

Ranjan Kumar Maji

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Bioinformatics Centre
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Research Interests Machine Learning, RNA informatics, Next-Gen Sequencing Data Analysis, Systems Biology, Biological Networks, Data Mining, Mathematical Modeling

Education **Bose Institute** Kolkata, WB, India
Ph.D. Tech in *Computer Science and Engineering* Aug 2011 - Present
To be awarded by Calcutta University, Kolkata, India
Thesis: Investigating the role of regulatory RNAs as versatile modulators - *A systems approach*
Advisor: Dr. Zhumur Ghosh & Dr. Sunirmal Khatua

Jadavpur University Kolkata, WB, India
M.Tech. in *Distributed and Mobile Computing* Aug 2009 - Jul 2011
Thesis: Analytical Modeling and Performance Evaluation of an integrated WiFi-WiMAX network

National Institute of Technology Durgapur, WB, India
B.Tech in *Information Technology* Aug 2005 - Jun 2009

Experience **Research Associate**, Bose Institute Kolkata, WB, India
April 2017 - Present

Advisors: Dr. Zhumur Ghosh & Dr. Sunirmal Khatua

- Fuzzy mutual information to score the distances between the features and cluster centres, for improved bi-clustering and more significant gene modules.
- Applying non-linear dimension reduction techniques for summarizing the functional pathway activity.
- Employed ensemble bi-clustering techniques to co-cluster genes and samples, and associate the significant miRNAs that modulate the relevant pathways.

Senior Research Fellow, Bose Institute Kolkata, WB, India,
April 2013 - March 2017

Advisors: Dr. Zhumur Ghosh & Dr. Sunirmal Khatua

- Identified the key regulatory genes modulating functional pathways using ‘Shortest Path’ analysis and ‘pivot nodes’
- Integrated miRNA and gene expression through ensemble of regression, inference and correlation based methods, so as to infer specific miRNA gene interactions.
- Developed a sensitive microRNA target prediction tool, “miRTPred”, to recognize their targets.
- Devised “PVT” pipeline for efficient spliced alignment towards NGS data analysis with cloud adaptability.

- Developed a structured relational database: “piRNAQuest” and other tools to explore the origin and function of piRNAs.

Masters Project, Jadavpur University

Electronics & Telecommunication
Engineering Department
Kolkata, India
May 2010 - April 2011

Supervisor: Dr. Iti Saha Misra

- *Thesis Title:* “Analytical Modeling and Performance Analysis of an Integrated WiFi (IEEE 802.11e) and WiMAX (IEEE 802.16d) Network”.

Development of a mathematical model based on tandem queueing theory for the simulated integrated WiFi - WiMAX network to predict the performance measures like blocking probability and service delay using MATLAB 7.0 (for the Analytical Model) and Qualnet 5.0.2 (to verify the analytical results with simulation).

Bachelors Project, National Institute of Technology

Information Technology
Durgapur, West Bengal, India
June 2008 - June 2009

Supervisor: Dr. Baisakhi Chakraborty

- “A Fire Emergency Handling System based on Case Based Reasoning”.

Development of an interactive graphical user interface in Java, using *jColibri2* CBR Framework, myCBR Similarity Measures and Protege to predict the requirement of emergency resources required to handle the fire emergency.

- “A Simple Query Retrieval and Response Framework on a Personal Centric Knowledge Management System”

Development of an interactive graphical user interface to predict the queried reply by learning repeated interactions through query response using Visual Basic 6.0 as frontend and MS Access 2007 and the database.

Publications

1. **Maji, R. K.**, Khatua, S., & Ghosh, Z.. “A supervised ensemble approach for sensitive microRNA target prediction.” Accepted in *IEEE/ACM transactions on computational biology and bioinformatics*, 2018.
2. **Maji, R. K.**, Khatua, S., & Ghosh, Z.. “An ensemble based approach towards sensitive miRNA target prediction.” Accepted in 5th International Doctoral Symposium on *Advanced Computing and Systems for Security* Springer, 2018.
3. Parida, S., Chakraborty, S., **Maji, R. K.**, & Ghosh, Z.. “Elucidating the gene regulatory networks modulating cancer stem cells and non-stem cancer cells in high grade serous ovarian cancer.” *Elsevier Genomics*, 2018.
4. Sarkar, D., **Maji, R. K.**, Dey, S., Sarkar, A., Ghosh, Z., & Kundu, P., “Integrated miRNA and mRNA expression profiling reveals the response regulators of a susceptible tomato cultivar to early blight disease.” *DNA Research*, 24(3), 235-250, 2017.
5. Sen, K., Sarkar, A., **Maji, R. K.**, Ghosh, Z., Gupta, S., & Ghosh, T. C., “Deciphering the cross-talking of human competitive endogenous RNAs in K562 chronic myelogenous leukemia cell line.” *Molecular BioSystems*, 12(12), 3633-3642, 2016.
6. Kumar, M., Sahu, S.K., Kumar, R., Subuddhi, A., **Maji, R.K.**, Jana, K., Gupta, P., Raffetseder, J., Lerm, M., Ghosh, Z. and van Loo, G., “MicroRNA let-7 modulates the immune response to Mycobacterium tuberculosis infection

via control of A20, an inhibitor of the NF- κ B pathway.” *Cell host & microbe*, 17(3), pp.345-356, 2015.

