SANKALPA VENKATRAGHAVAN

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EDUCATION

Program	Stream	Instituition	%/CGPA	Year
Bioengineering	Computational Biology	Indian Institute of Technology Madras (IITM)	9.63/10	2022
Class XII	Biotechnology (CBSE)	Vidya Mandir Senior Secondary School, Mylapore	97.2%	2017
Class X	CBSE	Vidya Mandir Senior Secondary School, Mylapore	10/10	2015

HONOURS AND AWARDS

- **Ranked 1st** in the department, Dr. Anita Mehta Damani Institute Merit Prize awardee for the highest CGPA 2021
- International Max Planck Research School student research fellowship 2021
- INSPIRE fellowship awarded by Govt. of India and selected to attend the National Science Camp 2017
- Awarded Gold, Silver, and Best Education Award (nominee) at iGEM, Boston USA 2019
- Runner up (out of 500) in the Science Communication Competition at the Annual IISc Symposium 2021

RESEARCH PUBLICATIONS AND CONFERENCE PRESENTATIONS

1. **Venkatraghavan S*,** Anantakrishnan S*, and Raman K. "PicCASO: A Cellular Automaton for Spatial Organisation." 2020. BioRxiv, https://doi.org/10.1101/2021.02.14.431138. *Presented at IBSE Symposium (2020)*
2. Beal, J,…**Venkatraghavan S** *et al.*, 2021. Comparative analysis of three studies measuring fluorescence from engineered bacterial genetic constructs. PLOS ONE 16, e0252263. https://doi.org/10.1371/journal.pone.0252263
3. Beal, J.,…**Venkatraghavan S** , *et al.,* 2020. Robust estimation of bacterial cell count from optical density. Commun Biol 3, 1–29. https://doi.org/10.1038/s42003-020-01127-5
4. Venkatraghavan S*, Gangadharan S*, et al., 'Development of Microbial Production Platform for the Synthesis of Campthothecin' – *Giant Jamboree (Boston, USA), India-EMBO Symposium & Bio Wissen SYNPOSIUM (2020)*

PROFESSIONAL EXPERIENCE

Max Planck Institute of Molecular Cell Biology and Genetics *Dresden, Germany*
Advisor: Prof. Jan Brugues *Jun 2021 - Ongoing*
Master's Thesis (Funded by Dresden International Ph.D. Program and IMPRS Student Research Fellowship)
Project: Investigating the physical principles of nuclear scaling

- Formulated and tested 2 frameworks to model the mechanics of nuclear scaling
- Performed image analysis of *Xenopus* oocyte extract to compare model findings with experimental data

Harvard Medical School *Boston, USA*
Advisor: Prof. Angela DePace *Aug – Nov 2020*
Project: Development of an automated Python-Fiji image analysis tool for *Drosophila* reporter systems

- Established a modular, open-source, AI-driven pipeline to analyze fluorescence reporters from live-cell imaging
- Reduced processing time from the order of months to hours by automating cell segmentation using deep learning tools
- Analyzed 10,000+ fixed cells from two cell lines to identify the efficacy of transfection and effects of heterogeneity

Indian Institute of Technology Madras *Chennai, India*
Advisor: Prof. Karthik Raman *Jan 2020 – Ongoing*
Project: Analysis of the spatial organization of microbial communities (Venkatraghavan et al., 2020)

- Conceptualized agent-based, cellular automaton models (MATLAB package available) to study spatial patterning
- Implemented novel quorum-sensing communication strategy, benchmarked against established auxotrophic coupling
- Facilitated design of synthetic microbial communities, identified parameters to best tune spatial organization

Advisor: Prof. K. Subramaniam *Dec 2019 – Ongoing*
Project: Identification of genetic interaction partners of puf-8 and their role in germ cell development in *C. elegans*

- Shortlisted 800 candidate genes with bioinformatics using a putative motif targeted by *puf-8*
- Performed an RNAi Screen to identify the interaction partners of *puf-8* and *glp-1*, identified 50 non-target genes

Project: Investigation of the role of *plp-1* in transcriptional regulation

- Examined RNA-sequencing data, identified 68 sperm-related genes upregulated in *plp-1* mutants
- Analyzed upstream sequences, 5'UTR and 3'UTR of target genes, identified consensus sequence (100bp) across 33%

Indian Institute of Science (Biosystems Science and Engineering) *Bengaluru, India*
Advisor: Prof. Sandhya S. Visveswariah *May – July 2019*
Project: Characterisation of the effect of copy-number variation of initiator genes on the fitness of *C. rodentium*

- Performed growth studies of copy number variants (CNVs) to determine the CFU/ml used in infection studies
- Monitored fecal CFUs in a 28-day study in 6 mice infected with WT and CNVs to characterize the clearance rate
- Sacrificed mice in 9- day study, mucosa-associated CFU, serum ELISA, histopathology revealed no *in vivo* effects

