

Innovation Ecosystem Module 1

ILO Role within an ERC

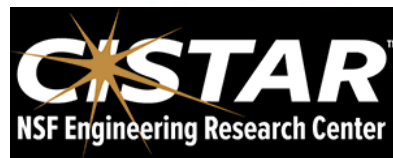
November 31, 2025

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CISTAR

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HAND



Job Title

NSF

ILO - Industrial Liaison Officer (Gen 1, 2, 3 ERCs)

Gen-3 ERCs ILOs are titled Industry & Innovation Director, Innovation Ecosystem Director, Innovation Director. Rarely use ILO.

SPI – Strategic Partner & Innovation Director (Gen 4 ERCs)

Gen-4 ERCs ILOs are sometimes titled Innovation Director. By including multiple stakeholders this is a broader role than Gen-3. Rarely use SPI.

ERC

<i>Gen-3</i>	<i>Gen-4</i>
<i>Industry and Innovation Director</i>	<i>Strategic Partners & Innovation (SPI) Director</i>
<i>Industry and Innovation Director</i>	<i>Senior Director of Strategic Partnerships</i>
<i>Innovation Ecosystem Leader</i>	<i>ILO & Co-Director, Strategic Partnerships</i>
<i>Innovation Ecosystem Leader</i>	<i>Industry & Ecosystem Engagement Director</i>
<i>Innovation Ecosystem Director</i>	<i>Vice President, Innovation Ecosystem</i>
<i>Innovation Director</i>	<i>Innovation Ecosystem Director</i>
<i>Industrial Liaison Officer</i>	<i>Innovation Ecosystem Lead</i>
	<i>Industry Liaison Officer</i>

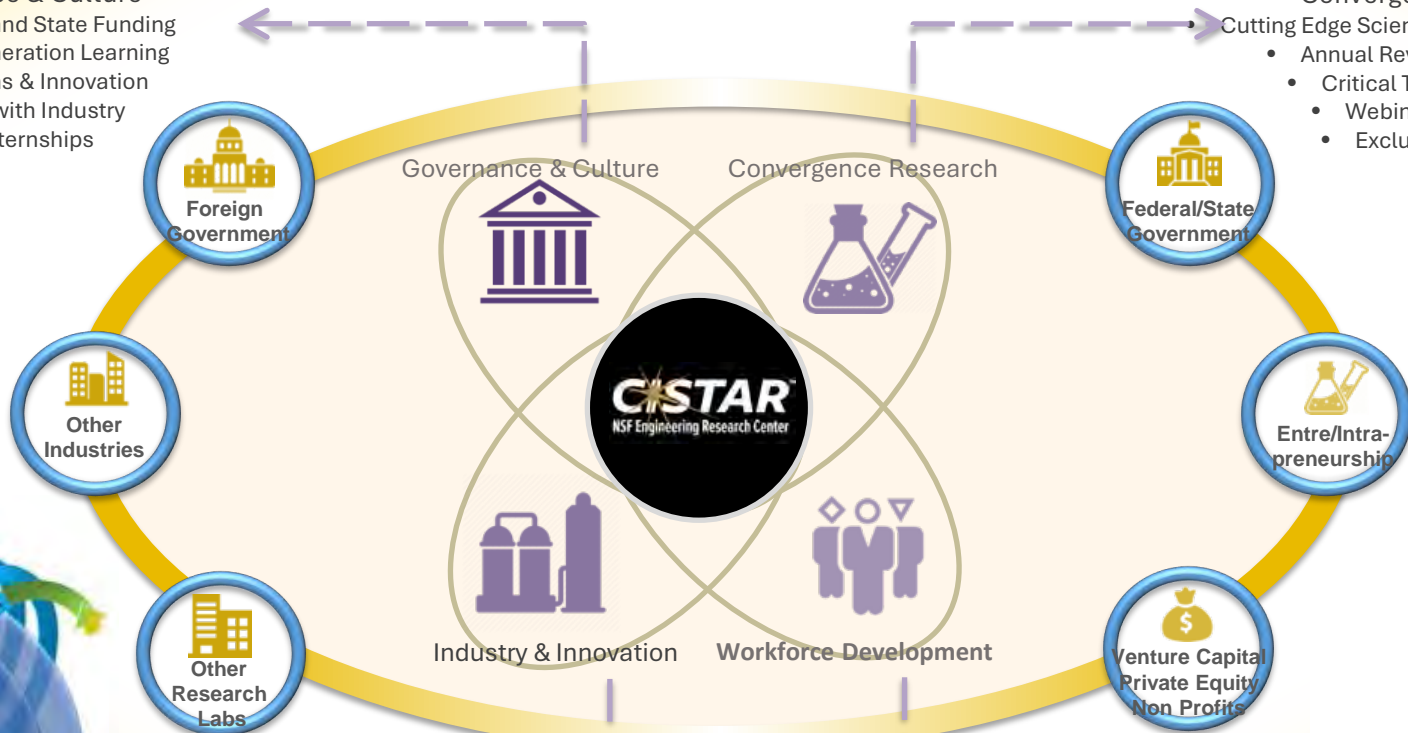
Overarching Ecosystem (Four Pillars)

