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Dr. Saurav Datta
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Co-Coordination:

Dr. Kaustav Chaudhury
Dr. Tarapada Roy
Department of Mechanical Engineering

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ABOUT US

The erstwhile **Regional Engineering College (REC) Rourkela** was converted to a deemed university and renamed as **National Institute of Technology, Rourkela** on 26th June, 2002. It was declared as **An Institution of National Importance** through the parliament act on 15th August 2007. The institute has made a rapid stride in earning a reputation as a place of higher learning in the field of engineering as well as technology during the last decade. NIT Rourkela provides quality education in a diverse and multi-cultural environment. The mission of the institute is to meet the needs of the industry and commerce by providing human resource with the required knowledge and skill and also by promoting, dissemination, developing and transferring technology. The institute strives hard to become an internationally acclaimed institution of higher learning that will serve as a source of knowledge and expertise for the society and be a preferred destination for undergraduate as well as post graduate students along with advanced research.



The Mechanical Engineering Department of NIT, Rourkela is known for research in diverse fields. The main foci of research are on mechanical vibration, robotics, CAD/CAM, precision engineering, metal forming, Machining, CFD, Industrial refrigeration and Cryogenics. The academic programme of the department reflects not only the core areas of Mechanical Engineer but also the research specialization of the faculty. The department at present has over one hundred research scholars pursuing projects on diverse fields. The faculty is organized under three divisions and six groups. All the groups are working in close co-operation while retaining individual identities. Many Research and Development projects being pursued by the faculty are sponsored by Government agencies and private industries. Some of the major sponsors are BRNS, DST, DAE, CSIR, DRDO, BARC, ISRO and private industries.

Workshop

On

Additive Manufacturing:
Knowledge and Skill Development towards
Industry 4.0
(AM-KSD 2023)

During

10th June – 14th June 2023

Coordinator

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Being organized by



Department of Mechanical Engineering
National Institute of Technology
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RESOURCE PERSONS

Academicians from premier institutions like IITs, NITs, State/ Centrally Funded Universities, foreign universities, experts from Industries as well as R&D Organizations having expertise and experience in relevant domain knowledge are to be invited as *Resource Person* for this workshop.

OBJECTIVE

Recently, global manufacturing paradigm has experienced a revolutionary transition towards entering a new paradigm called *Industry 4.0*. This is due to introduction of Additive Manufacturing (AM) technology which is gradually replacing traditional manufacturing methods. AM utilizes digital 3D CAD data to fabricate a part through layer-wise stacking mechanism (often, termed as 3D printing). Apart from polymers/composites, the scope of AM is extended to fabricate metallic and ceramic components as well.

AM clutches innovation in digital processes, communications, imaging, architecture and engineering to provide digital flexibility and efficiency to manufacturing operations. Recently, India has realized the need of exploring this emerging technology in all segments including defense and public sectors, especially within the nation's small, medium and large-scale industries to keep pace with the new manufacturing paradigm (Industry 4.0). In the strategy paper, documented by the Ministry of Electronics and Information Technology (MeitY), domestic manufacturers are encouraged to set up operations by exploring available resources and collaborating with foreign companies who are presently known as the leaders of AM throughout the *Globe*. It is believed that many possibilities of AM are to be unfolded in near future. This will definitely push forward the national program **MAKE IN INDIA**.

The Workshop on "**Additive Manufacturing: Knowledge and Skill Development towards Industry 4.0**" (AM-KSD 2023) is focused on the global knowledge transfer and networking of professionals involved in additive manufacturing technology domain. The course includes expert lectures from industry and academic from around the world, discussion on additive layer technologies and additive metal processes, latest developments in 3D printing and metal-based additive manufacturing, application potential of additively manufactured products in defense, aerospace, automotive and biomedical sectors.

