Name of Teaching Staff	:	Dr. Makrand A. Rakshe
Designation	:	Assistant Professor
Department	:	Mechanical Engineering
Date of Joining the Institution	:	15th January 2025
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Google Scholar Link	:	https://scholar.google.com/citations?user=Kfov6V8AAAAJ&hl=en&oi=sra
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ORCID		https://orcid.org/0000-0002-2099-6429
Publons Researcher ID	:	https://www.webofscience.com/wos/author/record/MTE-2186-2025
Qualifications with Class / Grade	:	Ph.D. Mechanical (IIT Bombay)
Total Experience in Years	:	2

Papers Published in Journal: :

1. Makrand Rakshe and Prasanna Gandhi. “Controlled viscous fingering in volatile fluid towards spontaneous evolution of ordered 3D patterns” Scientific Reports 13, no. 1 (2023): 10610. https://doi.org/10.1038/s41598-023-35510-z
2. Makrand Rakshe, Ketaki Bachal, Mallikarjun Reddy PVN, Abhijit Majumdar and Prasanna Gandhi,"Spontaneous Re-arrangement of Evaporating Suspension into Mesh-patterns towards Concentration Gradient Generation on a Chip" Sādhanā 49, 69 (2024). https://doi.org/10.1007/s12046-023-02405-8
3. Shital Yadav, Pratik Tawade, Ketaki Bachal, Makrand Rakshe, Yash Pundlik, Prasanna Gandhi, and Abhijit Majumder. "Scalable large-area mesh-structured microfluidic gradient generator for drug testing applications." Biomicrofluidics 16, no. 6 (2022): 064103. https://doi.org/10.1063/5.0126616 [Featured on the cover of Biomicrofluidics]

Papers Presented in Conferences

1. Makrand Rakshe and Prasanna Gandhi. "Analysis of Strain Gauge Sensor Fabricated by Interface Instability Driven Fluid Rearrangement." In 2018 IEEE SENSORS, pp. 1-4. IEEE, 2018 New Delhi, India DOI: 10.1109/ICSENS.2018.8589660. (Proceeding – IEEE)
2. Makrand Rakshe and Prasanna Gandhi, "Experimental Characterization of Lithography-less Fluid Film Re-arrangement of self-curing Polymer solution into Arrayed structure" presented in national conference on recent trends in material science and

technology(NCMST), IIST Thiruvananthapuram, 2019. (Oral presentation)

3. Makrand Rakshe and Prasanna Gandhi, "Experimental Characterization of Viscous Volatile Fingering in Uni-Port Lifted Hele-Shaw Cell" presented in Interfacial Flow and Heat Transfer in Droplets and Liquids for Advanced Thermal Management, IIT Bombay 2020. (Poster presentation)
4. Makrand Rakshe, Sachin Kanhurkar, Amitabh Bhattacharya and Prasanna Gandhi," Experimental and Numerical Studies on Liquid Bridge Stretching in Uni-port Lifted Hele-Shaw Cell for spontaneous Fabrication of Well-like Structures" Fluid Mechanics and Fluid Power, Volume 4, 2022. DOI : 10.1007/978-981-99-7177-0 (Book chapter)
5. Makrand Rakshe, Ketaki Bachal, Abhijit Majumdar and Prasanna Gandhi,"Spontaneous Re-arrangement of Evaporating Suspension into Mesh-patterns for Lab-on-chip Application" The 9th International and 49th National Conference on FMFP 2022, IIT Roorkee, India . (Oral presentation)
6. Makrand Rakshe and Prasanna Gandhi "Fabrication of Ultra-High Aspect Ratio Array Structures Using Spontaneous Evolution in Multiport Lifted Hele-Shaw Cell" Proceedings of the ASME 2023 International Mechanical Engineering Congress and Exposition. Volume 3: Advanced Manufacturing. New Orleans, Louisiana, USA. October 29–November 2, 2023. V003T03A094. ASME. https://doi.org/10.1115/IMECE2023-113267 (Proceedings - ASME)
7. Susweta Das, Ria Paul, Soumyajit Sarkar, Makrand Rakshe, Prasanna Gandhi and Hari M Varma, "A microfluidic based cerebral perfusion phantom for laser speckle imaging in small animals" in Diffuse Optical Spectroscopy and Imaging IX, Technical Digest Series (Optica Publishing Group, 2023), paper 126281B. https://doi.org/10.1117/12.2670972 (Proceedings - ECBO 2023)
8. Makrand Rakshe and Prasanna Gandhi "Spontaneous fluid shaping for microfluidic applications" 1st Indian conference on Micro Nano Fluidics- From soft matter to bioengineering ICOM 2023, IIT Madras, India. (Oral presentation)