Governance & Culture

- Federal and State Funding
- Next Generation Learning
- Inventions & Innovation
- Interact with Industry
- Jobs & Internships

Convergence Research

- Cutting Edge Science & Technology
- Annual Reviews & Meetings
- Critical Tools & Knowhow
- Webinars & Discussion
- Exclusive Access to IP



Industry & Innovation

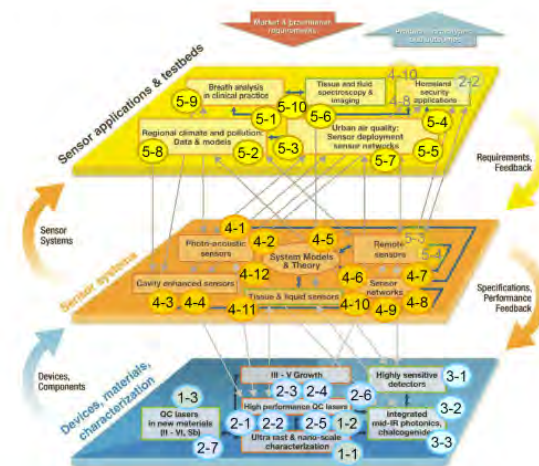
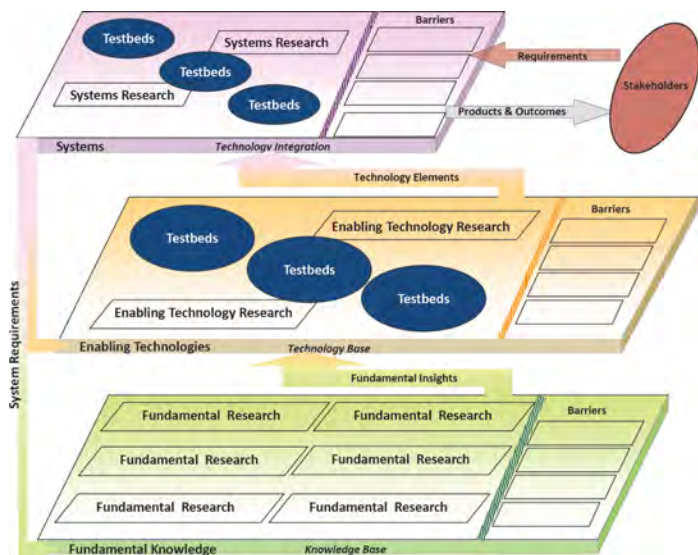
- IAB and Network
- Sponsored Projects
- Advice and Guidance
- Real World Innovations
- Partnering Academia/iCorps

Workforce Development

- Jobs and Internships
- Experienced Mentors
- Pitch Contests/Seminars
- Interactions with Industry
- Partnering Education & Diversity



