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Profile

- Ten years of Research and over Five years of Teaching experience in Chemical Engineering.
- Strong experience in proposing state-of-the-art research, developing CFD codes for fluid flow and heattransfer problems, publishing peer-reviewed journal papers, and Reviewing international journal papers.
- Experience in CFD coding (Lattice Boltzmann method in C++ programming language) and CFD solvers (ANSYS FLUENT, COMSOL) and Open-source CFD libraries (OpenLB, Palabos).
- **Areas of specialization: LBM, Heat Transfer in Enclosures, Non-Newtonian rheology, Magneto-hydrodynamics(MHD), etc.**
- Google Scholar Link:
<https://scholar.google.com/citations?hl=en&user=7fWxeQEAAAAJ>
- Personal webpage: <https://website.nitrkl.ac.in/FProfile.aspx?e=gangawanek>

Accolades

- **Included in the Top 2% of most Influential Scientists worldwide based on the Scopus publications impact for 2020 and 2021, published by Elsevier.**
- **Honorary Regional Secretary**, Indian Institute of Chemical Engineers, **IChE** (2022-2023).
- **Young Scientist Award (December 2015)**, by Venus Research Foundation, Chennai, India.
- **Best Researcher Award (December 2017)**, by the University of Petroleum and Energy Studies, Dehradun, India.
- Life Member of Indian Institute of Chemical Engineers, **IChE (LM-56580)**
- Life Member, Institution of Engineers India (IEI), **M-1643066**

Qualifications

- **Ph.D. in Chemical Engineering**, Indian Institute of Technology Roorkee,
Ph.D. Thesis: *Convective flow and heat transfer analysis by using thermal lattice Boltzmann method* (Awarded- 07 April 2015), Ph.D. supervisors: I) *Dr. Ram Prakash Bharti (Associate Professor, IIT Roorkee)*, II) *Professor Surendra Kumar (Former Emeritus Fellow, IIT Roorkee)*.
- **Master of Technology in Chemical Engineering** (specialization in Industrial Safety and Hazards Management), Indian Institute of Technology, Roorkee, India, GPA: 8.36/10, first class

- **Bachelor of Engineering in Chemical Engineering**, All India Shree Shivaji Memorial Societies' College of Engineering, Pune, University of Pune, India, Degree percentage: 60/100, first class

Professional Work Experience

- **Assistant Professor**, Department of Chemical Engineering, National Institute of Technology Rourkela, INDIA(March **2018 to Present**)
- **Assistant Professor**, Chemical Engineering, University of Petroleum and Energy Studies, Dehradun, INDIA(March **2015 to February 2018**)
- **Guest Faculty**, Chemical Engineering, Malviya National Institute of Technology, Jaipur, INDIA (**December 2014 to March 2015**)

Research funding

- **Principle Investigator- Development Of Low-Cost Hybrid Nanoparticles Based Phase Change Materials For Efficient Thermal Energy Storage**, Funding agency:- SCIENCE & ENGINEERING RESEARCH BOARD (SERB) (Under-EEQ), Amount – **INR 43,60,400/-** , Duration 2023-26.
- **Principle Investigator- Meshless Local Petrov-Galerkin (MLPG) Formulation Based Lattice Boltzmann Method Magnetohydrodynamics Based Solutal Convection Problems**, Funding agency:- SCIENCE & ENGINEERING RESEARCH BOARD (SERB) (Under- Core Research Grant), Amount – **INR 26,55,400/-** , Duration November 2022- November 2025
- **Principle Investigator- Lattice Boltzmann Method for Supersonic and Hypersonic Flows, Funding Agency:- Indian Space Research Organization (ISRO)**, Amount- **INR 20,92,000**, duration: April 2020- March 2022

Publications (in Peer-Reviewed Journals)

