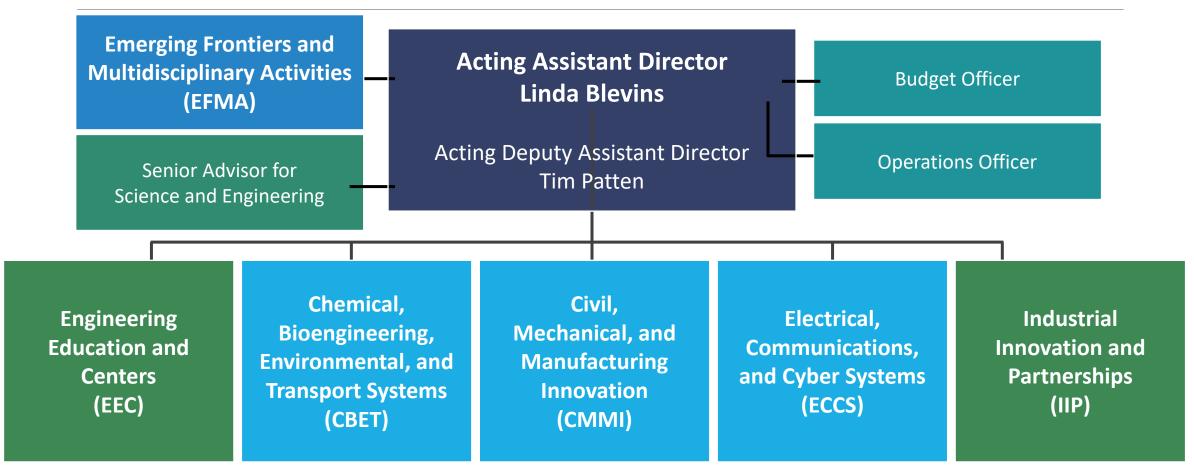# AGENDA: August 2nd, 2021

1:00 pm	Welcome from Linda Blevins
	Acting Assistant Director, NSF/ENG
1:10 pm	Overview of Germination Program Solicitation
1:45 pm	Questions

NSF Directorate for Engineering

Emerging Frontiers and Multidisciplinary Activities (EFMA)

Senior Advisor for Science and Engineering

**Acting Assistant Director
Linda Blevins**

Acting Deputy Assistant Director
Tim Patten

Budget Officer

Operations Officer

Engineering Education and Centers (EEC)

Chemical, Bioengineering, Environmental, and Transport Systems (CBET)

Civil, Mechanical, and Manufacturing Innovation (CMMI)

Electrical, Communications, and Cyber Systems (ECCS)

Industrial Innovation and Partnerships (IIP)

NSF/ENG personnel

Office of the Assistant Director, Directorate for Engineering

➤ Linda Blevins, *Acting Assistant Director*

Office of Emerging Frontiers & Multidisciplinary Activities (EFMA)

➤ Sohi Rastegar, *Senior Advisor & Head, EFMA Office*

➤ Louise R. Howe, *Program Director*

➤ Alias Smith, *Associate Program Director*

➤ Terria Davis, *Program Specialist*

➤ Tammy Wilbert, *AAAS Science & Technology Policy Fellow*

➤ Kathryn Burris*, Student Intern*

Goals of Webinar

The goals of this webinar are:

❖ To inform the community about the Germination Program Solicitation

❖ To respond to questions from potential applicants

NSF/ENG Germination Program

Numerous societal challenges indicate the pressing need for impactful fundamental science and engineering research to provide solutions.

The Germination program, offered by the National Science Foundation Directorate for Engineering (NSF/ENG), seeks to understand whether pedagogical frameworks can be developed to train academics to formulate research questions that result in transformative impacts on key societal needs.

