

Avijit Podder, PhD



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PROFILE

My research focuses on the comprehension of the genetic complexity of human diseases using computational graph theory and network biology and, an in-depth mining of high-throughput multi-omics datasets to hunt important therapeutic targets. I visualize diseases in a systemic perspective to confidently translate statistical observations on biological grounds. Big datasets always excite me to figure out their fundamental implication for therapeutic benefit.

WORK EXPERIENCE

Associate Computational Scientist | May 2023 - Present

The Jackson Laboratory for Genomic Medicine, Farmington, Connecticut, USA

- My ongoing research is focused on understanding the molecular basis of Alzheimer's disease using diverse computational systems biology approaches. I believe my research will likely be highly relevant to human health as they will provide new details into the workings of complex biological systems, which will allow for further extrapolations into the development of certain diseases and their progression related to human aging process.

Post-Doctoral Fellow | August 2019 - April 2023

Translational Genomics Research Institute (TGen), Phoenix, Arizona, USA

- Diseases/ Traits investigated: Human aging and longevity, Cancer biology and other complex disorders.
- Cross-species gene interaction-based network and pathway analysis to understanding the molecular basis of human longevity using diverse computational systems biology approaches.
- Workflow design using various statical tools in R and Cytoscape for personalized pathway analysis using differential gene expression data for various cancer patients.
- Comparative gene-set based pathway enrichment analysis using transcriptomic data for multiple bird species.
- Design functional enrichment analysis workflow for different multi-omics (cellular organoids, iPSC, scRNAseq and whole genome exome sequence) datasets.

Senior Research Fellow | June 2012 – June 2019

Bioinformatics Infrastructure Facility, Sri Venkateswara College, Delhi, India

- Diseases/ Traits investigated: complex neurological diseases – Schizophrenia and Alzheimer's disease.
- Structure modeling and molecular dynamics (MD) simulations of membrane proteins.
- In silico docking study– Protein-Ligand and Protein-Protein interactions,
- Mutation effect analysis on docking conformations and kinetics.
- Novel drug like molecule identification through computer aided drug designing (CADD) approaches.

Senior Research Fellow | Dec 2011 – May 2012

National Bureau of Animal Genetic Resource (ICAR-NBAGR), Karnal, India

- Haplotype analysis of using microsatellite markers to unravel genetic basis of milk production in Indian native cattle's.
- Population structure analysis (both model and distance-based methods) using whole genome SNP genotyping data (Illumina 770k BovineHD chip) for different Indian cattle breeds.
- Comparative pathway analysis using Gene set Enrichment Analysis (GSEA) method and Protein-Protein Interaction Method (PPIN) of tissue specific microarray gene expression data related to heat stress and different lactation period in Indian cattle's and buffaloes.

Project Assistant | Sep 2009 – Dec 2011

Institute of Genomics and Integrative Biology (CSIR-IGIB), Delhi, India

- Diseases/ Traits investigated: type 2 diabetes, Metabolic Syndrome, c-peptide in Indian population.
- Raw genotyping data handling both for Illumina and Sequenom platform.
- Genome wide data analysis- Data quality control (QC) and association analysis.
- Imputation technique for genome wide data.
- Sequencing data analysis- Normal and bisulfate converted DNA.
- In silico annotation and functional characterization of coding and non-coding genes using various databases and software tools.
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EDUCATION

Doctor of Philosophy (PhD) - Computational Biology | 2014 - 2019

Department of Biochemistry, University of Delhi South Campus, Delhi, India

“Computational Studies of Drug Targets in Dopaminergic System Implicated in Neurological Disorders”

Advisor: Dr. N. Latha

Master of Science and Technology – Bioinformatics | 2006 -2009

West Bengal University of Technology, Kolkata, India

Grade/percentage: 69%

Post Graduate Diploma (A & B Level) – Bioinformatics | 2005 – 2006
DOEACC Society Kolkata, India

Grade/percentage: B

Bachelor of Science – Zoology | 2002 – 2005
University of Calcutta, Kolkata, India

Grade/percentage: 52%

Higher Secondary – Biology, Physics, Chemistry & Mathematics | 2000 – 2002
West Bengal Board of Higher Secondary Education, University of Calcutta, Kolkata, India

Grade/percentage: 60%

High School – X Grade | 2000
West Bengal Board of Secondary Education, University of Calcutta, Kolkata, India

Grade/percentage: 75%

SKILL SET

Professional Skill Data Mining (Web-based applications), OMICS Data Analysis (GWAS, Microarray, NGS), Graph theory & Network Biology, Pathways & Enrichment Analysis, Protein Structure & Modeling, Molecular Dynamics & Simulation, Computer Aided Drug Designing, Operating Systems & Servers (Linux, Shell script), Programming Language (Bash command, Perl, R), Statistical Tools (R, SPSS, GraphPad, Microsoft Excel), Graph & Data Visualization (Cytoscape, R, Microsoft PowerPoint), Basic Molecular biology Techniques (Hands on).

