Sarbashis Das, Ph.D.

Curriculum Vitae

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Summary

Experienced senior Researcher with a demonstrated history of leading diverse projects of various types. Skilled in Python, R, Data Analysis, and Machine Learning. Strong research professional with a Doctor of Philosophy (Ph.D.) focused in Computational Biology from Jawaharlal Nehru University, India.

Research Experiences

July, 2018 – Present

Senior Researcher Dept. of Cell and Molecular Biology, Uppsala University, Uppsala, Sweden.

Project I: This project is funded by AstraZeneca. In this project I am modelling myocardial gene expression in patients undergoing elective coronary artery by-pass surgery to identify pattern in gene expression between heart failure patients across different heart tissues

July, 2014 – June, 2018

Researcher/Postdoc Dept. of Cell and Molecular Biology, Uppsala University, Uppsala, Sweden.

Project I: In this project I am modelling myocardial gene expression in patients undergoing elective coronary artery by-pass surgery to identify pattern in gene expression between heart failure patients with pEF (Preserved Ejection Fraction), rEF (Reduce ejection Fraction) and Normal ejection fraction.
Approach: I have applied Principle Component Analysis (PCA) in R to discriminate between pEF, rEF and Normal. Subsequently gene expression differences was statistically modelled. I further performed discriminant analysis on data.
Project II: Studying gene expression dynamics in response to different stress in *Mycobacteria*
Approach: Gene expression clustering using different methods such as hierarchical clustering, k-mean *etc*.

Feb, 2013 – July, 2014

Post-doctoral Fellow, Institute of Molecular Biology, Mainz, Germany.
My project was to understand the dynamics of genome-wide accessible regions during neuronal differentiation. Formaldehyde-Assisted Isolation of Regulatory Elements followed by sequencing (FAIRE-Seq) was used to identify accessible genomic regions and corresponding RNA-Seq generated from different cell stages. Preliminary analysis identified several stress specific distal enhancers.

July, 2012 – October, 2012

Guest Researcher, Dept. of Cell and Molecular Biology, Uppsala University, Sweden

Here I worked on gene expression and transcriptional regulation of *Mycobacterium marinum* in different stress condition using RNA-Seq data.

Professional Skills

Machine learning:	Deep Learning, Logistic Regression, SVM, PCA.
Programming Languages:	Python(advance), C/C++(advance), Shell Script (advance),Perl, Java(basic)
Statistical tools:	R, Bioconductor.
Pathway Analysis tools:	IPA, Reactome.
Experience in NGS Types:	
Genome Sequence:	DNA-Seq
Transcriptome:	RNA-Seq
Genome Accessibility:	ATAC-Seq, FAIRE-Seq, DNase I-Seq
Factor Binding Sites:	ChiP-Seq
NGS alignment tools:	Bowtie, BWA, SOAP, Tophat, BLAT, MAQ.
NGS assembly tools:	Velvet, SOAPdenovo, ABySS, Oases.
Differential expression Analysis tools:	Cufflinks, CummeRbund, DESeq, EdgeR.
Motif Analysis Tools:	MEME, RSAT, HOMER.
Operating Systems:	Linux, Mac OS, Windows.

Education and Qualifications

2012 **Ph.D.(Computational Biology & Bioinformatics)** School of Computational & Integrative Sciences,
Supervisor: Prof. Alok Bhattacharya Jawaharlal Nehru University, India.
Dissertation: *Comparative Analysis and Study of Mutations in Bacterial Genomes*

2008 **Master of Technology (M.Tech)** School of Computational & Integrative Sciences,
(Computational and Systems Biology) {formerly School of Information Technology}
Supervisor: Prof. Alok Bhattacharya Jawaharlal Nehru University, India.
Dissertation: *Identification of Single Nucleotide Variations and Inversions in Genomic Sequences*

2005 **Master of Science (M.Sc)** University of Burdwan, India.
(Specialization: Molecular Cytogenetics,
Cancer Biology and Biotechnology)

2003 **Bachelor of Science (B.Sc)** University of Burdwan, India.
(Zoology (Honours), Chemistry, Botany)

Certifications

- **Deep Learning a 5-course specialization** by deeplearning.ai on Coursera Certificate no: **6LZ2Q78BX8MD**
https://www.coursera.org/account/accomplishments/verify/6LZ2Q78BX8MD
- **Improving Deep Neural Networks: Hyperparameter tuning, Regularization and Optimization** specialized in Deep Learning course by deeplearning.ai. Grade Achieved: 91.6%. Certificate no: **3HENCRJ76HNE**
https://www.coursera.org/account/accomplishments/verify/3HENCRJ76HNE
- **Sequence Models** specialized in Deep Learning course by deeplearning.ai. Grade Achieved: 96.0%. Certificate no: **D7UZETX7SX9L**
https://www.coursera.org/account/accomplishments/verify/D7UZETX7SX9L