7. **Maji, R. K.**, Sarkar, A., Khatua, S., Dasgupta, S., & Ghosh, Z.. “PVT: an efficient computational procedure to speed up next-generation sequence analysis.” *BMC Bioinformatics*, 15(1), 167, 2014.
8. **Maji, R. K.**, Sarkar, A., Saha, S., & Ghosh, Z.. “piRNAQuest: searching the piRNAome for silencers.” *BMC Genomics*, 15(1), 555, 2014.
9. Chakraborty, S., Deb, A., **Maji, R. K.**, Saha, S., & Ghosh, Z., “LncRBase: an enriched resource for lncRNA information.” *PloS one*, 9(9), e108010, 2014.
10. Chakraborty, B., **Maji, R. K.**, & Ghosh, D. (2011). “An object oriented programming platform for ontology based KMS.” *Journal of Computational Methods in Sciences and Engineering*, 11(s1), 139-148.
11. Chakraborty, B., **Maji, R. K.**, Ghosh, D., Garnaik, S., & Debnath, N. (2010, July). “Knowledge management with case-based reasoning applied on fire emergency handling.” In *Industrial Informatics (INDIN)*, 2010, 8th IEEE International Conference on (pp. 708-713).

Conferences, Workshops and Seminars Attended

- **Presented Talk** on “An ensemble based approach towards sensitive miRNA target prediction.” in *5th International Doctoral Symposium on Applied Computation and Security Systems (ACSS-2018)*, organized by University of Calcutta, India.
- Participated in one day conference on “Genome Analysis and Protein Interaction Network”; 21 March 2016; organized by Bioinformatics Centre, Bose Institute.
- **Presented Poster** & Participated in “*International Conference on Informatics & Integrative Biology (CIIB-2014)*”; organized by Bioinformatics Centre, Bose Institute.
- **Participated** in “*Workshop on Computational Proteomics*”; 3-4 March 2014, organized by Bioinformatics Centre, Bose Institute.
- **Presented Poster** & Participated in “*NextGen Genomics and Bioinformatics Technologies (NGBT)*” conference; 14-16 November, 2013 organized by SciGenom Research Foundation, held in IGIB, New Delhi.
- *Participated* in 3 day Symposium-cum-Workshop on “*High-Throughput Data-Driven Biology*”; 12-14 September, 2012; held in IBAB, Bangalore.
- *Participated* in “*International Conference on Informatics & Integrative Biology (CIIB-2011)*”; 14-16 December 2011; organized by Bioinformatics Centre, Bose Institute.

Computational Skills

- **Programming Languages:** Python, R, MATLAB, Java, C, C++, AWK, PL/SQL, Scripting(bash shell etc), Perl
- **Web Languages:** HTML, PHP, Django web framework
- **Operating Systems:** GNU/Linux, Windows
- **Software:** NGS data analysis pipeline Tuxedo protocols, new Tuxedo protocol, Cytoscape, SPSS, GSEA, MeV, WEKA and other tools in computational biology.
- **Databases:** MySQL, Oracle

Awards

- Received a 2 year **Research Associate**-ship from Council of Scientific & Industrial Research (CSIR): Human Resource Development Group, Government of India, for the project entitled “Elucidating the role of piRNAs in ceRNA networks regulating cancer pathogenesis” in 2017.
- Received a 4 year **Senior Research Fellowship** from Council of Scientific & Industrial Research (CSIR): Human Resource Development Group, Government of India, for the project entitled “piRNAs: Unravelling their role as modulators in Ovarian Cancer” in 2013.
- Received Graduate Aptitude Test in Engineering (GATE) Fellowship Award, 2009
- 1st prize in “*Building an Autonomous Line Follower Robot*”, in Robocity, Aarohan’2k7, an Annual Technical Festival in NIT Durgapur, 2007.

References

Prof. Tapash Ch. Ghosh
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Dr. Zhumur Ghosh
Associate Professor
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Dr. Sunirmal Khatua
Assistant Professor
Department of Computer
Science and Engineering
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Kolkata, West Bengal, India
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Additional Information

- *Date of Birth*: November 24, 1987
- *Marital Status*: Single
- *Citizenship*: Indian