

Sreejith Santhosh

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| CONTACT INFORMATION | 9355 Discovery Way, Apt. C La Jolla, CA 92037, USA | Website: sreejithsanthosh.github.io e-mail: ssanthos@ucsd.edu |
| RESEARCH INTERESTS | Theoretical Biophysics, Dynamical Systems, Morphogenesis, Active Matter | |
| EDUCATION | PhD in Physics (Biophysics) Advisor : Mattia Serra University of California San Diego , La Jolla, CA. | 2020 - present |
| | B.Tech. in Engineering Physics. Indian Institute of Technology Madras , Chennai, India | 2016 - 2020 |
| PUBLICATIONS | <ul style="list-style-type: none">• Sreejith Santhosh, Mehrana R. Nejad, Amin Doostmohammadi, Julia M. Yeomans, Sumesh P. Thampi; "<i>Activity induced nematic order in isotropic liquid crystals</i>" <i>Journal of Statistical Physics</i> (2020)• Sreejith Santhosh, Mattia Serra. "<i>Optimal Locomotion for Limbless Crawlers</i>" <i>Physical Review E</i> (2022)• Sreejith Santhosh, Haodong Qin, Bjoern F. Klose, Gustaaf B. Jacobs, Jerome Vetel, Mattia Serra; "<i>Spike formation in 3d flow separation</i>" <i>J. Fluid Mechanics</i> (2023)• Mattia Serra,..., Sreejith Santhosh..., L. Mahadevan; "<i>A mechanochemical model recapitulates distinct vertebrate gastrulation modes</i>" <i>Sci. Advances</i> (2023)• Merlin Lange,..., Sreejith Santhosh..., Mattia Serra..., Loïc A. Royer; "<i>Zebrahub-Multimodal Zebrafish Developmental Atlas Reveals the State Transition Dynamics of Late Vertebrate Pluripotent Axial Progenitors</i>" <i>Cell</i> (2024)• Sreejith Santhosh, Cuncheng Zhu, Blaise Fencil, Mattia Serra; "<i>Coherent Structures in Active Flows on Dynamic Surfaces</i>" <i>bioRxiv</i> (2025)• Sierra Schwabach*, Sreejith Santhosh*, Audrey Miller Williams, Maureen Cetera, Mattia Serra, Sally Horne-Badovinac "<i>Tissue geometry and mechanochemical feedback initiate rotational migration in Drosophila</i>" <i>bioRxiv</i> (2025)• Enrico Maiorino, Sreejith Santhosh, Julian Dukes, Mattia Serra; "<i>Integrating local and global cues for optimal source finding without gradients</i>" (pre-print)• Sreejith Santhosh, Mattia Serra; "<i>Odd modulus localizes stress-strain at topological defects</i>" (pre-print) <p>* : These authors contributed equally</p> | |
| IN-PREPARATION | <ul style="list-style-type: none">• Sreejith Santhosh, Manli Chuai, Cornelis J Weijer, Mattia Serra; "<i>Epiblast mechanics pattern the pre-gastrulation chick embryo</i>" | |
| SOFTWARE AND DOCUMENTATION | <ul style="list-style-type: none">• Computing Finite-time Lyapunov exponent (FTLE) for flows on curved surfaces (github.com/SreejithSanthosh/curvedSurface-LCS)• Website with tutorials for FTLE code for flows in 2D and 3D. (sreejithsanthosh.github.io/FTLEhub/) | |
| CONFERENCES AND WORKSHOPS | <ul style="list-style-type: none">• "<i>Genes, geometry and mechanics govern vertebrate gastrulation</i>", April 2021, 11th Annual Southern California Systems Biology Symposium, UCLA (Los Angeles, USA)• "<i>Lagrangian folding of material surfaces and the theory of material spike formation in 3D flow separation</i>", April 2022, 15th Southern California Fluids Symposium, UCLA (Los Angeles, USA)• "<i>Mechanics and a Turing Mechanism pattern the early chick embryo</i>", Feb 2023, Biophysics of Organoids, Princeton University (Princeton, USA) | |

