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CURRICULUM VITAE

Gaurav Kumar (Ph.D.)
Assistant Professor Grade - II
Mechanical Engineering Department
National Institute of Technology Rourkela

Contact Information

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Educational Qualification

Qualification	Specialization	Year	Institution	CGPA*/%
Ph.D.	Production Engineering	2014-2020	IIT Roorkee	.....
M.Tech.	Production & Industrial Engineering			8.92*, #
B.Tech. (Hons)	Mechanical Engineering	2010-2014	NIT Jamshedpur	9.35*

**- on a scale of 10; #- with distinction*

Professional Experience

Organization	Designation	Time Period
NIT Rourkela	Assistant Professor (Gr-II)	18-10-2023 – Till date
NIT Uttarakhand	Assistant Professor (Gr-II)	14-10-2020 – 16-10-2023

Research Focus and Interests

- Microwave Materials Processing
- Advanced Manufacturing Processes
- Composites

Research/Projects/Internship

Publications

1. Summary of Publications

Sl. No.	Journal/Conference/ Book Chapters	Total
1.	Peer Reviewed Journals	08
2.	Conferences	15

3.	Book Chapters	08

2. Journals

Sl. No.	Total: 08
	2024
8.	Maurya, H., **Kumar, G.**, Prasad, L., Gupta, P. (2024). Development and Characterization of Microwave-Processed LLDPE based Sisal/Jute Hybrid Laminates, **Polymer Composites, Wiley (Accepted) (Impact Factor = 5.2).**
7.	**Kumar, G.**, Gupta, P., Naik, T.P., Sharma, A. K. & Singh, I. (2024). Drilling of natural fiber reinforced thermoplastic composite laminates using microwave energy at 2.45 GHz, **Materials Today Communications, Elsevier 108419 (Impact Factor = 3.8).**
	2023
6.	Sharma, M. P., Gupta, P. K., & **Kumar, G.** (2023). Modeling and Simulation of Electrochemical Discharge Machining for Fabrication of Micro-Channel on Glass. **Arabian Journal for Science and Engineering**, **Springer** 48(3), 2701-2713 (**Impact Factor = 2.9**).
	2022
5.	Rampal, **Kumar, G.**, Rangappa, S. M., Siengchin, S., & Zafar, S. (2022). A review of recent advancements in drilling of fiber-reinforced polymer composites. **Composites Part C: Open Access, Elsevier** 100312 (**Impact Factor = 4.2**).
	2021
4.	**Kumar, G.**, Mishra R.R. & Sharma, A. K. (2020). On Finite Element Analysis of Material Removal Rate in Microwave Drilling of Borosilicate Glass. **Materials Today: Proceedings, Elsevier** (Scopus Indexed).
	2020
3.	**Kumar, G.**, Mishra R.R. & Sharma, A. K. (2020). On defect minimization during microwave drilling of borosilicate glass at 2.45 GHz using flowing dielectric and optimized input power. **Journal of Thermal Science and Engineering Applications, ASME**, 13(3): 031021 (**Impact Factor = 2.1**).
2.	**Kumar, G.**, & Sharma, A. K. (2020). On processing strategy to minimize defects while drilling borosilicate glass with microwave energy. **International Journal of Advanced manufacturing technology, Springer**, 108(11), 3517-3536 (**Impact factor = 3.4**)
	2018
1.	**Kumar, G.**, & Sharma, A. K. (2018). Role of dielectric fluid and concentrator material in microwave drilling of borosilicate glass. **Journal of Manufacturing Processes**, Elsevier, 33, 184-193 (**Impact factor = 6.2**).

