



A 2-Week Hand-On TRAINING WORKSHOP

on
Monitoring & Characterization
Metal Additive Manufacturing
(M&C@MAM-2022)

December 05-18, 2022

Organized by

**Department of Mechanical Engineering
Visvesvaraya National Institute of Technology Nagpur,
South Ambazari Road, PIN- 440010**



**Sponsored by
DST-SERB Karyashala
(High-End Workshop)**



About M&C@MAM-2022



MAM-2022 is 2nd in the series organized @ VNIT Nagpur. MAM-2021 has witnessed 79 participants on different aspects of AM. MAM-2022 is a fully dedicated hand-on-workshop (OFFLINE), bringing more deliberations on real-time challenges and issues in metal additive manufacturing. Alloys used in aerospace, mining, steel making, etc. will be additively manufactured with in-situ monitoring, followed by characterization and testing.

VNIT Nagpur

Visvesvaraya National Institute of Technology, Nagpur is one of the premier NITs established in 1960. The Institute is a lush green campus covering 214 acres. The Govt. of India conferred on the Institute, the Deemed to be University status (under UGC Act, 1956 (3 of 1956)) on 26th June, 2002. Subsequently, by the Act of Parliament (NITs Act, 2007 (29 of 2007)), VNIT Nagpur is declared as an Institute of National Importance

Metal Additive Manufacturing



Today AM is the forefront of many advanced manufacturing technologies having enough potential to bring drastic changes in design and manufacturing. The global presence of AM is enlarging the logistics landscape and generating parts at reduced cost, energy consumption, carbon footprint, etc. The demand is increasing for newer and advanced materials in various domains of engineering leading to advancements in AM to become a viable process.

DST-SERB: Karyashala

Accelerate Vigyan, a division of DST-SERB empowers to develop high end research manpower. The scheme is specially designed to train the young potential researchers by giving them an opportunity to spend at least a week or two and acquire sufficient skills to undertake future research activities.

Workshop Coordinator

Dr. T V K Gupta

Department of Mechanical Engineering,

Visvesvaraya National Institute of Technology Nagpur, South Ambazari Road, PIN- 440010

Tel: +91-712-2801168, Email: tvkgupta@mec.vnit.ac.in, tvkgup@gmail.com

Course Fee & Registration Details

Registration Fee: Rs. 2,500/-

Last Date of Registration: 20th November 2022
Last Date for fee payment: 25th November 2022

Registration Fee: DD in favor of "Director, VNIT Nagpur" or
NEFT to SBI, VRCE Branch-Nagpur, A/c No. 10259420288, IFSC Code: SBIN0006702

How to Apply?

Total No. of participants: 25. Eligibility: Only M.Tech/PhD Students. Interested candidates can submit the following Google Form.

https://docs.google.com/forms/d/e/1FAIpQLSdFDVIL5_95nINdo89ff3BK7LyOtUcQX2kgFDEXR4QgRud_Q/viewform.

Note: Final Registration, to be made after the acceptance mail from Workshop Coordinator.

Travel, Lodging & Boarding

Train tickets, To & Fro or Road Transport charges from the place of residence will be reimbursed (limited to 3AC only on production of tickets). Suitable accommodation in student hostels including breakfast, lunch and dinner will be made available (No Charges).

Reaching VNIT

Nagpur belonging to the state of Maharashtra is in the centre of India. It is well connected by Rail/Road from different parts of the country. The institute is located at 7 Km from Nagpur Railway Station and 6 Km from State bus stand.

