AVINASH PARASHAR (P.Eng.)

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Education

- **Ph.D**., Mechanical Engineering, University of Alberta 2009- 2012
  - (GPA-4.0)
  - Computational mechanics, composites, nanocomposites

- **Masters**, Mechanical Engineering, Concordia University 2006-2008
  - (GPA-3.93)
  - Laser based nano-patterning of lens inserts

- **B.E.**, Mechanical Engineering, N.I.T. India 1998 - 2002
  - (79.5 %- Distinction with honors)

Professional Experience

- **Assistant Professor**, 2014-Present
  Department of Mechanical & Industrial Engineering,
  Indian Institute of Technology-Roorkee (India)
  - Teaching undergraduate & graduate level courses.
  - Developed courses for graduate and undergraduate level.
  - Supervising graduate students.
  - Associated with nanotechnology center.

- **Attached Scientist** 2013-2014
  Atomic Energy of Canada Limited,
  Chalk River Laboratories, ON (Canada)
  - Submitted a review report on hydride cracking in pressure tubes.
  - Simulated displacement cascade in single crystal of niobium.
  - Developed an atomistic model to study the effect of radiation damage on the mechanical and fracture properties of single crystal of niobium.

Teaching Experience

- **Courses Developed**
  - Nanomechanics to multiscale modeling (MI-600)/ Graduate level
  - Engineering Analysis and Design (MI-291)/ undergraduate level
- **Courses Taught**
  - Engineering Analysis and Design / *MI-291* (Assist. Prof. IIT Roorkee).

- Machine Design/ *MI-212* (Assist. Prof. IIT Roorkee).
- Engineering Drawing/ MIN-108 (Assist. Prof. IIT Roorkee).
- Measurement and Instruments / *MI-362* (Assist. Prof. IIT Roorkee).
- Modeling and Simulation / *NT-504* (Assist. Prof. IIT Roorkee).
- Mechanical Engineering Lab/ *Mec-403* (T.A. at University of Alberta).
- Manufacturing Processes / *MIE 313* (T.A. at Concordia University).

Industrial & Administrative Experience

- **National Thermal Power Corporation** Sept 2004- Sept 2006
  NTPC Ltd. India

  - Joined as executive engineer.
  - Worked in commissioning of thermal power plants.

- **Honda Siel Cars India Ltd** Oct 2003-Jul 2004

  - Joined as engineer in metal finish line.
  - Shift engineer, vehicle quality.
  - Coordinating departments to lower the defects/car.

- **LML Vespa Ltd.** Jul 2002-Oct 2003

  - Joined as graduate engineer in manufacturing management.
  - Coordinated project to reduce engine vibration.
  - Coordinated project on low-pressure casting.

Awards & Honors

- Atomic Energy of Canada Limited postdoctoral fellowship (2013-2014) $57200.
- NSERC (Visiting postdoctoral fellowship) (2013-14/declined) $47234.
- NSERC postgraduate scholarship (2009-12) $63000.
- Alberta innovates graduate scholarship in nanotechnology (2010-13) $64000.
- Ontario graduate scholarship (2009-12/declined) $45000.
- Presidents doctoral prize of distinction (2009-12) $20200.
- ASME OMAE Calgary graduate scholarship (2011-12) $3900.
- Tuition fees waiver (2009-10) $1500.

- University of Toronto fellowship (2009-10) $9000.
- President scout

Funded Research Project

- **Title**: Tailoring of polymer properties using nanofillers
  Funding agency: Indian Institute of Technology, Roorkee (Completed)

- **Title** : A molecular dynamics based atomistic simulation to study the effect of nanofiller on the mechanical and thermal properties of polymer based nanocomposites.
  Funding agency: Nanomission, Department of Science and Technology (In progress)

- **Title**: Atomistic simulations to study the mechanical and fracture properties of nuclear materials.
  Funding agency: BRNS, Department of Atomic Energy (Completed)

- **Title**: Atomistic simulations to study the feasibility of 2D nanomaterials for water desalination.
  Funding agency: Council of Scientific and Industrial Research (In Progress)

