Postdoctoral Fellowship Programme in the Department of Biological Sciences

Applications are invited from the motivated and potential candidates for postdoctoral positions available in the Department of Biological Sciences (DBS), IISER Kolkata.

The following criteria need to be fulfilled (apart from the essential criteria mentioned in the main part of the advertisement) to apply for a postdoctoral position in DBS.

1. A candidate must have secured at least 55% marks (or equivalent CGPA) in MSc (or equivalent exam) and at least one first authorship peer reviewed paper (related to her/his PhD work) published or accepted in a reputed journal.

2. Application should accompany (other than the detailed CV and copies of all certificates as mentioned in the main part of the advertisement) and fulfil other essential criteria mentioned in the main part of the advertisement.

i) a short research proposal (not exceeding 3 pages) on the project of interest.

ii) two recommendation letters (to be send by the referees directly to dbs.pdf@iiserkol.ac.in)

 *A candidate may opt for up to three projects (details are given below) according to their preference.

Short-listed candidates will have to present her/his Ph.D. work and appear for interview

Final selection will be based on presentation (open seminar) by the short-listed candidate and performance of the candidates during the selection interview.

How to apply: 1. Cover letter mentioning the order of preference of the projects (up to three). 2. Detailed CV. 3. Short research proposal (one for each of preferred projects). 4. Copies of all essential documents (as mentioned in the main part of the advertisement). 5. At least two recommendation letters (to be send by the referees to dbs.pdf@iiserkol.ac.in mentioning the name of the candidate in the subject). 6. A candidate MUST mention the code of the most preferred project in the subject of the email.

Last date of receiving applications (via e-mail to dbs.pdf@iiserkol.ac.in): 05.09.2021. Candidate MUST mention their preferred projects/mentors in the mail.

Project Title: *Sequence variability and disulfide ordering in plant cyclic peptides: In silico exploration of stability and potential applications* **(Code P-1)**

Project Mentors: Dr. Radhika Venkatesan and Dr. Neelanjana Sengupta

Job responsibility: Formulating goal oriented plans for the execution of the project. Regular cross-talk with experimental groups, interpretation of emergent results, report/manuscript writing and design of further directional studies.

Essential/Desirable experiences and/or expertises: PhD in physics/chemistry/biophysics, or related subjects with expertise and experience in plant peptides/proteins. Skill sets: homology modelling, advanced molecular dynamics simulation methods (including free energy calculations); HPC operations, and computer programming. The ability to interface with experimentalists is desirable.

Title of the project: *Engineering Peptides based biomolecules as therapeutics against cancer and ischemic disease* **(Code P-2)**

Project Mentor: Dr. Rituparna Sinha Roy

Job responsibility: Need to synthesize and characterize the peptide based biomolecules.

Essential/Desirable experiences and/or expertises: Essential: BSc in Chemistry, MSc in Chemistry and PhD in Chemistry/Biological Chemistry in the area of Peptide based Molecular Medicine/therapeutics. OR BSc in Biochemistry/ Microbiology having pass subject in Chemistry and MSc in Chemistry/Biochemistry/ Biotechnology. PhD in Biological Sciences and in the area of Peptide based Molecular Medicine/therapeutics. **Desirable:** Having experience in peptide designing and synthesis. Needs to have paper on peptide based therapeutics and patents.

Title of the project: *Role of Formin and other actin binding proteins on Leishmania physiology and host-parasite interaction* **(Code P-3)**

Project Mentors: Dr. Rupak Datta and Dr. Sankar Maiti

Job description: Should be able to think and design experiments independently to execute the above mentioned project in coordination with the laboratories of Dr. Rupak Datta and Dr. Sankar Maiti.

Essential/Desirable experiences and/or expertise: Masters degree in any branch of Life Sciences or Chemistry, PhD with good track record of publication having experience in molecular biology, cell biology and protein biochemistry techniques.

Title of the project: *Application of mass spectrometry to understand disease biology* **(Code P-4)**

Project Mentor: Dr. Amit Kumar Mandal

Job description: The candidate has to work extensively on various platforms of mass spectrometry (MS) such as MS based proteomics, isotope exchange based MS, tissue imaging using MS, Native MS. Sample to analyses would be predominantly clinical samples such as human blood, urine, surgically removed human tissues

Essential/Desirable experiences and/or expertise: Essential: MSc in Chemistry / Biochemistry /Medical Biochemistry/ Biotechnology/ Biophysics/ Molecular Biology and PhD in Biological Chemistry focusing in the area of Protein chemistry. **Desirable:** To work with protein structure, protein ligand interaction using molecular spectroscopic platforms. Familiar with protein purification, Biochemical assay of proteins. M.Sc project work done in the area of protein chemistry.

Title of the project: *Exploring the mechanism of Type-VI secretion system-based predation under environmental stress to mitigate the gut colonization by Campylobacter Jejuni* **(Code P-5)**

Project Mentors: Dr. Amirul Islam Mallick and Dr. Dipjyoti Das

Job description: The potential candidate needs to perform standard molecular techniques used in microbiology such as gel electrophoresis, ELISA, cloning, developing isogenic mutants, etc.

Essential/desirable experiences and/or expertise: Experience in handling bacterial culture is necessary, and familiarity with imaging (confocal, epifluorescence etc.) and bioinformatics could be a plus point.

Title of the project: *Structure function study of Ribosome and different protein complexes* **(Code P-6)**

Project Mentor: Dr. Partha Pratim Datta

Job description: The postdoctoral Fellow should isolate, clone, express and purify Ribosome and different protein complexes and do structure function study and publish papers, and help in training the Ph. D students

Essential/desirable experiences and/or expertise: PhD in any branch of Life Sciences with proven background in molecular biology/ biochemistry and/or structural biology. Knowledge and experience in computational biology and / or image processing and familiarity with Linux system is desirable and would be a plus point. He/she must have keen interest in the above topic of research and should be able to think and execute the jobs independently and in coordination with members of the lab.

