



# Industrial Membership Program

**Partners in revitalizing the U.S.  
petrochemical and fuels industries:**  
Basic research aimed at sustainable  
development of America's light  
hydrocarbon resources

[cistar.us](http://cistar.us)



**PURDUE**  
UNIVERSITY

**NM** THE UNIVERSITY OF  
NEW MEXICO



Northwestern  
University



UNIVERSITY OF  
NOTRE DAME



**TEXAS**  
The University of Texas at Austin

## ERC Overview

Engineering Research Centers (ERC), a flagship program of the National Science Foundation, bring together industry, academia, and government to cultivate engineering discovery and education in research areas critical to our nation's strength. ERCs have an infrastructure that integrates four pillars: research, workforce development, innovation ecosystem, and inclusion, with industry partners being paramount to center success.

## Light Hydrocarbons Landscape

Advances in unconventional gas and tight oil recovery technology have unleashed a wealth of hydrocarbon reserves that will help the U.S. meet its chemical and fuels needs for at least the next 100 years. These resources are lighter and richer in alkanes than resources the U.S. refining and petrochemical industry have previously experienced. Changes in the way we process these hydrocarbons will be necessary if we are to take full advantage of their potential to improve our quality of life.

## CISTAR Opportunity

**CISTAR™** - the Center for Innovative and Strategic Transformation of Alkane Resources - will work with key industry and innovation partners to develop novel engineered systems that catalytically convert methane and C2 alkanes derived from shale gas and oil to more valuable compounds for use as fuels, chemical intermediates, and other products. CISTAR's catalytic breakthroughs and innovations in chemical reactor designs and separation processes will lead to the commercialization of small, modular, and economical chemical plants located close to the wellhead and designed to produce valuable fuel and chemical products. While developing science, engineering, and technology breakthroughs, CISTAR will also develop a diversified, well-trained workforce of innovative students with the technical and professional skills needed to shape and implement the next industrial wave of energy solutions.

## Core Partner Institutions

Purdue University (Lead)  
University of New Mexico  
Northwestern University

University of Notre Dame  
University of Texas at Austin

## CISTAR's goal

is to develop long-term membership relationships with companies engaged in processing, transporting, and determining the use of alkane resources.

## CISTAR's Industrial Membership Program

leverages NSF funding with an industry membership fee that enables strategic advice from industry and helps accelerate R&D progress and technology transfer.

## The outcomes will be:

- Cost-competitive technology for direct conversion of light hydrocarbons to higher value ones
- Modular and mobile small-scale regional production plants
- Lower capital conversion of light hydrocarbons to transportation fuels
- Potential reduction in greenhouse gases through decreased flaring, lower energy requirements, and higher product yields



# CISTAR Industrial Membership Program Overview

## Description

	Silver Members	Gold Members
Large Entities (500 or more employees)	USD \$30,000	USD \$60,000
Medium Entities (10 or more employees, but less than 500)	USD \$15,000	USD \$30,000
Small Entities (less than 10 employees)	USD \$5,000	USD \$10,000

## Membership Benefit

	Silver Members	Gold Members
<b>Intellectual Property (IP):</b> Access to CISTAR novel catalytic and separation breakthroughs and innovations in chemical reactor designs with right to recommend IP filings.		○
<b>Licensing:</b> Priority notification of IP filings. Exclusive rights to review claims. First option to negotiate a commercial use license. Final rights as "most favored licensee."		○
<b>Confidential Information:</b> Right to request confidential information (requires NDA) on CISTAR research, technology, and inventions for internal research and evaluation purposes.	○	○
<b>Advisory Board:</b> Exclusive seat on the CISTAR Industrial Advisory Board (IAB) and invitation to attend biennial meetings and interact with CISTAR leadership team, as well as NSF representatives. Gold Members get an additional seat in IP Oversight Board (IPOB).	○	○
<b>Research Sponsorship:</b> Sponsor individual research programs outside the CISTAR Core, in areas related but not overlapping with the research funded by NSF, university cost-share, and industry membership fees. Submit joint proposals to other federal sponsors.	○	○
<b>Research Findings:</b> Exclusive access to CISTAR research findings, insider knowledge, and industry trends for R&D technology transfer, policy, and environmental aspects through biennial meetings, webinars, and quarterly newsletters.	○	○
<b>Networking:</b> Access to CISTAR experts in catalysis, separations, reactor design, and engineering economic analysis; professional interactions with a wide range of academia and industry leaders, and companies from the entire alkane transformation value chain.	○	○
<b>Recruiting:</b> Preferential access to talented, diverse, and highly-trained undergraduates, graduate students, and post-doctoral researchers.	○	○
<b>Promoting:</b> High visibility branding with all CISTAR university partners, NSF, and other affiliated professional organizations.	○	○
<b>Education:</b> Contribute to the education programs and workforce development of new generations of engineers through internships, seminars, speakers, and mentorship.	○	○







**NSF Engineering Research Center**

Center for Innovative and Strategic  
Transformation of Alkane Resources

### **CISTAR Leadership**

**Fabio Ribeiro**, Director  
Purdue University

**Joan Brennecke**, Deputy Director  
University of Texas at Austin

### **Research & Testbed Leaders**

**Jeffrey Miller**, Thrust 1 Leader  
Purdue University

**Linda Broadbelt**, Thrust 2 Leader  
Northwestern University

**Tobin Marks**, Thrust 3 Leader  
Northwestern University

**Rakesh Agrawal**, Thrust 4 Leader  
Purdue University

**Thomas Degnan**, Testbed Leader  
University of Notre Dame

### **Education & Diversity Leaders**

**Monica Cardella**,  
Pre-College Education Director  
Purdue University

**Abhaya Datye**,  
International Programs Director  
University of New Mexico

**Michael Harris**,  
Workforce Development Director  
Purdue University

**Adrian Thomas**,  
Diversity Director  
Purdue University

### **Administration & Industry Leaders**

**Cristina Farmus**,  
Administrative Director  
Purdue University

**Peter Keeling**,  
Innovation and Industry Director  
Purdue University

## **Vision**

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Create a transformative engineered system to convert light hydrocarbons from shale resources to chemicals and transportation fuels in smaller, modular, local, and highly networked processing plants.

## **Value Proposition**

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CISTAR will work with key industry and innovation partners to develop novel engineered systems that catalytically convert methane and C2+ alkanes derived from shale gas and oil to more valuable compounds for use as fuels, chemical intermediates, and other products.

## **Technology Readiness**

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### **Research**

(TRL 1-4) CISTAR will conduct basic science on how to develop catalysts capable of converting alkanes as well as separation knowhow that leads to the potential for integration and development.

### **Development**

(TRL 4-6) CISTAR & INDUSTRY will collaborate to develop what is learned through research, leading to insights into how to build an integrated pilot system that might be fully derisked leading to a design-build concept that might be implemented at pre-commercial scale.

### **Implementation**

(TRL 6-9) INDUSTRY is expected to construct and engineer modular systems at semi-works scale that leads to full implementation of the system at commercial scale.

## **Funding**

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CISTAR is one of the flagship Engineering Research Centers currently funded by the National Science Foundation. Combined with additional support from the academic partners and industry membership fees, the annual funding is in excess of \$5M. Significant and strategic industrial support is still needed to accelerate R&D progress and technology transfer to industry.

For more information or to become a member, contact: Peter Keeling • [pkeeling@purdue.edu](mailto:pkeeling@purdue.edu) • 765-494-4859

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