Supervision of PhD Thesis

Title : *An Atomistic Study on Defect Engineering to Tailor Mechanical Properties of Graphene*
Scholor : Dr. Rajasekaran G (MHRD candidate)
Year : 2014-2017
Status : **Awarded**
Current : Assistant research professor, SRM University

Title : *Effect of functionalization and defect engineering on the properties of h-BN/nanocomposites*
Scholor : Dr. Rajesh Kumar (MHRD candidate)
Co-Sup : Prof. Pierre Mertiny (University of Alberta, Canada)
Year : 2014-2018
Status : **Awarded**
Current : Postdoctoral research fellow, University of Connecticut

Title : *Atomistic modeling to study 2dimensional reinforced nanocomposites*
Scholor : Akarsh Verma (Project candidate)
Co-Sup : Prof. M. Packirisamy (Concordia University, Canada)
Year : 2016-continue
Status : **In progress**

Awards : Fulbright Indo –US fellowship

Title : *Atomistic simulations to study effect of irradiation on the properties of Zr-Nb alloys*
Scholor : Divya Singh (Project candidate)
Year : 2016-continue
Status : **In progress**

Title : *2D nanomaterials as membrane for ion separation*
Scholor : Bharat Bhushan Sharma (MHRD candidate)
Year : 2017-continue
Status : **In progress**

Supervision of M.Tech Thesis

Title : *Atomistic simulations to study effect of water on 2D nanomaterials*
Scholor : Saurabh Sharma
Year : 2017-2019
Status : **Completed**

Title : *Atomistic simulations to study properties of nuclear materials*
Scholor : Prashant Sharma
Year : 2017-2019
Status : **Completed**

Title : *Atomistic simulations to study properties of nuclear materials*
Scholor : Pankaj Sharma
Year : 2016-2018
Status : **Awarded**

Title : *Atomistic simulation to study defective nanofillers*
Scholor : Mukesh Kumar
Year : 2015-2017
Status : **Awarded**

Title : *Threshold displacement energy for single crystal of beryllium*
Scholor : Rohit Kumar
Year : 2015-2017
Status : **Awarded**

Title : *Atomistic modeling to study bcc crystal structure of niobium*
Scholor : Anil Kumar Gautam
Year : 2014-2016
Status : **Awarded**

Title : *Atomistic modeling to study properties of graphene*

Scholor : Desfe Muse
Year : 2014-2016
Status : **Awarded**

Title : *Analysis of CNT reinforced nanocomposites* ***(Co-Supervised)***
Scholor : Anuj Pratap Singh
Year : 2014-2016
Status : **Awarded**

Title : *Experimental investigation of aluminum based MMC* ***(Co-Supervised)***
Scholor : Umashankar Tripathi
Year : 2014-2016
Status : **Awarded**

Publications

Journal (Published/accepted)

1. Divya Singh, **Avinash Parashar** (**2019**) Effect of Nb precipitate on defect formation and migration energies in bi-crystalline Zr. **Materials chemistry and physics** (Revisions received)
2. Saurabh S Sharma, Bharat Bhushan Sharma, **Avinash Parashar** (**2019**) Defect formation dynamics in dry and water submerged graphene nanosheets. **Materials research express,** 6, 075063
3. Saurabh S Sharma, Bharat Bhushan Sharma, **Avinash Parashar** (**2019**) Mechanical and fracture behaviour of water submerged graphene. **Journal of applied physics** (Accepted)
4. Divya Singh, **Avinash Parashar** (**2019**) Atomistic simulations to study the effect of Nb precipitate on fracture properties of bi-crystalline Zr. **Journal of physics D: applied physics** (Published online)
5. Akarsh Verma, Rajesh Kumar, **Avinash Parashar** (**2019**) Enhanced thermal transport across bi-crystalline graphene-polymer interface: An atomistic approach. **PCCP**, 21, 6229-6237
6. Bharat Bhushan Sharma, **Avinash Parashar**, (**2019**) A review on thermo-mechanical properties of bi-crystalline and polycrystalline 2D nanomaterials. ***Critical reviews in solid state and materials sciences***. (**Accepted**)
7. Akarsh Verma, **Avinash Parashar**, Muthukumaran Packirisamy (**2019**), Effect of grain boundaries on the interfacial behaviour of graphene-polyethylene nanocomposite. **Applied surface science**, 470, 1085-1092.
8. Divya Singh, **Avinash Parashar**, Rajeev Kapoor, Apu Sarkar, A. Kedharnath (**2019**), Effect of symmetrical and asymmetrical tilt grain boundaries on the tensile deformation of zirconium bi-crystals: a MD based study. **Journal of Materials science**, 54, 3082-3095
9. Vibhor Singla, Akarsh Verma, **Avinash Parashar** (**2019**), A molecular dynamics based study to estimate the point defects formation energies in graphene containing STW defects. **Materials research express**, 6,015606 (**SPARK INTRENSHIP WORK**)

