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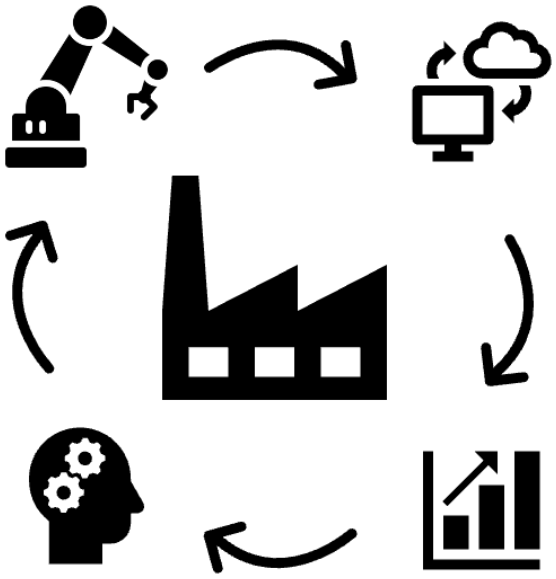
UNI Metal Casting & Foundry 4.0 Centers

Student Employee Takes on Cast in Steel Competition

As part of the 2025 Cast in Steel competition, Luke undertook the challenge of casting and finishing a George Washington sword. His process included extensive research, 3D modeling, magma simulations, pattern making, and creating no-bake molds to pour 5160 steel. After casting, he machined the sword to its desired look, crafted the hilt, and completed the final assembly. In addition to completing the sword, Luke also prepared a detailed technical report of no more than 30 pages and a 5-minute video summarizing his work. This impressive project showcases Luke's creativity, dedication, and technical expertise.

Meet Josh O’Dell, Project Engineer

Josh O’Dell, a Project Engineer, plays a key role in advancing the center’s innovative work. A 2016 graduate of Iowa State University with a Bachelor of Science in Aerospace Engineering, Josh supervises and trains students in modeling and simulation tools for additive manufacturing, robotics, and automation. He is also deeply involved in the center’s automation efforts, working with cutting-edge systems like the automated shelling line for investment casting, robotic sand milling, and a robotic torch system. Josh’s expertise drives innovation while mentoring the next generation of engineers. Check out Josh’s interview on our YouTube page.



Defense Logistic Agency Project Advances Sustainability in the DOD Supply Chain

The Metal Casting Center is wrapping up a groundbreaking project aimed at enhancing the sustainability of the Department of Defense supply chain. The work has led to innovations in dual robotic post-processing, thermal post-processing, sensors and IoT, and full automation of investment casting. Key research areas included developing low-cost process sensors for legacy equipment, automating casting cleaning operations, creating a digital twin of the casting production process, advancing additive manufacturing for large casting hard tooling, and conducting materials testing and development. These advancements pave the way for a more efficient and sustainable future in casting technology.

A Look Back: The Evolution of the Metal Casting Center

Established in 1990 with support from the Iowa State Lottery and a university matching grant, the Center for Applied Research in Metal Casting (CARMC) has continually evolved. In 2014, the Metal Casting Center (MCC) expanded with the opening of the Additive Manufacturing Center at TechWorks in Waterloo, Iowa. In 2022, the facility was renamed the Foundry 4.0 Center to better reflect its mission and innovative work. Most recently, in 2023-2024, the MCC underwent major renovations, updating its infrastructure and adding state-of-the-art equipment to remain at the forefront of metal casting technology.

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mcc-info@uni.edu / 319-273-6894

mcc.uni.edu