

Dr. Renu Kumari

Assistant Professor

Department of Metallurgical & Materials Engineering

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Areas of Specialization/Interest:

- **Surface Engineering, Biomaterials, Corrosion, Laser Materials Processing, Thermal Spraying, Electrophoretic deposition**

ACADEMIC QUALIFICATIONS

YEAR OF SESSION	EXAMINATION	SCHOOL/INSTITUTE	BOARD/UNIVERSITY
2011-2016	Ph.D	IIT Kharagpur	IIT Kharagpur
2009-2011	M.Tech	IIT Kharagpur	I.I.T Kharagpur
2005-2009	B.Sc. Engg.	BIT Sindri, Dhanbad	V.B.U Hazaribag

Academic Distinctions

Scholastic Achievements

- **IASc-INSNA-NASI Summer Research Fellowship in 2018.**
- **First prize** in Oral and poster presentation in 3rd International Conference on Laser and Plasma Application in Materials Science, Kolkata, 2015.
- Worked as an **Assistant Professor, MME department, VSSUT Burla, Odisha, for nearly 1.5 years (2014-2015)** and contributed to developed heat treatment, physical metallurgy lab.
- **First position** in the **Ph.D. comprehensive Exam**, IIT Kharagpur, 2012.
- Presented an attractive **model** on the “**Blast Furnace**” during my B.Sc.Engg.

Members of Professional Bodies/Organizations

- Life Member, Indian Institute of Metals (IIM)

Professional Experience

Organization	Designation	Year	Nature of Experience
NIT Jamshedpur	Assistant Professor	13 July 2018 to till Date	Teaching and Research
NIFFT Ranchi	Assistant Professor	26 th Nov 2015 to 12 th July 2018	Teaching and Research
VSSUT Burla, Odisha	Assistant Professor	21 st July 2014 to 25 th Nov 2015	Teaching and Research
I. I. T., Kharagpur	Research Fellow (MHRD)	July 2011 to July 2014	Doctoral Research

Project Undertaken

- Ph.D. Project work on the “**Surface Modification and Coatings on Titanium based Alloy (Ti-6Al-4V) for Bio-implant Application**” under supervision of **Prof. J. Dutta Majumdar**, Indian Institute of Technology Kharagpur, India.
- M.Tech Project Work on the “**Microstructural stability of steel for power plant application**” under Prof.R.N Ghosh , I.I.T Kharagpur, India.
- B.TechProject Work on the “**Study of the Surface Hardening Processes**” under Mr.A.K Rajak, BIT Sindri, Dhanbad, India.

Administrative + Other experience

- Serving as the Faculty Advisor for passed out Back log students.
- Organizing Committee, **National Conference on Advances in Structural Materials, 16-17 December, 2016**

- Served as **Hostel Warden** of Kalpana Chawla Girls Hostel, NIFFT, Ranchi from March 2016 to July 2018.
- Served as **Treasurer** of Gymkhana Committee, NIFFT Hatia, Ranchi
- Served as **Member Secretary**, Sexual Harassment, NIFFT Hatia, Ranchi
- Served as **Member**, Hostel and Discipline Committee, NIFFT Hatia, Ranchi
- Served as **Tabulator**, NIFFT Hatia, Ranchi

Guidance at the Masters level, M. Tech

Completed

- I. Development of Bioactive Coating on Titanium Alloy by Electrophoretic Deposition and Plasma Spraying Method, Name- Shikhar Barole (Year-2020).
- II. Development of corrosion resistance coating by Thermal spraying for Steel Grade used in Agriculture Equipments Name- Vikas Sampat Jadhav year 2020
- III. Use of LD slag in blended cement by altering reactivity and its influence on hydraulic and mechanical behaviour.,Name- Alok Gupta (Year-2019).
- IV. Artificial aging of Mg₃Y: Microstructure evolution and hardness, Name- Priyansh Tripathi (Year-2019).
- V. Study on the alkaline heat treated Mg alloy, Name- Kamal Bahadur Yadav (Year: 2018).
- VI. Study on the thermal oxidation behaviour of Mg alloy, Name- Abhishek Kumar Pathak (Year: 2018).
- VII. Study on the effect of heat treatment on microstructural evolution and mechanical properties of 0.6 % C steel, Name- Pramod Kumar (Year: 2018).
- VIII. Pearlitic transformation and its role on tribological performance, Name- Deepak Kumar sethi, (year: 2017. Collaborator: Prof. S. B. Kumar).
- IX. Tribological Performance of Tempered Martensitic Steel, Name- Gaurav Kumar Gautam, (year: 2017. Collaborator: Prof. S. B. Kumar)

