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Professor, Department of Chemical Engineering

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→ [Google Scholar](#) / [ORCID](#) / [ResearcherID](#) / [Scopus](#) / [Microsoft Academic](#) / [IRINS Vidwan](#) / [Research Gate](#) / [LinkedIn](#)

BROAD RESEARCH INTERESTS

- Computational Fluid Dynamics (CFD)**

→ Macrofluidics: Convective hydrodynamics and heat transfer, Bluff bodies and cavity flows

→ Microfluidics: Electrokinetic flows, Droplet generation and dynamics, MEMS

→ Development of complex flow solvers: FVM, FEM, LBM and Meshless methods

- Experiments with Fluids**

→ Flow visualization and characterization using Particle Image Velocimetry (PIV)

→ Rheology of complex fluids

PROFESSIONAL BACKGROUND

Duration	Position	Department / Institute
2023 – Present	Professor	Department of Chemical Engineering IIT Roorkee , India
2016 – 2023	Associate Professor	
2009 – 2016	Assistant Professor	
2007 – 2009	Post-Doctoral Research Fellow (Computational Fluid Dynamics)	Department of Chemical & Biomolecular Engineering University of Melbourne , Australia
2007 – 2007	Senior Project Associate	Department of Mechanical Engineering IIT Kanpur , India
2002 – 2006	Teaching Assistant and Doctoral Researcher	Department of Chemical Engineering IIT Kanpur , India
2000 – 2002	Teaching Assistant and Masters Researcher	Department of Chemical Engineering IIT Bombay , India

ACADEMIC BACKGROUND

Year	Level	Discipline	Institute/ University/ Board
2006	Ph. D.	Chemical Engineering	IIT Kanpur , India
2002	M. Tech.	Chemical Engineering	IIT Bombay , India
2000	B. Tech.	Chemical Engineering (Spl. in Paper Tech.)	SLIET Longowal , India (Punjab Technical University Jalandhar)

PERSONAL PROFILE

→ Name:	Dr. Ram Prakash	→ Gender:	Male
→ Father's Name:	Late Sh. Mangli Lal	→ Marital Status:	Married
→ Date of Birth:	07 - April - 1979	→ Nationality:	Indian

RESEARCH OUTCOME

→ Refereed International Journals Publications	50	Annexure 1(a) at Page 11
→ Conferences Abstracts/Presentations/Proceedings	64	Annexure 1(b) at Page 16
→ Books	01	Annexure 1(c) at Page 22
→ Books Chapter	10	Annexure 1(d) at Page 23
→ Academic Research Projects & Thesis	04	Annexure 1(e) at Page 25

RESEARCH/PROJECT GUIDANCE/MENTORSHIP

→ Post-Doctoral Fellow (PDF)/Faculty Fellow (FF)	02	Annexure 2(a) at Page 26
→ Doctoral (Ph. D.) Thesis	08	Annexure 2(b) at Page 26
→ Post Graduate (M. Tech.) Dissertations	28	Annexure 2(c) at Page 27
→ Under Graduate (B. Tech.) Major Projects	75	Annexure 2(d) at Page 29
→ Under Graduate (B. Tech.) Minor Projects	59	Annexure 2(e) at Page 31
→ Research Internship	04	Annexure 2(f) at Page 33

SPONSORED PROJECTS AND INDUSTRIAL CONSULTANCIES

Category↓ Status →	Completed	In Progress	Submitted	Remarks
→ Sponsored Projects (Budget in Lakhs)	05 (192.70)	03 (120.43)	03 (270.54)	Annexure 3(a) at Page 34
→ Industrial Consultancies (Budget in Lakhs)	01 (0.85)	– –	– –	Annexure 3(b) at Page 36

TEACHING ENGAGEMENT

	Course →	Theory	Lab	Misc	Remarks
→ Teaching Faculty	@ IIT Roorkee	14	07	04	Annexure 4(a) at Page 37
→ Teaching Assistantship	@ IIT Kanpur	–	03	01	Annexure 4(b) at Page 38
	@ IIT Bombay	01	01	01	

FELLOWSHIPS/AWARDS/RECOGNITIONS

- 2013 Marquis Who's Who in the World. Listed in 30th Pearl Anniversary Edition. Marquis Who's Who, Berkeley Heights, NJ. Nov 2012, ISBN: 978-0-8379-1150-2
- 2012 IAO - Certified Faculty Member. International Accreditation Organization (IAO), Houston, USA
- 2007 Post-Doctoral Fellowship (2007 - 2009). [University of Melbourne](#), Australia
- 2006 Cash Award (INR 20,000) for publications by students at [IIT Kanpur](#), India (year: 2006 - 2007)
- 2002 MHRD Fellowship during Ph. D. (2002 - 2006) at [IIT Kanpur](#), India
- 2000 MHRD Fellowship during M. Tech. (2000 - 2002) at [IIT Bombay](#), India

MEMBERSHIPS OF PROFESSIONAL/ALUMNUS BODIES

- Life Member (# LM-49655). Indian Institute Of Chemical Engineers (IIChE), Kolkata, India.
- Chartered Engineer (India) (# M-1551617). The Institution of Engineers (India) (IEI), Kolkata, India.
- Member (# M-1551617). The Institution of Engineers (India) (IEI), Kolkata, India.
- Member (# 91.42766). Asian Council of Science Editors (ACSE).
- Member (# 105527). International Association of Engineers (IAENG).
- Member (# 105527). IAENG Society of Chemical Engineering.
- Member (# 105527). IAENG Society of Scientific Computing.
- Member (# ...). Indian Society of Rheology (ISR).
- Member (2017 – ...). Executive Committee, SLIET Alumni Association (SAA) Longowal.
- Member (...). Alumni Association, [SLIET Longowal](#), India.
- Member (...). Alumni Association, [IIT Bombay](#), India.
- Member (...). Alumni Association, [IIT Kanpur](#), India.

ADMINISTRATIVE RESPONSIBILITIES HELD

• Department Level

- **Convener** Departmental Faculty Search Committee (DFSC)
- **Faculty Advisor** B.Tech. (Chemical Engineering, 1st Year)
- **Member** Anti-Ragging Committee
- **Member** Department Academic Program Committee (DAPC)
- **Member** Department Administrative Committee (DAC)
- **Member** Department Purchase Committee (DPC)
- **Member** Department Research Committee (DRC)
- **Member** Department Space Management Committee (DSMC)
- **Member** Experimental Research Facilities (IA, SMILE & FIST Labs)
- **Professor-in-Charge** Computing Research Facilities (CAD Centre & HCRL)
- **Professor-in-Charge** Examinations
- **Professor-in-Charge** Website and E-mail, Outreach

• Institute Level

- **Central Purchase Officer (CPO)** Coordinating Committee of Bhawans (CCB); DoSW
- **Chief Warden** Rajendra Bhawan; DoSW
- **Convener** Dr. B.R. Ambedkar Pragteesheel Manch; DoSW
- **Coordinator** Academic Reinforcement Program (ARP); DoSW
- **Faculty Advisor** SC/ST Students; DoSW
- **Institute Representative** GATE & IIT-JEE
- **Manager** Task Force (Master Planning of Campuses); Director
- **Member** Advisory Committee, Institute Computer Centre (ICC)
- **Member** Anti-Ragging Committee; DoSW
- **Member** Institute AC Committee; DoInfra
- **Member** Technical Committee for E-mail system, ICC
- **Presiding Officer** SAC Elections; DoSW
- **Returning Officer** SAC Elections; DoSW
- **Warden** Rajendra Bhawan; DoSW

LECTURES/INVITED TALKS DELIVERED

- NCL Pune (2006) → IIT Delhi (2009) → IIT Roorkee (2009, 2010, 2015, 2016, 2023)
- Lecture on “Electrokinetics in microchannel flow” in [FDP course](#) on “Advance Topics in Fluid Flow & Heat Transfer” from Sep 17 – 18 (2013) at Thapar University, Patiala.
- Lecture on “Introduction to Meso-scale Modeling: Lattice Boltzmann Method (LBM)” in [QIP course](#) on “Chemical Process Engineering: Flow Modelling and Applications” from Jun 20 – 24 (2016) at IIT Roorkee.
- Lecture on “Introduction to Meso-scale Modeling: LBM approach” in [QIP course](#) on “Multiphase Flow in Miniature Systems: Flow Modeling and Applications” from Jun 4 – 8 (2018) at IIT Roorkee.
- Academic Panelist for panel discussion on “Simulation Apps for Engineering Education: A New Paradigm” in [conference](#) on “COMSOL Conference 2019” from Nov 28 – 29 (2019) at Bangalore.
- Lecture on “Introduction to Computational Fluid Dynamics and Mesoscale Modeling” in [TEQIP-III course](#) on “Mathematical Modeling of Complex Fluids” from Sep 24 – 28 (2020) at NIT Jalandhar.
- Keynote Lecture on “Droplet Dynamics in Microfluidic Systems” in [National Conference](#) on “Recent Trends in Fluid Dynamics Research” from Apr 2 – 4 (2021) at NIT Rourkela.
- Lecture on “Hydrodynamics of droplets generation in microfluidic systems” in [Research Facility Training Program](#) on “Microfluidics and Microfabrication” from Dec 15 (2021) at NIT Calicut.

