MAJOR INITIATIVE

DIGITAL REMANUFACTURING

REVOLUTIONIZING REMANUFACTURING THROUGH DIGITAL TECHNOLOGIES, A.I., ROBOTICS, & AUTOMATION

REMADE® INSTITUTE

DRIVING NEXT-GEN REMANUFACTURING

THROUGH COLLABORATIVE R&D

REMADE® and its members are working diligently to unlock the full potential of remanufacturing by developing and demonstrating breakthrough technology solutions that drive digital remanufacturing across multiple sectors, including heavy-duty construction, industrial and agricultural equipment; aerospace and aviation; automotive; defense; industrial and consumer electronics; furniture; rubber and tires; transportation; and more.

In partnership with industry, academia, trade organizations, and national labs, REMADE invests in and conducts research and development – including advanced design, manufacturing materials optimization, remanufacturing and materials recovery – to develop technologies that increase the supply of critical and key materials, and enhance remanufacturing industry competitiveness and growth in the face of rapid change.

DID YOU KNOW?

REMADE has launched nearly 100 R&D and RD&D projects representing a combined investment of nearly **$100 MILLION.**

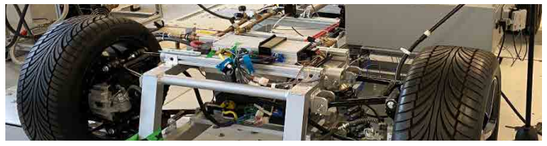
OUR GOALS

- **DEVELOP** new design for remanufacturing tools
- **INTEGRATE** A.I., robotics, and automation into processes and logistics
- **ADVANCE** reverse logistics and decision systems through A.I. and machine learning
- **IMPROVE** inspection and disassembly to reduce costs
- **CREATE** new advanced condition assessment tools
- **DEVELOP** low-cost restoration technologies to increase capabilities
- **DRIVE** digital remanufacturing through the use of data and connectivity

DIGITAL REMANUFACTURING R&D PORTFOLIO

To date, REMADE has made significant investments in remanufacturing resulting in technology development, intellectual property, and workforce development. Below are a few examples of REMADE projects.

SEE ALL OF REMADE'S REMANUFACTURING PROJECTS

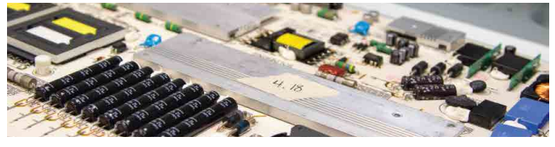


MACHINE LEARNING FOR HYBRID AND ELECTRIC VEHICLE BATTERY PROGNOSTICS

A3 Global · Northeastern University

DEVELOPMENT OF A NOVEL DESIGN FOR REMANUFACTURING SOFTWARE PLUGIN FOR CAD

RIT · TRANE TECHNOLOGIES · REMANUFACTURING INDUSTRIES COUNCIL · CATERPILLAR



CONDITION ASSESSMENT OF USED ELECTRONICS

RIT · CATERPILLAR · CoreCentric Solutions

HIGH SPEED LASER CLADDING REPAIR PROCESS DEVELOPMENT

RIT · CATERPILLAR · SYNERGY ADDITIVE MANUFACTURING, LLC.

DATA-DRIVEN DESIGN DECISION SUPPORT FOR REMANUFACTURING OF HIGH-VALUE COMPONENTS IN INDUSTRIAL AND AGRICULTURAL EQUIPMENT

UCONN · Iowa State University · Mississippi State University · University of Illinois Urbana-Champaign · aprra · John Deere

DEVELOPMENT OF HYBRID REPAIR AND NONDESTRUCTIVE EVALUATION TECHNOLOGIES FOR AEROSPACE COMPONENTS

RIT · PROTO · The Ohio State University · HYBRID

REMANUFACTURING OF SURFACE-HARDENED STEEL COMPONENTS BY ULTRASONIC SURFACE MODIFICATION

RIT · CATERPILLAR · University of Pittsburgh

AUTOMATION FOR REMANUFACTURING OF BATTERY MODULES

RIT · RIVIAN

IMAGE-BASED MACHINE LEARNING FOR COMPONENT IDENTIFICATION FOR REMANUFACTURING

RIT · CoreCentric Solutions

HYBRID LASER PROCESSING FOR METALLIC SURFACE REMANUFACTURING

VOLVO · University of Nevada, Reno · Iowa State University

LOW HEAT REPAIR OF CAST IRON

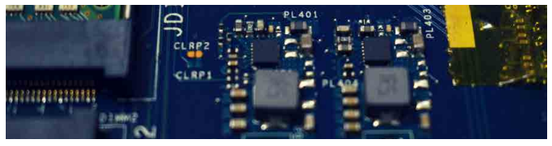
RIT · John Deere

FAST DIAGNOSTICS TO ENABLE EV BATTERY REUSE

ReJoule

DEVELOPMENT OF INSTRUMENTS AND TECHNIQUES THAT CAN ASSESS TIRE LIFE AND INCREASE RE-MANUFACTURING OF COMMERCIAL VEHICLE TIRES

