



PROFILE:

I am a highly motivated researcher in Mechanical Engineering and am actively interested in research and professorship. With expertise in mechanical design subjects, my doctoral research focused on ***Tribology, polymer science, machine design, mechanics of solids, and mechatronics***. Skilled in experimental design, data analysis, programming, and simulation work.

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Personal details

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Area of expertise

- ❖ *Machine Design and Failure Analysis*
- ❖ *Tribology, Lubricant and Lubrication*
- ❖ *Automation, Mechatronics and IoT*
- ❖ *Surface Properties characterization.*

Work Experience

- ✓ Work as an Assistant Professor in Parul University, Vadodara. (*May-2024 to Oct-2024*)
- ✓ Work as an Assistant Professor in Maulana Azad National Institute of Technology, Bhopal, (*Nov-2024 to Present*)

Educational Qualifications

DEGREE	NAME OF INSTITUTE	SPECIALIZATION	YEAR OF PASSING	CGPA/%
PhD	IIT KHARAGPUR, INDIA	Machine Design	2023	8.76
M-Tech	NIT WARANGAL, INDIA	Machine Design	2016	7.55
B-Tech	BPUT Odisha, INDIA	Mechanical Engineering	2013	7.50
12 th	CHSE ODISHA	Science	2009	73
10 th	BSE ODISHA	---	2007	83

Research output

❖ Research Work Developments:

- Developed several empirical models to calculate the surface mechanical (***Creep and Fatigue***) and tribological (***Friction and Wear***) properties of polymers using the ***Non-destructive method (such as Micro-indentation and Micro-scratch)***. (**Doctoral Thesis work**)
- Developed a ***polymer-based composite (PBC-1)*** by mixing PTFE, PEEK, and MoS₂ with the help of compression molding. (***Characterised by: Pin-on-Disc, micro-indentation and micro-scratch***)
- Developed a ***polymer-based coating (PBCo-1)*** of polymers like PTFE, PEEK, PVC, etc., on metal discs to reduce the friction between two sliding surfaces. (***Characterised by: Pin-on-Disc, micro-indentation and micro-scratch***)
- Developed a ***Vegetable oil-based lubricant (Lu-2)***, considering vegetable oil as the base oil and PTFE and MoS₂ as additives.
- Developed a ***Silicon oil-based lubricant (Lu-1)***, considering CaCO₃ Nanoparticles as an additive to the Silicon base oil. (***Characterised by: Four-ball Tester, Pin-on-Disc, Rheometer***)

❖ Developed Setups:

- ***Spiral Pin-on-Disc:*** Both lateral and rotational motion of the pin on the disc surface. (***Fully Automation: IoT based***)
- ***Bearing System:*** To predict the seal life in different types of bearing and to examine the bearing failure. (***Fully Automation: IoT based***)

❖ Publication:

International Conferences:

- Guru, S. R., Kumar, P., & Sarangi, M. (2022). **Tribological Behaviour of Polymer-Based Composite Reinforced with Molybdenum Disulphide.** In *Machines, Mechanism and Robotics* (pp. 503-511). Springer, Singapore.
- Guru, S. R., Panda, S., & Sarangi, M. (2018, September). **Effects of multicycle micro-indentation on mechanical properties of polymeric materials.** In *Proceedings of Asia International Conference on Tribology 2018* (Vol. 2018, pp. 182-183). Malaysian Tribology Society.
- Ismail, S, Guru, S.R (2016). **Tribological performance of silicon oil based CaCO₃ Nano fluid.** In *Proceedings of the International Conference on Nanotechnology for Better Living* (Vol. 3, pp. 272). DOI:10.3850/978-981-09-7519-7nbl16-rps-272.

International Journals:

- Guru, S.R., Sarangi, M. **Multicycle indentation based fatigue and creep study of polymers.** *J Polym Res* 30, 401 (2023). doi.org/10.1007/s10965-023-03774-8
- Guru, S. R., & Sarangi, M. (2024). **Advancement of constant and progressive load multi-cycle indentation method on surface properties characterization of polymers.** *Polymers for Advanced Technologies*, 35(9), e6573. doi.org/10.1002/pat.6573
- Guru, S. R., & Sarangi, M. (2024). **Development of empirical models for estimation polymer indentation fatigue and validation with finite element simulation models.** *Journal of Materials Research*, 1-13. doi.org/10.1557/s43578-024-01399-1
- Guru, S. R., & Sarangi, M. (2024). **A phenomenological model for predicting local creep and thermal drift of polymers from micro-indentation test data.** *Journal of Polymer Research*, 31(9), 1-12. doi.org/10.1007/s10965-024-04100-6
- Guru, S. R., & Sarangi, M. (2023). **Advancements in Polymer Friction and Wear: A Scratch-Modeling Approach.** *Tribology Transactions*, 1-14. doi.org/10.1080/10402004.2023.2281365
- Guru SR, Panda S, Kumar P, Sarangi M. **A study on tribological performances of PEEK and PTFE based composites with MoS₂ reinforcements.** *Polym Compos.* 2024; 1-17. [doi:10.1002/pc.28268](https://doi.org/10.1002/pc.28268)
- Guru, S.R., Venugopal, C. and Sarangi, M. (2023), "Effect of polymer additives on the tribological performance of soybean oil", *Industrial Lubrication and Tribology*, Vol. 75 No. 5, pp. 607-618. doi.org/10.1108/ILT-11-2022-0321
- Guru, S. R., & Sarangi, M. (2024). **Evaluation of Hardness and Elastic Modulus of Polymer Materials Through Micro-Scratch Method: An Empirical Study.** *Polymer-Plastics Technology and Materials*, 1-18. doi.org/10.1080/25740881.2024.2420788

Awards and honors

- ✓ **GATE EXAM** Qualified (Year 2014)
- ✓ Awarded with the Ministry of Human Resource Development (MHRD) scholarship of the Govt. of India for PhD research (2016-2022).
- ✓ Awarded with the Ministry of Human Resource Development (MHRD) scholarship of the Govt. of India for Post-graduation (2014-2016).

Reviewer of Referred Journals:

- ✓ Journal of Polymers (Springer, SCI)