

## BIO-DATA

1. Name and full correspondence address:

**Dr. Kishore Singh Patel**

Assistant Professor (Grade-II),  
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2. Email (s) and contact number, and webpage:

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Google Scholar: <https://scholar.google.com/citations?user=ns9MXAYAAAAJ&hl=en>

3. **Institution:** National Institute of Technology (NIT) Rourkela

4. **Date of Birth:** 15 April 1986

5. **Gender (M/F/T):** Male (M)

6. **Category (ST/SC/OBC/EWS)** OBC

7. **Whether differently abled (Yes/No):** No

8. **Academic Qualification** (Undergraduate Onwards)

Sr. No	Degree	Year	Subject	University/Institution	Percentage / CGPA
1	Ph.D.	2018	<b>Department:</b> Mechanical engineering	Indian Institute of Science (IISc) Bangalore	N.A.
2	M. Tech	2009	<b>Department:</b> Mechanical Engineering <b>Specialization:</b> Fluid & Thermal	Indian Institute of Technology Guwahati	8.11/10
3	B. E.	2007	<b>Department:</b> Mechanical Engineering	Govt. Engg. College, Bilaspur/Guru Ghasidas Central University, Bilaspur CG	75.4 %

9. Ph.D. thesis title, Guide Name, Institute/Organization/University, Year of Award

**Title:** - "Liquid bridge breakup and detachment dynamics investigated using dynamic domain multiphase flow simulations"

**Guide Name:** - Prof. Ratnesh K. Shukla (Associate Professor, Department of Mechanical Engineering)

**Institute:** - Indian Institute of Science (IISc) Bangalore.

**Year of Award:** - 2018.

**10. Brief Work introduction:**

Dr. Patel has over 15 years of experience in high-performance computing (HPC) and numerical analyses in the field of CFD (computational fluid dynamics). During his postdoctoral work at JNCASR Bangalore, he has worked on both CPU and GPU versions of a full 3D compressible Navier-Stokes solver (named as ANUROOP), and handled various high-end both CPU and GPU based supercomputers. For example, the GPU supercomputer DHRUVA-3 at ANURAG-DRDO lab Hyderabad, the CMMACS 4PI supercomputer at NAL Bangalore, and CrayXC40 supercomputer at IISc Bangalore have been used during the production run.

Further, during his Ph.D., a moving grid multiphase solver was developed from scratch to solve the generalized problem of liquid bridge dynamics. After joining NIT Rourkela in March 2020, the same multiphase solver has been modified further to understand the drug delivery mechanism in pulmonary airways to manage severe cases of COVID-19 pneumonia. Along with bio-fluid mechanics, Dr. Patel is currently involved in cryogenics research to design a miniaturized cryocooler for the phased array receivers of satellites (ISRO research project).

**11. Work experience (in chronological order):**

Sl. No.	Positions held	Name of the institute	From	To	Pay level / Pay Scale
1.	Assistant Professor (Grade-II)	National Institute of Technology (NIT), Rourkela	11 <sup>th</sup> March 2020	Ongoing	Pay level-11
2.	Postdoctoral Research Associate	Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bangalore	May 2017	9 March 2020	Rs. 47,000/-

**12. Administrative Responsibilities**

S. No.	Responsibilities	Year
1	Assistant Warden, GDB Hall of Residence, NIT Rourkela	June 2022 – Present
2	PIC, Modeling and Simulation Lab,	Jan 2022 – Present
3	Departmental PIC of Biju Patnaik Central Library	May 2022 – Present
4	Member of Departmental Infrastructure Development and Technical Services committee.	June 2022 – Present

<b>5</b>	M-Tech (Cryogenics and Vacuum Technologies) Faculty Advisor, NIT Rourkela	2021 – 2023
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### 13. Research Grants

S.N.	Title	Sponsor	Value (Rs.)	Year
1.	Design of Micro cryogenic coolers for phased array receiver <b>Role: - PI</b>	ISRO	37,23,020/-	2023 – 2026
2.	Design and development of Magneto Resistive Heat Switch <b>Role: - Co-PI</b>	ISRO	29,50000/-	2022-2024
3.	Development of Nocturnal Radiative Cooling Device <b>Role: - Mentors</b>	ISHARE-Bhubaneswar subchapter	50,000/-	2023

### 14. Short-term courses / Workshops / Conferences

S.N.	Title	Sponsor	Value	Year
1	High-Performance Computing and AI Predictive Tools in Fluids and Thermal. <b>Role: -Convener</b>	SERB	5,00,000/-	2022
2	A Five Day Online AICTE Training and Learning (ATAL) Academic FDP Program On Multidisciplinary research in the field of fluids <b>Role:- Convener</b>	AICTE	93,000/-	2021
3	Computational analyses of photovoltaic solar panel cooling the using the natural convection <b>Role:- PI</b>	NIT Rourkela	2,00,000/-	2020-2022
5.	A high-end training workshop on thermal energy storage in building applications to train research the scholars and faculties in thematic area– energy and buildings under Accelerate Vignan–Karyashala scheme. <b>Role: - Convener</b>	SERB	1,50,000/-	2021
6.	A Five Day Online AICTE Training and Learning (ATAL) Academic FDP Program on Fuel Cell Technology <b>Role: - Convener</b>	AICTE	93,000/-	2021

**15. Member of International Conferences**

- National organizing committee member of the 14<sup>th</sup> Asian Computational Fluid Dynamics Conference (ACFD-2023).

