1

Reminder

- Participation in the **Planning Grant** program should not be construed as an application submission for this ERC competition;
- To participate in this **ERC competition**, one is not required to have submitted a planning grant proposal nor to have received a planning grant

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Webinar Outline

- Gen-4 ERC Solicitation Goals
- ERC Program Model
  - Foundational Components
  - Areas of Impact:
- ERC Strategic Approaches
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Gen-4 ERC Solicitation Goals

ERC solicitation was informed by a study from *NASEM*

- Continued emphasis
  - **high-risk/high-payoff** engineered systems
  - inclusive **cross-disciplinary** and **cross-sector** partnerships.
- New emphasis
  - **High societal impact**
  - **Convergent** approaches,
  - **Stakeholder** engagement
  - **Team science** efficiencies
- ERCs should have strong synergies or value-added rationale that justifies a Center or institute-like approach

4

Strategic Planning of Research

- Describe engineered systems vision
- Define the engineered system
- Use 3-plane chart to describe ERC efforts at three levels of research
  - System level
  - Enabling level
  - Fundamental level
- Identify barriers preventing realization of System level goals

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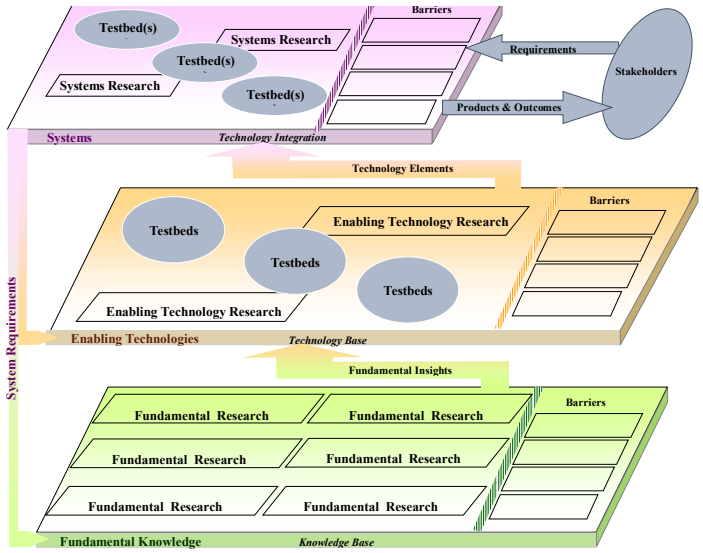
Engineered System and 3-plane Diagram

- 3-Plane Diagram Required and Essential
- Integrated, and used throughout the review



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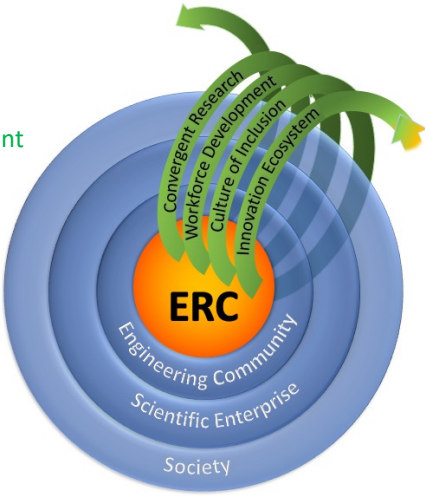
The ERC Model

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



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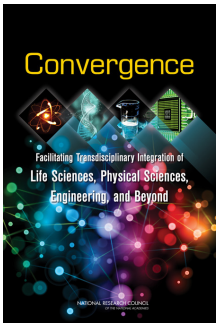
Foundational Components:
Convergent Research (CR)

…"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"



NAE study on Convergence
https://www.nae.edu/113283.aspx

- CR is the "first gate" of any ERC effort

- No foundational component of an ERC can be weak

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Foundational Components:
Engineering Workforce Development

- **Human resource development** aligned with the targeted engineered system.

