

## A Message from the Director

Sustainable and advanced manufacturing is essential to future-proofing New York State's industry. Despite recent disruptions across sectors, our commitment remains clear: to help our partners improve their products and manufacturing processes in ways that boost competitiveness and reduce environmental impacts.

Our recent work spans a range of advanced research and applied projects addressing critical challenges in materials, manufacturing, and sustainability. Current initiatives include rare earth recycling to support resource efficiency, AI-driven quality assessment and flexible robotics for precision manufacturing, and process optimization in smoked fish production. Recently completed projects advanced technologies such as industrial CO<sub>2</sub> capture for emissions reduction and production of synthetic blood vessels for biomedical applications; improved metal casting processes; and recommended scalable software solutions for school lunch production.

This year, we're looking forward to forging new partnerships, accelerating breakthrough technologies, and delivering solutions that secure the long-term success of our industry partners. Thank you to our collaborators, clients, stakeholders, and staff, all of whom are critical to continuing this vital work.



**Michael Thurston**  
Director, COE-ASM

## Core Insights

### The Circular Economy and Sustainable Futures

*The circular economy represents a powerful economic model that keeps resources in productive use as long as possible. Applied to manufacturing, it reduces costs and unlocks new revenue streams while reducing environmental impacts related to production.*

The Circular Economy includes activities such as repair and reuse of products and even remanufacturing products so that they are in as-good-as-new condition. When continued use is no longer possible, materials are recovered for recycling. While recycling is better than landfilling a product that you don't need anymore, from both an economic and environmental standpoint it is almost always better to keep a product in use through repair or remanufacturing.

You may have been exposed to remanufacturing without even knowing about it. Consumer products returned under warranty are often remanufactured for resale, and service parts for appliances and refrigerators are often remanufactured parts, saving you money.

The REMADE Institute, a national research institute located in Rochester, NY, focuses on advancing the Circular Economy in the U.S. Established by RIT and the U.S. Department of Energy, REMADE has over 150 company and university members nationwide. REMADE supports research that improves the cost effectiveness of recycling—including plastics, metals, textiles, and electronics—and that advances remanufacturing processes for diverse products such as coffee makers, tires, and heavy-duty equipment. Product design plays a large role in both recycling and remanufacturing, and REMADE is developing design tools to support the Circular Economy.

REMADE is also working on processes and technologies to recycle strategic and critical materials. Critical materials are substances that are essential for modern technologies and economic stability. However, the U.S. has limited capacity for mining and refining its own supply of critical materials, and today they are largely produced in China. These materials often include the 17 rare earth elements as well as lithium, cobalt, and platinum group metals. They play a vital role in everyday products and services: lithium and cobalt are key components in rechargeable batteries for smartphones, laptops, and electric vehicles; rare earth elements like neodymium are used in powerful magnets found in wind turbines and electric motors; and platinum is crucial for catalytic converters that reduce harmful emissions in cars. Advancing recovery and recycling of these materials in the U.S. is one way to reduce our dependence on materials imported from China and support cost effective domestic manufacturing.

To learn more about advances in the Circular Economy in the U.S. and worldwide, join the community in Washington, D.C., March 11-12, 2026, at the REMADE Circular Economy Tech Summit & Conference. [Register here](#)

## Current REMADE Projects Led by COE-ASM Staff



### Remanufacturing and Reuse of EV Batteries

Electric vehicles powered by lithium-ion batteries are rapidly becoming part of everyday life. When EV battery packs fail under warranty, remanufacturing is a good way to bring them back into service. Even when battery packs no longer serve the demands of EV vehicles, they still retain 80% or more of their original capacity—making them well suited for less-demanding secondary applications such as grid back-up energy storage.

To unlock this value, we are developing advanced robotic systems that automate EV battery-pack disassembly, dramatically improving safety, speed, and efficiency. Because pack designs vary widely in shape, size, and form factor—and continue to evolve—we use computer vision to automatically identify fasteners and components before removal, overcoming the limitations of inflexible robotic programming. We are also applying machine-learning models to estimate the remaining capacity of EV modules. Using a fast diagnostic test, the models enable rapid, data-driven decisions that maximize reuse, repurposing, and second-life potential. In cases where battery modules cannot be reused, automated disassembly is equally important because it provides improved recycling economics and material recovery rates.



