

RAMESH KUMAR SINGH

COMMUNICATION ADDRESS

Professor
Department of Mechanical Engineering
Indian Institute of Technology Bombay
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EDUCATION

Doctor of Philosophy in Mechanical Engineering 2007
Georgia Institute of Technology, Atlanta, Georgia, USA

- Major: Manufacturing
- Minor: Materials
- Ph.D. Dissertation Title: *Laser Assisted Mechanical Micromachining of Hard-to-Machine Materials*

Master of Science in Mechanical Engineering 2002

Graduate Certificate in Manufacturing Engineering 2002

Tufts University, Medford, Massachusetts, USA

- Major: Manufacturing
- Minor: Materials
- M.S. Thesis Title: *Impact Modeling of Composite Polymeric Enclosures*

Bachelor of Engineering in Mechanical Engineering 1997

Birla Institute of Technology, Ranchi, India

- Major: Mechanical Engineering

RESEARCH EXPERIENCE

Research Areas

- Additive Manufacturing, Finite Element Modeling, Dynamics of High-speed Micromachining, Systems Integration and Special Purpose Machine Development

Funded Projects

- Towards Sustainable Manufacturing at the Microscale: Addressing Some Scientific and Technological Issues, Swarnajayanti Fellowship in Engineering Sciences (**most selective and highly prestigious research grant in India awarded to 2 or 3 researchers in all of Engineering Sciences**) 2016-2020, PI, Funded by DST- INR 30 million)
- In-situ Robotic Restoration System Based on Laser Cladding (Technology Systems Development Program, 2016-2020, PI, DST- INR 20 million)
- Development of Robotic system for Automated Cleaning of Solar Photovoltaic (PV) Panel Grids in Indian/tropical Conditions (2016-2019, Co-PI, PI Prof. Abhishek Gupta and Co-PI Prof. V. Kartik, NTPC- INR 25.5 million)
- Investigation into High Speed Micro-grinding Process for Difficult to Machine Materials (2016-2019, Co-PI, PI Prof. Rakesh Mote, DST- INR 3.5 million)
- Finite Element Modelling of Ring Rolling Process for Aerospace Alloys (GTMAP) (2017-2020, Co-PI, PI Prof. K. Narasimhan, ARDB-INR 8.5 million)
- Development of Robust and Accurate Techniques for Measurement of Damage Induced Ultrasonic Nonlinearity in Solids (2017-2020, Co-PI, PI Prof. Salil Kulkarni, ARDB-INR 2.84 million)

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- Flexible Reconfigurable Fiber Laser-Assisted Manufacturing at Microscale (PI, Funded by DST- INR 4 million)
- Micro/Nano Technology Development: Nano-polishing of Semi-spherical Single Crystals and Arrayed Microstructure Fabrication by Excimer Laser LIGA (Co-PI, Funded by BARC-INR 6.6 million)
- Novel Process Variants of Micro-EDM (Co-PI, Funded by DST-INR 3.5 million)
- Engineered Surfaces for Desired Functional Response (Co-PI, Funded by ISRO-INR 2.6 million; PI, CSIR – INR 2.0 million)

Funded Research Facility

- Micromachining and Micrometrology Facilities (PI, funded by RIFC, IITB and NCAIR, INR 18.8 million)
- Surface Characterization Facility (funded by COEST, INR 7 million)

Mentorship for Startups

- *Micromach Innovations Pvt. Ltd.* (Co-founded by PhD students and me to commercialize High-speed Micromachining Centers and Special Purpose Machines developed in the lab)
- *Idris Automation* (Provide mentorship and technical advice to the company started by alumnus of IIT Bombay)

CONSULTING EXPERIENCE

- **Indian Institute of Technology Bhilai, India** (INR 10.2 million): Development of high-speed micromachining center
- **Bharat Forge, India** (INR 0.7 million): Characterization of wear and erosion of different coatings under thermal shock loading
- **Larsen & Toubro Defense, India** (INR 0.6 million): Study of laser material interaction
- **T-Rish Gems, India** (INR 1.0 million): Development of micromachined QR codes for jewelry
- **Ceat Tyres, Halol, India** (INR 6.0 million): Development of laser based robotic vent cleaning system
- **Ceat Tyres, Halol, India** (INR 1.5 million): Development of vision-based metrology system for tyre centering
- **Ordnance Factory, Ambernath, India** (INR 3.0 million): Development of Safe and Arm Device
- **Navaratna Industries, Nagpur, India** (INR 0.8 million): Design of fall arrester
- **Pest Control India, Mumbai, India** (INR 1.2 million): Design of 1500 cuft sterilizer
- **Bond Safety Belts, Mumbai, India** (INR 0.7 million): Design for manufacture of ELR mechanism

