

Curriculum vitae

Pankaj Barah, PhD

DBT-Ramalingaswami Re-entry Fellow

Member, Indian National Young Academy of Sciences (INSA-INYAS)

Assistant Professor, Department of Molecular Biology and Biotechnology

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CURRENT POSITION

2017 May onwards DBT-Ramalingaswami Re-entry Fellow and Assistant Professor, Department of Molecular Biology and Biotechnology, Tezpur University, Assam, India.

PREVIOUS POSITIONS HELD

2015 - 2017 **Bioinformatics scientist**, Computational Oncology Group, Division of Theoretical Bioinformatics, German Cancer Research Center (DKFZ), Heidelberg, Germany.

2013-2015 **Post-doctoral Fellow**, Cell, Molecular Biology and Genomics Group, Norwegian University of Science and Technology.

2015 **Visiting Scientist**, Comparative & Integrative Genomics Lab, VIB and University of Ghent, Belgium, European Cooperation in Science and Technology.

2009-2013 **PhD Fellow** at the Norwegian University of Science and Technology, Aug 2009- Feb 2013
Thesis Title: *Integrative Systems Approaches to Study Plant Stress Responses.*

2010-2011 **Visiting PhD Fellow** (6 months) at the Centre for Biological Sequence Analysis, Department of Systems Biology, Technical University of Denmark (DTU), Copenhagen.

2007-2009 **Senior Research Fellow (CSIR)** at the Mathematical Modelling and Computational Biology Group, Centre for Cellular and Molecular Biology, Govt. of India.

2006-2007 **Junior Research Fellow (DBT, COE)** Bioinformatics Centre, University of Pune, India.

EDUCATION

2013 **PhD in Computational Systems Biology:** Department of Biology, Norwegian University of Science and Technology; 2009-2012. (Submitted in Nov 2012, Defended in April 2013)

2006 **M.Sc. in Bioinformatics:** University of Madras, India; 2004-2006, First Class.

2003 **B.Sc. (Hons.) in Biology,** Gauhati University, India; 2000-2003, First class with distinction.

RESEARCH AREAS

Systems biology, Systems medicine, Computational Biology, Big data in biology and medicine, Machine learning, Data integration, Modelling and simulations OMICs, Next Generation Sequencing, Disease biology, Cancer Genomics, Evolutionary Genomics, Plant stress, Genome evolution.

EXTRAMURAL RESEARCH GRANTS AS PI

1. DBT-Ramalingaswamy fellowship grant, " *Integrative approach for understanding the role of noncoding mutations in the evolution of biological systems* ", (2017-2022).
2. DBT Twinning project "Integrative systems biology approach to identify the molecular response signatures in Rice during concurrent biotic and abiotic stresses", (2018-2021).
3. SERB Start Up Grant "Big data and Machine learning based approach to understand combined stress response signatures in multiple cultivating crop plants", (2019-2021).
4. ICMR NER seed grant "A case-control pilot study for identification and validation of Gallbladder cancer biomarkers from North-East Indian population using transcriptomics approach.", (2021-2023).

LIST OF PUBLICATIONS

- 1 Roy,N....**Barah, P.** An Integrative Systems Biology Approach Identifies Molecular Signatures Associated with Gallbladder Cancer Pathogenesis. *J. Clin. Med.* 2021,10(16), 3520.