Three-Plane Chart

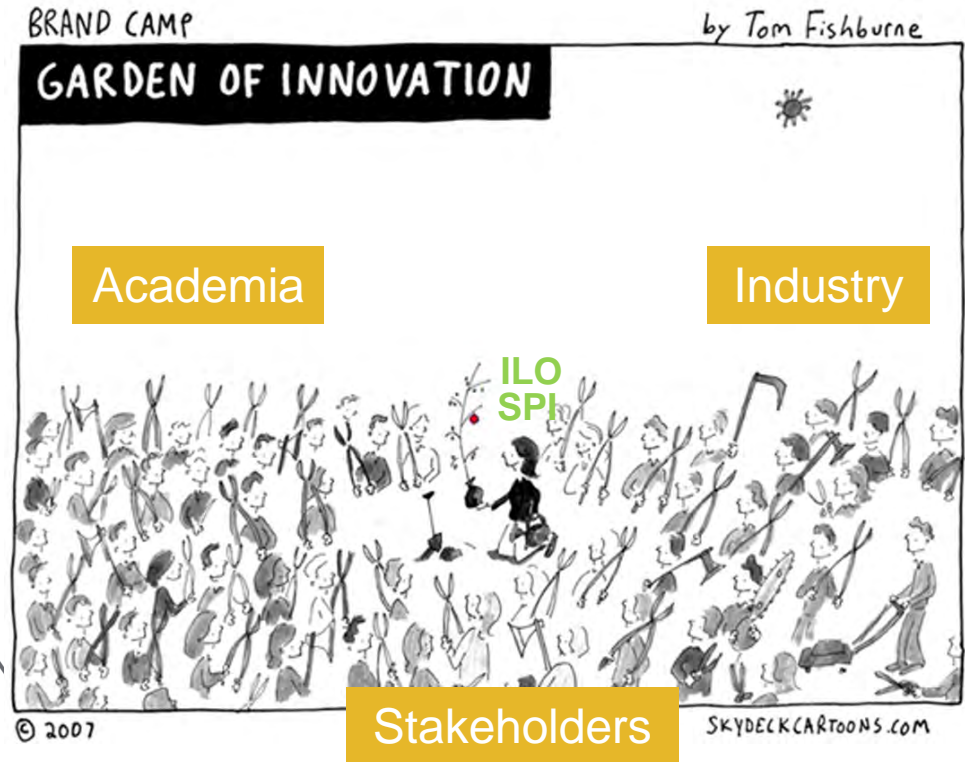


Project assignment to MIRTH's 3-level ERC strategic framework

Thrust index	Project name ...	Thrust index	Project name ...	Thrust index	Project name ...
5-1	Coupled Water, Carbon, and Nitrogen Cycles in Urban Environments	4-1	Development of Quartz Enhanced Photo-Acoustic Spectroscopy Based ...	3-1	Novel Mid-Infrared Sources and Detectors Based on Resonant ...
5-2	Coupled Water, Carbon, and Nitrogen Cycles in Urban Environments	4-2	Development, Verification, and Validation of Three-Dimensional Models for ...	3-2	Photomodifiable Chalcogenide Glass Materials for Integrated ...
5-3	Monitoring Trace Gas and Aerosol Properties in the Urban Environment	4-3	Development of Trace Gas Sensor Platforms for Applications in Health, ...	3-3	Chalcogenide-on-Lithium Waveguides
5-4	Monitoring Trace Gas and Aerosol Properties in the Urban Environment	4-4	Development of External Cavity Quantum Cascade Lasers with High Speed, ...	2-1	High Performance (Threshold, Power, Efficiency) Quantum ...
5-5	Nitrous Oxide Instrument Development Using a Single Mode, Continuous Wave, ...	4-5	Develop Statistical and Deterministic Signal Processing Algorithms for ...	2-2	Spectrally High-Performance Quantum Cascade Lasers
5-6	Ultra Sensitive Ammonia Sensor for Urban Air Quality	4-6	Development of Ultra-Low Power, All-Digital-Signal-Processing Laser-Based ...	2-3	3-5 μm Quantum Cascade Laser Gain Materials
5-7	Monitoring of Ammonia Mixing Ratios in Houston Using MIRTHE Technology	4-7	Gas Sensing Wireless Networks	2-4	Broadband Quantum Cascade Laser Gain ...
5-8	Gas Sensing Using Mid-Infrared Technology in Fish-Smoking Areas In ...	4-8	Optical Transmission and Signal Cancellation Techniques in Sensor ...	2-5	Modelocking of Quantum Cascade Lasers
5-9	Breath Ammonia in Humans, a Pilot Study	4-9	Integrating MIRTHE Sensors into Wireless Meteorological Sensing Networks	2-6	Integrated Tunable Quantum Cascade Lasers
5-10	Development of Mid-Infrared Based Instrumentation for In Vitro Toxicity Testing	4-10	Securing Sensor Networks	2-7	Solid State Mid-Infrared Lasers Pumped by ...
		4-11	Mid-Infrared Cancer Detection and Monitoring		
		4-12	Confocal Microscopy Based on Quantum Cascade Laser and Single Hollow Core ...	1-1	Nanoscale Characterization of Metal Organic Molecular Beam ...
				1-2	Mid-Infrared Ultrafast Diagnostic Instrumentation for Quantum Cascade ...
				1-3	Wide Bandgap II-VI Semiconductors for ...

