Dr. Yazar K. U.

Assistant Professor
Department of Metallurgical and Materials Engineering
Indian Institute of Technology Kharagpur

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Research Homepage
Google Scholar

Research Interests

Overview: Understand and predict how microstructure governs deformation and failure in metallic systems by combining crystal plasticity and finite element simulations with quantitative microstructural characterisation. My work spans fatigue, creep, fracture and metal forming, with a primary focus on titanium alloys and growing activity in superalloys and steels.

Current interests include machine-learning-enabled accelerated crystal plasticity frameworks, slip-system-resolved rate sensitivity in crystal plasticity models, thermomechanical simulations of additive manufacturing processes, high strain rate deformations, and quantitative plastic strain mapping using electron diffraction.

Key areas: Fracture, Fatigue and Creep; Titanium Alloys; Metal Forming; Additive Manufacturing (LPBF, WAAM, DED); EBSD and Texture Analysis; Crystal Plasticity and Finite Element Modelling; Machine Learning for Materials;

Professional Experience

Indian Institute of Technology Kharagpur, India [Nov. 2026]–Present
Assistant Professor, Department of Metallurgical and Materials Engineering

Vellore Institute of Technology (VIT), Vellore, India [Jun.2022–Oct. 2026]
Assistant Professor, CIMR, School of Mechanical Engineering
Quality Manager, CIMRL (NABL accredited)

Sunchon National University, South Korea [2021–2022]
Postdoctoral Fellow, Department of Advanced Components and Materials Engineering
Mentor: Prof. Shi-Hoon Choi

Indian Institute of Technology Bombay, India [2014–2015]
Project Research Associate (10/2014–07/2015); Research Technical Assistant (08/2014–09/2014), Department of Mechanical Engineering, Mentor: Prof. Sushil Mishra

Macmet India Limited, Kolkata, India [Feb. 2011-Jul. 2011]
Graduate Trainee

Education

Indian Institute of Science, Bengaluru, India 2015–2021
Doctor of Philosophy (Ph.D.), Department of Materials Engineering
Advisor: Prof. Satyam Suwas

Indian Institute of Technology Bombay, India 2012–2014
Master of Technology (M.Tech.), Materials Science, Department of Metallurgical Engineering and Materials Science
Advisors: Prof. K. Narasimhan and Prof. Date

Amrita Vishwa Vidyapeetham, Amritapuri, Kollam, India 2006–2010
Bachelor of Technology (B.Tech.), Mechanical Engineering

Funded Research Projects

Aeronautics Research and Development Board (ARDB), DRDO, Ministry of Defence 11/2025–Present
Principal Investigator. Development of a predictive tool for fatigue crack nucleation in Ti-6242-Si alloy for gas turbine applications using accelerated crystal plasticity simulations aided by machine learning.

Aeronautics Research and Development Board (ARDB), DRDO, Ministry of Defence 03/2025–Present
Co-Principal Investigator. A comprehensive analysis on forming behavior of L605 (Haynes 25) superalloy for developing impingement tube for gas turbine engine application.

Aeronautics Research and Development Board (ARDB), DRDO, Ministry of Defence 10/2026–Present
Co-Principal Investigator. Understanding mixed-mode fracture behaviour and correlations with microstructure variables of Ti-5553 alloy for landing gear applications.