PROFESSIONAL ACTIVITIES AND RECOGNITIONS

● Member, Faculty Selection Committee

- Indian Institute of Technology Mandi (Sep 2019)
- Thapar Institute of Engineering and Technology, Patiala (Feb 2024)

● Editorial Roles

- Associate Editor, [Frontiers in Chemical Engineering](#) (Microfluidic Engineering and Process Intensification), Frontiers Media SA. Switzerland. (Since Jun 2022)
- Review Editor, [Frontiers in Physics](#) (Fluid Dynamics), Frontiers Media SA. Switzerland. (Since May 2022)
- Editorial Board Member, [International Journal of Aerospace Sciences](#), Scientific and Academic Publishing (SAP), California, USA. (Since Aug 2012)

● Official Nominator

- [VinFuture Prize](#), VinFuture Foundation, VinUniversity Campus, Hanoi, Vietnam (2022, 2023)

● Chairman BOS, RDC in Chemical Engineering

- VMSB – Uttarakhand Technical University, Dehradun (Feb 2024)

● Reviewer for International Journals

- AIChE Journal, Canadian Journal of Physics, Chemical Engineering Research and Design, Chemical Engineering Science, Industrial & Engineering Chemistry Research, Heat and Mass Transfer, ASME Journal of Fluid Engineering, ASME Journal of Heat Transfer, ASME Journal of Thermal Sciences and Engineering Applications, International Journal of Chemical Reactor Engineering, International Journal of Heat and Mass Transfer, International Journal of Mechanics and Applications, Journal of Thermal Engineering, Computational Thermal Sciences, Journal of Applied Fluid Mechanics, Physics of Fluids, Soft Matter, Journal of Mechanical Engineering Science, Molecular Simulations, American Journal of Fluid Dynamics, Indian Journal of Chemical Technology, Polymers for Advanced Technologies, Journal of Experimental Nanoscience, International Journal of Hydraulic Engineering, Journal of Nanomaterials, Numerical Heat Transfer, Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Engineering Science, etc.

● Reviewer for National & International Conferences

- Chemeca 2008, EURECA 2013, FMFP, ICHMT

● External Examiner (Reviewer & Oral Board Member*) for Ph.D. Thesis

- University of Delhi (Malti Bansal, 2010)
- IISc Bangalore (Eluru Gangadhar, 2018)*
- IIT Bombay (Niteen Kumar, 2020)*
- NIT Rourkela (Deepak Kumar, 2022)*
- IIT Ropar (Kalyani Agarwal, 2023)*

● Examiner for M.Tech. Thesis and B.Tech. Projects

- Large number of internal and external thesis/projects examined

MISCELLANEOUS ACADEMIC/RESEARCH ACTIVITIES

• Convener

- [12th International Conference on Complex Fluids and Soft Matter \(COMPFLU – 2018\)](#). IIT Roorkee, India. Dec 6 – 9, 2018. (Co-Conveners: Prof. Gaurav Sharma, Prof. Prateek Kumar Jha)
- [Indo-US Workshop of Soft Matter \(IUWSM – 2018\)](#). IIT Roorkee, India. Dec 9 – 11, 2018. (Co-Conveners: Prof. Gaurav Sharma, Prof. Prateek Kumar Jha)

• Joint Organizing Secretary

- International Conference of Advances in Chemical Engineering (ACE – 2013). IIT Roorkee, India. Feb 22 – 24, 2013.

• Session Chair

- “Microfluidics” session in [16th International Complex Fluids Symposium \(CompFlu-2022\)](#). IIT Kharagpur, India. Dec 19 - 21, 2022.
- “Modelling and Simulation” session in [International Conference on Advances in Smart Materials, Chemical and Biochemical Engineering \(CHEMSMART-22\)](#), NIT Rourkela, India. Dec 16-18, 2022.
- “Computational Fluid Dynamics” session in [9th International and 49th National Conference on Fluid mechanics and Fluid power \(FMFP-2022\)](#), IIT Roorkee, India. Dec 14-16, 2022.
- “Microfluidics” session in [9th International and 49th National Conference on Fluid mechanics and Fluid power \(FMFP-2022\)](#), IIT Roorkee, India. Dec 14-16, 2022.
- “Sustainable Energy” session in [International Conference of Chemical Engineering: Enabling Transition Towards Sustainable Future \(CHEMTSF\)](#). IIT Roorkee, India. Sep 8 – 10, 2022.

• Member (Organizing Committee)

- [International Conference of Chemical Engineering: Enabling Transition Towards Sustainable Future \(CHEMTSF\)](#). IIT Roorkee, India. Sep 8 – 10, 2022.
- “CHEMREFERENCE-2003”: the first annual series of seminars presented by the research scholars of the Department of Chemical Engineering, IIT Kanpur.

• Member (Program Committee)

- [International Conference on Data Analytics in Business and Marketing \(ICDABM2022\)](#), Shivaji College, University of Delhi. Mar 1 – 2, 2022.
- [International conference on Advanced Technology, Sustainability and Management \(IATSM2021\)](#), Sushant University Gurgaon. May 27 – 28, 2021.
- [COMSOL Conference](#), Bangalore. Nov 28 – 29, 2019.

• Member (Advisory Committee)

- [International Conference on Advances in Smart Materials, Chemical and Biochemical Engineering \(CHEMSMART-22\)](#), NIT Rourkela, India. Dec 16-18, 2022.
- [9th International and 49th National Conference on Fluid mechanics and Fluid power \(FMFP-2022\)](#), IIT Roorkee, India. Dec 14 – 16, 2022.
- [International Chemical Engineering Conference 2021 \(ICheEC 2021\)](#), NIT Jalandhar, India. Sep 16 – 19, 2021.
- [International Conference on Advances in Systems, Control and Computing \(AISCC – 2020\)](#), MNIT Jaipur, India. Feb 27 – 28, 2020.

- Annual Conference on Civil Engineering and Engineering (ACCEE – 2014), Phuket, Thailand. Mar 15 – 16, 2014.
- [International Congress on Engineering and Information \(ICEAI\)](#)
 - (i) ICEAI 2016. Osaka, Japan. May 10 – 12, 2016.
 - (ii) ICEAI 2015. Kyoto, Japan. May 07 – 09, 2015.
 - (iii) ICEAI 2014. Beijing, China. May 22 – 24, 2014.
 - (iv) ICEAI 2013. Macau, China. Aug 28 – 30, 2013.
 - (v) ICEAI 2013. Bangkok, Thailand. Jan 26 – 28, 2013.
 - (vi) ICEAI 2012. Beijing, China. Aug 17 – 20, 2012.
- Conference on Technical Advancements in Chemical and Environmental Engineering (TACEE 2012). BITS Pilani, India. Mar 23 – 24, 2012.

