



ERC

Engineering Research Centers

Gen-4 ERC: **Convergent**
Research and Innovation
through **Inclusive**
Partnerships and
Workforce Development

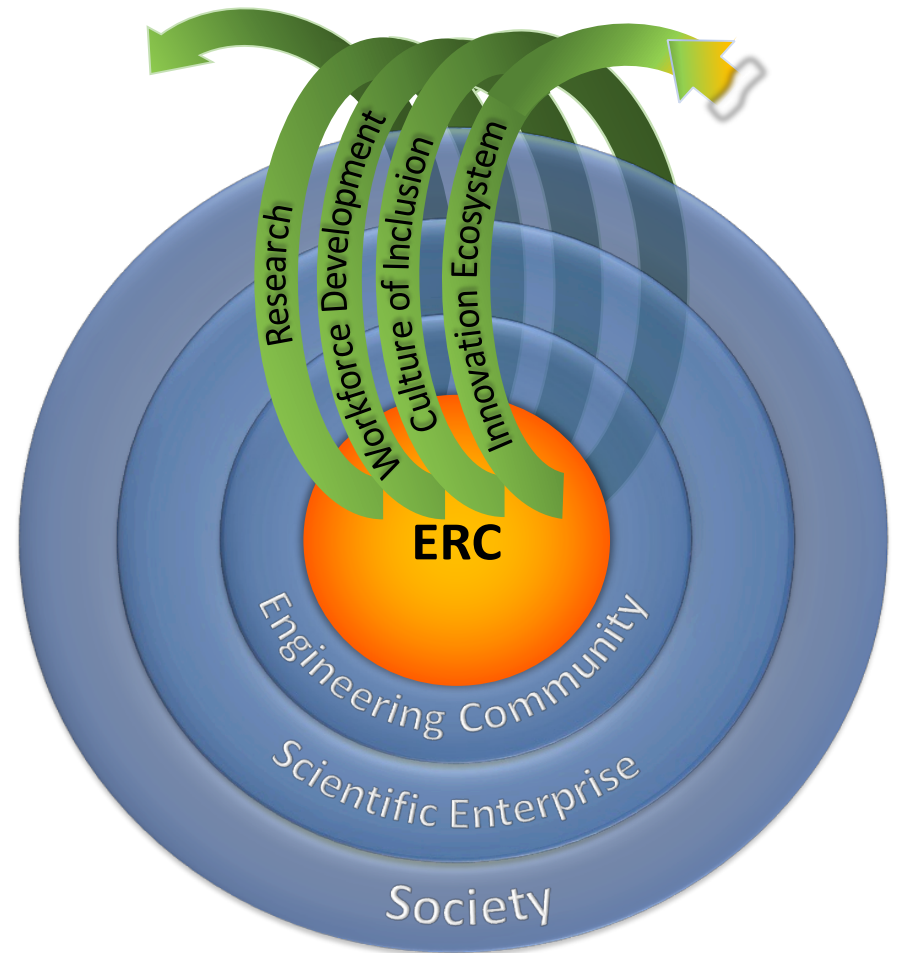
ILO SUMMIT

Deborah Jackson

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The ERC Model

- Foundational Components:
 - Convergent Research (CR)
 - Engineering Workforce Development (EWD)
 - Diversity and Culture of Inclusion (DCI)
 - Innovation Ecosystem (IE)
- Areas of Impact:
 - Engineering Community
 - Scientific Enterprise
 - Society



