

Sreepadmanabh M

PERSONAL DATA

PLACE AND DATE OF BIRTH Kerala, India | 18th November 1997

CURRENT AFFILIATION National Center For Biological Sciences (NCBS), India

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padmanabh97@gmail.com

ACADEMIC TIMELINE AND EDUCATION

SEPT 2021 - PRESENT Graduate student
National Center For Biological Sciences
(NCBS), India

MAY 2016 - JUN 2021 Bachelor of Science - Master of Science (BS-MS
Indian Institute of Science Education and Dual) in Biological Sciences
Research (IISER) Bhopal, India CPI: 9.62 (on a 10-point scale) [[Transcript Link](#)]

MAY 2016 12th Grade in Science, CBSE Board
D.A.V. Boys Sr. Sec. Gopalapuram, Chennai, Percentage: 95.4%
India

MAY 2014 10th Grade, CBSE Board
D.A.V. Boys Sr. Sec. Gopalapuram, Chennai, CGPA: 10 (on a 10-point scale)
India

DISTINCTIONS

- Travel Awards/Grants
- **Distinguished Student Program Award** - sponsored by the Forum on International Physics and American Physical Society, for the March Meeting 2024 at Minneapolis, USA
 - **FEBS-IUBMB Transcontinental Travel Award** for the FEBS Mechanics in Biology Course, held at the University of Glasgow, from June 4th to 9th, 2023
 - Travel grant to attend the Active Matter at Surfaces and in Complex Environments Workshop, held at MPI-PKS Dresden, from June 19th to 24th, 2023
 - Infosys Travel Award, 2023

Poster Awards

- Best Poster in **Biophysics and Biochemistry** category, at the NCBS

Annual Talks 2024, with a travel grant of INR 50,000

- Poster award at **CompFlu 2023**
- **First prize** for poster presentation at the EMBO Physics of Cells and Tissues Symposium, held at IISc. from 15-16th Feb 2023
- **Best Poster Award** at the NCBS Annual Talks 2023, with a travel grant of INR 50,000

2016 - 2021 **KVPY Fellow:** Competitive national-level fellowship awarded to undergraduate students pursuing basic sciences by the Department of Science and Technology, Govt. of India

DEC 2019 Secured **all-India Rank 33** in the CSIR UGC NET Examination, out of 83,055 candidates in the Life Sciences category (**top 0.1** percentile). Qualified for the Junior Research Fellowship (JRF).

iGEM, 2019 and 2021 Silver Medal at the International Genetically Engineered Machines (**iGEM**) Competition, 2019
Bronze Medal as Team Mentor at iGEM 2021

2019 - 2020 Elected **President** of the Students' Senate, IISER Bhopal

2013 **INSPIRE Award** from Department of Science and Technology, Govt. of India

COMPETITIVE PROJECTS CBSE National Science Exhibition 2014: Environmental Sciences category winner
IRIS (Initiative for Research and Innovation in Science) National Fair 2014:

- Outstanding Award in Environmental and Earth Sciences
- Gujarat Council of Science and Technology Merit Award

PUBLICATIONS, TALKS, AND POSTERS [[Google Scholar Link](#)]

Publications

1. **Sreepadmanabh M**, Meenakshi Ganesh, Pratibha Sanjebam, Christina Kurzthaler, Deepa Agashe, and Tapomoy Bhattacharjee - Effect of 3D confinement on bacterial growth dynamics (*in review at Nat. Comm.*)
2. Nandhu K Babu, **Sreepadmanabh M**, Sayantan Dutta, and Tapomoy Bhattacharjee - Interplay of geometry and mechanics in epithelial wound healing (*in review at Phy. Rev. E*)
3. **Sreepadmanabh M***, Ashitha B Arun*, and Tapomoy Bhattacharjee (* = equal contribution) - Design approaches for 3D cell culture and 3D bioprinting platforms; Biophysics Reviews (2023); **Impact Factor: 2.90** (2023); selected as a Featured Article; Publication [link](#).
4. **Sreepadmanabh M**, Meenakshi Ganesh, Ramray Bhat, and Tapomoy Bhattacharjee - Jammed microgel growth medium prepared by flash-solidification of agarose for 3D cell culture and 3D bioprinting; Biomedical Materials (2023); **Impact Factor: 4.10** (2023); Publication [link](#).
5. Tarun Mishra*, **Sreepadmanabh M***, Pavitra Ramdas, Amit K Sahu, Atul Kumar, and Ajit Chande (* = equal contribution) - SARS-CoV2 nucleoprotein enhances the infectivity of lentiviral spike particles; Frontiers

in Cellular and Infection Microbiology (2021); Impact Factor: 6.07 (2021); Publication [link](#). Media coverage may be found [here](#).

