Krunal M Gangawane, Ph.D.
Assistant Professor,
Chemical Engineering Department,
National Institute of Technology Rourkela (NIT Rourkela)
krunalgangawane@gmail.com; gangawanek@nitrkl.ac.in
+91-9045732245/8077808922

Profile:

➢ Seven (10) years of Research and over Five (5) of Teaching experience in field of 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

Qualifications:

➢ **Ph.D. in Chemical Engineering**, Indian Institute of Technology Roorkee,
PhD Thesis: *Convective flow and heat transfer analysis by using thermal lattice Boltzmann method* (Awarded-07 April 2015), PhD 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
➢ **Bachelor of Engineering in Chemical Engineering**, All India Shree Shivaji Memorial Societies' Collage of Engineering, Pune, University of Pune, India, Degree percentage: 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**

Publications

1. 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
2. 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
3. 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.
4. 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.
5. 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 (2019).
6. 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.
7. 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.
8. 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.

9. 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.

10. K.M. Gangawane, R.P. Bharti, Computational analysis of magneto-hydrodynamic natural convection in partially differentially heated cavity: Effect of cooler size, J Mechanical Engineering Science, 232(3) (2018) 515–528.

11. 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.

12. 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.

13. 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.

14. 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.

15. 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.

16. 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.

17. 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.

18. 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. The Korean Journal of Chemical Engineering. 32(8) (2015) 1498-1514.

19. K.M. Gangawane, Numerical simulation of magneto-hydrodynamics (MHD) natural convection in partially heated and cooled cavity by thermal lattice Boltzmann method. 5th International Conference on Mechanics, Simulation and Control (ICMSC 2015), Saint Petersburg, Russia.

20. K.M. Gangawane, R. P. Bharti, S. Kumar, (2014). Lattice Boltzmann computation of forced convection heat transfer from heated built-in square cylinder: Effect of wall confinement. 5th international and 41st national conference on fluid mechanics and fluid power (FMFP-2014), IIT Kanpur, India, December 12-14, 2014.

21. K.M. Gangawane, R. P. Bharti, S. Kumar, (2013). Lattice Boltzmann simulation of natural convection in a partially differentially heated square enclosure. 22nd National and 11th International ISHMT-ASME Heat and Mass Transfer Conference, IIT Kharagpur, India, December 28-31, 2013.

22. K.M. Gangawane, R. P. Bharti, S. Kumar, (2013). Thermal Analysis of natural convection in an enclosure containing heated square body by Thermal Lattice Boltzmann Approximation. International Conference on Advances in Chemical Engineering (ACE 2013), IIT Roorkee, India, February 22-24, 2013.

23. K.M. Gangawane, R. P. Bharti, S. Kumar, (2012). Thermal analysis of natural convection in differentially heated shallow cavities at different Rayleigh numbers by lattice Boltzmann approximation. International Conference on Sustainable Technologies for Energy and Environment in Process Industries and Indo-US Joint International Conference on Energy and Environment, Dr. B. R. Ambedkar National Institute of Technology, Jalandhar, India, December 28 -31, 2012.

24. K.M. Gangawane, R. P. Bharti, S. Kumar, (2012). Thermal lattice Boltzmann method: A review. Conference on Technological Advancements in Chemical and Environmental Engineering (TACEE 2012), BITS Pillani, India, March 23 - 24, 2012.

Sponsored Projects:

➢ **Principle Investigator- Lattice Boltzmann Method for Supersonic and Hypersonic Flows**, Sponsored by Indian Space Research Organization, Cost INR 20.90 Lacs (USD 2796.75)

Books:

➢ **EDITOR- Advanced Computational Techniques for Heat and Mass Transfer in Food Processing**, CRC Press, Taylor & Francis, IN PRESS, January 2022, ISBN No.: 978036774782

➢ **EDITOR- Recent Trends in Fluid Dynamics Research-Select Proceedings of RTFDR 2021**, SPRINGER, IN PRESS, January 2022, ISBN No.: 978-981-16-6927-9, Series ISSN: 2195-4356

Editorial Activity

➢ **Topic EDITOR-** *Magnetohydrodynamics Convection*, 'Frontiers in Mechanical Engineering', 2019-2020.

Accolades:
➢ **Young Scientist Award (December, 2015)**, by Venus Research Foundation, Chennai, India.
➢ **Best Researcher Award (December 2017),** by University of Petroleum and Energy studies, Dehradun, India.
➢ Life Member of Indian Institute of Chemical Engineers, **IIChE (LM-56580)**

➢ Life member, Institution of Engineers India (IEI), **M-1643066**

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)

Extra and Co-Curricular Activities:
➢ **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 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 Uttrakhand State Science and Technology Congress (USSTC) 2016 Organized by: Uttrakhand 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.

Specific Areas of Interest
➢ Computational Fluid Dynamics (CFD), Lattice Boltzmann Method (LBM), Heat Transfer in Enclosures, Heat Transfer from bluff bodies, Non-Newtonian rheology, Magneto-hydrodynamics (MHD)

➢ PhD Thesis Supervision
➢ Supervisor, Sudhanshu Kumar, "Mesoscopic Method For Convection Problems", Registered June 2018, Status: ***Ongoing***
➢ 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***.
➢ Co-Supervisor, Pooja Chandrakar, "Optimization Of Processes", ***Ongoing***

Teaching activities
➢ Theory courses subjects - Modelling and Simulation for Chemical Process, Heat Transfer, Principles of Chemical Process Safety, Fluidization, Chemical Reactor Design and Analysis, etc., Chemical Engineering Mathematics (UG), Chemical engineering analysis: Application of mathematical and statistical methods.
➢ Lab courses- Fluid Mechanics lab, Heat Transfer lab, Particulate Technology lab, Petroleum Product testing lab, etc. Software Laboratory (ANSYS FLUENT)

References

Dr. Ram Prakash Bharti,
PhD. [IIT Kanpur]
Associate Professor,
Department of Chemical Engineering,
Indian Institute of Technology Roorkee,
Roorkee-247667,
rpbharti@iitr.ac.in; rpbharti@gmail.com