- **Structuring Machine Learning Projects** specialized in Deep Learning course by deeplearning.ai. Grade Achieved: 92.5%. Certificate no: **2U8B3KWVDE5E**
  https://www.coursera.org/account/accomplishments/verify/2U8B3KWVDE5E
- **Neural Networks and Deep Learning** specialized in Deep Learning course by deeplearning.ai. Grade Achieved: 97.2%. Certificate no: **J6CCTRE6H37B**
  https://www.coursera.org/account/accomplishments/verify/J6CCTRE6H37B
- **Convolutional Neural Networks** specialized in Deep Learning course by deeplearning.ai. Grade Achieved: 98.4%. Certificate no: **643EV5PHMSMV**
  https://www.coursera.org/account/accomplishments/verify/643EV5PHMSMV
- **Machine Learning A-Z™ Hands-On Python & R In Data Science** by Udemy. Certificate no: **UC-BJVU4D7B** http://ude.my/UC-BJVU4D7B
- **Machine Learning** course authorized by Stanford University and offered through Coursera. Grade Achieved: 96.1%. Certificate no: **79V42RZZTPQQ**
  https://www.coursera.org/account/accomplishments/verify/79V42RZZTPQQ

Teaching

2010 & 2011(winter semester) Perl Programming to Master of Technology students at School of Computational and Integrative Sciences.

Publications

Peer-Reviewed Publications

1. **Sarbashis Das**, Fredrik Pettersson, Phani Rama Krishna Behra, Amrita Mallick, Martin Cheramie, Lisa Shirreff, Tanner Tanner DuCote, Santanu Dasgupta, Don G Ennis, and Leif Kirsebom (2018). **Extensive genomic diversity among Mycobacterium marinum strains revealed by whole genome sequencing**. *Scientific Reports* **8**(1), 315.
2. **Sarbashis Das**, B M Fredrik Pettersson, Phani Rama Krishna Behra, Malavika Ramesh, Santanu Dasgupta, Alok Bhattacharya, and Leif A Kirsebom (2016). **The Mycobacterium phlei genome: expectations and surprises.** *Genome biology and evolution* **8**(4), 975–985.
3. **Sarbashis Das**, B.M. Fredrik Pettersson, Phani Rama Krishna Behra, Malavika Ramesh, Santanu Dasgupta, Alok Bhattacharya, and Leif a. Kirsebom (2015). **Characterization of Three *Mycobacterium spp*. with Potential Use in Bioremediation by Genome Sequencing and Comparative Genomics**. *Genome Biology and Evolution* **7**(7), 1871–1886.
4. B M Fredrik Pettersson, **Sarbashis Das**, Phani Rama Krishna Behra, Heather R Jordan, Malavika Ramesh, Amrita Mallick, Kate M Root, Martin N Cheramie, Irma de la Cruz Melara, Pamela L C Small, Santanu Dasgupta, Don G Ennis, and Leif A Kirsebom (2015). **Comparative Sigma Factor-mRNA Levels in Mycobacterium marinum under Stress Conditions and during Host Infection.** *PloS one* **10**(10), e0139823.
5. **Sarbashis Das**, Tanmoy Roychowdhury, Parameet Kumar, Anil Kumar, Priya Kalra, Jitendra Singh, Sarman Singh, Hk Prasad, and Alok Bhattacharya (2013). **Genetic heterogeneity revealed by sequence analysis of Mycobacterium tuberculosis isolates from extra-pulmonary tuberculosis patients.** *BMC genomics* **14**(1), 404.
6. B M Fredrik Pettersson, Ram G Nitharwal, **Sarbashis Das**, P R Krishna Behra, Evgen Benedik, Uma T Arasu, Nurul M Islam, Santanu Dasgupta, Alok Bhattacharya, and Leif a Kirsebom (2013). **Identification and expression of stressosomal proteins in Mycobacterium marinum under various growth and stress conditions.** *FEMS microbiology letters*.
7. **Sarbashis Das**, Priyanka Duggal, Rahul Roy, Vithal P Myneedu, Digamber Behera, Hanumanthappa K Prasad, and Alok Bhattacharya (2012). **Identification of Hot and Cold spots in genome of Mycobacterium tuberculosis using Shewhart Control Charts.** *Scientific reports* **2**, 297.

8. Chung-Chau Hon, Christian Weber, Odile Sismeiro, Caroline Proux, Mikael Koutero, Marc Deloger, **Sarbashis Das**, Mridula Agrahari, Marie-Agnes Dillies, Bernd Jagla, Jean-Yves Coppee, Alok Bhattacharya, and Nancy Guillen (2012). **Quantification of stochastic noise of splicing and polyadenylation in Entamoeba histolytica.** *Nucleic acids research*.
9. **Sarbashis Das**, Anchal Vishnoi, and Alok Bhattacharya (2009). **ABWGAT: anchor-based whole genome analysis tool.** *Bioinformatics (Oxford, England)* **25**(24), 3319–20.
10. **Sarbashis Das**, Ragothaman M Yennamalli, Anchal Vishnoi, Parul Gupta, and Alok Bhattacharya (2009). **Single-nucleotide variations associated with Mycobacterium tuberculosis KwaZulu-Natal strains.** *Journal of biosciences* **34**(3), 397–404.

