**Docket #:** S24-036

# Next-generation omnidirectional 3D printing

Researchers at Stanford University have developed a novel 3D printing method, enabling multiple printheads to collaboratively pattern materials from multiple directions, an 'inwards-out' approach that overcomes previous limitations.

3D printing has found widespread use across various domains, from rapid prototyping to manufactured goods. Especially, Embedded 3D printing (E3DP) techniques enable the patterning of materials along predefined paths in multiple directions. Despite this, traditional methods are constrained by limited geometric complexity, slow speeds, workspace restrictions, inefficient multi-material printing, and lack of dexterity for printing.

Now, using methodology commonplace in robotic surgery, Professor Skylar-Scott's team has developed a new 3D printing method that overcomes previous limitations. Their improved system allows the spouts to navigate through small and complex pathways, while maintaining dexterity as well as deviate from the traditional layer by layer printing. This paradigm shifting system allows for better on-demand printing and a wider range of design options.

**Stage of Development**
Prototype

## Applications

- 3D printing
    - Prototyping
    - Industrial manufacturing
    - Medical implants
    - Architectural models
    - Custom consumer goods

## Advantages

- Improved printing without distortions in structure
- Ability to print small and complex structures
- Better geometrical flexibility of printing
- Improved speed of printing
- Removed the need for printer nozzle changes, even in E3DP
- Broader workspace

## Patents

- Published Application: WO2025179212

## Innovators

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