- **Workforce Development** at all levels of the Center

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Foundational Components: Diversity and Culture of Inclusion

- The culture of the ERC creates an environment in which **all members** feel valued, contribute, and mutually benefit.
- **Diversity** in terms of **scientific** fields**, traditionally underrepresented groups and other perspectives** is required.

> Diversity is being invited to the Party. Inclusion is being asked to dance ~ Vernā Myers

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Foundational Components: Innovation Ecosystem

- **Trusted** partners that work together to create and enhance the **capacity for innovation**.
- **Effective translational efforts**.
- **Articulate plans** for strategic engagement of stakeholder communities.

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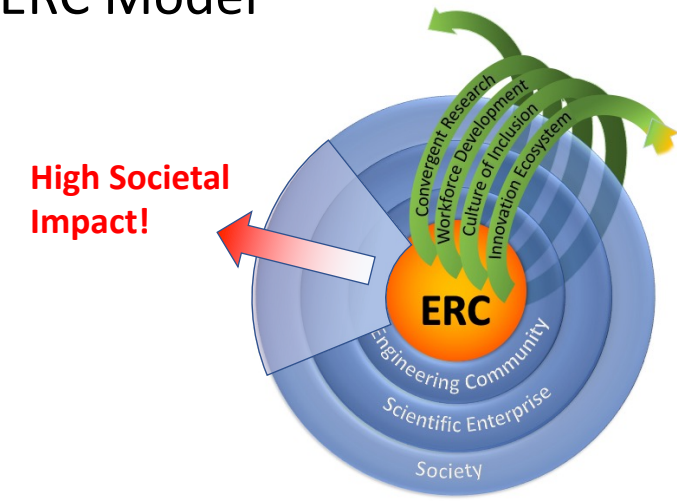
The ERC Model



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Areas of Impact:
Engineering Community

Preparing students and researchers by impacting

- New areas of engineering, or new disciplines
- Best practices for workforce development,
- Innovations in diversity and inclusion
- Excellent academic-industrial partnerships

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Areas of Impact:
Scientific Enterprise

- Create major impact that informs the scientific community, engineering and beyond.

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Areas of Impact:
Impact on Society

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

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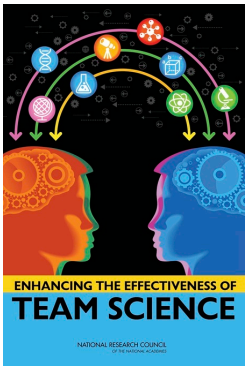
ERC Strategic Approaches: Team Formation

Process by which all necessary disciplines, skills, perspectives, and capabilities are brought together.

Operation as an integrated team that embraces all four foundational elements



Best practices: https://www.nap.edu/catalog/19007/enhancing-the-effectiveness-of-team-science

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ERC Strategic Approaches:
Stakeholder Community

Can include any parties who may add value to the ERC or may be impacted by the ERC.

Examples: Relevant researchers; Industry; Community Organizations; Regulatory Agencies; and other Beneficiaries

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Changes in ERC Solicitation:
Focus

- **High-risk/High-Payoff**:
  - Research ideas and discovery that pushes the frontiers of engineering knowledge.

- **Review Criteria**:
  - Additional Review Criteria reflect the changed focus areas.

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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 these degrees
- BS
- MS
- PhD

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Flexibility in Personnel

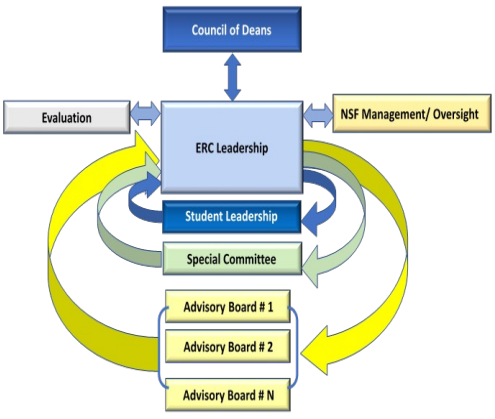
- **Principal Investigators (PI):**
  - Lead PI must be a faculty at the lead university.
  - PI does not have to be from Engineering. Need letter of support PI's Dean of Engineering.
  - Non-Lead PIs are listed on the Cover Sheet after the Lead PI and may be from institutions other than the lead university.
  - The Lead PI and the ERC Director are not required to be the same person, but both from the Lead Institution.