*denotes equal contribution

INTERNATIONAL GENETICALLY ENGINEERED MACHINE (STUDENT LEADER)

- First team from IIT Madras to win gold at an international conference in Boston, USA (2018)
- Co-authored two collaborative studies after expanding the team by 3x and overseeing the training of 15 members
- Raised 1L INR through a new initiative, 'Biotech Lab Day', and handled a budget of 10L INR

Project: Establishing a microbial production platform for the synthesis of camptothecin *Jan – Nov 2019*

- Standardized growth and media conditions, developed transformation protocols for endophytic fungus *F. solani*
- Created a new BioBrick consisting of CaMV-35s promoter-driven GFP and strictosidine synthase
- Designed hygromycin sensitivity assay to characterize the activity of CaMV-35s promoter in our cassette

Project: Engineering a promoter library and codon-optimized reporters validated in *A. Baylyi* *Jan – Nov 2018*

- Characterized library and identified promoter with 80x strength of T5 promoter in GFP reporter studies
- Implemented codon-optimization algorithms, the efficacy of optimized reporters was significantly higher than WT

LEADERSHIP IN SCIENCE EDUCATION

The Language Project *(Founder)* *2018 – 2020*

- Developed 105 short videos explaining basic concepts with feedback from 1000+ high school students
- Available in 30 regional and international languages with 50,000+ views and 850+ subscribers
- Received national media coverage in The Times of India, The New Indian Express, IEEE Newsletter

Indian Scientists Respond to COVID-19 *(Volunteer)* *May - Jul 2020*

- Worked with a volunteer-run action group to develop science popularisation material for COVID-19.
- Created 5 guides on best practices for household hygiene and safety, reaching 5000+.
- Set up the Tamil Webpage for all available guides, improving site traffic by 3x**.**

The Fifth Estate *(Editor – Official Media Body of IIT Madras)* *2018 - 2020*

- Pioneered a popular science column 'Science Deconstructed' with 9 articles, 2500+ average views
- Authored 4 investigative pieces on the experiences of women in STEM (3x average views)
- Demystified the credit system in a review article, garnering the highest ever readership (4400+ views)

Biotech Research Club *(Founder)* *2019 - 2020*

- Established the first platform for UG research with biweekly meetings, conducted 12 showcases
- Launched 'Alumni Talk Series' with 15 talks from the industry/academia reaching 750+ students
- Programmed website, curated a blog (8 articles), and authored an essay on diagnostics (500+ views)

Play2Learn *(Volunteer)* *May – Sep 2019*

- Edited article 'Let's Play to Learn' published in IEEE India Council Newsletter on gamified learning
- Created a Jeopardy! style game to revise concepts, demo with 50 students received positive feedback

National Programme on Technology Enhanced Learning *(Teaching Assistant)* *2020 - 2021*

- Managed an active discussion forum for 5000+ students across two Massive Online Open Courses

DIVERSITY AND INCLUSION INITIATIVES

Black Tulip – Women's Forum of IIT Madras *2020 - 2021*

- Suggested policy reforms to the head of the sexual harassment committee as a panel member
- Organized flagship webinar for aspiring engineers (300+ students), inaugurated by the Director
- Created pan-IIT platforms (500+ members) for incoming students to seek mentorship and guidance
- Spearheaded social media campaign #ILookLikeAnEngineer breaking stereotypes for 5000+ students

Vannam – LGBTQIA+ Alliance of IIT Madras *May - Jul 2021*

- Instituted the first resource group for the LGBTQIA+ community and allies, drafted a vision statement
- Planned events to improve mental health, raise awareness based on a survey of 7 college collectives

Biotech Mentor Programme *Oct – Jul 2021*

- Guided 10 first-year students in a remote semester with course work in mathematics, chemistry, and physics.
- Assisted cohort on time management, adapting to college life, and exploring opportunities in college.
- Served as 'Saathi Academic Mentor' aiding students in a focused group to improve their grades

EXTRACURRICULARS

Chess	• Bronze medalist at CBSE south-zone regionals, 6th in CBSE Nationals in U-19 Girls team in '12 • Singapore (SGP) rating of 1400 from participating in 6 international tournaments ('10-'12)
Basketball	• Quarterfinalist at 52nd Inter IIT sports meet ('17- '18), Schroeter Gold ('18), and Silver ('20)
Quiz & Puzzles *(Team Member)*	• 1st place - Inter-IIT Scrabble League ('20), 3rd place in Literature Quiz, Bhargavi Memorial ('21) • 3rd place - Puzzle Champ, 4th place - Wipro Quiz Festember ('19), 3rd place - Scrabble at LitSoc ('19)
Theatre & Oratory	• Lead actor in Aakriti Bisht, IITM Playoffs, production crew of The Nether, IITM flagship play ('19) • Chaired UNEP in VMUN ('15), awarded a verbal special mention in CHEMUN ('14), PSBBMUN ('14)