3. Conferences

S.No.	Total: 15
	2022

15.	Kumar, G., Kumar, M., Kukshal, V., Kumar, M. (2023) Finite Element Analysis of Melting of Bulk Metals Using Microwave Energy at 2.45 GHz. In: Tewari, A., Dhawan, N., Agarwal, G., Das, S., Mishra, S., Karmakar, A. (eds) **Proceedings of the 3rd International Conference on Advances in Materials Processing: Challenges and Opportunities. AMPCO 2022,** 17 - 19 October 2022. Springer Proceedings in Physics, vol 293. Springer, Singapore.
14.	Kumar, G., Sharma, M. P., Gupta, P. K., (2022) Process Parameters and their Effect During Electro-Chemical Discharge Machining: A Review. **Proceedings of 5th International Conference on Emerging Trends in Mechanical & Industrial Engineering (ICETMIE-2022),** Department of Mechanical Engineering, The NorthCap University, Gurugram, 4 -5 March 2022.
13.	Sharma, M. P., Gupta, P. K., Kumar, G., A comprehensive review on modeling and simulation studies in electro-chemical discharge machining. **The Congress on Research in Engineering, Science & Management**, Padre Conceicao College of Engineering, Verna, Goa, India, March 10-12, 2022.
2021	
12.	Kumar, G., Sharma, A.K., Kumar, M. Microwave Drilling of Polymer Based Composite: Challenges and Opportunities. **Proceedings of 1st International Conference on Advanced Manufacturing and Materials Processing (CAMMP-2021)" Department of Mechanical Engineering,** Malaviya National Institute of Technology Jaipur,24th - 25th July 2021
11.	Sharma, M. P., Gupta, P. K., Kumar, G., A review on theories and discharge mechanisms in electrochemical discharge machining. **Proceedings of 1st International Conference on Advanced Manufacturing and Materials Processing (CAMMP-2021)" Department of Mechanical Engineering,** Malaviya National Institute of Technology Jaipur,24th - 25th July 2021
2020	
10.	Singh, A., Kumar, G., and Sharma, A.K. Recent Developments In Microwave-metal Discharge Based Machining Process and Associated Challenges, **Rustum Roy Symposium, MS&T20, USA**.
9.	Kumar, G., Sreehari, D., Mishra, R.R. and Sharma, A.K. Joining of mild steel plates using microwave energy at 2.45 GHz. **Proceedings of 1st International Conference on Innovative Engineering Design - 2020 (ICOIED-2020)**, NIT Uttarakhand, IIT Roorkee and Institution of Engineers, Uttarakhand, 18-20 January 2020. (Best Paper Award).
8.	Mishra, R.R., Alam, P., Yadav, J., Kumar, G., and Sharma, A.K., (2020). Characterization of SiC reinforced AZ91 Magnesium Alloy Composites produced using In-situ Microwave Casting. **Proceedings of 1st International Conference on Innovative Engineering Design - 2020 (ICOIED-2020)**, NIT Uttarakhand, IIT Roorkee and Institution of Engineers, Uttarakhand, 18-20 January 2020.
7.	Chaudhary S.K., Sharma, H. and Kumar, G., (2020). Moisture and flammability behaviour of natural fillers-based hybrid epoxy composites. **Proceedings of 1st International Conference on Innovative Engineering Design - 2020 (ICOIED-2020)**, NIT Uttarakhand, IIT Roorkee and Institution of Engineers, Uttarakhand, 18-20 January 2020
2019	
6.	Kumar, G., & Sharma, A. K. (2019). Analysis on Thermal Characteristics of Micro-Drilled Glass Using Microwave Energy at 2.45 GHz**. 2nd International Conference on Computational Methods in Manufacturing (ICCMM -2019)**, IIT Guwahati.

5.	Kumar, M., Kumar, G., & Kukshal, V. (2019). On Finite Element Analysis of Melting of Metallic Powders Using Microwave Energy at 2.45 GHz. **2nd International Conference on Computational Methods in Manufacturing (ICCMM -2019)**, IIT Guwahati.
4.	Kumar, G., Mishra, R.R. and Sharma, A.K. On Material Removal Rate in Microwave Drilling of Borosilicate Glass. **Proceedings of 7th International Conference on Advancements and Futuristic Trends in Mechanical and Materials Engineering (AFTMME - 2019), IIT Ropar**, 05-07 December 2019.
3.	**Kumar, M**., Kumar, G., and Kukshal, V., Analysis of Microwave Casting of Bulk Metals., **Proceedings of 2nd International Conference on New Frontiers in Engineering Science and Technology (NFEST - 2019)**, NIT Kurukshetra, 18-22 February 2019, pp: 61.
2017	
2.	Yadav, V., Sreehari, D., **Kumar, G.,** Preliminary Simulation Studies on Microwave Joining of P91 Steel, **Proceedings of International Conference on Nanotechnology: Ideas, Innovation & Initiatives - 2017**", IIT Roorkee, 06 - 08 December 2017, pp: 754.
1.	Kumar, G., and Sharma, A.K. Defect Minimization in Microwave Drilling of Glass Using Dielectrics. **Proceedings of 10th International Conference on Precision, Meso, Micro and Nano Engineering (COPEN 10)**, IIT Madras, 07 - 09 December 2017, pp: 280-283.

