Kushal K Dey

Contact Information

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Research Interests

I am primarily interested in applying Statistics and Machine Learning models to find structure in biological data. Recently, I have been working on applying admixture or topic model type algorithms to learn structure in data coming from RNA-seq, ecological applications and ancient DNA. In addition, I have been involved in developing nonparametric methods to learn cell differentiation trees and cell cycle ordering from single cell RNA-seq data.

Education

University of Chicago, Chicago, IL, United States

PhD, Statistics (expected graduation date: June 2018)
Advisor: Matthew Stephens, *Stephens Lab*

Indian Statistical Institute, Kolkata, West Bengal, India

B.Stat, M.Stat, Statistics (2008-2013)

Selected Publications

1. **KK Dey**, C Hsiao, and M Stephens. Clustering RNA-seq expression data using grade of membership model. (http://biorxiv.org/content/early/2016/05/03/051631). *under revision*
2. **KK Dey**, C Hsiao, and M Stephens. CountClust: Clustering and Visualizing RNA-Seq Expression Data using Grade of Membership Models. R package version 1.0.2, (https://github.com/kkdey/CountClust).
3. AL Tarca, M Lauria, M Unger, E Bilal, S Boue, **KK Dey**, J Hoeng et al. Strengths and limitations of microarray-based phenotype prediction: lessons learned from the IMPROVER Diagnostic Signature Challenge. *Bioinformatics*. 29 (22), pp 2892-2899. 2013.
4. P Nandy, M Unger, C Zechner, **KK Dey**, H Koeppl. Learning diagnostic signatures from microarray data using L1-regularized logistic regression. *Systems Biomedicine*. 1 (4), 2013.
5. **KK Dey**, S Bhattacharya. On Geometric Ergodicity of Additive and Multiplicative Transformation Based Markov Chain Monte Carlo in High Dimensions. *Brazilian Journal of Probability and Statistics*. To appear. (http://imstat.org/bjps/papers/BJPS295.pdf)
6. **KK Dey**, S Bhattacharya. A Brief Tutorial on Transformation Based Markov Chain Monte Carlo and Optimal Scaling of the Additive Transformation. *Brazilian Journal of Probability and Statistics*. To appear. (http://imstat.org/bjps/papers/BJPS325.pdf)
7. S Pradhan, P Patra, S Das, S Chandra, S Mitra, **KK Dey**, S Akbar, P Palit, A Goswami. Photochemical Modulation of Biosafe Manganese Nanoparticles on Vigna radiata: A Detailed Molecular, Biochemical, and Biophysical Study. *Environ. Sci. Technol.*, 2013, 47 (22), pp 13122-13131.

8. S Mitra, P Patra, S Pradhan, N Debnath, **KK Dey**, S Sarkar, D Chattopadhyay, A Goswami. Microwave synthesis of $ZnO@mSiO2$ for detailed antifungal mode of action study: Understanding the insights into oxidative stress. *Journal of Colloid and Interface Science*, Volume 444, 15 April 2015, Pages 97-108.
9. B Karmakar, K Dhara, **KK Dey**, A Basu, AK Ghosh. Tests for statistical significance of a treatment effect in the presence of hidden sub-populations. *Statistical Methods & Applications*.March 2015, Volume 24, Issue 1, pp 97-119.
10. SR Choudhury, **KK Dey**, S Bera, A Goswami. Colloidal stability and coagulation kinetics study of different sized sulphur nanoparticles. *Journal of Experimental Nanoscience*, 8 (3), 2013.

Softwares

- CountClust [*author*]: clustering and visualization of structure in RNA-seq data (with M. Stephens and C.J.Hsiao) release version, developmental
- cellcycleR [*author*]: model based inference of cell cycle ordering (with M. Stephens). developmental
- classtpx [*author*]: A supervised or semi-supervised topic model approach for structure detection (with M. Stephens). developmental
- ecostructure [*author*]: Visualization and Structure detection in ecological abundance data (with A.White, T.Price and M.Stephens). developmental
- pfar [*author*]: pfar: Paired factor analysis model (with G.Wang). developmental
- tmcmcR [*author*]: tmcmcR: R package for sampling with improved coverage (with S. Bhattacharya). developmental

Awards and Honors

- Received the 2016 David Wallace Award from the University of Chicago, Department of Statistics, for contributions in applications of Statistics in scientific domains.
- A member of Team 161, which ranked **2nd** in the Psoriasis Sub-challenge and **3rd** in the overall ranking in the First IMPROVER Challenge: Diagnostic signature.
- Recipient of INSPIRE scholarship in the category of SHE (Scholarship for Higher Education) by Dept. of Science & Technology (DST), Govt. of India.
- Recipient of 'Scheme of SCHOLARSHIP for College & University Students' by Dept. of Higher Education, Ministry of HRD, Govt. of India, on the basis of Higher Secondary examination results.

Skills

- Statistical Softwares: R, Matlab, LaTeX, Python, Processing
- Languages: C++
- Operating Systems: Unix/Linux, Windows.