Management Skill People Management, Team Management, Communication, Time Management, Multi-Tasking, Strategy Design, Leadership.

PUBLICATIONS

- 13 Frankel E, **Podder A**, Sharifi M, Pillai R, Belnap N, Ramsey K, Dodson J, Venugopal P, Brzezinski M, Llaci L, et al. (2023) Genetic and Protein Network Underlying the Convergence of Rett-Syndrome-like (RTT-L) Phenotype in Neurodevelopmental Disorders. *Cells*. 12(10):1437.
- 12 **Podder A**, Raju A, Schork NJ (2021) Cross-Species and Human Inter-Tissue Network Analysis of Genes Implicated in Longevity and Aging Reveal Strong Support for Nutrient Sensing. *Front Genet*. 12:719713.
- 11 **Podder A**, Pandit M and Latha N (2018) Drug Target Prioritization for Alzheimer's Disease Using Protein Interaction Network Analysis. *OMICS: A Journal of Integrative Biology*. 22(10):665-677.
- 10 Bandesh K and **Podder A** (2018) C-peptide—A Promising Biomarker Beneath the Radar of Diabetes Therapeutics. *J Biomol Res Ther* 7 (167), 2.
- 9 **Podder A** and Latha N. (2017). Data on Overlapping Brain Disorders and Emerging Drug Targets in Human Dopamine Receptors Interactions Network. *Data in Brief*. 12:277–286.
- 8 Pandey D, **Podder A**, Pandit M and N Latha. (2016). CD4-gp120 Interaction Interface - A Gateway for HIV-1 Infection in Human: Molecular Network, Modeling and Docking Studies. *Journal of Biomolecular Structure & Dynamics*. 35(12):2631-2644.
- 7 Singh AK, Bhardwaj JK, Olival A, Kumar Y, **Podder A**, et al., (2016). Design, synthesis and biological evaluation of Arylpiperazine-based novel Phthalimides: Active inducers of testicular germ cell apoptosis. *Journal of Chemical Science*. 128(8):1245–1263.
- 6 **Podder A**, Deeksha Pandey, N Latha. (2016). Investigating the structural impact of S311C mutation in DRD2 receptor by molecular dynamics & docking studies. *Biochimie*. 123:52-64.
- 5 **Podder A** and Latha N. (2014). New Insights into Schizophrenia Disease Genes Interactome in the Human Brain: Emerging Targets and Therapeutic

Implications in the Postgenomics Era. OMICS: Journal of Integrative Biology. 18(12):754-66.

- 4 **Podder A**, Jatana N and Latha N. (2014). Human Dopamine Receptors Interaction Network (DRIN): A systems biology perspective on topology, stability and functionality of the network. Journal of Theoretical Biology. 357(2014)169–183.
- 3 Jaiswal A, Tabassum R, **Podder A**, Ghosh S, Tandon N and Bharadwaj D. (2012). Elevated level of C-reactive protein is associated with risk of Prediabetes in Indians. Atherosclerosis. 222(2):495-501.
- 2 Mahajan A, Jaiswal A, Tabassum R, **Podder A**, Ghosh S, Madhu SV, Mathur SK, Tandon N and Bharadwaj D. (2012). Elevated levels of C - reactive protein as a risk factor for Metabolic Syndrome in Indians. Atherosclerosis. 220(1):275-81.
- 1 Indian Diabetes Consortium. INDICO: the development of a resource for epigenomic study of Indians undergoing socioeconomic transition. Hugo J. 2011 Dec;5(1-4):65-9. doi: 10.1007/s11568-011-9157-2. Epub 2011 Nov 22. PMID: 23205164; PMCID: PMC3238020. (**Podder A** is a member of the **INDICO**)

BOOK CHAPTER

- 1 Chan AP, Choi Y, Rangan A, Zhang G, **Podder A**, Berens M, Sharma S, Pirrotte P, Byron S, Duggan D, Schork NJ. (2022) Interrogating the Human Genome: Computational Methods, Emerging Applications, and Challenges. Methods Mol Biol. 2590:1-30.



