

3D PRINTING INSIGHT

JAN 2025

THE INSIGHT INTO
3D PRINTING &
ADDITIVE MANUFACTURING
TECHNOLOGY



3D PRINTING INSIGHT



PRESIDENT'S REPORT



Dear Members & Patrons,

We are excited to present the November 2024 issue of the '3D Printing Insight', a joint effort by the Additive Manufacturing Society of India (AMSI) and the Indian Women in 3D Printing organization (IW3DP). AMSI proudly unveils its new logo and outlines five key objectives for the next five years:

- **MADE IN INDIA – MADE FOR THE WORLD:** Foster the development of industry-grade additive manufacturing machines, materials, and software in India for global markets.
- **Enhance 3D Printing Applications:** Work towards expanding the applications of 3D printing across various sectors in India.
- **Skilling and Upskilling:** Offer industry-driven skill enhancement courses in 3D printing, additive manufacturing, Industry 4.0, and digital twin platforms.

- **Mentoring and Incubation:** Provide guidance and support for startups and incubators in the additive manufacturing domain.
- **Global Networking:** Facilitate connections with global additive manufacturing industries, organizations, and academic institutions through technology showcases and conferences.

A heartfelt thank you to all our esteemed guests, speakers, and delegates for making this event a success. Your presence and insights have truly enriched our discussions and are paving the way for an innovative ecosystem in 3D Printing. Let's continue to collaborate and drive the future of additive manufacturing. We look forward to welcoming you to AMNEXT - 2025 - the 4th International Conference & Exhibition

We thank our corporate and academic members for their unwavering support in fostering a thriving 3D printing technology ecosystem in India with AMSI.

Sincerely,

Dr. L. Jyothish Kumar

President, AMSI





3D PRINTING INSIGHT



CHAIRWOMAN'S REPORT



Dear Members and Patrons,

As the Chairwoman of the Indian Women in 3D Printing Society (IW3DP), I am thrilled to share our latest initiative, Envision 3D, a design challenge competition aimed at harnessing the creative talents of college students in the field of 3D printing. This competition not only showcases design skills but also encourages innovative thinking among young minds.

The inaugural edition of Envision 3D took place during the 13th International Conference on Additive Manufacturing, hosted by the Additive Manufacturing Society of India (AMSI), in collaboration with the Central Manufacturing Technology Institute (CMTI).

We were delighted to witness an impressive array of submissions from student teams, each demonstrating exceptional creativity and technical prowess.

Five standout teams were recognized for their outstanding designs and prototypes, each receiving cash prizes along with accolades for their innovative contributions. This edition of our newsletter will highlight these winning designs and the talented individuals behind them, celebrating their achievements and the potential they represent for the future of 3D printing technology.

At IW3DP, we are committed to bridging the gender gap in this exciting industry and empowering women through education and hands-on experience. Initiatives like Envision 3D are vital in creating awareness about the technology and in promoting inclusivity. I encourage all members and supporters to engage with these young innovators and continue fostering an environment where creativity thrives.

Let us celebrate these achievements and look forward to more inspiring innovations in the upcoming editions of Envision 3D!

Sincerely,
Dr. Kavya Shree K
Chairwoman
Indian Women in 3D Printing





ORGANIZATION UPDATES

ADDITIVE MANUFACTURING SOCIETY OF INDIA

Congratulations to Dr. V. Narayanan On His Appointment as the Next Chairman of ISRO



The Additive Manufacturing Society of India (AMSI) extends heartfelt congratulations to Dr. V. Narayanan on his appointment as Chairman of the Indian Space Research Organisation (ISRO) and Secretary of the Department of Space, Government of India.



We are honored to have hosted Dr. Narayanan as the Chief Guest at the 12th International Conference on 3D Printing and Additive Manufacturing on 13th September 2023 at BIEC, Bangalore. Dr. L. Jyothish Kumar had the privilege of felicitating him during the event.

AMSI wishes Dr. Narayanan great success in his new role!



