Workshop on
Capability and Tools / Technology Mapping

Organized by:
ICME National Hub
In association with:
Indian National Academy of Engineering

February 19 – 20, 2022

About the Workshop

Indian National Academy of Engineering (INAE) has established an expert group to prepare a technology roadmap with actionable recommendations for "Accelerated Materials Discovery, Scale-up and Exploitation Strategies for Strategic Materials Needs of India". Materials form a critical part of a nation's progress touching all aspects of life and industry. However, design, development, production and deployment of materials is an expensive process involving significant efforts, cost and time and this has been a hindrance to investments in our country to develop new materials. There is an urgent need to address this issue by developing technologies, capabilities and infrastructure to accelerate materials development while reducing the cost, as well as the environmental footprint in certain cases.

The group has identified the following five foundational proof of concept problems for engineering realization of structural / engineering materials:

- **Advanced Steels for Critical Applications**
- **Next Generation Super-alloys for Thermal Power Plants**
- **Automotive Lightweighting**
- **Super-alloy based Component Development through PM Routes**
- **Ti-alloy based Bio-implants**

One of the significant components of this project is compiling the capabilities and various tools / technologies available in India so that a roadmap with actionable recommendations may be developed. In order to achieve this goal, the ICME National Hub at IIT Kanpur, in association with INAE, is organizing an online Workshop on Capability and Tools / Technology Mapping.

For more information, please visit the workshop website:
https://www.iitk.ac.in/ICME/CTTM-Workshop/

The workshop will be webcasted via Zoom and is open to all.
We cordially invite you to join the workshop.
Zoom link (for all sessions):
https://iitk-ac-in.zoom.us/j/99268190234?pwd=dTZ3TzB6SkFQbGRGdmFFR25rMXk4UT09
Meeting ID: 992 6819 0234
Passcode: 428230

Workshop Tracks and Track Coordinators:

Domains / Subject Areas	Track Coordinators
1. Ti-alloy based Bio-implants	Dr. Partha Ghosal, DMRL
2. Advanced Steels for Critical Applications	Dr. R. Balamuralikrishnan, DMRL
3. Next Generation Super-alloys for Thermal Power Plants	Dr. Dipti Samantaray, IGCAR
4. Automotive Lightweighting	Dr. K. Anand, Deakin-IIT CoE
5. Super-alloy based Component Development through PM Routes	Dr. Goudu Appa Rao, DMRL
Modeling and Simulations	**Track Coordinators**
1. Macroscopic and Process Modeling including Computational Mechanics (CFD / CSM)	Dr. Amarendra K. Singh, IIT Kanpur Dr. Gerald Tennyson, TCS
2. Mesoscopic / Microstructure Modeling including Phase Field and Crystal Plasticity	Dr. Pritam Chakraborty, IIT Kanpur Dr. Abhik Choudhury, IISc Bangalore
3. Electronic Structure Calculation, Ab-initio / DFT Methods and Molecular Modeling	Dr. Somnath Bhowmick, IIT Kanpur Dr. R. Sankarasubramanian, DMRL
4. Multiscale Modeling / Homogenization	Dr. Alankar Alankar, IIT Bombay Dr. Anand Kanjarla, IIT Madras
5. Computational Thermodynamics / New Alloy Design	Dr. Hari Kumar K.C., IIT Madras Dr. A. Durga, IIT Bombay
6. Surrogate Modeling, Uncertainty Optimization, Data Science and ANN	Dr. Umesh Waghmare, JNCASR Dr. Kishalay Mitra, IIT Hyderabad
7. Topology Optimization based Product Design	Dr. G.K. Ananthasuresh, IISc Bangalore Dr. Srinivas Gunti, Mahindra Research Valley
Experiments	**Track Coordinators**
1. High-throughput Experiments	Dr. Nilesh P. Gurao, IIT Kanpur Dr. Kaustubh Kulkarni, IIT Kanpur
2. Controlled Experiments	Dr. Kantesh Balani, IIT Kanpur Dr. Niraj Sinha, IIT Kanpur
3. Sophisticated Characterizations	Dr. Satyam Suwas, IISc Bangalore Dr. K.G. Pradeep, IIT Madras
Case Studies	**Track Coordinators**
Model Integration (Horizontal Integration / Vertical Integration)	Dr. Gandham Phanikumar, IIT Madras Dr. B.P. Gautham, TCS

INAE Experts:

Dr. B. Basu
Principal Engineering Investigator, FNAE

Prof. K.A. Padmanabhan
Co-PI and Former Director, IIT Kanpur

Dr. S.V. Kamat
Co-PI and DG, NS&M

Program Schedule:

Day-1: February 19, 2022 (Saturday)

Time (IST)	09:30AM - 10:15AM	10:15AM - 10:30AM	10:30AM - 11:00AM	11:00AM - 11:30AM	11:30AM - 12:00PM	12:00PM - 12:30PM
Morning Session	Inauguration Function and Workshop Outline	Break	Ti-alloy based Bio-implants	Advanced Steels for Critical Applications	Break	Automotive Lightweighting
Break: 12:30PM – 02:00PM						
Time (IST)	02:00PM - 02:45PM	02:45PM - 03:30PM	03:30PM - 04:15PM	04:15PM - 04:30PM	04:30PM - 05:15PM	05:15PM - 06:00PM
Afternoon Session	Macroscopic and Process Modeling including Computational Mechanics (CFD / CSM)	Break	Electronic Structure Calculation, Ab-initio / DFT Methods and Molecular Modeling	Break	Multiscale Modeling / Homogeni-zation	Computational Thermo-dynamics / New Alloy Design

Day-2 : February 20, 2022 (Sunday)

Time (IST)	09:30AM - 10:00AM	10:00AM - 10:30AM	10:30AM - 10:45AM	10:45AM - 11:30AM	11:30AM - 11:45AM	11:45AM - 12:30PM	12:30AM - 01:15PM
Morning Session	Super-alloy based Component Development through PM Routes	Next Generation Super-alloys for Thermal Power Plants	Break	Topology Optimization based Product Design	Break	High-throughput Experiments	Controlled Experiments
Break: 01:15PM – 02:00PM							
Time (IST)	02:00PM - 02:45PM	02:45PM - 03:30PM	03:30PM - 04:15PM	04:15PM - 04:30PM	04:30PM - 05:30PM		
Afternoon Session	Sophisticated Characterizations	Case Study - I	Case Study - II	Break	Panel Discussion and Open Session		

Remaining tracks have been shifted to the next weekends; the program schedule will be circulated through email.

Conveners:

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