Dr. Manpreet Singh

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ACADEMIC DETAIL:

Qualification/Degree	School/College	University or Board	Year	%age
Ph.D.	Thapar Institute of Engineering and Technology, Patiala	Thapar Institute of Engineering and Technology	2016-2020	8.67/10
M. Tech (Mechanical Engineering)	PEC (Punjab Engineering College), Chandigarh	PEC University of Technology	2013-2015	9.14/10
B. Tech. (Mechanical Engineering)	Chitkara Institute of Engineering & Technology, Rajpura	Punjab Technical University	2010-2013	78
Diploma	M.M.B Polytechnic College	P.S.B.T.E&IT	2007-2010	72
Xth	Govt. Sen. Sec. School	P.S.E. B	2006-2007	68
I.T. I	Govt. Industrial Training	P.S.B.T.E&IT	2005-2006	80

PROJECTS & TRAININGS:

- **Thesis (Ph.D.)**

Design and development of a rotating core based magnetorheological finishing process for different external cylindrical surfaces

The external surface finishing of cylindrical components at the nano-meter level with good surface characteristics is highly demanded in today's industries for improving their operative functionalities. A rotating core based magnetorheological (MR) finishing process is developed. The magnetostatic finite element (FE) analysis is utilized to design the effective tool core tip surface. The capability of the designed rectangular shaped tool core tip surface has been successfully demonstrated for the fine finishing of the various real time industrial applications of ferromagnetic and non-ferromagnetic (diamagnetic) cylindrical workpieces.

Supervisor (s): *Associate Prof. A. K. Singh (Mechanical Engineering Department, Thapar Institute of Engineering and Technology, Patiala-147004, Punjab, India. Email: anantsingh@thapar.edu, Phone no.: +91-9855927663)*

- **Thesis (M.Tech)**

An experimental investigation of Al/SiC-MMC on fabricated electro stream drilling setup

The modern trend towards miniaturization has provided an innovative push towards the creation of unconventional minute holes in drilling practices. Electro stream drilling (ESD) is one such emerging process. It finds its various industrial applications such as medical, automobile, aerospace and micro fabrication which further finds its use in electronic and computer components.

This work reports experimental findings on the effects of important process parameters such as applied voltage, nozzle diameter, feed rate, electrolyte concentration, and pump pressure on the productivity and the quality of small holes produced by the fabricated electro jet drilling set-up.

- **BTech Project**

Effect of Ash Particle on Steel Tube at Elevated Temperature

The degradation of steel at high temp becomes more severe when erosive and corrosive environment happens on the external surface of tubes. In this work, evaluation of the degradation of the three specimens of steel (Grade-A, T-11, T-22) in the actual boiler environment & calculate the weight gain (mm per year) in each specimen & found the superior material from selected specimen.

PUBLICATIONS:

SCI Indexed Journal Articles:

1. Manpreet Singh, Ashpreet Singh, Anant Kumar Singh, A rotating core based magnetorheological nano-finishing process for external cylindrical surfaces. *Material and Manufacturing Processes* **2018**; 33 (11): 1160–1168.

2. Manpreet Singh, Anant Kumar Singh, Improved magnetorheological finishing process with rectangular core tip for external cylindrical surfaces, *Material and Manufacturing Processes* **2019**; 34(9), 1049-1061.

3. Manpreet Singh, Anant Kumar Singh, Performance investigation of magnetorheological finishing of rolls in cold rolling process, *Journal of Manufacturing Processes* **2019**; 41: 315–329.

4. **Manpreet Singh,** Anant Kumar Singh, Magnetorheological finishing of micro-punches for enhanced performance of micro-extrusion process. *Material and Manufacturing Processes* **2019**; 34 (14): 1646–1657.

5. **Manpreet Singh,** Anant Kumar Singh, Magnetorheological finishing of grooved drum surface and its performance analysis in winding process. *International Journal of Advanced Manufacturing Technology* **2020**; DOI: 10.1007/s00170-019-04812-w.