RESEARCH ADVISORS/MENTORS/COLLABORATORS

- **Prof. Raj P. Chhabra** Ph.D. Advisor @ IIT Kanpur, India
 Professor, Department of Chemical Engineering,
Shiv Nadar University, Gautam Buddha Nagar - 201314, UP, India
 E-mail: chhabra@iitk.ac.in URL: <https://bit.ly/3vOiKbg>

- **Prof. V. Eswaran** Ph.D. Advisor @ IIT Kanpur, India
 Professor, Department of Mechanical Engineering,
Indian Institute of Technology Hyderabad, Yeddumailaram - 502205, AP, India
 E-mail: eswar@iith.ac.in URL: <https://bit.ly/3VMYLnO>

- **Prof. Malcolm R. Davidson** Post-Doc Mentor
 Adjunct Professor & Honorary (Principal Fellow), Department of Chemical Engineering,
University of Melbourne, Parkville 3010, VIC, Australia
 E-mail: m.davidson@unimelb.edu.au URL: <https://bit.ly/3WSSeJB>

- **Prof. Dalton J.E. Harvie** Post-Doc Co-Mentor
 Associate Professor, Department of Chemical Engineering,
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 E-mail: daltonh@unimelb.edu.au URL: <https://bit.ly/3WTthOd>

- **Prof. Fangbao Tian** Research Collaborator
 Associate Professor, School of Engineering and Information Technology,
University of New South Wales, Canberra 2600, ACT, Australia
 E-mail: f.tian@adfa.edu.au URL: <https://bit.ly/3WwVnO7>

- **Prof. Xuehua Zhang** Research Collaborator & Joint PhD Supervision
 Professor, Department of Chemical and Materials Engineering,
University of Alberta, Edmonton T6G 1H9, Alberta, Canada
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LIST OF ANNEXURES

DETAILS OF RESEARCH OUTCOME

→ 1(a). Refereed International Journals Publications	@ 11
→ 1(b). Conferences Presentations/Proceedings/Abstracts	@ 16
→ 1(c). Books Published	@ 22
→ 1(d). Books Chapters Published	@ 23
→ 1(e). Academic Research & Thesis (Prior to joining at IIT Roorkee)	@ 25

DETAILS OF RESEARCH SUPERVISION

→ 2(a). Post-Doctoral Fellow (PDF) Mentored	@ 26
→ 2(b). Doctoral (Ph. D.) Thesis Guidance	@ 26
→ 2(c). Post Graduate (M. Tech.) Dissertations Guidance	@ 27
→ 2(d). Under Graduate (B. Tech.) Major Projects	@ 29
→ 2(e). Under Graduate (B. Tech.) Minor Projects	@ 31
→ 2(f). Research Internship Guidance	@ 33

DETAILS OF SPONSORED PROJECTS AND INDUSTRIAL CONSULTANCIES

→ 3(a). Sponsored Projects	@ 34
→ 3(b). Industrial Consultancies	@ 36

DETAILS OF TEACHING ACTIVITIES

→ 4(a). Teaching Engagement	@ 37
→ 4(b). Teaching Assistantship	@ 38

RESEARCH SKILLS

→ 5(a). Research Skills	@ 39
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DECLARATION

I hereby declare that all the information furnished above is true to the best of my knowledge and belief.

(Ram Prakash Bharti)

ANNEXURE - 1(A)

REFEREED INTERNATIONAL JOURNALS PUBLICATIONS (*Corresponding author)

- [J.50]. P.K. Mohanty, A.K. Sahu, and R.P. Bharti*. CFD analysis of the influence of solvent viscosity ratio on the creeping flow of viscoelastic fluid over a channel-confined circular cylinder. **Communicated** (2024). arXiv preprint: [doi:10.48550/arXiv.2403.05904](https://doi.org/10.48550/arXiv.2403.05904)
- [J.49]. J. Dhakar, and R.P. Bharti*. CFD analysis of electroviscous effects in electrolyte liquid flow through heterogeneously charged non-uniform microfluidic device. **Communicated** (2023). arXiv preprint: [doi:10.48550/arXiv.2312.16053](https://doi.org/10.48550/arXiv.2312.16053)
- [J.48]. J. Dhakar, and R.P. Bharti*. CFD analysis of electroviscous effects in electrolyte liquid flow through heterogeneously charged uniform microfluidic device. **Communicated** (2023). arXiv preprint: [doi:10.48550/arXiv.2312.16032](https://doi.org/10.48550/arXiv.2312.16032)
- [J.47]. J. Dhakar, and R.P. Bharti*. CFD analysis of the influence of contraction size on electroviscous flow through the slit-type non-uniform microfluidic device. **Communicated** (2023). arXiv preprint: [doi:10.48550/arXiv.2312.15928](https://doi.org/10.48550/arXiv.2312.15928)
- [J.46]. A. Kumar, and R.P. Bharti*. Evaluation of RANS-based turbulence models for isothermal flow in a realistic can-type gas turbine combustor application. **Communicated** (2023). arXiv preprint: [doi:10.48550/arXiv.2312.14459](https://doi.org/10.48550/arXiv.2312.14459)
- [J.45]. A.K. Lal, and R.P. Bharti*. Local characteristics of cross-buoyancy mixed convection from an isothermal cylinder rotating in non-Newtonian liquids. **Chinese Journal of Physics**, review comments received (2023).
- [J.44]. J. Dhakar, and R.P. Bharti*. Electroviscous effects in pressure-driven flow of electrolyte liquid through an asymmetrically charged non-uniform microfluidic device. **Journal of the Taiwan Institute of Chemical Engineers**, 153, 105230 (21 pages) (2023). [doi:10.1016/j.jtice.2023.105230](https://doi.org/10.1016/j.jtice.2023.105230), arXiv preprint: [doi:10.48550/arXiv.2305.02830](https://doi.org/10.48550/arXiv.2305.02830)
- [J.43]. A. Venkateshwarlu, and R.P. Bharti*. Effects of surface wettability and flow rates on the interface evolution and droplet pinch-off mechanism in the cross-flow microfluidic systems. **Chemical Engineering Science**, 267, 118279 (17 pages) (2023). [doi:10.1016/j.ces.2022.118279](https://doi.org/10.1016/j.ces.2022.118279), arXiv preprint: [doi:10.48550/arXiv.2201.00605](https://doi.org/10.48550/arXiv.2201.00605)
- [J.42]. J. Dhakar, and R.P. Bharti*. Electroviscous effects in charge-dependent slip flow of liquid electrolytes through the charged microfluidic device. **Chemical Engineering and Processing - Process Intensification**, 180, 109041 (18 pages) (2022). [doi:10.1016/j.cep.2022.109041](https://doi.org/10.1016/j.cep.2022.109041), arXiv preprint: [doi:10.48550/arXiv.2201.00605](https://doi.org/10.48550/arXiv.2201.00605) ([Invited article](#) for Festschrift issue in honor of Prof. K.D.P. Nigam at his 75th Birthday)
- [J.41]. R. Pravesh*, A.K. Dhiman, and R.P. Bharti. Thermal Features of mixed convection from an inline periodic array of circular cylinders in non-Newtonian power-law fluids. **Case Studies in Thermal Engineering**, 36, 102175 (17 pages) (2022). [doi:10.1016/j.csite.2022.102175](https://doi.org/10.1016/j.csite.2022.102175)

- [J.40]. A. Venkateshwarlu, and R.P. Bharti*. Interface evolution and droplet pinch-off mechanism in two-phase liquid flow through T-junction microfluidic system. *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, 642, 128536 (16 pages) (2022). doi:10.1016/j.colsurfa.2022.128536, arXiv preprint: doi:10.48550/arXiv.2202.02130
- [J.39]. R.P. Bharti*, R.P. Ram, and A.K. Dhiman. Computational analysis of cross-flow of power-law fluids through a periodic square array of circular cylinders. *Asia-Pacific Journal of Chemical Engineering*, 17(2), e2748 (25 pages) (2022). doi:10.1002/apj.2748
- [J.38]. A. Venkateshwarlu, and R.P. Bharti*. Effects of capillary number and flow rates on the hydrodynamics of droplet generation in two-phase cross-flow microfluidic systems. *Journal of the Taiwan Institute of Chemical Engineers*, 129, 64 – 79 (2021). doi:10.1016/j.jtice.2021.07.045, arXiv preprint: doi:10.48550/arXiv.2105.10308
- [J.37]. R. Kumar, A.K. Lal, R.P. Bharti*, and V. Pancholi. Experimental and computational analysis of material flow characteristics in friction stir welding. *International Journal of Advanced Manufacturing Technology*, 115 (9-10), 3011 – 3020 (2021). doi:10.1007/s00170-021-07345-3
- [J.36]. G. Vishal, J. Tomar, and R.P. Bharti*. Critical parameters for non-Newtonian shear-thickening power-law fluids flow across a channel confined circular cylinder. *Journal of the Taiwan Institute of Chemical Engineers*, 123, 34 – 46 (2021). doi:10.1016/j.jtice.2021.05.025, arXiv preprint: doi:10.48550/arXiv.1901.07362 (GV, JT, RPB: all first author(s) contributed equally)
- [J.35]. P. Kumar, and R.P. Bharti*. Nanocomposite polymer electrolyte membrane for high performance microbial fuel cell: synthesis, characterization and application. *Journal of Electrochemical Society*, 166 (15), F1190 – F1199 (2019). doi:10.1149/2.0671915jes
- [J.34]. R. Pravesh*, A. Dhiman, and R.P. Bharti. Non-Newtonian power-law fluid's thermal characteristics across periodic array of circular cylinders. *Journal of Brazilian Society of Mechanical Sciences and Engineering*, 41(2), 88 (20 pages) (2019). doi:10.1007/s40430-019-1584-3
- [J.33]. R. Pravesh*, A. Dhiman, and R.P. Bharti. Aiding buoyancy mixed convection flow and thermal features across a periodic array of heated cylinders. *International Journal of Heat and Mass Transfer*, 130, 1141 – 1162 (2019). doi:10.1016/j.ijheatmasstransfer.2018.11.035
- [J.32]. A. Bhattacharyya, F. Nasim, R. Mishra, R.P. Bharti, and P.P. Kundu*. Polyurethane incorporated Chitosan/alginate core-shell nanoparticles for controlled oral insulin delivery. *Journal of Applied Polymer Science*, 135(26), 46365 (15 pages) (2018). doi:10.1002/app.46365
- [J.31]. R. Kumar, V. Pancholi*, and R.P. Bharti. Material flow visualization and determination of strain rate during friction stir welding. *Journal of Material Processing Technology*, 255, 470 – 476 (2018). doi:10.1016/j.jmatprotec.2017.12.034
- [J.30]. K.M. Gangawane, and R.P. Bharti*. Computational analysis of MHD natural convection in partially-differentially heated cavity: effect of cooler size. Proceedings of IMechE, Part C: *Journal of Mechanical Engineering Science*, 232(3), 515 – 528 (2018). doi:10.1177/0954406217752745