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

Flexibility in Management

➢**Management Structure**:
- More freedom and creativity
- Define the roles of various advisory boards/entities

➢Explain ERC's processes for
- Team communication
- Taking in and responding to advisory feedback



Award Information

Year	Allowable Max Budget	Year	Allowable Max Budget
1	$3,500,000	6	$6,000,000
2	$4,500,000	7	$6,000,000
3	$6,000,000	8	$6,000,000
4	$6,000,000	9	$4,000,000
5	$6,000,000	10	$2,600,000

- The initial ERC award would be for 5 years.
- Cost Share is required **for all 10 years** of an ERC.

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ERC Proposal: **Merit Review Criteria**

Proposals are evaluated via the 2 National Science Board approved merit review criteria:

- **Intellectual Merit (IM)**
- **Broader Impacts (BI)**

Using both criteria above, these 5 elements will be considered in the review :

1. What is the potential for the proposed activity to
   a) Advance knowledge and understanding within its own field or across different fields (IM);
   b) and Benefit society or advance desired societal outcomes (BI)?
2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?
4. How well qualified is the individual, team, or organization to conduct the proposed activities?
5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

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ERC Preliminary Proposals: Additional Review Criteria

Questions to Guide the Narrative:

1. *What is the compelling new **idea** and what is the potential **high societal impact**?*
2. *What is the **engineered system**? Is it high-risk but high payoff?*
3. *How does the proposed Center's research benchmark against the state-of-the-art?*
4. *Why is an ERC necessary to tackle the idea?*
5. *What is the proposed management structure for the ERC? How will the proposed infrastructure integrate and implement the four foundational components (CR, EWD, DCI, and IE) and foster team-formation?*
6. *What are the proposed strategies for engaging and developing the appropriate stakeholder community?*
7. *Does the proposed ERC create an inclusive environment where all the ERC participants learn to work on a team towards a common goal?*

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ERC Full Proposal:
Additional Review Criteria in These Areas

- Vision
- Engineered system/3 plane diagram
- High Societal Impact
- High-risk/High-Payoff
- Convergence
- Stakeholder Engagement
- Team Formation
- Strategic Plan
- Infrastructure
- Research
- Engineering Workforce Development
- Diversity and Culture of Inclusion
- Innovation Ecosystem
- Evaluation Plan
- Financial Support and Resources

PIs are strongly urged to read the review criteria detailed in the solicitation before starting to write!

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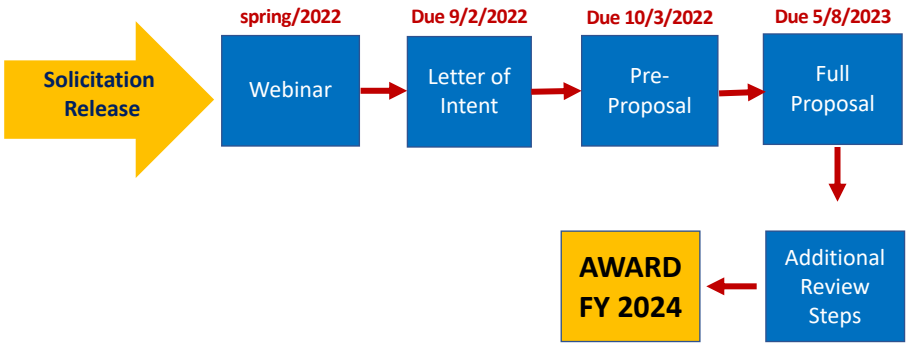
Key Dates on Competition Timeline



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Two Ways to Ask Questions

FIRST Check the FAQ https://beta.nsf.gov/funding/opportunities/gen-4-engineering-research-centers-erc

1. Submit questions to NSFERC@nsf.gov at any time
2. Ask during Webinar & L**ive Q&A events** with NSF ERC Team. ANONYMOUSLY
   - Mon Jun 27 @11:00 AM E.T.
   - Thu Aug 4 @ Noon E.T.