6. **Manpreet Singh,** Anant Kumar Singh, Theoretical investigations into magnetorheological finishing of external cylindrical surfaces for improved performance. *Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Process Mechanical Engineering* **2021**; DOI:10.1177/0954406220931550.

7. **Manpreet Singh,** Anant Kumar Singh, Magnetorheological finishing of copper cylindrical roller for its improved performance in printing machine. *Proceedings of the Institution of Mechanical Engineers, Part E: Journal of Process Mechanical Engineering* **2021**, DOI:10.1177/0954408920945232.

8. **Manpreet Singh,** Gagandeep Singh, Arvind Jayant, Optimization of turning parameters of titanium chrome-moly (Ti-Cr-Mo) alloy using taguchi method. *Indian Journal of Engineering and Materials Sciences (IJEMS)* **2021**, 27(3), 776-782.

9. **Manpreet Singh,** Anant Kumar Singh, Magnetorheological finishing of typical tapered cylindrical punch surface for improving its functionality. *Journal of Manufacturing Processes* **2021**, 61, 153-172.

10. Manpreet Singh, Sunil Kumar Paswan, Magnetorheological finishing of aluminium cylindrical roller for enhanced performance of printing operation. *Part E: Journal of Process Mechanical Engineering* **2022,** DOI: 10.1177/09544089221093010.

11. Manpreet Singh, Sunil Kumar Paswan, Magnetorheological fine finishing of steering rack bar for improving its functional operation. *Proceedings of the Institution of Mechanical Engineers, Part E: Journal of Process Mechanical Engineering*. **2022**;0(0). Doi:10.1177/09544089221137425.

12. Gagandeep Singh, Arvind Jayant, **Manpreet Singh,** Parametric investigation and optimization of revolving tools-based magnetorheological finishing process for external cylindrical surface of printing machine roller made of copper. *Proceedings of the Institution of Mechanical Engineers, Part E: Journal of Process Mechanical Engineering*. **2023**;0(0). doi:10.1177/09544089231161464.

13. Singla, M. K., Gupta, J., Beryozkina, S., Safaraliev, M., & **Singh, M.** The colorful economics of hydrogen: Assessing the costs and viability of different hydrogen production methods-A review. *International Journal of Hydrogen Energy 2024, 61*, 664-677.

14. Singh, M., Singla, M. K., Beryozkina, S., Gupta, J., Safaraliev, M., Hydrogen vehicles and hydrogen as a fuel for vehicles: A-State-of-the-Art review, International Journal of Hydrogen Energy, 64, 2024, 1001-1010.

15. Singh, M., Singla, M. K., Safaraliev, M., Singh, K., Odinaev, I. Advancements and challenges of fuel cell integration in electric vehicles: A comprehensive analysis. 88, 1386-1397. https://doi.org/10.1016/j.ijhydene.2024.09.212.

16. Kumar, A., Aljaidi, **M., Singh**, M., Alshammari, M., Alsuwaylimi, A. A., & Alenezi, S. M. Recent Trends in Compact Planar Antennas at 5G Sub-6 GHz and mmWave Frequency Bands for Automotive Wireless Applications: a Review. Progress In Electromagnetics Research C, Vol. 143, 169-180, 2024. DOI: 10.2528/PIERC24022708.

17. Manpreet Singh, Parametric Investigation of Rotary Type Magnetorheological Finishing Operation by Batch Gradient Descent Algorithm, Recent Advances in Computer Science and Communications; Volume 17, Issue , Year 2024, e26662558305619. DOI: 10.2174/0126662558305619240828080622.

18. Gupta, J., Giri, N. C., Singla, M. K., Gupta, A., Thakur, E., Behera, S., & **Singh, M.** (2024, October). Solar cell parameter extraction: A synergistic fusion of mathematical modeling and optimization algorithms. In *AIP Conference Proceedings* (Vol. 3209, No. 1). AIP Publishing.

