

Saikat Banerjee

COMPUTATIONAL GENOMICS · STATISTICAL GENETICS · MACHINE LEARNING · BAYESIAN METHODS · DATA SCIENCE

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🏠 8 Sep. 1985 | 🇮🇳 Indian

Experience

Staff Scientist, University of Chicago

Chicago, USA

RESEARCH GROUP OF PROF. MATTHEW STEPHENS

Oct 2022 – Present

- Variational inference for Bayesian generalized linear model (GLM).

Postdoctoral Fellow, University of Chicago

Chicago, USA

ADVISOR: PROF. MATTHEW STEPHENS

Oct 2020 – Sep 2022

- Variational empirical Bayes approaches for sparse multiple regression of linear models.
- Penalized regression approach for multiple regression with adaptive shrinkage prior.

Postdoctoral Fellow, Max Planck Institute for Multidisciplinary Sciences (MPI-NAT)

Göttingen, Germany

ADVISOR: DR. JOHANNES SÖDING

May 2015 – Sep 2020

- Reverse regression technique for finding trans-eQTLs from GTEx data.
- Bayesian multiple logistic regression method for post-GWAS analyses including variable selection.
- Bayesian theory for integrating GWAS and eQTL data for identifying intrinsic causal mediations.
- Presented our work at ISMB2019 (Basel) and e:Med 2020 (virtual). Invited to speak at the University of Göttingen.

Co-founder, Beejig

Bengaluru, India

A B2B COMPANY FOR WORD-OF-MOUTH MARKETING

Jan. 2013 - Feb. 2014

- Extensively involved in conceptualization, market research, app development, fundraising and recruitment.

Education

PhD (Computational biophysics), Indian Institute of Science

Bengaluru, India

ADVISOR: PROF. BIMAN BAGCHI

Aug. 2009 - Apr. 2014

- Diffusion equation for a rugged potential energy landscape; Understanding the origin of long-range hydrophobic force; Role of biological water in the hydration shell of proteins; Hydrophobicity and composition-dependent anomalies in aqueous binary mixtures.

M.S. (Chemistry), Indian Institute of Science

Bengaluru, India

ADVISOR: PROF. BIMAN BAGCHI

Aug. 2007 - Jun. 2009

- Statistical Physics, Physical Chemistry, Thermodynamics, Basic probability theory, CGPA of 6.9 out of 8 (class rank 2nd).

B.Sc., University of Calcutta

Calcutta, India

RAMAKRISHNA MISSION VIDYAMANDIRA

Aug. 2004 - May 2007

- Major in chemistry, with physics and mathematics as auxiliary subjects. Ranked 1st in the University of Calcutta.

Software

B-LORE Bayesian multiple logistic regression with variable selection.

TEJAAS L_2 regularized 'reverse' multiple linear regression for discovering trans-eQTLs.

GradVI Gradient descent technique for variational inference of multiple linear regression

Mr.Ashpen Penalized regression for multiple linear regression with adaptive shrinkage prior

Supervision / Teaching

Master's Thesis (co-supervised with Dr. Johannes Söding)

Göttingen. 2018

ANUBHAV KAPHLE, GEORG AUGUST UNIVERSITÄT

- *Thesis title:* Statistical methods to discover trans-eQTLs for better prediction of gene expression from genotype data.
- Anubhav is currently doing PhD with Prof. David Balding at the University of Melbourne

Mentor for Master's Thesis

Göttingen. 2021

AKANKSHA YADAV, GEORG AUGUST UNIVERSITÄT

- *Thesis title:* Reverse sparse logistic regression for trans-eQTL discovery.

Internship students

Göttingen. 2015 - 2020

- VIOLA TOZZI. Identifying novel cardiovascular disease risk loci from UK Biobank.
- RAKTIM MITRA. 'Reverse' multiple regression on a toy model with correlated variables.
- RAHUL NAGIAL. eQTL analysis of GTEx data.

Tutorial courses

Göttingen. 2015-2020

- Introduction to GWAS (as part of the Computational Biology course at the MPI-NAT).
- Introduction to R (as part of the Computational Biology course at the MPI-NAT).

Teaching Assistant

Bengaluru. 2012-2013

- Non-equilibrium statistical mechanics: Application to biological systems (for advanced PhD students).
- Statistical mechanics of liquids and simple systems (for new PhD students).

Selected Presentations

Meeting on Systems Medicine (e:Med 2020)

Virtual Conference. Nov 2020

TITLE: Reverse regression increases power for detecting trans-eQTLs.

International Society for Molecular Biology (ISMB 2019)

Basel, Switzerland. Jul 2019

TITLE: Bayesian logistic regression for case-control GWAS.

Advanced seminar for statistical genetics

Göttingen, Germany. Jan 2017

Invited seminar at Georg August Universität. Invited by Dr. Henner Simianer.