10. Divya Singh, Pankaj Sharma, Sahil Jindal, Prince Kumar, Piyush Kumar, **Avinash Parashar** (**2018**): Atomistic simulations to study crack tip behaviour in single crystal of bcc Niobium and hcp Zirconium. **Current applied physics** 19,37-43.

11. Akarsh Verma, **Avinash Parashar** (**2018**) Structural and Chemical Insights into Thermal Transport for Strained Functionalised Graphene: A Molecular Dynamics Study. **Materials research express**, 5,116505.

12. Akarsh Verma, **Avinash Parashar** (**2018**) Tailoring the failure morphology of bicrystalline graphene oxide. **Journal of Applied Physics,** 124, 015102.

13. Akarsh Verma, **Avinash Parashar** (**2018**) Reactive force field based atomistic simulations to study fracture toughness of bicrystalline graphene functionalised with oxide groups. **Diamond and Related Materials**, 88, 193-203.

14. Divya Singh, Avinash Parashar (**2018**) Effect of symmetrical and asymmetrical tilt grain boundaries on radiation induced defects in zirconium. **Journal of Physics D: Applied physics,** 51,265301.

15. Rajesh Kumar, **Avinash Parashar** (**2018**) Effect of geometrical defects and functionalization on the interfacial strength of h-BN / polyethylene based nanocomposite. **Polymer**, 146, 82-90.

16. Akarsh Verma, **Avinash Parashar** (**2018**) Molecular dynamics based simulations to study the fracture strength of monolayer graphene oxide. **Nanotechnology** 29,115706.

17. Divya Singh, **Avinash Parashar** (**2018**) Effect of symmetric and asymmetric tilt grain boundaries on the tensile behaviour of bcc-Niobium. **Computational materials science, 143,** 126-132

18. Akarsh Verma, **Avinash Parashar** (**2018**) Molecular dynamics based simulations to study failure morphology of hydroxyl and epoxide functionalised graphene. **Computational materials science**. 143, 15-26

19. Akarsh Verma, **Avinash Parashar**, Muthukumaran Packirisamy (**2018**) Atomistic modeling of graphene/h-BN polymer nanocomposites: A review. **Wires Computational molecular science.** 3,1-50

20. Rajesh Kumar, **Avinash Parashar**, Pierre Martiny (**2018**) Displacement thresholds and knock-on cross sections for hydrogenated h-BN monolayers. **Computational materials science**. 142,82-88

21. Rajesh Kumar, **Avinash Parashar**, (**2017**) Dislocation assisted crack healing in h-BN nanosheets. **PCCP**,19, 21739-21747

22. Akarsh Verma, **Avinash Parashar**,(**2017**) Effect of STW defects on mechanical properties and fracture toughness of pristine and hydrogenated graphene. **PCCP**, 19, 16023 - 6037

23. Rajesh Kumar, **Avinash Parashar**, (**2017**)Fracture toughness enhancement of h-BN monolayers via hydrogen-passivation of crack surface. **Nanotechnology** ,28,165702

24. Rajasekaran G., **Avinash Parashar**, (**2017**) Enhancement of Fracture Toughness of Graphene via Crack Bridging with Stone-Thrower-Wales Defects. **Diamond and related materials.** 74,90-99

25. **Avinash Parashar**, Divya Singh, (**2017**) Molecular dynamics based study of an irradiated single crystal of niobium. **Computational materials science**.131,48-54

26. Rajasekaran G., **Avinash Parashar**, (**2016**) Anisotropic compressive response of Stone-Thrower-Wales defects in graphene: A molecular dynamics study. **Materials research express**, 9 095015

