



JYOTHY INSTITUTE OF TECHNOLOGY

VTU Affiliated, AICTE Approved, Accredited by NBA (CSE, ISE ECE, ME, CIV)

Off Kanakapura Road, Thataguni, Bengaluru-560 082

And

KARNATAKA SCIENCE AND TECHNOLOGY ACADEMY

Department of Science and Technology, Government of Karnataka

Joint Workshop on

3D PRINTING FOR

Innovative Research and Knowledge Development

**2nd, 3rd
and 4th
June 2022**



VISION

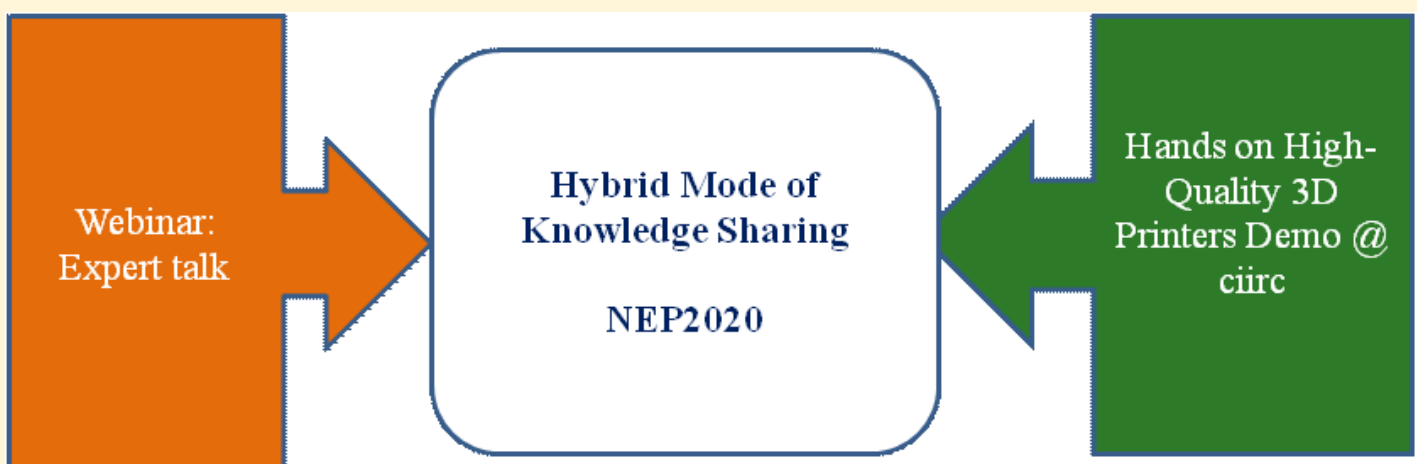
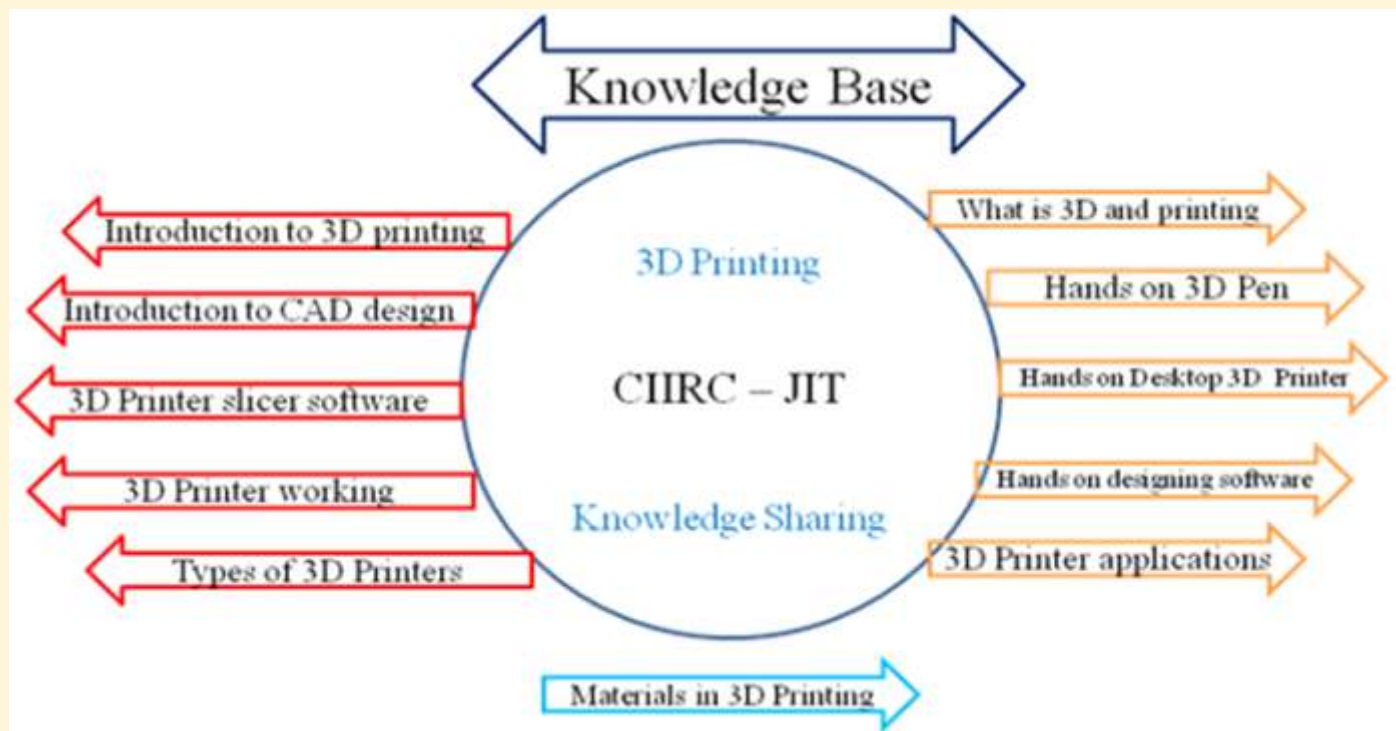
To be an Institution of Excellence in Engineering education, Innovation and Research and work towards evolving great leaders for the country's future and meeting global needs besides being a Centre of Excellence for Developing New Technologies undertaking Incubation and Innovation