TEACHING EXPERIENCE

Professor , Indian Institute of Technology Bombay	2018-
Associate Professor , Indian Institute of Technology Bombay	2014-18
Assistant Professor , Indian Institute of Technology Bombay	2008-2014

- Research Guidance
 - Masters (M. Tech + DD) – **67 graduated** + 5 in progress
 - PhD– **12 graduated** + 8 in progress
 - Postdoctoral Fellows- 1 finished and 2 in progress
- International Collaborations
 - Joint doctoral guidance with Monash University in Australia for 4 PhD students with Dr. Wenyi Yan

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- Collaboration with Australian Nuclear Science and Technology Organization (ANSTO) for Neutron Diffraction and Imaging for additively manufactured products
- Joint research and Postdoctoral Fellow guidance with Prof. Jose Outeiro of Arts et Métiers, Campus of Cluny, France

- Teaching
 - Established Tinkerers' Lab for hands-on skill development for Undergraduates at IIT Bombay: Conceived the concept, helped with fund raising, identified the key equipment and facilities, designed the work-space and involved in mentoring the students who run the lab
 - Machine Design, ME 423
 - Manufacturing Processes I, ME 206
 - Manufacturing Processes II, ME 338
 - Advanced Manufacturing Process, ME 649
 - Laser Material Processing, ME 677 (Designed and developed this course)
 - Setup workshop at IIT Gandhinagar in its founding year

Instructor

August 2007- December 2007

George W. Woodruff School of Mechanical Engineering, Georgia Institute of Technology, Atlanta, Georgia

- Manufacturing Processes and Engineering, ME 4210

List of Guided Students

- ***Doctor of Philosophy***
 1. Abhishek Kumar Singh (2020), Flow forming studies of Titanium alloys
 2. Rinku Kumar Mittal (2019), Investigation of tribological effects on the dynamic stability in high-speed micromilling of Ti-6Al-4V
 3. Suryawanshi Pradeepkumar Pandurang (2019), A novel mass spring model for simulating transversely isotropic materials under in-plane loading
 4. Kundan Kumar Singh (2018), Modeling and experimental analysis of dynamic stability in high speed micromilling process
 5. Gulshan Kumar (2017), Residual stresses in zirconium: a combined experimental and numerical study
 6. Santanu Paul (2017), Laser surface cladding for structural repair
 7. Sumit Tripathi (2017), High internal phase emulsions: interfacial, rheological and transport studies
 8. Dattatraya Parle (2016), Modeling of size effect in micro-cutting considering fracture and microstructure
 9. Sachin Adinath Mastud (2014), Development and modeling of reverse micro-EDM for fabrication of high aspect ratio features and textured surfaces
 10. Ganesh Soni (2014), Novel multiscale modeling schemes of damage evolution in composite laminates
 11. Dongre Ganesh Govardhan (2014), Efficient slicing of silicon ingots by wire-EDM process with focus on photovoltaic applications
 12. Vivek Bajpai (2013), Characterization and modeling of pyrolytic carbon micromachining for creation of engineered features

- ***Masters (Dual Degree)***
 1. Pranjal Amule (2018), Design of fixture for free-form holding

2. Akash Kishore (2018), Development of software for dynamic stability analysis in micromachining
3. Rajendra Thathe (2017), Molecular dynamics simulation of gas-assisted excimer laser micromachining
4. Anurag Malviya (2017), Laser cleaning of tire mold vents
5. Patel Swapnil Shailesh (2016), Effect of micro tool coatings on cutting force and surface topography in high speed micromilling of Ti6Al4V
6. Rik Chatterjee (2016), Parallel manipulators for free form laser cladding applications
7. Ravalia Sugat Shamjibhai (2016), Modeling of dynamic stability in high speed micromilling
8. Bhag Chand Meena (2016), Effect of micro engineered texture surface of Ti-alloy on wettability and corrosion behavior
9. Ashwin Uttam Ahire (2015), Modeling of drilling induced damage in composite laminates
10. Shubham Yadav (2015), Burr formation modelling & analysis in microdrilling of Titanium alloys
11. Ashutosh Unhale (2015), Microscale damage detection in a composite laminate using representative volume element
12. Kumar Keshav (2015), Laser cladding: free form deposition
13. Vijay Mahawar(2014), Micro machining characterization of ultra-thin membranes
14. Sebastrian Bala (2014), Designing of rail guided fall arresters
15. Surandra Kumar Meena (2013), Tensile and delamination testing of composite materials
16. Abhishek Shrivastav (2013), Modeling of laser surface cladding
17. Parth Choksi (2013), Tensile failure in unidirectional composite materials
18. Kulkarni Anish Ajit (2012), Modeling of laser ablation and fabrication of microstructures
19. Purushottam Meena (2012), Experimental investigation and finite element modeling of cross-ply glass fiber/epoxy laminates
20. Bhaskar Chandra Bharti (2012), Design and development of desktop high speed micromilling machine
21. Mohit Janoiya (2012), Laser surface cladding using coaxial powder feeder mechanism
22. Prashant Kumar (2011), Design and development of conformal hydrodynamic nanopolishing machine and process for polishing single crystal sapphire
23. Gupta Ishank Manoj (2011), Laser surface cladding
24. Mayank Garg (2011), Numerical simulation of bulk flow over textured surfaces
25. Piyush Anand (2011), Laser surface texturing
26. Akshay Shrivastava (2011), Process characterization of reverse micro EDM
27. Arvind Krishna (2011), Modeling of residual stresses at elevated temperatures
28. Jagdish Prasad Meena (2011), Fabrication of PDMS arrayed micro structures using silicon etching-LIGA
29. Gurpreet Singh Bhatti (2010), Finite element modeling of laser assisted machining of AISI D2
30. Rishabh Bhandari (2010), Anti-lock brake system for two wheelers
31. Rinku Kumar Mittal(2010), Characterization and modeling of hydrodynamic nanopolishing process
32. Prithvi Raj (2010), Design and fabrication of super-hydrophobic surface for single-droplet
33. Gautam Vijay Salhotra, (2010), Modelling the machining characteristics of pyrolytic graphite
34. Ashish Mall (2010), Design and fabrication of superhydrophobic surfaces for bulk flow
35. Lohit Dhamija (2010), Design and analysis of rod cutter for biomedical application
36. Mrinal Joshi (2009), Hydrodynamic polishing of hardened steels
37. Nikhil Jain (2009), A statistical approach for integrating analytical and finite element models in micromachining applications