6. Amit K. Sahu, **Sreepadmanabh M**, Mahendra K Rai, and Ajit Chande - SARS-CoV-2: Phylogenetic origins, pathogenesis, modes of transmission, and the potential role of nanotechnology; VirusDisease (2021); Impact Factor: 3.39 (2021) Publication [link](#).

7. Aditi Choudhary, Pratibha Madbhagat, **Sreepadmanabh M**, Vipin Bhardwaj, and Ajit Chande - Circular RNA as an additional player in the conflicts between host and virus; Frontiers in Immunology (2021); Impact Factor: 8.79 (2021) Publication [link](#).

8. **Sreepadmanabh M**, Amit K. Sahu, and Ajit Chande - COVID-19: Advances in diagnostic tools, treatment strategies, and vaccine development; Journal of Biosciences (2020); Impact Factor: 2.79 (2021) Publication [link](#).

9. **Sreepadmanabh M** and Bhushan J. Toley - Investigations into the Cancer Stem Cell Niche using In-Vitro 3-D Tumor Models and Microfluidics; Biotechnology Advances (2018); Impact Factor: 17.68 (2021). Publication [link](#).

Manuscripts under preparation

10. **Sreepadmanabh M**, Mridul Gautam, Nivedita Hariharan, Dasaradhi Palakodeti, and Tapomoy Bhattacharjee - An oxo-mechanical regulation of cellular morphology in 3D (*in preparation*)

11. Saheli Dey, **Sreepadmanabh M**, Sayan Kundu, Ashitha B Arun, Sandhya Koushika, Shashi Thuttupalli, Madan Rao, Duncan Hewitt, and Tapomoy Bhattacharjee - Nematode motility in granular media (*in preparation*)

12. Abhirami P, **Sreepadmanabh M**, Tapomoy Bhattacharjee, and Amey Redkar - A transparent soil-like 3D matrix for studying plant-fungal interactions (*in preparation*)

13. Nandhu K Babu, **Sreepadmanabh M**, and Tapomoy Bhattacharjee - An emulsion-based oil-in-water biomaterial for 3D cell culture and 3D bioprinting (*in preparation*)

Invited and Contributed Talks

1. Designer platforms for 3D cell culture and 3D bioprinting - invited talk at InStem Regulation of Cell Fate meeting, 8th May 2024

2. Understanding cellular behavior using designer 3D platforms - invited talk at IISER Bhopal Biology Club, 7th Jan, 2024

3. **Sreepadmanabh M**, Ashitha Arun, Nandhu Babu, Nivedita Chaudhary, Dasaradhi Palakodeti, Tapomoy Bhattacharjee - Combinatorial role of mechano-chemical cues in cell mechanics and state transitions; Bulletin of the American Physical Society, 2024

4. Tapomoy Bhattacharjee, **Sreepadmanabh M**, Meenakshi Ganesh, Pratibha Sanjenbam, Christina Kurzthaler, Deepa Agashe - Single-cell morphology dictates bacterial growth dynamics under 3D confinement; Bulletin of the American Physical Society, 2024

5. Ashitha Arun, **Sreepadmanabh M**, Sunil Laxman, Tapomoy Bhattacharjee - Growth dynamics of yeast in 3D granular media; Bulletin of the American Physical Society, 2024

6. Tapomoy Bhattacharjee, Saheli Dey, **Sreepadmanabh M**, Sandhya Koushika - Nematode Motility in Granular Media; Bulletin of the American Physical Society, 2024
7. **Sreepadmanabh M**, Saheli Dey, Pratibha Sanjenbam, Christina Kurzthaler, Deepa Agashe, Tapomoy Bhattacharjee - Substrate stiffness-dependent bacterial growth dynamics in 3D; Bulletin of the American Physical Society, 2024

