Addressing the Needs of the Financial/Insurance-Related Industries for Climate and Catastrophic Natural Disasters

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Mission: NSF

“To promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense...”
“To understand and predict changes in climate, weather, oceans, and coasts; to share knowledge and information with others;...”
$8.5B budget, anticipated to double in the next 5 years.

Supports 24% of all federally funded academic research - ~57% if don’t count NIH funding.

240+ Nobel Laureates supported.

310,000+ people engaged (faculty, researchers, postdocs, students, trainees, and teachers.

Initiates/funds ~400 startups/ small businesses each year.
NSF: Supports all Areas of Science and Engineering

- Biological Sciences
- Computer & Information Science & Engineering
- Engineering
- Geosciences
- Integrative Activities
- International Science and Engineering
- Mathematical & Physical Sciences
- Social, Behavioral & Economic Sciences
- STEM Education
- Technology, Innovation & Partnerships
NSF: Driving Toward Societal Impact

NSF’s Vision – Creating a Nation that is the global leader in research and innovation

$8.5B
Basic Research

Investment in Technology, Innovation, and Partnerships

~$800M
Translational Research

Moving research innovation toward commercialization
NSF Translational Research Programs

Use-Inspired Basic Research

Grant Opportunities for Academic Liaison with Industry
https://www.nsf.gov/pubs/policydocs/pappg20_1/pappg_2.jsp#IIE4

Partnerships for Innovation: Technology development
https://www.nsf.gov/PFI

Industry University Cooperative Research Centers
https://iucrc.nsf.gov

Graduate Student INTERN Program: <55k, 6 months
https://www.nsf.gov/INTERN

I-Corps™ - Entrepreneurial Education
www.nsf.gov/icorps

Commercial Development

Small Business Innovation Research
https://seedfund.nsf.gov
NSF: A Catalyst for Partnerships

Industry
National Labs
States
Other Federal Agencies

Academia
Foundations
International
Professional Societies
IUCRC – A Collaborative Partnership

**Government**
NSF catalyzes partnership; other agencies join as Members or co-fund the Center

**Universities**
Provide research infrastructure, human capital, and technical expertise.

**Industry**
Members provide funds for research and insight into needs of the economic sector.

IUCRCs bridge the gap between academic curiosity-driven research and commercial readiness.
NSF IUCRCs – Portfolio Snapshot and Facts

- **84** Active Centers
- **400+** Large Firms
- **300+** Small Firms
- **110+** Universities
- **20+** Government Entities

In 2021: **$47M** in non-NSF funds generated to support Center research.

~1/4 of graduating IUCRC-involved students hired by Center members.
Sampling of Participating IUCRC Members
**IUCRC - Value Proposition for Members**

**Member ROI:**
Each member dollar leverages ~23 additional dollars

**Access to Talent**
Able to scout and Mentor student talent with skills for work in Industry.

**Reduce R&D Risk**
R&D risk for developing early-stage disruptive tech shared with others.

**Research Cost Avoidance**
Low human capital cost. Access to facilities. Save on internal research money.

**R&D Leverage**
High ROI due to joint project funding model

**Network Access**
Collaborative venue for interaction with other Members, competitors, regulators

**Access to IP**
Royalty-free, non-Exclusive licenses on IP produced in the Center.
Student Training & Workforce

6,500*
Center-trained students nationwide

25%*
Center-trained students hired by member organizations

*(10-year data)

Student Support

Enhance resources for student training, skill development & job placement

Funding.

Increase & diversify research funding via industry-driven research.

Collaboration

Build relationships, develop industry partnerships for tech transfer.

Broad Impact

Work with industry to address societal Challenges.

Feedback

Get industry guidance on research problems.

Access

Access to industry information to Spur innovation.
IUCRC Center Structure and Operations
Industrial Advisory Board (IAB) funds Center research

University overhead on industry money capped at 10%

Pooled Membership fees

Research Portfolio
Cooperatively defined & recommended

Selected to address shared IAB needs

NSF funds
Center admin

Universities provide intellectual capital, & collaboration with

infrastructure, talent, venue for interaction industry.

