REMADE INSTITUTE

MAJOR INITIATIVE

ELECTRONICS RECYCLING

PIONEERING BREAKTHROUGH TECHNOLOGIES IN ELECTRONICS RECYCLING

Electronics are integral to modern life, used in:

- Communications
- Industrial Automation
- Transportation
- Renewable Energy
- Emissions Control
- Medical Diagnostics
- Hybrid & EVs
- and many others...

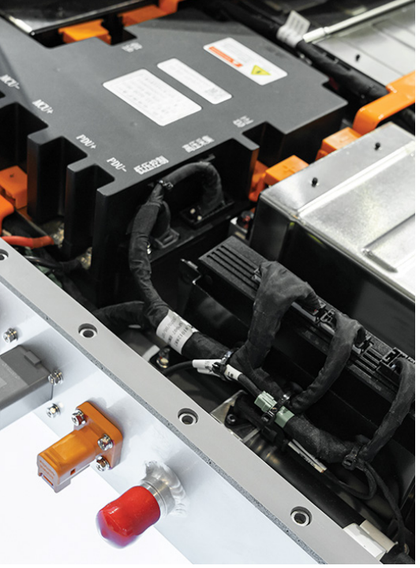
Electronics are high-value and incorporate diverse materials, including plastics, metals, and critical minerals. However, recovery and recycling (including reuse, remanufacturing and materials recycling) of end-of-life electronics remains limited due to system complexity, inadequate collection infrastructure, and the lack of cost-effective recycling process technologies. For example, less than 20% of consumer electronics are collected for recycling. The infrastructure for materials recovery from solar panels is just emerging. Efficient and safe processing of used EV batteries for reuse, second use, remanufacturing and materials recovery will require robust collection networks, automated disassembly, and rapid diagnostics to assess battery health. Remanufacturing of automotive and industrial electronics will depend on advanced failure detection and accurate estimation of remaining component life.

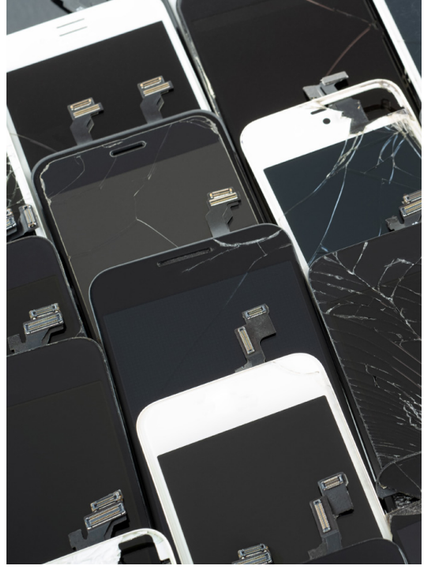
REMADE and its members are working to address these challenges by developing and demonstrating technology solutions that increase the recycling of electronics.

OUR GOALS

DEVELOP:

- Collection strategies to optimize recovery of end-of-life electronics
- Design tools to enable reuse, remanufacture and materials recovery of electronics
- Automated disassembly processes for high-throughput and safe removal of batteries
- Right-sized technologies to recover precious metals and critical minerals from electronics
- Effective materials sorting, separation, recovery, and recycling technologies
- Workforce training and development





SCOPE OF THE INITIATIVE

CONSUMER ELECTRONICS

TVs, computers, smartphones, tablets, game consoles, printers, etc.

AUTOMOTIVE ELECTRONICS

Navigation systems, infotainment units, electric vehicle battery packs.

IT & TELECOM EQUIPMENT

Servers, networking gear, routers, data center equipment, office electronics

LARGE HOUSEHOLD APPLIANCES

Refrigerators, washing machines, dishwashers, ovens (contain metals, plastics, refrigerants).

INDUSTRIAL / COMMERCIAL ELECTRONICS

Medical equipment, manufacturing automation devices, test instruments

SMALL HOUSEHOLD APPLIANCES

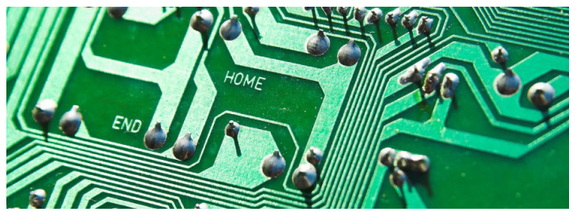
Toasters, coffee makers, hair dryers, vacuum cleaners