Skills

Programming	Proficient in Python, FORTRAN, C++. Basic experience in R and Java.
Bioinformatics	GWAS, eQTL, Finemapping, PrediXcan
Molecular Dynamics	LAMMPS, GROMACS
Web	HTML5, CSS, PHP, Javascript
Languages	Bengali (native), English (fluent), Hindi (fluent), German (basic)
Others	Linux, Bash, \LaTeX , Git, VMD, Adobe Illustrator, Adobe Photoshop, Inkscape

Honors

2007 **Gold Medalist**, 1st position in B.Sc. Chemistry Honors at the University of Calcutta

2002 **National Merit Scholarship, Govt. of India**, 23rd rank in final school examination, West Bengal

Academic activity

Journal Peer Review	PLOS Genetics, Frontiers in Cardiovascular Medicine
Conference Organization	Meeting in Chemical Biology, Bengaluru, 2009. Theoretical Chemistry Symposium, Bengaluru, 2009.
Seminar Organization	Monthly Campus Seminar at MPI-NAT, 2012-2014. Weekly seminar of Söding lab, 2013-2015.
Memberships	American Society of Human Genetics (ASHG) International Society for Computational Biology (ISCB)

Publications

* indicates equal contributions, † indicates corresponding author(s), **BOLDFACE** highlights my name in the list of authors.

- 1 **S. BANERJEE***†, F. L. SIMONETTI*, K. E. DETROIS, A. KAPHELE, R. MITRA, R. NAGIAL, AND J. SÖDING†. “Tejaas: reverse regression increases power for detecting trans-eQTLs”. *Genome Biology* 22 (2021). [↗](#)
- 2 **S. BANERJEE**, L. ZENG, H. SCHUNKERT, AND J. SÖDING†. “Bayesian multiple logistic regression for case-control GWAS”. *PLOS Genetics* 14 (2019). [↗](#)
- 3 T. SAMANTA, R. BISWAS, **S. BANERJEE**, AND B. BAGCHI†. “Study of distance dependence of hydrophobic force between two graphene-like walls and a signature of pressure induced structure formation in the confined water”. *The Journal of Chemical Physics* 149 (2018). [↗](#)
- 4 **S. BANERJEE**, R. S. SINGH, AND B. BAGCHI†. “Orientational order as the origin of the long-range hydrophobic effect”. *The Journal of Chemical Physics* 142 (2015). [↗](#)
- 5 R. GHOSH, T. SAMANTA, **S. BANERJEE**, R. BISWAS, AND B. BAGCHI†. “Spatio-temporal correlations in aqueous systems: computational studies of static and dynamic heterogeneity by 2D-IR spectroscopy”. *Faraday Discussions* 177 (2015). [↗](#)
- 6 S. SARKAR, **S. BANERJEE**, S. ROY, R. GHOSH, P. P. RAY, AND B. BAGCHI†. “Composition dependent non-ideality in aqueous binary mixtures as a signature of avoided spinodal decomposition”. *Journal of Chemical Sciences* 127 (2015). Cover article. [↗](#)
- 7 **S. BANERJEE**, R. BISWAS, K. SEKI, AND B. BAGCHI†. “Diffusion on a rugged energy landscape with spatial correlations”. *The Journal of Chemical Physics* 141 (2014). [↗](#)
- 8 **S. BANERJEE**, J. FURTADO, AND B. BAGCHI†. “Fluctuating micro-heterogeneity in water–tert-butyl alcohol mixtures and lambda-type divergence of the mean cluster size with phase transition-like multiple anomalies”. *The Journal of Chemical Physics* 140 (2014). Featured article. [↗](#)
- 9 R. GHOSH, **S. BANERJEE**, M. HAZRA, S. ROY, AND B. BAGCHI†. “Sensitivity of polarization fluctuations to the nature of protein-water interactions: study of biological water in four different protein-water systems”. *The Journal of Chemical Physics* 141 (2014). [↗](#)
- 10 **S. BANERJEE** AND B. BAGCHI†. “Stability of fluctuating and transient aggregates of amphiphilic solutes in aqueous binary mixtures: studies of dimethylsulfoxide, ethanol, and tert-butyl alcohol”. *The Journal of Chemical Physics* 139 (2013). [↗](#)
- 11 **S. BANERJEE**, R. GHOSH, AND B. BAGCHI†. “Structural transformations, composition anomalies and a dramatic collapse of linear polymer chains in dilute ethanol–water mixtures”. *The Journal of Physical Chemistry B* 116 (2012). PMID: 22364364. [↗](#)
- 12 R. GHOSH, **S. BANERJEE**, S. CHAKRABARTY, AND B. BAGCHI†. “Anomalous behavior of linear hydrocarbon chains in water–DMSO binary mixture at low DMSO concentration”. *The Journal of Physical Chemistry B* 115 (2011). PMID: 21591704. [↗](#)
- 13 S. ROY, **S. BANERJEE**, N. BIYANI, B. JANA, AND B. BAGCHI†. “Theoretical and computational analysis of static and dynamic anomalies in water–DMSO binary mixture at low DMSO concentrations”. *The Journal of Physical Chemistry B* 115 (2011). PMID: 21186810. [↗](#)
- 14 **S. BANERJEE**, S. ROY, AND B. BAGCHI†. “Enhanced pair hydrophobicity in the water–dimethylsulfoxide (DMSO) binary mixture at low DMSO concentrations”. *The Journal of Physical Chemistry B* 114 (2010). PMID: 20845968. [↗](#)

References

- Matthew Stephens** University of Chicago, USA
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- Peter Carbonetto** University of Chicago, USA
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- Johannes Söding** Max Planck Institute for Multidisciplinary Sciences, Göttingen
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- Biman Bagchi** Indian Institute of Science, Bengaluru
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