Recent Germination Awards

- ❖ 2016108: **Project Confluence: Engineering and Science to Address Community Needs**; Darshan Karwat, Arizona State

- ❖ 1844448: **Using case studies to train PhD students in ideation and questioning processes**; Amy Charles, U. Iowa

- ❖ 1839558: **Faculty Springboard to Advance Breakthrough Science by Post-Tenure Faculty**; George Truskey, Duke

- ❖ 1745970: **Using Human-Centered Design to Conceptualize and Prototype Ways to Increase Graduate Student Engagement with Transformative Research**; Patrick Little, Harvey Mudd College

- ❖ 1745944: **Piloting a Center for Transformative Research at Boise State University**; William Hughes, Boise State

- ❖ 1745919: **The Question Improvement Model: A Simple and Scalable Model for Improving the Question Formulation Skills of Ph.D. Students**; Dan Perlman, Brandeis

- ❖ 17458997 / 1745891: **An Experimental Approach to Formulate Transformative Research Questions**; Grace Wang & Kemper Lewis, SUNY

- ❖ 1745889: **Extending a platform to germinate transformative science through diverse collaboration**; William Barley, UIUC

- ❖ 1745774 : **Cultivating Creativity in STEM Research through Mindfulness Training**; Susan Hagness, U. Wisconsin-Madison

NSF 21-594: GERMINATION: Germination of Research Questions for Addressing Critical Societal Challenges

The NSF/ENG Germination program invites proposals to design, test, evaluate and implement innovative frameworks, platforms and/or environments that will increase the ability of academic researchers, from graduate students through to mid-senior career faculty, to formulate research questions and ideas that have the potential to address critical societal challenges.

In order to catalyze development of novel approaches, while simultaneously expanding the reach of pilot approaches which are already exhibiting promise, two tracks will be supported in Fiscal Year 2022:

- ❑ GERMINATION Innovation

- ❑ GERMINATION Expansion

GERMINATION Innovation

Proposals submitted to the GERMINATION Innovation track:

- ❖ Should describe projects to design, test and evaluate **previously unexplored** pedagogical frameworks, platforms and/or environments that have the explicit goal of enabling the participants to formulate research questions with potentially transformative outcomes.

- ❖ Must be submitted as EAGER (EArly-concept Grants for Exploratory Research) proposals.

- ❖ May request between $100,000 and $300,000 support, commensurate with project scope.

- ❖ Projects should be 1-2 years in duration.

GERMINATION Expansion

Proposals submitted to the GERMINATION Expansion track:

❖ Should describe projects that focus on **development, implementation and scaling of evidence-based strategies** for enabling the participants to formulate research questions with potentially transformative outcomes.

❖ Should focus on **scaling previously piloted approaches with demonstrated efficacy** to a regional or national sphere of activity (i.e., beyond the pilot institution).

❖ May request up to $500,000 support, depending on project scope.

❖ Projects may be up to 3 years in duration.

GERMINATION: Participants

Proposals to both tracks should:

- Include as participants STEM graduate students, postdoctoral researchers, and/or faculty.

- Clearly identify the targeted participants.

- Propose approaches designed to meet the needs of the targeted participant type.

- Focus on the development of key skills and mindsets that will increase the capacity of participants to identify big opportunities, think creatively, and take intellectual risk to formulate novel research questions with potential to address societal challenges.

GERMINATION: Evaluation Plan

All proposals must include an evaluation plan which incorporates successful documentation and assessment of the effectiveness of the proposed approach to enhance the **ability and interest** of the participants to germinate research questions and ideas that address important societal needs.

GERMINATION teams must gather, analyze, evaluate and utilize data during development and implementation of these platforms to identify successful training strategies for leveraging and dissemination.

GERMINATION Innovation proposals should additionally assess how likely it is for the proposed approaches to be scalable and adaptable beyond the institutions involved in the proposed study.

Involvement of individuals with evaluation expertise in the leadership team is strongly encouraged.

Solicitation Parameters

Eligibility: Organizations

Who May Submit Proposals:

◦ Proposals may only be submitted by:

- ◦ Institutions of Higher Education: universities and two- and four-year colleges (including community colleges) accredited in, and having a campus located in the United States, acting on behalf of their faculty members.
- ◦ Non-profit, non-academic organizations: Independent museums, observatories, research labs, professional societies and similar organizations in the U.S. associated with educational or research activities.