([Invited article](#) for special issue on the Lattice Boltzmann Method and its Applications in Complex Flows and Fluid-Structure Interactions)

- [J.29]. R.P. Ram, R.P. Bharti*, and A.K. Dhiman. Forced convection flow and heat transfer across an in-line bank of circular cylinders. *Canadian Journal of Chemical Engineering*, 94(7), 1381 – 1395 (2016). [doi:10.1002/cjce.22483](#)
- [J.28]. K.M. Gangawane, R.P. Bharti*, and 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*, 37(6), 507 – 522 (2016). [doi:10.1080/01457632.2015.1060748](#)
- [J.27]. K.M. Gangawane, R.P. Bharti*, and S. Kumar. Lattice Boltzmann analysis of effect of heating location and Rayleigh number on natural convection in partially heated open ended cavity. *Korean Journal of Chemical Engineering*, 32(8), 1498 – 1514 (2015). [doi:10.1007/s11814-014-0361-3](#)
- [J.26]. K.M. Gangawane, R.P. Bharti*, and S. Kumar. Lattice Boltzmann analysis of natural convection in a partially heated open ended enclosure for different fluids. *Journal of Taiwan Institute of Chemical Engineers*, 49, 27 – 39 (2015). [doi:10.1016/j.jtice.2014.11.020](#)
- [J.25]. K.M. Gangawane, R.P. Bharti*, and 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(4), 766 – 780 (2015). [doi:10.1002/cjce.22161](#)
- [J.24]. F.-B. Tian*, R.P. Bharti, and Y.-Q. Xu. Deforming-Spatial-Domain/Stabilized Space-Time (DSD/SST) method in computation of non-Newtonian fluid flow and heat transfer with moving boundaries. *Computational Mechanics*, 53(2), 257 – 271 (2014). [doi:10.1007/s00466-013-0905-0](#) (Selected and highlighted as [Featured article](#) in “Advances in Engineering”, under the section of Mechanical Engineering, April 13, 2014)
- [J.23]. A. Kumar, A.K. Dhiman*, and R.P. Bharti. Power-law flow and heat transfer over an inclined square bluff body: effect of blockage ratio. *Heat Transfer - Asian Research*, 43(2), 167 – 196 (2014). [doi:10.1002/htj.21071](#)
- [J.22]. J.D. Berry, M.R. Davidson*, R.P. Bharti, and D.J.E. Harvie. Effect of wall permittivity on electroviscous flow through a contraction. *Biomicrofluidics*, 5(4), 044102 (17 pages) (2011). [doi:10.1063/1.3645194](#)
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ANNEXURE - 1(B)

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ANNEXURE - 1(C)

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ANNEXURE - 1(D)

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- [BC.9]. P. Dogra, and R.P. Bharti. Hydrodynamics of Droplet Generation Under Squeezing Regime in a T-junction Cylindrical Microfluidic System. In: K.M. Singh, S. Dutta, S. Subudhi, N.K. Singh (Eds.), **Fluid Mechanics and Fluid Power**, Volume 5, Chapter 6, pp. 59 – 70 (2024). Lecture Notes in Mechanical Engineering (LNME) Book Series, Springer, Singapore. [doi:10.1007/978-981-99-6074-3_6](https://doi.org/10.1007/978-981-99-6074-3_6)
- [BC.8]. A.K. Lal, R.P. Bharti, and D. Panda. Finite difference method for chocolate crystallization. In: K.M. Gangawane and M. Dwivedi (Eds.), **Advanced Computational Techniques for Heat and Mass Transfer in Food Processing**, 1st edition, Chapter 2, pp. 21 - 44 (2022). CRC Press. [doi:10.1201/9781003159520-2](https://doi.org/10.1201/9781003159520-2)
- [BC.7]. S. Samadder, A. Venkateshwarlu, and R.P. Bharti. Effect of inertial force and interfacial tension on droplet generation in a T-junction microfluidic system. In: R.P. Bharti and K.M. Gangawane (Eds.), **Recent Trends in Fluid Dynamics Research**, Chapter 14, pp. 173 - 182 (2022). Lecture Notes in Mechanical Engineering (LNME) Book Series, Springer, Singapore. [doi:10.1007/978-981-16-6928-6_14](https://doi.org/10.1007/978-981-16-6928-6_14)
- [BC.6]. P. Dhondi, A. Venkateshwarlu, and R.P. Bharti. Effect of shear rate on non-Newtonian droplet generation in T-junction microfluidic system. In: R.P. Bharti and K.M. Gangawane (Eds.), **Recent Trends in Fluid Dynamics Research**, Chapter 13, pp. 161 - 172 (2022). Lecture Notes in Mechanical Engineering (LNME) Book Series, Springer, Singapore. [doi:10.1007/978-981-16-6928-6_13](https://doi.org/10.1007/978-981-16-6928-6_13)
- [BC.5]. J. Dhakar, and R.P. Bharti. Slip effects in ionic liquids flow through a contraction-expansion microfluidic device. In: R.P. Bharti and K.M. Gangawane (Eds.), **Recent Trends in Fluid Dynamics Research**, Chapter 12, pp. 149 - 160 (2022). Lecture Notes in Mechanical Engineering (LNME) Book Series, Springer, Singapore. [doi:10.1007/978-981-16-6928-6_12](https://doi.org/10.1007/978-981-16-6928-6_12)
- [BC.4]. A. Venkateshwarlu, and R.P. Bharti. Effect of contact angle on droplet generation in a T-junction microfluidic system. In: R.P. Bharti and K.M. Gangawane (Eds.), **Recent Trends in Fluid Dynamics Research**, Chapter 11, pp. 137 - 148 (2022). Lecture Notes in Mechanical Engineering (LNME) Book Series, Springer, Singapore. [doi:10.1007/978-981-16-6928-6_11](https://doi.org/10.1007/978-981-16-6928-6_11)
- [BC.3]. P. Kumar, R.P. Bharti, V. Kumar, and P.P. Kundu. Polymer electrolyte membranes for microbial fuel cells: Part A. Nafion-based membranes. In: P.P. Kundu and K. Dutta (Eds.) **Progress and Recent Trends in Microbial Fuel Cells**, 1st edition, Chapter 4, pp. 47-72 (2018). Elsevier. [doi:10.1016/B978-0-444-64017-8.00004-X](https://doi.org/10.1016/B978-0-444-64017-8.00004-X)
- [BC.2]. V.N. Venkatesan, K.-P. Weiss, R.P. Bharti, H. Neumann, and R. Ramalingam. Strain calibration of substrate-free FBG sensors at cryogenic temperature, In: Mandler B. et al. (Eds.) **Internet of Things. IoT Infrastructures**. IoT360 2015. Lecture Notes of the Institute for Computer Sciences, Social Informatics

and Telecommunications Engineering (LNICST) book series, Volume 170. Chapter 24, pp. 191-202 (2016). Springer, Cham. [doi:10.1007/978-3-319-47075-7_24](https://doi.org/10.1007/978-3-319-47075-7_24)