1. S. Kumar, D. Panda, P. Ghodke, **K. M. Gangawane**, Lattice Boltzmann method for heat transfer in phase change materials: A Review, **Journal of Thermal Analysis & Calorimetry** (2023), Accepted, IN PRESS
2. D. Panda, **K. M. Gangawane**, Hybrid $NiFe_2O_4-NiCO_4O_4$ nanoparticles-based eutectic phase change materials for enhancement of thermal efficiency of pin-fin heat sink arrangement, **Journal of Energy Storage** 60 (2023) 106644
3. S. Kumar, K. M. Gangawane, Entropy generation study due to MHD double-diffusive convection in the rectangular cavity with built-in rectangular blockage, **NUMERICAL HEAT TRANSFER, PART A: APPLICATIONS** <https://doi.org/10.1080/10407782.2022.2155738> IN PRESS (2023)
4. A. Kumar, **K. M. Gangawane**, Synthesis and effect on the surface morphology & magnetic properties of ferrimagnetic nanoparticles by different wet chemical synthesis methods, **Powder Technology**, **Accepted (2022)**, <https://doi.org/10.1016/j.powtec.2022.117867>
5. D. Panda, **K. M. Gangawane**, Superhydrophobic hybrid silica-cellulose aerogel for enhanced thermal, acoustic, and oil absorption characteristics, **Journal of Material Science** (2022), IN PRESS, <https://doi.org/10.1007/s10853-022-07506-z>
6. S. Kumar, Sibasish Panda, **K. M. Gangawane**, A. Vijayan, H. F. Oztop, N-A. Hamdeh

- Mixed convection in a lid-driven cavity with triangular corrugations and built-in triangular block, *Chemical Engineering & Technology*, Accepted (In Press), <https://doi.org/10.1002/ceat.202200057>
7. S. Kumar, **K. M. Gangawane**, Double-diffusive convection in a rectangular cavity subjected to an external magnetic field with heated rectangular blockage insertion for liquid sodium-potassium alloy, **Journal of Thermal Analysis & Calorimetry** (2022) Doi: <https://doi.org/10.1007/s10973-022-11354-z>
 8. A. Kumar, **K. M. Gangawane**, Effect of precipitating agents on the magnetic and structural properties of the synthesized ferrimagnetic nanoparticles by co-precipitation method, **Powder Technology**, 117298, (2022), In Press, <https://doi.org/10.1016/j.powtec.2022.117298>
 9. S. Kumar, **K. M. Gangawane**, Double-diffusive convection in a rectangular cavity subjected to an external magnetic field with heated rectangular blockage insertion for liquid sodium-potassium alloy, **Physics of Fluid** 34(2) (2022) Doi: [10.1063/5.0080434](https://doi.org/10.1063/5.0080434)
 10. D. Panda, **K. M. Gangawane**, Physical, mechanical and dry sliding wear properties of non-woven viscose fabric epoxy-based polymer composites: An optimization study, **Proceedings of the Institution of Mechanical Engineers, Part J: Journal of Engineering Tribology**, (2022) DOI: [10.1177/13506501211068943](https://doi.org/10.1177/13506501211068943)
 11. S. Kumar, **K. M. Gangawane**, Numerical study of mixed convection in a two-sided lid-driven tall cavity containing heated triangular block for non-Newtonian power-law fluids, **Heat Transfer** (Wiley), (2021) Doi: [10.1002/htj.22103](https://doi.org/10.1002/htj.22103)
 12. Aparna Vijayan, **K. M. Gangawane**, Mixed convection in a tall lid-driven cavity with a triangular heat source for non-Newtonian power-law fluids, **Journal of Thermal Analysis & Calorimetry**, (2020) <https://doi.org/10.1007/s10973-020-10028-y>
 13. **K. M. Gangawane**, H.F. Oztop, Mixed convection in the semi-circular lid-driven cavity with heated curved wall subjugated to constant heat flux for non-Newtonian power-law fluids, **International Communication in Heat and Mass Transfer**, 114 (2020) 1-9.
 14. **K. M. Gangawane**, H.F. Oztop, Mixed convection in the heated semi-circular lid-driven cavity for non-Newtonian power-law fluids: Effect of presence and shape of the block, **Chinese Journal of Chemical Engineering** 28(5) (2020) 1225-1240.
 15. **K. M. Gangawane**, H.F. Oztop, M.E. Ali, Mixed convection in a lid-driven cavity containing triangular block with constant heat flux: Effect of location of block, **International Journal of Mechanical Sciences**, 152 (2019) 492-511, Doi: [10.1016/j.ijmecsci.2019.01.020](https://doi.org/10.1016/j.ijmecsci.2019.01.020) (2019).
 16. **K. M. Gangawane**, MHD Free Convection in a Partially Heated Open-Ended Square Cavity: Effect of Angle of Magnetic Field and Heater Location, **International Journal of Applied and Computational Mathematics**, 5 (2019) 63.
 17. M. Manchanda, **K. M. Gangawane**, Mixed convection in a two-sided lid-driven cavity containing heated triangular block for non-Newtonian power-law fluids, **International Journal of Mechanical Sciences** 144 (2018) 235-248.
 18. **K. M. Gangawane**, S. Gupta, Mixed convection characteristics in rectangular enclosure containing heated elliptical block: Effect of direction of moving wall, **International Journal of Thermal Sciences** 130 (2018) 100–115.