**16. Professional Recognition/Award/Prize/Certificate, Fellowship received by applicant**

Sl. No.	Name of Award/Fellowship	Awarding Agency	Year
1.	Best speaker award in the annual symposium	Department of Mechanical Engineering, IISc Bangalore	2016
2.	Received Central Fellowship to pursue postdoctoral research	JNCASR	2018-2020
3.	Fund under DRDO-CARS (Centre for Acquisition for Research Services) grant during early years of Postdoctoral work	DRDO-CARS	2017–2018

**17. Ph. D. Students guidance at NIT Rourkela**

S.N.	Name of the Student (Roll No.)	Duration	Supervisor /Co-Supervisor	Project Title/research area
1.	Ashis Mishra (220ME3426)	2021-2025	Supervisor	Effects of the electric field in liquid bridge dynamics.
2.	Sameer Kumar Verma (522ME1012)	2022-2026	Supervisor	Biofluid Mechanics And Multiphase Flows
3	Manish Sonkar (522ME8003)	2022-2026	Co-Supervisor	Design of Novel Desalination system

**18. M. Tech. Students guidance at NIT Rourkela**

S.N.	Name of the Student (Roll No.)	Duration	Co-Supervisor	Project Title/research area
1.	Sourav Sudhakaran (220ME3426)	2021-2022	Nil	Effects of insoluble surfactants in liquid bridge breakup and detachment dynamics
2.	Dasari Bramhaiah (220ME5428)	2021-2022	Nil	Heat transfer enhancement in MWCNT based cryo-nanofluids in cooling of superconducting material

3.	B. Raghu Ram (220ME5427)	2021-2022	Nil	Performance analysis of mechanical heat switches at cryogenic temperature
4.	Omkar Sunkarwar (221me3536)	2022-23	Nil	Evacuated U-tube Solar Collector performance analysis
5	Md. Asif (221ME3527)	2022-23	Nil	Multiphase flow optimization of drug delivery for COVID19 management
6.	Shivendra Rathore (221me5544)	2022-23	Nil	Low temperature Magneto resistive heat switches for space applications.
7.	Smrutiranjana Nayak (221me5603)	2022-23	Nil	Cryo-Nanofluids performance evolutions in natural convection

### 19. Projects during my Postdoctoral work

S.N	Title	Sponsor		Value	Year
1	High fidelity simulation of stator blade of an experimental small turbofan engine (STFE)	GTRE-DRDO	Performed DNS and establish optimal mesh for HPT blade, and perform the sensitivity analysis of different RANS model	60,00,000/-	2017-2018

### 20. Publications

S. N.	Author(s)	Title	Name of Journal	Volume	Page	Year
1.	A. Bhattad, K. S. Patel	Performance analysis of diesel engine using Madhuca longifolia blended biodiesel with nano-additive for variable parameters	<i>International Journal of Ambient Energy</i>	01	1-18	2023
2.	B. Raghuram, V. Malik, B. K. Naik, K. S. Patel, V. K. Singh	Design and Performance Assessment of CuAlMn Shape Memory Alloy Based Mechanical Heat Switch	<i>Sadhana</i>	Accepted	Accepted	2023
3	B. Raghuram, V. Malik, B. K. Naik, K. S. Patel	A Critical Review on Heat Switches for Engineering and Space Applications	<i>Heat Transfer Engineering</i>	01	1-14	2022

4	<b>K. S. Patel</b> , N. H. Maruthi, R. Ranjan, S. M. Deshpande, Roddam Narasimha	A critical comparison of DNS versus RANS model results on an HPT blade for a small engine	<i>J. Aerospace Sciences and Technologies</i>	71	219-224	2019
5.	<b>K. S. Patel</b> , R. K. Shukla	Numerical simulation of breakup and detachment of an axially stretching Newtonian liquid bridge with a moving contact line phase field method	<i>Sadhana</i>	42	467 - 477	2017
6.	P. Muthukumar, <b>K. S. Patel</b> , P. Sachan, N. Singhal,	Computational study on metal hydride based three-stage hydrogen compressor	<i>Int. J. Hydrogen energy</i>	37	3797 – 3806	2012
7.	S. Nayak, D. Bramhaiya, A. Bhattad, <b>K. S. Patel</b>	Computational Analysis of Heat Transfer Characteristics of Cryogenic Nanofluids Inside a Cylindrical Tube	<i>Cryogenics</i>		Communicated	2023
8.	S. Sudhakaran, Md Asif, <b>K. S. Patel</b>	Computational analysis of drug solution deposition in liquid-lined cylindrical airways for COVID-19 treatment	<i>International Journal of Multiphase flow</i>		Communicated	2023

