

Aditya Kumar

Resume

Molecular Biology and Biotechnology
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Current position

Apr 2017 - **Assistant Professor**
Department Molecular Biology and Biotechnology, Tezpur University, Tezpur - 784028, Assam, India

Education

- 2016 **PhD in Computational Biology**, *Molecular Biophysics Unit, Indian Institute of Science, Bangalore, Karnataka, India.*
- 2008 **MSc in Molecular Biology and Biotechnology**, *Tezpur University, Tezpur, Assam, India.*
- 2004 **BSc in Chemistry, Zoology and Botany**, *DDU Gorakhpur University, Gorakhpur, UP, India.*

Research experience

- Jan 16 - Mar 17 **Research Associate**
supervisor Professor Manju Bansal, Molecular Biophysics Unit, IISc Bangalore
title *Characterization of promoters in Mycobacterium tuberculosis using sequence dependent DNA structural features*
- 2016 **PhD thesis**
supervisor Professor Manju Bansal, Molecular Biophysics Unit, IISc Bangalore
title *Structural features of prokaryotic promoters and their role in gene expression*
description Emergence of sequencing technologies has created huge amount of raw data in the form of whole genome sequence of organisms. Computational approaches allow fast and reliable promoter annotation. These methods are based either on sequence motif which lack the wide applicability by being organism specific in nature or structural features of DNA sequence. This study explores the DNA sequence dependent structural properties (stability, bendability and intrinsic curvature) in the promoter regions of prokaryotes. It suggests that using these structural features, promoter regions of transcriptome can be annotated reliably across the organisms. Since these structural features are associated with the promoter physiology they also provide insights about the gene expression. Promoter regions associated with high gene expression are more pronounced as compared to the low gene expression.

2008 **MSc thesis**
supervisor Dr. Suvendra Kumar Ray, Tezpur University Assam, India
title *Chargaff's second parity rule in bacterial chromosomes: A computational approach*
description Chargaff's second parity rule (PR2) states that compositional abundance values of complimentary nucleotides (A vs T and G vs C) are similar even in individual DNA strands of bacterial chromosomes. This study describes the observation of the parity in terms of the frequency distribution of nucleotides and oligonucleotides compositional abundance. Total 112 bacterial chromosomes were analyzed *in silico*. It suggests that the parity in a chromosome is due to the proportionate composition of sense sequences in each of the DNA strands.

Research articles

Venkata Rajesh Yella, Aditya Kumar and Manju Bansal. *Identification of putative promoters in 48 eukaryotic genomes on the basis of DNA free energy*. **Scientific Reports**, 8:4520(1-13), 2018

Aditya Kumar and Manju Bansal. *Unveiling DNA structural features of promoters associated with various types of TSSs in prokaryotic transcriptomes and their role in gene expression*. **DNA Research**, 24-1(25-35), 2017

Aditya Kumar, Vasumathi Manivelan and Manju Bansal. *Structural features of DNA are conserved in the promoter region of orthologous genes across different strains of Helicobacter pylori*. **FEMS Microbiology Letters**, 363, 2016

Manju Bansal, Aditya Kumar and Venkata Rajesh Yella. *Role of DNA sequence based structural features of promoters in transcription initiation and gene expression*. **Current Opinion in Structural Biology**, 25-C(77-85), 2014

Aditya Kumar and Manju Bansal. *Characterization of structural and free energy properties of promoters associated with Primary and Operon TSS in Helicobacter pylori genome and their orthologs*. **Journal of Biosciences**, 37-3(423-431), 2012

B.R. Powdel, Siddhartha Sankar Satapathy, Aditya Kumar, Pankaj Kumar Jha, Alak Kumar Buragohain, Munindra Borah and Suvendra Kumar Ray. *A study in entire chromosomes of violations of the intra-strand parity of complementary nucleotides (Chargaff's second parity rule)*. **DNA Research**, 16-6(325-343), 2009

Book chapters

Aditya Kumar and Manju Bansal. *Gene Expression is modulated by gene architecture and promoter structure* chapter in **Bioinformatics in the Era of Post Genomics and Big Data**. IntechOpen, 2018

Venkata Rajesh Yella, Aditya Kumar and Manju Bansal. *DNA Structure and Promoter Engineering* chapter in **Systems and Synthetic Biology Book**. Springer (241-254), 2015

Conferences

2013 **International conference on Genome Informatics, NUS, Singapore, Dec 16-19.**
poster title Role of DNA sequence dependent structural properties in gene expression

- 2013 **International Conference on Biomolecular Forms and Function**, *IISc Bangalore, India*, Jan 8-11.
- poster title DNA structural features in promoter regions and their role variable gene expression in *E. coli* and *S. cerevisiae*
- 2011 **Conference on Nucleic acids in Diseases and Disorders**, *IIT Delhi, India*, Dec 7-9.
- poster title Sequence dependent structural properties and promoter prediction of essential genes of prokaryotes

Fellowships and Grants

- 2017 National Postdoctoral Fellowship (N-PDF) **SERB, Department of Science and Technology (DST)**, Govt. of India
- 2016 DBT Research Associate Fellowship by **Department of Biotechnology**, Govt. of India
- 2013 International travel grant by **SERB, Department of Science and Technology (DST)**, Govt. of India
- 2013 International travel grant by **Department of Biotechnology (DBT-CTEP)**, Govt. of India
- 2010-2013 Senior Research Fellowship for PhD by **CSIR**, Govt. of India
- 2008-2010 Junior Research Fellowship for PhD by **CSIR**, Govt. of India
- 2006-2008 DBT scholarship for MSc by **Department of Biotechnology (DBT)**, Govt. of India

Achievements

- 2017-2020 Associate of the **Indian Academy of Sciences**, Bengaluru
- 2009 Cleared CSIR-JRF by **Council of Scientific & Industrial Research (CSIR)**, Govt. of India
- 2009 Cleared ICMR-JRF by **Indian Council of Medical Research (ICMR)**, Govt. of India
- 2008, 2009 Cleared DBT-JRF by Department of Biotechnology, **Ministry of Science and Technology**, Govt. of India
- 2009 Cleared National Eligibility Test (NET) by **University Grants Commission (UGC)**, Govt. of India
- 2008 Cleared national level entrance examination for admission to **Indian Institute of Science, Bangalore**
- 2007, 2008 Cleared national level Graduate Aptitude Test in Engineering (GATE) by **Ministry of Human Resource Development (MHRD)**, Govt. of India
- 2006 Cleared national level Combined Entrance Examination for Biotechnology (CEEb) by **JNU**, India
- 2006 Certificate in Information Technology (CIT) by **NIIT**, India

Technical skills

- programming Linux Shell scripting, Awk, Perl, Python, Julia & MATLAB

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|-----------------------|--|
| hpc | parallel programing in Perl & Julia |
| mathematical packages | MATLAB & R |
| OS | GNU/Linux, MacOS X & Windows |
| typesetting | MS Office & L ^A T _E X |
| graphics design | Adobe Illustrator & GIMP |
| administration | GNU/Linux, web server & hybrid cluster (cpu + gpu based) |

References

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