ILO Role within an ERC

- ▶ INFINITE
- ▶ A JOURNEY THAT EVOLVES
- ▶ DIFFERENT ACROSS ERCs
- ▶ RECRUIT / RETAIN / EVOLVE
- ▶ STAKEHOLDERS NEW DIMENSION



RESPONSIBILITY: Create the strategic plan for nurturing the ERC's innovation ecosystem. Under that umbrella, the ILO/SPI Director defines the organization, reporting structure, and processes needed to complete the following three functions:

- Manage industry partner relations
- Nurture innovation ecosystem
- Engage stakeholders

Essential Functions & Competencies

1. Industrial Liaison X%

- ▶ Direct the implementation of the membership agreement for Industrial Practitioner Advisory Board (IPAB) participation.....

2. Business Development X%

- ▶ Direct a process to identify prospective IPAB members, engage and convert them to members.....

3. Innovation Ecosystem X%

- ▶ Direct a process to define the breadth and range of intra/entrepreneurial efforts in the center.....

4. Miscellaneous X%

- ▶ Perform miscellaneous duties related to the ERC to ensure the success of the center.....

5. Stakeholder Engagement X%

- ▶ ILO/SPI Role Gen 4 ERCs – broader stakeholder role



"In five years, I see myself with the same job title, about the same salary, and significantly more responsibilities."

You are Not Alone

- ▶ Training/Mentoring/Consultants
- ▶ ILO/SPI Meetings (twice per year)
- ▶ ILO/SPI Contacts / NSF Contacts
- ▶ NSF Bimonthly Meetings (more impactful to meet in-person)
- ▶ NSF Annual Meeting (now Biennial)
- ▶ NSF-ERC ASSOCIATION (<https://erc-assoc.org/content/welcome-erc-program>)
 - ▶ [ILO RESOURCES](#) (Various Presentations)
 - ▶ [BEST PRACTICES MANUAL](#) (Chapter 5)
 - ▶ [AGENTS OF CHANGE: NSF'S ENGINEERING RESEARCH CENTERS – A HISTORY](#)





Technology

- Domain working knowledge
- University tech transfer & IP
- Innovation methods/processes
- Tech startups/entrepreneurship



Partnerships

- Recruiting
- Networking
- Relationship management
- Business development



Communications

- Marketing/promotions
- PPT presentations
- Written communication/reporting



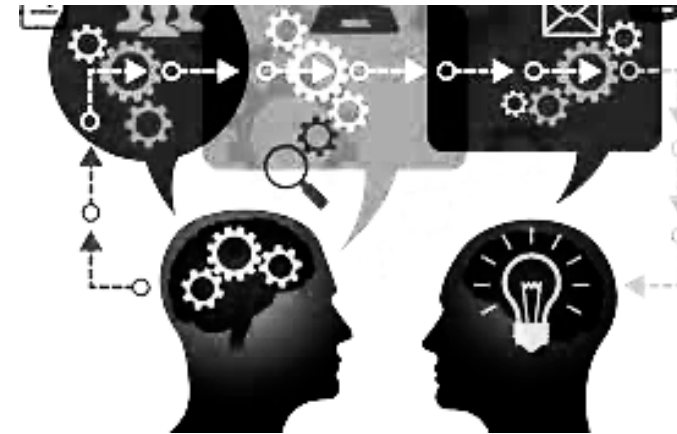
Administration

- Advisory board management
- Project management
- Research administration
- Legal agreements
- Accounting/finance operations

- ▶ **MINIMUM EDUCATION:** Professional Degree (Specify)
- ▶ **EDUCATION:** Professional degree required, such as MBA or other sufficiently deep technical and business education base. A detailed understanding of principles of post-graduate level R&D. A combination of education and relevant experience is required.
- ▶ **EXPERIENCE:** Business and technology management, experience with grant writing, IP prosecution, experience reviewing legal documents and agreements, experience with technology development, technology transfer, entrepreneurship and start-ups, experience mentoring and teaching students and young professionals required.