Limit on Number of Proposals per Organization: ONE

◦ Only one proposal may be submitted by a single organization

- ◦ A single organization may only submit a proposal on one of the two tracks, either on the Innovation track or on the Expansion track.

Eligibility: PI

Who May Serve as PI:

◦ There is no constraint on the role of the Principal Investigator (PI) within the submitting organization.

◦ The proposal must document the PI's experience with, and commitment to, leading a culture of change.

◦ The proposal must document the team's experience in mentoring academics of the category that will be involved as participants in the proposed pedagogical framework, platform or environment.

◦ Inclusion of appropriate social science expertise (e.g., organizational psychologists and evaluation professionals) in the leadership team is highly recommended.

PI Constraints

Limit on Number of Proposals per individual (PI or co-PI):   ONE

◦ An individual may participate as either PI or co-PI in only one proposal submitted to this solicitation.

Additional Eligibility Information:

◦ Investigators who have previously received a GERMINATION EAGER are not eligible to receive an award under the GERMINATION Innovation track of this solicitation.

Award Information: Innovation Track

Anticipated Number of Awards: 4-5

Award Type: EAGER

Award Duration: 1-2 years

Award Amount: $100,000-$300,000

Investigators who have previously received a GERMINATION EAGER are not eligible to receive an award under the GERMINATION Innovation track of this solicitation.

Innovation Track: Concept Paper Required Due Date: August 27th, 2021

MUST obtain Program Officer approval for submission of the EAGER proposal
(true for all EAGER proposals)

❖ Submit two page research concept outline:

- Explain the core idea of your project

- Submit to Program Officer by E-mail

❖ If PO invites the PI to submit an EAGER proposal:

- Upload the E-mail invitation as a document entitled "EAGER – Program Officer Concurrence Email" in the Supplementary Documentation section of FastLane

[see PAPPG Section II.E.2 for guidance on EAGER preparation/submission]

Innovation Track: Full Proposals
Due Date: October 29th, 2021 *(if invited)*

Follow NSF Proposal & Award Policies & Procedures Guide <u>or</u> Grants.gov Application Guide

Solicitation-Specific Requirements:

❖ The **title** must include the prefix "EAGER GERMINATION".

❖ **Project Description** – must include:

- Goals and Objectives

- Rationale and Context

- Research Team

- Research and Evaluation Plan

- Barriers

- Roadmap for Scaling

❖ **Budget** must include travel funds for team to attend annual grantees' meetings

Innovation Track: Full Proposals
Proposal Description-Additional Sections-I

Goals and Objectives: Clearly state what pedagogical framework, platform and/or environment will be piloted, together with goals for what this will achieve for the participants, as well as for the institution where appropriate.

Rationale and Context: Provide the rationale for the planned approach including prior supportive evidence or a motivating theory of change. Clearly articulate the underpinnings provided by relevant social science and/or education research.

Research and Evaluation Plan: GERMINATION Innovation projects must have a research plan that will enable the research team to effectively pilot *and* evaluate a novel pedagogical approach. A coherent evaluation plan is an essential component. Evaluation should include monitoring of the activities, to ensure the project stays on track, and also analysis of the outcomes of the project, using clearly reasoned metrics to understand the success of the piloted approach. Evaluation of outcomes should be designed to furnish data on whether the participants have increased ability, and interest, in germinating research questions and ideas that address important societal needs.

Innovation Track: Full Proposals
Proposal Description-Additional Sections-II

Research Team: Describe the constituent members of the research team, delineating what expertise each member brings to the project, and how their knowledge and skillsets will contribute to successful project outcomes.

Barriers: Proposers are encouraged to identify potential cultural, structural, organizational, and/or individual barriers that may impede success of their approach, and to describe how these barriers will be addressed.

Roadmap for Scaling: The intended goal of GERMINATION Innovation projects is to lead to development of novel approaches to enhance the ability of academic researchers to formulate potentially impactful research questions. Ideally, successful piloted approaches will be succeeded by broader deployment within the research community.

Proposals should therefore include a roadmap for how success in this pilot would be extended beyond the initial testbed to achieve regional or national impact.