Publications

* Corresponding author

Journals

31. G Anuradha, KV Lokesh, A John, V Edachery, K. U. Yazar, Micro-structural refinement and tribological enhancement of Inconel X-750 superalloy through surface mechanical attrition treatment, *Journal of Materials Science*, 2026.
30. P Mahajan, K. U. Yazar, J Patil, S K Mishra, RG Mote, Intrinsic length scale effects in thermally assisted micro-incremental forming of ultra-thin Ti-6Al-4V sheets: Microstructure and crystal plasticity perspective, *Journal of Materials Processing Technology*, 2026.
29. D Sharda, KU Yazar, AK Saxena, A Kesarwani, S K Mishra, VK Barnwal, Mechanistic Understanding of Forming Limits Using Experiments and Crystal Plasticity Simulations, *Transactions of the Indian Institute of Metals*, 2026.
28. AR Lingarkar, DL Raut, P Mahajan, KU Yazar, A Kumar, S K Mishra*****, Influence of tool diameter on micro-deformation mechanism during micro-incremental sheet forming of thin SS-304 sheet, *Manufacturing Letters*, 2026.
27. Pranav B. Nair, Jahnavi Vikash Jain, Nishka Bhojwani, Karthik Agnihotram, Ashish Kumar Saxena, Vivek Kumar Barnwal, R.J. Vikram, **K. U. Yazar***, Decoupling microstructural contributions to static and transient mechanical properties of LB-PBF IN718 through microscopy-informed machine learning, *Materials Science and Engineering: A*, 2026.
26. Pranav B. Nair, Nishka Bhojwani, Karthik Agnihotram, N. Harshavardhana, Ashish Kumar Saxena, Vivek K. Barnwal, **K. U. Yazar***, Anisotropy in the effect of hydrogen environment on the mechanical properties of wire arc additively manufactured titanium alloy, *Materials Chemistry and Physics*, 2026.
25. **K. U. Yazar***, Sureddy Tejanath Reddy, Amit Bhattacharjee, Marc De Graef, Satyam Suwas, Local chemistry-driven intragranular stress redistribution during dwell fatigue of a near-alpha titanium alloy, *Mechanics of Materials*, 2026.
24. Saurabh Pawar, **K. U. Yazar***, Khushahal Thool, Wi-Geol Seo, Chang-Gon Jeong, Yoon-Uk Heo, Shi-Hoon Choi, Anisotropic compression behavior of 316L stainless steel at room and cryogenic temperatures: The influence of twinning and transformation mechanisms, *International Journal of Plasticity*, 2026.
23. Souvik Sahoo, Anuja P. Joshi, **K. U. Yazar**, Shibayan Roy, Fine-scale microstructure, elemental distribution, and dislocation substructure formation and their influence on post-deposition phase transformation in additive manufacturing of Ti-6Al-4V alloy, *Journal of Materials Engineering and Performance*, 2025.
22. Aarya Kedar Sathe, Diya Anil Kumar, Krish Mehta, Ashish Kumar Saxena, Vivek K. Barnwal, Sureddy Tejanath Reddy, Satyam Suwas, Shi-Hoon Choi, **K. U. Yazar***, Mitigating room-temperature tensile and creep anisotropy in laser powder bed fusion processed Ti6Al4V by modulating slip activity and intervariant boundary distribution through post-printing heat-treatment, *Acta Materialia*, 2025.
21. **K. U. Yazar***, V.K. Barnwal, A.K. Saxena, A.K. Kanjarla, P.P. Date, K. Narasimhan, The role of through-thickness shear in single point incremental forming: a micromechanical perspective, *The International Journal of Advanced Manufacturing Technology*, 2025.
20. Ashish Kumar Saxena, Vivek Kumar Barnwal, **K. U. Yazar**, N. Harshavardhana, Sushil Kumar Mishra, Dynamic evolution of hard orientations and consequent ductility loss during uniaxial tension of Ti6Al4V alloy, *Bulletin of Materials Science*, 2025.
19. Jahnavi Vikash Jain, Vivek K. Barnwal, Ashish Kumar Saxena, Pranav B. Nair, **K. U. Yazar***, Satyam Suwas, Predicting crack nucleation in commercially pure titanium using orientation imaging microscopy and machine learning, *Materials Letters*, 2025.
18. Sureddy Tejanath Reddy, **K. U. Yazar***, Sita Choudhary, Satyam Suwas, Micromechanical response of commercially pure titanium: insights from experiments and crystal plasticity simulations, *Materials Transactions*, 2025.
17. **K. U. Yazar**, Khushahal Thool, V. Kavimani, Aman Gupta, Shi-Hoon Choi, Microstructural and textural evolution in hexagonal close-packed metals: the case of zirconium, magnesium, and titanium, *Crystals*, 2024.
16. **K. U. Yazar**, S. Bahl, S. Mishra, V. Sahu, Amit Bhattacharjee, S. Suwas, Microcrack formation mechanisms under normal and dwell fatigue of IMI 834, *International Journal of Fatigue*, 2023.
15. **K. U. Yazar**, Amit Bhattacharjee, Satyam Suwas, Effect of thermomechanical processing on the dwell fatigue behaviour of near alpha titanium alloy IMI 834, *JOM*, 2022.
14. **K. U. Yazar**, S. Pawar, K.S. Park, S.H. Choi, Effect of process parameters on the clad morphology, microstructure, microtexture, and hardness of single layers 316L stainless steel during direct energy deposition, *Materials Characterization*, 2022.
13. **K. U. Yazar**, S. Mishra, L. Kumar, S. Bahl, T. Kiran Kumar, S. Suwas, Texture induced planar anisotropy of dwell fatigue response in titanium: insights from experiments and crystal plasticity simulations, *International Journal of Plasticity*, 2021.
12. **K. U. Yazar**, M. Shamitha, S. Suwas, Texture dependent dwell fatigue response of titanium, *Philosophical Magazine*, 2021.