19. **K. M. Gangawane**, H.F. Oztop, N. Abu-Hamdeh, Mixed convection characteristic in a lid-driven cavity containing heated triangular block: Effect of location and size of block, **International Journal of Heat and Mass Transfer** 124 (2018) 860–875.
20. **K. M. Gangawane**, R.P. Bharti, Computational analysis of magneto-hydrodynamic natural convection in partially differentially heated cavity: Effect of cooler size, **Proceedings of the Institution of Mechanical Engineers, Part J: Journal of Engineering Tribology**, 232(3) (2018) 515–528.
21. **K. M. Gangawane**, Effect of angle of applied magnetic field on natural convection in an open ended cavity with partially active walls, **Chemical Engineering Research and Design** 127 (2017) 22–34.
22. **K. M. Gangawane**, Computational analysis of mixed convection heat transfer characteristics in lid-driven cavity containing triangular block with constant heat flux: Effect of Prandtl and Grashof numbers, **International Journal of Heat and Mass Transfer** 105 (2017) 34–57.
23. **K. M. Gangawane**, B. Manikandan, Laminar natural convection characteristics in an enclosure with heated hexagonal block for non-Newtonian power law fluids, **Chinese Journal of Chemical Engineering** 25 (2017) 555–571.
24. **K. M. Gangawane**, B. Manikandan, Mixed convection characteristics in lid-driven cavity containing heated triangular block, **Chinese Journal of Chemical Engineering** 25 (2017) 1381–1394.
25. **K. M. Gangawane**, R. P. Bharti, S. Kumar, Lattice Boltzmann analysis of natural convection in a partially heated open ended enclosure for different fluids, **Journal of the Taiwan Institute of Chemical Engineers** 49 (2015) 27–39.
26. **K. M. Gangawane**, R. P. Bharti, S. Kumar, Effects of heating location and size on natural convection in partially heated open-ended enclosure by using lattice Boltzmann method. **Heat Transfer Engineering** 36 (7) (2016) 507-522.
27. **K. M. Gangawane**, R. P. Bharti, S. Kumar, Two-dimensional lattice Boltzmann simulation of natural convection in differentially heated square cavity: Effect of Prandtl and Rayleigh numbers. **Canadian Journal of Chemical Engineering** 93 (2015) 766-780.
28. **K. M. Gangawane**, R. P. Bharti, S. Kumar, Lattice Boltzmann analysis of natural convection in an open ended cavity with partially heated wall: Effect of heating location. **Korean Journal of Chemical Engineering** 32(8) (2015) 1498-1514.