   Each will start with ~40 min webinar, followed by live Q&A with ERC Program Directors.

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Summary

1. **Societal impact**, convergence, team formation, & stakeholder engagement.
2. Clearly defined **engineered system**
3. **Integrate** 4 Foundational Components
4. Plan a 3-plane chart using **a top-down** thought process.
5. Read the Solicitation & **review criteria** carefully.
6. Is there a **need for center?**
7. Look at FAQ online & use email Alias **nsferc@nsf.gov**

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The Value of an ERC

ERCs are of tremendous value to all their institution. See: https://erc-history.erc-assoc.org/

Additional Resources:

- **Webinar slides/recording** will be posted to the ERC Association Website: http://erc-assoc.org/
- **Gen-4 ERC Program** Website: https://beta.nsf.gov/funding/opportunities/gen-4-engineering-research-centers-erc

NAS Reports:

1. *A New Vision for Center-Based Engineering Research:* https://www.nap.edu/catalog/24767
2. *Convergence*: https://www.nap.edu/catalog/18722
3. *Enhancing the Effectiveness of Team Science*: https://www.nap.edu/catalog/19007

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Consultation Time

- Timeslots are 20 mins.
  - 1 timeslot per Preliminary Proposal
  - all available meeting times are posted
- Provide two documents 1-2 days prior to Meeting
  - ❑1-page summary of Vision/Goals
    - Include 1 sentence - Engineered System
    - list of partnering institutions (for COI)
  - ❑3-plane chart
- Platform Link: https://tinyurl.com/ConsultERC
- Extra Questions (not on FAQ): email to nsferc@nsf.gov

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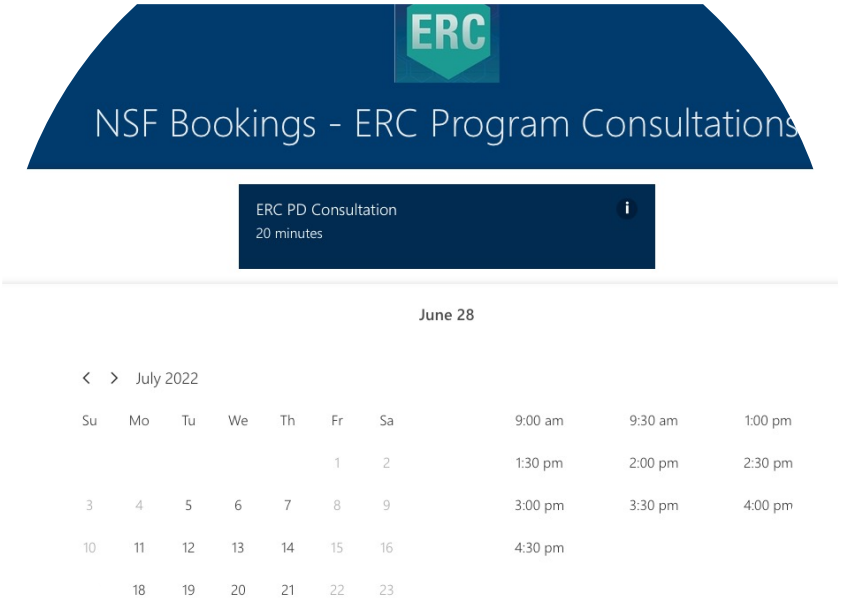
This is how the platform looks



**NOTE: We will NOT evaluate your technical idea, but whether it fits our ERC Program

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