

Dr. Ankit Saxena

Assistant Professor
Department of Mechanical Engineering
IIT (ISM) Dhanbad, India

Email ID ankitsaxena@iitism.ac.in

LinkedIn <https://www.linkedin.com/in/ankitsaxena-83b091a7>



EXPERIENCE

- Assistant Professor (G2) at IIT ISM Dhanbad, Dhanbad, India

May 2026 – Current

- Department of Mechanical Engineering

- Postdoctoral Research Associate at RWTH Aachen University, Aachen, Germany (QS 105)

Mar 2024 – Mar 2025

- Institute for Machine Elements and Systems Engineering (MSE)
- **Research Area:** Lubricating films, Additive-free lubrication, ML modelling
- **Supervisor:** Dr.-Ing. Florian König

- Early-postdoc Research Associate at IIT Delhi, New Delhi, India (QS 123)

Jul 2023 – Oct 2023

- Centre for Automotive Research and Tribology (CART)
- **Research Area:** Electrical properties of lubricants
- **Supervisors:** Prof. Deepak Kumar and Prof. (em) Naresh Tandon

- Graduate Engineer Trainee at Reliance Industries Limited, Surat, India

Jul 2017 – Dec 2017

- Hazira Petrochemical Plant

EDUCATION

- **Ph.D.** from IIT Delhi, New Delhi, India

Jan 2018 – Jul 2023

- Centre for Automotive Research and Tribology (CART)
- **Thesis:** Development and Tribo-dynamic Performance of Environment-Friendly Lubricating Greases
- **Supervisors:** Prof. Deepak Kumar and Prof. (em) Naresh Tandon

- **B. Tech** from IIT BHU, Varanasi, India

May 2013 – May 2017

- Department of Mechanical Engineering
- Cumulative grade - 9.11/10

RESEARCH INTERESTS

- Lubrication in VFD-driven systems under electrical stress
- Advanced tribological testing infrastructure development
- Sustainable and reliable lubricant development
- Lubrication challenges in mining and heavy machinery
- Data-driven lubricant design using advanced ML and computational methods

PUBLICATIONS & PATENTS

IP 1	Kumar, D., Tandon, N., & Saxena, A. Development Of High-Performance Eco-Friendly Greases Using Natural Resources - IN Patent (India), Patent no. 582549	2026	Granted
JP 7	Saxena, A. , Jacobs, G., König, F., & Reimers, M. Influences Of Contact Parameters On The Wear-Protective Boundary Layer Formation In Rolling-Sliding Contacts. <i>Wear</i> , 206259. IF = 6.1, Q1 https://doi.org/10.1016/j.wear.2025.206259	2025	
JP 6	Saxena, A. , Kumar, D., & Tandon, N. Dynamic performance of newly developed environmentally friendly greases containing polysaccharide gums in rolling bearing. Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Engineering Science , 238(9), 4124-4138. IF = 1.9, Q2 https://doi.org/10.1177/09544062231207058	2023	
JP 5	Saxena, A. , Kumar, D., & Tandon, N. Tribo-Dynamic Performance of Newly Developed Environmentally Friendly Lubricating Greases Containing Nano-CaCO ₃ . <i>Journal of Tribology</i> , 145(12). IF = 3.0, Q2 https://doi.org/10.1115/1.4063138	2023	
JP 4	Saxena, A. , Kumar, D., & Tandon, N. Development of lubricious environmentally friendly greases using synergistic natural resources: A potential alternative to mineral oil-based greases. <i>Journal of Cleaner Production</i> , 380, 135047. IF = 10.0, Q1 https://doi.org/10.1016/j.jclepro.2022.135047	2022	
JP 3	Saxena, A. , Kumar, D., & Tandon, N. Unexplored potential of acacia and guar gum to develop bio-based greases with impressive tribological performance: A possible alternative to mineral oil-based greases. <i>Renewable Energy</i> , 200, 505-515. IF = 9.1, Q1 https://doi.org/10.1016/j.renene.2022.09.127	2022	
JP 2	Saxena, A. , Kumar, D., Tandon, N., Kaur, T., & Singh, N. Development of Vegetable Oil-Based Greases for Extreme Pressure Applications: An Integration of Non-toxic, Eco-Friendly Ingredients for Enhanced Performance. <i>Tribology Letters</i> , 70(4), 1-16. IF = 3.3, Q2 https://doi.org/10.1007/s11249-022-01651-x	2022	
JP 1	Saxena, A. , Kumar, D., & Tandon, N. Development of eco-friendly nano-greases based on vegetable oil: An exploration of the character via structure. <i>Industrial Crops and Products</i> , 172, 114033. IF = 6.2, Q1 https://doi.org/10.1016/j.indcrop.2021.114033	2021	
CP 3	‘A sustainable, potential, and economical alternative to mineral oil-based greases.’ 11th International Conference on Industrial Tribology (India Trib - 2022), IIT Delhi, India.	2022	