▪ **Masters (M. Tech)**

1. Mehta Prem Manojkumar (2019), Development and integration of translation and rotary micro positioning stages for mechanical machining with closed loop feedback

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2. Rushikesh Ingle (2018), Design and development of 5-axis CNC system for micro-milling application
3. Shyam Dutt Shukla (2017), Experimental characterization of minimum quantity lubrication in highspeed micromilling
4. Ishan Ravindra Barai (2016), Development of a 3D thermo-mechanical elastic plastic Finite element model for the ring rolling process
5. Meenakshi Singh (2015), Finite element simulation of bursting of clad tubes used in nuclear reactors
6. Sandip Kumar Balo (2015), 3D finite element simulation of cold pilgering of Zirconium tubes for nuclear applications
7. Phapale Kamlesh Ashok (2015), Study of drilling induced delamination in carbon fiber reinforced polymer materials via conventional and non-conventional drilling techniques
8. Yetalkar Ashutosh Digambar (2014), Laser micro-drilling
9. Badwar Pritam Ganpatrao (2014), Design, Fabrication and control of haptic interface for virtual reality surgical simulator
10. Ashish Hiralal Dhoble (2014), Finite element simulation of pilgering process for nuclear applications
11. Neeraj Gupta (2013), Laser based surface modification of engineering materials
12. Shinde Hemant Popatrao (2013), Finite element analysis of flow forming process
13. Waghmare Kiran Kishor (2013), Brazing of metals and ceramics
14. Avik Samanta (2012), Characterization of residual stresses in laser assisted mechanical micromachining of Inconel 625
15. Kaunain Ashraf (2012), Thermomechanical modeling of laser surface cladding
16. Ravikumar Beeranur (2012), Characterization and mechanical properties of alumina ceramic and metal brazed joint
17. Mahajan Pushkar Shridhar (2012), Finite element analysis of flow forming process
18. Harshita Gupta (2012), Finite element analysis of ring rolling process
19. Prakash Ashok Kattire (2012), Laser cladding for die life enhancement
20. Varkal Vivekkumar Shivram (2011), Finite element analysis of electromagnetic forming
21. Wagh Yogesh Raghunath (2011), Laser surface hardening
22. Mahesh Pradip Teli (2011), Characterization of residual stresses in laser assisted mechanical micromachining
23. Sudhir Sarjerao More (2010), Design and development of hydrodynamic nanopolishing set up and process for super polishing of hard materials
24. Ahirrao Sachin Bhimrao (2010), Fiber laser assisted hardening for steels
25. Doiphode Vijay Govardhanrao (2010), Modeling of laser assisted machining
26. Anil Kumar G. (2010), Finite element analysis of rod cutter devices for biomedical application
27. Raut Prashant Brahmadeo (2009), Excimer laser-LIGA: numerical simulation of micro hot embossing process
28. Lekkala Ravi (2009), Modeling and analysis of burrs in micro milling

SERVICE/ADMINISTRATIVE EXPERIENCE

Professor in-charge, National Center for Aerospace Innovation and Research 2019-
▪ Provide leadership to a research consortium of aerospace industries led by The Boeing Company