ORGANIZATION UPDATES

December 2024 Recap: AMSI's Monthly Innovations in Additive Manufacturing

The top of the graphic features the AMSI logo on the left and the Sciaky Inc. logo on the right, both in white against a dark blue background.

AMSI's Expert Technology Talk Series:
MONTHLY INNOVATIONS IN ADDITIVE MANUFACTURING

A circular portrait of Mr. John O'Hara, a man with glasses and a light blue shirt, smiling.

Mr. John O'Hara
Global Sales Manager
Sciaky Inc., USA

**Topic: DED - Interpass Temperature Management
with Electron Beam Additive Manufacturing
Production of Grade 5 Titanium.**

4th December 2024
 2:30 PM - IST
 Register to receive the link.

In December, AMSI hosted Mr. John O'Hara, Global Sales Manager at Sciaky Inc., USA, for an engaging session on "DED - Interpass Temperature Management with Electron Beam Additive Manufacturing of Grade 5 Titanium."

Mr. O'Hara's insights into Electron Beam Additive Manufacturing (EBAM) and temperature control techniques provided valuable knowledge for advancing additive manufacturing practices.

Thank you to all who attended! Stay connected for more sessions in our monthly series.



ENVISION 3D Design Challenge: Featured projects from the 13th International Conference

Indian Women in 3D Printing, in collaboration with AMSI and CMTI, proudly hosted the "3D Innovation Challenge" during the AM Conference + Expo - 13th International Conference and Exhibition on 3D Printing and Additive Manufacturing Technologies (AM 2024) on October 24-25, 2024, at The Lalit Ashok, Bengaluru.

This special workshop brought together talented students and researchers who showcased their unique designs and prototype models. We extend our heartfelt gratitude to all participants and look forward to fostering more creativity and excellence in future editions.

1) Optimizing Propulsion with Toroidal Design

By Harshil C N and Vaibhav Kumar Pandit

Nitte Meenakshi Institute of Technology

Introduction:

Harshil C N and Vaibhav Kumar Pandit showcased their project, "Optimizing Propulsion with Toroidal Design," at the ENVISION 3D Competition. The project focused on enhancing propulsion efficiency through innovative design.

Prototyping and Testing:

Utilizing SolidWorks and CATIA, they modeled and simulated the design, selecting PETG for its strength and flexibility. This project highlights the potential of 3D printing in advancing aerodynamic design, setting the stage for future innovations in the field.

Conclusion and Future Directions:

Harshil C N and Vaibhav Kumar Pandit's project showcases the innovation of ENVISION 3D, advancing fluid dynamics and paving the way for future 3D printing and aerodynamic innovations.





ENVISION 3D Design Challenge: Featured projects from the 13th International Conference

2) 3D Printed Charging Case for Standalone Earbuds

By Dileep Choudhary, Mohammed Abrar, Pranav S.

BMS College of Engineering

Innovative Solution to E-Waste Challenge:

In response to the growing issue of electronic waste, Dileep Choudhary, Mohammed Abrar, and Pranav S. have designed a 3D-printed charging case for standalone earbuds, showcased at the ENVISION 3D Competition. The project addresses the problem of discarded earbuds due to lost or damaged cases, offering a sustainable and cost-effective solution.

Project Highlights:

The team designed a reusable charging case to restore functionality to earbuds, preventing waste and reducing the need for new purchases. After researching earbud designs and using FDM 3D printing on a Creality Ender 3 V3, they refined their prototype through multiple iterations to create a lightweight, customizable product.

Outcome and Future Prospects:

The final prototype successfully addressed the initial design flaws, resulting in a practical and user-friendly product. This project not only highlights the potential of 3D printing in reducing electronic waste but also underscores the importance of sustainable design solutions in consumer electronics.

Conclusion:

Their work highlights the role of 3D printing in sustainable design, exemplifying the innovative spirit of ENVISION 3D and contributing valuable solutions to electronic waste challenges.