- ▶ Extensive knowledge of business, ethics, entrepreneurship, leadership, management, R&D and IP practices.
- ▶ Proven leader with established reputation in engineering/business disciplines.
- ▶ Excellent written and oral communication, problem solving ability, and interpersonal skills.
- ▶ Must be a demonstrated self-starter with the ability to interact effectively at a senior level with industry, university faculty, students and staff.
- ▶ Must possess a professional and ethical attitude of service to the center and its partners.
- ▶ Must be a team player and have demonstrated the ability to work effectively in a multi-disciplinary team.



Strategic Partnership and Innovation - Gen-4 ERC

- ▶ Gen-4 broadening to SPI concept warranted
 - ▶ Increase connectedness
 - ▶ Increased multi-disciplinary approach
 - ▶ Appropriate attention to ethical and social issues
 - ▶ Public expectations on responsible innovation
- ▶ Implications
 - ▶ Transactional still critical – get cash paying members
 - ▶ Relationships and conceptual buy-in important



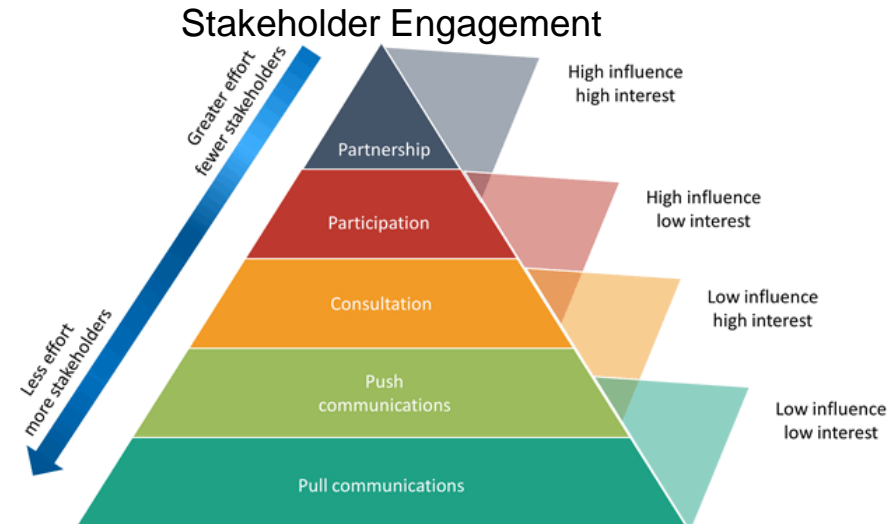
- ▶ The Project Management Institute (2021) defines stakeholder engagement as *“the process of identifying and analysing stakeholders’ interests, influence, and potential impact on project success.”*

<https://www.linkedin.com/pulse/why-should-i-engage-stakeholders-tarnia-riggs/>

Strategic Partnership and Innovation - Gen-4 ERC

Stakeholders

- ▶ Evolving definitions
 - ▶ SEIC working group
- ▶ Aspirational
 - ▶ Technologies developed in ERCs have impacts on citizens of the world - engage everyone under the sun



Implications

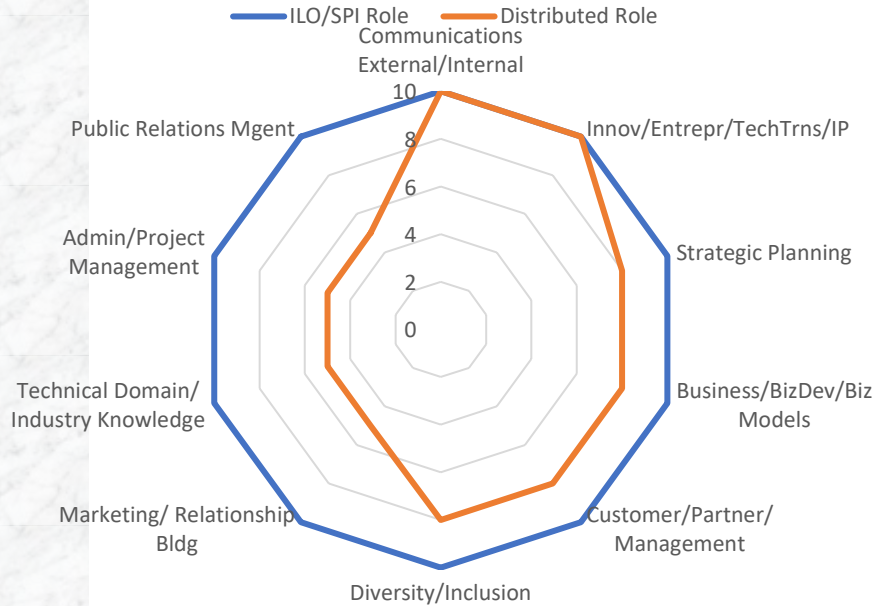
- ▶ Stakeholder group is broader
 - ▶ Non-profits, economic development groups, citizen groups, special interest groups, patients
- ▶ Risk assessment is different (broader participation)
- ▶ Adoption of Corporate Social Responsibility concept