Workshop on 3D Printing for Innovative Research and Knowledge Development:

CIIRC, JIT In association with KSTA is organizing a three day Hands on workshop on Additive Manufacturing for sensitizing various stake holders. In Additive Manufacturing (AM) workshop, participants will learn the fundamentals, applications and implications of AM. They will earn knowledge and walk away with the confidence to deploy AM which will create value in their roles as academicians & researchers. The course incorporates fundamental digital design, modeling, and visualization tools, and concludes with a case study, where learners shall visualize a real-time design using their knowledge of AM.

Unique Features of Hybrid Workshop

- ▲ Experts talk on fundamental principles and workflow of 3DP
- ▲ Advanced Digital Tools
- ▲ High-Quality 3D Printers Demo



Workshop Flow diagram

Knowledge Base



Registration

Hands on Knowledge Base for the Participants Session Schedule

Important Dates

Last date for Registration : 31/05/2022
 Conformation through mail : 01/06/2022
 Conformation of Visit to CIIRC : 01/06/2022

Day 1 - 02/06/2022	
Activity	Time
Registration/log in	9:00AM to 9:30AM
Inauguration , Address By Principal	9:30AM to 10:00AM
Overview of "3D Printing for Innovative Research and Knowledge development"	10:00AM to 10:30AM
Tea Break	10:30AM to 11:00AM
Session 1 (Webinar): • Introduction to 3D Printers <i>Questionnaire Session</i>	11:00AM to 12:30PM 12:30PM to 1:00PM
Lunch	1:00PM to 2:00PM
Session 2 (Webinar): • 3DP Software: Design and Analysis <i>Questionnaire Session</i>	2:00PM to 3:30PM 3:30PM to 4:00PM
Day 2 - 03/06/2022	
Session 3 (Webinar): • Metal 3D Printer <i>Questionnaire Session</i>	10:30AM to 12:30PM 12:30PM to 1:00PM
Lunch	1:00PM to 2:00PM
Session 4 (Webinar): • 3DP Classification and its applications <i>Questionnaire Session</i>	2:00PM to 3:30PM 3:30PM to 4:00PM
Day 3 - 04/06/2022	
Visit to CIIRC-JIT: • Hands on 3D Pen and 3D FDM Printer • Valedictory Function • Lunch	9:30 AM to 11:30 AM 11:45 AM to 12:30 AM 12:45 AM to 01:30 AM