Registration Form, duly signed by Head of Dept./Institute to be mailed tvkgup@gmail.com

REGISTRATION FORM

Monitoring & Characterization @ Metal Additive Manufacturing (M&C@MAM-2022)
December 05-18, 2022

Name: _____

Student Status (M.Tech/PhD): _____

Department: _____

Institution/Organization: _____

Address: _____

Email: _____

Mobile: _____

Areas of Research Interest: _____

Registration Fee Details:

DD/NEFT Ref. No. _____

Date: _____

Amount in Rs. _____

Bank Details: _____

Signature of Applicant

Sign & Seal of Head of the Dept./Organization



DST-SERB, Accelerate Vigyan Sponsored (Karyashala Scheme) MONITORING & CHARACTERIZATION @ METAL ADDITIVE MANUFACTURING (M&C@MAM-2022)



05-18 DECEMBER 2022

Tentative Schedule

Day/Slot	9:30-11:00		11:30-13:00		14:30-16:00		16:15-18:00
Day 1 (MON) Dec. 05, 2022	Metal Additive Manufacturing	Tea Break	Online Monitoring, Sensors,	LUNCH BREAK	Role of Characterization	Tea Break	SEM Lab Visit and Demo
Day 2 (TUE) Dec. 06, 2022	Temperature Measurement in Additive Mfg.		Distortion Monitoring with LDS		Visit to Shreenath Engineering, Nagpur		Visit to Shreenath Engineering, Nagpur
Day 3 (WED) Dec. 07, 2022	Distortion Simulation Program		Characterization of AM Samples-SEM & XRD		Ni based Depositions (Shreenath Engineering, Nagpur)		Ni based Depositions (Shreenath Engineering, Nagpur)
Day 4 (THU) Dec. 08, 2022	Friction, Wear & Tribology in Mfg.		Cold Metal Transfer		Co based Depositions (Shreenath Engineering, Nagpur)		Co based Depositions (Shreenath Engineering, Nagpur)
Day 5 (FRI) Dec. 09, 2022	Machining of AM Builds		μ -Hardness Measurements		μ -Hardness Measurements		Break
Day 6-7 (SAT-SUN) Dec.10-11, 2022	Dec. 10-11, 2022: Sample Cutting, Polishing using EDM and Polishing Setup for Hardness and SEM Characterization at VNIT & Local Workshop, Nagpur						
Day 8 (MON) Dec. 12, 2022	Temperature and Stress Analysis in Additive Mfg.	Tea Break	COMSOL Multi-Physics for Metal Deposition	LUNCH BREAK	SEM Characterization	Tea Break	SEM Characterization
Day 9 (TUE) Dec. 13, 2022	Metallurgical Issues in Metal AM		An overview of XRD Analysis		SEM Characterization		SEM-Characterization
Day 10 (WED) Dec. 14, 2022	Mechanical Advantages of Metal Additive Mfg.		COMSOL Based Additive Manufacturing		Optical Microscopy for Dimensions		Clad Morphology
Day 11 (THU) Dec. 15, 2022	Dilution-Overview		SEM, Machining, Hardness Data Handling		How to analyze SEM Images		SEM Analysis
Day 12 (FRI) Dec. 16, 2022	Microstructure Analysis		Microstructure Analysis		Data Analysis		How to write a research article
Day 13 (SAT) Dec. 17, 2022	Manuscript Structure		Manuscript Analysis		Discussion (Venue: Shreenath Engineering, Nagpur)		Applications of Metal Additive Manufacturing (TVKG)
Day 14 (SUN) Dec. 18, 2022	Final Closure, Brain Storming on M&C@MAM-2022; Feed Back, Report Preparation, Manuscript Submission Guidelines						

List of Resource Persons/Experimental Facility

M/s Shreenath Engineering, Nagpur

DS: Dr. Dheepa Srinivasan; **GSK:** Dr. G Saravana Kumar; **GM:** Dr. Gopinath Muvvala;
JRK: Dr. J Ramkumar; **JK:** Dr. Jitendra Katiyar; **RK:** Dr. Rajesh Khatirkar; **TVKG:** Dr. T V K Gupta; **RAM:** Dr. Rahul A Mali;
ABA: Dr. A B Andhare; **NKL:** Dr. Nitin Kumar Lautre; **NT:** Dr. Nikhil Thawari; **TB:** Dr. Tushar Banerjee