Editorially-Reviewed Publications

11. B M Fredrik Pettersson, P R Krishna Behra, Satyam Manduva, **Sarbashis Das**, Santanu Dasgupta, Alok Bhattacharya, and Leif A Kirsebom (2014). **Draft Genome Sequence of Saccharopolyspora rectivirgula.** *Genome announcements* **2**(1).

Submitted papers

12. Phani Rama Krishna Behra, B M Fredrik Pettersson, **Sarbashis Das**, Santanu Dasgupta, and Leif Kirsebom (2018). **Comparative genomics of Mycobacterium mucogenicum and Mycobacterium neoaurum clade members emphasizing tRNA and non-coding RNA**. *Under Review BMC Evolutionary Biology*.
13. **Sarbashis Das**, Christoffer Frisk, Maria J Eriksson, Matthias Corbascio, Camilla Hage, Chanchal Kumar, Anna Walentinsson, Michaela Asp, Joakim Lundeberg, Eva Maret, Hans Persson, Cecilia Linde, and Bengt Persson (2018). **Transcriptomics of heart biopsies reveals differences in patients with stable coronary artery disease with or without diagnostic parameters for heart failure with preserved ejection fraction.** *Manuscript submitted*, 1–25.

Unpublished working papers

14. **Sarbashis Das**, B M Fredrik Pettersson, Phani Rama Krishna Behra, Karl-Gustav Jacobsson, Santanu Dasgupta, Don G Ennis, and Leif Kirsebom (2018). **Comparative genomic analysis Mycobacterium chelonae-Mycobacterium abscessus complex members: differentiation of Mycobacterium salmoniphilium and Mycobacterium salmoniphilium-like as two separate species**. *Manuscript in Preparation*.
15. Fredrik Pettersson, **Sarbashis Das**, Malavika Ramesh, Phani Rama Krishna Behra, Santanu Dasgupta, and Leif Kirsebom (2018). **Anti-σ factors in *Mycobacterium marinum*: Expression, control and interaction with cognate σ factors and components of the stressosome pathway**. *Manuscript in Preparation*.

Membership

- International Society of Computational Biology (ISCB)

Conferences attended/participated

2018 Attended "European Computational Biology Conference (ECCB)", Athens, Greece.
2017 Attended "Keystone Symposia: RNA-Based Approaches in Cardiovascular Disease", Colorado, USA.
2017 Attended "European Computational Biology Conference (ECCB)", Prague, Czech Republic.
2016 Attended "European Computational Biology Conference (ECCB)", The Hague, The Netherland.
2013 Attended "Chromatin Dynamics and Stem Cells", Mainz, Germany.
2012 Attended "SciLifeLab Day" organized by Science for Life Laboratory, Uppsala University, Sweden.
2010 Poster presentation at "8^{th} Asia Pacific Bioinfomatics Conference", Bangalore, India.
2009 Conducted training in International Training in Global Infectious Diseases (GID) jointly organized by Seattle Biomedical Research Institute and Jawaharlal Nehru University in JNU.
2006 Attended "International Conference on Bioinformatics (InCoB)", New Delhi India.

Reviewer for the Journals:

- F1000 Research.
- Elsevier: Science of the Total Environment.

Oral Presentations at

2015 "Computational Biology: Back to the Future", New Delhi, India.
2015 "ICM Meeting", Balsta, Sweden.
2014 Genomics, biology and therapeutics in tuberculosis and other mycobacterial diseases, India
2012 "Indo-Swedish Meet". India

Achievements

Research Grants

2017 Project grant awarded as a co-applicant. Project titled *Dynamics of gene regulatory networks in response to different stresses in Mycobacteria*. Funding Agency: FORMAS.

2016 Project grant awarded as a co-applicant. Project titled *Non-coding and regulatory RNAs in mycobacteria*. Funding Agency: Swedish Recearch Council (VR).

Fellowships

2012 Awarded Wennergren Postodoc fellowship for two year (2013-2015) from the Wennergren foundations. (Grant offered, but gracefully declined due to accepting other Postdoc position)

2010 Awarded Senior Research Fellowship from Council of Scientific and Industrial Research.
Government of India.

2006 Awarded Scholarship from Department of Biotechnology, Government of India for Master of Technology.

Personal Details

Date of Birth: 06^{th} of May, 1981
Nationality : Indian
Languages known: English, Swedish (basic).