**Title:**

Recycling Metal Feedstock Powders for Re-Use in Cold Spray Additive Manufacturing

**Presenting Author:**

Ashton H. Lyon, Worcester Polytechnic Institute (ahlyon@wpi.edu)

**Co-Authors:**

Stephen Price, Worcester Polytechnic Institute (sprice@wpi.edu)

Dr. Kyle L. Tsaknopoulos, Worcester Polytechnic Institute (kltsaknopoulos@wpi.edu)

Dr. Danielle L. Cote, Worcester Polytechnic Institute (dlcote2@wpi.edu)

**Abstract:**

Deposition of metal powders through Cold Spray Additive Manufacturing exhibits a wide range of material efficiency. For softer metal powders such as aluminum, nearly 100% of consumed powder can be successfully deposited on the work surface. However, for harder metal powders such as nickel-based or refractory alloys, the cold spray process may deposit less than half of the powder consumed by the system, with the remaining powder lost as it rebounds off the work surface. To recover the un-deposited powder particles for re-use, and reduce costly losses, copper-nickel powder was collected from a cold spray booth which was operated under an inert atmosphere with its dust collection disabled. The powder was characterized using scanning electron microscopy, chemical composition analysis, powder size, shape, moisture analysis, and x-ray diffraction. The recovered powder was compared to raw feedstock powder to determine its viability for re-use in further cold spray processing.