

# UNI Foundry 4.0 & Metal Casting Centers

University of Northern Iowa



# UNI Metal Casting Center

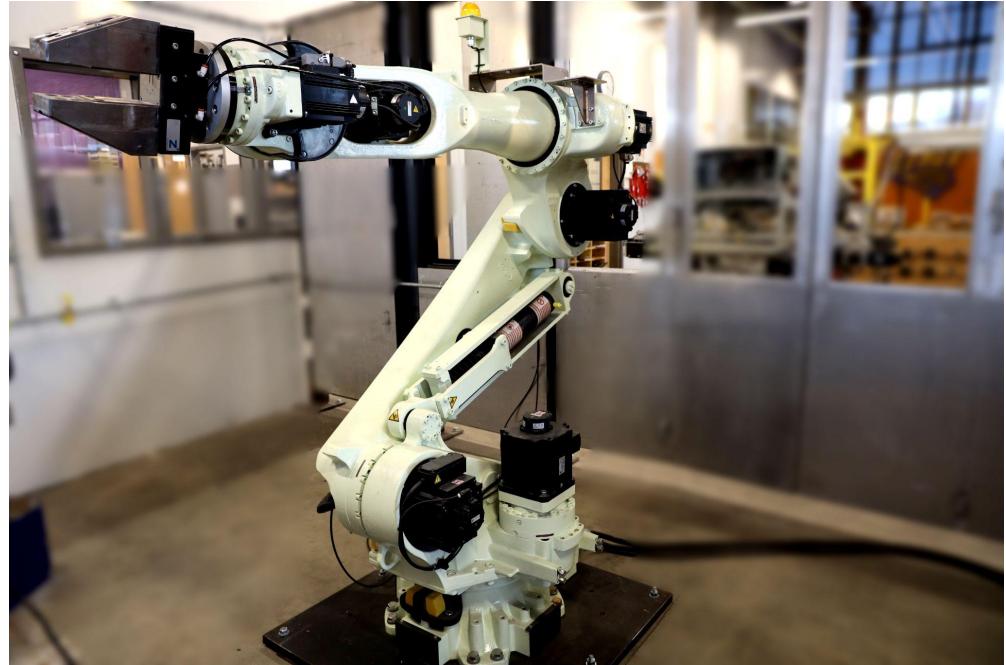
The UNI Metal Casting Center focuses on materials research, metal manufacturing, and foundry education. With revolutionary metal casting, molding, and 3D printing equipment, the MCC is able to advance learning and push the boundaries of technology.



# UNI Foundry 4.0 Center

The UNI Foundry 4.0 Center works directly with industry partners to create new technologies and processes that improve the supply chain.

The facility uses special materials and processes that are not yet commercially available to bring new technologies to the marketplace.



# History Highlights

In 1989, the Center for Applied Research in Metal Casting (CARMC) was created with a grant from the Iowa State Lottery and a matching grant from the university.

In 2013, the Foundry 4.0 Center opened in the TechWorks building in Waterloo, Iowa. The Metal Casting Center is undergoing renovations with state of the art technologies and is scheduled to reopen in 2024.

Currently the Metal Casting and Foundry 4.0 Centers support research-based additive manufacturing projects.



# Research & Development

- Robotic operations of traditionally labor-intensive foundry practices including gating and riser removal of ferrous and non-ferrous alloys
- Investment casting shell building and burnout, along with robotic 3D printing