11. S. Mishra, **K. U. Yazar**, A. Kar, R. Lingam, N.V. Reddy, Om Prakash, S. Suwas, Texture and microstructure evolution during single point incremental forming of commercially pure titanium, *Metallurgical and Materials Transactions A*, 2021.
10. **K. U. Yazar**, S. Mishra, A. Karmakar, Amit Bhattacharjee, S. Suwas, On the temperature sensitivity of dwell fatigue of a near alpha titanium alloy: role of strain hardening and strain rate sensitivity, *Metallurgical and Materials Transactions A*, 2020.
9. K.V. Vaishakh, R. Narasimhan, **K. U. Yazar**, S. Suwas, Mixed-mode (I and II) fracture behavior of a basal-textured magnesium alloy, *Acta Materialia*, 2020.
8. K. Dash, **K. U. Yazar**, K. Chattopadhyay, S. Suwas, Graded microstructure and interface in ultrafine grained multi-layered immiscible bimetallic system, *Materialia*, 2020.
7. S. Mishra, **K. U. Yazar**, A.M. More, R. Lingam, N.V. Reddy, Om Prakash, S. Suwas, Elucidating deformation modes in incremental sheet forming process: insights from crystallographic texture, microstructure, and mechanical properties, *Materials Science and Engineering: A*, 2020.
6. S. Acharya, S. Mishra, **K. U. Yazar**, K. Chatterjee, S. Suwas, Evolution of deformation texture in the low modulus β titanium alloys Ti-34Nb-2Ta-(0, 3)Zr-0.5O, *Metallurgical and Materials Transactions A*, 2020.
5. D. Karthik, **K. U. Yazar**, Anuj Bisht, S. Swaroop, S. Suwas, Chandan Srivastava, Gradient plastic strain accommodation and nanotwinning in multi-pass laser shock peened 321 steel, *Applied Surface Science*, 2020.
4. S. Bahl, S. Mishra, **K. U. Yazar**, I.R. Kola, K. Chatterjee, S. Suwas, Non-equilibrium microstructure, crystallographic texture and morphological texture synergistically result in unusual mechanical properties of 3D printed 316L stainless steel, *Additive Manufacturing*, 2019.
3. L. Kumar, **K. U. Yazar**, Sudipta Pramanik, Effect of fusion and friction stir welding techniques on the microstructure, crystallographic texture and mechanical properties of mild steel, *Materials Science and Engineering: A*, 2019.
2. V.K.S. Jain, **K. U. Yazar**, S. Muthukumaran, Development and characterization of Al5083-CNTs/SiC composites via friction stir processing, *Journal of Alloys and Compounds*, 2019.
1. **K. U. Yazar***, S. Mishra, K. Narasimhan, P.P. Date, Deciphering the deformation mechanism in single point incremental forming: experimental and numerical investigation, *The International Journal of Advanced Manufacturing Technology*, 2018.

Conference proceedings

2. **K. U. Yazar**, Anish Karmakar, Vivek Sahu, Amit Bhattacharjee, Satyam Suwas, Normal and dwell fatigue behavior of a near-alpha titanium alloy – IMI 834, The 14th World Conference on Titanium (Ti 2019), Nantes, France.
1. **K. U. Yazar**, P.P. Date, K. Narasimhan, Experimental studies on single point incremental forming of metallic sheets, IDDRG 2014, Paris, France.

