

Subho Ghosh

Permanent Address: Bishalaxmitala, P.O.-Rahara, DIST-24 Pgs. (N), PIN-700118, West Bengal, India
PHONE-9163427855 E-MAIL-subho.iisc@gmail.com

Industrial experience:

March 2024-June 2024 Senior Scientist in Episteme Genomics Pvt. Ltd.

- Worked in biotechnology R&D set up.
- Worked on sequence validated clones starting from DNA fragment synthesis in BioXP platform to validated plasmid clones through Gibson assembly (both Hi Fi and Ultra kits), Oxford Nanopore sequencing library prep, sequencing and data analysis.
- Sample preparation and ONT sequencing of metagenomics samples and bacterial whole genome sequencing.
- Improved the methodologies of preparation of competent cells, transformation and plating.
- Trained colleague and trainees.

Research experience:

June 2019-January 2024 Postdoctoral Research fellow, Cancer Center, Albert Einstein College of Medicine, New York, USA

- Research Area: Molecular basis of bacterial differentiation, SOS response, iron metabolism, outer membrane proteins, gut microbe-host interaction.
- Coauthored 2 papers, 1 preview as 1st and corresponding author, 2 manuscripts under preparation.

September 2018-May 2019 Postdoctoral Research Associate, Department of immunology, St. Jude Children's Research Hospital, Memphis, Tennessee, USA

- Research area: Regulation of inflammation by CARD6 and Dnmt3a.

August 2017-August 2018 Bridging Postdoctoral fellow, Institute for stem cell science and regenerative medicine, National Center for Biological Sciences (NCBS), Bangalore, India

- Research area: Role of signaling molecules in pattern formation during embryonic development in mouse.
- Coauthored 1 paper.

- August 2011-July 2017** **Integrated PhD student, Indian Institute of Science, Bangalore, India**
- Research area: Regulation of transcription by zinc finger proteins in mycobacteria and making thermodynamic engine using bacteria.
 - 1 single author paper and 1 second author paper.
- August 2009-July 2011** **Master degree student, Indian Institute of Science, Bangalore, India**
- Research area: Participated in rotation project on zebra fish development, mouse-Salmonella interaction.
 - Acknowledged for doing AFM studies of proteins (**J Phys Chem**, 2012,116, 621-632).
- ❖ **Research Interest:**
Molecular biology, immunology, host-microbiota/pathogen interaction, DNA/RNA-protein interaction, transcription, signaling, extra cellular vesicles, stress response of bacteria and eukaryotes.
- ❖ **Education:**
- August 2011-July 2017** **Integrated PhD student, Indian Institute of Science, Bangalore, India**
- Biochemistry, Biophysics, Molecular Biology of transcription in *Mycobacterium smegmatis*, a non-pathogenic model for studying *Mycobacterium tuberculosis*.
 - Thesis: **Biochemical, biophysical and evolutionary perspectives of zinc finger proteins in *Mycobacterium smegmatis*.**
 - Guide: Prof. Dipankar Chatterji
 - Published single author paper (**Genes to cells, 2017**), second author paper (**Nature Physics, 2016**) as original research articles.
- August 2009-July 2011** **Master degree student, Indian Institute of Science, Bangalore, India**
- Worked in zebrafish development, mouse-Salmonella interaction.
 - Acknowledged (**J. Phys. Chem. B, 2012**) for doing Atomic force microscopy.
- July 2006-July 2009** **Bachelor degree student, Presidency College, Kolkata,**

University of Calcutta

- First class in Zoology (Hons.) with Botany and Chemistry.

❖ **Scientific Publications:**

- **2022**

Subho Ghosh* and Sridhar Mani*. Phospholipid immunomodulator from *Akkermansia muciniphila*. 2022. **Cell Host and Microbe**. 30(9). 1191-1193. (*Joint corresponding author).

