Dr. Gaurav Arora (Research Scientist – Specialist 2)
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Objective:

My academic goal is to continuously learn and apply advanced techniques to become an expert in engineering research.

Projects:

- June 2011- December 2011: **"Modelling and Simulation of Spiral Flow Assisted Abrasive Flow Machining" at IIT Roorkee.** The work focuses on a FEM analysis of media used in Spiral Flow Assisted Abrasive Flow Machining. The analysis was performed by using software SOLID WORKS (COSMO FLO - WORKS).

- January 2012 – June 2012: **"Investigations on Ultra-Sonic Assisted Abrasive Flow Machining" at IIT Roorkee.** This work includes experimental investigations on Surface Finish and Material Removal Rate in Ultra Sonic Assisted Abrasive Flow Machining of EN – 8 material using a newly designed and fabricated fixture with the aid of a new polymer media developed at IIT Roorkee.

- February 2017 – September 2021: "**Thermo-mechanical Properties of Polymer CNT Composites: Experimental and Multi-scale Modelling Approach**" **at IIT Mandi.** This work is mainly divided into two phases, i.e., the experimental analyses and the computational modelling of polymer CNT composites. First, the composites were fabricated and then analyzed destructively and non-destructively to observe the thermo-mechanical behavior. Second, in the computational modelling, the effective elastic properties were first determined at meso-scale using homogenization and finite element techniques. Then, these properties were used at a macro-scale to observe the composites' fracture behavior under the thermo-mechanical environment.

Training & Internship:

- January 2010- June 2010: **"Designing of Head-up display for Light Combat Aircraft" at Central Scientific Instruments Organization, Chandigarh.** Scientist Hary Garg gave Autodesk Inventor and Solid Works Software Training in the DU-3 department of CSIO, Chandigarh. Solidworks was used for modelling, analysis like CFD and also parts were easily assembled to see their relative movements.

- Jun 2008 - July 2008: **"AutoCad and Pro - E Software" at Chandigarh Engineering College, Landran, Mohali.** Introductory training course for Autocad and Pro - E in Department of Mechanical Engineering of CEC, Landran to understand design software and application.

Educational Qualifications:

S. No.	Course	Specialization	Percentage	Institution	Year of Passing
1	Xth	Science Stream	69.40	C. B. S. E.	2003
2	XIIth	Science Stream	71.40	C. B. S. E.	2005
3	B. Tech.	Mech. Engineering	79.94	CEC, Landran	2010
4	M. Tech.	Mech. Engineering	84.50	IIT, Roorkee	2012
5	Ph.D.	Mech. Engineering	87.50 (Course Work)	IIT, Mandi	2021

----------Publications----------

Journals (SCI/SCIE/ESCI/Scopus)

1. **G. Arora**, H. Pathak, Modeling of transversely isotropic properties of CNT polymer composites using meso-scale FEM approach, Compos. Part B Eng. 166 (2019) 588-597. https://doi.org/10.1016/j.compositesb.2019.02.061 **(Impact factor 12.7) -Q1.**

2. **G. Arora**, H. Pathak, S. Zafar, Fabrication and characterization of microwave cured high-density polyethylene/carbon nanotube and polypropylene/carbon nanotube composites, J. Compos. Mater. 53 (2019) 2091-2104. https://doi.org/10.1177/0021998318822705 **(Impact factor 2.3)-Q2.**

3. **G. Arora**, H. Pathak, Experimental and numerical approach to study mechanical and fracture properties of high-density polyethylene carbon nanotubes composite, Mater. Today Commun. 22 (2020) 100829. https://doi.org/10.1016/j.mtcomm.2019.100829 **(Impact factor 3.7)-Q2.**

4. **G. Arora**, M. Singh, H. Pathak, S. Zafar, Micro-scale analysis of HA-PLLA bio-composites: Effect of the interpenetration of voids on mechanical properties, Mater. Today Commun. (2021) 102568. https://doi.org/10.1016/j.mtcomm.2021.102568 **(Impact factor 3.7)-Q2.**

5. **G. Arora**, H. Pathak, Fracture and elasto-plastic behaviour of polymer-CNT composites under thermo-mechanical environment: An integrated dual scale modelling and experimental study, J. Mater. Eng. Perform., JMEP-20-12-22632, https://doi.org/10.1007/s11665-022-06743-2 **(Impact factor 2.2)-Q2.**

6. S. Padmanabhan, A. Gupta, **G. Arora**, H. Pathak, R. G. Burela, A. S. Bhatnagar, Meso-macro-scale computational analysis of boron nitride nanotube-reinforced aluminium and epoxy nano-composites: A case study on crack propagation, Proc. Inst. Mech. Eng. Part L J. Mater. Des. Appl. 235 (2020) 293-308. https://doi.org/10.1177/1464420720961426 **(Impact factor 2.5)-Q2.**

7. A. S. Bhatnagar, A. Gupta, **G. Arora**, S. Padmanabhan, R. G. Burela, Mean-field homogenization coupled low-velocity impact analysis of nano fibre reinforced composites, Mater. Today Commun. 26 (2021) 102089. https://doi.org/10.1016/j.mtcomm.2021.102089 **(Impact factor 3.7)-Q2.**

8. **G. Arora,** Experimental analysis of blended nanocomposites processed using compression molded microwave process, Proceedings of the Institution of Mechanical Engineers, Part N: Journal of Nanomaterials, Nanoengineering and Nanosystems, https://doi.org/10.1177/23977914231224054, **(Impact factor 4.2)-Q3.**

9. P. S. Bisht, **G. Arora**, H. Pathak, Strain-rate sensitivity analysis of microwave processed polypropylene-carbon nanotube composites, Journal of Engineering Research, https://doi.org/10.1016/j.jer.2024.04.022, **(Impact factor 0.9)-Q3.**