19. Thakur, E., Giri, N. C., Gupta, A., Singla, M. K., Routray, S. K., Gupta, J., & **Singh, M.** (2024, October). Design of a two-element super ultra-wide MIMO antenna for diverse applications (Diversifying). In *AIP Conference Proceedings* (Vol. 3209, No. 1). AIP Publishing.

20. Singh, M. Influence of magnetorheological finishing on roller surface properties and thread rolling efficiency. Proceedings of the Institution of Mechanical Engineers, Part E: Journal of Process Mechanical Engineering. 2025;0(0). doi:10.1177/09544089251322861.

21. Singh, M.; Singh, G.; Abu-Malouh, R.; Chauhan, S.; Vashishtha, G. Influence of Magnetorheological Finishing on Surface Topography and Functional Performance of Shoulder Joint Cap Surface. *Materials* **2025**, *18*, 3397. https://doi.org/10.3390/ma18143397.

22. Singh G, Jayant A, Singh K, Vashishtha G, Singh M. Enhancing surface quality of cylindrical mold punch made of P20 steel using a newly developed magnetorheological finishing process. *Proceedings of the Institution of Mechanical Engineers, Part E: Journal of Process Mechanical Engineering*. 2025;0(0). doi:10.1177/09544089251359343.

23. Singh, M. Singh, G. Precision Surface Finishing of Additively Manufactured ABS Punches via Magnetorheological Finishing. The Journal of The Minerals, Metals & Materials Society (TMS), 2025, 1-17.

24. Singh, M., Singla, M. K., Jangir, P., & Mbasso, W. F. (2025). Design and Fabrication of a Self-Driven Air Purifying Bicycle With Real-Time Monitoring System. *Engineering Reports*, *7*(12), e70507.

25. Mittal, A., Kumar, V., Singh, M., Mer, A., & Sharma, N. K. (2025). Unveiling the path to TQM excellence: a strategic analysis using mixed method approach. *International Journal of Six Sigma and Competitive Advantage*, *15*(3), 234-265.

26. Singh, M., Singh, J. (2025). Tribological Landscape of MXenes: Synthesis to Applications. In: Khanna, V., Walvekar, R. (eds) MXenes for Sustainable Development. Green Chemistry and Sustainable Technology. Springer, Singapore. https://doi.org/10.1007/978-981-96-9408-2_11.

27. Singh, M. (2025). Smart Manufacturing at the Nanoscale: Exploring AI-Enhanced Magnetorheological Finishing, Nanomaterials for Smart Manufacturing, Edition1st Edition, CRC Press, Pages16, https://doi.org/10.1201/9781003560234.

28. Kumar, M. Singh, M. (2025).Advancing Surface Quality in Metal Additive Manufacturing: The Role of Magnetorheological Finishing, Advanced Manufacturing Technologies in Biomedical Science: Practical Applications, Case Studies, and Future Trends, CRC Press, DOIhttps://doi.org/10.1201/9781003516064.

29. Singh, M. (2025), Microwave Clads for High-Temperature Wear Applications, Microwave Claddings: Engineering Applications, CRC Press, DOIhttps://doi.org/10.1201/9781003566953.

30. Singla, M.K., **Singh, M.,** Kumar, R. *et al.* Walrus optimization algorithm for enhanced solid oxide fuel cell (SOFC) model parameter identification. *Ionics* **31**, 13201–13228 (2025). https://doi.org/10.1007/s11581-025-06772-6.

31. Singh, M. (2026). Precision Surface Finishing and Functional Performance Enhancement of Spline Shaft Using Magnetorheological Process: Singh. *JOM*, 1-19.

32. Singh, M. (2026). Internal Bore Magnetorheological Finishing for Zirconia/Alumina Ceramic Dies in Micro- Extrusion Applications: Singh. *JOM*, 1-16.