ENVISION 3D Design Challenge: Featured projects from the 13th International Conference

3) Compliance Mechanism Wheels for Rough Terrain Traversal

By Shantanu Madavan, Bidyu Bandyopadhyay, Marlakunta Chinmayee
Nitte Meenakshi Institute of Technology

The Compliance Mechanism Automatic Weighing and Dumping Machine is an innovative solution designed to handle mass segregation and quantity collection through a unique compliance mechanism. The model is engineered to handle specific weights, with the current design calibrated for 10 newtons (approximately 1 kilogram).

Design Process:

Once the 1-kilogram threshold is reached, the compliance mechanism activates, tipping and dumping the items, then resets to its original position. This system is customizable for various mass requirements and can handle mass segregation or unit collection. It uses leaf springs and folded flaps as compliance hinges for the return and hold-down mechanism. The design was refined iteratively to finalize the spline shape, ensuring the right angle and volume for effective mass handling.

Prototyping and Testing:

The mechanism has been tested and proven to function effectively within its design specifications, with plans for scaling up for larger applications in the future.

This innovative approach demonstrates the flexibility of 3D printing in developing efficient and customizable solutions for mass handling systems, offering vast potential for future industrial and operational applications.





ENVISION 3D Design Challenge: Featured projects from the 13th International Conference

4) Compliance Mechanism Wheels for Rough Terrain Traversal

By Bidyu Bandyopadhyay St
Nitte Meenakshi Institute of Technology

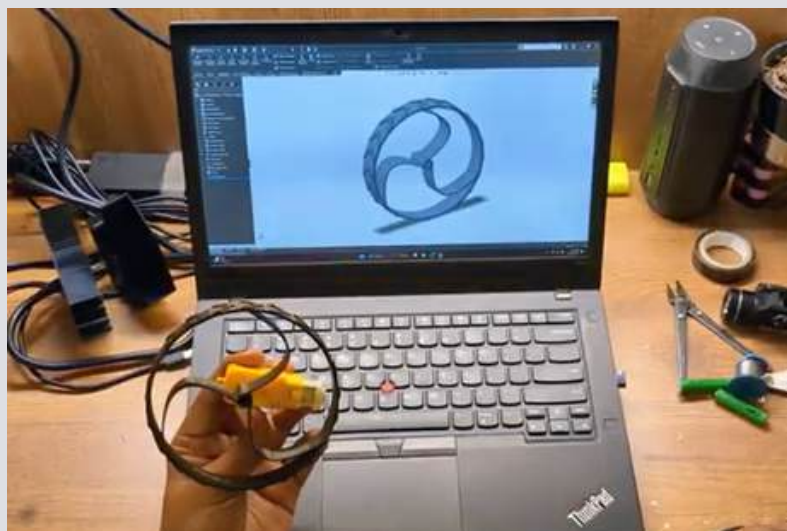
This project focuses on the design and development of compliance mechanism wheels, which incorporate a suspension system and wheel tractor system into a single 3D-printed component. Unlike traditional designs, this integrated system allows for smooth traversal over bumps and rough terrain without the need for independent suspension, wheel, or drive systems.

Design Process and Iterations:

The wheel design, modeled using SolidWorks 2024, is inspired by the wheels of NASA's Mars lunar rovers, which feature built-in suspension systems for enhanced terrain adaptability. The design underwent a detailed iterative process to optimize key parameters such as the number of splines, their geometry, thickness, and overall wheel dimensions. These factors were adjusted to ensure optimal performance, with each application potentially requiring different specifications.

Application and Manufacturing Considerations:

For this design, the focus was on maximizing the active manufacturing process to facilitate bulk printing. This approach allows the wheel to be produced in large quantities and separated into individual pieces during mass production. With soft springs and a high displacement range, the wheel is designed to efficiently handle rough terrain, making it ideal for use in robots and vehicles navigating challenging environments.