Member, Institute Undergraduate Programs Committee 2018-
▪ Formulate and evaluate academic policies for undergraduate programs at IIT Bombay
▪ Evaluate and recommend the addition of new courses and changes to the curriculum of undergraduate courses across all disciplines at IIT Bombay

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Member, Department Postgraduate Committee

2017-

- Formulate and evaluate academic policies for undergraduate programs at IIT Bombay
- Evaluate and recommend the addition of new courses and changes to the curriculum of undergraduate courses across all disciplines at IIT Bombay

Group Coordinator, Manufacturing

2014-2017

- Handle all the administrative and academic affairs of the Manufacturing group in the Mechanical Engineering Department at IIT Bombay
- Coordinate the faculty candidate seminars and assist the faculty search committee

Member, Faculty Search committee

2014-2017

- Evaluate applications of the faculty candidates and summarize the feedback obtained from internal reviews

Member, Department Space Committee

2014-2017

- Conduct space audit for the Mechanical Engineering Department
- Facilitate allocation of lab space requested by the faculty members

Member, Department Policy Committee of Mechanical Engineering

2011-2014

- Formulate the academic, financial, and organizational policies
- Decide on faculty and staff hiring

Chairman (Sports)

2012-2015

- Budget allocation and administration of the sports activities at IIT Bombay
- Coordinate hiring of coaches and support staff for sports activities

INDUSTRIAL EXPERIENCE

Project Engineer

1999-2000

Engineers India Ltd., New Delhi, India

- Technical supervision of project execution for petrochemical projects at different sites in India
- Handled planning, scheduling and billing

Rotating Equipment Engineer

1997-1999

Engineers India Ltd., New Delhi, India

- Application engineering for pumps, compressors and gas turbines in the field of petrochemical, oil refineries, power plants and metallurgical operations
- Coordination with other engineering departments such as Process, Piping and Structures
- Erection of new units, alignment and commissioning at various installation sites

PUBLICATIONS

Book

- **Singh, R.**, and Srivastava, A., "Engineering Applications of Lasers," Manuscript under preparation to be published by CRC press

Book Chapters

- Paul S., **Singh R.**, Yan W., “Finite element simulation of laser cladding for tool steel repair”, Lasers based Manufacturing, Springer 2015
- Jacob, J., Shanmugavelu, P., Balasubramaniam, R., **Singh, R.**, “Excimer Laser Micromachining and its Applications” Lasers based Manufacturing, Springer 2015
- **Singh, R.** and V. Bajpai, “Coolant and Lubrication in Machining,” Handbook of Manufacturing Engineering and Technology, edited by Andrew Yeh-Ching Nee, Springer 2013
- **Singh, R.**, and Melkote, S. N., “Laser Assisted Mechanical Micromachining,” *Smart Devices and Machines for Advanced Manufacturing*, co-edited by Dr. Lihui Wang and Dr. Jeff Xi, Springer-Verlag, London, 2008

Keynote and Awarded Papers in Conferences

- Soni, G., **Singh, R.**, Mitra, M., and Falzon, B. G., “Modeling multiple damage mechanisms via multi-fiber multi-layer representative volume element and micro-macro approach,” 9th Australasian Congress on Applied Mechanics (ACAM9), University of new South Wales, Sydney, Dec 2017 (**Keynote paper**)
- Paul S., **Singh R.**, Yan, W., “Thermal model for additive restoration of mold steels using crucible steel” 44th SME North American Manufacturing Research Conference (NAMRC), 2016, Virginia Tech, Blacksburg, USA (**NAMRI SME Outstanding Paper award**)
- Hashimoto, F., Melkote, S. N., **Singh, R.**, and Kalil, R. C., “Effect of Finishing Methods on Surface Characteristics and Performance of Precision Components in Rolling/Sliding Contact, 10th CIRP International Workshop on Modeling of Machining Operations, Reggio Calabria, Italy, August, 2007 (**Keynote paper**)

Journal Papers

Under Review

1. Pramanik, A., Basak, A. K., Littlefair, G., Debnath, S., Prakash. C., Singh, M. A., Marla, D. and **Singh, R.**, “Electrical Discharge Machining of Titanium Alloy – A Review, “submitted to *Advances in Manufacturing*
2. Mukherjee, A., Barai, A., **Singh, R.**, Yan, W. and Sen, S., “Nuclear Plasticity Increases Susceptibility to Damage During Confined Migration,” submitted to *Science Advances*
3. Azim, S., Mahapatra, S. S., Mittal, R. K., **Singh, R.**, and Gangopadhyaya, S., “Role of tool coating on wear and surface integrity during micro drilling of Ni-based superalloy,” submitted to *Journal of Cleaner Production*
4. Anandita, S., Solanki, D., Sencha, R., Singh, R. K., Mote, R., and **Singh, R.** “Study and Characterization of the Ductile-Brittle Transition Zone in Sintered Zirconia,” submitted to *Journal of Materials Processing Technology*
5. Singh, M.A., Hanzel, O., Joshi, K., **Singh, R.**, Sajgalik, P. and Marla, D., “Identification of Wire Electrical Discharge Machinability of SiC Sintered Using Rapid Hot Pressing Technique,” submitted to *Ceramics International*
6. Kumar, P., Mittal, R. K., **Singh, R.**, Joshi, S. S., “Experimental Characterization of Conformal Hydrodynamic Nanopolishing of a Machined Single Crystal Sapphire Cavity” submitted to *Machining Science and Technology*
7. Jacob, J., Shanmugavelu, P., Balasubramaniam, R., **Singh, R.**, “A comparative Study of Different Regression Models for Ablation Depth Prediction during KrF Excimer Laser Ablation of Photoresist Polymer in Hydrogen gas Medium,” submitted to *International Journal of Advanced Manufacturing Technology*