Book Chapters

B1. Shubhashis Dixit, RJ Vikram, **K. U. Yazar***, A Review on Creep Behaviour of High-Entropy Alloys, Multi-scale Mechanics of High Entropy Alloys, *Springer Nature Singapore*, 2026.

Conference Presentations

P6. Normal and dwell fatigue behavior of a near alpha titanium alloy – IMI 834, *Titanium 2019 (14th World Conference on Titanium), Nantes, France* 2019
P5. Effect of texture on tensile, fatigue, and dwell fatigue behavior of commercially pure titanium, *Aeromat 2019, Reno, USA* 2019
P4. Effect of texture on the tensile, fatigue, and dwell fatigue response of commercially pure titanium, *MRSI Annual General Meeting 2019, Bangalore, India* 2019
P3. Dwell fatigue behavior of cp-titanium: experiments and simulations, *Microstructure 2019, IIT Kanpur, India* 2019
P2. Normal and dwell fatigue behavior of a near alpha titanium alloy – IMI 834, *NMD-ATM 2018, Kolkata, India* 2018
P1. Experimental studies on single point incremental forming of metallic sheets, *IDDRG 2014, Paris, France* 2014

Invited Talks

T3. Mechanistic linkages between build strategy, grain morphology, variant selection, and texture in LPBF Ti6Al7Nb alloy, *International Conference on Additive Manufacturing and Characterization, IIT Madras* Feb 2026
T2. Anisotropy in the static and transient mechanical properties of SLM Ti6Al4V alloy, *International Conference on Additive Manufacturing and Characterization, IIT Bombay* Jan 2025
T1. On the dissimilar rate sensitivity and hardening of slip systems in SLM Ti6Al4V and its influence on room temperature creep, *Mechanical Metallurgy Division, Bhabha Atomic Research Centre, Mumbai* Jan 2025

Patents / Design Registration

P2. **Yazar K. U.**, Pranav Tukaram Nandedkar, Pranav Binoy Nair, Ashish Kumar, Vivek Kumar Barnwal, Portable Metallographic Sample Preparation System, Design No. 452601-001, *Indian Patent Office* 24/03/2025

P1. Vivek Kumar Barnwal 3.Darsh Nilesh Kansagara, Ashish Kumar, **Yazar K. U.,** A single point incremental forming tool with localized lubricant supply, Design No: 447914-001, *Indian Patent Office* 13/02/2025, *Ind. Pat. Of.* 24 Mar 2025

Teaching Experience

Vellore Institute of Technology (VIT), Vellore, India

Materials Science and Engineering (Theory and Lab)	Jul–Nov 2025
Advanced Materials Characterization (Theory and Lab)	Jan–May 2025
Advanced Manufacturing Processes (Theory and Lab)	Jan–May 2024
Metal Forming and Machining (Theory and Lab)	Jul–Nov 2023
Metal Casting and Welding (Theory and Lab)	Jan–May 2023
Materials Science and Engineering (Theory and Lab)	Jul–Nov 2022

Professional Memberships

Life Member Indian Institute of Metals

Life Member Electron Microscopy Society of India

Professional Commitments

Reviewer:

Advanced Engineering Materials

Journal of Manufacturing Science and Engineering (ASME)

Materials Characterization

Metallurgical and Materials Transactions

Awards and Recognitions

Faculty Research Award, VIT Vellore	2026
Best Poster Presentation (Non-Ferrous Category), NMD-ATM 2018, Kolkata	2018
Best oral presentation, First runner-up, Students symposium, Dept. of Materials Engineering, IISc Bangalore	2018
Best Outgoing Student Award, Amrita Vidyalayam, Kozhikode	2006

References

Prof. Satyam Suwas
Professor, Department of Materials Engineering, and Dean, Division of Mechanical Sciences, Indian Institute of Science, Bengaluru, India
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Prof. Shi-Hoon Choi
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Prof. Dipankar Banerjee
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Dr. Sumit Bahl
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