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| | <ul style="list-style-type: none"> • "<i>Spike formation theory in 3d flow separation</i>", Southern California Fluids Symposium, SDSU (April 2023, San Diego, USA), APS DFD (Nov 2024, Salt Lake City, USA) • KITP summer school on "<i>Synthetic Morphogenesis</i>", Jul-Aug 2023, KITP (Santa Barbara, USA) • "<i>Patterning mechanisms in pre-gastrulation chick embryo</i>", March 2024, APS March Meeting (Minneapolis, USA) • "<i>Coherent Structures in Active Flows on Dynamic Surfaces</i>", March 2025, APS March Meeting (Anaheim, USA) | |
| RESEARCH EXPERIENCES | Nonlinear dynamics and physics of complex systems group <i>PI: Mattia Serra</i> | 2021 - present UCSD |
| | <ul style="list-style-type: none"> • Graduate student researcher tackling research questions in theoretical dynamical systems, morphogenesis and biophysics. | |
| | Theoretical biophysics group <i>PI: Manoj Gopalakrishnan</i> | 2019 - 2020 IIT Madras |
| | <ul style="list-style-type: none"> • Studied chemotactic signalling network of E.Coli as a stochastic processes and investigated the dependence of drift velocity in different environments. | |
| | Theory of complex materials group <i>PI: Dmitry Chigrin</i> | Summer 2019 RWTH Aachen |
| | <ul style="list-style-type: none"> • Investigated theoretical non-equilibrium models of hydro-gels and worked with the numerical implementations of these models. | |
| | Soft and active fluids group <i>PI: Sumesh Thampi</i> | 2018 - 2019 IIT Madras |
| | <ul style="list-style-type: none"> • Theoretically demonstrated an activity induced hydrodynamic instability that generates nematic ordering in an isotropic phase. | |
| TEACHING EXPERIENCE | <ul style="list-style-type: none"> • Teaching Assistant, (Mechanics I) UCSD • Teaching Assistant, (Quantum Mechanics II) UCSD • Teaching Assistant, (Mechanics II) UCSD • Teaching Assistant, (Waves, Fluids and Thermodynamics) UCSD | Fall 2020 Winter 2020 Winter 2023, 2024, 2025 Winter 2024 |
| AWARDS/HONORS | <ul style="list-style-type: none"> • Recipient of the Kishore Vaigyanik Protsahan Yojana (KVPY) scholarship by the Govt. of India. Top 1% of $\approx 50,000$ high school students in India. • Recipient of the Physics Excellence Fellowship by Department of physics, UCSD in recognition of academic achievement in undergraduate studies (USD 8,500). • University of California president's Lindau Nobel Laureate Meetings Fellow 2024. Selected after a rigorous campus-wide and UC-wide selection procedure among graduate students and postdocs, to represent UC at the Lindau meeting. • UCSD Department of physics chair's challenge travel grant (USD 500) | |
| ACADEMIC OUTREACH | Organizer: Coffee Room Seminar Series, UCSD | 2022 - 2024 |
| | <ul style="list-style-type: none"> • Managed logistics for a student-run quantitative biology (q-bio) seminar series. • Organizes events to create an inclusive and collaborative environment among graduate students, post-docs & faculty doing q-bio research at UCSD. | |
| | Tensors Student Coordinator, IIT Madras | 2016 -2017 |
| | <ul style="list-style-type: none"> • Organized workshops and seminars for engineering aspirants in high school from unprivileged backgrounds in the state of Kerala, India. • Managed a team of 15 to conduct a mock engineering entrance examinations for over 2000 high school students. | |

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| | Founded organized a physics undergraduate journal club at IIT Madras | 2019-2020 |
| | Volunteer for UC San Diego Young Physicist program for high-school and middle-school students | 2023 |
| JOURNALS REFEREED | Science Advances (2024) | |
| STUDENTS MENTORED | <ul style="list-style-type: none"> • Julian Dukes (Physics undergraduate UCSD, 2023). After: PhD (Physics) UCSD 2024 • Blaise Fencil (Maths undergraduate UCSD, 2024) • Kelly Ortiz Franco (ENLACE summer program 2024, Undergraduate Instituto Politécnico Nacional) • Isabela Cifuentes Enriquez (ENLACE summer program 2024, Undergraduate Instituto Politécnico Nacional) • Aravind Ramakrishnan (CS masters student UToronto, 2024). After: PhD (Physics) UCSD 2025 • Yuyang Lai (Engineering mechanics undergraduate, Peking University). After: PhD (Physics) UCSD 2025 | |
| PRESS | <ul style="list-style-type: none"> • Representing University of California in Lindau Nobel Laureate Meeting 2024 universityofcalifornia.edu/news/young-uc-scientists-selected-fellows-prestigious-nobel-laureate-meeting • Mathematical Modeling of Chick Gastrulation today.ucsd.edu/story/gastrulation-evolution • Zebrahub: Developmental atlas of zebrafish gastrulation czbiohub.org/life-science/zebrahub-tracks-zebrafish-development/ • National 3rd out of 851 teams, Samsung E.D.G.E shorturl.at/SXZxv, shorturl.at/FDhtL | |
| PUBLIC PROFILES | Google scholar: shorturl.at/zbOEc GitHub : github.com/SreejithSanthosh | |
| ADDITIONAL INFORMATION | <p>Samsung E.D.G.E</p> <p>2018</p> <ul style="list-style-type: none"> • Secured 3rd position among 851 teams from top 18 engineering and business schools in India in E.D.G.E, the business case study competition run by Samsung India. Awarded prizes worth $\approx 1,500$ USD. • Proposed marketing and product strategies for Samsung to leverage the growing millennial population in India. <p>Professional shows, Saarang IIT Madras</p> <p>2016 -2018</p> <ul style="list-style-type: none"> • Managed a team of 20 to organize shows by artists from across the world over a 4 day period during Saarang, the cultural festival of IIT Madras. • Brought in sponsorship from consulate of Israel ($\approx 1,500$ USD), World Irish Dance Association ($\approx 10,000$ USD) and Spic Macay ($\approx 1,000$ USD). • Was part of the broader professional shows team that managed an annual budget of $\approx 100,000$ USD to organize concerts at Saarang. <p>Job offer as a business analyst at e-commerce firm Flipkart.</p> <p>2019</p> <p>Apnea international stage A freediving certification.</p> <p>2024</p> | |