Upgrading of Indirect Liquefaction (IDL) Intermediates

**Goal:**
Develop a market-responsive, integrated biorefinery concept based on the conversion of IDL intermediates (methanol and ethanol) to produce a suite of fuels and co-products that can be controlled to meet market demand.

**Approach:**
Develop multi-functional catalysts for unique upgrading processes and provide the experimental data to improve the understanding of these chemical transformations and processes.

**Impact:**
Provide the scientific and economic basis for developing new biofuels processes via IDL intermediates that can exceed the performance and economics of commercial, benchmark processes.

**Biomass Indirect Liquefaction**
Light oxygenate intermediates

**Multi-functional catalysts for unique transformations**
Balancing acidic, basic, metallic sites

**Suite of biofuels and co-products to meet market demand**
High-octane gasoline, distillate fuels, and polymer precursors