8. Tripathi, S., Tabor, R. F, **Singh, R.**, and Bhattacharya, A., “Experimental Studies on Pipeline Transportation of High Internal Phase Emulsions Using Water-lubricated Core-annular Flow Method,” submitted to Chemical Engineering Science
9. Sahoo, P., Patra, K., Singh, V. K., Mittal, R. K., and **Singh, R.**, “Modelling Dynamic Stability and Cutting Forces in Micro Milling of Ti6Al4V using Intermittent Oblique Cutting Simulation-based Force Coefficients,” submitted to ASME Journal of Manufacturing Science and Engineering
10. Mittal, R. K., Kulkarni, S. S, and **Singh, R.**, “A Higher Order Stability Model for High-Speed Micromilling of Ti-6Al-4V based on Rotor dynamics,” submitted to Journal of Sound and Vibration
11. Vundru, C., **Singh, R.**, Yan, W. and Karagadde, S., “The effect of martensitic transformation on the evolution of residual stresses and identification of the critical linear mass density in direct laser metal deposition (DLMD) based repair,” submitted to ASME Journal of Manufacturing Science and Engineering

Accepted and Published

12. Mittal, R. K., Kulkarni, S. S., Barshilia H. and **Singh, R.**, “Machining Response and Damage Evolution of Amorphous Carbon (WC/a-C) Coated Tools in High-Speed Micromilling of Ti-6Al-4V,” accepted to ASME Journal of Micro Nano Manufacturing
13. Soni, G., **Singh, R.**, Mitra, M., and Yan, W., “Modeling multiple damage mechanisms via multi-fiber multi-layer representative volume element,” *Sādhanā* 45, 64 (2020)
14. Singh, M.A., Hanzel, O., **Singh, R.**, Sajgalik, P. and Marla, D., "Laser Surface Modification of Wire-Electric Discharge Machined Graphene Nanoparticle Reinforced SiC Composites," accepted to ASME Journal of Micro Nano Manufacturing, 2020, 8(1): 010908
15. Maheshwari, C., Mittal, R., Kulkarni, S. S., and **Singh, R.**, “The Effect of Progressive Tool Wear on the Evolution of the Dynamic Stability Limits in High-speed Micromilling of Ti-6Al-4V,” ASME Journal of Manufacturing Science and Engineering, (2019), 141(11): 111006
16. Azim, S., Mahapatra, S. S., Mittal, R. K., Anandita, S., **Singh, R.**, and Gangopadhyaya, S., “Study of Cutting Forces and Surface Integrity in Micro Drilling of a Ni-based Superalloy” *Journal of Manufacturing Processes*, (2019), Volume 45, pp. 368-378
17. Singh, A. K., Narasimhan, K. and **Singh, R.**, “Finite Element Analysis of Thermomechanical Behavior and Residual Stresses in Cold Flowformed Ti6Al4V Alloy,” *International Journal of Advanced Manufacturing Technology*, (2019), Volume 103, Issue 1–4, pp. 1257–1277
18. Jacob, J., Shanmugavelu, P., Balasubramaniam, R., **Singh, R.**, “FEA modeling and experimental validation of excimer laser ablation of photo resist polymer in presence of Hydrogen gas environment for micro-fluidic applications,” *Materials Research Express*, (2019) Volume 6, Number 8, pp. 085316
19. Dhale, K., Banerjee, N., Outeiro, J.C., and **Singh, R.**, Investigation on chip formation and surface morphology in orthogonal machining of Zr-based bulk metallic glass, *Manufacturing Letters*, (2019) Volume 19, pp 25-28.
20. Singh, K., Kartik, V. and **Singh, R.**, “Stability Modeling with Dynamic Run-out in High Speed Micromilling of Ti6Al4V.” *International Journal of Mechanical Sciences*, (2019), Volume 150, pp. 677-690
21. Anandita, S., Mote, R., and **Singh, R.**, “Surface Roughness Prediction during Surface Grinding of Brittle Materials,” *International Journal of Advanced Manufacturing Technology*, (2019), Volume 100, Issue 5–8, pp. 1193–1206
22. Paul, S., **Singh, R.**, Yan, W., Samajdar, I., Thool, K., Paradowska, A., Reid, M., “Critical Deposition Height for Sustainable Restoration via Laser Additive Manufacturing,” *Nature Scientific Reports*, (2018), Volume 8, Article number: 14726
23. Singh, K., Kulkarni, S. S., Kartik, V. and **Singh, R.**, “A Component Mode Synthesis Approach for Determining Micro-end Mill Dynamics with Machine Tool Compliance,” *ASME Journal of Micro Nano-Manufacturing*, (2018), Vol.6, 031005-1

