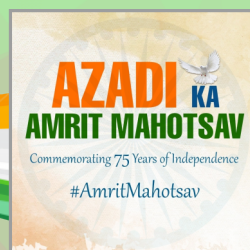## Online Workshop on
# ICME READINESS OF DIGITAL PLATFORMS

An Invited Technical Presentation Series: July-August, 2021

Organized by
**ICME National Hub**
in association with
**Indian National Academy of Engineering**

**AZADI KA AMRIT MAHOTSAV**
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## TCS PREMAP: A PLATFORM FOR INTEGRATED SIMULATION, DATA AND KNOWLEDGE DRIVEN DESIGN OF MATERIALS, PRODUCTS AND MANUFACTURING PROCESSES

By

### Dr. Chetan Malhotra
Principal Scientist, TCS Research

**Date and Time**
July 13, 2021 (Tuesday), 06:00 PM IST

**Zoom link for the event**
https://zoom.us/j/97692031231?pwd=VlJmRXJGMUFyVXJuUVhPczFCZmprdz09
**Meeting ID:** 976 9203 1231
**Passcode:** 740924

### •• About the Workshop ••

Integrated Computational Materials Engineering (ICME) is an emerging and transformative discipline with a huge potential to accelerate materials discovery, product design and process optimization. The Indian National Academy of Engineering (INAE) is engaged in developing a technology roadmap for "Accelerated Materials Discovery, Scale-up and Exploitation Strategy for Strategic Materials Needs of India". The compilation and integration capabilities of various digital platforms that can assist the ICME community is one of the essential parts of this effort. Therefore, the ICME National Hub at IIT Kanpur, in association with INAE, is organizing a "Workshop on ICME Readiness of Digital Platforms" – a technical presentation series about the capabilities of important digital platforms vis-à-vis accelerated development, production and exploitation of materials and products.
**For more details please visit:** https://www.iitk.ac.in/ICME/INAE-Workshop/

**ICME National Hub Website:** https://www.iitk.ac.in/ICME/
**INAE Website:** https://www.inae.in/

## Abstract

TCS PREMAP (Platform for Realization of Materials and Products) is a knowledge-driven engineering design and development platform, which leverages modeling and simulation, and artificial intelligence (AI) into the engineering design process. The platform has a unique model driven architecture which allows for formal specification of various entities, viz. – product, material and manufacturing process, thereby providing a semantic language for the expression of knowledge, data and achieving seamless integration across various simulation tools. These meta-models describe materials and systems at different scales and degrees of complexity in a hierarchical fashion. The platform allows for the setting up of engineering analysis processes in the form of workflows for integrated design, performance analysis, and design of materials and manufacturing processes. It also allows for leveraging analytical models, simulation tools, decision algorithms, external databases, design of experiments, decision support algorithms as well as knowledge engineering features such as rule engines, data mining and machine learning algorithms. The layered modeling architecture of the platform makes it highly extensible across different domains by allowing the user to create domain-specific models derived from standardized meta-models.

## About the Speaker
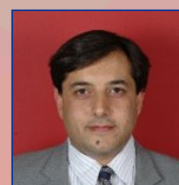
**Dr. Chetan Malhotra** leads the product development activities as part of TCS' ICME and PREMAP Research and Innovation Program. His interests include R&D management, new product development, digitization in manufacturing as well as core materials and process research.

Dr. Malhotra obtained his Masters (1998) and Ph.D. (2006) degrees in Mechanical Engineering from the University of Colorado at Boulder, USA. Between 1999 and 2003, he served as a Scientist at the TCS Innovation Labs – TRDDC working on projects involving model-based optimization of industrial heating and heat treatment processes. From 2007 till 2015, he led a research team at TCS Innovation Labs – TRDDC focused on the development of low-cost solutions to drinking water problems in the Indian subcontinent. Since 2015, he is contributing towards the development of TCS PREMAP, a knowledge-based platform for the integrated design of products, processes and materials for the manufacturing industry. Dr. Malhotra has published over 25 papers in international journals and conferences, is an inventor on 10 patent applications and has 5 granted patents.

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