Project Title: *Computer-aided protein engineering to understand and improve enzymes ligand interactions* **(Code P-7)**

Project Mentors: Dr. Supratim Datta and Dr. Rahul Das

Job Description: The project requires the use of classical atomistic molecular dynamics (MD) simulations and free energy calculations to capture the alteration in dynamics or enzyme conformation in the presence of ligands to identify key residues involved in the enzyme-ligand interactions followed by In-silico mutations and experimental verifications. Furthermore, computational simulations using a hybrid quantum-mechanical/molecular-mechanical (QM/MM) approach would be employed to understand the catalytic mechanism of the wild-type and proposed mutants by comparative analysis of the transition states involved in the reaction pathway. The candidate is expected to develop metabolic network connections to evaluate the role of changes in enzyme kinetics on the remodeling of metabolic pathways.

Essential/desirable experience and/or expertise: A Ph.D. in computational biology involving all aspects of molecular dynamics simulations of proteins, and demonstrable ability to work with experimentalists. Ability to develop and implement plans for complex experiments, excellence in oral and written technical communication, strong problem-solving skills, and a commitment to excellence in research.

Project Title: *Investigation of memory retention in a Indian ant* **(Code P-8)**

Project Mentor: Prof. Sumana Annagiri

Job Description: To design, perform experiments to check different hypothesis, perform analysis and write

manuscript. Help in the lab functioning and help in mentoring Master's student.

Essential/desirable experience and/or expertise: Recent PhD in the area of Behaviour/Ecology/Molecular Biology

and a strong interest in organismal biology.

Project Title: *Understanding the role of the cellular prion protein in beta-coronavirus induced neuro-infection and Neuro-immunity* **(Code P-9)**

Project Mentor: Prof. Jayasri Das Sarma

Job description: Executing the project which will involve animal studies, virus infection in in-vitro primary neuroglial cells and in-vivo in mice, tissue harvesting from mice, isolation of neonatal primary neuroglial cells, RNA extraction, RT-PCR, immunohistochemistry, immunofluorescence, western blot, data curation and data analysis, manuscript writing, helping PI to write research grants.

Essential/desirable experience and/or expertise: pro-efficient in logical thinking and independent execution of the project, good written and oral English communication skills. Desirable: Emotionally stable, hardworking, smart, dedicated in research

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Project Title: *Studies on the effect of local microbiota on the proliferation, survival and migration of breast cancer cells: Implications in therapeutics* **(Code P-10)**

Project Memtor: Prof. Tapas K Sengupta

Job description: Designing and execution of experiments related to the project in a collaborative research atmosphere, analysis of data and communication of research findings for publication

Essential/desirable experience and/or expertise: PhD in any branch of Life Sciences. Research motivation with strong educational and research background in Cancer Biology and/or Microbiology, Hands on experiences in Molecular Biological techniques, Strong communication skills.

Project Title: *Understanding the role of membrane tension in intracellular trafficking* **(Code P-11)**

Project Mentors: Dr. Bidisha Sinha and Dr. Arnab Gupta

Job description: The study will address how tension of endomembranes may determine trafficking of apically/basolaterally targeted membrane proteins in polarized epithelial system using novel tension sensors and labelling compartments with unique Rab-GTPases.

Essential/desirable experience and/or expertise: PhD in cell biology with experience in microscopy and quantitative analysis.

Project Title: *Carbon and Nitrogen cycling in relation to landcover and ecological variation in the Eastern Terai ecosystems of India* **(Code P-12)**

Project Mentors: Dr. Robert John Chandran and Prof. Punyasloke Bhadury

Job description: The candidate is expected to undertake sample and data collection from field sites and undertake laboratory analyses. She/He should lead the landscape ecological analyses starting with biogeochemical measurements of microbes and microalgae and modelling.

Essential/desirable experience and/or expertise: The prospective candidate should be familiar with landscape ecological analyses and modelling in the Geographical Information System (GIS) framework with data and tools of Remote Sensing (RS). Knowledge of biogeochemical cycling at the ecosystem level, microbial processes, genomics, analytical skills in methods of classification, spatial modelling and statistical inference, image processing, mapping, and related tools.

Project Title: *Analysing patterns in dog behaviour using mathematical and computational tools* **(Code P-13)**

Project Mentor: Dr. Anindita Bhadra

Job description: The fellow would be required to (i) use a large volume of existing data in the Dog Lab to address various questions pertaining to dog behaviour, using a modelling approach; (ii) to design a program for future data sorting and analysis; (iii) train students to run these programs and (iv) be a teaching assistant in some courses.

Essential/desirable experience and/or expertise: A background in mathematics/statistics or physics, Experience of modeling, Should know Matlab and R, Should be interested in ecology and animal behavior, Should be able to communicate reasonably well

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Project Title: *Understanding the mechanistic basis of temperature-mediated regulation of growth and development in Rice* **(Code P-14)**

Project Mentor: Dr. Sreeramaiah N. Gangappa

Job description: The candidate will be directly involved in screening diverse rice genotypes for temperature response under optimum and warm temperature conditions. He/She will try to understand the genetic and molecular basis of warm temperature response using genetic, genomic and biochemical tools.

Essential/desirable experience and/or expertise: The candidate should have a Ph.D. in the plant biology with specialisation in Rice functional genomic with at least one first-author publication. The candidate should have at least 2-3 years of postdoctoral experience in rice functional genomics aspect is highly preferable. Postdoc should have expertise in creating knock-out and the gain-of-function lines through tissue culturing using agrobacterium mediated transformation. Moreover, good communication skills are necessary.