IOWA

Additive Manufacturing-Integrated Product Realization Lab

The Additive Manufacturing-Integrated Product Realization Lab, or AMPRL, studies how material-forming processes existing in nature can be utilized to enable next-generation additive manufacturing (AM) technologies.

Research Topics

Next-generation AM technology development: We learn from nature to develop next-generation AM technologies, which are multi-material, multi-scale, ultra-fast speed, and energy efficient.

AM process modeling, quality control, and optimization: We use experimental and theoretical techniques to advance the understanding of fundamental physics behind nature-inspired AM processes and achieve performance-driven process control.

Novel applications of new AM technologies: AMPRL utilizes the unique capabilities of our AM technologies to create game-changing devices for various applications, such as tissue engineering, sensing, energy harvest, and robots.

Who We Work With

- Aerospace and information technology developers
- Biotechnology companies
- Heavy machining companies
- Manufacturers with 3D printing needs

Lab Director: Xuan Song

- Assistant Professor of Industrial and Systems Engineering
- PhD: Industrial & Systems Engineering, University of Southern California
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RESEARCH HIGHLIGHTS

Additive Manufacturing of Bi-continuous Piezocomposites: 3D printing technology can reliably tune properties of bi-continuous piezocomposites, an emerging material featuring excellent flexibility and piezoelectricity with potential applications in sensors, actuators, and ultrasound transducers.

Hydrothermal-assisted Transient Binder Jetting: New technology can fabricate high-density ceramic and composite materials with locally tailorable microstructures and compositions under mild conditions, enabling highly programmable properties that have never existed.

Support-free Ceramic Stereolithography: Patented ceramic printing technology can print ceramic structures of arbitrary geometric complexity, without the need for building additional support required in traditional methods.

Multi-material, Multi-scale Additive Manufacturing: Technology can fabricate structures with multiple types of materials spanning multiple scales (e.g., 10μm features over a large area of 1,000mm²), providing an effective solution for numerous biomedical applications, such as drug delivery, bioresorbable vascular scaffold, and lab-on-a-chip.

LEARN MORE

SCHEDULE A VISIT

by contacting Xuan Song at **xuan-song@uiowa.edu** or **319-335-5680**

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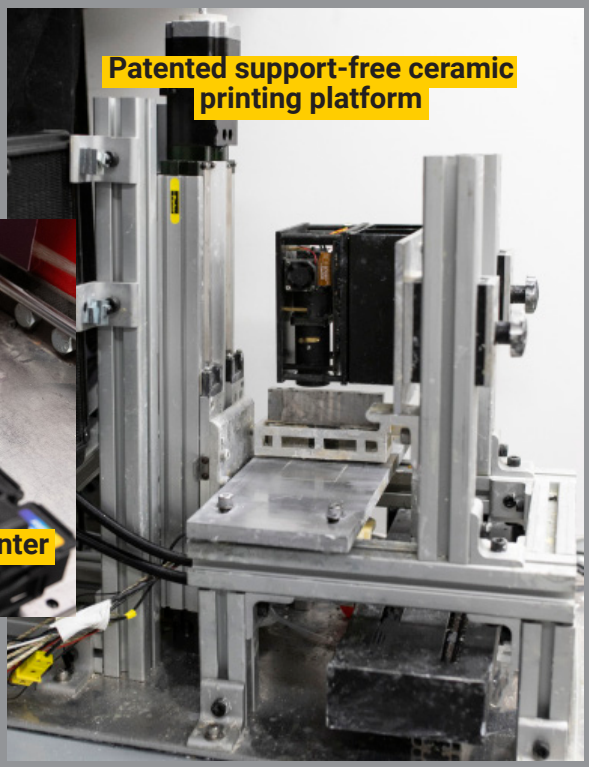
on our website **songsean.com**

3D printed piezo-composites measurements

Hydrothermal-assisted ceramic printer



Patented support-free ceramic printing platform