27. Rajesh Kumar, Pierre Pertiny, **Avinash Parashar**, (**2016**) Effects of Different Hydrogenation Regimes on Mechanical Properties of h-BN: A Reactive Force Field Study: A Reactive Force Field Study. **The Journal of physical chemistry C**. *120,* 21932–21938

28. Muse Degefe, **Avinash Parashar**, (**2016**) Effect of non-bonded interactions on failure morphology of defective graphene. **Materials research express**, 4, 045009

29. Rajasekaran G., **Avinash Parashar**, (**2016**) Molecular Dynamics Study on Mechanical Response and Failure Behaviour of Graphene: Performance Enhancement via 5-7-7-5 Defects. ***RSC Advances***,6, 26361-26373

30. Rajasekaran G., **Avinash Parashar**, (**2016**) Molecular dynamics based simulations to study the effect of modified cut-off function for Tersoff potential on estimating mechanical properties of graphene. ***Material research express*** , *3* , 035011.

31. Rajesh Kumar, Rajasekaran G, **Avinash Parashar**, (**2016**), Optimised cut-off function for Tersoff like potentials for BN nanosheet: A molecular dynamics study. ***Nanotechnology***, 27,085706

32. Rajesh Kumar, **Avinash Parashar**, (**2016**), Atomistic modelling of mechanical and thermal properties of BN nanofillers: a review. ***Nanoscale***, 8,22-49.

33. Rajasekaran G., **Avinash Parashar** (**2016**) Effect of point and line defects on the properties of graphene. ***Critical reviews in solid state and materials sciences***. 41,46-70.

34. **Avinash Parashar**, Pierre Mertiny, (**2013**) Effect of van der Waals interaction on the fracture characteristics of graphene sheet. ***Solid State Communication***. 173, 56-60.

35. **Avinash Parashar**, Pierre Mertiny, (**2013**) Effect of van der Waals forces on the buckling strength of multiple graphene sheets. ***Computational and Theoretical Nanoscience***, 10, 2626-2630.

36. **Avinash Parashar**, Pierre Mertiny (**2013**) Multiscale model to study fracture toughening in graphene/polymer nanocomposites, ***International Journal of Fracture***, 179, 221-228.

37. **Avinash Parashar**, Pierre Mertiny, (**2013**) Failure mechanism in adhesively bonded FRP pipe sections with different fibre architecture, ***Composite Part B*** 47, 102-106.

38. **Avinash Parashar**, Pierre Mertiny, (**2013**) Finite element analysis to study the effect of dimensional and geometrical parameters on the stability of graphene sheets. ***Journal of Computational and Theoretical Nanoscience***, 10, 292-296.

39. **Avinash Parashar**, Pierre Mertiny, (**2012**) Representative volume element to estimate buckling behavior of graphene/polymer nanocomposite. ***Nanoscale Research Letters***, 7, 515. (**Highly Accessed Article**)

40. **Avinash Parashar**, Pierre Mertiny, (**2012**) Multiscale model to investigate the effect of graphene on the fracture characteristics of graphene/polymer nanocomposite, ***Nanoscale Research Letters***, 7, 595. (**In Oct 2012 was listed among the top 20 downloaded papers**)

41. **Avinash Parashar**, Pierre Mertiny, (**2012**) Effect of FRP pipe scaling on its adhesive bonding strength. ***Journal of Adhesion***, 88, 866-880.

42. **Avinash Parashar**, Pierre Mertiny, (**2012**) Study of mode I fracture of graphene sheets using atomistic based finite element modeling and virtual crack closure technique. ***International Journal of Fracture***, 176,119-126.

43. **Avinash Parashar**, Pierre Mertiny, (**2012**) Adhesively bonded composite tubular joints: Review. ***International Journal of Adhesion and Adhesives***, 38, 58-68. (**In Oct 2012 was listed among the top 5 downloaded papers**)

44. Jasjit Singh Mann, **Avinash Parashar**, Ankur Shah, N.R.Sivakumar, **(2010)** Numerical and experimental analysis of nanosecond pulsed laser drilling with dual frequency. ***International Journal of Abrasion Technology***, 3, 141-156.

