

Transitioning Michigan to a Circular Economy

Rex L. LaMore, Ph.D.

Director, MSU Center for Community and Economic Development



Our Current "Take, Make, Waste" Paradigm



Economic Paradigm Shift: The Circular Economy

A circular economy is based on the principles of:

- designing out waste and pollution
- keeping products and materials in use
- Regenerating natural systems

Requires collaboration throughout the supply chain.



Transitioning Michigan to a Circular Economy: MSU-Circular Economy

- Assisting industry by supporting **innovative research** on material waste reduction, reuse, recycling and recovery.
- Identifying **best practices** in industry and **public policies** in e-waste and other materials salvage and reuse.
- **Conducting training and providing technical assistance** to industry, public agencies, and other key stakeholders in the **implementation of best practices** in material waste reduction, reuse, recycling and recovery.
- Increasing effective business and **workforce development, job creation, and corporate social responsibility** in the circular economy in Michigan.
- Developing and supporting **professional development opportunities** through certificate programs and other appropriate means to improve our circular economy innovative workforce capacity.



Anticipated Impacts of Transitioning to a Circular Economy

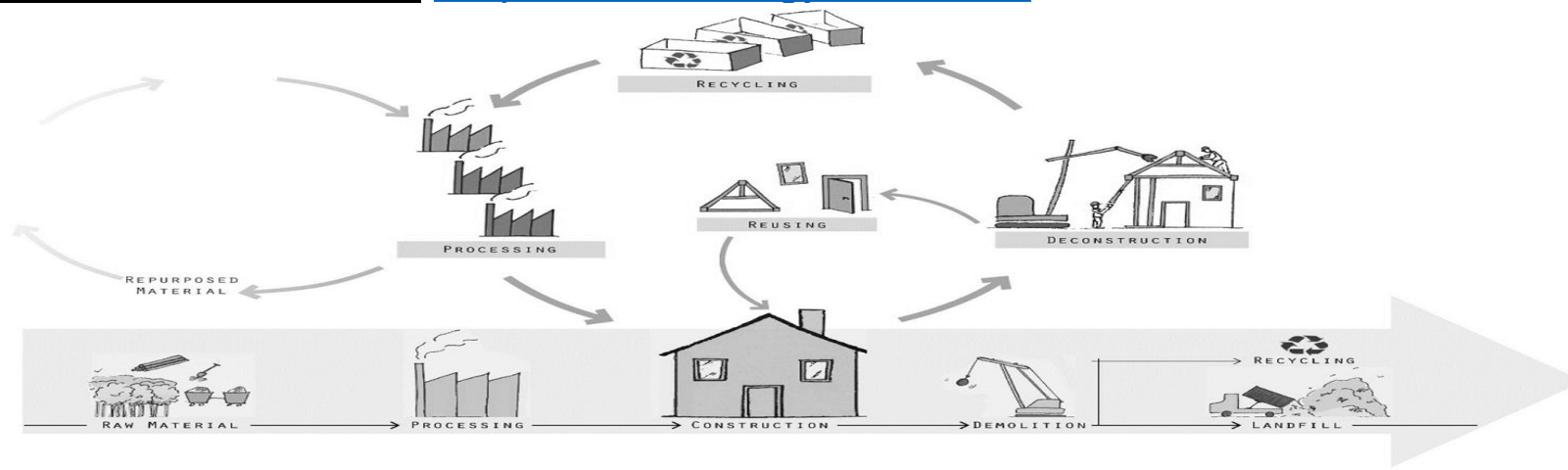
- Preparing Michigan industry and communities to compete in a 21st Century global economic system that values green industry/product practices.
- Mobilizing financial and other resources to support innovative research with industry, public, non-profit partners and other higher education institutions in critical product supply chains on material waste reduction, reuse, recycling and recovery.
- Creating and supporting a globally competitive workforce on the on the implementation of best practices in a circular economy.
- Reducing material waste, improve profitability and increase job creation in this growing economic sector in Michigan.
- Reducing waste disposal cost and greenhouse gas emissions

MSU and Higher Education in Michigan can Assist with the Transition to a Circular Economy

