

Abir Bhattacharyya, Ph.D.

CONTACT ADDRESS

Department of Metallurgical and Materials Engineering
Indian Institute of Technology, Jodhpur
N.H. 65, Nagaur Road
Karwar, Rajasthan-342037
Email: abir@iitj.ac.in / abir.mtl@gmail.com
Phone: +91 291-280-1554



RESEARCH INTEREST

Mechanical behavior of materials, Fracture and Fatigue, High strain-rate deformation of materials, Thermal barrier coatings, Mechanics of soft materials, Experimental mechanics

PROFESSIONAL EXPERIENCE

Assistant Professor (September 2018-Current)

Department of Metallurgical & Materials Engineering, Indian Institute of Technology Jodhpur

Postdoctoral Research Associate (2017-2018)

Department of Mechanical & Aerospace Engineering, University of Florida, Gainesville, FL
Project: Mechanics of polymer gels and boron rich solids under quasi-static and high strain-rates

Oak Ridge Institute of Science and Education Postdoctoral Fellow (2016-2017)

Materials & Manufacturing Division, National Energy Technology Laboratory (NETL), Department of Energy, Albany, OR, USA

Project: Processing, characterization and stress analysis of thermal barrier coatings

Postdoctoral Research Associate (2015-2016)

Institute for Shock Physics, Washington State University, Pullman, WA

Project: Shock compression of Boron Carbide

EDUCATION

Doctor of Philosophy (Ph.D.) in Mechanical Engineering (2011-2015)

University of Florida, Gainesville, FL

Thesis: Evolution of cyclic plasticity during rolling contact fatigue of a case-hardened bearing steel

Master of Engineering (M.E.) in Materials Engineering (2009-2011)

Indian Institute of Science, Bangalore, India

Thesis: Strain-rate sensitive plastic flow in bulk metallic glasses under nanoindentation loading

Bachelor of Engineering (B.E.) in Metallurgical Engineering (2005-2009)

Jadavpur University, Kolkata, India

Thesis: Effect of stress amplitude on fatigue and ratcheting behavior of an interstitial free steel

JOURNAL PUBLICATIONS

1. A. Bhattacharyya, C. oBryan, Y Ni, C.D. Morley, C.R. Taylor, and T. Angelini, "Hydrogel Compression and Polymer Osmotic Pressure" *Biotribology*, 2020
2. K. Upadhyay, A. Bhattacharyya, G. Subhash and D. Spearot, "Quasi-static and high strain rate simple shear characterization of soft polymers", *Experimental Mechanics*, 2019
3. A. Bhattacharyya* and D. Maurice, "Residual stresses in functionally graded thermal barrier coatings" *Mechanics of Materials*, Vol 129, pp. 50-56, 2019
4. A. Bhattacharyya and D. Maurice, "On the evolution of stresses due to lattice misfit at a Ni-superalloy and YSZ interface", *Surfaces and Interfaces*, Vol 12, pp. 86-94, 2018
5. H.A.E. Hawa, A. Bhattacharyya* and D. Maurice, "Modeling of thermal and lattice misfit stresses within a thermal barrier coating" *Mechanics of Materials*, Vol 122, pp. 159-170, 2018
6. A. Bhattacharyya, N. Londhe, N. Arakere and G. Subhash, "A new approach towards life prediction of case-hardened bearing steels", *Materials Performance and Characterization, ASTM International*, Vol 6(4), pp. 656-677, 2017 (*invited paper for special edition*)
7. A. Bhattacharyya, G. Subhash, N. Arakere, B.D. Allison and B. McCoy, "Influence of residual stress and temperature on the cyclic hardening response of high-strength M50 steel subjected to rolling contact fatigue", *ASME Journal of Engineering Materials and Technology*, ASME, 138(2) 021003-14, 2015 (*Best paper award ORR, ASME Journal of Engineering Materials and Technology, 2016*)
8. A. Bhattacharyya, A. Pandkar, G. Subhash and N. Arakere, "Cyclic constitutive response and effective S-N diagram of M50 NiL case-hardened bearing steel subjected to rolling contact fatigue", *ASME Journal of Tribology*, ASME 137(4) 041102-041116, 2015
9. A. Bhattacharyya, G. Singh, K.E. Prasad, R. Narasimhan and U. Ramamurty, "On the rate sensitivity of plastic flow in metallic glasses", *Materials Science and Engineering A*, Vol 625, pp. 245-251, 2015
10. A. Bhattacharyya, G. Subhash and N. Arakere, "Evolution of subsurface plastic zone due to rolling contact fatigue of M50 NiL case hardened bearing steel", *International Journal of Fatigue*, Vol 59, pp. 102-113, 2014 (*Among the most cited (52 times since 2014) papers in IJF*)