- 2 Chowdhury HA, **Barah P**, Bhattacharyya DK, Kalita JK (2021), Identification of potential Parkinson's disease biomarkers using computational biology approaches, **Network Modeling Analysis in Health Informatics and Bioinformatics** 10 (1), 1-16.
- 3 Roy N, Gaikawd M, Bhattacharyya D.K., **Barah P**, (2021), Identification of systems level molecular signatures from glioblastoma multiforme derived extracellular vesicle, **Journal of Molecular Neuroscience**, 71, 1156–1167
- 4 Sahu, A., Das, A., Saikia, K., **Barah P**, (2020) Temperature differentially modulates the transcriptome response in *Oryza sativa* to *Xanthomonas oryzae pv. oryzae* infection, **Genomics**. 112 (6),4842-4852
- 5 Sahu, A., Chowdhury, H. A... & **Barah P**, (2020), Integrative network analysis identifies differential regulation of neuroimmune system in Schizophrenia and Bipolar disorder. **Brain, Behavior, & Immunity-Health**, Volume 2, 100023.
- 6 Patowary, P.,..., & **Barah P**, (2020). Identifying critical genes in esophageal squamous cell carcinoma using an ensemble approach. **Informatics in Medicine Unlocked**, 18, 100277.
- 7 Patowary P., Bhattacharyya D.K., **Barah P**, (2019) Biomarker Identification for ESCC Using Integrative DEA. In: Deka B., et al.. (eds) **Pattern Recognition and Machine Intelligence**. PReMI 2019. **Lecture Notes in Computer Science**, vol 11942. Springer, Cham.
- 8 Kakati T, ... **Barah P**, Kalita J.K., (2019) Comparison of Methods for Differential Co-expression Analysis for Disease Biomarker Prediction. **Computers in Biology and Medicine** 113, 103380
- 9 Körber V, Yang J, **Barah P**,... Lichter P.,(2019), EvolutionaryTrajectories of IDHWT Glioblastomas Reveal a Common Path of Early Tumorigenesis Instigated Years ahead of Initial Diagnosis. **Cancer Cell**, 15;35(4):692-704.e12.
- 10 Singh A, ... **Barah P**, Saha S (2019); Arginylation regulates adipogenesis by regulating expression of PPAR γ at transcript and protein level. **Biochim Biophys Acta MCBL**, 1864(4):596-607
- 11 Mahanta A, Ganguli P, **Barah P**. *et al.*, (2018), Integrative Approaches to Understand the Mastery in Manipulation of Host Cytokine Networks by Protozoan Parasites with Emphasis on Plasmodium and Leishmania Species. **Front Immunol**. 23;9:296.
- 12 **Barah P**, ... Bones AM (2016), Transcriptional regulatory networks in *Arabidopsis thaliana* during single and combined stresses. **Nucleic Acids Res**. 20;44(7):3147-64.
- 13 **Barah P** and Bones AM (2015), Multi-dimensional approaches for studying plant defence against insects: from ecology to omics and synthetic biology. **Journal of Exp. Bot.**;66(2):479-493.
- 14 **Barah P** and Bhuyan K (2014), India: Endangered species damned by dams. **Nature** 515, 37 *Correspondence
- 15 **Barah P**. *et al.* (2013); Genome scale transcriptional response diversity among ten ecotypes of *Arabidopsis thaliana* during heat stress. **Front. in Plant Sci**. 26;4:532.
- 16 **Barah P**. *et al.*(2013), Genome Scale Cold Response Regulatory Networks in ten *Arabidopsis thaliana* Ecotypes. **BMC Genomics**, 22;14(1):722.
- 17 Rasmussen S, **Barah P** *et al.* , (2013); Transcriptome response to combinations of stresses in *Arabidopsis thaliana*. **Plant Physiol**, 161: 1783-1794.
- 18 **Barah P**, ... Bones AM (2013); Molecular signatures of specific and common defense responses in *Arabidopsis thaliana* during an insect feeding and a bacterial infection. **PLoS One**, 8(3):e58987.
- 19 Sankaran S, Rani SS, **Barah P**,...,Sowdhamini R (2009); Length variations amongst protein domain superfamilies and consequences on structure and function. **PLoS One**;4(3):e4981.
- 20 Sandhya. S, **Barah P**, M. K. Govind, B. Offman, N. Srinivasan, and R. Sowdhamini (2008); CUSP: an algorithm to distinguish structurally conserved and unconserved regions in protein domain alignments and its application in the study of large length variations. **BMC Structural Biology**, 8:28.
- 21 **Barah P** and Sinha S (2008) ; Analysis of Protein Folds Using Protein Contacts Networks. **PRAMANA: Journal of Physics**, Vol. 71, (No.2).

Book and Book chapters:

- 1 Book: **Barah P**, Bhattacharyya DK, Kalita JK. Gene Expression Data Analysis: A Statistical and Machine Learning Perspective. Chapman & Hall/CRC Press; 2021, ISBN 9780367338893.