Conference Posters

1. **Sreepadmanabh M**, Mridul Gautam, Nivedita Hariharan, Dasaradhi Palakodeti, and Tapomoy Bhattacharjee - *An oxo-mechanical regulation of cellular morphology in 3D* - EMBO Symposium Physics of Cells and Tissues, Indian Institute of Science, Bangalore, India, 2024
2. **Sreepadmanabh M**, Meenakshi Ganesh, Pratibha Sanjenbam, Christina Kurzthaler, Deepa Agashe, Ramray Bhat, and Tapomoy Bhattacharjee - *Cellular growth and behavior in designer 3D culture media* - NCBS Annual Talks; National Center For Biological Sciences, Bangalore, India, 2024
3. **Sreepadmanabh M**, Meenakshi Ganesh, Pratibha Sanjenbam, Christina Kurzthaler, Deepa Agashe, Ramray Bhat, and Tapomoy Bhattacharjee - *Cellular growth and behavior in designer 3D culture media* - CompFlu; IIT Madras, 2023
4. **Sreepadmanabh M**, Meenakshi Ganesh, Pratibha Sanjenbam, Christina Kurzthaler, Deepa Agashe, Ramray Bhat, and Tapomoy Bhattacharjee - *Cellular growth and behavior in designer 3D culture media* - InStem Annual Talks; Institute For Stem Cell Science and Regenerative Medicine, Bangalore, India, 2023
5. **Sreepadmanabh M**, Meenakshi Ganesh, Pratibha Sanjenbam, Christina Kurzthaler, Deepa Agashe, Ramray Bhat, and Tapomoy Bhattacharjee - *Understanding cellular behavior using designer 3D platforms* - Active Matter at Surfaces and in Complex Environments Workshop; Max-Planck Institute for the Physics of Complex Systems, Dresden, Germany, 2023
6. **Sreepadmanabh M**, Meenakshi Ganesh, Pratibha Sanjenbam, Christina Kurzthaler, Deepa Agashe, Ramray Bhat, and Tapomoy Bhattacharjee - *Understanding cellular behavior using designer 3D platforms* - FEBS Mechanics in Biology Course; University of Glasgow, Scotland, 2023
7. **Sreepadmanabh M**, Meenakshi Ganesh, Pratibha Sanjenbam, Christina Kurzthaler, Deepa Agashe, Ramray Bhat, and Tapomoy Bhattacharjee - *Understanding cellular behavior using designer 3D platforms* - EMBO Symposium Physics of Cells and Tissues, Indian Institute of Science, Bangalore, India, 2023
8. **Sreepadmanabh M**, Meenakshi Ganesh, Pratibha Sanjenbam, Christina Kurzthaler, Deepa Agashe, Ramray Bhat, and Tapomoy Bhattacharjee - *Understanding cellular behavior using designer 3D platforms* - NCBS Annual Talks; National Center For Biological Sciences, Bangalore, India, 2023
9. Tarun Mishra, **Sreepadmanabh M**, and Ajit Chande - SARS CoV-2 nucleocapsid protein-mediated enhancement of spike-pseudotyped lentivirus infectivity and loss of sensitivity to neutralization; *Accepted for ASM World Microbe Forum 2021*. [Poster link](#).
10. Team IISER Bhopal, iGEM 2019, presented by **Sreepadmanabh M** and Rucha D. Kulkarni - *E.coli Learning Suboptimal Acclimatization*; **European Molecular Biology Organization (EMBO) India Symposium 2020**, IIT Madras - Chennai. [Poster link](#).
11. **Sreepadmanabh M**, Kavyashree Rai, Bhushan J. Toley, and Ramray Bhat - *Simulating the effect of flow and trajectory dynamics on metastatic ovarian cancer cells and their multicellular collectives*; **Chemical Engineering Symposium 2019**, Indian Institute of Science - Bangalore

RESEARCH EXPERIENCE (Pre-PhD)