NagenderLedala, Mishika Malik, Karim Rezaul, Sara Paveglio, Anthony Provas, Aaron Kiel, Melissa Caimano, Yanjiao Zhou, Jonathan Lindgren, Kristyna Krasulova, Peter Illes, Zdeněk Dvořák, Sandhya Kortagere, Ellen L. Zechner, **Subho Ghosh**, Sridhar Mani, and Adam P. Matson. Bacterial indole: a multifunctional regulator of *Klebsiella oxytoca* complex enterotoxicity and host pathogenesis. 2022. **MBio**. 13 (1). e03752-21.

- **2021**

De A, Chen W, Li H, Wright JR, Lamendella R, Lukin DJ, Szymczak WA, Sun K, Kelly L, **Ghosh S**, Kearns DB, He Z, Jobin C, Luo X, Byju A, Chatterjee S, San Yeoh B, Vijay-Kumar M, Tang JX, Prajapati M, Bartnikas TB, Mani S. Bacterial swimmers enriched during intestinal stress ameliorate damage. 2021. **Gastroenterology**. 161 (1). 211-224.

- **2018**

Nitya Nandkishore, Bhakti Vyas, Alok Javali, **Subho Ghosh** and Ramkumar Sambasivan. Divergent early mesoderm specification underlies distinct head and trunk muscle programs in vertebrates. 2018. **Development**. 145 (18), dev 160945.

- **2017**

Subho Ghosh and Dipankar Chatterji. Two zinc finger proteins from *Mycobacterium smegmatis*: DNA binding and activation of transcription. 2017. **Genes to Cells**. 22. 699-714.

- **2016**

Sudeesh Krishnamurthy, **Subho Ghosh**, Dipankar Chatterji, Rajesh Ganapathy and A.K. Sood. A micrometer-sized heat engine operating between bacterial reservoirs. 2016. **Nature Physics**. 12. 1134-1138.

- **2012 (Acknowledged in the following paper for doing Atomic Force microscopy during MSc)**

Abantika Ganguly, Priya Rajdev, Sunanda Margrett Williams, Dipankar Chatterji.
Nonspecific Interaction between DNA and Protein allows for Cooperativity: A Case Study with Mycobacterium DNA Binding Protein. 2012. **J Phys Chem.** 116. 621-632.

❖ **Conferences attended:**

- London Calling 2024 (Virtual participation)-Oxford Nanopore annual conference.
- The New York Bacillus Interest Group (NYBIG) symposium, 2023.
- The New York Bacillus Interest Group (NYBIG) symposium, 2022 (gave talk).
- CSHL virtual conference on Microbial pathogenesis and host response 2021 at Cold Spring Harbor Laboratory (Presented poster).
- CSHL virtual conference on Microbiome 2020 at Cold Spring Harbor Laboratory.
- The New York Bacillus Interest Group (NYBIG) virtual symposium, 2021.
- 4th Stem cell symposium on gene editing and RNA. biology in stem cells, 2020 in New York, USA.
- Keystone conference on Transcription and RNA processes in Inflammation and Immunity 2019 at Granlibakken, Tahoe City, USA.
- Gordon Research Conference on Chromosome Dynamics 2017 at Renaissance Il Ciocco, Barga, Italy (Presented poster).
- Discussion Meeting on Conflict and Cooperation in Cellular Populations, 2016 (International conference) in NCBS, Bangalore, India.
- 19th Transcription Assembly meeting 2016 at Bose Institute, Kolkata (Presented poster).
- 2nd National conference on Tuberculosis 2016 at Indian Institute of Science, India.
- International Conference on Biomolecular Forms and Function at Indian Institute of Science, India.
- Annual Meeting of the Indian Biophysical Society 2016, entitled “Molecules in living cells: Mechanistic basis of function” at Indian Institute of Science, India.