HONORS AND AWARDS

- *Outstanding reviewer*, *Mechanics of Materials*, Elsevier, 2017
- *Best paper award*, *ASME Journal of Engineering Material and Technology (JEMT)*, 2016
- *Oak Ridge Institute for Science and Education (ORISE) Postdoctoral Fellowship*, 2016
- *National scholarship* under National Merit Scholarship Scheme 2005 in India
- *National scholarship* under National Merit Scholarship Scheme 2003 in India

ACHIEVEMENTS

- **Instructor** (one of the two international students selected from a pool of PhD candidates) for delivering lecture in undergraduate “Mechanical Design” course in the department of Mechanical Engineering of University of Florida
- **Delivered invited talk** on behalf of Prof. Ghatu Subhash in ASME International Mechanical Engineering Congress and Exposition; Nov 15-21 2013; San Diego, CA
- **7th national (India) rank in Graduate Aptitude Test in Engineering (GATE)** examination among few thousand students appeared in the field of Metallurgical Engineering in 2009
- **Overall second (2nd) rank in the four years Bachelor of Engineering (B.E.) program** in Metallurgical Engineering at Jadavpur University
- **Ranked 37th** among half a million students appeared in the secondary (10th grade) examination held in the state of West Bengal, India in the year 2003

PRESENTATIONS

- On improving the existing life-prediction models for rolling element bearings, A Bhattacharyya, IndiaTrib-2019, December 1-4, 2019, IISc Bangalore
- Quasi-static and dynamic simple shear response of cross-linked PDMS, A Bhattacharyya, Nanoyantrika 2019, Sept. 22-24, 2019, Trivandrum (Invited Talk)
- Modeling of Stresses in Thermal Barrier Coatings for Reactors, A Bhattacharyya, International Workshop on Mechanics of Energy Materials (IWMEM), Nov. 19-22, 2018; IIT Madras (Invited Talk)
- Evolution of hardened and softened zones during rolling contact fatigue (RCF) of M-50 Nil steel rods. A. Bhattacharyya, G. Subhash, NK Arakere; ASME International Mechanical Engineering Congress and Exposition; November 15-21, 2013; San Diego, CA. (Invited talk, presented on behalf of Prof. Ghatu Subhash)
- Evolution of hardened and softened regions in RCF-affected zones in M-50 Nil rod. G Subhash, N Arakere, A Bhattacharyya; STLE Annual Meeting, May 5-9, 2013, Detroit, MI
- Experimental evaluation of subsurface damage due to rolling contact fatigue in case hardened bearing steel via micro-indentation mapping. A Bhattacharyya, NK Arakere, G Subhash; TMS Annual Meeting & Exhibition 2013 (March 3-7), San Antonio, TX
- Rolling contact fatigue response of M-50 Nil case hardened bearing steel as a function of cycles. A Bhattacharyya, G. Subhash, N Arakere; STLE Annual Meeting May 6-10 2012, St. Louis, Missouri

JOURNAL REVIEWER

Acta Materialia, Scripta Materialia, Mechanics of Materials, Engineering Fracture Mechanics, Tribology International, Wear, Coatings, Multidiscipline Modeling in Materials and Structures, Journal of Aerospace Engineering, Journal of Mechanical Engineering Sciences