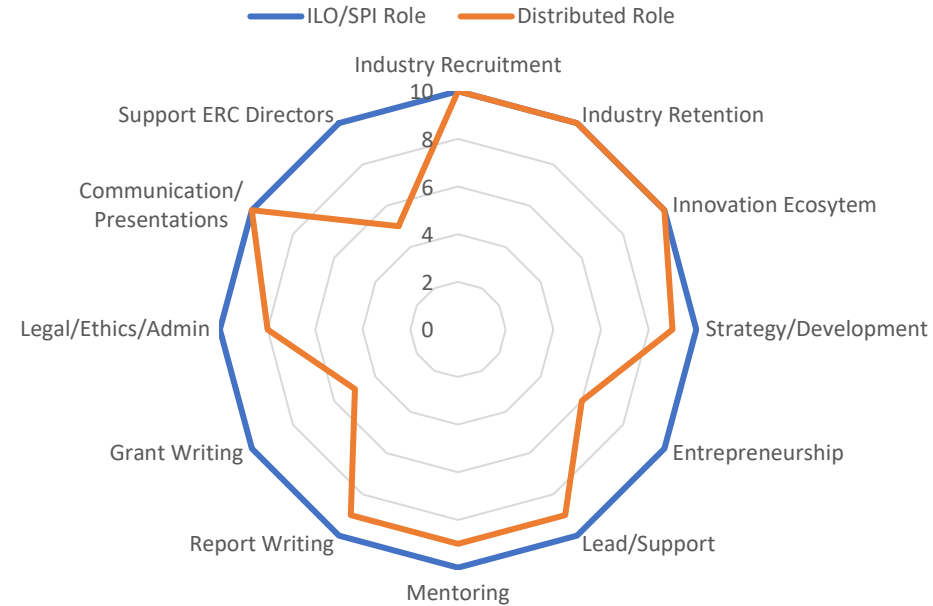
Dimensions

Direct and Implement strategies to develop the Industrial Membership and Innovation Ecosystem Program in the Center.....

Management & Communications



Membership & Innovation



MEMBERSHIP

All Members:

- **Industry Advisory Board (IAB)**
- **Sponsor Research (Outside Core)**
- **Privileged Information**
 - One-Way NDA Protection
 - Annual Meetings & Webinars
 - Reports & Posters
 - Intranet, Newsletters & Emails
 - Listen, Evolve & Build Relationships
- **Privileged Access**
 - Faculty & Students,
 - Research & Innovations
 - Other members
 - Workforce & Diversity
 - Mentoring & Internships

Gold Members:

- **IP Rights**
 - 1st Rights to IP (240-day Option)
 - 2nd Option to IP
 - Most favored licensee

Cash or In-Kind Payments:

- **Cash is Preferred**
- **In-Kind is negotiable**
 - Must be at a discount rate of 30% to 50% of retail value. Furthermore, the aggregate amount of dues collected as discounted in-kind payments should not exceed 25% of the cash dues collected

Description

Large Entities (500 or more employees)

Medium Entities (10 or more employees, but less than 500)

Small Entities (less than 10 employees)

Silver Members

USD \$30,000

USD \$15,000

USD \$5,000

Gold Members

USD \$60,000

USD \$30,000

USD \$10,000



CISTAR
NSF Engineering Research Center
Center for Innovative and Strategic Transformation of Alkane Resources

A National Science Foundation
Engineering Research Center
ESTABLISHED 2017



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



www.cistar.us

Membership Benefits

Intellectual Property (IP): Access to CISTAR novel catalytic and separation breakthroughs and innovations in chemical reactor designs with right to recommend IP filings.

Licensing: Priority notification of IP filings. Exclusive rights to review claims. First option to negotiate a commercial use license. Final rights as "most favored licensee."

Confidential Information: Right to request confidential information (requires NDA) on CISTAR research, technology, and inventions for internal research and evaluation purposes.