- [BC.1]. P. Sivakumar, R.P. Bharti, and R.P. Chhabra. Steady power-law flow over a circular cylinder, In: S.K. Dwivedy and D. Maity (Eds.). **Recent Advances in Computational Mechanics and Simulations**, Volume II, 1st edition. pp. 1254-1260 (2007). IK International Publishing House Pvt. Ltd. New Delhi. ISBN: [9788189866167](https://doi.org/10.1007/978-81-89866167)

ANNEXURE - 1(E)**ACADEMIC RESEARCH & THESIS** (Prior to joining at IIT Roorkee)→ **Post-Doctoral Research**

Title	Electroviscous flow of Newtonian and non-Newtonian fluids through microchannels	
Mentor(s)	→ Prof. Malcolm R. Davidson	
University	University of Melbourne, Australia Department of Chemical & Biomolecular Engineering	
Year	→ Start date: May 15, 2007	→ End date: May 14, 2009

→ **Senior Project Associate Research**

Title	Implementation of a subroutine to calculate the non-Newtonian flux in the General Purpose Robust CFD Solver	
Mentor(s)	→ Prof. Vinayak Eswaran	
Institute	IIT Kanpur, India Department of Mechanical Engineering	
Year	→ Start date: Jan 01, 2007	→ End date: Mar 31, 2007

→ **Ph. D. Research**

Title	Steady flow of incompressible power-law fluids across a circular cylinder: a numerical study	
Supervisor(s)	→ Prof. Raj P. Chhabra → Prof. Vinayak Eswaran	
Institute	IIT Kanpur, India Department of Chemical Engineering	
Year	→ Submission date: Dec 26, 2006	→ Defense date: May 07, 2007

→ **M. Tech. Research**

Title	Monte Carlo analysis of molecular weight distribution of vinyl acetate emulsion polymers	
Supervisor(s)	→ Prof. Hemant Nanavati → Prof. Kannan Moudgalya	
Institute	IIT Bombay, India Department of Chemical Engineering	
Year	→ Submission date: Jan 2002	→ Defense date: Jan 2002

ANNEXURE - 2(A)

POST-DOCTORAL FELLOW (PDF)/FACULTY FELLOW (FF)

-
2. **Dr. Pooja Jangir**, DST - INSPIRE Faculty Fellow → (May 29, 2023 – Dec 21, 2023)
Project Title: Particle laden flow through microfluidic devices (Ref. No. DST-2147-CHD-CNA/23-24)
 1. **Dr. Piyush Kumar**, SERB – NPDF (National Post-Doctoral Fellow) → (Feb 01, 2017 – Jan 17, 2018)
Project Title: Development of highly selective and low cost polymer electrolyte membranes (PEM) for microbial fuel cell (Ref. No. PDF/2016/001581)
-

ANNEXURE - 2(B)

DOCTORAL (PH. D.) THESIS GUIDANCE

-
8. **Pratibha Dogra** (A2020, 20908007, PMRF) → (Aug 2020 – Pursuing –)
 Colloidal hydrodynamics of active generation and interaction of droplets in multiple immiscible liquids in microfluidic systems.
Co-advisor: Prof. Xuehua Zhang, University of Alberta, Canada; under IIT Roorkee - University of Alberta (IITR- UoA) Joint-Doctoral Degree Program (JDDP)
 7. **Lekhraj Malviya** (S2018, 18908016, MHRD) → (Jan 2019 – Pursuing –)
 Non-Newtonian fluid flow and heat transfer from freely rotating cylinders and spheres.
 6. **Jitendra Dhakar** (S2017, 17908011, MHRD) → (Jan 2018 – Jan 03, 2024 –)
 Electroviscous effects in pressure-driven flow of electrolyte liquids through microfluidic devices.
 5. **Akepogu Venkateshwarlu** (S2015, 15908011, MHRD) → (Jan 2016 – Apr 23, 2022 – Jul 28, 2022)
 Hydrodynamics of droplets generation in two-phase flow through T-junction microfluidic device.
 4. **Abhishek Kumar Lal** (A2013, 13912001, MHRD) → (Jul 2013 – Dec 24, 2019 – Feb 28, 2020)
 Mixed convection in non-Newtonian fluid flow over a rotating circular cylinder.
 3. **Ram Pravesh Ram** (A2012, 12912011, QIP) → (Jul 2012 – Aug 21, 2017 – Jan 31, 2018)
 Periodic flow of non-Newtonian fluids across an array of cylinders.
Co-advisor: Prof. Amit Kumar Dhiman, IIT Roorkee, India
 2. **Vijay Kumar Verma** (S2010, 10912020, MHRD) → (Jan 2011 – Nov 30, 2017 – Apr 09, 2018)
 The development of meshless local Petrov Galerkin (MLPG) method for complex fluid flow simulations.
 1. **Krunal Madhukar Gangawane** (A2010, 10912001, MHRD) → (Jul 2010 – Dec 19, 2014 – Apr 07, 2015)
 Convective flow and heat transfer analysis by using thermal lattice Boltzmann method.
Co-advisor: Prof. Surendra Kumar, IIT Roorkee, India
-

ANNEXURE - 2(C)

MASTERS (M. TECH.) DISSERTATIONS GUIDANCE

28. Brahman Ashwin Kumar (23561005)	Pursuing
To be decided....	
27. Ankita Keshri (23561002)	Pursuing
To be decided....	
26. Akanksha Gupta (22561003)	Pursuing
Stability analysis of complex fluid-particle systems.	
25. Rohit Rajpal Dhole (21561015)	2023
Rheological studies of complex fluids.	
24. Pradeep Dhondi (19561005)	2021
Droplet dynamics in non-Newtonian fluid flow through microchannels.	
23. Lalit Singh Mehra (17514006)	2019
Hydrodynamics of channel confined rotating circular cylinder submerged in non-Newtonian media.	
22. S. Abu Saif (16515003)	2018
CFD analysis of opposing buoyancy mixed convection heat transfer from a confined circular cylinder in non-Newtonian power-law fluids.	
21. Sanjay Ram (16514010)	2018
CFD analysis of aiding buoyancy mixed convection in non-Newtonian fluids flow over a channel confined circular cylinder.	
20. S. Aman Kumar (12210026)	2017
Non-Newtonian fluid flow and heat transfer from a cylinder confined in corrugated channel.	
19. Ashok Paliwal (12210008)	2017
Non-Newtonian fluid flow and heat transfer from a cylinder confined in irregular channel.	
18. Venkataraman N. V. (13515024)	2015
Preliminary investigation and simulation of fibre Bragg grating (FBG) cryogenic flowmeters.	
Co-advisor: Dr. R. Ramalingam, Institute for Technical Physics (ITEP) , Karlsruhe Institute of Technology (KIT), Germany	
17. Jyoti Tomar (13514010)	2015
Characterization of flow regimes for shear-thinning fluid flow across a channel confined circular cylinder.	
16. Garima Vishal (13514009)	2015
Critical Parameters for shear thickening fluid flow across a channel confined circular cylinder.	
15. Shikha Verma (12514023)	2014
Electroviscous effects in shear flow of power-law fluid through a microchannel. (partial supervision)	

14. Vipin Kumar Sachan (11514027) [2014](#)
Mixed convection heat transfer in confined flow of power-law fluid across a pair of tandem circular cylinders.
 13. Toshi Gupta (11514024) [2013](#)
Effect of opposing buoyancy in confined flow of power-law fluids across a circular cylinder.
 12. Sharad Tiwari (11514020) [2013](#)
Convective flow of power-law fluids across a pair of tandem circular cylinder in confined arrangement.
 11. Aarti Kain (08210001) [2013](#)
Effect of aiding buoyancy in confined flow of power-law fluid across a circular cylinder.
 10. Vipin M. Rokade (10514020) [2012](#)
Effect of opposing buoyancy on convective heat transfer from a cylinder to power-law fluids.
 9. Mayank Agarwal (10514011) [2012](#)
Mixed convection heat transfer in Poiseuille flow of power-law fluids across a cylinder.
 8. Pratik Dilip Kakkar (071105) [2012](#)
Mixed convection heat transfer in unconfined flow of power-law fluids across a cylinder: effect of temperature and shear-dependent viscosity.
 7. Manish Bhatia (---) [2011](#)
Steady flow of non-Newtonian fluids across an array of circular cylinders.
 6. Bhaskar Thota (---) [2011](#)
Finite difference solution of electrokinetic flow through microchannel.
 5. P. Ramulu Rathod (---) [2011](#)
Finite difference solution of electrokinetic flow through microfluidic pipe.
 4. Vijaya K. Patnana¹ (---) [2008](#)
Momentum and heat transfer from a cylinder to power-law fluids in the unsteady flow regime.
 3. Avadhani T. Srinivas¹ (---) [2008](#)
Mixed convection from a circular cylinder to power-law liquid.
 2. Rahul C. Patil¹ (---) [2007](#)
Flow over two circular cylinders in tandem configuration: drag and heat transfer.
 1. P. Sivakumar¹ (---) [2006](#)
Flow past circular and elliptical cylinders: a numerical study.
-

