
Rajaram Lakkaraju

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🌐 <http://iitkgp.ac.in/department/ME/faculty/me-rlakkaraju>

Fields of specialization

Turbulence, Multi-phase flows, Fluid-Structure interactions, Direct numerical simulations

Qualifications

As a teacher.....

- **Assistant Professor** **2015–Present**
○ *Indian Institute of Technology Kharagpur* *India*
- **Assistant Professor** **2013–2015**
○ *Birla Institute of Technology and Sciences-Pilani* *India*

Education.....

- **Doctor of Philosophy** **2009–2013**
○ *University of Twente, Enschede* *The Netherlands*
- **M. S. (Engg.)** **2005–2007**
○ *Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore* *India*
- **B. Tech (Mechanical Engineering)** **2000–2004**
○ *Acharya Nagarjuna University, Andhra Pradesh* *India*

Awards and Honors

- **Young Scientist Research Award** given by Board of Research Nuclear Sciences and Department of Atomic Energy, India (2017-2019)
- **Young Scientist Scheme** award given by Department of Science and Technology, India (2015-2018)
- **INSPIRE Faculty Award** given by Indian National Science Academy and Department of Science and Technology, India (2015-2020)
- **FOM Fellowship** to pursue Ph.D program by Foundation for Fundamental Research on Matter (FOM), The Netherlands (2009-2004)
- **DST Fellowship** Graduate scholarship for Masters program by Department of Science and Technology, India (2005)
- **GATE 2004**- Secured 98.98% and 246 rank (out of nearly 50000 students) in the Mechanical engineering stream from all over India

Publications

12. P. Kar, Y. N. Kumar, P. K. Das, and **Rajaram Lakkaraju**, Thermal convection in octagonal-shaped enclosures, **Physical Review Fluids** 5, 103501 (2020) <https://doi.org/10.1103/PhysRevFluids.5.103501>
11. R. Roy, S. Mukherjee, **Rajaram Lakkaraju**, and S. Chakraborty, Streaming potential in bio-mimetic microvessels mediated by capillary glycocalyx, **Microvascular Research** 132, 104039 (2020) <https://doi.org/10.1016/j.mvr.2020.104039>
10. O. Satbhai, S. Roy, S. Ghosh, S. Chakraborty, and **Rajaram Lakkaraju**, Comparison of the quasi-steady-state heat transport in phase-change and classical Rayleigh-Bénard convection for a wide range of Stefan number and Rayleigh number, **Physics of Fluids** 31, 096605 (2019) <https://doi.org/10.1063/1.5110295>
9. A. Senapati, G. Singh, and **Rajaram Lakkaraju**, Direct numerical simulations of an in-line rising unequal sized bubble pair in a liquid column, **Chemical Engineering Science** 208, 115159 (2019) <https://doi.org/10.1016/j.ces.2019.115159>
8. G. Singh, and **Rajaram Lakkaraju**, Wall-mounted flexible plates in a two-dimensional channel trigger early flow instabilities, **Physical Review E**, 100, 023109 (2019) It is featured as the **Kaleidoscope of the month** <https://doi.org/10.1103/PhysRevE.100.023109>
7. Y. N. Kumar, S. Chakraborty, M. K. Verma, and **Rajaram Lakkaraju**, On heat transport and energy partition in thermal convection with mixed boundary conditions, **Physics of Fluids**, 31, 066601 (2019) <https://doi.org/10.1063/1.5095242>
6. S. A. Etha, A. Jena, and **Rajaram Lakkaraju**, Clusterlike instabilities in bubble-plume-driven flows, **Physical Review E**, 99, 053101 (2019) <https://doi.org/10.1103/PhysRevE.99.053101>
5. **Rajaram Lakkaraju**, F. Toschi, and D. Lohse, Bubbling reduces intermittency in thermal convection, **Journal of Fluid Mechanics**, 745, 1-24 (2014) <https://doi.org/10.1017/jfm.2014.33> It is featured as the **Cover page**
4. **Rajaram Lakkaraju**, R. J. A. M. Stevens, P. Oresta, R. Verzicco, D. Lohse, and A. Prosperetti, Heat transport in bubbling turbulent convection, **Proceedings of the National Academy of Sciences of the United States of America (PNAS)**, 110 (23) 9237-9242 (2013) <https://doi.org/10.1073/pnas.1217546110>
3. **Rajaram Lakkaraju**, R. J. A. M. Stevens, R. Verzicco, S. Grossman, A. Prosperetti, C. Sun, and D. Lohse, Spatial distribution of heat flux and fluctuations in turbulent Rayleigh-Bénard convection, **Physical Review E**, 86, 056315 (2012) <https://doi.org/10.1103/PhysRevE.86.056315>
2. **Rajaram Lakkaraju**, L. E. Schmidt, P. Oresta, F. Toschi, R. Verzicco, D. Lohse, and A. Prosperetti, Effect of vapor bubbles on velocity fluctuations and dissipation rates in bubbly Rayleigh-Bénard convection, **Physical Review E**, 84, 036312 (2011) <https://doi.org/10.1103/PhysRevE.84.036312>