Guidance at the Undergraduate level

Completed

- I. Corrosion Resistance Coating by Plasma Spraying for steel grades used in Agriculture equipments, Name- Avinash Kumar Singh (2016UGMM070), Avinash Kumar (2016UGMM066) Year-2020.
- II. Functionally graded biocompatible coating by plasma spraying on Ti alloy, Name- Divya Gautam (2016UGMM059) and Sandip Yadav (2016UGMM036) Year-2020.
- III. Development of corrosion resistance coating by EPD, Name-Shubham Upadhyay (2016UGMM039) and Pradeep Kumar Nayak (2016UGMM033) Year-2020.
- IV. Surface Protection of Ti and its alloys by Laser Cladding, P. Akash (2016UGMM060), Subham Das (2016UGMM069) Year-2020.
- V. Wear resistance by plasma spraying for steel grades used in agriculture equipments,,Name- Konthil Akshay Kumar (2016UGMM029) ,A.H.V.Sai Kamal Kumar(2016UGMM012) Year-2020.
- VI. Surface treatment for improving corrosion resistance of Ti alloy, Name- Ashis Kumar Singh (2015UGMM014) and Durgesh Singh Tanwar (2015UGMM080), Year-2019.
- VII. Surface Treatment For Improving Corrosion Resistance of Mg alloy, Name- Mohammed Irfan Khan and Santosh Kumar Das, Year-2019
- VIII. Development of corrosion resistance coating by thermal spraying for steel grade EN-31 used in agriculture,Name- Kilaru Ruthvik (2015UGMM085) and Hari Chandra Prasad(2015UGMM054) Year-2019
- IX. Heat Treatment of Low Carbon Steel,Name- Vikky Kumar, Rahul Kumar,(Year:2018)
- X. Heat Treatment of Medium Carbon Steel,Name- Rohit Tiwari, Shrikant Kumar,(Year:2018)
- XI. Microstructure and property evaluation of welded zone ,Name- Archit Raj, Ritesh Kumar Ranjan, (Year: 2018)

Research and Consultancy:

Sl No	Project Title	Sponsoring	Date of	Project cost	Investigator	Duration
1	Development of corrosion resistance coating by thermal spraying for steel grades used in Agriculture Equipment	National Initiative for design innovation Project, NIT Jamshedpur	March 2019- March 2021	5 lakh	Dr. Renu Kumari	2 Years
2	Development of Functionally Graded HA based Bioactive Composite Coating by Plasma Spraying and Electrophoretic deposition (EPD)	DST-SERB	March 2019- March 2022	22 lakh	Dr. Renu Kumari	3 Years

PUBLICATIONS

International Journals

- I. **Renu Kumari**, Carsten Blawert, and Jyotsna Dutta Majumdar, 2016. "Microstructures and Properties of Plasma Electrolytic Oxidized Ti Alloy (Ti-6Al-4V) for Bio-implant Application." Metallurgical and Materials Transactions A 47(2):788-800.
- II. **Renu Kumari**, Tim Scharnweber, Wilhelm Pfleging, HeinoBesser, and Jyotsna Dutta Majumdar 2015. "Laser surface textured titanium alloy (Ti-6Al-4V) – Part II – Studies on bio-compatibility." Applied Surface Science 357, Part A: 750-758.
- III. Wilhelm Pfleging, **Renu Kumari**, HeinoBesser, Tim Scharnweber, and J. Dutta Majumdar, 2015. "Laser surface textured titanium alloy (Ti-6Al-4V): Part 1 – Surface characterization." Applied Surface Science 355:104-111.
- IV. **Renu Kumari** and Jyotsna Dutta Majumdar, 2016." Microstructural Characterization of Multilayered Coating on Titanium Based Alloy (Ti-6Al-4V) Substrate for Bio-Implant Application" Adv. Sci. Lett. 22, 256-260.

- V. Jyotsna Dutta Majumdar, Evgeny L. Gurevich, **Renu Kumari**, Andreas Ostendorf, 2016. Investigation on femto-second laser irradiation assisted shockpeening of medium carbon (0.4% C) steel” Applied Surface Science 364: 133–140
- VI. **Renu Kumari**, Prashant Sharma and Jyotsna Dutta Majumdar, Studies on Graded Bio-active Coating on Titanium Based Alloy (Ti-6Al-4V), Proceedings of the 3rd International Conference on Laser and Plasma Application in Materials Science, ISBN: 978-93-84935-10-8.
- VII. **Renu Kumari** and Jyotsna Dutta Majumdar, Heat-Treated TiO₂ Plasma Spray Deposition for Bioactivity Improvement in Ti-6Al-4V Alloy, Journal of Materials Engineering and Performance, 2017, 26(6), DOI: 10.1007/s11665-017-3063-2.
- VIII. **Renu Kumari**, and Jyotsna Dutta Majumdar, Microstructure and Surface Mechanical Properties of Plasma Spray Deposited and Post Spray Heat Treated Hydroxyapatite (HA) based Composite Coating on Titanium Alloy (Ti-6Al-4V) Substrate, **Materials Characterization**, 131 (2017) 12-20.
- IX. **Renu Kumari**, and Jyotsna Dutta Majumdar, Studies on corrosion resistance and bio-activity of plasma spray deposited hydroxylapatite (HA) based TiO₂ and ZrO₂ dispersed composite coatings on titanium alloy (Ti-6Al-4V) and the same after post spray heat treatment, Applied Surface Science 420 (2017) 935–943.
- X. **Renu Kumari** and Jyotsna Dutta Majumdar, Wear Behavior of Plasma Spray Deposited and Post Heat Treated Hydroxyapatite (HA) based Composite Coating on Titanium Alloy (Ti-6Al-4V) Substrate, Metallurgical and Materials Transactions A, 49(7)(2018) 3122-3132.
- XI. **Renu Kumari**, Wilhelm Pfleging, Heino Besser, Jyotsna Dutta Majumdar, Microstructure and Corrosion Behavior of Laser induced Periodic Patterned Titanium based Alloy, Optics & Laser Technology, 116(2019) 196-213.
- XII. Kamal Bhadur Yadav and **Renu Kumari**, Microstructure and corrosion behavior of alkaline treated Mg-1wt.%Ca alloy, Materials today: proceedings, DOI: 10.1016/j.matpr.2020.04.151.
- XIII. Shikhar Barole, Abhishek Pathak, and **Renu Kumari**, Study of thermal oxidation behaviour of Mg-1%Ca alloy, Materials today: proceedings, DOI: 10.1016/j.matpr.2020.02.583.