¹ Advisor: Prof. R.P. Chhabra, Department of Chemical Engineering, [IIT Kanpur](#), India

ANNEXURE - 2(D)

UNDERGRADUATE (B. TECH.) MAJOR PROJECTS

(CH/CHN-400: Major Project course; *Group project coordinator; Duration: two semesters)

75. Vinod Kumar (20121035), 74. Neeru Giri (20121017), 73. Deepanshu Paliwal* (20112040),
72. Archi Gupta (20112022), 71. Ankit Kumar (20112014), 70. Adarsh (20112006),

Project 15: **Techno-economic feasibility analysis of hydrogen production from sea water.** [2024*](#)

69. Nishanth R. (19121019), 68. Abhinav Tyagi (19121001), 67. Hitesh Kumar (19118034),
66. Vansh Ruhela* (19112092), 65. Harshit Baranda (19112032),

Project 14: **Techno-economic feasibility analysis of design of tower for absorption of CO₂ from power plant emission source using DEA solvent of different concentrations.** [2023](#)

64. Sant Babu (18121020), 63. Devashish Yadav* (18112019), 62. Anuj Singh (18112012),
61. Anamika Verma (18112007), 60. Akanchha Bhadani (18112003),

Project 13: **Techno-economic feasibility analysis of a plant for hydrogenation of CO₂ to formate and methanol.** [2022](#)

59. Shuvam Samadder (17112076),

Project 12: **Droplet dynamics in microfluidics system - CFD study.** [2021](#)

58. Shivani Raghuwanshi* (17112073), 57. Rishabh Singh (17112064),
56. Pratibha Deoraj (17112054), 55. Oman Kumar (17112051), 54. Avinash Jharwal (17112018),

Project 11: **Techno-economic feasibility analysis of a plant for production of 90000 MTPA terephthalic acid using para-xylene.** [2021](#)

53. Saket Bhatt (16112075), 52. Ravi Ranjan (16112069),
51. Kshitij Pratap Singh Bhdauria (16112036), 50. Astha Verma (16112016),
49. Astha (16112015), 48. Abhishek Singh* (16112002), 47. Abhishek Kumar (16112001),

Project 10: **Techno-economic feasibility analysis of a plant for production of 30000 MTPA pentaerythritol & sodium formate.** [2020](#)

46. Vardan Bapna (15112105), 45. Manish Kumar Rasgania (15112049),
44. Ayush Yadav (15112026), 43. Akshay Verma* (15112008), 42. Satnam Singh (15111037),

Project 9: **Techno-economic feasibility analysis of a plant for production of 20000 MTPA liquid fuel from waste plastics.** [2019](#)

41. Saurav Kumar Goyal (14112088), 40. Nimisha Gupta* (14112065),
39. Hemant Kumar (14112038), 38. Anunay Anand (14112016),

Project 8: Techno-economic feasibility analysis of a plant for production of 2 MMTPA benzylamine production via gas phase hydrogenation of benzonitrile. [2018](#)

37. Vaibhav Pal (13112103), 36. Shivam Kumar* (13118084), 35. Shanu Singhal (13112085),
34. Sanjay Godara (13112079), 33. Ashutosh Rungta (13112019), 32. Abhishek Kumar (13112003),

Project 7: Techno-economic feasibility analysis of a plant for production of 55000 MTPA Ethylene Glycol (MEG) production using coal as feedstock. [2017](#)

31. Virendra Kumar Verma (12112080), 30. Rahul (12112055), 29. Mohit Goyal (12112047),
28. M. Satyam (12112045), 27. Ishtyaque Ahmad Ansari* (12112036), 26. Faisal Saifi (12112027),

Project 6: Techno-economic feasibility analysis of a plant for production of 100000 MTPA phenol production by toluene oxidation. [2016](#)

25. Surya Pratap Singh Solanki (11112050), 24. Siva Sanhit Vaddiparthi (11112047),
23. Maanik Gupta (11112022), 22. Jitendra Kumar Prabhakar (11112017),

Project 5: Techno-economic feasibility analysis of a plant for production of 1.2 million TPA total recycle hydrocracker for maximizing middle distillates from vacuum distillation unit residue in a high sulphur heavy crude petroleum refinery. (Co-advisor: Prof. Basheshwar Prasad) [2015](#)

21. Tanuj Agarwal (10112054), 20. Manav Bhati* (10112025), 19. Latil Kumar Patidar (10112023),
18. Himanshu Gupta (10112015), 17. Alok Ratre (10112004),

Project 4: Techno-economic feasibility analysis of a plant for production of sodium chlorate through electrolysis route using NaCl as a feedstock. (Co-advisor: Prof. Shri Chand) [2014](#)

16. Voggu Vikas Reddy* (9112048), 15. Utsav Marwaha (9112045), 14. Sandeep Kumar (9112037),
13. Priyanka Gupta (9112030), 12. Bhanu Kumar Paliwal (9112012),

Project 3: Techno-economic feasibility analysis of a plant for the recovery of valuable olefins from FCCU off gas streams. (Co-advisor: Prof. Shishir Sinha) [2013](#)

11. Saumya Agarwal (8112032), 10. Sanjay Kumar Dudawat (8112030),
9. Sahil Sood* (8112028), 8. Rameshwari Ahriwar (8112024), 7. Harshit Wadhwa (8112009),
6. Dongla S.S. Krishna Teja (8112006),

Project 2: Techno-economic feasibility analysis of a plant for production of Propylene from LPG. (Co-advisor: Prof. V.K. Agarwal and Prof. Shashi) [2012](#)

5. Shubham Sharma (070730), 4. Manas Gupta* (070713), 3. Arun Singh (070707),
2. Arkapol Basu (070706), 1. Ajay Kumar Meena (070702),

Project 1: Techno-economic feasibility analysis of a plant for production of 500 TPD Fischer Tropsh liquid from syngas ($H_2:CO = 2:1$). (Co-advisor: Prof. Shri Chand) [2011](#)

ANNEXURE - 2(E)**UNDERGRADUATE (B. TECH.) MINOR PROJECTS**

(CH/CHN/PEN-300: Minor Project/Case Study course; Group/individual project; Duration: one semester)

59. Piyush Yadav (20112077), 58. Akshay Pareek (20112010), 57. Mohammed Aman (20112065),
 56. Rahul Sunwaniya (20112089), 55. Sandal Rana (20112098),

Project 15: **Carbon Emission and Heat Transfer aspects of EVs with website.** [2023](#)

54. Hardik Garg (19113048), 53. Sushant Kumar Roy (19112085), 52. Nipun Aggarwal (19112051),
 51. Mogillannolla Hareeshwar Reddy (19112043), 50. Meshram Vedant Pramanand (19112042),

Project 14: **External Flow over cylinder.** [2022](#)

49. Gautam Goyal (18112023), 48. Arjun Aryan (18112015), 47. Arham Habib (18112014),
 46. Anurag Kumar Jaiswal (18112013), 45. Anuj Singh (18112012),

Project 13: **Machine learning for fluid mechanics of bluff bodies and two-phase flow.** [2021](#)

44. Vinay Jain (17112088), 43. Utkarsh Mishra (17112085), 42. Ruchi Sharma (17111028),
 41. Ritik Gupta (17112067), 40. Rishabh Singh (17112064), 39. Prabhat Koutha (17121014),

Project 12: **Symbolic non-linear regression analysis.** [2020](#)

38. Tanpreet Singh Kalsi (16112095), 37. Pawan Kumar (16112054), 36. Naman Sinha (16112047),
 35. Kunal Satpal (16112037), 34. Chirag Garg (16112018), 33. Ashish Kumar (16112012),

Project 11: **Curve fitting and data regression analysis of multivariable function.** [2019](#)

32. Ritu Sharma (15112078), 31. Parth Nagar (15112059), 30. Ishita Singhal (15112044),
 29. Harsh Wardhan (15112041), 28. Anurag Kumar (15112013),

Project 10: **Bluff bodies hydrodynamics in non-Newtonian fluids: a CFD study.** [2018](#)

27. Sagar Arora (14112083), 26. Rahul Kumar Pandey (14112070),
 25. Durga Prasad Murmu (14112033), 24. Ayushi Agrawal (14112026), 23. Archit Umrao (14112020),