ENVISION 3D Design Challenge: Featured projects from the 13th International Conference

5) Vertical Axis Wind Turbine (VAWT)

By Jalina Maris & Nihal Ganesh

Nitte Meenakshi Institute of Technology

Ideation Process:

Jalina and Nihal embarked on a journey to address the need for renewable, small-scale energy solutions. They explored the advantages of Vertical Axis Wind Turbines (VAWT) and investigated how 3D printing could facilitate efficient and customizable turbine designs. Through brainstorming, they considered various materials, design features, and scaling options for their prototype.

Design Thinking:

- Empathize: Focused on understanding challenges related to wind turbine efficiency and material constraints.
- Define: Identified the core objective of developing an accessible and cost-effective VAWT.
- Ideate: Explored multiple blade shapes and materials through iterative design processes.
- Prototype: Utilized 3D printing for rapid prototyping of turbine blades.
- Test: Conducted real-world evaluations of prototypes under varying wind conditions to ensure performance and efficiency.

Prototype and Demonstration:

The team researched turbine models, designed airfoil-shaped blades, and used CAD for detailed modeling. They 3D-printed and assembled the turbine, which successfully captured wind from all directions, generating electricity. The prototype, tested for stability and efficiency, highlighted the potential for scalable renewable energy, earning recognition at the ENVISION 3D Competition.



**AMSI**ADDITIVE MANUFACTURING
SOCIETY OF INDIA

14th International Conference + Expo 3D Printing & Additive Manufacturing Technologies - AM 2025

11 - 12th September 2025

The Lalit Ashok, Bengaluru, INDIA

Call for Papers

We invite researchers, academicians, professionals and industry experts to contribute and share their knowledge, experiences and research outcomes at the International Conference on 3D Printing and Additive Manufacturing Technologies - 2025.

The conference aims to exchange ideas and explore innovative solutions for academic & industry applications.

Submission Guidelines

- The paper should be in IEEE format, and should not exceed 7 pages.
- The full paper should include the title of the paper, author's name, author's affiliation, email ID, corresponding other details, etc., with font size 12, font style - Times New Roman, line space of 2 points, headings - 12 + Bold.
- Papers must be in PDF FORMAT.
- All the submitted conference papers will be peer-reviewed by the experts.
- The accepted papers will be published in the International Journals.

Paper submission details

Email your submissions to:

✉ am@amsi.org.in

www.amsi.org.in

am@amsi.org.in



14th International Conference + Expo **3D** Printing & Additive Manufacturing Technologies - AM 2025

11 - 12th September 2025 The Lalit Ashok, Bengaluru, INDIA

Highlights of **amnext - 25**



Showcase of Advanced AM Technologies: Hardware, Software, and Materials



Expert Keynotes and Insightful Panel Discussions



Hands-On Interactive Workshops



Networking to Build the AM Ecosystem



Start-up & R&D Pavilion for Innovation Display



Design & 3D Printing Competitions with Awards



Buyer-Seller Networking Meetings

www.amsi.org.in

www.iw3dp.com



AMSI
ADDITIVE MANUFACTURING
SOCIETY OF INDIA

ACADEMIC PARTNERS



NIE
The National Institute of Engineering

National Institute of Engineering, Mysore



VIT
Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

Vellore Institute of Technology



NITTE Meenakshi Institute of Technology



Ajay Kumar Garg Engineering College



SRM Institute of Science and Technology

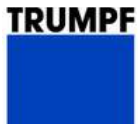


Ganpat University



BIT Sindri Alumni Association Of North America

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MEDIA PARTNERS





INDIAN WOMEN IN 3D PRINTING

INSTITUTIONAL MEMBERS



VIT

Vellore Institute of Technology
(Decreed to be University under section 3 of UGC Act, 1956)

Vellore Institute of Technology



**Dayanand Sagar
College of
Engineering**



**RV College of
Engineering**



**National Institute of
Engineering, Mysore**



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**NITTE Meenakshi
Institute of Technology**



**BMS College of
Engineering**



VVCE

**Vidya Vardhaka College
of Engineering**

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LAYERX
ON DEMAND MANUFACTURING