Award Information: Expansion Track

Anticipated Number of Awards: 4-5

Award Type: Standard or Continuing

Award Duration: Up to 3 years

Award Amount: Up to $500,000

All proposals should include data supporting the efficacy of the proposed approach, as well as convincing plans to scale beyond the institution(s) at which the approach has previously been successfully piloted.

Expansion Track: An LOI Is Required
Due Date: August 27th, 2021

A Letter of Intent is REQUIRED – Submitted through FastLane

Two Page

1. **TITLE** – The title must begin with "GERMINATION Expansion"

2. **TEAM** - 1) The name and departmental affiliation of the Principal Investigator (PI). 2) The name(s) and departmental affiliation(s) of the Co-PI(s) and all senior personnel. 3) The names(s) of any other (non-lead) participating institutions or organizations, including all sub-awardees.

3. **PROJECT SYNOPSIS** - Brief summary of the project, including how it is expected to contribute to the goals of the GERMINATION program (maximum 700 words).

Additional Requirement (for LOI):
◦ A Minimum of 1 and Max. of 4 Other Senior Project Personnel (co-PIs)
◦ A Minimum of 0 and Max. of 5 Other Participating Organizations

LOIs are not merit reviewed and no feedback is provided to the submitters

If multiple LOIs for a single project are submitted, the last one submitted before the deadline will be used.

Expansion Track: Full Proposals
Due Date: October 29th, 2021

Follow NSF Proposal & Award Policies & Procedures Guide or Grants.gov Application Guide

Solicitation-Specific Requirements:

❖ The **title** must include the prefix "GERMINATION Expansion".

❖ **Project Description** – must include:

- Goals and Objectives

- Rationale and Context

- Research Team

- Scaling

- Evaluation Plan

- Dissemination Plan

❖ **Budget** must include travel funds for team to attend annual grantees' meetings

Expansion Track: Full Proposals
Proposal Description-Additional Sections-I

Goals and Objectives: Clearly state what pedagogical framework, platform and/or environment will be implemented, together with goals for what this will achieve for the participants, as well as for the institution where appropriate.

Rationale and Context: Provide the rationale for the planned approach including prior supportive evidence obtained in earlier studies which justifies development and expansion of the approach.*** In the absence of pilot data, a well-supported rationale for why the proposed approach is expected to yield successful outcomes is essential.

Research Team: The proposal should include a description of the constituent members of the research team, delineating what expertise each member brings to the project, and how their knowledge and skillsets will contribute to successful project outcomes. Previous experience with the proposed approach should be described.

*** Prior exploratory studies may have been conducted with NSF support, but prior NSF support is not a requirement for consideration for support under the Expansion Track of this solicitation.

Expansion Track: Full Proposals
Proposal Description-Additional Sections-II

Scaling: GERMINATION Expansion projects should provide a clear plan for their proposed study for scaling their approach beyond the original institutional testbed, including a consideration of how barriers identified in preliminary studies will be overcome during this larger scale implementation. Proposers should also identify, and discuss potential solutions to, novel challenges arising from deployment at scale.

Evaluation Plan: GERMINATION Expansion projects must have a coherent evaluation plan that will enable the research team to effectively evaluate their pedagogical approach. Evaluation should include monitoring of the activities, to ensure the project stays on track, and analysis of the outcomes of the project, using clearly reasoned metrics to understand the success of the scaled approach. Evaluation of outcomes should be designed to furnish data on whether the participants have increased ability, and interest, in germinating research questions and ideas that address important societal needs. Ideally metrics will have been established and validated during pilot studies.

Dissemination Plan: The proposal must provide a plan for disseminating the validated approaches from this study to other departments and institutions. Include discussion of challenges and strategies to adaptation in new settings.

Review & Award Process

GERMINATION Innovation: Required Concept Paper due **August 27th, 2021**

- Innovation proposals submitted without PO approval will be returned without review.

GERMINATION Expansion: Required Letter of Intent due **August 27th, 2021**

- Expansion proposals submitted without LOI will be returned without review.