❖ **Technical Skills:**

- **Next generation sequencing:** Oxford nanopore sequencing technology for clone validation, metagenomics samples and bacterial whole genome sequencing, rapid and native barcoding-library preparation.
- **Synthetic biology:** Gibson assembly, handling BioXP platform for DNA synthesis.
- **Microbiological techniques:** Growth curve, CFU counting, colony morphology, biofilm formation, sliding motility, swimming and swarming motility assays, biochemical test for bacteria identification, knock out production (produced several knockouts in an intractable strain of *Enterobacter* sp.), bacterial metabolism, enzyme assays, experienced in culturing anaerobic bacteria, fluorescence microscopy of bacterial cells, isolation of bacterial extracellular vesicles, oral route infection of mice models.
- **Cell culture:** RAW264.7 and Int407 cell line, E14tg2a cell line, Mouse embryonic fibroblast (MEF), Caco2, HEK293T, MEF isolation, Bone marrow derived

macrophages, growing cells on feeder and matrices, lipofectamine mediated transfection, directed differentiation to cardiomyocytes and skeletal muscle.

- **Microscopy:** Fluorescence microscopy of bacterial cells, bright field microscopy and confocal microscopy of histological sections (H & E staining), animal cells, fluorescence microscopy, SEM, TEM, atomic force microscopy of DNA, protein and DNA-protein complex.
- **Histological techniques:** Collection of organs after dissection, embedding of tissue in wax, block preparation, microtomy and staining of tissue sections by H&E stains, immunostaining, histology of colon and small intestine.
- **Mouse genetics:** Mouse genetics-Cre-lox system, knockout mice for inflammasome components, mouse embryo, mouse microbiota transfer experiment, experienced in DSS induced colitis model.
- **DNA techniques:** Genomic DNA isolation from mycobacteria and *Escherichia coli*, mouse tissue, plasmid DNA isolation, production of knock out by homologous recombination and knockdown by antisense RNA in mycobacteria, PCR, colony PCR, restriction digestion and ligation of DNA fragments, agarose and acrylamide gels for DNA, EMSA, site directed mutagenesis-point mutation, deletion mutation, body and end labelling of DNA, promoter mapping, β -galactosidase assay for measuring promoter activity, 16S rRNA sequencing.
- **RNA techniques:** In vitro transcription assay, RNA isolation from bacterial and mammalian cells, have experience of handling RNA in situ hybridization, bacterial small RNA.
- **Protein techniques:** Purification of (His)₆ protein using Ni-NTA chromatography and purification of untagged protein by ammonium sulfate precipitation and ion exchange chromatography, protein purification from inclusion bodies, RNA polymerase preparation from mycobacteria and *E. coli*, reconstitution of RNA polymerase, Ni-NTA pull down assay for protein-protein interaction, protein estimation by Lowry and Bradford method, native, SDS, acidic PAGE, silver staining, FPLC, TLC, in gel tryptic digestion and mass spectroscopy related Mascot search.
- **Antibody related techniques:** Raising antibodies against proteins in rabbits, affinity purification of antibodies, colorimetric and chemiluminescent western blot, immunofluorescence, cytokine ELISA.
- **Biophysical techniques:** Surface Plasmon Resonance (SPR) for protein-protein and DNA-protein interaction, UV/VIS spectroscopy, atomic absorption spectroscopy, mass spectroscopy (MALDI and ESI), CD, fluorescent spectroscopy, size exclusion chromatography, DLS, SEC-MALS.
- **Bacteria handled:** *Mycobacterium smegmatis*, *E. coli*, *Bacillus subtilis* and *B. licheniformis*, *Salmonella enterica* var. Typhimurium, *Citrobacter rodentium*, *Francisella novicida*, *Enterobacter* sp. SM3.
- **Computational techniques:** FASTA, BLAST, CLUSTAL omega, Ensembl, UCSC Genome Browser, ESPript, Web Logo, MUSCLE, Homology modelling of proteins, Pymol, MEGA, Dendroscope, Graph Pad PRISM, Sigma Plot, Biorender.

❖ **Teaching and science related activities:**

- Judge in NYC STEM fair to find future scientists.
- Teaching assistant in the course-DNA-Protein interaction and Nanobiology, 2014 in Indian Institute of Science, Bangalore, India.
- Assisted in CD spectroscopy practical class in Freshman's Biology course for undergraduates in Indian Institute of Science, Bangalore, India.
- Mentored summer trainees and undergraduate students.

❖ **Other activities:**

- Participated in organization of in-house symposia and conferences.
- Drawing and painting, hiking.