Complete List of Published Work in My Bibliography:

- **ORCID ID –**

<https://orcid.org/0000-0002-8296-0034>

- **Google Scholar -**

<https://scholar.google.co.in/citations?hl=en&user=ImgLXS8AAAAJ>

Talks and Presentation

- 2021 Presented a Poster entitled "Implications of biological networks: Search for the basal gene network using plasma proteomic signatures of COVID-19 patients" at annual meeting of American Society of Human Genetics (ASHG), 2021 Virtual Meeting, United States.
- 2020 Presented a Poster entitled "Cross-species network analysis of genes implicated in human aging reveal strong differences in nutrient sensing" at annual meeting of American Society of Human Genetics (ASHG), 2020 Virtual Meeting, United States.
- 2018 Presented an oral talk on "Computational Studies of Drug Targets for Human Dopaminergic System Implicated in Neurological Disorders" at 19th International Conference on Systems Biology (ICSB), Lyon, France.
- 2018 Presented a Poster entitled "Drug Target Prioritization for Alzheimer's disease by Protein Interaction Network analysis" at 17th International Conference on Bioinformatics (INCOB); organized by JNU, New Delhi, India.
- 2016 Presented a poster entitled "Investigating the Structural Impact of S311C Mutation in DRD2 Receptor by Molecular Dynamics & Docking Studies" at 3rd International Conference on Protein Folding and Dynamics; organized by NCBS, Bangalore, India.
- 2015 Presented a conference paper at Biophysics & Golden Jubilee Meeting of Indian Biophysical Society (IBS) organized by Jamia Millia Islamia, Delhi, India.
- 2011 Presented a poster entitled "From statistical significance to biological significance: an in silico analysis of GWA signals implicated in type 2 diabetes to predict their roles." at Indian Society of Human Genetics (ISHG), ISHG, Manipal University, India.

Research Support and/or Scholastic Performance

- 2019 - 2022 Completed the course works and trainings for Responsible Conduct of Research (RCR) under CITI Program at Translational Genomics Research Institute (TGen), Phoenix, Arizona, USA.
- 2018 Awarded International travel grant from Department of Science and Technology (DST), India to attend the 19th International Conference on Systems Biology (ICSB), Lyon, France.
- 2012 Attended workshop on "Programmes in Bioinformatics and Computational Biology" organized by IIT Delhi, Delhi, India
- 2011 Completed training on "Advances in Animal Bioinformatics", NBAGR, Karnal, India.
- 2009 Attended workshop on 'Artificial Intelligence & Its Applications in Bioinformatics' organized by RCC IIT, Kolkata, India.

TEACHING & TRAINING SUPERVISION

- 2020 - 2022 **Guided Undergraduate student as summer trainee**
Designed a Shiny app (R application) and published the work Helios Scholars at TGen, Phoenix, Arizona, USA
- 2016 - 2018 **Guided Undergraduate students Training Program**
Network analysis in systems biology of neurological disorders
DU Star Innovative Project, Sri Venkateswara College, Delhi, India
- 2014 - 2017 **Organized Workshop for College teachers & postgraduate students**
Molecular Modeling & Drug Designing
DBT funded Project, Sri Venkateswara College, Delhi, India

PEER REVIEWER

Frontiers in Bioinformatics - Network Bioinformatics | 2023 – Present

Review Editor

Profile - <https://loop.frontiersin.org/people/1004212/overview>

Nature Scientific Reports, Nature Publishing Group | 2019 – Present

Academic Reviewer

Publons – <https://publons.com/researcher/3482124/avijit-podder>

Journal of Biomolecular Research & Therapeutics | 2018 - Present

Editorial Board Member

Profile - <https://www.walshmedicalmedia.com/editor/avijit-podder-10659>

PERSONAL DETAILS

Nationality:	Indian
Date of Birth:	August 25, 1983
Languages:	English (Proficient), Bengali and Hindi (Native)
Fond of:	Music, Travel and Nature Photography
Current work authorization in USA:	J2 visa (EAD card); good till July 2023.
Web profile:	LinkedIn: www.linkedin.com/in/avijitpodder