

**Chemical and Commodity Processing Focus Area** PI technologies can yield enormous energy savings in the Chemical Process Industries (CPI) and refineries. RAPID will manage a broad portfolio of PI activities in this sector, coordinated by the University of Texas and University of Houston

## Vision

Research, develop, and demonstrate intensification in selected key processes in major commodity markets with >20% improvement in energy efficiency using relevant testing environments. Pilot and commercial processes will be used as test beds supported by a strong modeling and simulation foundation. Key unit operations include dividing wall columns, reaction-enhanced separation, amine gas separation, solids processing, paraffin-olefin separation, brackish water treatment, ionic solvent extraction, water separation, and utility systems

## Objectives

- Develop screening guidelines for integration of novel reaction and separation modules that will provide stable, safe, and economical modular chemical process.
- Select test beds to validate design tools for process intensification in modularized units developed by Modeling and Simulation Focus Area.
- Operate separation processes dynamically to improve yields and safety for a variety of petrochemical feedstocks.
- Develop a roadmap for CPI that includes different reaction catalysts, membranes, and traditional and novel separations.

## Key Approaches

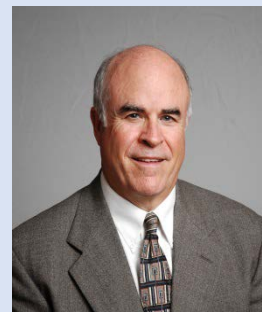
- Identify explicit connections between properties of membrane materials, ionic liquids, and process performance using lab and pilot plant testing.
- Evaluate in situ separation/removal of reaction products using novel reactor designs.
- Examine unsteady-state (dynamic) operation to improve performance and energy used of unit operations and the need for new control strategies and sensors.
- Determine how thermal storage and smart materials can be effectively used in utility systems in process plants.
- Test design tools developed by Modeling and Simulation Focus Area on pilot plant facilities.

## Expected Outcomes

- Through collaboration with existing industrial consortia, identify and screen key chemical processes where intensification will have major economic, energy, and environmental impacts without operational limitations.
- Validate design tools for process intensification operations
- Operate and analyze results from commercial and pilot test beds via academic/industrial collaboration.



## Contacts



**Thomas Edgar, Ph.D.**

Lead - Chemical and Commodity Processing Focus Area, The University of Texas

*Email: tfedgar@austin.utexas.edu*  
*phone: 512-471-3080*



**Ramanan Krishnamoorti, Ph.D.**

Co-Lead - Chemical and Commodity Processing Focus Area, University of Houston

*Email: ramanan@uh.edu*  
*phone: 713-734-4307*

***The RAPID institute's  
focal point for  
the chemical Process  
Industries***