- 2 **Chapter:** Rohloff J, **Barah P**, and Bones A M, Improving crop productivity and abiotic stress tolerance in cultivated *Fragaria* using omics and systems biology approach. , in "Improving Crop Productivity in Sustainable Agriculture", pp 451-480, Wiley-VCH Germany, ISBN: 978-3-527-33242-7, 2012.
- 3 **Chapter:** Chawla K*, **Barah P***, Kuiper M, and Bones AM; "Systems Biology: a promising tool to study abiotic stress responses" in "Omics and Plant Abiotic Stress Tolerance", Bentham Publishers, USA, ISBN: 978-1-60805-058-1). * Equal contribution

Popular Science Writings:

1. Regular contributor of science communication articles in vernacular newspapers and magazines.
2. *Korkat Rugor Adhunik Chikitsa aru Pratyahban*, (Eds.) Barah P and Bhattacharyya DK, Publisher Tezpur University [ISBN:978-81-937452-0-5]. Supported by a grant from the Commission for Scientific and Technical Terminology, Ministry of Human Resource Development, Government of India, New Delhi.

FELLOWSHIPS, PRIZES, AND OTHER ACHIEVEMENTS

- 2021 Selected as member of the Indian National Young Academy of Sciences (INIAS), the first and only recognized young scientist academy of India, established by Indian National Science Academy.
- 2020 Selected as 'Young Investigator' to participate in the the annual Young Investigators' Meeting (YIM 2020) held in Mahabalipuram, India organised by IndiaBioscience.
- 2019 Invited to Participate as Inspiring Teacher in the 3rd India Nobel Prize Series 2019, on the theme Teaching and Learning held in Delhi, Mohali and Ludhiana, jointly organized by the Nobel Foundation Sweden and the Department of Biotechnology, Government of India.
- 2017 *Ramalingaswamy Re-entry Fellowship (2018-2023)* by the Department of Biotechnology, Ministry of Science & Technology, Government of India.
- 2015 *Short-Term Scientific Missions (STSM)* fellowship from European Cooperation in Science and Technology to visit Comparative & Integrative Genomics Lab, University of Ghent, Belgium.
- 2015 Travel award to WG2 meeting of COST action *Phenotyping: from the lab to the field* in Carcavelos, Portugal.
- 2015 Travel award, and invitation to present research work at COST SUSTAIN workshop on cellular dynamics of effector action and recognition, held in Tel Aviv, Israel.
- 2014 Full sponsorship award from the *BBSRC (UK)* for the ERASynBio Summer School: *Introduction to Synthetic Biology* in plant systems, Jointly organized by John Innes Centre, BBSRC and University of Cambridge.
- 2014 Young scientist's award during '*Advanced Lecture Course on Systems Biology*', by the SystemsX.ch (Switzerland), BMBF (Germany) and ERASysAPP (EU), held in Innsbruck, Austria.
- 2012 Travel grant from *www.unifor.no*, to present my paper in the 12th International Conference on Bioinformatics & Computational Biology held in Las Vegas, USA.
- 2012 Fellowship from COST (European Cooperation in Science and Technology), to present my paper in the Fourth StatSeq workshop "*Statistical Challenges of the 1000€ genome sequences in plants*", held in Verona, Italy.
- 2011 Full sponsorship award from the *Scandinavian Plant Physiology Society (SPPS)* to present my research as an oral talk in XXIV SPPS Congress, Stavanger, Norway.
- 2011 Travel fellowship from Faculty of Natural Science and Technology, Norwegian University of Science and Technology for the *10th International Conference in Systems Biology (ICSB)* held in Heidelberg, Germany.
- 2011 *Genesys Young Scientists Runners up award and Poster Award*, during International Conference on Systems Biology, in Edinburgh (UK). (Selected out of >500 posters).
- 2010 Received full fellowship from the *Welcome Trust (UK)* to attend 10 days long Welcome Trust Advance Course "*Functional Genomics to Systems Biology*" Sanger Institute, Cambridge, UK.
- 2009 Senior Research Fellowship in Trans Disciplinary Research area, by the Council of Scientific and Industrial Research (CSIR), Govt. of India.
- 2007 Junior Research Fellowship (DBT-COE), by the Department of Biotechnology, Govt. of India.
- 2005 Summer Research Fellowship, by National Centre for Biological Sciences (Tata Institute of Fundamental Researches), Bangalore, India.
- 1995 Child scientists award (state level), in National Children's Science Congress, organised by National Council for Science & Technology Communication (NCSTC), Govt. of India.