Insight Software



Print Software



Material Selection



WORKSHOP COURSE FILE

The Workshop

3D Printing Workshop:

The workshop focuses in bringing new technology to Teachers, Researchers and students, to face the competitive world in future for development of workforce for Industry 5.0. 3D printing is the technology which brings imagination into 3D object realistic world. In here, everyone will be provided with an opportunity to participate in this technology belonging to any stream. In today's world there is huge demand of 3D technology as it is the cutting-edge perspective on digital transformation and the factory of the future.

Participants Benefits:

1. Idea to prototype conversion
2. Engaging Unwilling/Reluctant Learners
3. Creating Responsible Digital Workforce
4. Knowing how to make Everything Hands On
5. Working principle of various 3D printers
6. Solving Real World Problems
7. Experienced Trainer
8. Guaranteed Successful Program
9. Happy participants



What Participants would gain?

- ▲ Teachers/Researchers/Students enhance their ability to utilize information technology in design practice.
- ▲ Chance to experience most evolving Technology.
- ▲ Participants develop their ability to apply necessary CAD skill to meet the emerging challenges occurring in different profession.
- ▲ Students improve their ability to prepare for pursuing their carrier in Additive Manufacturing.
- ▲ Innovations in effective teaching and learning programs supported by faculty and staff development opportunities; widespread emphasis on student-centered learning environments.



Session Details – “3D Printing for Innovative Research and Knowledge Development”

DAY-1

Session 1: Introduction to 3D printers (Dr Raghavendra Krishna)

- ★ General introduction
- ★ Basic and technologies in 3D printers
- ★ History of 3D Printing
- ★ How does a 3D-printer work?
- ★ What are the different types of printers and materials you can use?
- ★ Who uses 3D Printing and what for?
- ★ What can you print with a 3D-printer?

Session 2: CAD for 3D Printing (Rohit G)

- ★ Design and print process
- ★ Basic CAD software
- ★ File sources & formats
- ★ Modifying existing designs
- ★ Making your own creation
- ★ **Session 3: Initialize and set up the 3D Printer with basic settings**
- ★ Printer settings
- ★ How to setup a 3D printer
- ★ Troubleshooting
- ★ Testing and calibration of 3D Printer

DAY-2

Session 4: Live Demo on working principles of various 3D printers

Session 5: Expert talk–Metal 3D printer and its applications. (Dr MManjaiah–NIT Warangal)

- ★ Operating a Metal 3D Printer
- ★ Evaluate the prototype and tips to improve it
- ★ Advanced topics, latest trends, tips and tricks – more hands-on 3d printing training



DAY-3

Session 6: Live demo to showcase working principle of FDM 3D printers (Dr RK and Team)

- At the end of the workshop, all participants will be invited for hands on experience to get a thorough knowledge on working principle of FDM 3D printers at JIT-CIIRC and a Certificate of Participation shall be send through email to the institute.
- Make your own 3D design to check for printing feasibility

Workshop on “3D Printing for Innovative Research and Knowledge Development”

What the participants would understand!!!???

In the workshop participants will learn about 3DP from experts in the 3 day exploration of the fundamentals, applications, and implementation of AM, and will walk away with the confidence to deploy AM to create value in their roles and organizations. The course incorporates fundamentals of 3DP, digital design, modeling, and visualization tools, and concludes with visit to CIIRC -JIT for hands on experience, where learners will see real-world design or strategy problem using their knowledge of AM.

What participants will acquire?

- The vocabulary necessary to understand the complex, multivariate landscape of additive manufacturing processes, materials, and applications.
- For each mainstream AM process, an understanding of its materials compatibility and fundamental mechanism of operation.
- The ability to identify how, when, and where additive manufacturing can create value across the entire product lifecycle, from design conception to end-of-life.
- The skills necessary to design parts for AM into a functional product.
- A cutting-edge perspective on digital transformation and the factory of the future.