Project 9: **Economic aspects of sugar industry, its qualitative and quantitative analysis.** [2017](#)

22. Shyam Pratap Singh (13112093), 21. Shubham Kumar Jain (13112092),
 20. Shubham Gusain (13112091), 19. Shobhit Gupta (13112090), 18. Shivansh Singh (13112089),

Project 8: **Simulation of urea synthesis reactor: thermodynamics framework and reactor model.** [2016](#)

17. Shubham Jain (12112070), 16. Saurabh Bharti (12112064), 15. Sachin Kumar (12112060),
 14. K.P. Vikas (12214010),

Project 7: **....** [2015](#)

13. Anurag Anand (11112006),

Project 6: **Hydrodynamic characteristics of power-law fluid flow across a cylinder confined within the square cavity.** [2014](#)

12. Anuj Kumar (11112005),

Project 5: **Effect of temperature dependent viscosity on the hydrodynamic characteristics of a cylinder confined within the square cavity.** [2014](#)

11. Ronak Jain (10112039),

10. Raunak Kumar (10112038),

9. Rakesh Bhardwaj (10112037),

Project 4:

[2013](#)

8. Shubham Khare (9112041),

7. Ravi Kumar Chaudhary (9112035),

6. Rajat G. Garia (9112033),

Project 3:

[2012](#)

5. Himanshu Goyal (8112011),

4. Himanshu Agarwal (8112010),

Project 2: **Lattice Boltzmann simulation of non-Newtonian fluid flow in a pipe.**

[2011](#)

3. Tarun Singh Bhatia (070733),

2. T. Sivaram Reddy (070732),

1. Suhen Singhal (070731),

Project 1: **Poiseuille flow of power-law fluid across a rotating cylinder.**

[2010](#)

ANNEXURE - 2(F)

RESEARCH INTERNSHIP

4. Khushi Kumari

→ (May 20, 2023 – Jul 07, 2023)

SPARK fellowship, [IIT Roorkee](#), India. (SPARK ID: SPA2300364)

Program/Institute: 2nd year, B. Tech. (Chemical Engineering), [Banasthali Vidyapith, Rajasthan](#), India

Project Title: [Computational fluid dynamics of packed and fluidized beds using OpenFOAM.](#)

3. Pratyush Kumar Mohanty

→ (Dec 06, 2022 – Dec 26, 2022)

Program/Institute: 3rd year, B. Tech. (Chemical Engineering), [NIT Rourkela](#), India

Project Title: [Viscoelastic fluid flow across a channel confined cylinder using RheoTool - OpenFOAM.](#)

2. Rushi Girish Yerawar

→ (Jun 01, 2021 – Jul 26, 2021)

SPARK fellowship, [IIT Roorkee](#), India. (SPARK ID: SPA216259)

Program/Institute: 2nd year, B. Tech. (Chemical Engineering), [IIT Kharagpur](#), India

Project Title: [Hydrodynamics of multilayer asymmetric ionic liquids flow through the rectangular microchannel.](#)

1. Archi Agrawal

→ (May 15, 2020 – Jul 25, 2020)

SPARK fellowship, [IIT Roorkee](#), India. (SPARK ID: SP202376)

Program/Institute: 2nd year, B. Tech. (Metallurgical and Materials Engineering), [IIT Roorkee](#), India

Project Title: [Electroviscous effects in low Reynolds number fluid flow through a slit-like microfluidic device.](#)

ANNEXURE - 3(A)

SPONSORED PROJECTS

Projects →	Externally Funded		Institute Funded		Total	
Status ↓	No.	Budget (in INR)	No.	Budget (in INR)	No.	Budget (in INR)
Completed	03	37,60,006	02	1,55,10,000	05	1,92,70,006
In Progress	03	1,20,42,932	–	–	03	1,20,42,932
Total	06	1,58,02,938	02	1,55,10,000	08	3,13,12,938
Submitted	03	2,70,54,322	–	–	03	2,70,54,322

3(A.1) → Externally Funded Projects: (No: 06, Total Fund: ≈ 158.03 Lakhs)

6. Mechanistic understanding of spreading and splashing dynamics of blood simulant droplets for forensic applications → In Progress (2024 – 27)

→ Investigator(s): G. Sharma, R.P. Bharti

→ Funding Source: SERB⁴

→ Funding Outlay: INR 22,61,600

→ Funding Scheme: CRG⁸

→ Ref. No.: CRG/2023/002759

5. Clean hydrogen (Zero CO₂) production using methane pyrolysis in the molten salt reactor → In Progress (2024 – 27)

→ Investigator(s): D.K. Ojha, R.P. Bharti

→ Funding Source: SERB⁴

→ Funding Outlay: INR 49,50,000

→ Funding Scheme: CRG⁸

→ Ref. No.: CRG/2023/002105

4. Synergistic design and thermal performance analysis of a liquid-cooled microfluidic thermal management system for a lithium-ion battery pack for electric vehicles → In Progress (2023 – 26)

→ Investigator(s): R.P. Bharti

→ Funding Source: SERB⁴

→ Funding Outlay: INR 48,31,332

→ Funding Scheme: EMEQ⁷

→ Ref. No.: EEQ/2022/001053

3. Particle laden flow through microfluidic devices → Completed (2023 – 23)

→ Investigator(s): Pooja Jangir (PI), and R.P. Bharti (Mentor PI)

→ Funding Source: DST⁹

→ Funding Outlay: INR 11,80,006^{??}

→ Funding Scheme: INSPIRE Faculty Fellow¹⁰

→ Ref. No.: EEQ/2022/001053

¹ Sponsored Research & Industrial Consultancy (SRIC), IIT Roorkee ² Faculty Initiation Grant (FIG), Scheme A, ³ Support for Major Interdisciplinary Laboratory Equipment (SMILE), ⁴ Science and Engineering Research Board (SERB), New Delhi, ⁵ National Post-Doctoral Fellow (NPDF), ⁶ Mathematical Research Impact Centric Support (MATRICS), ⁷ Empowerment and Equity Opportunities for Excellence in Science (EMEQ), ⁸ Core Research Grant (CRG), ⁹ Department of Science and Technology (DST), New Delhi, ¹⁰ DST – INSPIRE Faculty Fellow, ¹¹ Ministry of Human Resource Development (MHRD), New Delhi, ¹² Scheme for Promotion of Academic and Research Collaboration (SPARC), ¹³ Principal Scientific Advisor (PSA) to GoI, New Delhi, ¹⁴ IOCL Projects - Industry Academia Interaction (Domain: cost efficient carbon capture & utilization (CCU) technologies), ¹⁵ National Quantum Mission (NQM), ¹⁶ Australia-India Strategic Research Fund (AISRF), ¹⁷ Oil and Natural Gas Corporation (ONGC), ¹⁸ ONGC - PAN IIT Research Collaboration, ¹⁹ Mission on Nano Science and Technology (Nano Mission), ²⁰ International Bilateral (Indo – Sri Lanka) Joint Research, ²¹ International Bilateral (India - Portugal) Joint Research,

2. Numerical analysis of electroviscous effects in multilayer complex fluids flow through a microfluidic device → [Completed \(2020 – 23\)](#)

→ Investigator(s): R.P. Bharti

→ Funding Source: SERB⁴

→ Funding Outlay: INR 6,60,000

→ Funding Scheme: MATRICS⁶

→ Ref. No.: MTR/2019/001598

1. Development of highly selective and low cost polymer electrolyte membranes (PEM) for microbial fuel cell → [Completed \(2017 – 19\)](#)

→ Investigator(s): Piyush Kumar (PI), and R.P. Bharti (Mentor PI)

→ Funding Source: SERB⁴

→ Funding Outlay: INR 19,20,000

→ Funding Scheme: NPDF⁵

→ Ref. No.: PDF/2016/001581

3(A.2) → Institute Funded Projects: (No: 02, Total Fund: ≈ 155.10 Lakhs)

2. Advanced Rheometer with Microscopy, High temperature, Extensional Rheology, Magneto Rheology Attachments → [Completed \(2017 – 18\)](#)

→ Investigator(s): Vimal Kumar, Gaurav Sharma, Sumana Ghosh, Prateek Kumar Jha, P.P. Kundu, R.P. Bharti, Amit Kumar Dhiman, V.C. Nathan, Anshu Anand, Sanjoy Ghosh, P. Bera, Vivek Pancholi

