



National Science Foundation
and



National Oceanic and Atmospheric Administration

INDUSTRY UNIVERSITY COOPERATIVE RESEARCH CENTER (IUCRC) PROGRAM

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

Feb 2, 2023

Barbara Ransom: NSF/GEO IUCRC Program Director

Karen Hyun: NOAA Chief of Staff

Mission: NSF



“To promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense...”

Photo Credit: Maria Barnes, NSF

Mission: NOAA

“To understand and predict changes in climate, weather, oceans, and coasts; to share knowledge and information with others;...”



NSF: Quick Facts

\$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



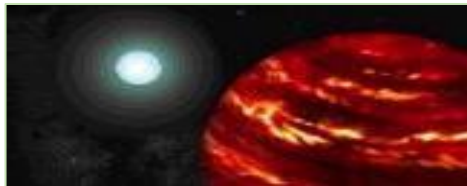
Geosciences



**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**



**Commercial
Development**

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

Small Business Innovation Research

<https://seedfund.nsf.gov>

NSF: A Catalyst for Partnerships

Industry

Academia

National Labs

Foundations

States

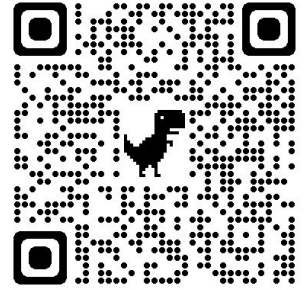
International

Other Federal Agencies

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.

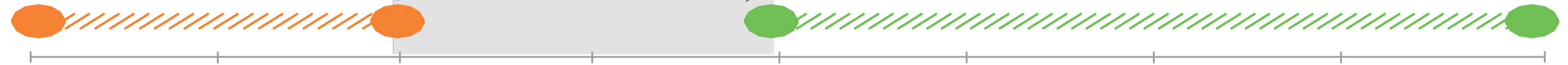


Industry

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

IUCRC TARGET

IUCRCs bridge the gap between academic curiosity-driven research and commercial readiness.



Early Stage Research

Technology Readiness

Commercial Deployment

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

IUCRC

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.

IUCRC – Value Proposition for Universities

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.