ELECTRONICS RECYCLING R&D PORTFOLIO

SEE ALL OF REMADE'S ELECTRONICS RECYCLING PROJECTS

REMADE's R&D projects in electronics recycling address the following challenges:

- Logistics and Collection
- Design
- Reuse and Remanufacturing
- Disassembly
- Precious Metals & Critical Minerals Recovery
- Materials Recovery



EVALUATION OF LOGISTICS SYSTEMS FOR COLLECTION, PREPROCESSING, & PRODUCTION OF SECONDARY FEEDSTOCKS FROM E-SCRAP

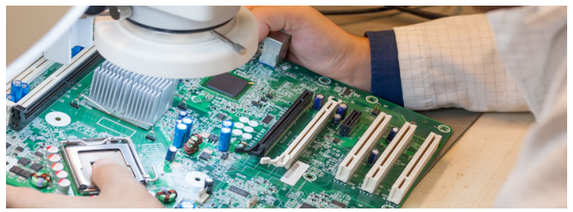
SUNNKING · INL Idaho National Laboratory

IMAGE-BASED MACHINE LEARNING FOR COMPONENT IDENTIFICATION FOR REMANUFACTURING

RIT · CoreCentric Solutions

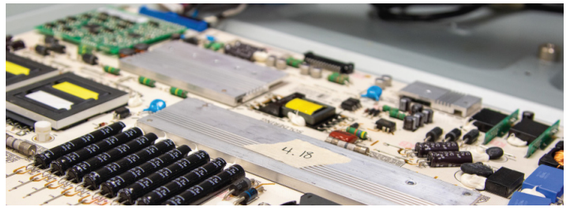
DESIGN FOR REMANUFACTURING

RIT · CATERPILLAR · REMANUFACTURING INDUSTRIES COUNCIL



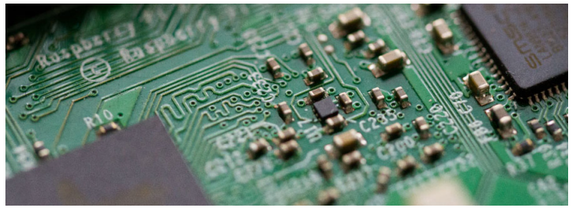
DEVELOPMENT AND VALIDATION OF METAL SEPARATION TECHNOLOGY FOR COMPLEX METAL STREAMS

PennState



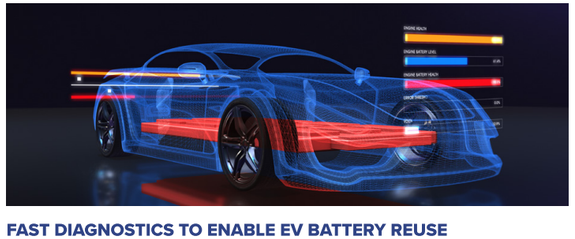
CONDITION ASSESSMENT OF USED ELECTRONICS

RIT · CATERPILLAR · CoreCentric Solutions



LOW-CONCENTRATION METAL RECOVERY FROM COMPLEX STREAMS USING GAS-ASSISTED MICROFLOW SOLVENT EXTRACTION

PHINIX



FAST DIAGNOSTICS TO ENABLE EV BATTERY REUSE

ReJoule

CHEMICAL RECYCLING OF MIXED PLASTICS AND VALUABLE METALS IN THE ELECTRONIC WASTE USING SOLVENT-BASED PROCESSING

Recycled Materials Association · SUNNKING · UMASS LOWELL

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 | SER North America | Volvo | University of Wisconsin-Madison | Artisan Industries, Inc.

JOIN OUR STRATEGIC INTEREST GROUP

- **ENGAGE** with a group of leading experts from industry, academia, national laboratories, and federal agencies to collaboratively identify and address critical challenges in electronics recycling.
- **ESTABLISH** and strengthen connections with key organizations dedicated to resolving similar business challenges.
- **LEVERAGE** funding opportunities across public, private, and philanthropic sectors to advance, mitigate risks, and implement innovative technology solutions.
- **PRIORITIZE** research and development initiatives endorsed by the group
- **COLLABORATE** with partners to mitigate risks and drive innovation in cutting-edge technologies.
- **FACILITATE** the creation of proposals to secure funding for research, development, and demonstration projects aimed at addressing pivotal electronics recycling challenges

NABIL NASR

CEO of REMADE Institute

FOR MORE INFORMATION:

To learn more about REMADE, visit REMADEinstitute.org.

Contact Nabil and join our Strategic Interest Group at by Email at:

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