

# 3D Printing in Medicine

From 16<sup>th</sup> to 21<sup>st</sup> July 2018

## **About the Workshop:**

Medical applications for 3D printing are expanding very fast and every year, 3D printing put forward more and more promise in the medical field. This technology is abetting to save and improve lives in ways - and in places – that could not possible just a few years ago. Medical uses for 3D printing, both actual and potential, can be categorized into several broad classes, including: tissue and organ fabrication (bioprinting); creation of customized orthotics, prosthetics, and implants; development of anatomical and surgical models; and pharmaceutical research involving drug dosage forms, delivery, and discovery. The application of 3D printing in medicine brings in many benefits, including the customization and personalization of medical products, drugs, and equipment; cost-effectiveness; increased productivity; the democratization of design and manufacturing; and enhanced collaboration. However, it should be cautioned that outstanding scientific and regulatory challenges remain and the most transformative applications for this technology are yet to be fully realized. All the aspects of this field will be covered in this workshop with interactive lectures from experts, both from engineering and from medicals backgrounds and with few hands on sessions.

This workshop is designed for biomedical, biotechnology, mechanical, material scientists to learn about 3D printing technologies, design aspects, medical applications, and critical issues related to these topics. We hope that the workshop will benefit faculty and researchers from Mechanical Engineering, Materials Science and Engineering, Biomedical Engineering, Biotechnology, Chemical Engineering, and other related domains.

## **Topics covered:**

The six-day workshop provides an overview of:

Introduction to 3D Printing; Introduction to CAD; Introduction to Various 3D Printing Technology; Emergence of 3D Printed Implants; Biomaterials for 3D Printing; Material Design and Processing; Application of 3D Printing for Different Medical Applications Like Dentistry, Customized Implants and Prostheses, Anatomical Models for Surgical Preparation; Custom 3D-Printed Dosage Forms and Drug Delivery Devices; Ethical Issues related to 3D Printing for Medical Applications; Hands On Sessions On Various 3D Printing Techniques Like FDM, SLA, Extrusion-Based and Printing 3D Structures For Medical Applications.

## **Intended participants:**

Faculty members and Students from academic institutes; Personnel from R&D organizations; Personnel from related industries. We hope that the workshop will benefit faculty and researchers from Mechanical Engineering, Materials Science and Engineering, Biomedical Engineering, Biotechnology, Chemical Engineering, and other related domains.

## **Registration:**

For TEQIP participants, registration is free, and accommodation and food are provided as per TEQIP norm. For Non-TEQIP participants, registration fee is there; only lunch and tea are complimentary.



**Prof. Santanu Dhara** is a Professor in School of Medical Science and Technology at IIT Kharagpur. He has completed his Ph.D. in Materials Science from IIT Kharagpur. Prof Dhara's research interest is related to Biomaterials and Tissue Engineering. He is also interested in using additive manufacturing to design and develop scaffolds for tissue engineering application.



**Dr. Subha Narayan Rath** is an Associate professor in Department of Biomedical Engineering at IIT Hyderabad. He has completed Ph.D. from Division of Bioengineering at National University of Singapore (NUS) and Post-doctoral from Department of Plastic & Hand Surgery, University, Hospital of Erlangen, Germany. His research expertise is on Stem Cells and Tissue Engineering.



**Dr. S. Suryakumar** is an Associate professor in Department of Mechanical and Aerospace Engineering at IIT Hyderabad. He has completed PhD from IIT Bombay. His research interests are Additive Manufacturing of Metallic Objects, Fabrication of Functionally Gradient Objects through Additive Manufacturing, Design for Additive Manufacturing, Medical Applications of AM, Data formats for Heterogeneous objects (i.e., gradient objects)..



**Dr. Subhadeep Chatterjee** is an Assistant professor in Department of Materials Science & Metallurgical Engineering at IIT Hyderabad. He obtained PhD from IISc Bangalore. His research interest is related to Welding Metallurgy, Transmission Electron Microscopy, Diffraction, Thermal Analysis, Phase Field Models, Finite Element and Finite Volume Methods.



**Dr. Jyostnendu Giri** is an Assistant professor in Department of Biomedical Engineering at IIT Hyderabad. He obtained his PhD from IIT Bombay. His research interests are engineering Nano-medicine for regenerative, preventive and personalized care; Tissue engineering, Novel scaffold system, Interfacial graded tissues (bone-cartilage etc.).



**Dr. Omkar Prasad** is an Assistant professor in Department of Design at IIT Hyderabad. He obtained his PhD from Indian Institute of Science, Bangalore. Some of his Research Highlights are Development of desktop based virtual environment for 3D sketching, Development of sketching application for Touch Screen Tablets, Development of sketch enabled collaborative conceptual design system.



**Dr. G.P.V. Subbaiah** is one of the few dedicated doctors who performs exclusive Spine Surgeries and treats a large number of people with spinal disorder problems in the state of Andhra Pradesh. He leads a team of highly experienced specialists dedicated to manage the exclusive Spine care program at Star hospitals.



**Dr. Aditya Mohan Alwala** is a Maxillofacial surgeon working in MNR Medical College and Hospital. He is an active user of 3D printing technology for maxillofacial reconstruction. He developed a patent pending TMJ joint and implanted on a patient successfully. The patient is doing fine even after 12 months.



**Dr. Falguni Pati** is an Assistant professor in Department of Biomedical Engineering at IIT Hyderabad. He has completed his PhD from IIT Kharagpur and done postdoc in POSTECH, South Korea and KTH, Sweden. His research interest are 3D Bioprinting, Tissue Engineering, and Regenerative Medicine.

## Course Co-ordinator

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