Addressing Systems Challenges through Engineering Teams (ASCENT) Webinar

Solicitation: NSF 25-503

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Outline

ECCS and Its Three Program Clusters

ASCENT Program and History

New in ASCENT 2025

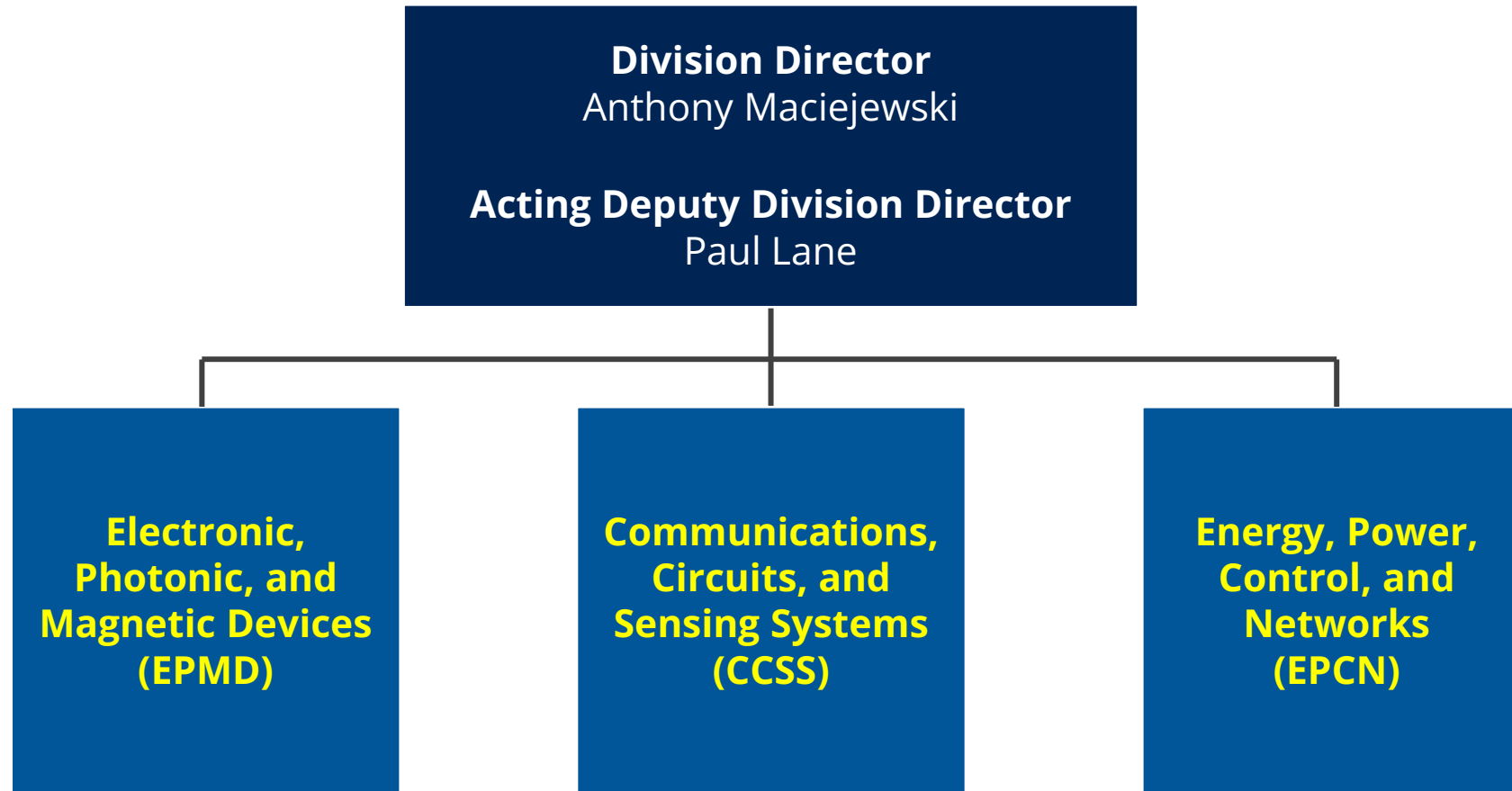**Highlights of Proposal Preparation Instructions**