24. Wagh, Y., Paul, S., Gupta, N., and **Singh, R.**, “Metallurgical and Tribological Investigation of Micro-scale Fiber Laser Based Surface Hardening,” *International Journal of Mechatronics and Manufacturing Systems*, (2018), Vol. 11(2-3), pp. 120-134
25. Mittal, R.K., **Singh, R.**, Kulkarni, S. S., Kumar, P., and Barshilia, S., “Characterization of Anti-Abrasion and Anti-Friction Coatings on Micromachining Response in High Speed Micromilling of Ti6Al4V,” *Journal of Manufacturing Processes*, (2018), Vol. 34(A), pp. 303-312
26. Mittal, R.K., Kulkarni, S. S., and **Singh, R.**, “Characterization of Lubrication Sensitivity on Dynamic Stability in High-Speed Micromilling of Ti-6Al-4V via a Novel Numerical Scheme,” *International Journal of Mechanical Sciences*, (2018), Vol. 142-143, pp. 51-65
27. Singh, K., and **Singh, R.**, “Chatter Stability Prediction in High Speed Micromilling of Ti6Al4V via Finite Element Based Micro End Mill Dynamics,” *Journal of Advances in Manufacturing*, (2018), Volume 6, Issue 1, pp. 95–106
28. Anandita, S., Mote, R., and **Singh, R.**, “Stochastic Analysis of Microgrinding Tool Topography and its Role in Surface Generation,” *ASME Journal of Manufacturing Science and Engineering*, (2017), 139(12), 121013
29. Tripathi, S., Bhattacharya, A., **Singh, R.**, and Tabor, R. F., “Rheological Behavior of High Internal Phase Water-in-oil Emulsions: Effects of droplet size, phase mass fractions, salt concentration and aging,” *Chemical Engineering Science*, (2017), Volume 174, pp. 290-301
30. Kumar, G., Lodh, A., Singh, J., **Singh, R.**, Srivastava, D., Dey, G. K., and Samajdar, I., “Experimental Characterization and Finite Element Modeling of Through Thickness Deformation Gradient in a Cold Rolled Zirconium Sheet,” *CIRP Journal of Manufacturing Science and Technology*, (2017), Volume 19, Pages 176-190,
31. Jelia, P. R., Agrawal, A., **Singh, R.**, Joshi, S. S., “Pressure Drop Characteristics over a Textured Surface,” *Sadhana*, (2017), Volume 42, Issue 11, pp 1915–1927,
32. Mittal, R.K., Kulkarni, S. S. and **Singh, R.**, “Effect of Lubrication on Machining Response and Dynamic Instability in High-Speed Micromilling of Ti-6Al-4V,” *Journal of Manufacturing Processes*, (2017), Volume 28, Part 3, pp. 413-421.
33. Tripathi, S., Bhattacharya, A., **Singh, R.**, and Tabor, R. F., “Characterization of Interfacial Waves and Pressure Drop in Horizontal Oil-Water Core Annular Flows,” *Physics of Fluids*, (2017), 29 (8), 082109
34. Phapale, K., Ahire, A. and **Singh, R.**, “Experimental Characterization and Finite Element Modeling of Critical Thrust Force in CFRP Drilling,” *Journal of Machining Science and Technology*, (2017), 22:2, pp. 249-270
35. Yadav, A. K., Kumar, M., Bajpai, V., Singh, N. K., and **Singh, R.**, “FE Modeling of Burr Size in High-Speed Micro-Milling of Ti6Al4V,” *Precision Engineering*, (2017), 49, pp. 287-292
36. Kumar, G., Balo, S., Dhoble, A., Singh, J., **Singh, R.**, Srivastava, D., Dey, G. K., and Samajdar, I., “Through thickness deformation gradient in a part-pilgered zirconium tube: experimental measurements and numerical validation,” *Metallurgical and Materials Transactions A*, (2017), Volume 48, Issue 6, pp. 2844-2857
37. Kumar, P., Bajpai, V., and **Singh, R.**, “Burr Height Prediction of Ti6Al4V in High Speed Micromilling by Mathematical Modeling,” *Manufacturing Letters*, (2017), 11, 12-16
38. Singh, K., Kartik, V. and **Singh, R.**, “Modeling of Dynamic Instability via Segmented Cutting Coefficients and Chatter Onset Detection in High-Speed Micromilling of Ti6Al4V,” *ASME Journal of Manufacturing Science and Engineering*, (2017), 139 (5), 051005
39. Samanta, A., Teli, M. and **Singh, R.**, “Process Characterization and Modeling of Residual Stresses in Laser assisted mechanical micromachining (LAMM) of Inconel 625”, *Proceedings of Institution of Mechanical Engineers, Part B: Journal of Engineering Manufacture*, (2017), 231 (10), pp. 1735-1751
40. Parle, D., **Singh, R.**, and Joshi S. S., “Contribution of Specific Work of Fracture to Size Effect in Micro-cutting,” *Machining Science and Technology*, (2016), 20(4), 2016, pp. 567-585.
41. Paul S., **Singh R.**, Yan, W., “Thermal Model for Additive Restoration of Mold Steels using Crucible Steel,” *Journal of Manufacturing Processes* Volume 24, Part 2 (2016), pp. 346–354