IAB Value
- Foundational research results.
- Leveraging of R&D dollars.
- Royalty free IP.
- Scouting of talent.
Winter
Faculty proposed project
Ideas refined & new project proposals generated

Continuing interaction with IAB

Focus on Industrial Advisory Board (IAB) needs

Summer
Meeting
IAB feedback on projects

Ideas for new projects discussed

IAB reviews proposals & recommends funding projects and provides industry insights

IAB needs survey, possible new project ideas discussed

Winter Meeting
New project selection

IAB meets
New projects start

Project completion

Continuing interaction with IAB

Work progresses

Project continuation
IUCRC Center Creation Path and Timeline

1. Ideation Phase
   - Talk to industry to identify pain points
   - IUCRC bootcamp
   - Planning meeting

2. Planning Phase
   - (12 mo)

3. Merit review
   - (3-6 mo)

4. Planning Proposal Submitted

5. Center Proposal Submitted

6. New IUCRC Created

Note: The image includes a flowchart with various stages and activities related to the creation of an IUCRC center, including ideation, planning, and proposal submissions, along with timelines for each phase.
IUCRC Characteristics and Must-Haves

Key for a Successful Partnership & Center
IUCRC Criteria for Viability: All Centers must retain a minimum number of Members, at the full membership rate and a minimum amount of contributed Member cash in the form of a membership fee.

IUCRC Goal: To advance a technology or targeted sector of the economy, employing cutting-edge research ideas & technology

Membership Eligibility* - Anyone can join, if they sign the IUCRC Membership agreement.

- Private sector companies (large, small, startups, international).
- Government agencies & public sector entities (federal, state, local).
- National labs, FFRDCs.
- Non-profits, foundations.

*NSF encourages Members of all types, with emphasis on the private sector to ensure translation of research to commercial uses for societal impact.
IUCRC – Controlling Documents

- **Membership Agreement**
  - Same for all.
  - Must be signed prior to becoming a Center member.
  - Identifies types of memberships and fee structure.
  - Codifies rights for Center derived IP.
    - University owns IP.
    - All Members have royalty free licensing rights
    - Possibility of exclusive rights (if no other Member interested)

- **Center Bylaws**
  - Defines how Center will operate.
  - Describes research project consideration and voting practices.
  - Sets faculty/student Center research publication policies/delays.
  - Written jointly by university and IAB, can be amended as needed.
  - NSF approval required - ensures adherence to IUCRC model.

Signed by 100’s of firms involved in IUCRCs
What an IUCRC Is and What It Is Not

• IUCRCs are engines of innovation to help Members overcome the collective conceptual and technological hurdles of the sector through fundamental use-inspired research projects focused on industry needs. **IUCRCs are NOT contract or service organizations: no one-on-one or hand-in-hand projects allowed.**

• IUCRC research is to provide ground-breaking research results of mutual interest where faculty learn industry pain points and pitch projects to address them with Members recommending funding for those of highest priority. **IUCRCs are not for faculty simply wanting to augment their funding, motivation should be for understanding and the collective needs of the sector.**

• The first word in IUCRC is “industry” which NSF takes to mean “private sector product producers”. Center research is focused on carrying out research that has the potential to help Members boost the national economy. Public sector, government entities and non-profits are welcome, but should not dominate Center membership. **IUCRCs are not places dominated by non-product producing entities.**
• IUCRCs provide companies opportunities for serious talent scouting, to find students who are creative, resourceful, and understand industry needs and how to communicate and effectively in a private sector-like environment. IUCRCs are not simply research engines, they can provide access to talent, infrastructure, research capacity, etc. missing from your organization.

• Any party who shares the same interests and who wants to join the Center, agrees to abide by its bylaws, and signs the membership agreement can become a Member with the same rights as every other member. IUCRCs are not exclusive “clubs” with membership controlled by the IAB or faculty.

• IP in an IUCRC is owned by the university and shared among Members. Private contracts and one-on-one arrangements can be made with Center faculty. But, those must be done outside the Center using the normal university process and overhead. IUCRCs are not places where a company can develop Intellectual Property (IP) restricted to its exclusive use.
Questions?

Please feel free to share with your corporate colleagues or with other potentially interested private or public sector parties – it takes many players to make IUCRCs deliver maximum impact!

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For more information see
NSF IUCRC solicitation 20-570