Full Proposals are due on **October 29th, 2021**

Award are anticipated in **FY22**, subject to availability of funds

Review Criteria

NSB-approved Merit Review Criteria:

- ❖ Intellectual Merit
- ❖ Broader Impacts

Additional Solicitation-Specific Review Criteria:

- ❖ Potential for Success, Sustainability and Scaling
  - ▪ How achievable and significant is the proposed framework, platform or environment?
  - ▪ What are the prospects for sustaining this beyond the lifetime of the GERMINATION award?
  - ▪ For GERMINATION Innovation proposals, how likely are the proposed approach(es) to be scalable and adaptable beyond the institution(s) involved in this initial study?
  - ▪ For GERMINATION Expansion proposals, does the plan encompass a robust mechanism for scaling beyond a single institution?

NSF 21-594: GERMINATION: Germination of Research Questions for Addressing Critical Societal Challenges

Important Solicitation Dates

August 2nd, 2021   Informational Webinar

August 27th, 2021   Expansion Track: Letter of Intent Due (required)

         Innovation Track: Concept Paper Due (required)

October 29th, 2021   Full Proposal Deadline

Frequently Asked Questions:
Participation Limit: Individuals

Question:

Can an investigator be PI on one proposal and co-PI on another proposal?

Answer:

No.

Individuals may participate as either PI or co-PI in only one proposal submitted to this solicitation.

Frequently Asked Questions:
Participation Limit: Organizations

Question:

Is there a limit on the number of GERMINATION proposals that may be submitted by a single organization?

Answer:

An organization may submit only one GERMINATION proposal as lead organization, which can be either on the Innovation track or on the Expansion track.

A single organization may not submit one proposal on each track.

Frequently Asked Questions:
Participation Limit: Organizations

Question:

How many participating organizations are allowed on a GERMINATION proposal?

Answer:

There is no limit to the number of participating institutions allowed on a GERMINATION proposal.

(Limits are imposed in the Letter of Intent purely for administrative purposes so that key individuals and organizations can be identified early on)

Frequently Asked Questions:
LOI Format

Question:

Do you have any formatting requirements for the Letter of Intent (font, size, margins, etc)?

Answer:

Fastlane templates will walk you through submitting the Letter of Intent and automatically format the LOI.

Please prepare your text in a word-processing program on your computer and cut and paste the required information into Fastlane.

Frequently Asked Questions:
Participants

Question:

Can the proposal involve undergraduates as participants?

Answer:

No.

To be responsive to this solicitation, the proposal must involve STEM graduate students, postdoctoral researchers, and/or faculty as participants.

Frequently Asked Questions: Organization type

Question:

Are non-profit organizations eligible to apply?

Answer:

Proposals may be submitted by:

◦ Institutions of Higher Education: universities and two- and four-year colleges (including community colleges) accredited in, and having a campus located in the United States, acting on behalf of their faculty members.

◦ Non-profit, non-academic organizations: Independent museums, observatories, research labs, professional societies and similar organizations in the U.S. associated with educational or research activities.

Acronyms and Terminology

CBET	Division of Chemical, Bioengineering, Environmental & Transport Systems		**CMMI**	Civil, Mechanical & Manufacturing Innovation
Co-PI	Co-Principal Investigator		**ECCS**	Division of Electrical, Communications and Cyber Systems
EAGER	EArly-concept Grants for Exploratory Research		**EEC**	Division of Engineering Education and Centers
EFMA	Office of Emerging Frontiers and Multidisciplinary Activities		**ENG**	Directorate for Engineering
IIP	Division of Industrial Innovation and Partnerships		**LOI**	Letter of Intent
NSB	National Science Board		**NSF**	National Science Foundation
PAPPG	Proposal & Award Policies & Procedures Guide		**PI**	Principal Investigator
STEM	Science, Technology, Engineering, and Mathematics			

Housekeeping Notes
AFTER THE MEETING

After the meeting, a copy of the slides will be archived and made available. Visit the NSF/ENG website for information: http://www.nsf.gov/eng/

After the meeting, you may submit questions by:
- E-mail: LHOWE@nsf.gov