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- Comprehensive understanding of solid waste management practice
  - economics and constraints
  - work closely with industry
  - teaching
- Observed changes in waste composition over time

Landfill Processes

- Biological and chemical reactions in landfills
  - Anaerobic waste decomposition (methane yields and rates, inverse modeling, collection/recovery, leachate quality)
  - behavior of trace organics in landfills
  - long-term post-closure management of landfills
  - elevated temperature landfills
  - PFAS in landfill leachate and gas
- Modeling, experimental work at lab and field-scale

Application of Life-Cycle Assessment to Solid Waste Management

- Optimization model to describe solid waste management:
  - generation, collection, transport, separation, biological and thermal treatment, landfill disposal
    - process models for each solid waste unit operation
    - integrated into an optimization model
    - assessment of new technologies

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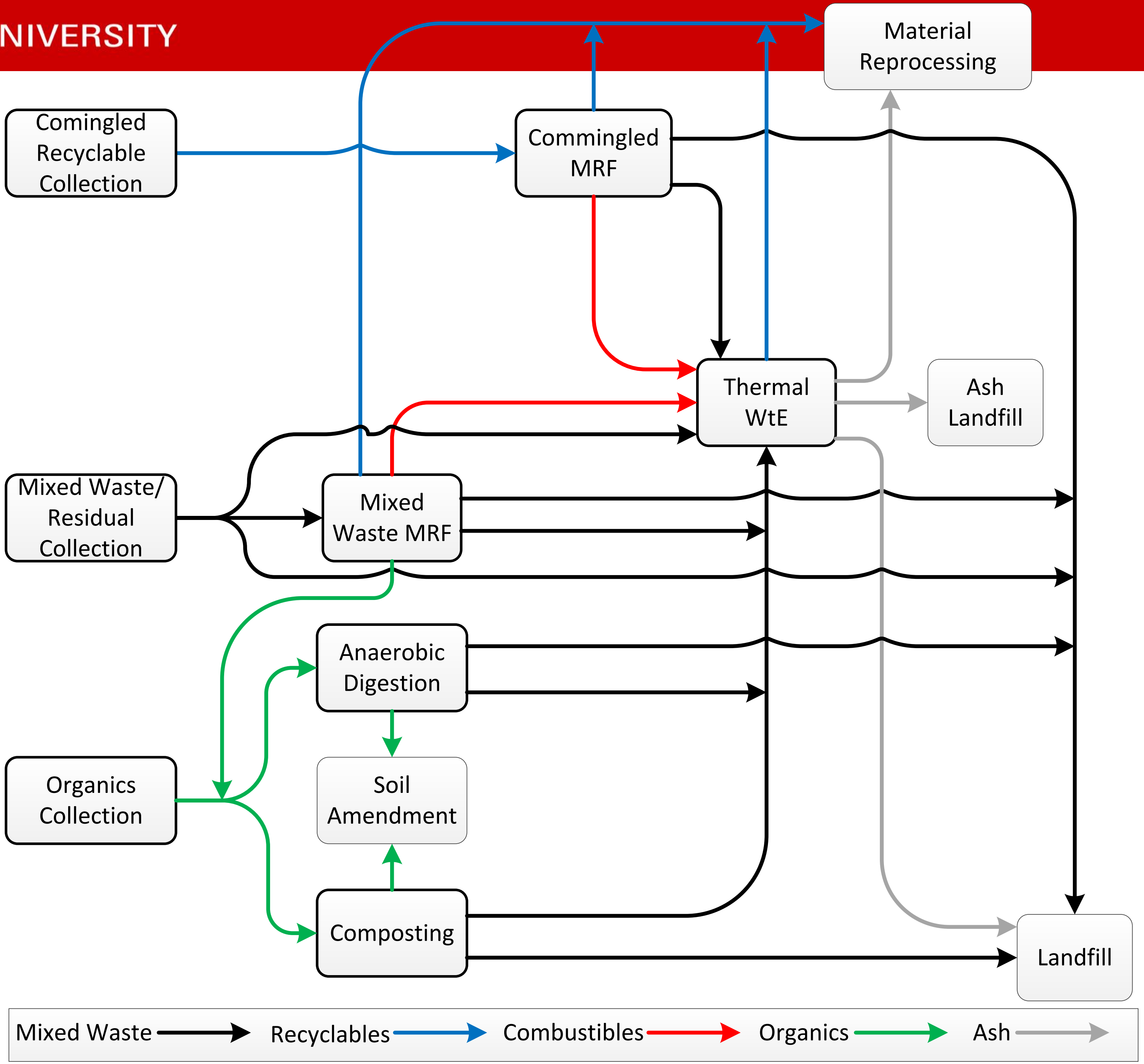

The solid waste management system

Cases Studies

- County
- State
- industry

Life-Cycle Modeling of Nutrient and Energy Recovery through Mixed Waste Processing Systems

Scenarios:

1. Landfill
2. Mass Burn Waste-to-Energy
3. Gasification Fischer-Tropsch (GFT)
4. Gasification Combustion to Electricity (GC)
5. GC – All Residuals to Landfill
6. GC – Organic Residual to Compost
7. GC – Organic Residual to Anaerobic Digestion

Results:

- Gasification-to-electricity led to lowest environmental impacts, while GFT and landfill had the greatest impacts.
- Separating organics for composting or anaerobic digestion generally increased environmental impacts.
- The GFT process typically performed worse than the other waste-to-energy processes primarily due to the level of compression required for the syngas.