45. Ankur Shah, **Avinash Parashar**, Jasjit Singh Mann, N.R. Sivakumar, (**2009**) Interference assisted laser induced forward transfer for structured patterning. ***The Open Applied Physics***, 2, 49-52.

46. **Avinash Parashar**, Jasjit Singh Mann, Ankur Shah, N.R.Sivakumar, (**2009**) Numerical and experimental study of interference based micromachining of stainless steel. ***Journal of Laser Micro/Nano Engineering***, 4, 124-127.

47. Jasjit Singh Mann, **Avinash Parashar**, Ankur Shah, N.R.Sivakumar, (**2009**) Optical setup with high power transmission for creating gratings at the focusing length. ***Journal of Modern Optics***, 56, 1341-1347.

48. **Avinash Parashar**, Jasjit Singh Mann, Ankur Shah, N.R.Sivakumar, (**2009**) Interference based marking method for toric contact eye lens inserts. ***Journal of Modern Optics***, 56, 855-862.

49. **Avinash Parashar**, Ankur Shah, Muthukumaran Packirisamy, N.R.Sivakumar, (**2007**) Three cavity tunable MEMS Fabry Perot interferometer. ***Journal of Sensors***, 7, 3071-3083. (**Published in special issue on modeling, testing and reliability issues in MEMS engineering**)

Conference proceeding

1. Akarsh Verma, **Avinash Parashar**, Role of chemical species in fracture mechanics of graphene nanolayer. Materials Today **proceedings 2018.**

2. Akarsh Verma, **Avinash Parashar**, M.Packirisamy, Molecular mechanics of oxidation on strained 2D nanomaterial: a reaxFF study. ACMS **2018**, IIT Roorkee

3. Akarsh Verma, **Avinash Parashar**, Strength and fracture investigation of polycrystalline graphene with tilt grain boundaries. ACMS **2018**, IIT Roorkee

4. Akarsh Verma, **Avinash Parashar**, Characterization of 2D nanomaterials for energy storage. **2017** International conference on theoretical, applied, computational and experimental mechanics. IIT Kharagpur

5. Akarsh Verma, **Avinash Parashar**, Mechanics of plasticity in epoxide functionalized nanographene. **2017** International conference on advances in materials & processing: challenges & opportunities, IIT Roorkee

6. Akarsh Verma, **Avinash Parashar**, Molecular insights on 2D nanomaterials for hydrogen storage. **2017**, International conference on advances in materials & processing: challenges & opportunities, IIT Roorkee

7. Divya Singh, **Avinash Parashar**, Molecular dynamics based simulations to study grain boundaries in niobium. **2017,** INCAM 2017, MNNIT Allahabad.
8. Akarsh Verma, **Avinash Parashar**, Effect of hydrogenation on mechanical and fracture properties of graphene. **2017,** INCAM 2017, MNNIT Allahabad.

9. Rajasekaran G, **Avinash Parashar**, Effect of topological defects mechanical properties of graphene sheets: a molecular dynamics study. **2017**; Materials today proceedings.

10. **Avinash Parashar**, Pierre Mertiny. Impact of scaling on fracture strength of adhesively bonded fibre reinforced polymer piping. *Procedia Engineering*. **2011**; 10 : 455-459.

11. **Avinash Parashar**, Pierre Mertiny. Challenges in joining thermoset composite piping. *International pipeline conference*.**2010** Calgary -IPC2010-31297.

12. Pierre Mertiny, Mohamed T. Bashar, **Avinash Parashar**, Kulwinder Juss. Technological advances for improved performance and operation of fiber reinforced polymer piping. *ASME Pressure Vessels & Piping Conference* **2010**

13. **Avinash Parashar**, Ankur Shah, N.R.Sivakumar. *Laser micromachining for biomedical applications*. *International Conference LPM*.**2008** Quebec.

14. **Avinash Parashar**, Mukesh K. Meena. Robotics and artificial intelligence. *National Level Conference DOKINCE*.**2001**. India.

15. **Avinash Parashar**, Ashutosh Pandey. Space Robotics. *National Level Conference PRODIGY*. **2001**. India