33. Singh, M. (2025). Advancing electric vehicle drivetrain reliability through magnetorheological finishing of 42CrMo4 motor shaft. *Proceedings of the Institution of Mechanical Engineers, Part E: Journal of Process Mechanical Engineering*, 09544089261419663.

Book:-

1. **Manpreet Singh,** Tejinder Pal Singh Sarao, Emerging Trends in Mechanical Engineering, ISBN: 978-93-93810-38-0, **Empyreal Publishing House, 2023.**

Book Chapter (Scopus Journals):

1. **Manpreet Singh,** Ashpreet Singh, Anant Kumar Singh **(2018).** Parametric Optimization for Nano-Finishing of the External Cylindrical Surfaces Using Rotating Core Magnetorheological Finishing Process. In International Manufacturing Science and Engineering Conference (Vol. 51388, p. V004T03A006). American Society of Mechanical Engineers.
2. **Manpreet Singh,** Ashpreet Singh, Anant Kumar Singh, Nanofinishing of external cylindrical surface of C60 steel using rotating core-based magnetorheological finishing process. In: Shunmugam M., Kanthababu M.(eds) Advances in Unconventional Machining and Composites. Lecture Notes on Multidisciplinary Industrial Engineering. Springer, Singapore. DOI: https://doi.org/10/1007/978-981-32-9471-4_5 **(2020).**
3. **Manpreet Singh**, Gagandeep Singh, Maninder Singh, Advanced Finishing Processes for External Cylindrical Surfaces—A Review, *Advances in Materials and Mechanical Engineering* **(2021);** 367-378.
4. **Manpreet Singh**, Sunil Kumar Paswan, Systematic study of electrochemical machining processes for micromachining, Additive Manufacturing in Industry 4.0, DOI:10.1201/9781003360001-10 **(2022)**.
5. Er. Janardhan Kumar, Dr. Sunil Kumar Paswan, Er. Davinder Singh, **Dr. Manpreet Singh,** Environmental and Economic Benefits Achieved by Swarf Forging of Alloy Steel an Experimental Study, Industry, Innovation and Infrastructure SDG-09, ISBN: 978-93-5717-807-5 **(2022)**.
6. **Manpreet Singh (2024).** Machining of Aluminium Silicon Carbide Metal Matrix Composite Using Fabricated Electro Stream Drilling Setup. In *Fabrication Techniques and Machining Methods of Advanced Composite Materials* (pp. 25-41). CRC Press.
7. **Singh, M**., Singh, G., & Alshinwan, M. **(2024).** Advanced Finishing Processes for Cylindrical Surface Finishing: A Review. *Modern Hybrid Machining and Super Finishing Processes*, 161-179.

International Conference:

1. Prof. Alakesh Manna, Manpreet Singh, An investigation during machining of Al/SiC-MMC on fabricated electro jet drilling setup. IIT Bombay COPEN 9; Reg.Code: Y940 International Conference on Precision, Meso, Micro and Nano Engineering in December 2015.

2. Manpreet Singh, Anant Kumar Singh, Parametric optimization for nano-finishing of the external cylindrical surfaces using rotating core magnetorheological finishing process, *Proceedings of the 2018 Manufacturing Science and Engineering Conference MSEC2018*, June 18-22, 2018, College Station, TX, USA.

3. Manpreet Singh, Anant Kumar Singh, Nanofinishing of external cylindrical surface of c60 steel using rotating core based magnetorheological finishing process, 7th International & 28th *All India Manufacturing Technology, Design and Research (AIMTDR) Conference 2018,* December 13th-15th2018, College of Engineering Guindy, Anna University, Chennai, India.

4. Manpreet Singh, Anant Kumar Singh, Effect of direction of rotations on process performance of a rectangular-rotating core magnetorheological finishing process, 40th *MATADOR International Conference on Advanced Manufacturing and Design*, July 8-10, 2019, Hangzhou, China.

5. Manpreet Singh, Anant Kumar Singh, Review on Magnetorheological fluid and its applications, 4th International Conference on Production and Industrial Engineering, December 19-21, 2016, Dr. BR Ambedkar National Institute of Technology Jalandhar, India.