COURSE CONTENT

The workshop will cover but is not limited to the following topics:

- ☑ History of Additive Manufacturing (AM): Journey from 3D to 7D
- ☑ Advanced welding techniques to support additive manufacturing, Friction Stir Additive Manufacturing (FSAM) vs. Friction Surfacing Additive Manufacturing (FSAM)
- ☑ Rapid Prototyping (RP) vs. additive manufacturing, Polymer and metal based AM, Liquid/ Solid based AM systems, Powder based AM systems and Characterization of feedstock powders, Direct Energy Deposition (DED)
- ☑ Post-processing, Defects, Inspection and Future prospects, various in-situ and ex-situ techniques, heat treatment
- ☑ Additive manufacturing of sustainable construction materials
- ☑ Software used for Additive manufacturing
- ☑ Characterization and performance evaluation of additively manufactured industrial product
- ☑ Nano-additive manufacturing
- ☑ Recent progress of AM of Carbon Fiber Reinforced Polymer (CFRP) composites, design opportunities within the material, process and structural domain
- ☑ Functionally Graded Materials (FGM) considering metallic/ CNTs/ advanced fibers, AM techniques for fabrication of FGMs, variable property fabrication, multi-material printing
- ☑ AM methods for fabrication of auxetic structures/ systems, design and analysis of polymer based auxetic core structures
- ☑ CFRP/ FGM/ auxetic-additive manufactured part for multi-functional applications including shape morphing, sensing and energy storage absorptivity
- ☑ Mathematical modelling for material properties of CFRP/FGM/auxetic materials, nonlinear dynamic analysis
- ☑ Dynamic Mechanical Analysis (DMA), experimental vibration/ dynamics analysis
- ☑ Thermo-fluid modelling,
- ☑ The birth of rheology. Non-Newtonian and complex fluids, Fluid dynamic behaviors of complex fluids.
- ☑ Constitutive models.: (i) generalized Newtonian models, (ii) linear viscoelastic models, (iii) differential models, (iv) integral models
- ☑ Software for simulating polymer flows.

IMPORTANT GUIDELINES

- ✦ Faculty members, Research scholars, PG students, Industry personnel, Technical Staff-members of different academic institutes are eligible to apply for the workshop.
- ✦ **Registration Fee (Including GST):**
Faculty members and Technical Staff-members from academia: Rs. 3,000/-
Research scholars and PG students: Rs. 2000/-
Industry person: Rs. 10,000/-
- ✦ The registration fee includes workshop kit, working lunch and refreshment during programme days. Accommodation (double sharing) may be arranged for outside participants at NIT Guest house (on payment basis) subjected to availability.
- ✦ Interested participants are required to send the hardcopy of the Registration Form through Airmail. **DD should be drawn in favor of:**
Account Name: **CONTINUING EDUCATION NIT ROURKELA**
Payable Bank and branch: SBI, NIT Campus, Rourkela-769008
Account No.: **10138951784**
- ✦ Last date of registration: **31st May 2023**
- ✦ Registration Form can also be downloaded from the institute website.
- ✦ There is no registration fee for the participants from the host institute.

CONTACT DETAILS

For any queries regarding this programme, please contact:

Dr. SAURAV DATTA

The Coordinator (**AM-KSD 2023**)
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Workshop
On

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(AM-KSD 2023)
During

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Department of Mechanical Engineering
National Institute of Technology
Rourkela, Odisha-769008

Registration Form

NAME (Block Letter) _____

Designation _____ Department _____

Organization _____

Mail Address _____

Mobile No _____ Email _____

Accommodation (double sharing) required (Yes/ No) _____
(Subject to availability)

PAYMENT DETAILS

Demand Draft No _____ Date _____

Bank/ Branch _____

Bank Address _____

Signature

Date

DD should be drawn in favor of CONTINUING EDUCATION NIT ROURKELA, payable at SBI, NIT Campus, Rourkela-769008

Send the hardcopy of the Registration Form along with DD (through Air-mail) to **Dr. Saurav Datta, Coordinator (AM-KSD 2023),**
Department of Mechanical Engineering, NIT Rourkela-769008 (Odisha)