), Bioinformatics and Computational Biology). The students were required to apply the statistical techniques learned in this course in research problems arising in their research area, and complete an in-depth project during the semester. Many of these projects became significant parts of their dissertations and some led to research publications. Projects of the students: W. Putthividhya (class of Spring 2006, major prof: W. Tavanapong, Dept. of Computer Sc.) and A. Agrawal (class of Spring 2007, major prof: X. Huang, Dept of Computer Sc.) resulted in research publications mentioned below (see [9] and [10] in publication list).

(IV) **Advising:**

(a) Currently co-advising 1 M.S. student (with R. Maitra, Stat.). Also co-advising 1 Ph. D student (with H. Wu, Stat. and S. Basu, Comp. Sc.).

(b) I am currently in 6 Ph.D committees and 2 M.S committees.

(V) **Publications:**

Book Chapters

[1] Heavy traffic methods in wireless systems: towards modeling heavy tails and long range dependence. (with R. T. Buche, V. Pipiras, and J. X. Zhang). *IMA Volumes in Mathematics and its Applications Series, Vol. 143: Wireless Communications, Springer-Verlag.* (Editors: P. Agrawal, D. M. Andrews, P. J. Fleming, G. Yin, and L. Zhang) vol 143, 2007, X, p. 53-74 (2007).

Journal Publications (refereed)

[2] A simple statistical method for recognition of hand-written numerals. *Calcutta Statistical Association Bulletin*, 54, no. 213-214, p. 81-91 (2003).

[3] A large deviations approach to asymptotically optimal control of crisscross network in heavy traffic. (with A. Budhiraja), *Annals of Applied Probability*, Vol 15, no. 3, p. 1887-1935 (2005).

[4] Diffusion approximations for controlled stochastic networks: An asymptotic bound for the value function. (with A. Budhiraja), *Annals of Applied Probability*, Vol. 16, no. 4, p. 1962-2006 (2006).

[5] Optimal buffer size for a stochastic processing network with a drift (with A. Weerasinghe) *Queueing systems*, Volume **55**, Number 3 / March, 2007, p. 147 - 159 (2007).

[6] Growth of preferential attachment random graphs via continuous-time branching processes. (with K. B. Athreya and S. Sethuraman), *Proceedings Mathematical Sciences* (Accepted), (2007).

Conference Proceedings (refereed)

[7] Heavy traffic limits in a wireless queueing system with long range dependence (with R. T. Buche and V. Pipiras), *Proceedings of the IEEE Conference on Decision and Control*, New Orleans, LA, December 2007 (Accepted), (2007).

Pending:

[8] Optimal buffer size and dynamic rate control for a queueing network with reneging in heavy traffic. (with A. Weerasinghe), *Submitted*, (2007).

[9] Modeling of available bandwidth of end-to-end paths. (with W. Putthividhya and W. Tavanapong), *Submitted*, (2007).

[10] Estimating statistical significance of pairwise protein local alignments using a clustering classification approach based on amino-acid composition . (with A. Agrawal and X. Huang), *Submitted*, (2007).

(VI) **Honors and Awards:**

(a) Grants:

Received:

i. **NSF Proposal** DMS-0608634 (2006): *Collaborative Research: Heavy Traffic Limit Models and Control Analysis for Wireless Queueing Systems - Incorporating Long Range Dependence and Heavy Tails.* I am the PI on this grant, with my part being $117000, Sept 2006 - Aug 2009 (other PIs: R.T. Buche (NC state), V. Pipiras (UNC-Chapel Hill)).

Other Grant-writing efforts:

i. Participant of the Research Training Group (RTG) grant, Statistics Dept. at Iowa State.
ii. Member of the advisory group of the VIGRE grant (2005), Statistics Dept. at Iowa State.
iii. Department of Defense Multidisciplinary Research Program of the University Research Initiative (MURI, Topic 18) (2007). Submitted white-paper for the grant with a team (consisting of researchers from Georgia Tech., UW-Madison, UMD-College Park, Arizona State Univ., NC State and UNC Chapel Hill). (declined)

(b) Honors:

i. *Bose-Nandi Award* (2005). For the best paper in Applied Statistics in Calcutta Statistical Association Bulletin for the publication [2]. (Calcutta Statistical Association).
ii. *Laha Award* (2005). To attend the Joint Statistical Meetings/IMS Annual Meeting. (Institute of Mathematical Statistics)
iii. *Excellence in Teaching Award* (2004). For undergraduate teaching (Department of Statistics and Operations Research, UNC-CH).
iv. *SAMSI Graduate Student Fellowship* (2003-2004). Research fellow in the program of "Network Modeling for the Internet" in SAMSI.
v. *Wassily Hoeffding Fellowship* (2001). For best performance in the first year of PhD program (Statistics Dept, UNC-CH).
vi. *Prasanta Chandra Mahalanobis Award* (2000). For most outstanding student in M-Stat program (ISI-CAL).