CP 2	‘Augmenting the performance of eco-friendly greases using synergistic natural resources.’ 9th IUPAC International Conference on Green Chemistry, Athens, Greece. 2022
CP 1	‘Augmenting the performance of eco-friendly greases using synergistic natural resources.’ 8th Go Green Summit (Asia for Earth 2022), Bali, Indonesia. 2022

PRESENTATIONS

1. ‘A sustainable, potential, and economical alternative to mineral oil-based greases.’ **Industry Day (Dec 2022), IIT Delhi, India.**
2. ‘A sustainable, potential, and economical alternative to mineral oil-based greases.’ **11th International Conference on Industrial Tribology (India Trib - 2022), IIT Delhi, India.**
3. ‘Augmenting the performance of eco-friendly greases using synergistic natural resources.’ **9th IUPAC International Conference on Green Chemistry, Athens, Greece.**
4. ‘Augmenting the performance of eco-friendly greases using synergistic natural resources.’ **8th Go Green Summit (Asia for Earth 2022), Bali, Indonesia.**
5. ‘Development of eco-friendly lubricating grease.’ **10th International Conference on Industrial Tribology (India Trib - 2019), Indian Institute of Science (IISc) Bangalore, India.**

EQUIPMENTS

- Twin disc tribometer
- Four-ball tester (FBT) tribometer
- Elastohydrodynamic (EHD) tribometer
- Pin on Disc (PoD) tribometer
- High Frequency Reciprocating Rig (HFRR)
- Rheometer
- Contact angle goniometer
- RAMAN spectroscope
- Scanning Electron Microscope (SEM)
- Thermo-gravimetric analyser (TGA)
- DLS particle size analyser
- Surface profilometer
- Shock Pulse Monitoring (SPM) meter
- Data Acquisition System (DAQ)

SOFTWARES

- Machine Learning: GNNs, RNNs, MLPs, XAI, PyTorch, TensorFlow, PyG, DGL, Python
- Laboratory Automation: LabVIEW
- CAD & Design: SolidWorks
- Data Analysis & Visualization: Origin, ImageJ
- Research Communication: LaTeX, Mendeley
- Digital Teaching & Outreach: OBS Studio, DaVinci Resolve

POSITIONS OF RESPONSIBILITY

- [Department Postgraduate Committee \(DPGC\) member](#) at Department of Mechanical Engineering, IIT (ISM) Dhanbad (Jun. 2026 - present)
- [Organizing committee member](#) – Symposium on National Frontiers of Engineering (NATFOE) and innovation in manufacturing practices (IMP) (to be held in Aug. 2026)
- [Coordinator](#) - Yuva Sangam Phase 6 (a program by government of India) – Coordinated the delegation of Jharkhand students from IIT (ISM) Dhanbad to IIT Indore (Jun 2026)

STUDENT SUPERVISION

1. Ömer Faruk Altay - Bachelor's research assistant (HiWi) at MSE, RWTH Aachen University
2. Kh Safkat Amin - Master's research assistant (HiWi) at MSE, RWTH Aachen University

PROFESSIONAL DEVELOPMENT ACTIVITIES

- Participated in 'DFG Proposal Writing Workshop' organized by RWTH Aachen University (Sep. 2024)
- Completed course on 'Machine Learning with Graphs' offered by Stanford University (May 2025)
- Certification in 'Peer Reviewer Course' by Elsevier Researcher Academy (Feb 2023)
- Participated in '11th Summer School in Tribology' organized by Tribology Society of India (May 2019)