TALKS, POSTERS, CONFERENCES, WORKSHOPS, TRAININGS

- 2021 Conducted workshop on 'Computational Genome Analysis of SARS-CoV-2', during 'inSciGnis 2021' the annual mega science fest organised by the Students' Science Council of Tezpur University.

- 2021 Popular Science Talk during 52 Biennial Conference of Assam Science Society, Bihpuria, Assam, India.
- 2020 Invited popular lecture during Lakhimpur District level National Children Science Congress organized by National Council for Science and Technology, Communication (NCSTC), Department of Science and Technology, Government of India.
- 2020 Workshop on “Biological Data analysis using R and Molecular Phylogenetics”, 5-6 March 2020, Institute of Advanced Study in Science and Technology (Government of India under the Department of Science and Technology), delivered lecture as Resource person.
- 2020 Participated with invitation and presented poster in the annual Young Investigators' Meeting (YIM 2020) held in Mahabalipuram, 14-18 February 2020, organised by IndiaBioscience.
- 2019 Third India Nobel Prize Series 11-13 September 2019, in Delhi and Punjab (Mohali, Ludhiana), India, jointly organized by the Nobel Foundation Sweden and the Department of Biotechnology, Government of India.
- 2019 “Stimulating the Young Minds”, invited lecture during Second State Science Festival, Assam Science Technology & Environment Council, held in Tezpur, Assam.
- 2019 Presented a poster during India-EMBO Symposium, Regulatory epigenomics: From large data to useful models, 10 – 13 March 2019, Chennai, India.
- 2019 National workshop on Machine learning in R & Python, 28th January- 01st February 2019, Tezpur University, as Resource person.
- 2018 Invited talk on “P-4 medicine” during Translational Drug discovery: Current trends and future interventions, 10th and 11th November 2018, Assam down town University- Assam, Guwahati.
- 2018 Resource person in Bioinformatics training cum workshop on "Tool for Transcriptome Analysis", 26-27 April 2018, CSIR-North East Institute of Science and Technology (NEIST)- Assam.
- 2018 Delivered a lecture in the International Seminar cum Workshop on “Computer Aided Drug Design for Human Pathogens (CADDHP)” at Tezpur University, Tezpur during 12-17 Feb 2018.
- 2018 International Symposium on Biodiversity and Biobanking, 27th -29 January 2018, IIT Guwahati, Invited talk.
- 2018 Annual day lecture, Mangaldai College, Assam.
- 2018 Invited talk ‘Interdisciplinary Biology’ Department of Physics, Madhabdev University, Assam.
- 2018 Invited talk on “Synthetic Life”, 26.10.2018, DBT-Biotech Hub, B. Barooah College, Guwahati Assam.
- 2017 Annual Orientation Day Lecture on , University of Science and Technology (USTM), Meghalaya, India.
- 2017 Bioinformatics training cum workshop, 11-12 July 2017, CSIR-North East Institute of Science and Technology (NEIST)- Assam, Resource person.
- 2017 Advancement of second-generation sequencing technology for health research, Regional Medical Research Centre - NE Region – ICMR, attendance.
- 2016 Attended the international symposium ‘*Bioinformatics for Human Health and Disease*’ took place at the German Cancer Research Center (DKFZ) in Heidelberg, Germany.
- 2016 *Biotech Entrepreneurship Training Program*, summer sem., Heidelberg University, Germany.
- 2016 Talk at the *DKFZ PostDoc Network annual retreat*, Neustadt, Germany.
- 2015 Talk at the annual retreat of Molecular Systems Biology Group, NTNU, Trondheim Norway.
- 2015 An invited talk at the CSIR-North East Institute of Science and Technology (NEIST), Jorhat, India.
- 2014 ERASynBio 2nd Summer School: *Introduction to Synthetic Biology in plant systems* at the John Innes Centre, Norwich, UK, Organised by BBSRC, and University of Cambridge.
- 2014 Indo-Norwegian joint workshop on academic collaboration, held in New Delhi.
- 2014 Oral talk and a poster during *Advanced Lecture Course on Systems Biology (SysBio2014)*, Innsbruck, Austria.
- 2013 Talk during *STATSEQ meeting Gene Network Inference with systems genetic data and beyond*, Paris, France.
- 2012 Presented a talk in the Norwegian Bioinformatics Forum meeting, Trondheim, Norway.
- 2012 Talk in the 12th International Conference on Bioinformatics & Computational Biology, Las Vegas, USA.
- 2012 Presented poster and short talk in 4th StatSeq workshop "Statistical Challenges of the 1000€ genome sequences in plants", Verona, Italy.
- 2012 Presented an invited talk in 10th Norwegian Arabidopsis Meeting, Norway.
- 2011 Presented an invited talk in XXIV SPPS Congress, Stavanger, Norway.
- 2011 Presented poster in International Conf. on Systems Biology, Heidelberg, Germany.
- 2010 Presented poster in *International Conf. on Systems Biology*, Edinburgh (UK).
- 2010 Participated in the advance course on *Functional Genomics and Systems Biology*, held at Wellcome Trust Genome Campus, Hinxton, Cambridge.
- 2009 Poster during National Symposium on Cellular and Molecular Biophysics (NCMB), CCMB , Hyderabad, India.
- 2008 Presented a poster International Workshop and Conference on: Statistical Physics Approaches to Multi disciplinary Problems, 2008, Indian Institute of Technology, Guwahati, India.