Who participants Meet?

- NIT and CIIRC -JIT faculty from mechanical engineering with expertise in Additive manufacturing.
- Experts in designing and development of parts from AM, & implementing in problem solving
- What Participants See!?
- An in-depth series of video lectures & detailed descriptions.
- A portfolio of AM applications including prototyping, rapid product development, tooling, customization, repair & maintenance.
- The use of generative design & build simulation software for AM.

Unique Course Features

- Advanced digital tools
- Dismantled components of 3d printer.
- 3d printer kit



SPEAKERS

Dr. Manjaiah: Metal 3D Printing



M. Manjaiah is an Assistant Professor in the Department of Mechanical Engineering at NIT Warangal. He began working on 3D printing along with various national and international industry and academic institutes for widespread commercial uses. Manjaiah's career spans academia and industry relevant to 3D printing of metal structures. He has 3.5 years of Postdoctoral Experience from the University of Johannesburg, South Africa (2015–2016) and Ecole Centrale de Nantes–CNRS lab, France (2016–2018). He is currently Faculty Coordinator for M. Tech. – Additive Manufacturing at NIT Warangal

Dr Raghavendra Krishna: Introduction to Polymer 3D Printing.



Dr RK is a 3D Printing (3DP) research facilitator at CIIRC. His 3DP research focuses on novel design and development of products for multiple applications ranging from Art to Architecture and Engineering to Medical. Dr RK is an Associate Professor of Additive Manufacturing and Rapid prototyping at CIIRC and the Department of Mechanical Engineering where he teaches Post Graduate and Undergraduate students. He has published multiple Books and Book Chapters in the domain of Additive manufacturing with special emphasis on 3D Printing. Dr RK's research group focuses on Additive Manufacturing, Thermal Interface Materials, and Tribology.

Mr. Rohit G: 3DP Software: Design and Analysis.



Rohit G holds a degree in Mechanical Engineering and is currently at ALTEM Technologies. He has ample knowledge in different mechanical software encompassing both modeling and analysis skill set.



Karnataka Science and Technology Academy

Karnataka Science and Technology Academy (KSTA) is an organization established in 2005 to promote science and technology-related activities in the Indian State of Karnataka. It functions under the Department of Science and Technology of the government of Karnataka.

Host Institution

Jyothy Institute of Technology (JIT)

Jyothy, though initially started as a typical teaching institute in 2011 undertook a white space finding activity in the year 2016 and decided to prioritize Research, Innovation and Incubation addressing society & environment amalgamating both science & technology to be the cornerstones of its journey forward alongside teaching and since then embarked on a journey to transform itself. The same is aptly reflected in the **NIRF and ARIIA 2020** rankings. JIT is ranked in the band 250 – 300 in NIRF 2020 and 26 – 50 in ARIIA 2020, Performer band in 2021 by MHRD and its research centre **CIIRC** also has the distinction of being recognized as a **Scientific & Industrial Research Org (SIRO Centre)** by DSIR, GoI alongside its incubation centre **AIC-JITF** being amongst the top performing Atal incubators.



The institution offers Undergraduate Programmes in the disciplines of Civil Engineering, Mechanical Engineering, Computer Science Engineering, Information Science Engineering, Electronics & Communication Engineering, AI& ML with five of the programmes being accredited by NBA. Besides this the Institution also offers Masters Programmes in Mechanical Engg, CSE and Food Technology as well as Doctoral Programmes in the domains of CSE/ISE, Mech Engg, E&C, Civil Engg, Nanotechnology, Biotechnology, Physics, Chemistry, Mathematics, Polymer Science & Technology, Material Science & Engg and is a **recognized R&D Centre of Visvesvaraya Technological University (VTU)** with an overall scholar strength of 1200 on campus. The institution has a dedicated team of teaching and research staff with 50+ doctorates and 70 masters who are alumni of premier institutes such as IISc, IIT, NIT, Central, State and Foreign Universities.

