Adya Charan Arohi

Contact

MEMS Department, IIT Bombay,
Powai, Mumbai, India, 400076
EMail ID: arohi0310@gmail.com
Contact Number: +91-7978619774

Research Interests

Titanium alloys, Ni-based superalloy, NiTi shape memory alloy, Structure-property correlation, Additive Manufacturing, Thermal barrier coating, Mechanical metallurgy, Physical metallurgy, Microstructural characterization

Awards and Achievements

- Secured **first prize** on the paper titled "Microstructure-Property correlation of metastable Ti-5Al-5V-5Mo-3Cr alloy" under **poster presentation** category in the **76th Annual Technical Meeting of the Indian Institute of Metals**, held at Hyderabad during 13-16 November, 2022
- Secured first prize in 3 minute thesis titled "Thermomechanical treatment assisted microstructure evolution and property modification for metastable β Ti-5Al-5V-5Mo-3Cr alloy" at RSD-2024, IIT Kharagpur
- Secured **second prize** on the paper titled "Understanding the size effect and creep behavior in metastable β Ti-5Al-5V-5Mo-3Cr alloy using nanoindentation technique" at **RSD-2023, IIT Kharagpur**

PROFESSIONAL HIGHLIGHTS

An accomplished researcher with expertise in establishing process–structure–property relationships in advanced metallic systems, particularly titanium alloys, Ni-based superalloys, and NiTi shape memory alloys. Extensive research experience in thermomechanical processing, phase transformations, additive manufacturing, mechanical behaviour, and surface engineering of structural materials for aerospace and defence applications. Actively engaged in the investigation of thermal barrier coating systems, including electron beam physical vapour deposited (EB-PVD) and plasma-sprayed coatings, with a focus on damage evolution, fracture mechanisms, thermomechanical fatigue, and coating durability under complex loading conditions. Successfully led complex research initiatives culminating in high-quality publications and international conference presentations. Proficient in advanced materials characterization and driven by a strong passion for innovation, collaboration, and impactful materials research.

WORK EXPERIENCE

ANRF-National Postdoctoral Fellow (Oct 2026-Present)
Indian Institute of Science Bengaluru
Actively engaged in creep and thermomechanical fatigue behavior of additively manufactured CMSX-4 Nickel superalloy

Institute Post-Doctoral Fellow (Dec 2024 to October 2026)
Indian Institute of Technology Bombay
Microstructural and mechanical characterization of additively manufactured Ni-superalloy and electron beam physical vapor deposited YSZ thermal barrier coatings using a wide range of advanced characterization techniques.

Project Scientist, (July 2024-Nov 2024)
Indian Institute of Technology Kharagpur
Understanding MTR formation and its removal strategies during secondary TMP of Ti-6Al-4V alloy (Industry Part)", sponsored by GE India Industrial Private Limited.

EDUCATION

PhD: Metallurgical and Materials Engineering, 02/2018 - 11/2024
Indian Institute of Technology Kharagpur, Kharagpur, India
Thesis: Processing induced microstructural evolution and property modification for metastable β Ti-5Al-5V-5Mo-3Cr alloy
Supervisor: Prof. Indrani Sen, IIT Kharagpur, India

M. Tech: Metallurgical and Materials Engineering, 07/2015 - 05/2017
National Institute of Technology Warangal, Telangana, India
Thesis: Multiaxial fatigue behaviour of IMI834 alloy for aeroengine applications
Supervisors: Prof. N. Narasaiah and Dr. Vikas Kumar

B. Tech: Mechanical Engineering, 08/2010 - 06/2014
Gurukul Kangri Vishwavidyalaya, Haridwar, India

Technical Skills

- **Characterization Techniques**: Optical microscopy, X-ray Diffraction (XRD), Scanning electron microscopy (SEM), Atomic force microscopy (AFM), Electron back scattered diffraction (EBSD), Transmission electron microscopy (TEM), Atom probe tomography (APT), X-ray photoelectron spectroscopy (XPS), Potentiodynamic polarization test, Electrochemical impedance spectroscopy (EIS) analysis.
- **Mechanical Characterization:** Nanoindentation, Tensile, Three point bend, Cantilever bending
- **Manufacturing Techniques**: Casting, Forging, Rolling, Heat treatment process.
- **Software Skills:** X'Pert High Score, Indentation 7.3.10, and TSL-OIM .
- **Hands-on experience** in Scanning Electron Microscope (SEM) and X-Ray Diffraction (XRD), Nanoindentation, Universal Testing Machine.

PUBLICATIONS SUMMARY

- **Scientific journals: 12** (Published)
- **Citation index** - Total citations: 131; h-index: 6

(As per Google Scholar database)