Advisory Board: Exclusive seat on the CISTAR Industrial Practitioner Advisory Board (IPAB) and invitation to attend biennial meetings and interact with CISTAR leadership team, as well as NSF representatives.

Research Sponsorship: 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.

Research Findings: 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.

Networking: 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.

Recruiting: Preferential access to talented, diverse, and highly trained undergraduates, graduate students, and post-doctoral researchers.

Promoting: High visibility branding with all CISTAR university partners, NSF, and other affiliated professional organizations.

Education: Contribute to the education programs and workforce development of new generations of engineers through internships, seminars, speakers, and mentorship.

Silver Members	Gold Members
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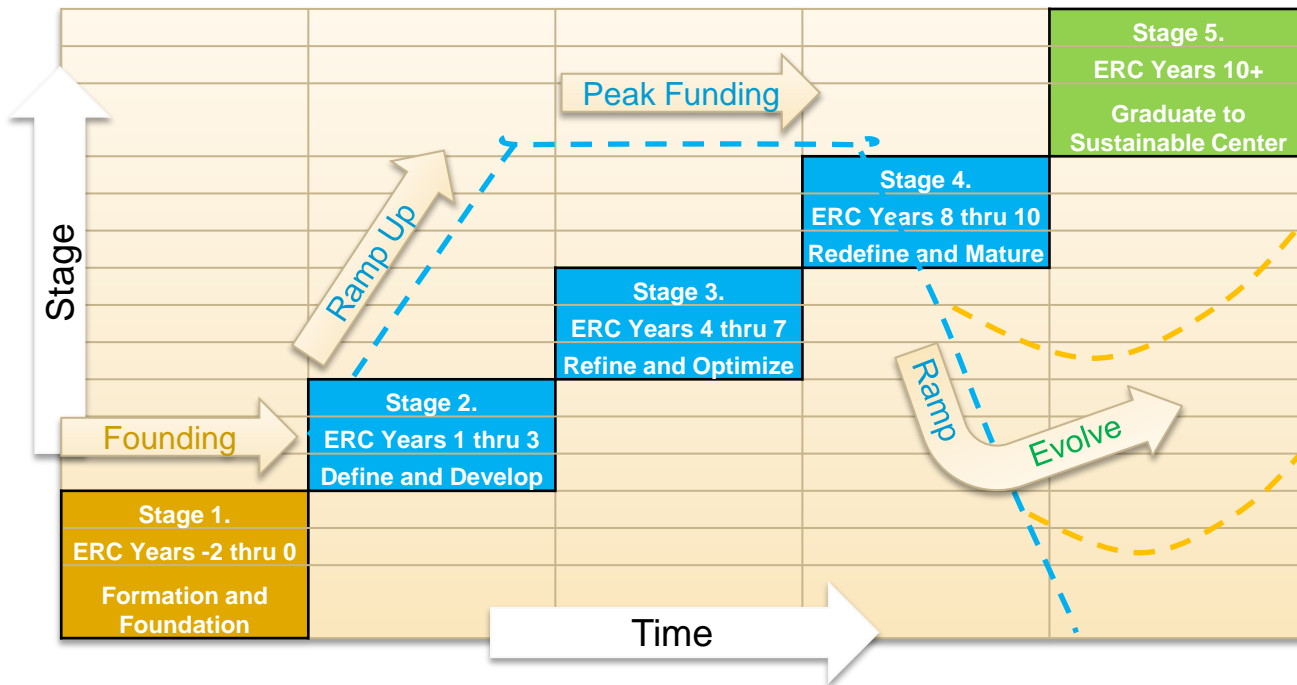


Distribution of Core Needs & Expectations

- ▶ **Job #1 = Grow Membership**
- ▶ **Job #2 = Retain Members**
- ▶ **Job #3 = Get Organized (CRM)**
- ▶ **Job #4 = Technology Development**
- ▶ **Job #5 = Support other Pillars**
- ▶ **Job #6 = Don't Drop the Ball**

- ▶ **Full / Part time / Distributed?**
- ▶ **What does NSF Expect?**
- ▶ **What does ERC Need?**
- ▶ **What does Director Want?**
- ▶ **What do you Want?**