In line with its motto of transforming itself as a research & innovation driven institute the institution has established an exclusive **Multidisciplinary R&D Centre CIIRC** with research and innovation labs spread over approx 50000 Sq.ft at a significant cost duly supported by Sri Sharadha Peetham Sringeri in **18 areas of S&T**. The areas being Affordable Medical Devices & Sensors, Ancient Indian S&T, Autonomous Systems, Biocomposites & Biopolymers, Cell & Molecular Biology, Computational Engg, Energy, Environment, Food Technology, Nanobiotechnology, Nanoscience & Engg, Plant & Microbial Technology, Remote Sensing & VLSI, Surfaces & Interfaces, Thermal Engg, Tribology & RP, Water, Ink alongside a dedicated Sophisticated Instrument Facility housing instruments such as SEM, XRD, GC, FT-IR, DSC, TGA



and a host of other equipment. Students, Staff, Innovators & Incubates in house and from outside have the benefit of utilizing these facilities for carrying out their research, projects and internships.

The institution also has about **50 + projects funded by DST, DRDO, DBT, MOES, DOS, VGST, KCTU, CEFIPRA, GITA, UGC-DAE, VTU, AYUSH** which includes bilateral projects with **France, Sweden, Belarus, ASEAN, Egypt and the European Union**. In terms of its **Publication** record the faculty have numerous publications (~ 200 in last two years) in peer reviewed National and International Journals with good impact factor, indexed in Scopus/Thomson Reuters/Web of Science and a no of book chapters and books published by major publishing houses such as springer, elsevier, wiley and others. Many of the research faculty have good metrics in terms of h index and citations and have developed over **35 products** of relevance from societal and environmental perspectives and the same is being commercialized through the Atal incubation centre located on campus.

In terms of **collaborations** the institute has numerous R&D, Industrial, International and academic MOU's. The institution also offers technical and **consultancy services** to various organizations and individuals alike. The faculty of the institute have been conferred with **awards/ recognitions** such as Commonwealth Fellowship, BRICS Young Scientist, DBT Women Fellowship, DBT Ramalingaswamy, CSIR, Raman Charpak (Indo-French) Fellowship, WOSA, WOSB from DST, BIRAC-Shrishti award DST Young Scientist, Soviet Union Grant Challenge, Member Executive Council of VTU, Member Vision Group on Nanotechnology and others.

The **highlight of the achievements** of the institution has been hosting ISRO satellite receiver for data collection pertaining to IRNSS satellite, Leading the 4th Indian **Scientific expedition** to the **North Pole (Arctic)** for mapping arctic glaciers in Sep 2019 and thus by becoming the first Indians to fly drones in the arctic, **Winning Bangalore Nano 2018** for the most innovative products display and Nano Sparx in 2020, Being the Pace setting car at the Asia Pacific Coffee-500 rally running its car on biodiesel made from waste cooking oil in 2017 and planting its foot print on the **South Pole (Antartica)** in March 2022 as part of an International expedition and much more.

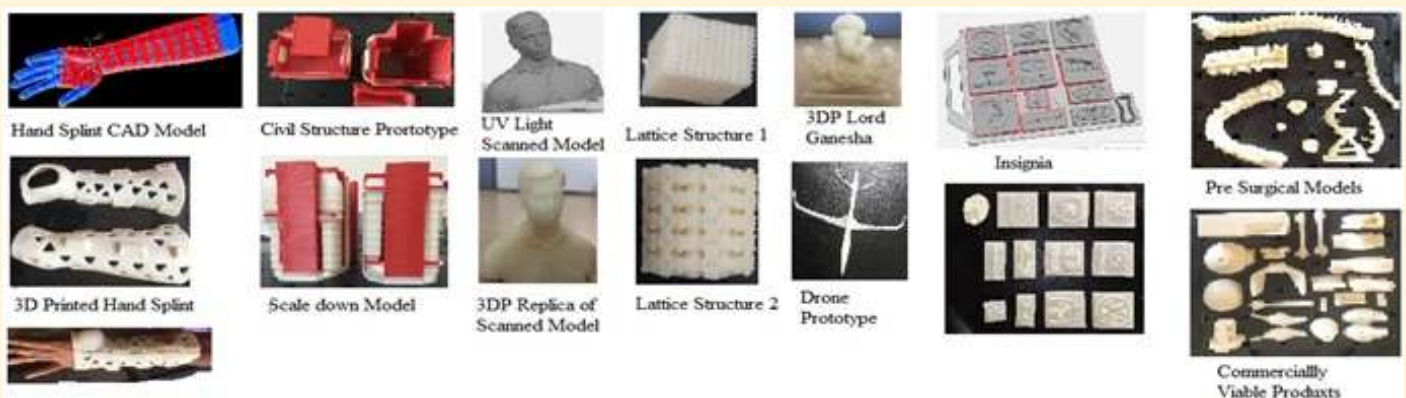
To harness the research output the institute decided to establish an **Incubation Centre** and was selected by **Atal Innovation Mission from NITI Aayog** to set up the same in 2018 under the banner **AIC – JIT Foundation** which became operational in 2019. AIC-JITF is one of the four incubators in Karnataka that have been sanctioned in Phase one from NITI Aayog, GoI to promote start-ups and entrepreneurship culture. The focus areas of AIC-JITF are Food Technology, Sensors & Devices (including IOT) and Materials. The incubation centre is spread over 25000 Sq.ft and has exclusive incubate space allotted to each start-up ranging from 50 sqft. to 800 sq.ft. The incubation centre currently has **45 start-ups** that have been incubated till date, with many of them getting BIG, VILLGROW, INFOSYS, K-ELEVATE, DST, Angel & VC grants.