(VII) **Presentations:**

(a) Invited:

(1) *Optimal Controls for Multiclass Queueing Networks in Heavy Traffic: A bound on the value (cost) function.* 12th International Conference on Statistics, Combinatorics, Mathematics and Applications (SCMA), Auburn University. (Dec. 2005).
(2) *Optimal buffer size for a controlled stochastic processing system with drift.* Seminar, Statistical Sciences Group, Los Alamos National Laboratory. (Jan. 2007).
(3) *Optimal buffer size for a controlled stochastic processing system with drift.* Spring Colloquium, Department of Statistics and Actuarial Sciences, University of Iowa. (Feb. 2007).
(4) *Optimal buffer size for a rate control for a queueing network.* The 14th Applied Probability Society of Institute for Operations Research and the Management Sciences (INFORMS) Conference, in Eindhoven University of Technology & EURANDOM, Eindhoven, Netherlands. (July 2007).
(5) *Optimal buffer size and a rate control problem for a queueing network in heavy traffic.* Probability/Comp. Finance seminar, Department of Mathematical Sciences, Carnegie Mellon University. (Oct. 2007).
(6) *Optimal buffer size for a rate control for a queueing network.* International conference on Recent Advances in Probability, Indian Statistical Institute, Calcutta, India (part of the celebration of its Platinum Jubilee (75th year)). (Dec. 2007).

(b) Contributed:

(1) Fifth International Triennial Calcutta Symposium on Probability & Statistics, Calcutta, India. (Dec. 2003).
(2) Joint Statistical Meeting, San Francisco. (Aug. 2003).
(3) Conference on Stochastic Processes and its Applications, Santa Barbara (July 2005).
(4) Joint Statistical Meeting, Minneapolis. (Aug. 2005).
(5) Conference on Stochastic Processes and Its Applications, Paris, France. (July 2006).
(6) Sixth International Triennial Calcutta Symposium on Probability & Statistics, Calcutta, India. (Dec. 2006).

(7) Conference on Stochastic Processes and Its Applications, University of Illinois, Urbana-Champaign. (July 2007).

(c) Local (within Iowa State):

(1) *Optimal Controls for Stochastic Networks in Heavy Traffic.* VIGRE Theory Group seminar, Dept. of Statistics. (Oct. 2005).

(2) *Queues in Heavy Traffic* (series of 3 talks). Probability Seminar, Dept of Mathematics. (Oct.-Nov. 2005).

(3) *Optimal controls for Queueing Networks in Heavy Traffic.* Communications and Signal Processing Seminar, Dept. of Electrical and Computer Engineering. (Feb. 2006).

(4) *Scale Free Networks and the Internet.* VIGRE Theory Group seminar, Dept. of Statistics. (Feb. 2006).

(5) *Optimal buffer size and a rate control problem for a queueing network in heavy traffic* Probability Seminar, Dept of Mathematics. (Oct. 2007)

(6) *How to apply for Academic jobs.* (with C. Yu and P. Liu) VIGRE Survey Group seminar, Dept of Statistics. (Oct. 2007)

(VIII) **Service:**

(a) Departmental Committees:

2007-2008 Ph.D Prelim Exam Committee, Admissions Committee, Renovation Committee.
2006-2007 Ph.D Prelim Exam Committee, Admissions Committee, Library Committee.
2005-2006 Strategic Planning/External Review Committee, Library Committee.

(b) Refereeing for Journals/Conferences:

i. *Statistical Methodology:* 1 article.
ii. *Sankhyā:* 1 article.
iii. *Acta Applicandae Mathematicae*: 1 article
iv. *2008 American Control Conference (Seattle, Washington):* 1 article.

(c) Membership in Professional Organization:

i. *Applied Probability Society (APS)* - subdivision of *Institute for Operations Research and the Management Sciences (INFORMS)*: Member since 2007.
ii. *Calcutta Statistical Association (CSA).* (Life-) member since 2006.
iii. *Society for Industrial and Applied Mathematics (SIAM).* Member since 2005.
iv. *Institute of Mathematical Statistics (IMS).* Member since 2000,
v. *American Statistical Association (ASA).* Member since 2000.

(d) Other

i. Member of the organizing committee for the Spring Research Conference (SRC), Ames, Iowa, (May 21-23, 2007).
ii. Faculty mentor of V. Kalivarapu in the 'Preparing Future Faculty (PFF)' program offered by the Center for Excellence in Teaching (CELT) in Iowa State (Fall 2007).