1. **Rajaram Lakkaraju** and M. Alam, Effects of Prandtl number and a new instability mode in a plane thermal plume, **Journal of Fluid Mechanics**, 592, 221-232 (2007) <https://doi.org/10.1017/S0022112007008610>

Sponsored projects and consultancy

9. Instability, rupture, and pattern dynamics of thin viscous films, MATRICS, Science and Engineering Research Board (SERB), India (PI)
8. High-performance gpu based immersed boundary methods for simulations of biological flows, Apex Committee of SPARC, Ministry of Human Resources and Development, India (Co-P)
7. A computational approach for performance assessment of a reflux classifier in coal preparation-TATA Steel Limited, India (Co-PI)
6. The study of flow, turbulence and heat transfer enhancement in a gas-liquid near-wall bubbly flow considering bubble breakup and coalescence, Department of Science and Technology, Department of Science and Technology, India (Co-PI)
5. Theoretical and experimental studies on flow characteristics during change-over of flow from start-up tank to run tank during liquid rocket engine testing, Indian Space Research Organisation, India (Co-PI)
4. Unravelling heat transfer mechanism in nucleate boiling using multiscale simulations, Department of Atomic Energy, India (PI)
3. Novel computational strategy to understand two phase flows, Department of Science and Technology, India (PI)
2. Novel computational methods to understand voice generation mechanism of human vocal-folds, Department of Science and Technology, India (PI)
1. Novel computational strategy to understand aggregations and swimming of gyrotactic microorganism in oceans, IIT Kharagpur, India (PI)

Referee for Journals

- Journal of Fluid Mechanics
- Physical Review Letters
- Physical Review E
- Physics of Fluids
- Journal of Applied Mathematics and Mechanics (ZAMM)
- Nature-Scientific Reports
- International Journal of Heat and Mass Transfer
- Journal of The Institution of Engineers (India): Series C

Curriculum development as a teacher

- Computational fluid dynamics (in 2020)
- Two-phase flow (in 2017, 2018, 2019 and 2020)
- Fluid mechanics (in 2018, 2019 and 2020)
- Mathematical methods for thermal engineers (in 2016, 2018, 2019, 2020)

- Computational methods for thermal engineers (in 2015)
- Waves in continuum media (in 2016, 2017 and 2018)
- Engineering drawing and computer graphics (Laboratory in 2016, 2017, 2018 and 2019)
- Refrigeration and air-conditioning (Laboratory in 2015, 2016, 2017 and 2018)
- Gas dynamics (Laboratory in 2015 and 2016)

Academic-Industrial collaborations

Collaboration with **SHELL Global**, **DSM**, **AkzoNobel**, and **Tata Steel** in The Netherlands, through industry partnership program 2019-2013

Collaboration with TATA Steel-Raw Material processing division (2018 to 2020)