ACHIEVEMENTS & RECOGNITION

- Lifetime membership of Tribology Society of India (Jul. 2022)
- 3rd prize in paper presentation at 8th Go Green Summit (Asia for Earth 2022), Bali, Indonesia titled 'Augmenting the performance of eco-friendly greases using synergistic natural resources' (Jun. 2022)
- Research Scholar Travel Award (RSTA) by IIT Delhi (Jul. 2022)
- Rank 2888 in JEE Advanced (National level engineering entrance examination) among ~ 13 lakh candidates
- Rank 27 in UPSEE (State-level engineering entrance examination) among ~ 1.5 lakh candidates

POSTDOC RESEARCH

Additive-free wear protection in rolling bearings



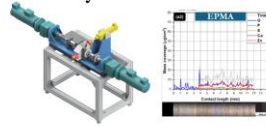
Minimizing harmful lubricant additives
Enhancing sustainability

Grinding-induced tribofilms as wear protectors



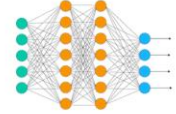
Catalyzes further tribofilm growth
during running-in

Experimental & Surface Analysis Framework



Tribotesting – Grinding vs No grinding
Tribofilm evolution & wear measurements

Predictive model for wear protection



Predicts wear from grinding
and tribological parameters

- The research focused on achieving wear protection in rolling bearings by preconditioning the workpiece surfaces during grinding and hence aimed at additive-free lubrication in highly loaded contacts. DFG (German Research Foundation) funded the project.
- An in-depth exploration of the influence on operating conditions on the film formation by extreme pressure/antiwear (EP/AW) lubricant additives was central to the project. Design extensions and maintenance measures were also carried out on twin-disc tribometer test bench to facilitate the experimental work.

Ph.D. RESEARCH

Eco-friendly greases



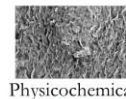
Sustainable
but
Underperforming

Performance enhancement with additives

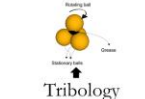


Biopolymers Nanoparticles
Tailored formulations

Multiscale experimental evaluation

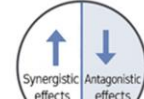


Physicochemical
Surface analysis



Tribology
Bearing test bench

Understanding mechanisms



Property-specific
additive behaviour

- Developed sustainable lubricating greases based on soybean oil and organoclay; explored strategies to overcome limitations (poor wear resistance) through additives like biopolymers (gum acacia, guar gum) and nanoparticles (nano-CaCO₃).
- Greases were screened for - physicochemical, tribological, and bearing performance. Underlying mechanisms were in-depth explored using FESEM, TEM, EDS, FTIR, TGA, XRD, Contact angle measurements, Rheometer, Profilometer, etc. Most significant contribution was the discovery of synergistic effects between guar gum and organoclay.

REFERENCES

1. Prof. Deepak Kumar (PhD Supervisor)

Dean (Diversity & Inclusion) and Professor,
Centre for Automotive Research and Tribology (CART),
IIT Delhi (New Delhi)

Email: dkumar@iitd.ac.in

2. Prof. Naresh Tandon (PhD Co-Supervisor)

Former Emeritus Professor,
Centre for Automotive Research and Tribology (CART),
IIT Delhi (New Delhi)

Email: ntandon@itmmec.iitd.ac.in

3. Dr.-Ing. Florian König (Postdoc Supervisor)

Co-founder (Senlytics) and Tenure Track Assistant Professor,
Faculty of Engineering and Architecture,
Department of Electromechanical, Systems and Metal Engineering
Ghent University

Email: florian.koenig@imse.rwth-aachen.de

HOBBIES

- Fitness, Athletics, Travelling, Music, Cooking, Community Service

PERSONAL INFORMATION

Current Address: Cabin 6, Mechanical Workshop,
Department of Mechanical Engineering, IIT (ISM)
Dhanbad, Dhanbad, Jharkhand, India-826004

Nationality: Indian

Languages: English & Hindi

Date of Birth: 28-Nov-1994

DECLARATION

I hereby declare that all the above information is accurate to the best of my knowledge.

June, 2026

Dhanbad, India


(Ankit Saxena)