Review and Selection Process

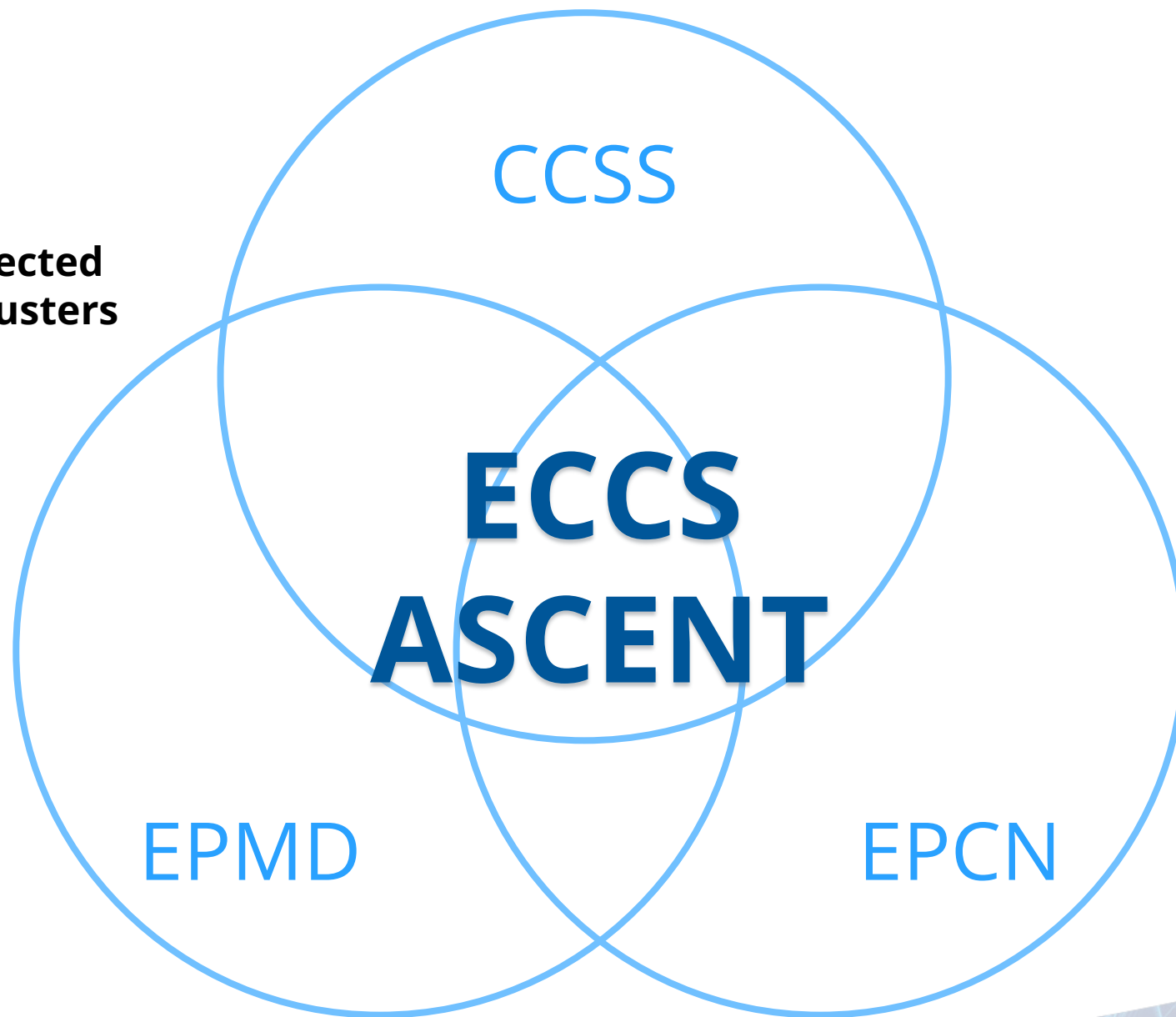**Special Award Conditions**

Q&A

ECCS Organization Structure

Division Director
Anthony Maciejewski

Acting Deputy Division Director
Paul Lane

Electronic, Photonic, and Magnetic Devices (EPMD)

Communications, Circuits, and Sensing Systems (CCSS)

Energy, Power, Control, and Networks (EPCN)

Devices to Systems

Three Interconnected Core Program Clusters

CCSS

ECCS ASCENT

EPMD

EPCN

ASCENT Program

- ASCENT supports **fundamental research** projects involving **at least three collaborating PIs and co-PIs**.

- **$1M to $1.5M** for a period of **four years**.

- ASCENT Proposals
  - must highlight the **engineering leadership focus** of the proposal **within the scope of ECCS programs**,
  - must articulate a **fundamental research** problem with compelling **intellectual challenge** and significant **societal impact**,
  - must involve research areas of **at least two** of the three ECCS clusters (CCSS, EPMD, EPCN). Research proposals spanning three clusters are highly encouraged,
  - must demonstrate the need for a concerted research effort by an **integrated and interdisciplinary team**, and strongly justify the **interdisciplinary nature** of the proposed work.