- 2008 International Workshop on Physics in Biology: A Synergy (IWPBS 2007), University of Hyderabad, India.
 2007 Attended 11th ADNAT symposium on Structural Biology and Structure Prediction at CCMB Hyderabad.
 2005 Presented paper on "Pharmacogenomics" in a conference jointly organized by Association of Biological Chemist and Dept. of Biochemistry University of Madras, India, 2005.

JOURNAL ASSIGNMENTS

- Guest associate editor: *Frontiers in Plant Science (Switzerland)*.
- Reviewer: *BMC Genomics, PLOS One, Advances in Bioinformatics, Frontiers in Molecular Biosciences, Nucleic Acids Research, Computational Biology and Chemistry, Genes, Journal of Bioscience, Frontiers in plant science, Genomics etc.*
- Founder, and editorial board member of www.xahitya.org, Platform for Assamese Unicoded Literature (ISSN 2321-5097), reference web portal by the UGC, for Assamese language.
- Editor of the journal 'Mahapurushjyoti', published by Srimanta Sankardeva University, Assam

COURSES TAUGHT

- A. **Ph.D** : BT 710- Research Methodology
 B. **M Sc in Molecular Biology and Biotechnology**: BT 449- Basics of Mathematics and Statistics , BT450 Evolutionary Genetics, BT 446-Bioinformatics, BT 475: Critical analysis of classical papers and scientific communication skills
 C. **Integrated M.Sc. in Bioscience and Bioinformatics** : BI 327 -Bioprogramming and Biostatistics, BI 425 Bioinformatics Software and Algorithms, BI 226-Basics in Bio-computing, BI 328-Biological database management systems , BI 522-Project work, BI 338- Advanced Biology Seminar –I, BI 342: Advanced Programming I, BI 449: Advanced programming II, BI438: Lab. on Applied Bioinformatics.
 D. **CBCS**: BI 109-Basics in Bioinformatics

COMMITTEE MEMBERSHIP

- Faculty in charge of the *Ek Bharat Shreshtha Bharat* essay competition at the Tezpur University.
- Faculty in charge of the The 13th Edition of the Annual Magazine of Tezpur University: Srijan
- Assistant General Secretary of Assam Science Society, Tezpur University Branch (2019- till now).
- Committee member of Tezpur University Outreach program called "Meet With Students".
- Member Board of studies, Department of Molecular Biology and Biotechnology, Tezpur University.
- Member Departmental Advisory Committee, Dept. of Molecular Biology and Biotechnology, Tezpur University
- Doctoral Committee member of 12 PhD students from Dept. of Molecular Biology and Biotechnology and Dept. Computer Science and Engineering at Tezpur University.
- Member of the management committee, Tezpur Science Centre, Assam Science Society.
- Executive member of Centre for Innovation Incubation and Entrepreneurship (CIIE), Tezpur University.
- Member of Institutional Biosafety Committee, Dr. Bhubaneswar Borooah Cancer Institute (BBCI), Guwahati.
- Examiner of PG thesis, Assam Agriculture University, Jorhat, Assam.
- Member of organizing committees of several conferences, workshops, meetings at Tezpur University.

*****END** OF** DOCUMENT*****