4. Book Chapters

Sl. No.	**Total: 08**
2022	
8.	Singh, A., Kumar, G., Gupta, P., & Sharma, A. K. (2022). Microwave Drilling: Methods, Applications and Challenges. Advances in Microwave Processing for Engineering Materials, 19-34. **(ISBN: 9781003248743)**
7.	Kumar, G., Mishra, R.R., Verma, A. (2022). Introduction to Molecular Dynamics Simulations. In: Verma, A., Mavinkere Rangappa, S., Ogata, S., Siengchin, S. (eds) Forcefields for Atomistic-Scale Simulations: Materials and Applications. Lecture Notes in Applied and Computational Mechanics, vol 99. Springer, Singapore. **(ISBN: 9789811930928)**
2021	
6.	Gupta, P. K., Sharma, R., & Kumar, G. (2021). Impact of Water Particles on Fly Ash–Filled E-Glass Fiber–Reinforced Epoxy Composites. In Advanced Materials and Manufacturing Processes (pp. 257-267). CRC Press. **(ISBN: 9781003093213)**
5.	Chaudhary, S. K., Sharma, H., & Kumar, G. (2021). Moisture and Flammability Behaviour of flax Fibre and Natural Fillers-Based Hybrid Epoxy Composites. In Advances in Engineering Design (pp. 385-392). Springer, Singapore. **(ISBN: 978-981-33-4018-3)**
4.	Kumar, G., Sreehari, D., Mishra, R. R., Yadav, V., & Sharma, A. K. (2021). Investigation on Microwave Joining of Mild Steel Plates at 2.45 GHz and Joint Characterization. In Advances in Engineering Design (pp. 127-136). Springer, Singapore. **(ISBN: 978-981-33-4018-3)**

3.	Mishra, R. R., Alam, P., Yadav, J., Kumar, G., & Sharma, A. K. (2021). Characterization of SiC-Reinforced AZ91 Magnesium Alloy Composites Produced Using In situ Microwave Casting. In Advances in Engineering Design (pp. 23-30). Springer, Singapore. **(ISBN: 978-981-33-4018-3)**
2019	
2.	Kumar, G., & Sharma, A. K. (2019). Analysis on Thermal Characteristics of Micro-Drilled Glass Using Microwave Energy at 2.45 GHz. In Advances in Computational Methods in Manufacturing (pp. 557-568). Springer, Singapore. **(ISBN: 978-981-32-9072-3)**
1.	Kumar, M., Kumar, G., & Kukshal, V. (2019). On Finite Element Analysis of Melting of Metallic Powders Using Microwave Energy at 2.45 GHz. In Advances in Computational Methods in Manufacturing (pp. 703-717). Springer, Singapore. **(ISBN: 978-981-32-9072-3)**

5. Research Students (Total: 01 (ongoing))

Sl. No.	Research Area	Name of Ph.D. Research Scholar	Co-advisor (if any)	Duration	Status
1.	Fabrication and characterization of Microwave Cured Sisal/cocopeat reinforced PLA Hybrid Composite	Hariom Maurya	Dr. Lalta Prasad NIT Uttarakhand	July 2021 -	On-going

6. M. Tech. Students (Total: 05)

Sl. No.	Dissertation Topic	Name of Student	Co-advisor (If any)	Session	Status
1.	Experimental Investigations on Microwave Joining of Metals	Viveksheel Yadav	Dr. Dungali Sreehari NIT Uttarakhand	2017-18	Awarded
2.	Experimental investigation on Effect of Natural Fillers (Orange Peel) on Epoxy Composites	Sanjul Pratap Singh	Dr. Hitesh Sharma NIT Uttarakhand	2017-18	Awarded
3.	Experimental and Numerical Analysis of Material Removal Mechanism by Ultrasonic Machining	Guru Prasad	Dr. Dungali Sreehari NIT Uttarakhand	2018-19	Awarded
4.	Fabrication of Copper Alloy Using Microwave Casting	Mohit Kumar	Dr. Vikas Kukshal NIT Uttarakhand	2018-19	Awarded
5.	Development and Characterization of Flax	Sudhir Kumar Chaudhary	Dr. Hitesh Sharma	2019-20	Awarded

	Fiber and Natural Fillers-Based Hybrid Polymer Composite		NIT Uttarakhand		

7. B.Tech. Students/Internship

Sl. No.	Name of Student(s)	Project Title	Session
1.	Rajkumar & Rahul Kumar	Automatic Metallic Segregation System	July-Dec 2020
2.	Adityram & Kishan Kumar	Self-Balancing Two-Wheeler Vehicle Using Gyroscope	July-Dec 2021
3.	Adityram, Kishan Kumar, Sintaj, Prashant Gaurav	Design and Fabrication of Pedal Powered Washing Machine	Jan-July 2022