42. Phapale, K., **Singh, R.**, Patil, S., Singh, R. K. P., “Comparative Study of Drilling Induced Delamination in CFRP with Different Ply Orientation,” *Key Engineering Materials*, 705, pp. 227-232
43. Kumar, G., Kanjarla, A. K., Singh, Lodh, A., Singh, J., **Singh, R.**, Srivastava, D., Dey, G. K., Saibaba, N., Doherty, R, and Samajdar, I., “Burst Ductility of Zirconium Clads: The Defining Role of Residual Stress,” *Metallurgical and Materials Transactions A*, (2016) 47: 3882.
44. Shinde, H., Mahajan, P., **Singh, R.** and Narasimhan, K. "Process Modeling and Optimization of The Staggered Backward Flow Forming Process of Maraging Steel via Finite Element Simulations," *International Journal of Advanced Manufacturing Technology*, (2016), Volume 87, Issue 5, pp. 1851–1864
45. Bajpai, V., Prasad, B., and **Singh, R.**, “Creation and Functional Characterization of Engineered Features on Pyrolytic Carbon Surface,” *Advances in Manufacturing*, (2016) 4: 134
46. Bajpai, V. and **Singh, R.**, “Effect of Thermal and Material Anisotropy of Pyrolytic Carbon in Vibration-Assisted Micro-EDM Process,” *Materials and Manufacturing Processes*, (2016), 31 (14), pp. 1879-1888
47. Parle, D., **Singh, R.**, and Joshi S. S., “Fracture Energy Evaluation using J-integral in Orthogonal Micro-cutting,” *ASME Journal of Micro Nano Manufacturing*, (2016), 4 (1), 011002
48. Kumar, G., **Singh, R.**, Singh, J., Srivastava, D., Dey, G. K. and Samajdar, I., “Defining the Stages of Annealing in a Moderately Deformed Commercial Zirconium Alloy,” *Journal of Nuclear Materials*, (2015), 466, 243-252
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85. **Singh, R.**, Saigal, A., and Greif, R., “Recycled ABS Core / ASA Composite Polymeric Enclosures,” *Proceedings of the International Conference of Restoration, Recycling and Rejuvenation Technology for Engineering and Architecture Application*, University of Bologna, Cesena, Italy, June 2004, 312-322
86. **Singh, R.**, Saigal, A., and Greif, R., “Impact Behavior of Recycled Core Sandwich Polymeric Enclosures,” *Proceedings of 6th International Conference on Sandwich Structures*, Fort Lauderdale, FL, April 2003

Technical Presentations/Reports

- Manufacturing Roadmap in India, Presented in the Consultative Committee of Young Scientist for High Powered Scientific Committee of DST
- **Singh, R.**, Melkote, S. N., and Kalil, R.C., “Evaluation of Frictional Characteristics of Precision Machined Surfaces,” *A technical presentation to Advanced Process Technology Group*, The Timken Company, Canton, Ohio, July, 2004
- **Singh, R.**, Melkote, S. N., and Kalil, R.C., “Evaluation of Functional Characteristics of Precision Finished Surfaces,” *Technical report submitted to The Timken Company*, July 2004
- Greif, R., **Singh, R.**, and Saigal, A., “Impact Modeling of Recycled Core Composite Polymeric Enclosures,” *2004 ASME International Mechanical Engineering Congress and Exposition, Symposium on design and manufacturing of composites*, New Orleans, Louisiana, November 2002

