



## Metal Foam Additive Manufacturing with Controlled Pore Patterns

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**WARF: P210245US01**

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### The Invention

UW researchers have developed a new 3D printing technique for fabrication of metal foams with pore patterns. Unlike traditional manufacturing techniques used for fabrication of metal foams, this new metal foaming technique is entirely controllable, which enables printing of metal foams with uniform pore dispersion (and thereby tunable density), as well as custom pore patterns for lightweight structures reinforced at key points. This technique uses pulsed mode laser powder bed fusion additive manufacturing (Pulsed-LPBF AM) to fabricate the metal foams containing patterns of micron sized closed pores. Pulsed-LPBF AM is a technique that prints metal directly from digital models in a layer-wise manner. The underlying physical mechanism of pore formation during Pulsed-LPBF AM involves transformation of a cavity into a closed pore using two consecutive pulses. By adjusting the primary laser process parameters, different patterns of pores can be produced inside the bulk of the metal.

### Applications

- Lightweight and Strong Structural Components
- Energy Absorption Materials
- Thermal Management
- Filtration
- Catalysts
- Surgical Implants
- Fuel Cells

### Key Benefits

- Control of pore distribution
- Tunable density
- No post-processing required
- Can use any metal/allow
- Improved mechanical and structural properties
- Lightweight

### Additional Information

#### For More Information About the Inventors

- [Lianyi Chen](#)

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#### Tech Fields

- [Engineering : Additive manufacturing](#)

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