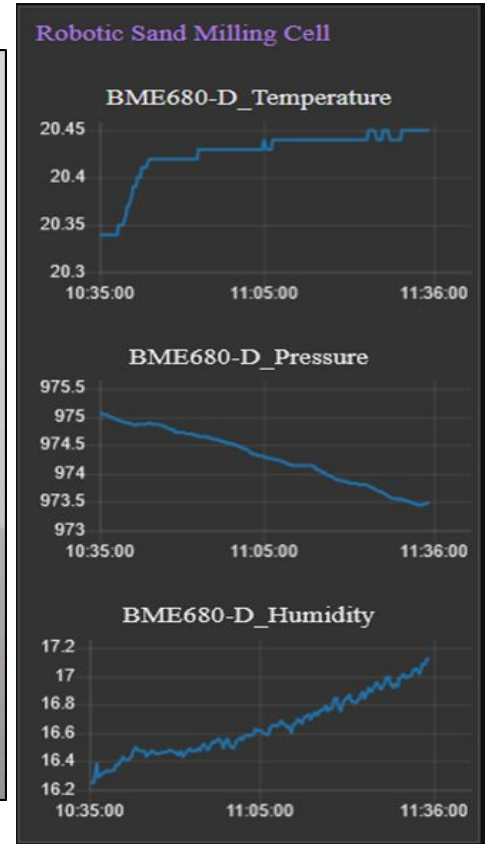
# Research & Development

- A variety of additive manufacturing (AM) methods such as binder jet printing of sand for molds and cores, binder jetting of polymethyl methacrylate powder for expendable pattern printing, photopolymer resin printing utilizing both the stereolithography (SLA) process and digital light processing (DLP), and the popular fused filament fabrication (FFF)



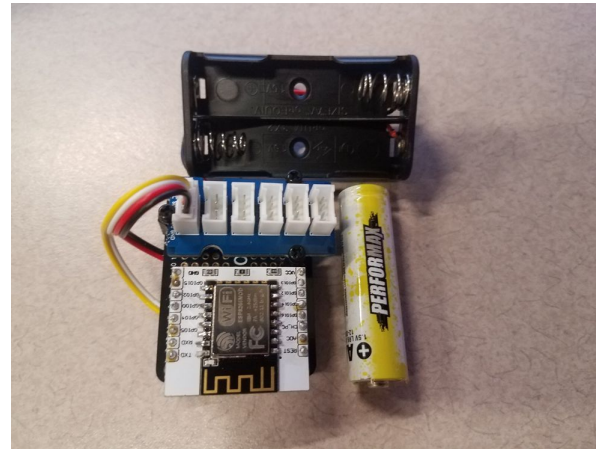
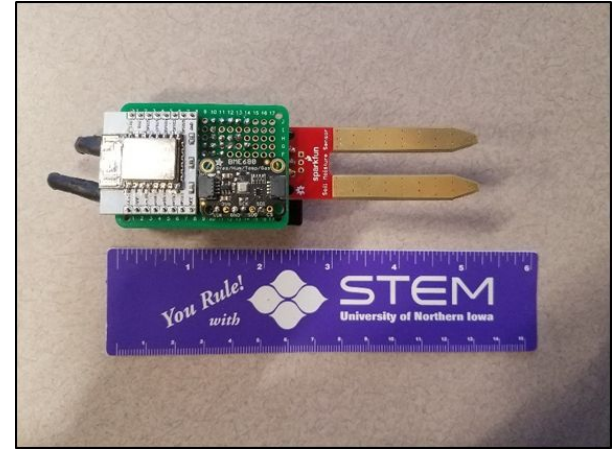
# Foundry 4.0 in Action

Robots, 3D printer and sensors built by under by undergraduate computer science students generate a tremendous amount of data that is stored on a centralized database. This data is used in research efforts to optimize foundry processes through the assistance of machine learning algorithms.



# Developments in Smart Manufacturing

The Foundry 4.0 Center has undergone significant changes in recent years to support smart manufacturing. The Metal Casting Center foundry laboratory is designed around information technology that optimizes the process to ensure quality castings. Every process within the foundry provides data to make smart decisions.





# UNI Students

The Metal Casting and Foundry 4.0 Centers offers student design and lab technician positions where undergraduate and graduate students gain hands-on experience on private and government projects.

From foundry technology to additive manufacturing, the Centers continues to support an innovative, impactful and prosperous academic program with an approximate 95% placement rate for graduates. UNI is accredited by the Foundry Educational Foundation (FEF).



# Metal Casting Center/Foundry 4.0 Center Staff



Gerard Thiel - Director, Metal Casting Center/Foundry 4.0 Center



Nathaniel Bryant - Assistant Project Manager



Joshua O'Dell - Project Engineer



Sam Manternach - Project Engineer



Nicholas Costleigh - Research Associate



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# Thank you!

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