→ Funding Source: SRIC¹

→ Funding Outlay: INR 1,52,30,000

→ Funding Scheme: SMILE³

→ Ref. No.: SMILE/2017/42

1. Bluff body hydrodynamics of non-Newtonian fluids → [Completed \(2010 – 13\)](#)

→ Investigator(s): R.P. Bharti

→ Funding Source: SRIC¹

→ Funding Outlay: INR 2,80,000

→ Funding Scheme: FIG-A²

→ Ref. No.: IITR/SRIC/886/F.I.G.(Scheme-A)

3(A.3) → Projects Submitted for External Funding: (No: 03, Total Fund: ≈ 270.54 Lakhs)**3. Design and construction of a commercially viable CVD reactor for SiC for quantum applications**

→ Submitted (Apr 2024)

- Investigator(s): Madhusudan Singh (Lead PI, IIT Delhi), R.P. Bharti (PI, IIT Roorkee*),
Manjesh Kumar (IIT Delhi)
- Funding Source: DST⁹ → Funding Outlay: INR 27,28,00,000 (*1,57,22,000)
- Funding Scheme: NQM¹⁵ → Ref. No.: NA

2. Reusable microcapsules for carbon dioxide (CO₂) capture

→ Submitted (Dec 2020)

- Investigator(s): R.P. Bharti, B.J. Deka,
S. Mettu (Univ. of Melbourne, Australia)
- Funding Source: PSA¹³ → Funding Outlay: INR 72,31,920
- Funding Scheme: IOCL Industry Academia¹⁴ → Ref. No.: through email

1. Development of lattice Boltzmann method based numerical solver for electro-thermo-hydrodynamic phenomenon

→ Submitted (Oct 2019)

- Investigator(s): K.M. Ganagwane (NIT Rourkela), R.P. Bharti,
Abdulmajeed Mohamad (Univ. of Calgary, Canada),
Gholamreza Kefayati (Univ. of Tasmania, Australia)
- Funding Source: MHRD¹¹ → Funding Outlay: INR 41,01,714
- Funding Scheme: SPARC¹² → Ref. No.: 1583

ANNEXURE - 3(B)**INDUSTRIAL CONSULTANCIES****1. Opinions on phosphorus pentachloride (PCl₅) manufacturing process**

→ Completed (Mar 2010)

- Investigator(s): R.P. Bharti → Funding Outlay: INR 85,000
- Ref. No.: CHD-1001/10-11
- Industry: Pharma Chemicals Industries (PCI),
Plot 2811, GIDC, Sarigam - 396155, Valsad, Gujrat, India

ANNEXURE - 4(A)

TEACHING ENGAGEMENT

→ @ IIT Roorkee, India (2009 – Present)

→ Theory Courses¹

14. CH-205:	Fluid Dynamics	(3-2-2)	DCC – UG – 2
13. CH-308:	Industrial Instrumentation	(2-0-0)	DCC – UG – 3
12. CH-423:	Process Integration	(3-0-0)	DEC – UG – 4
11. CH-426:	Advanced Numerical Methods	(3-0-0)	DEC – UG – 4
10. CH-560:	Process Intensification in Hydrocarbon Industries	(3-1-0)	DEC – UG – 4
9. CHN-103:	Computer Programming and Numerical Analysis	(3-2-2)	DCC – UG – 1
8. CHN-104:	Fluid Dynamics	(3-2-2)	DCC – UG – 1
7. CHN-322:	Optimization of Chemical Engineering Processes	(3-1-0)	DEC – UG – 3
6. CHN-324:	Computational Fluid Dynamics	(3-1-0)	DEC – UG – 3
5. CH-561:	Computational Fluid Dynamics ²	(3-1-0)	DEC – PG – 1
4. CHE-501:	Mathematical Methods in Chemical Engineering ²	(3-1-0)	DCC – PG – 1
3. CHE-503:	Advanced Transport Phenomena ²	(3-1-0)	DCC – PG – 1
2. ICH-01:	Computational Fluid Dynamics	(3-1-0)	IEC – UG – 3/4
1. MI-101:	Thermodynamics	(2-1-0)	ICC – UG – 1

→ Laboratory Courses¹

7. CH-310:	Chemical Engineering Lab - II	(0-0-3)	DCC – UG – 3
6. CHN-103:	Computer Programming and Numerical Analysis	(0-0-2)	DCC – UG – 1
5. CHN-104:	Fluid Dynamics	(0-0-2)	DCC – UG – 1
4. CHN-201:	Heat Transfer	(0-0-2)	DCC – UG – 2
3. CHN-301:	Mass Transfer - II	(0-0-2)	DCC – UG – 3
2. CH-504:	Process Simulators	(0-0-4)	DCC – PG – 1
1. CH-507:	Computer Programming and Software Tools	(0-0-4)	DCC – PG – 1

¹ Course Code: Title (L-T-P) Type-Level- Year → Semester: Session [Students]

→ **AS**: Autumn Semester (Jul - Dec);

→ **SS**: Spring Semester (Jan - May);

→ **ICC**: Institute Core Course;

→ **IEC**: Institute Elective Course;

→ **DCC**: Department Core Course;

→ **DEC**: Department Elective Course

² (PG Core + UG Elective + Pre-Ph.D.) Course

→ **Miscellaneous Courses¹**

4. CH-312:	Communication Skills	(0-4-0)	DCC – UG – 3
3. CH-407:	In-Plant Training - Seminar	(0-2-0)	DCC – UG – 4
2. CHN-391:	Technical Communication	(0-4-0)	DCC – UG – 3
1. CHE/N-700:	M.Tech. / Ph.D. Seminar ²	(0-4-0)	DCC – PG – 1

ANNEXURE - 4(B)**TEACHING ASSISTANTSHIP**→ At [IIT Kanpur](#), India (2002-2006)→ At [IIT Bombay](#), India (2000-2002)

No.	Code	Name of subject/Task	Coordinator	Institute
7.	ChE 391	Heat and Mass Transfer Lab	Prof. J. P. Gupta	IIT Kanpur
6.	ChE 491	Reaction Engineering Lab	Prof. D. P. Rao	IIT Kanpur
5.	ChE 492	Process Control Lab	Prof. A. Khanna	IIT Kanpur
4.	–	Departmental Web & Computers	Prof. V. Shankar	IIT Kanpur
3.	–	Thermodynamics	Prof. H. Nanavati	IIT Bombay
2.	–	Heat Transfer Lab	Prof. H. Nanavati	IIT Bombay
1.	–	Departmental Library	Prof. V. A. Juvekar	IIT Bombay

ANNEXURE - 5(A)

RESEARCH SKILLS

• CFD Solvers:

- Commercial: ANSYS FLUENT, COMSOL Multiphysics
- Open Source: OpenFOAM, OpenLB, Palabos (Parallel Lattice Boltzmann Solver), Gmsh, Salome,
- In-house: Based on FVM, FEM, Meshless and LBM

• Numerical Methods:

- Structured Finite volume (FV), Finite difference (FD), Lattice Boltzmann (LB), Meshless, Deforming-Spatial-Domain/Stabilized-Space-Time (DSD/SST) method

• Hands-on and Development Experience:

- Rheometer and Particle Image Velocimetry (PIV) handling experience
- Development of LBM and Meshless solvers for complex fluid flow simulations
- Development of DSD/SST finite element method in computation of non-Newtonian fluid flow and heat transfer with moving boundaries
 - One of the highly accurate method for complex fluid flow simulations
 - Moving and deformable boundary problems can be handled at very ease
 - Incorporates forced and mixed convection flow and heat transfer in Non-Newtonian fluids
- FVM Solver for Newtonian flow in a lid-driven cavity (Prof. Eswaran's Research Group @ IIT Kanpur); further developed and extended as
 - Development of grid generation solver for flow across circular cylinder
 - Implementation of boundary conditions of channel confined and unconfined cylinder flow
 - Implementation of non-Newtonian power-law fluid viscosity model
- FVM (serial and parallel) Solver for electroviscous flows of Newtonian and non-Newtonian fluids through microchannels (Prof. Davidson's Research Group @ University of Melbourne)
 - Partial implementation of non-Newtonian Carreau-fluid viscosity model
 - Partial implementation of electrokinetics in permeable wall
- Development of FDM algorithm and FORTRAN solver for electroviscous flow of power-law fluids through microchannels of circular and non-circular cross-sections (@ University of Melbourne)

• Programming Languages:

- C/C++, FORTRAN, MPI, Python, Parallel Programming, $\text{\LaTeX}$, HTML, CSS, Javascript

• Operating Systems: Windows and Linux

• Miscellaneous Tools: MATLAB, Scilab, Mathematica, Maple, ASPEN, Tecplot, Origin, Paraview, etc.