

## IMPACTS SUBMISSION

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### For division/directorate use

*Please use the following template to present items that would make persuasive Impacts. Information must be understandable by a lay person.*

**SUBJECT: Feeding the advanced manufacturing revolution: New method developed to produce the main ingredient for laser 3D manufacturing, alloyed metal powders.**

**CATEGORY- Chose U.S./global economy, national security or scientific knowledge:  
U.S./global economy**

**NSF AWARD(S) - Provide award number hyperlink:**

[https://nsf.gov/awardsearch/showAward?AWD\\_ID=1541079](https://nsf.gov/awardsearch/showAward?AWD_ID=1541079)

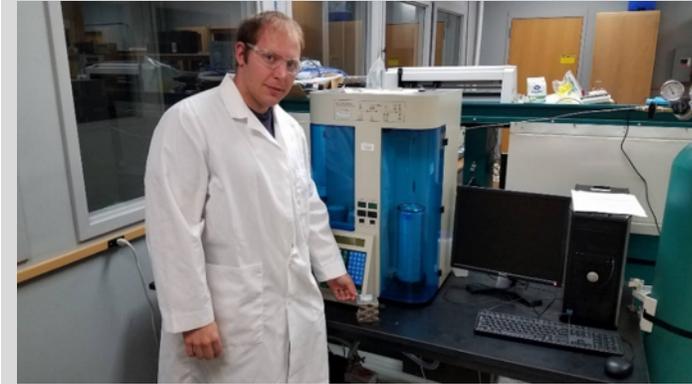
### **OTHER SUPPORTING INFORMATION:**

#### **BRIEF SUMMARY OF OUTCOMES - (Why is this award compelling for use as an Impact?):**

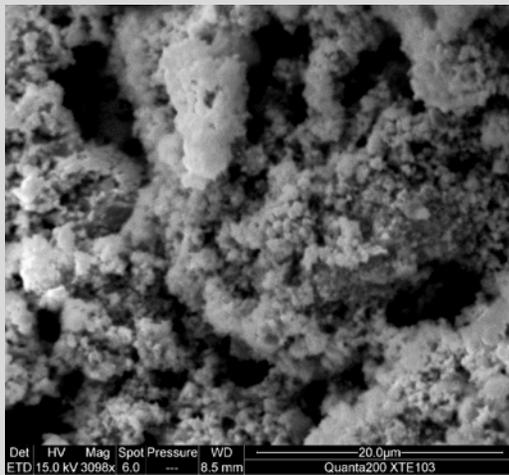
When manufacturing metal parts for airplanes or space stations, you need strong, precise parts that last a long time. The manufacturing industry in the U.S. is transitioning to new technologies that can 3D print strong, extremely complicated parts rapidly with less cost and waste. In particular, a technology called Selective Laser Melting (SLM), is being developed in Louisiana by a team of researchers in the Consortium for Innovation in Manufacturing and Materials (CIMM). SLM uses high-powered lasers to melt metal alloy powders layer by layer to create complicated 3D parts.

The current technology for producing the metal powders for SLM is a hard-to-control process and has been unsuccessful in producing powders for new exotic metal alloys without inordinately expensive equipment. Louisiana Tech University graduate student Alexander Ulrich has developed a new method to produce alloyed metal powders for use in SLM. The newly developed method is similar to electroplating, and has shown great promise producing alloy powder materials.

To help facilitate this new technological process, the structure and properties of the metal alloys first had to be researched in great depth, and this has been completed with the help of Dr. Naidu Seetala at Grambling State University. Both Dr. Seetala and Mr. Ulrich are part of a research team led by Dr. Chester Wilson in Louisiana's Consortium for Innovation in Manufacturing and Materials (CIMM).



Graduate student Alexander Ulrich testing the surface area of alloy powder samples at Louisiana Tech University's Institute for Micromanufacturing, part of Louisiana's Consortium for Innovation in Manufacturing and Materials (CIMM). *Credit: Dr. Chester Wilson, Louisiana Tech University, [chester@latech.edu](mailto:chester@latech.edu)*



Scanning electron microscope photo of micron-sized alloyed powder made through a new and inexpensive chemical deposition method. *Credit: Dr. Naidu Seetala, Grambling University, [naidusv@gram.edu](mailto:naidusv@gram.edu); Alexander Ulrich, Louisiana Tech University, [aju002@latech.edu](mailto:aju002@latech.edu)*

**THREE REASONS this award outcome impacts U.S./global economy, national security or scientific knowledge:**

The metal alloy components that our military uses every day cannot be produced rapidly via traditional U.S. manufacturing facilities. 3D Selective Laser Melting (SLM) manufacturing techniques can replace those outdated facilities and adapt to the constant need for new materials and manufacturing methods.

Current U.S. manufacturing technology involves casting metal into parts and shaving them down, which results in components that lack precision and generates excessive waste. This new SLM technology will make available to U.S. manufacturing industries the cutting edge of technology for producing complex, precise parts out of innovative materials while also minimizing costs and waste.

This newly developed method provides the ability to generate many alloy powders that have not been made before. This method allows the production of the new alloy powders with a high degree of accuracy and control at less expense, and can be tailored to specific manufacturing needs.

**NSF Directorate(s)/Division(s): OIA**

**State(s): Louisiana**