6. Manpreet Singh, Magnetorheological finishing process parametric optimization using batch gradient descent algorithm, 1st International Conference on Additive Manufacturing and Advanced Materials (AM2), 4-6 October 2021 at Pandit Deendayal Energy University, Gandhinagar, Gujarat, India

National Conference:

1. Manpreet Singh, Vishwas Grover, Magnetorheological fluid and its importance in external cylindrical finishing processes- A review, National Conference on Advanced Concepts in Mechanical Engineering (ACME-2018), September 7-8, 2018, Ajay Kumar Garg Engineering College, Ghaziabad, India.

2. Vishwas Grover, **Manpreet Singh,** Design and development of magnetorheological fluid based advanced finishing tool, National Conference on Advanced Concepts in Mechanical Engineering (ACME-2018), September 7-8, 2018, Ajay Kumar Garg Engineering College, Ghaziabad, India.

PATENTS (Utility):

1. Manpreet Singh, Bicycle with Self-Driven Real Time Monitored Air Purifier, 202111044130, (2021).
2. Manpreet Singh, Autonomous Multipurpose Agroturtle, 202111043891, (2021).
3. Manpreet Singh, Adjustable Drain Cleaner Machine, 202111040325, (2021). **(Granted), Patent No.:- 495169**
4. Manpreet Singh, Door Stopper for Refrigeration, 202211031264, (2022). **(Granted), Patent No.:- 527572.**
5. Manpreet Singh, Refrigeration Tray Adjustment System, 202211033867, (2022). **(Granted), Patent No.:- 503351.**
6. Manpreet Singh, A Magneto-Rheological (MR) Machining System, 202211036593, (2022). **(Granted), Patent No.:- 500601**
7. Manpreet Singh, Auto Sleeping Pods, 202211044558, (2022).
8. Manpreet Singh, Shoulder, Hand and Head Supported Brick Picker, 202211053534, (2022). **(Granted), Patent No.:- 513788.**
9. Manpreet Singh, A Computing System for Parameter Estimation of Solar PV Cell, German Patent, 2023011116564100DE (2023). **(Granted)**
10. Manpreet Singh, An IOE-based health monitoring system, 202311003532, (2023).
11. Manpreet Singh, An Automated Waste Segregation System And A Method Thereof, 202311053134, (2023).
12. Manpreet Singh, Self-Cleaning Mat for Automobiles, 202311031301, (2023).
13. Manpreet Singh, Smart Dung Cake Making Device and a Method Thereof, 202311088396, (2023).
14. Manpreet Singh, IoT- based Self-Powered Air Curtain for Bike, German Patent, 202024105714 **(Granted).**
15. Manpreet Singh, Self-Adjustable Clothing Belt, 202411026893, (2024).
16. Manpreet Singh, Dung Cake Making Apparatus, 202411033424, (2024).
17. Manpreet Singh, Tiffin Carrier Apparatus, 202411030350, (2024).
18. Manpreet Singh, A Smart Sheet Feeder System and Method for Automated Evaluation, 202511072315 (2025).
19. Manpreet Singh, A Smart System and Method for Crop Produce Grading and Shelf-Life Prediction, 202511078990 (2025).
20. Manpreet Singh, Self-Powered Air Curtain Device for Two-Wheeler Rider Protection, 202511087573, (2025)
21. Manpreet Singh, Air-Cooled Solar Powered Adjustable Sun Shade with Smart Sensing and Air Filtration, 202511119783, (2025).
22. Manpreet Singh, Voice based Hydration System with Automatic Throat Detection and Real Time Dryness and Water Dispensing, 202511116010, (2025).
23. Manpreet Singh, A Self-Aligning Modular Attachment System for Coupling Agricultural Implements to Tractors and A Method Thereof, 202511116651, (2025).
24. Manpreet Singh, Air-Cooled Solar-Powered Adjustable Sun Shade with Smart Sensing and Air

Filtration, 202511119783 (2025).