- JUN 2020 - APR 2021
(11 months)
Masters Thesis: An Fc-fused ACE2 microbody for neutralization of SARS CoV-2 spike-pseudotyped lentiviral particles: [[Link to thesis](#)]
Supervised by Dr. Ajit Chande, (Dept. of Biological Sciences), IISER Bhopal
A synthetic construct of the human angiotensin-converting enzyme 2 (ACE2) fused to the Fc domain of human IgG was cloned. ACE2 acts as the chief cellular entry receptor for SARS CoV-2, hence this construct is suitable for use as a neutralizing agent against lentiviral particles pseudotyped with the viral spike glycoprotein. Biochemical characterization and functional validation of the molecule were undertaken using Western blotting, epitope tag-based pulldown, and second-generation lentiviral systems pseudotyped with both the wild-type SARS CoV-2 spike protein as well as its highly infectious D614G variant.
- JUN 2020 - APR 2021
(11 months)
Volunteer at COVID-19 Diagnostic Testing Center
COVID-19 Testing Center at IISER Bhopal
Trained to process patient swab samples for RT-PCR-based diagnosis in a Biosafety Level 2 Plus (BSL-2+) level facility.
- MAR - OCT 2019
(8 months)
iGEM Competition 2019 IISER Bhopal:
Supervised by Dr. Apurba Lal Koner, (Dept. of Chemistry), IISER Bhopal
The project aimed to develop novel strains of cold-tolerant chassis for recombinant protein expression. Cold tolerance-conferring genes like the Cpn 10/60 chaperones from *O. antarctica* and the co-chaperone Trigger Factor from *P. haloplanktis* were cloned into *E. coli*. We further coupled the experimental approach with a mathematical modeling-based analysis, which was also supplemented by extensive public engagement and industrial outreach initiatives in order to develop a holistic and comprehensive project profile.
- MAY - JUL 2019, DEC 2018, and MAY - JUL 2018
(6 months)
Modeling Ovarian Cancer Metastasis and Spheroid Morphology using in-vitro Microfluidic Systems:
Collaborative project co-advised by Dr. Ramray Bhat (Dept. of Molecular Reproduction, Development, and Genetics) and Dr. Bhushan J. Toley (Dept. of Chemical Engineering), IISc Bangalore
The project aims to analyze multi-cellular collectives of ovarian cancer cells (spheroids) across fluid shear stress (FSS) gradients, using a PDMS-based microfluidic chip that aims to mimic the heterogeneous folds and curvatures of the peritoneal cavity. Comparative studies between single cells and spheroids in response to a range of FSS conditions were carried out, and the cellular viability was quantified as a function of the flow dynamics. Our observations implicate spheroidal morphology as a key factor determining the outcomes of exposure to FSS.
- NOV - DEC 2017
(2 months)
Recombinant Protein Expression and Purification:
Supervised by Dr. Apurba Lal Koner, (Dept. of Chemistry), IISER Bhopal
Trained in recombinant protein expression, purification, and analysis techniques using a monomeric unit of the heterotetrameric protein Streptavidin as the model.

MAY-JUL 2017 **Summer Research Internship:**
Supervised by Dr. Bhushan J. Toley (Dept. of Chemical Engineering), IISc Bangalore

(2 months) I performed an extensive literature survey centered around the subject of cancer stem cells. I critically analyzed the various experimental approaches adopted to study the physiological interactions and biology of these cells, with an especial focus on applied biomedical engineering-based tools.

MENTORING

1. **Ashitha B Arun** - Graduate student (*August-October 2022 and February - August 2023*); Worked on understanding yeast budding dynamics under granular 3D confinement. Published a co-first author review paper with me on biomaterial platforms for 3D cell culture and bioprinting. Presently, graduate student at NCBS.
2. **Meenakshi Ganesh** - Masters thesis student (*May-July 2022 and June 2023 - April 2024*); Worked on developing jammed agarose microgels platform as a universal biomaterial, understanding the effect of physical confinement on bacterial growth, and morphodynamics of multicellular ovarian cancer aggregates. Co-authored her first two research papers with me.
3. **Joanrose John** - Masters thesis student (*June 2023 - Ongoing*); Worked on extending the idea of physical confinement-induced selection of bacterial growth across evolutionary timescales. Presently, undergraduate student at IISER Pune.
4. **Mridul Gautam** - Project associate (*May 2023 - Ongoing*); Worked on characterizing and extending an oxo-mechanical phase space that describes cellular morphology as an outcome of combinatorial oxygen levels and substrate mechanics. Will be co-authoring a research paper with me.
5. **Gokul Ganesh** - Intern and Project Associate (*December 2022 and May - July 2024*); Worked on quantitating the effects of antibiotics on bacterial growth under physical confinement. Also led a project on expanding the regulatory role of cellular shape in determining growth success under confinement, against the backdrop of altered nutrient profiles. Presently, incoming PhD student at the Dept. of Chemical Engineering, MIT.
6. **Sanchit Korde** - Intern (*December 2023 - January 2024 and May - July 2024*); Worked on exploring how bacterial motility is altered under physical confinement by changing the single cell morphology and oxygen availability. Presently, undergraduate student at IISER Berhampur.
7. **Sayan Kundu** - Intern (*May - July 2024*); Worked on quantitatively analyzing the undulatory motion of nematodes in granular media. Will be co-authoring their first research paper with me. Presently, undergraduate student at NISER Bhubaneswar.