PATENTS/INVENTION DISCLOSURE

- Indian Patent No. 289135 awarded (Application number 442/MUM/2011) for “Method and device for generating laser beam of variable intensity distribution and variable spot size,” **R. Singh**, Y. Wagh, S. S. Joshi, S. Ahirrao, N. Gupta
- US Patent No. 10442117 awarded (U.S. Patent Application No.: 15/489,188) for “Laser based tyre mold vent cleaning process and device,” **R. Singh**, S. Alya, R. Mittal, A. Rahim, S. Kharat, P. Parmar and K. Keshav
- Indian patent filed (1319/MUM/2012) for “Surgical Rod Cutter based on Inverse Slider Crank Mechanism,” A. Guha, **R. Singh**, L. Dhamija, G. Soni
- Indian patent filed (1929/MUM/2012) for “Conformal Hydrodynamic Polishing Process and Machine,” P. Kumar, **R. Singh**, S. S. Joshi, R. Balasubramaniam, T. Dewangan, V. K. Suri
- Indian patent filed (2547/MUM/2013) for “Slicing of ultra-thin wafers using WEDM process,” G. Dongre, S. S. Joshi, **R. Singh**

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- U.S. patent filed (U.S. Patent Application No.: 16/410, 432; Filing Date: May 13, 2019) for “Method for Creating Micro Scale Optical Codes on Jewelry and Gemstones and Scanning Micro Scale Optical Codes thereof for Digital Personalization,” R. Mittal, P. Mehta, **R. Singh** and D. Kothari

HONORS/AWARDS

- **Swarnajayanti Fellowship**, 2014-15, DST (for 2016-2021) (**Most prestigious and high-selective research fellowship** in India awarded to around 2 researchers in the field of Engineering Sciences every year)
- **NAMRI/SME Outstanding Paper award** for paper titled “Thermal model for additive restoration of mold steels using crucible steel” 44th SME North American Manufacturing Research Conference (NAMRC), 2016, Virginia Tech, Blacksburg, USA
- Invited Professor at Arts et. Métiers, Campus of Cluny, France 2017-2018
- Laser-assisted mechanical micromachining research covered by Industry Week Magazine in October 1, 2007 issue
- 1st Prize at Graduate Research Symposium, Tufts University, Medford, MA (2002)
- Nominated as Mechanical Engineering Department Representative to Graduate Student Council at Tufts University (2001-2002)

PROFESSIONAL ACTIVITIES AND EDITORIAL ASSIGNMENTS

- Congress Chair, 4th World Congress on Micro Nano Manufacturing 2020, Indian Institute of Technology Bombay
- Executive Committee Member, International Forum on Micromanufacturing
- Member, Young Scientists Consultative Committee, Department of Science and Technology, Government of India
- Associate Editor, IISE Transaction, Design and Manufacturing
- Member, Editorial Board of Nature Scientific Reports
- Member, Editorial Board of JMST Advances
- Member, Editorial Board of International Journal of Precision Technology
- Evaluation for funding research projects from KU Leuven, Belgium and Polish National Science Academy
- Faculty Promotion Review for NTU, Singapore
- Member, Academic Advisory Board, Birla Institute of Technology Mesra, Ranchi
- Member, Senate IIT Dharwad
- Member Board of Studies: VJTI, Mumbai; Walchand College of Engineering, Sangli; Vishwakarma Institute of Technology, Pune
- Reviewer for:
 - ASME Journal of Manufacturing Science
 - Materials and Manufacturing Processes
 - Proceedings of IMECHE B: Journal of Engineering Manufacture
 - Applied Mathematical Modeling
 - Applied Surface Science
 - Precision Engineering
 - International Journal of Machine Tools and Manufacture
 - International Journal of Advanced Manufacturing Technology
- Member, American Society of Mechanical Engineers (ASME)

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KEYNOTE AND INVITED TALKS

- Keynote at Global Research Group on Light Metal Manufacturing at University of Toyama, Japan, 2020
- Invited talk at University of North Carolina Charlotte, September 2019
- Invited talk at Michigan State University, East Lansing, June 2019
- Keynote lecture at Australasian Conference in Applied Mechanics, ACAM9, at UNSW Sydney, November, 2017
- Invited Speaker at Bangalore India Nano, Bengaluru, December 2016
- Member, Standing Consultative Committee of Young Scientists of DST
- Invited talk at VJTI, Mumbai, 2018
- Invited talk at Birla Institute of Technology, Ranchi, 2018 and 2019
- Invited talk at Arts et Metiers, Paris Tech, Campus of Cluny, France
- Invited talk at Universidad Politécnica de Cartagena, Spain, 2016
- Invited talk at IIT Kanpur, 2016 and 2018

COMMUNITY SERVICE

- Volunteered at IIT Bombay KV
- Vice-President of ASHA for Education (An action group for children's education in India) at Georgia Tech, 2003-2004
- Vice-President, Indian Society at Tufts University, 2001-2002
- Volunteered as tutor for International Community School, Dekalb County, Georgia, Fall 2005
- Volunteer with Habitat for Humanity