Area of Specialization : Microfabrication, Fluid shaping, Microfluidics

PhD Guide ? Give field & University : **Prof. Prasanna S. Gandhi**

Field: 3D Microfabrication, Dynamical Systems and Control

University: Indian Institute of Technology Bombay

PhDs / Projects Guided :

PhDs : Nil

Projects at Masters level:

Books Published / IPRs / Patents	:	Books (Editors for conference Proceedings on Springer)	**Patents:** 1. Method and Apparatus for Fabricating High Aspect Ratio Structures Indian Patent Application No.: 202021034604; Filing Date: 12/08/2020. PCT application PCT/IN2020/050794, filed on 16/09/2020. Published on 17/02/2022, Publication No. WO2022034597A1. Granted on: 08/12/2023 2. Method and Apparatus for Fabricating High Aspect Ratio Structures Filed US national phase application in US national phase number 17/276,104-202021034604PCT/IN2020/050794, Published on: 15/06/2023 Inventors: Makrand Ashok Rakshe, Tanveer ul Islam, Prasanna Subhash Gandhi. 3. Perfusion Phantoms and Method of Fabricating Thereof Indian Application No.:202421059519 Filing Date: 6/08/2024 , Published on: 30/08/2024 Inventors: Susweta Das, Makrand Rakshe, Soumyajit Sarkar, Prof. Prasanna Subhash Gandhi and Prof. Hari M. Verma
Professional Memberships	:		Nil
Grants fetched	:	Minor Research Grant (University of Mumbai)	Nil

Interaction with Professional Institutions	:	**Guest Lectures:**	Conducted expert session on 'Controlled Instability-driven Microfabrication Technique and its Application' in AICTE's Training and Learning Academy (ATAL) sponsored, one week Faculty Development Program on "Semiconductors in Design and Development of Micro-electromechanical Systems" in SPCE Mumbai.
		Other Achievements and Responsibilities:	**Awards:** • Society for Research and Initiatives for Sustainable Technologies and Institutions (SRISTI) Gandhian Young Technological Innovation Award 2021 for "Lithography-less Frugal and Scalable Microfluidic Device for Drug Discovery and Drug Screening Applications". Team: K Bachal, S Yadav, T ul Islam, and M Rakshe Guide: Prof. A Majumdar and Prof. P Gandhi • 1st Prize in the 3 Minute Thesis Competition organized by Material Advantage IIT Bombay chapter. **Research work:** • Junior Research Fellow: 1/07/2022 to 14/06/2023, Project: Nature inspired fractal patterned micro-nano-structured catalyst modified electrodes; A novel approach for efficient hydrogen production by electrolysis of the water. • Research Associate: 18/03/2024 to 31/07/2024, Project: Development of machine for rapid fabrication of the biocompatible microneedles followed by clinical testing. (SERB Sponsored project)
Subjects Taught			**UG Level:** Strength of Material, Design of Machine Elements, Mechanical System Design, Theory of Machine, Finite Element Method, Digital Marketing Management (Open Elective), Dynamics of Machinery Lab, AutoCAD Lab, Ansys APDL Lab **PG Level:** Stress Analysis, Advanced Automobile Transmission Systems, 3D Printing
Projects Guided	:		**UG Level:** Nil **PG Level:** Nil

Recommended Students for Higher Education	**Name of the University/Industry -** Nil **Student**
Institute/Department Responsibility handled:	• 3 times NPTEL Teaching Assistant for Design of Mechatronic Systems course. **Role:** Designing assignments and exams; clarifying conceptual doubts and assisting a batch of 3065 students with problem solving. • Presented Suman Mashruwala Advance Microengineering Lab projects on a 3D printer, fluid shaping, and complaint mechanism in Techfest IIT Bombay. • Co-coordinator in 2nd International conference on ADVANCES IN THERMAL SYSTEMS, MATERIALS AND DESIGN ENGINEERING (ATSMDE – 2024).
Pedagogy Development	Technology Integration – • Used digital tools like MS Teams, Google Classroom and Software like (AutoCAD, MATLAB, ANSYS). • During Covid 19 pandemic, assisted for conducting exam in online mode on SAFE IITB and Code Tantra platforms.