JOURNAL PUBLICATIONS

1. **Arohi, A. C.,** Abbas, S., Sampath, S., Venkatachalapathy, V., Srinivasan, D., Balila, N. J., Failure mechanisms of thermal spray coating systems under bending loads, Proceedings of ASME 2026, IMECE-India, 2026
2. Mohapatra, S., Kumar, S., **Arohi, A. C.,** Pradhan, R., Mahapatra, B. N., & Oh, M. S. (2026). Influence of annealing time on microstructure and impact behavior of medium Mn-automotive steel. *Materials Letters*, 140832.
3. **Arohi, A. C.,** Bairi, L. R., Mandal, S., & Sen, I. (2025). Effect of microstructural evolution on the corrosion and passive film behavior of metastable β Ti-5Al-5V-5Mo-3Cr alloy. *Materials Today Communications*, 113667.
4. **Arohi, A. C**., Nayak, P., Punyamanthula, K. K., Ramesh, S., Tarafder, S., Frenzel, J., & Sen, I. (2025). Processing—microstructure—functional properties correlation for NiTi-based pseudoelastic shape memory alloy. *Journal of Materials Science*, 1-21.
5. **Arohi, A.C**, Shashi Shekhar, and Indrani Sen. "Stress-induced martensitic transformation during cold rolling of metastable β Ti–5Al–5V–5Mo–3Cr alloy." *Materials Science and Engineering: A* 911 (2024): 146910.
6. **Arohi, A. C**., Shekhar, S., & Sen, I. (2024). Microstructural effects on the ambient temperature indentation creep behavior of metastable β Ti-5Al-5V-5Mo-3Cr alloy. *Materials Today Communications*, 107834.
7. **Arohi, A. C**., Shekhar, S., & Sen, I. (2024). Effect of thermomechanical processing on microstructure evolution and mechanical properties of metastable β Ti–5Al–5V–5Mo–3Cr alloy. *Materials Chemistry and Physics*, 128809
8. **Arohi, A. C.**, Kumar, V., Babu, N. C., & Narasaiah, N. (2022). Multiaxial Fatigue Behavior of Near Alpha Titanium Alloy for Aeroengine Applications. In *Advances in Structural Integrity: Structural Integrity Over Multiple Length Scales* (pp. 173-191). Singapore: Springer Singapore. Sai, R. J.,
9. Sai, R.J., **Arohi, A. C.**, Khanra, A. K., Kumar, R., Telasang, G., Manna, I., & Sen, I. (2024). A Comparative Study on the Laser Surface Melting and Laser Surface Cladding of H13 Tool Steel. *Journal of Materials Engineering and Performance*, 1-19.
10. Basu, S., **Arohi, A. C**., Mahato, A., Chakravarty, D., Sen, I., & Roy, S. (2024). Understanding the Individual Role of Composition and Spark Plasma Sintering Temperature on the Microstructure and Hardness of Alumina–Zirconia Composites. *Metallurgical and Materials Transactions A*, 1-20.
11. Kumar, S. S., **Arohi, A. C.,** & Sen, I. (2022). A Review on Micro-mechanical Testing of NiTi-Based Shape Memory Alloys. *Journal of the Indian Institute of Science*, *102*(1), 211-235.
12. Avula, I., **Arohi, A. C.,** Kumar, C. S., & Sen, I. (2021). Microstructure, corrosion and mechanical behavior of 15-5 PH stainless steel processed by direct metal laser sintering. *Journal of Materials Engineering and Performance*, *30*(9), 6924-6937.

Personal Details

Address: Vill-Kasimchak, PO-Belhouri, Dist-Patna, State-Bihar, India-801102
Google Scholar: https://scholar.google.co.in/citations?user=N20YSCQAAAAJ&hl=e
Linkedin: https://www.linkedin.com/in/adya-charan-arohi/
ORCID: https://orcid.org/0009-0005-2146-6808
Scopus ID: 57226741038

CONFERENCE PRESENTATION

- **Adya Charan Arohi,** Indrani Sen, "Microstructure Evolution and Mechanical Properties of Titanium Alloy", 3rd Structural Integrity Conference and Exhibition SICE 2020, December 2020.
- **Adya Charan Arohi,** Vikas Kumar, N. Chittibabu, N.Narasaiah, "Multiaxial Fatigue Behavior of Near Alpha Titanium Alloy for Aeroengine Applications", 3rd Structural Integrity Conference and Exhibition SICE 2020, December 2020.
- **Adya Charan Arohi,** Indrani Sen, "Microstructure evolution and mechanical properties evaluation of metastable β Ti-5553 alloy", 11th Research Scholars' Day, IIT Kharagpur, 2022.
- **Adya Charan Arohi,** Indrani Sen, "Microstructure-property correlation of metastable β Ti-5Al-5V-5-Mo-3Cr alloy" The Indian Institute of Metals, NMD ATM 2022, Hyderabad.
- **Adya Charan Arohi,** Indrani Sen, "Understanding the size effect and creep behavior in metastable β Ti-5Al-5V-5Mo-3Cr alloy using nanoindentation technique" 12th RSD, IIT Kharagpur, 2023.
- **Adya Charan Arohi,** Indrani Sen, "Stress induced martensitic transformation during cold rolling of metastable β Ti-5553 alloy, FEMS-EUROMAT 2023, Frankfurt, Germany
- **Adya Charan Arohi,** Ashutosh Suresh Gandhi, Nagamani Jaya Balila, "Microstructural and micro-mechanical characterization of electron beam physical vapor deposited Yitrria-stabilized Zirconia thermal barrier coatings" Nanoyantrika 2025.
- **Adya Charan Arohi,** Shrikant Joshi, Nagamani Jaya Balila, "Effect of post-deposition heat treatment on microstructure evolution and mechanical performance of IN718 superalloy fabricated using direct energy deposition technique" The Indian Institute of Metals, NMD ATM 2025, Hyderabad.

REFERENCES

1. Prof. Praveen Kumar
Professor
Department of Materials Engineering
Indian Institute of Science Bengaluru
Email address: praveenk@iisc.ac.in

2. Prof. Indrani Sen
Associate Professor
Department of Metallurgical and Materials Engineering
Indian Institute of Technology Kharagpur
Email ID: indrani.sen@metal.iitkgp.ac.in

3. Dr. Vikas Kumar
Former Director, Defence Metallurgical Research Laboratory
DRDO, Hyderabad
Chairman, Aeronautics Research and Development Board
Email ID: vikas.dmrl@gmail.com

4. Prof. Nagamani Jaya Balila
Department of Metallurgical Engineering and Materials Science
Indian Institute of Technology Bombay
Email ID: jayabalila@iitb.ac.in