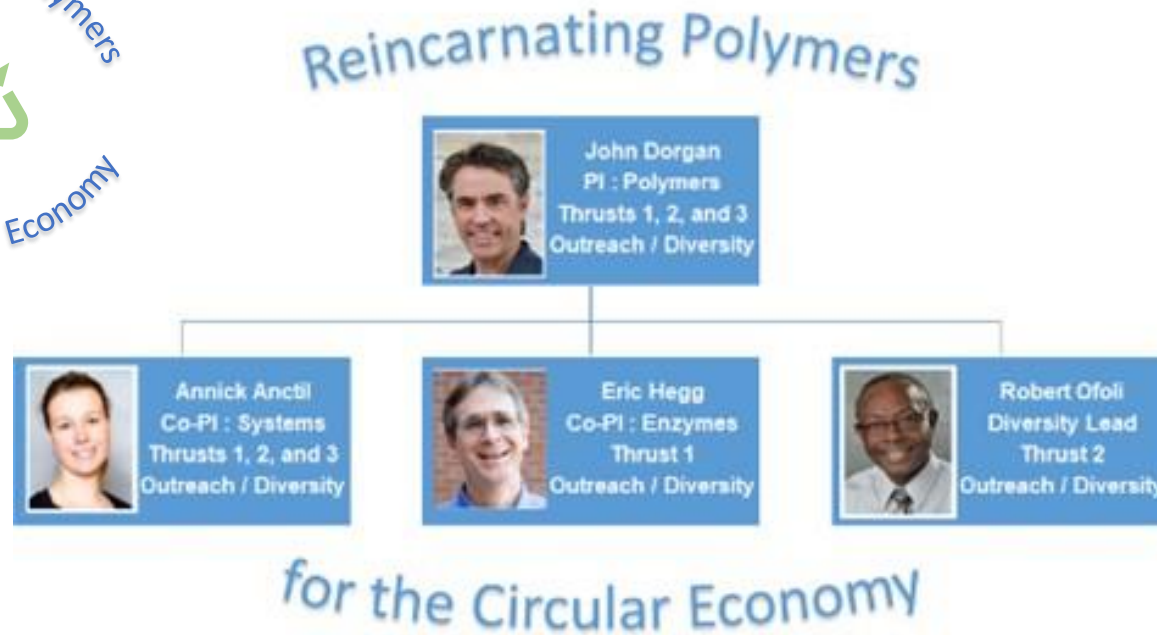
- MSU has a long and sustained tradition and outreach capacity to serve the people, industry and communities in Michigan.
- As a major research institution MSU has the capacity to develop a consortium to support the interdisciplinary applied scholarship necessary to address this complex societal challenge.

Examples of Current Scholarly Engagement in Advancing Circularity: Domicology

- Structural C&D debris in 2018 accounted for **twice as much waste as MSW**
- Activities include:
 - *Conducting pioneering research on value added **reuses of salvaged wood** (organic) products present in **abandoned structures** to bring that material back into the marketplace, (CLT-Cross laminated Timber/Reuse of Asphalt shingles)*
 - *Supporting a statewide salvage/reuse **business accelerator** through strategic training, technical assistance and networking to improve the viability of this nascent industry sector and **expand businesses' recycling markets for salvaged structural materials**. <https://domicology.msu.edu/>*



MSU Examples Continued: RIPCE – Reincarnating Polymers for the Circular Economy



Supported by an NSF grant for \$2.0 million and DOE funding of \$1.5 million in the past two years.




- Major Industry Partners
 - Dow Chemical
 - BASF
 - Braskem

- Federal Agencies
 - NIST
 - Army Research Office
 - Department of Energy (NREL)



School of Packaging – Examples of Projects

Development of Sustainable Packaging Systems for the Circular Economy

Principal Investigator	Circular Economy project themes	Funding
 Muhammad Rabnawaz	<ul style="list-style-type: none">• High-Barrier Biodegradable Paper (HB2P) as a plastics alternative• Removal of PFAS for packaging materials	NSF, DOE, EPA
 Laurent Matuana	Use of Cellulose Nanofibers (CNC) to improve barrier properties of renewable polymers	NSF, DOE, EPA
 Rafael Auras	<ul style="list-style-type: none">• Lifecycle assessment of packaging systems• Development of high oxygen and water barrier compostable polymers	Perrigo, Kraft-Heinz, ERF

August 2021: \$10.8M corporate partnership with Amcor Corporation for Packaging Sustainability

State Government Leading the Way:

- Incentivizing circular industry processes and products through targeted economic development partnerships
- Supporting workforce development in circular sectors
- Supporting circularity in state government operations and purchasing
- Supporting product extended producer initiatives by industry and communities
- Supporting circular material research, outreach and instruction at universities

Thanks to the MSU Circular Economy Team

Rex L. LaMore, Ph.D.

Director - MSU Center for Community and Economic Development

Rafael Auras, Ph.D.

Professor - MSU School of Packaging

Vedat Verter, Ph.D.

Chairperson - MSU Department of Supply Chain Management

Lawrence Drzal, Ph.D.

University Distinguished Professor – MSU Department of Chemical Engineering and Materials Science

John Dorgan, Ph.D.

David L. and Denise M. Lamp Endowed Chair – MSU Department of Chemical Engineering



www.ced.msu.edu

MICHIGAN STATE
UNIVERSITY

School of Packaging
College of Agricultural and Natural Resources

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Department of
Supply Chain Management
Broad College of Business

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