Nike · Michelin · Sealed Air · Arizona State University · Virginia Tech



EPOXY/SILICON POTTING MATERIAL REMOVAL FOR GREATER RECOVERY OF CIRCUIT BOARDS

RIT · CATERPILLAR · CoreCentric Solutions

RAPID DAMAGE IDENTIFICATION TO REDUCE REMANUFACTURING COSTS

Iowa State University · John Deere

QUANTITATIVE NON-DESTRUCTIVE EVALUATION OF FATIGUE DAMAGE BASED ON MULTI-SENSOR FUSION

University of Illinois · PennState

DEVELOPMENT OF ADDITIVE MANUFACTURING MATERIAL & PROCESS TECHNOLOGIES TO IMPROVE THE RE-MANUFACTURING EFFICIENCY OF COMMERCIAL VEHICLE TIRES

Northwestern University · Michelin

NON-DESTRUCTIVE IN-PROCESS ASSESSMENT OF THERMAL SPRAY REPAIRS

RIT · CATERPILLAR · University of Pittsburgh

DESIGN ITERATION SUPPORT TOOL TO SUSTAIN REMANUFACTURABILITY

Iowa State University · Danfoss

QUANTIFICATION OF FINANCIAL AND ENVIRONMENTAL BENEFITS TRADEOFF IN MUTIGENERATIONAL PRODUCT FAMILY DEVELOPMENT CONSIDERING RE-X PERFORMANCES

Iowa State University · University of Illinois · John Deere

EDUCATION & WORKFORCE DEVELOPMENT REMANUFACTURING PROJECTS

REMAN BOOTCAMP

The five part bootcamp is designed for industry professionals and leaders new to the reman industry looking for a comprehensive dive into advancements delivering widespread benefits to businesses that depend on remanufacturing.

CIRCULAR ECONOMY WORKFORCE TRAINING FOR REMANUFACTURING & E-SCRAP INDUSTRIES

This project is upskilling the reman workforce for critical roles that don't require four-year degrees.

A VIBRANT ECOSYSTEM FOR INDUSTRY COLLABORATION

As a consortium of more than 150 manufacturers, universities, national labs, and trade associations, REMADE and its members develop innovative technologies to enhance U.S. manufacturing competitiveness, increase the resiliency of the U.S. supply chain, and accelerate the nation's transition to a Circular Economy. Together, we have the power to accomplish what no one organization could on its own.

MORE THAN THE POWER OF ONE

Constellation Biomining | Aquapak Polymers | University of Florida | University of Cincinnati | Kent County Department of Public Works | Volvo | University of Wisconsin-Madison | Artisan Industries, Inc.

JOIN OUR DIGITAL REMANUFACTURING STRATEGIC INTEREST GROUP

- **COLLABORATE WITH INDUSTRY LEADERS:**
  Engage with top experts from industry, academia, national laboratories, and federal agencies to identify, address and solve critical challenges in digital remanufacturing.
- **BUILD STRATEGIC RELATIONSHIPS:**
  Establish and strengthen connections with key organizations and stakeholders dedicated to resolving similar business challenges
- **ACCESS DIVERSE FUNDING OPPORTUNITIES:**
  Leverage resources from across public, private, and philanthropic sectors to support innovation, reduce risks, and accelerate the deployment of transformative technologies
- **SHAPE R&D PRIORITIES:**
  Influence and prioritize research and development initiatives endorsed by the group to ensure alignment with industry needs and goals.
- **DRIVE INNOVATION THROUGH COLLABORATION:**
  Work alongside partners to reduce barriers, share risks, and support the advancement and implementation of emerging technologies.
- **SUPPORT PROPOSAL DEVELOPMENT:**
  Participate in coordinated efforts to develop strong proposals for funding research, development, and demonstration projects that target key challenges in the remanufacturing industry.

TO JOIN, CONTACT: JOHN KRECKEL

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PRINTED ON RECYCLED PAPER THAT SUPPORTS SUSTAINABILITY EFFORTS

LEARN MORE ABOUT REMADE AT REMADEINSTITUTE.ORG