Books (EDITED)

- **K. M. Gangawane**, Praveen Ghodke, Madhuresh Dwivedi, **Advanced Computational Approaches for Water Treatment: Applications in Food and Chemical Engineering**, **CRC Press, Taylor & Francis**, December 2022, **APPROVED**
- **K. M. Gangawane**, Madhuresh Dwivedi, Rama C Pradhan - **Advanced Computational Approaches for Drying in Food Processing**, **Springer**, December 2022, **APPROVED**
- **K. M. Gangawane**, Madhuresh Dwivedi - **Advanced Computational Techniques for Heat and Mass Transfer in Food Processing**, **CRC Press, Taylor & Francis**, January 2022, ISBN No.: 978036774782

- **K. M. Gangawane**, Ram Prakash Bharti - **Recent Trends in Fluid Dynamics Research-Select Proceedings of RTFDR 2021**, **SPRINGER**, January 2022, ISBN No.: 978-981-16-6927-9, Series ISSN: 2195-4356

Book Chapters

- D. Panda, **K. M. Gangawane**, Next-generation energy storage and optoelectronic nanodevices, Chapter 13, Pp. 223-239 (17), Series Title: Current and Future Developments in Nanomaterials and Carbon Nanotubes, Applications of Nanomaterials in Energy Storage and Electronics, Bentham Science publisher (2022)
- A. Kumar, **K. M. Gangawane**, and B., "Ferrofluids for Waste-Water Treatment", Advances in Chemical, Bio and Environmental Engineering, ch.10, pp.723-744, Springer, May 2022, 10.1007/978-3-030-96554-9_48
- S. Kumar, V. S. Reddy, **K. M. Gangawane**, and M. Dwivedi, "Mesoscopic Simulation for Electrohydrodynamics (EHD) Drying", Advanced Computational Techniques for Heat and Mass Transfer in Food Processing, ch.1, no.8, pp.169-190, CRC Press Taylor and Francis 2022, 10.1201/9781003159520
- D. Panda, A. Kumar, **K. M. Gangawane**, and A. A. Mohamad, "Overview of Different Computational Approaches for Heat and Mass Transfer in Food Processing", Advanced Computational Techniques for Heat and Mass Transfer in Food Processing, ch.1, no.1, pp.1-20, CRC Press Taylor and Francis 2022
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Editorial Activity

- Guest Editor, **Materials Today Proceedings (Elsevier)**, 2023, Special Issue-CHEMSMART-22
- **Topic EDITOR- Magnetohydrodynamics Convection**, 'Frontiers in Mechanical Engineering', 2019-2021.

Computer skills

Programming : C++, MATLAB, LaTeX,
Packages : ANSYS-Fluent, COMSOL, Polymath
Plotting tools : Origin, SigmaPlot, Tecplot, GNU Plot, Paraview,
Open Source Codes : OpenLB, Palabos
Operating Systems : Windows, Linux (UBUNTU and Redhat based OS)

Professional responsibilities

- **Convener**, International conference on '**Advances in Smart Materials, Chemical and Biochemical Engineering- CHEMSMART-22**', December 16-18, 2022.
- **Assistant Warden**, Homi Bhabha Hall of Residence, NIT Rourkela, 2020-2022
- **Member, On-Campus Business Committee**, NIT Rourkela, **June 2021-February 2022**
- **Convener**, National e-conference on '**Recent Trends in Fluid Dynamics Research-RTFDR21**', held during April 2-4, 2021.
- **Coordinator** of TEQIP-iii sponsored three-day National e-Short Term Course on 'Advanced Mathematical Techniques for Engineers & Scientists- AMTES20' organized

during September 28-30, 2020.