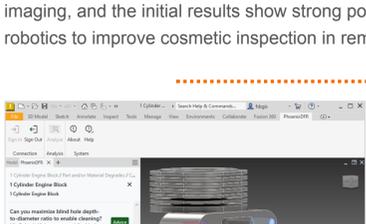
### Automated Defect Inspection Supports Consumer Product Reuse

Customer-friendly policies have greatly increased the volume of product returns. Some of these returns may be like-new, while others may have functional issues or cosmetic defects. The manufacturer is usually interested in reselling these returns to recover some of the items' value.

COE-ASM staff are working with a company that processes a wide variety of consumer products for resale as refurbished or remanufactured items. Inspection of the functional condition and to inform needed repairs, as well as inspection of the cosmetic condition, are critical steps in this process. Inspection of cosmetic condition is done manually today, which is a subjective process that is prone to errors and tedious for workers. We are developing an automated computer vision-based system to detect scratches, dings, dents, and other cosmetic defects on small kitchen appliances.

The system uses a robotic arm equipped with a 2D and 3D camera. The 3D camera is used for planning a path for the 2D camera to image the surface of the appliance. A library of defect images is collected from damaged returns, and this is used to train a machine learning model to identify these types of defects.

One of the challenges in computer vision-based inspection is achieving proper illumination. This becomes even more difficult with the reflective surfaces often present on small appliances. The path planning is used to minimize the effect of reflections on accurate imaging, and the initial results show strong potential for combining machine vision and robotics to improve cosmetic inspection in remanufacturing applications.



### Design for Remanufacturing Tool

COE-ASM staff have developed the PhoenixDFR™ tool, which helps new-product designers build in the features that make cost effective remanufacturing possible.

[Learn more](#)



### Reversing Fatigue Damage in High Stress Components

The heavy-duty equipment sector, including mining and off-road equipment, agricultural equipment, and large trucks, is one of the largest remanufacturing sectors. Many power system components in this sector have high operational stresses that result in metal fatigue, limiting the potential to recondition parts for use in the remanufactured product.

COE-ASM is developing a process using Ultrasonic Impact Treatment (UIT) to extend the life of diesel engine crankshafts. Fatigue damage usually occurs at the surface of components where stresses are the highest. UIT treatment creates high compressive residual stresses that can return the expected life of operationally fatigued components to like-new condition. This process has been demonstrated on rotating bending fatigue samples, and validation is underway on full scale crankshafts.

## Past Events



### RIC-RIT World Remanufacturing Conference

**October 14-16, 2025**

The RIC-RIT World Remanufacturing Conference was a successful three-day event that brought together seasoned experts and emerging professionals from across the global remanufacturing community. Participants exchanged best practices, explored emerging trends, and examined key global remanufacturing challenges.



### NYS Innovation Summit

**October 14-16, 2025**

COE-ASM exhibited at the NYS Innovation Summit, where we strengthened partnerships, made new connections, and gained insight into initiatives emerging across New York State.

## Mark Your Calendar

**March 11-12, 2026**

### REMADE Circular Economy Tech Summit & Conference

[Register here](#)

**April 25, 2026**

### Imagine RIT

[Learn more](#)

**Save the Date:**

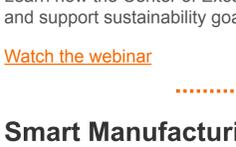
**September 29-October 1, 2026**

### RIC-RIT World Remanufacturing Conference

[Learn more](#)

[Subscribe to Conference Updates](#)

## In the News



We're proud to share that our director, [Nabil Nasr](#), has been named to the [Rochester Business Journal's](#) 2025 Power List for Environmental Leaders—recognizing leaders who are driving meaningful progress in sustainability, innovation, and regional impact.

[Read more](#)

## Tools and Resources

*In case you missed it:*

### Lowering Manufacturing Costs: AI, Automation, and Sustainability for NYS Manufacturing

Learn how the Center of Excellence helps manufacturers improve efficiency, reduce costs, and support sustainability goals.

[Watch the webinar](#)

### Smart Manufacturing - Industry 4.0 Video Series

[Watch the series](#)

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