INTERNATIONAL AND NATIONAL CONFERENCES

- I. Kamal Bhadur Yadav and **Renu Kumari**, Microstructure and corrosion behavior of alkaline treated Mg-1wt.%Ca alloy, 2nd International Conference on Processing and Characterization of Materials (ICPCM-2019), NIT Rourkela, 12th -14th December 2019.
- II. **Renu Kumari** and Jyotsna Dutta Majumdar, Development of bioactive coating on Ti-alloy by plasma spraying, 2nd International Conference on Processing and Characterization of Materials (ICPCM-2019), NIT Rourkela, 12th -14th December 2019.
- III. Shikhar Barole, Abhishek Pathak, and **Renu Kumari**, Study of thermal oxidation behaviour of Mg-1%Ca alloy, Materials today: proceedings, 10th international conference on Material Processing and Characterization (ICMPC-2020), GLA University, Mathura, 21-23 Feb 2020.
- IV. **Renu Kumari** and Vikas Jadhav, A Study of Corrosion Resistance Coatings for Steel grades used in Agricultural Equipment's, IIM-NMD-ATM-2019, 13-16th November 2019, IIM Trivandrum, Kerala.
- V. Priyansh Tripathi, Ansu J Kailath, Palash Poddar, **Renu Kumari** and Arvind Sinha, Artificial Aging of Mg-3Y: Microstructure Evolution and Hardness" in the 32nd National conference of AEMSD 2019 organised by Institution of Engineers (India) at CSIR-NML, Jamshedpur on 18-19th January 2019.
- VI. Alok Gupta, **Renu Kumari**, Sanjay Kumar, T.C. Alex, Use of LD Slag in Blended Cement: Hydration and Mechanical, National conference of Indian ceramic society, Jamshedpur, 9-10th Jan 2019.
- VII. **Renu Kumari**, and J. Dutta Majumdar, Plasma Spray Deposition of TiO₂ Bio-active coating on Ti-6Al-4V alloy for Bio-implant Application, IIM-NMD-ATM-2018, BITS Pilani.
- VIII. **Renu Kumari**, and J. Dutta Majumdar, Studies on Hydroxyapatite (HA)/TiO₂ Composite Coating on Titanium Alloy (Ti-6Al-4V)“ presented in **4th International Conference on Advances in Materials and Materials Processing (ICAMMP-IV)**-2016, IIT Kharagpur.

- IX. **Renu Kumari**, and J. Dutta Majumdar, Wear Behavior of Hydroxyapatite (HA) based Composite Coating on Titanium Alloy (Ti-6Al-4V) Substrate by Plasma Spray Deposition and Post Spray Heat Treatment, Presented in IIM-NMD-ATM-2016, IIT Kanpur.
- X. J. Dutta Majumdar, **Renu Kumari**, Heino Besser and Tim Scharnweber, Studies on laser surface texturing of Ti alloy, Presented in the word of photonic congress 2015, Munich, Germany.
- XI. **Renu Kumari**, P. Sharma and J. Dutta Majumdar, Studies on Graded Bio-active Coating on Titanium Based Alloy (Ti-6Al-4V), Presented in 3rd International Conference on Laser and Plasma Application in Materials Science, 2015, Kolkata.
- XII. **Renu Kumari**, and J. Dutta Majumdar, Microstructural Characterization of Multilayered Coating on Titanium Based Alloy (Ti-6Al-4V) for Bio-implant Application, Presented in international Conference EMCA-2014, Kolkata.
- XIII. **Renu Kumari**, and J. Dutta Majumdar, Laser surface Texturing of Ti-6Al-4v, Presented in IIM-NMD-ATM-2013, IIT-BHU.

TECHNICAL SKILL

Equipment: Field Emission Scanning Electron Microscopy, Optical microscopy and image analyzer, X-ray Diffraction, (Bruker's D8 Advance X-ray Diffraction, nano-indentation, Microhardness, Macrohardness, Plasma Spraying, Sputtering.

Software: X'Pert High Score plus, Origin Pro, Oxford Channel 5 Software, ImageJ, Adobe Photoshop, Microsoft Office, etc.