- **Coordinator** of TEQIP-iii sponsored a five-day National workshop on ‘Introduction to Different Computational Methods for Fluid Flow & Heat Transfer Problems (ICMFHT19)’ organized **during July 1-5, 2019.**
- **Member of organizing committee**, INTERNATIONAL CONFERENCE ON NANO FOR ENERGY AND WATER(NEW-2017) & Indo-French Workshop on Water Networking, **February 22-24, 2017**, UPES Dehradun
- Member of organizing committee, 10th Uttarakhand State Science and Technology Congress (USSTC) 2016 Organized by: Uttarakhand State Council for Science and Technology (UCOST), **February 10-12, 2016**, UPES Dehradun
- Member of organizing committee, **One Day Workshop (April 16, 2016) on “Advances in Petroleum and Petrochemicals”**, UPES Dehradun
- Demonstrated **ANSYS-FLUENT** for heat and fluid flow problems to undergraduate students under Professional Software Development (PST) Program, **2015.**
- Volunteered- Advances in Chemical Engineering (ACE-2013), Indian Institute of Technology Roorkee, **February 2013.**
- Interested in Space Research and related literature.
- Reviewer of many peer-reviewed journals, such as Int. J. Heat and Mass Transfer, Int. J. Mechanical Sciences, Int. Communications in Heat and Mass Transfer, Journal of the Brazilian Society of Mechanical Sciences and Engineering, Chemical Engineering Research and Design, Thermal Science Journal, Heat Transfer - Asian Research, Propulsion and Power Research, etc.
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Dissertation supervision

Ph.D.		M.Tech		B.Tech	
Completed	Ongoing	Completed	Ongoing	Completed	Ongoing
01	02	09	03	19	02

Ph.D. Thesis supervision

- Supervisor, Sudhanshu Kumar, "Mesoscopic Method For Convection Problems", Registered June 2018, Status: **Thesis Submitted on 8 August 2022**
- Supervisor, Abhishek Kumar, " Energy & Environmental Engineering, Smart nanofluids for environmental applications", Registered July 2019, Status: **Ongoing.**
- Supervisor, Debabrata Panda, " Magnetic nano colloids/LBM", Registered January 2020, Status: **Ongoing.**

Master’s (M.Tech) supervision

- Manvi Manchanda, (UPES Dehradun), Mixed Convection in Lid-driven Cavity for Non-Newtonian Power-law fluids, M.Tech Supervision 2017-18

- Aparna Vijayan (218CH1069), "Study of fluid flow and heat transfer in a lid-driven enclosure having power-law fluid and heated obstacle" - M.Tech. Supervisor 2019-20 Spring
- Devanand Parida (218CH3295), "Computational Analysis Of Heat Exchange & Pressure Measuring System" - M.Tech. Supervisor 2019-20 Spring
- Pallav Sahu (218CH3076), "Mixed Convection Characteristics In A Tall Cavity Containing Uniformly Heated Triangular Block" - M.Tech. Supervisor 2019-20 Spring
- Vikash Yadav (219CH3097), "Study on melting/solidification of phase change materials using Lattice Boltzmann methods" - M.Tech. Supervisor 2020-21 Spring
- Kundan Kumar Yadav (220CH3029), "Mixed convection in the semi-circular lid-driven cavity with a diamond block placed at its geometric centre for non-newtonian fluid" - M.Tech. Supervisor 2021-22 Spring
- Mukund Jitendra Siddhabhatti (220CH3242), "CFD Modelling Of Flat Plate Solar Collector And Its Optimization To Improve Efficiency" - M.Tech. Supervisor 2021-22 Spring

Teaching activities

- **Theory class:** Chemical Engineering Mathematics, Computational Fluid Dynamics, Modeling and Analysis of Energy Systems, Chemical Engineering Analysis: Application of Mathematical and Statistical Methods
- **Laboratory class:** Biochemical Engineering Laboratory, Chemical Engineering Data Analysis Laboratory, Process Plant Simulation Laboratory – I, CAD Laboratory, Process Simulation Laboratory, Computational Transport Phenomena Laboratory, Software Laboratory – II, Software Laboratory – IV {Practical}

References

The list of referees shall be provided through email request (email to krunalgangawane@gmail.com)