

Contact: Rachel Boon

**REQUEST TO CREATE NEW CENTER AT UNIVERSITY OF NORTHERN IOWA:  
ADDITIVE MANUFACTURING CENTER**

**Action Requested:** Consider recommending approval of the request by University of Northern Iowa to establish the Additive Manufacturing Center in the College of Humanities, Arts and Science.

**Recommendation:** The Council of Provosts and Board office have reviewed the proposal and recommend approval.

**Background:** The Additive Manufacturing Center (AMC) has been operating as a program of the UNI Metal Casting Center (MCC) for over five years. It aligns closely with the MCC mission to improve the productivity and competitiveness of the operating metal casting industry through research, technology transfer, assistance to businesses and education. A difference is that it focuses on the larger manufacturing industry with capabilities in 3D printing using plastic, metal and sand with one of the largest 3D sand printers in North America.

As a program of MCC, the AMC has already established a level of direct support unmatched in the country and a national reputation as the go-to place for additive manufacturing assistance. As additive manufacturing advances from prototype to production quality parts, the industry is very competitive in the global marketplace. This increased competitiveness supports industry growth creating demand for new skills and higher paying jobs in Iowa. Being housed within UNI's Department of Technology, students gain first-hand experience in the changing industry and will be on the forefront of new research, development, equipment and processes while positioning themselves to bring these advancements to their employers upon graduation.

**Need for proposed center.** Additive manufacturing is a disruptive technology that has revolutionized the manufacturing industry. The technology is used with various engineering materials including metals, plastics or ceramics in producing both end-use products and components to facilitate conventional manufacturing. The technology is highly adaptive allowing subject matter experts to participate in large original equipment manufacturing supply chains. The capabilities and opportunities available through additive manufacturing are still being discovered. The center has established itself as an industry leader through not only research and development, but also industry work and education. The proposed center will fill a strong need of being on the forefront of the advancements in additive manufacturing. It allows UNI students to receive a high-level education and real-world experience while also supporting the needs of small and medium-sized enterprises and increasing Iowa's competitiveness throughout the industry.

**Proposed center activities and objectives.** The goal of the AMC is to help the manufacturing industry adopt new technology to remain competitive in the world market. The staff already work to support industry change short-term and are now focusing on improving and developing new processes, tools and materials. Through demonstration projects that involve consultation and engineering assistance, the center can expose not only industry to advanced technology, but also UNI's students through academic classes, student research opportunities, and face-to-face interaction with leaders in the industry. Research and development programs with federal, state and private industry will not just follow the technology, but will lead its future direction.

The AMC recently developed printing materials that drastically reduce the cost of additive manufacturing and improve the performance of the products that are created. Companies seek the Metal Casting Center's assistance in developing materials, equipment and new concepts in 3D printing. Additionally, with the expertise of the staff of the proposed center, assistance can be

provided to original equipment manufacturers and small- and medium-sized enterprises that need additional support to adopt advancing technology.

General activities that of the Additive Manufacturing Center will include demonstrations of the capabilities and new technologies, intellectual property development, industry education, continual growth in working with industry customers and consultation with clients, as well as a strong emphasis on the academic focus for UNI students. Major emphasis will be preparing the industrial supply chain to properly utilize and take advantage of the technology as it becomes available. This includes support for UNI's Department of Technology by teaching state-of-the-art concepts, methods and materials to students.

Relationship of proposed institute to University's Strategic Plan. The Additive Manufacturing Center aligns directly with the current UNI strategic plan. The Additive Manufacturing Center's primary focus is to provide experience and opportunities for UNI students involved in the program primarily through the Department of Technology. Students gain real-world experience through engaged learning and having the opportunity to use state-of-art equipment and processes to build their portfolios and resumes.

Additionally, the Additive Manufacturing Center has multiple outlets to support goal #3 – community engagement. First, students can interact and work with large and small companies, regional and international associations, and the federal government, which positions them for advanced opportunities as they enter the workforce. Second, the community engagement that results from the student, business and organizational opportunities contributes significantly to economic development in the Cedar Valley and in the communities and regions that use the expertise and work of the center. Third, as part of Business and Community Services, the center collaborates with a variety programs that work on economic development, entrepreneurship and environmental sustainability by engaging with community clients, partners and organizations.

Relationship to existing centers/institutes. The AMC will be an extension of the MCC, an established UNI center since 1989. The MCC is part of the Department of Technology in the College of Humanities, Arts, and Sciences. Beyond the department, the center also collaborates with other Business and Community Services programs, which have ties in the College of Business Administration, College of Social and Behavioral Sciences and the College of Education.

Relationship to other Iowa institutions. Additive manufacturing technology provides multiple opportunities for UNI to collaborate with universities across North America. In process now are two federal projects including a partnership with Youngstown State University, which includes the U.S. Air Force Research Laboratory, and a second partnership through America Makes, the additive manufacturing innovation organization. Prior AMC partners include the University of Wisconsin, University of Michigan, Lehigh University, Pittsburg State University, Iowa State University and the University of Iowa on efforts ranging from U.S. Department of Energy sponsored projects to student projects in metal casting.



AMC prints molds/cores for ISU Cyclone Power Pullers team since 2017.

Unique features of the university to

support the proposed institute. With the MCC already an established center at UNI, the addition of the AMC increases the depth and scope of capabilities available to students, industry and government partners. The Foundry Educational Foundation continually recognizes the Department of Technology for its excellence in cast metals education. Now the AMC will allow UNI similar recognition through the additive and advanced manufacturing industries.

Resources. Personnel, facilities and equipment needed to establish the AMC are already in place. No additional facilities or equipment are needed.

Cost. The AMC generates revenue through multiple sources, all external from UNI. The largest source is from state level grants and contracts. For FY16, over \$3 million was received through grants to support the AMC. For FY 2019 \$1.5 million will be received. This money is already set aside to be used for equipment to expand the AMC's capabilities and industry impact. Many existing contracts will continue through the next fiscal year and the AMC expects to continue to seek and receive contracts on an annual basis.

The AMC has numerous clients that request the staff's expertise and experience to complete projects with fee-for-service. The AMC currently conducts projects that bring in over \$800,000 per year. The budget estimates that the fee-for-service projects will not only continue consistently, but will increase annually as the AMC acquires more clients.

The AMC has been recognized at the federal level and has been successful at receiving multiyear research grants. There is a high probability that this will continue in future years as projects are completed successfully. The AMC also receives a direct legislative appropriation from the Economic Development Appropriations bill. The funding is split between the MCC and the AMC, so the amount realized in the revenues is 50% of the received amount.

Evaluation plan. The AMC will gauge success on four levels. First, the level of funding support by both industry and federal sources for growth and to achieve sustainability. Second, the depth and breadth of interaction within the additive manufacturing industry. Third, the number of companies the center is able to work with and assist. Lastly, the number of students involved in the advanced manufacturing process.