Many other start-ups are in the pre incubation stage. Besides this the incubation centre has more than 25 MOU'S with various other institutions & corporate and is helping them with training programmes and with co-incubation support forthcoming. Till date more than 50 events and 70 training programmes/workshops have been organized across many districts and different

states. The centre has supported a few ATL in mentoring them and has the active support of more than 30 mentors internally and 15 externally. Recently AIC-JITF also won the start up India seed fund of Rs five crores.

In terms of its **outreach activities** the institute has adopted the local village Tataguni and helps to serve the village through various means. The institution has been selected for the Unnat Bharath Ayaan (UBA) and is also involved in the Swacch Bharath Abhyaan, EBSB campaign besides participating regularly in National and International events in order to expose students to the various facets of life and education.

Students of JIT have won numerous awards such as the **first place at Smart India Hackathon 2020, KSCST Best project of the year award 2020, 2021, VTU Avishkar Award 2020 and fifth place in SAE Aero design USA 2020**, awards at various national and International conferences held at IIT's, IISc amongst others. The campus is a **green campus** and has solar power generating capability of upto Half Megawatt with the current generation being pegged at 350 KW.



FDM 3D printed structures at CIIRC-JIT



Sophisticated Instrumentation Facility at CIIRC



Divine Blessings



Sri Sharada Peetham Sringeri

CHIEF PATRONS

Padma Shri
Dr. V R Gowrishankar
CEO & Administrator, SSPS

Prof. S Ayyappan
Chairman KSTA
Chancellor UAS, Imphal

Sri Basavaraju A B, IAS
Director (Technical)
Department of Electronics,
Information Technology,
Bio Technology and
Science and Technology
Government of Karnataka

Smt. Seetha B V
Chairperson, JCT

PATRONS

Sri M. Narasimhan
Trustee, JCT

Sri B K Ramesh
Trustee, JCT

Dr Krishna Venkatesh
Director, CIIRC

GENERAL CHAIR

Dr. A M Ramesh
Chief Executive Officer
KSTA

PROGRAM CHAIR

Dr. K Gopalakrishna
Principal, JIT

ORGANIZING CHAIR

Sri Umesh Ghatage
Scientific Officer, KSTA

CONVENERS

Dr. C B Mohan
Vice Principal
& Head, Dept. of
Mechanical Engg.
JIT

Dr. M G Anantha Prasad
CEO, AIC-JITF

Dr. Raghavendra Krishna
Associate Professor
CIIRC and Dept. of
Mechanical Engg.
JIT





Workshop Registration Form

“3D Printing for Innovative Research and Knowledge Development” 2nd, 3rd & 4th June, 2022

Name :

Designation :

Department :

Institution :

Mobile No :

Email-id :

Address for Correspondence:

.....

Deputation Certificate for teachers.

Dr/Mr/Ms/Mrs.....is a faculty of our institution / college/university/ and is permitted to attend workshop on “3D Printing for Innovative Research and Knowledge Development”

Signature of Principal/
Head of the department