25. Manpreet Singh, Method for Automated Electromagnetic-Assisted Side Stand Retraction in Two-Wheelers, 202511124779, (2025).
26. Manpreet Singh, A Thermoelectric Floor Heating Tile Panel System, 202611000571, (2026).
27. Manpreet Singh, An Automated Seed Treatment System and Method for Controlled Coating And Drying, 202611006674, (2026).

PATENTS (Design):

1. Manpreet Singh, Self-Adjustable Chair (Under Filling Process).
2. Manpreet Singh, Brick Picker, 428970-001, (2024).
3. Manpreet Singh, Self-Adjustable Clothing Belt, 428969-001, (2024) **(Granted)**.
4. Manpreet Singh, Self-Dust Cleaning Mat for Car, 425481-001, (2024) **(Granted)**.
5. Manpreet Singh, Foldable Sitting Table with Attachment on Workshop Working Table, 414911-001, (2024) **(Granted)**.
6. Manpreet Singh, Phone Holder for Charging, 412135-001, (2024) **(Granted)**.
7. Manpreet Singh, Bag Hanger for Washroom, 428968-001, (2024) **(Granted)**.

PROJECT GRANT:

- Development of Magnetorheological Finishing Setup for Fine Finishing of Different Industrial Applications
  Grant Amount: - 2 Lac
  Grant Agency: - Baba Farid Research Policy Grant
- Design and Development of Magnetorheological Finishing Setup for Finishing of Diverse Industrial Applications
  Grant Amount:- 2.20 Lac
  Grant Agency:- NewGen IEDC

PROJECT COMPLETED:

Working as Project Coordinator; Completed Various Live and Research Projects in Engineering Field: -

- 4 Speed Electric Car
- Air Purifying Bicycle
- Electro Jet Drilling Setup
- Automatic Watering System
- E Bike
- Portable Mobile Charging Wind Turbine
- Optimized Brick Design
- Solar Drone 2.0
- E Bike
- Efficycle
- Self-Adjustable Clothing Belt
- Head Movement Operated Wheel Chair

INDUSTRIAL COLLABORATIONS:

- Merla Wellhead Solutions Houston TX, USA is provided choke valve real time application for MR finishing on the external and internal surface of the choke valve parts.
- Swami Textile Pvt. Ltd., Ludhiana, India is provided the functional performance test of the MR finished grooved drum in the winding process.

- Vaid Engineering, New Delhi, India is provided the functional performance test on the MR finished rolls surface in the cold rolling process.

SCHOLASTIC ACHIEVEMENTS:

- Gate qualified: - All India Rank (AIR) – 2748

WORK EXPERIENCE:

Work in Thapar Institute of Engineering and Technology Teaching Associate Aug'16-Jul'19

- Engineering Drawing Tutorial and AutoCAD Lab
- Machine Design Tutorial
- Engineering Mechanics Tutorial

Work in Thapar Institute of Engineering and Technology Senior Research Fellow Oct'19-Jan'20

- DST-SERB Funded project on Magnetorheological finishing setup
- Fine finishing of real time industrial applications

Work in Baba Farid College of Engineering and Technology, Bathinda Assistant Professor Feb' 21-Aug'21

- Non- Conventional Energy Resources
- AutoCAD Lab
- Industrial Automation lab
- Intellectual Property Rights
- Advanced Finishing Processes

Work in Baba Farid College of Engineering and Technology, Bathinda HoD Aug' 21- Aug' 22

- Departmental Responsibilities
- Workshop Incharge
- Intellectual Property Rights

Work in Chitkara University, Rajpura- Punjab Assistant Professor Aug' 23-April 25

- Project Coordinator
- Training Coordinator

SKILLS:

- FluidSIM 6.0
- Fusion 360
- AutoCAD
- SOLIDWORKS
- MiniTab
- Design Expert
- Microsoft Office