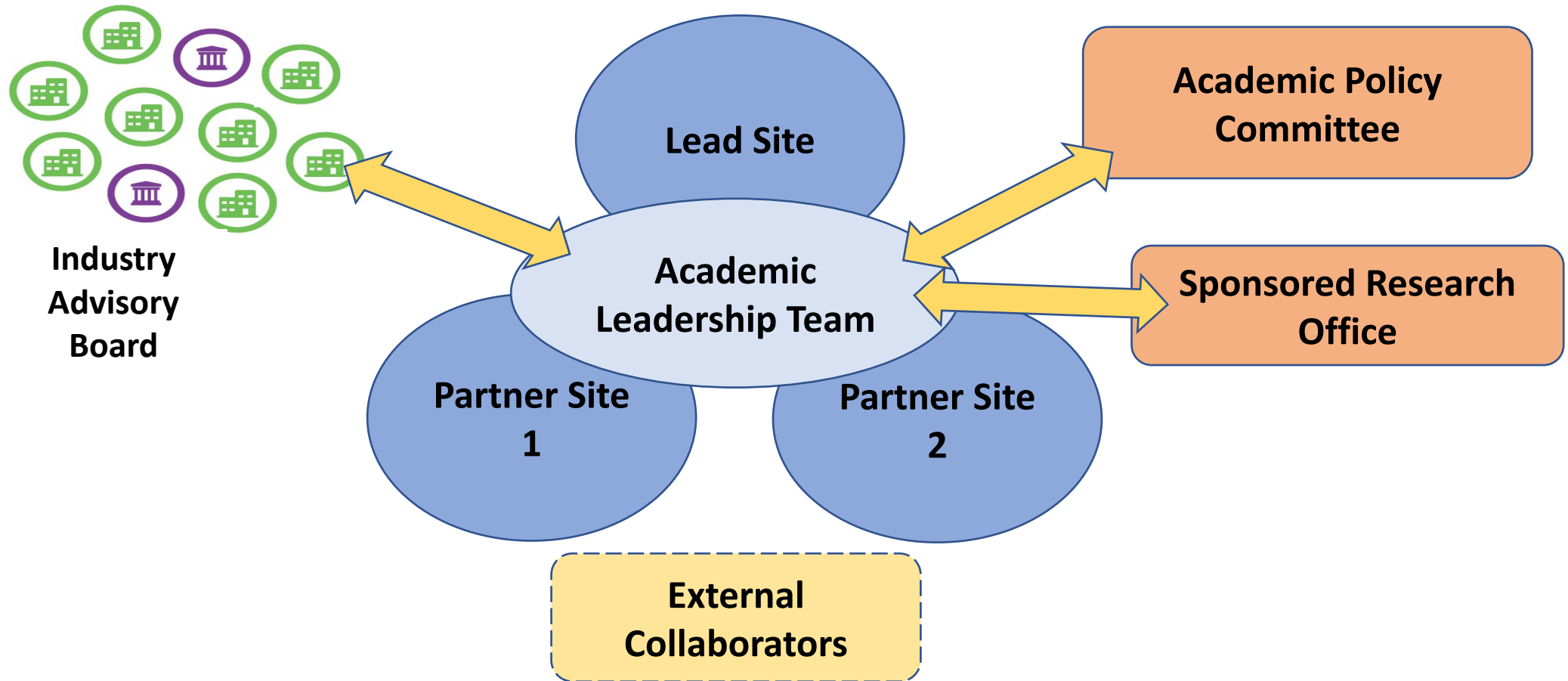


IUCRC Center Structure and Operations

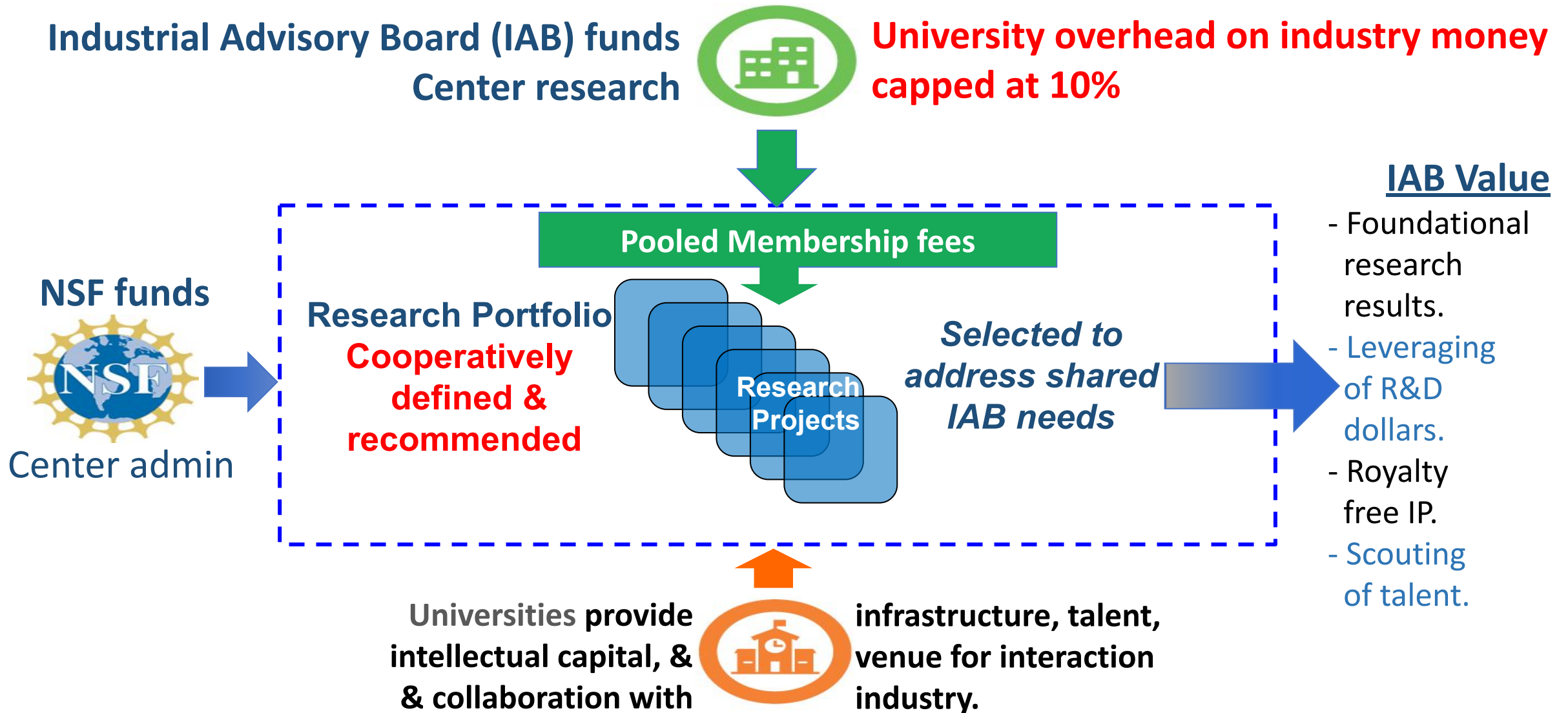
IUCRC – Center Structure



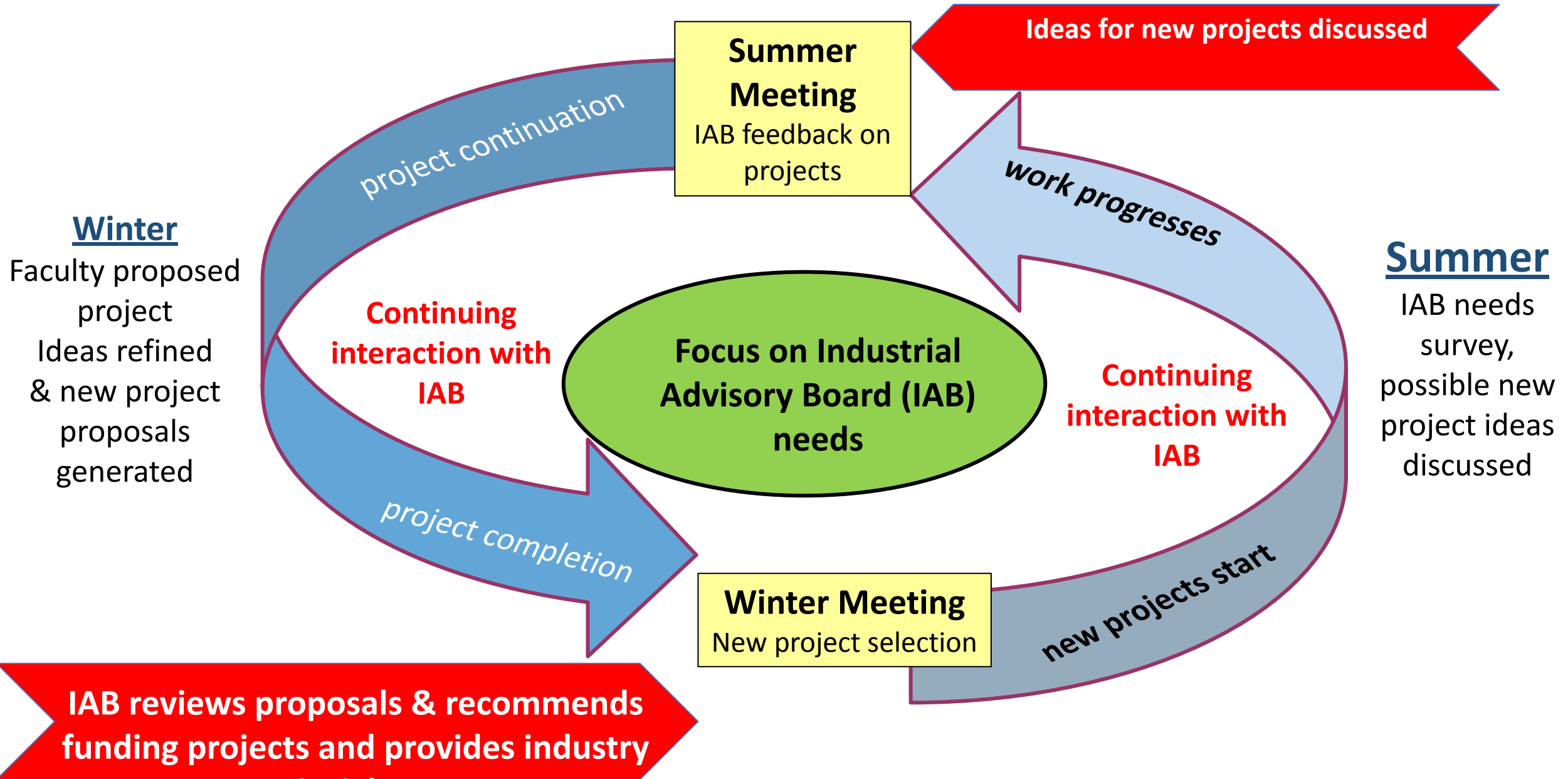
IUCRC



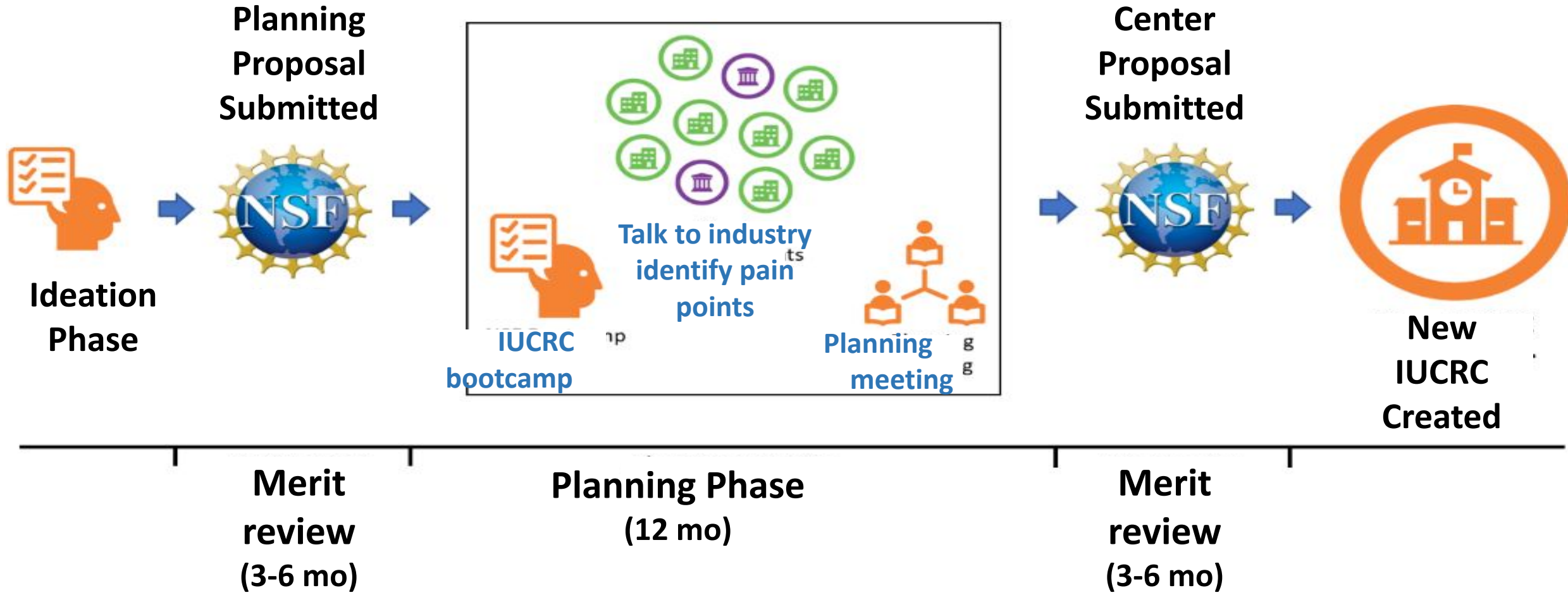
IUCRC – Program Operational Essentials



IUCRC - Member Role in Project Selection



IUCRC Center Creation Path and Timeline





IUCRC Characteristics and Must-Haves

Key for a Successful Partnership & Center

Center, Center Members, and Member Eligibility

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)



Signed by 100's of
firms involved in
IUCRCs

- **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.

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.**

Is and Is Not (cont.)

- 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.**

NSF IUCRC Geoscience Portfolio Summary

2 Site: \$400k

OCE - 2013
Marine
Fisheries

17 REU

5 INTERN

2 Site: \$900k

EAR - 2018
Mines &
Mining

13 REU

16 INTERN

2 GOALI

1 START

1 Site: \$400k

EAR - 2018
Geomechanics &
Geohazards

3 REU

to be proposed

1 Site: \$600k

AGS – 2021
WIRC
Wildfire

6 REU

Share w/ BIO

AGS – NOAA-NSF
Climate/Cat Model
Integration

4 Site: \$600k

EAR - 2023
NEW: Soil
Sensing

Share w/ ENG



AGS: Division of Atmospheric and Geospace Science



EAR: Division of Earth Science



OCE: Division of Ocean Sciences



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*