### Conference Proceedings

1. K. S. Patel, N. H. Maruthi, S. M. Deshpande, R. Narasimha, “A critical comparison of DNS versus model results on an HPT turbine blade”, 20<sup>th</sup> *AeSI* Annual CFD Symposium, NAL (2018).
2. K. S. Patel, R. Ranjan, Maruthi NH, S. M. Deshpande, R. Narasimha, “Predictions of aero-thermal loadings on an HPT stator blade of a typical small turbofan engine”, 19<sup>th</sup> *AeSI* Annual CFD Symposium, NAL (2017).
3. K. S. Patel, R. K. Shukla, “Simulation of liquid bridge dynamics using phase field method”, Paper number-121, *Fluid Mechanics and Fluid Power* 2015.
4. K. S. Patel, R. K. Shukla, “Numerical investigation of liquid bridge dynamics with a phase field method.” *IUTAM Symposium on Multiphase Flows with phase change: challenges and opportunities*, IIT Hyderabad, India, December 08 - December 11, 2014.
5. N. H. Maruthi, K. S. Patel, S. M. Deshpande, R. Narasimha. “Performance of a Compressible DNS code on latest GPU architectures.”. *GPU Technology Conference*, San Jose, USA, March 2019.

6. B. Raghuram, V. Mallik, B. K. Naik, K. S. Patel,. "A Critical Review on Mechanical Heat Switches for Space Applications", *The International Conference on Futuristic Advancements in Materials, Manufacturing and Thermal Sciences (ICFAMMT 2022)*, Accept, IITRAM Ahmadabad, 20-21 Jan. 2022.
7. B. Raghuram, V. Mallik, B. K. Naik, K. S. Patel,. "Design and Performance Assessment of Shape Memory Alloy Based Mechanical Heat Switch", *NCRAC 2022 – 7th National and 1st International Conference on Refrigeration and Air Conditioning*, Accepted, IIT Guwahati, 24-26 Feb. 2022.
8. V. Malik, B. R. Ram, K. S. Patel, B. K. Naik, H. Balaji, and R., "Comparison of pure and impure single-crystal tungsten magneto-resistive heat switch for space applications", in *International Conference on "Contemporary Innovations in Mechanical Engineering"*, 21st-23rd April 2022, no.paper id:243, pp.266, CIME-2022 2022
9. V. Malik, B. R. Ram, K. S. Patel, and B. K. Naik, "Thermal Performance Assessment of Tungsten Based Magneto-Resistive Heat Switch for Space Application", in *7th National and 1st International Conference on Refrigeration and Air Conditioning*, 24-26th Feb 2022, no.paper id: 012, pp.36, NCRAC 2022.
10. B. R. Ram, V. Malik, B. K. Naik, and K. S. Patel, "Performance Prediction of CuAlMn-Based Shape Memory Alloy Thermal Switch Using Empirical Correlations", in *7th National and 1st International Conference on Refrigeration and Air Conditioning*, 24-26th Feb 2022, no.paper id: 034, pp.51, NCRAC, 2022.
11. D. Bramhaiah, S. Nayak, A. Bhattad, K. S. Patel, "Numerical Investigation of Heat Transfer Characteristics of Cryo-Nanofluids," *International Conference on Advances in Transport Phenomena (ICATP 2022) - A Virtual Meet*, 16-18<sup>th</sup> July 2022, VIT-AP University, Amaravati, Paper ID 3160, TP01.
12. D. Bramhaiah, S. Nayak, A. Mishra, K. S. Patel, and A. Bhattad, "Heat transfer analysis of liquid Nitrogen based nanofluid in a compact heat exchanger", in *28th National Symposium on Cryogenics and Superconductivity*, no.218, NSCS28 2022
13. S. Sudhakaran, Md. Asif, K. S. Patel, "Numerical Investigation of Liquid Plug Deposition in Human Respiratory Airway," *International Conference on Advances in Transport Phenomena (ICATP 2022) - A Virtual Meet*, 16-18<sup>th</sup> July 2022, VIT-AP University, Amaravati, Paper ID 9213, TP06.

## 21. Membership in professional body:

- Holding the position of "**Membership promotion chair and Advocacy chair for ISHRAE Bhubaneswar subchapter**" (MembershipID: **61604**).
- Lifetime Member of "**Space Society of Mechanical Engineers (SSME)**" (Membership ID LM-0394).