Outline of Self Ph.D. Work

Gaurav Kumar did his Ph.D. research work on "Microwave Drilling of Borosilicate Glass" at the Indian Institute of Technology Roorkee. The study included the development of an experimental setup for microwave drilling, laying the groundwork for subsequent examinations. Microwave drilling is an electromagnetic energy-based machining process in which microwaves at an frequency of 2.45 GHz is concentrated into a narrow region using a thin metallic concentrator. The process induces plasma formation, leading to ablation and melting of the target material. Through simulation and experiments, the impact of key process parameters was explored, revealing an optimal configuration of process parameters that minimizes critical defects like heat-affected zone (HAZ), overcut, and thermal stresses. Nuanced relationships between input power and HAZ were uncovered, with decreased power intensifying HAZ in static conditions, while dynamic setups exhibited reduced HAZ due to enhanced heat dissipation. Insights into energy distribution during drilling highlighted the allocation of approximately 30% of input power for material removal, with the remaining 70% absorbed by dielectric and concentrator materials. Exploration of dielectric properties, concentrator materials, shape, and immersion depth emphasized their role in shaping plasma characteristics. The study provides a comprehensive understanding of optimizing microwave drilling for borosilicate glass, emphasizing the delicate balance required between input power and mitigating thermal cracking tendencies.

Papers published in journals: 04.
Paper published in conferences: 04.

Publication Metrics

Sl. No.	Metrics	Value

1.	Citations on Google Scholar	104
2.	h-index on Google Scholar	05
3.	I-index on Google Scholar	04
4.	ResearchGate Score	103.5

Teaching Assignments

Sl. No.	Course Name	UG/PG	Role	Institute
1.	Machining & Machine Tool	UG	Coordinator	NIT Uttarakhand
2.	Casting, Welding & Forming	UG	Coordinator	
3.	Operation Research	UG	Coordinator	
4.	Metrology & SQC	UG	Coordinator	
5.	Mechanical Workshop	UG	Coordinator	
6.	Mechanical Behavior of Material	UG	Coordinator	
7.	Non-Traditional Manufacturing Processes	UG	Coordinator	
8.	Operations Management	UG	Coordinator	
9.	Material Resource Planning	UG	Coordinator	
10.	Mechanical Measurement	UG	Coordinator	

Short Term Courses/Workshops/Conferences Organized

Sl. No.	Title	Sponsorship	Participants number	Dates	Role
1.	Recent advancement in micromanufacturing	NIT Uttarakhand	70	23-11-2020 to 27-11-2020	Coordinator
2.	Microwave Material Processing: Opportunities & Challenges	NIT Uttarakhand	90	14-12-2020 to 18-12-2020	Coordinator
3.	Awareness to Innovation, Startup and Entrepreneurship	TEQIP, NIT Uttarakhand	40	29-01-2021 to 02-02-2021	Coordinator
4.	Pandemic and Socio-Economic Determinants: The Uses, Mathematics and Computations behind the Modeling to inform Decision Makers	TEQIP, NIT Uttarakhand	105	08-02-2020 to 12-02-2021	Coordinator
5.	Sustainable Composites: Processing, Characterization & Applications	NIT Uttarakhand	50	22-02-2021 to 26-02-2021	Coordinator
6.	Micromachining Technologies for Industrial Applications	NIT Uttarakhand	65	09-05-2022 to 13-05-2022	Coordinator

Institute Administrative Services

Sl. No.	Position	Time Period
1.	I/c. Assistant Registrar, Planning & Development, NIT Uttarakhand	04-11-2022 to 16-10-2023
2.	I/c. Assistant Registrar, Academics, NIT Uttarakhand	01-02-2021 to 03-11-2022
3.	Coordinator, DPC, Registrar Office, NIT Uttarakhand	01-02-2021 to 03-11-2022
4.	Member, AISHE, NIT Uttarakhand	01-02-2021 to 03-11-2022
5.	Member, Innovation & Incubation, NIT Uttarakhand	18-12-2020 to 31-01-2021

Awards/Recognitions

- Best Paper Award in International Conference on Innovative Engineering Design - 2020 (ICOIED-2020).
- Chaired a technical session in the International Conference on "Advances in Materials Processing & Manufacturing Applications" (iCADMA 2020).

Outreach Activities

Reviewer Assignments

1. Journal of manufacturing Processes
2. Indian Journal of Engineering and Materials Sciences

Sessions Chaired in Conference

Sl. No.	Conference	Dates	Institution
1.	International Conference on "Advances in Materials Processing & Manufacturing Applications" (iCADMA 2020).	5th November 2020	MNIT Jaipur

Membership of Professional Bodies

Sl. No.	Position	Professional Body	Membership Number
1.	Associate Member	Institution of Engineers (India)	AM3002665

Personal Details

Wife name: Mrs. Rashmi
Father's name: Mr. Ravindra Kumar Singh
Mother's name: Mrs. Manju Devi
Date of birth: 14th November 1992

Referees

Prof. Apurbba Kumar Sharma [Ph.D. Supervisor]

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