POSITIONS OF RESPONSIBILITY

1. Served as the **Secretary** of the **Career Development Council**, IISER-Bhopal (2017-2019). I led a team of over forty students involved in organizing both campus placements and internship programs (both research and industrial). Prior to this, I had also worked as a **Communications Associate** in the Institute Placement Cell.
2. Elected as **President** of the Students' Senate, IISER Bhopal (2019-20). Additionally, I have served as a member of the Student Senate for over **three years** (2017-20), as well as a core member of the Election Committee responsible for conducting the annual Institute Student Senate elections. I had also been appointed as the **School Captain** of my alma-mater during the academic years 2015-2016.
3. Served as the **coordinator** for the **Quiz Club** and the **Oratory Club**, IISER Bhopal. I also functioned as Head of Operations for the Annual IISER-B Model United Nations Conference 2018, as well as **co-organizer** and host for IISER-B's inaugural **TEDx** event on 15th Oct 2017.

EXTRACURRICULAR ACTIVITIES

1. I am interested in **science communication and popularization**, and have regularly delivered **public talks** on a variety of subjects in IISER-Bhopal's science clubs. I have experience with **scientific writing** and had a piece published on **Addgene's official [blog site](#)**. I had also maintained a **blog** dedicated to communicating scientific concepts using accessible, elementary narratives (<https://catsandapples.home.blog/>). In addition, I served on the Editorial Board of IISER Bhopal's Institute magazine "Uday", for two years (2017-2019).
2. I have been an active **quizzier** for over **nine years**, having won a plethora of highly competitive national, state-level, and district-level accolades throughout high school and college. Notably, I was the National Finalist (**4th position, All-India**) at the Brahm Prakash Metals and Material Science Quiz 2015, as well as **Runner-Up** at the Tamil Nadu State-Level Radiation Physics Quiz 2014. I am also a regular **quizmaster**, having conducted more than ten formal quizzes in IISER-Bhopal.
3. A regular on the **debating/elocution** circuit for a number of years, I very frequently engage in public speaking events, open mics, community talks, and orientation sessions for junior batches. I had also been instrumental in organizing a weekly open platform for community members to engage in **public debates, elocutions, and open discussions** during my stint as the Oratory Club coordinator.

ORGANIZATIONS AND CLUBS (*at IISER Bhopal*)

Student Senate (SAC)

- President (2019-20)
- Member, student senator (2017-19)
- Advisory member (2020)

Career Development Council (CDC)

- Secretary (2017-2019)

	<ul style="list-style-type: none"> ● Vice-Secretary (2017) ● Communications Associate (2016-18) ● Member, editorial team of CDC's newsletter "CarMa" ● Head of Operations, Model United Nations 2018
Institute Career Development and Placement Council	Representative, Natural Sciences stream (2018-19)
Quiz Club	Coordinator (2018-19)
Oratory Club	Coordinator (2017-18)
Institute Magazine "Uday"	Member, Editorial Board (2017-19)
Election Committee of the Student Senate (SACEC)	<ul style="list-style-type: none"> ● Convener (2019-20) ● Member (2017 and 2018)

REFERENCES

Dr. Tapomoy Bhattacharjee tapa@ncbs.res.in	Asst. Professor NCBS, India
Prof. Dasaradhi Palakodeti dasaradhip@instem.res.in	Professor InStem, India
Dr. Deepa Agashe dagashe@ncbs.res.in	Assoc. Professor NCBS, India
Dr. Ramray Bhat ramray@iisc.ac.in	Assoc. Professor, Dept. of Molecular Reproduction, Development and Genetics IISc., Bangalore, India
Dr. Ajit Chande ajitg@iiserb.ac.in	Assoc. Professor, Dept. of Biological Sciences IISER Bhopal, India
Prof. Satyajit Mayor mayor@ncbs.res.in	Professor NCBS, India
Dr. Bhushan J. Toley bhushan@iisc.ac.in	Assoc. Professor, Dept. of Chemical Engineering IISc Bangalore, India