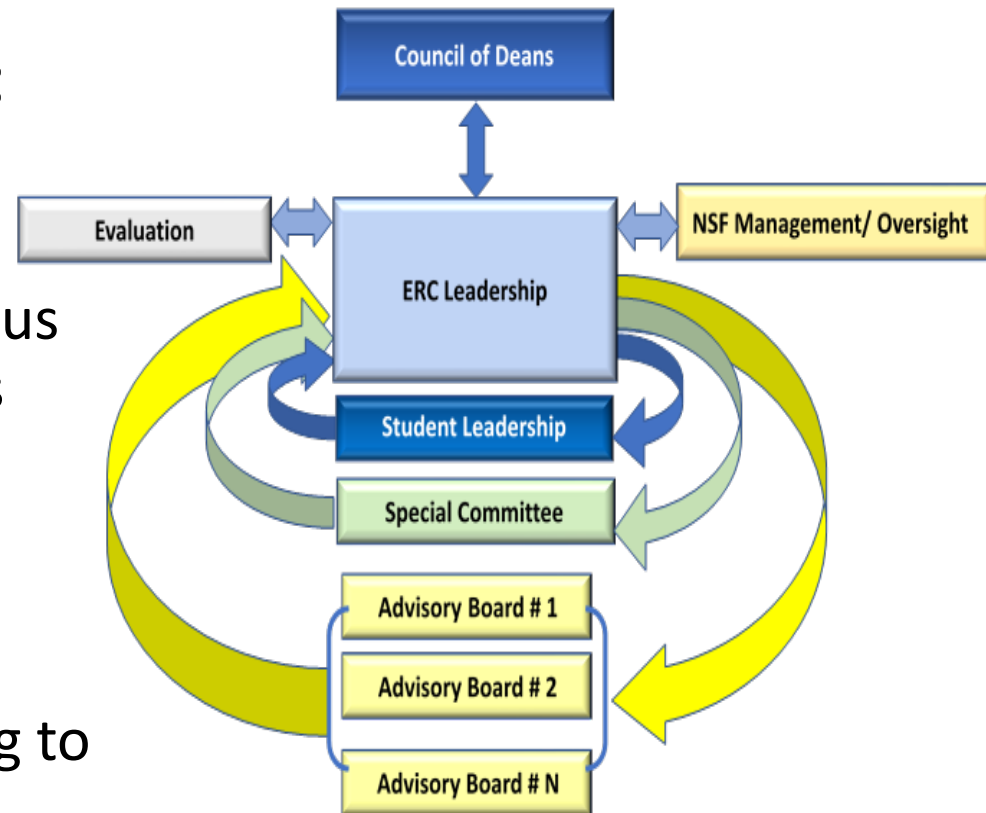
Changes in ERC Solicitation: Focus

- **High-risk/High-Payoff:**
 - Research ideas and discovery that pushes the frontiers of engineering knowledge to address problems with high societal impact.
- **Review Criteria:**
 - Additional Review Criteria with greater emphasis on:
 - On team formation
 - Stakeholder engagement



Flexibility in Management

- Management Structure:
 - More freedom and creativity
 - Define the roles of various advisory boards/entities
- Explain the ERC's processes for
 - Team communication
 - Taking in and responding to advisory feedback



ERC Strategic Approaches: Team Formation

- **Team Formation** is the process by which all necessary disciplines, skills, perspectives, and capabilities are brought together.
- Successful teams are interdependent, multidisciplinary, and diverse; can work and communicate effectively even when geographically dispersed; and effectively overcome barriers to collaboration.
- Best practices:
<https://www.nap.edu/catalog/19007/enhancing-the-effectiveness-of-team-science>



Team Formation

- Strong overlap between Team Formation and **Culture of Inclusion** characteristics
 - Living strategic plan
 - Shared vision among team members
 - Shared accountability
 - Engaging partner who reinforce ERC culture
 - Onboarding process sets clear expectations
 - Multi-directional mentorship opportunities among all personnel
 - Communicating clear message of culture & values
 - **Rewarding and recognizing contributions that reinforce ERC's culture of inclusion**
 - **Assessment strategy**
 - **Retention**



ERC Strategic Approaches:

Stakeholder Community

- **Stakeholder Community** includes all parties who may contribute to the ERC or may be impacted by the ERC.
- **Stakeholders** can include but are not limited to:
 - Relevant researchers across partner institutions with complementary research and education expertise;
 - Industry leaders who can guide the innovation effort;
 - Partners for innovation, education, workforce development, and diversity;
 - Beneficiaries of the ERC outcomes (community members, users, customers, patients, and policy-makers, et al.).



Stakeholder Engagement

- IAB is a subset of all the stakeholders



Foundational Components: Innovation Ecosystem

- **Trusted** partners that work together to create and enhance the **capacity for innovation** and new ways for delivering value with positive societal impact.
- Include **effective translational efforts** from ideation to **implementation**, workforce development for the **enterprise**, and deliberate efforts to attract **funding** and **resources**.
- **Articulate plans** for strategic engagement of stakeholder communities while **including the legal frameworks** needed to protect the participants.





Questions?

NSFERC@nsf.gov



Mute



Stop Video



Participants



Q&A



Polling

Foundational Components: Convergent Research

Convergence is an approach to problem solving that cuts across disciplinary boundaries.

It deeply integrates knowledge, tools, and ways of thinking from life/health sciences, physical, mathematical, and computational sciences, engineering disciplines, and beyond to form a comprehensive synthetic framework for tackling scientific and societal challenges that exist at the interfaces of multiple fields.

- **Convergent** engineering is a deeply collaborative, team-based engineering approach for defining and solving important and complex societal problems (NAE, 2017).
- **Convergent** research has the strong potential to lead to transformative solutions or new fields of study.
- <https://www.nae.edu/113283.aspx>



Foundational Components: Engineering Workforce Development

- **Human resource capacity development** aligned with the targeted engineered system; ERC engineering workforce development strengthens a robust spectrum of engineering education and pathways.
- **Workforce Development** occurs at all levels of the Center and provides opportunities for engagement by all ERC members including students, faculty, and external partners as appropriate.



Flexibility in Eligibility

- Limit on Number of **Letters of Intent** and Preliminary Proposals:
 - Per Institution: None
 - Per PI or Co-PI: None
- The **lead institution** must have an Engineering Department/School, offering degrees at the Bachelors, Masters, and PhD level.



Flexibility in Personnel

- **Principal Investigators:**

- The Lead PI must be a faculty at the lead university.
- PI does not have to be from an Engineering Department. A letter of support must be received from the Dean of Engineering at that institution.
- Non-Lead PIs are the PIs listed on the Cover Sheet after the Lead PI and may be from institutions other than the lead university.
- The Lead PI and the ERC Director are not required to be the same person, but both must be from the Lead Institution.

- **Leadership Roles:**

- Opportunity for different models of leadership
- Exception: ERC Administrative Director role is required.



ERC Program Overview:

Impact on the Engineering Community

- **Engineering Community:** ERCs directly impact the engineering community, preparing students and researchers by highlighting new engineering approaches and best practices for engineering workforce development, diversity and inclusion, and academic-industrial partnerships.



ERC Program Overview:

Impact on the Scientific Enterprise

- **Scientific Enterprise:** ERCs should be exemplars of how cohesive, high-performing teams engage in convergent research and innovative approaches to create major impact that informs and inspires the scientific community, engineering and beyond.



ERC Program Overview:

Impact on Society

- **Societal Impact** represents opportunities and challenges that may be addressed through advances in engineering research and innovation for the benefit of society at large.
 - Potential **societal impact** should be relevant and complex, and not limited to any specific schema of grand challenges