Role/Dimensions Change over Time



ERC STAGES & YEARS CONCEPT

Ideation and Formation

Member Recruitment

Member Retention

Commercialization of IP

Intellectual Property

Innovation Strategy

Education Programs

Sustainability Planning

Role/Dimensions Change over Time

ERC STAGES & YEARS CONCEPT	Stage 1. ERC Years -2 thru 0 Formation and Foundation	Stage 2. ERC Years 1 thru 3 Define and Develop	Stage 3. ERC Years 4 thru 6 Refine and Optimize	Stage 4. ERC Years 7 thru 10 Redefine and Mature	Stage 5. ERC Years 10+ Graduate to Sustainable Center
Ideation and Formation	Work closely with ERC Founders and University advisors to develop ideas within context of NSF ERC Guidelines. Help define ERC opportunity.	Define and develop ERC concept working closely with ERC Management Team.	Refine ERC concept working closely with ERC Management Team.	Redefine Center concept based around a vision of future sustainability.	Review and define new sustainability strategy
Member Recruitment	Secure letters of Intent from future industry members. Identify key individuals to work with.	Develop active outreach process through business connections, technical summits, outreach presentations, fliers and brochures. Tiered membership structure based on company size, varying benefits. What is a realistic IAB size.	Refine recruitment efforts with a greater emphasis on maximizing ability to retain key members.	Redefine recruitment and retention around a future sustainability strategy.	Develop connections to forge the best path into Sustainability.
Member Retention	Begin to define strategy to retain members through engagement in center activities including newsletters, websites and other informational tools.	Develop company interaction and benefits. Develop ideas around joint projects, testbeds, and other ERC opportunities.	Maximize ERC / company interaction and benefits. Cultivate interest in joint projects, involvement in testbeds, and other ERC opportunities. Value and mechanisms of establishing multiple points of contact in firms.	Redefine recruitment and retention around a future sustainability strategy.	Develop retained connections to forge the best path into sustainability planning.
Commercialization of IP	Begin to define testbeds and cross project integration alongside a strategy for commercialization.	Develop Industry R&D needs alongside ERC needs in testbeds, Integrate industrial input from project inception, using project management tools (timelines, go/no-go points, cross project integration, etc.). Strategies for increasing sponsored research projects with industry.	Meet Industry R&D needs alongside ERC needs in testbeds, Integrate industrial input from project inception, using project management tools (timelines, go/no-go points, cross project integration, etc.). Strategies for increasing sponsored research projects with industry.	Redefine commercialization strategy around a future sustainability strategy.	Refine commercialization strategy in light of sustainability plans.
Intellectual Property	Begin to define strategy for IP management and technology transfer.	Develop processes for management and strategy, Technology Transfer and the Invention Disclosure. Start to identify key technology transfer staff for ERC IP management (invention disclosures, patent processing, IP marketing, etc.), the licensing process and what is really valuable to the membership.	Refine management and strategy, Technology Transfer and the Invention Disclosure process. Realistic chances of "big-hit" from IP generated revenue. Cultivate connections to key technology transfer staff for ERC IP management (invention disclosures, patent processing, IP marketing, etc.), the licensing process and what is really valuable to the membership.	Redefine intellectual property strategy around a future sustainability strategy.	Refine IP strategy in light of sustainability plans.
Innovation Strategy	Begin to identify key local innovation partners and infrastructure	Develop paths to entrepreneurship activities in the ERC and University, connecting to local, state, and regional economic development and incentive programs and role of investment groups such as Angels, VCs.	Cultivate entrepreneurship activities in the ERC and University, connecting to local, state, and regional economic development and incentive programs and role of investment groups such as Angels, VCs.	Redefine innovation strategy around a future sustainability strategy.	Refine innovation strategy in light of sustainability plans.
Education Programs	Begin to identify strategy to develop valuable education programs	Start student mentoring programs, short courses and workshops for industry, Certificate programs and distance learning models, Faculty and student exchange, Active promotion of industrial recruitment of graduates.	Refine student mentoring programs, short courses and workshops for industry, Certificate programs and distance learning models, Faculty and student exchange, Active promotion of industrial recruitment of graduates.	Redefine education strategy around a future sustainability strategy.	Redefine education strategy in light of sustainability plans.
Sustainability Planning	Begin to recognize that sustainability planning is just a few years away.	Start being aware of need for planning and evaluating options. Be aware of how other ERCs evolve their plans.	Define options and strategies around a future sustainability plan.	Redefine entire strategy and options around a future sustainability plan.	Redefine entire strategy in light of sustainability plans.

The Job is Infinite



Keep it Simple