10. **G. Arora**, H. Pathak, Nanoindentation characterization of polymer nanocomposites for elastic and viscoelastic properties: Experimental and mathematical approach, Compos. Part C Open Access. 4 (2021) 100103 https://doi.org/10.1016/j.jcomc.2020.100103 **(SCOPUS)-Q2.**

11. K. Dwivedi, **G. Arora** and H. Pathak, Fatigue crack growth in CNT-reinforced polymer composite, Journal of Micromechanics and Molecular Physics, https://doi.org/10.1142/S242491302241003X **(SCOPUS)-Q2.**

----------Patents----------

1. **G. Arora**, G. Kumar, L. Kumar, Y. Kohli, "Protection wire-frame for two wheelers to avoid kite string accidents", Ref. No.: CU 2740 **(In-Process, with IP-cell of Chandigarh University).**
2. **G. Arora**, G. Kumar, J Sharma, "Automated Vehicle Overload Control System" **(Filed, Application No. 202411003466).**
3. **G. Arora**, A. Anand, G. Kumar, "Automatic Terrain-Adjusting Side Stand for Two-Wheelers", **(In-Process).**

----------Editor (Book)----------

1. M. Singh, **G. Arora**, S. Zafar, Sanjay M. R., Ing. habil. Suchart Siengchin, Composite Materials Processing Using Microwave Heating Technology, SPRINGER, ebook ISBN 978-981-97-2772-8 (https://link.springer.com/book/9789819727711).

2. M. Singh, **G. Arora**, M. H. Kumar, P. Bhowmik, Sanjay M. R., Ing. habil. Suchart Siengchin Investigating Polymer Fiber Reinforced Composites through Experimental and Computational Methods: From Theory to Practice **(Authored Book- Under Preparation).**

----------Editor (Journal)----------

1. **Special Issue on High-Performance Lightweight Materials and Structures: Advanced Processing Techniques and Performance Evaluation, International Journal on Interactive Design and Manufacturing (IJIDeM).**
    a. Dr. Ankit Gupta, Shiv Nadar Institution of Eminence, India
    b. Prof. Vijay Kumar Thakur, Biorefining & Advanced Materials Research Centre, United Kingdom
    c. Dr. Manoj Kumar Singh, University of Guelph, Canada
    d. Dr. Gaurav Arora, Chandigarh University, India
    Link : https://www.springer.com/journal/12008/updates/24026716.

2. **Thematic Issue: Latest Experimental and Computational Aspects of Advanced Composites for Structural Applications,** submitted to **Recent Patents on Mechanical Engineering, Bentham Science Publishers, Submission No.** BMS-MENG-2023-HT-12.
    a. Dr. Gaurav Arora, Chandigarh University, India
    b. Dr. Papiya Bhowmik, Research Fellow, IIT Ropar, India.

Workshops/FDPs:

1. Attended an FDP on "Composite Materials: Machining Issues and Technical Advancements" organized by I.T.S Engg College, Greater Noida, on 28th February 2015.

2. Attended an FDP on "Advanced Materials and Structures for Space Applications" organized by IIT Roorkee, Roorkee on 14th February 2016.

3. Attended a short-term course on "Modeling and Simulation using Finite Element Method for Engineering Applications" organized by Dr. Himanshu Pathak, Dr. Rajeev Kumar, and Dr. Vishal Singh Chauhan from 19th to 23rd June 2017 at IIT Mandi.

4. Attended a national workshop organized by Dr. Sunny Zafar and Dr. Himanshu Pathak on "National Workshop on Composite Materials in Engineering Applications: Design and Manufacturing Perspective" from 15th to 19th January 2018 at IIT Mandi.

5. Attended a national workshop organized by Dr. Subhamoy Sen, Dr. Himanshu Pathak, and Dr. Sunny Zafar on "Advanced Composites for Aerospace: Design, Manufacturing and Condition Monitoring Perspective" from 11th to 15th February 2020.

Competitive Examinations:

1. Qualified GATE 2010 (Production & Industrial Engineering) with All India Rank 67.
2. Qualified GATE 2015 (Mechanical Engineering) with All India Rank 26248.

Experience:

1. Worked as Assistant Professor at Sharda University, Greater Noida from 16th July 2012 to 31st January 2017.
2. **Currently working as Assistant Professor at Chandigarh University, Mohali from 1st Oct 2021.**

Areas of Interest:

1. Materials and Manufacturing.
2. Multi-scale Modelling of Composites.

Subjects Taught at Sharda University:

1. Engineering Mechanics, Machine Design-I, Fluid Mechanics, Advanced Manufacturing Technology, Sheet Metal Technology, Modern Vehicle Technology, Materials Science, Metrology.

Extra-curricular Activities:

1. Actively involved in the organization of sports and social events at IIT Roorkee.
2. Volunteer in social service-related projects conducted through "Art of Living."
3. Served as sports secretary for B7 hostel at IIT Mandi.
4. Secured winning position in Kamand Premier League (Cricket) 2020 held at IIT Mandi.

Honors/Achievements:

1. Received "Award of Excellence" for organizing Intra Bhawan Sports in GEETANJALI' 12 at Ravindra Bhawan, IIT Roorkee.

Strengths:

1. Highly competitive self-starter who is organized, disciplined, and goal-oriented.
2. Reliable and Responsible.

Hobbies:

1. Playing Cricket, Table Tennis, Carrom-Board, Volley Ball, Kho-Kho.

References:

- **Dr. Himanshu Pathak**
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  School of Mechanical and Materials Engineering
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