ASCENT History

- 2020: 5 projects, 2021: 5 projects, 2022: 6 projects, 2023: 7 projects. Total: 23 projects.
- 2020 and 2021: No special focus or theme.
- 2022 themes:
  - **Future Semiconductor Technology (FST)**
  - **Sustainable Micro- and Nano-Electronics (SMN)**
- 2023 themes:
  - **Integrated Electronic Systems enabled by WBG/UWBG Semiconductors for Climate Change Mitigation**
  - **Integrated Power Systems for Clean Energy**

New in ASCENT 2025

ASCENT 2025 New Focus

- **Wafer-Scale or Panel-Scale Heterogeneous Integration of Innovative Semiconductor Systems through Advanced Packaging**

- Novel ideas to advance wafer-scale or panel-scale heterogeneous integration technologies are also encouraged.

- Applications including, but not limited to, next-generation communications and sensing, high-performance computing, biotech and healthcare, power and energy, transportation, and aerospace.

- Please refer to the solicitation for examples of topics.

New Funding Partner: Intel

- **Intel Corporation** is a funding partner in ASCENT 2025.
- Additional PI eligibility guidelines, award terms and conditions (including intellectual property).
  - Apply to awards made in this funding cycle and not awards in previous funding cycles.
- Review process is not changed.
- For panel-scale (500mm x 500mm or larger) heterogeneous integration, see the Intel's panel-scale computing webpage for an exemplar system illustration.
  - https://www.intel.com/content/www/us/en/research/panel-scale.html

Increased Total Funding

- Anticipated Total Funding Amount: **$9M**
- $1M to $1.5M each project
- Estimated Number of Awards: 6 to 9

New Submission Requirements and Guidelines

Letter of Intent (LOI) or preliminary proposal not required

Full proposal submission deadline:
January 22, 2025

Both types of collaborative proposals are accepted (PAPPG Chapter II.E.3):

Submission of a collaborative proposal from one organization (a single proposal with subaward(s))

Submission of a collaborative proposal from multiple organizations (Lead and non-lead)

Note: Lead and non-lead awardees can both submit supplemental funding requests (e.g., REU, INTERN).

PAPPG: Proposal & Award Policies & Procedures Guide (NSF 24-1)

New Submission Requirements and Guidelines: Topic

The topic at the heart of the proposal must lie within the scopes of **at least two** of the three ECCS clusters (CCSS, EPMD, EPCN). Research proposals spanning three clusters are highly encouraged.

Previously in FY23 NSF 23-541: "at least one"

New Submission Requirements and Guidelines: Eligibility

Additional Eligibility Guidelines for Individuals Affiliated with Intel

Individuals affiliated with Intel may participate in proposals but are subject to certain limitations. **These limitations apply to individuals who are currently employed by, consulting for, or on an active personal agreement with Intel**. Specifically:

- Such individuals may not participate in proposals using their affiliations with Intel.

- Such individuals may participate if they (i) hold a primary appointment at an organization other than Intel (e.g., a primary academic appointment at an institution of higher education), and (ii) do so strictly in their capacity at that other organization.

Highlights of Proposal Preparation Instructions

Who May Submit Proposals?

Who May Serve as PI?

Proposals may only be submitted by

- Institutions of Higher Education (IHEs) - Two- and four-year IHEs (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members.

PIs or co-PIs

- must hold primary, full-time, paid appointments in research or teaching positions at US-based campuses/offices of IHEs eligible to submit to this solicitation, with exceptions granted for family or medical leave, as determined by the submitting institution.

Personnel and Title of Proposal

- Senior/Key Personnel
  - NSF policy allows proposers to identify a PI and a maximum of four co-PIs on a proposal.
  - **A minimum of three PIs/co-PIs must be identified for ASCENT proposals**. Additional investigators should be listed on the project summary page and entered as Other Senior/Key Personnel.

- Title of Proposed Project
  - Must begin with "**ASCENT:**".
  - Must state clearly and succinctly the major theme(s) of the project.
  - GOALI proposals must begin with "**GOALI: ASCENT:**".

- **Limit** on Number of Proposals per PI or co-PI: **1**
  - No individual may be a PI, Co-PI, or Senior/Key Personnel on more than one ASCENT proposal in the current review cycle.
  - If more than ONE proposal, all submittals after the first proposal (based on time-stamp) will be returned without review.

Project Summary

- Intellectual Merit
  - Include the **scope of the research** and **the interdisciplinary and transformative nature** of the proposed research.
- Broader Impacts
  - Include the potential long-term impact on **national needs or a grand challenge**.

Project Description

- Must contain, as **a separate section** of less than a page, a section labeled "**Addressing ASCENT Solicitation-Specific Review Criteria**".

- This section should provide a description of how the ASCENT solicitation-specific review criteria are addressed in the proposal and include references to other relevant sections in the proposal for additional details.

- **Proposals not meeting this requirement will be returned without review.**

Research Integration Plan

- Must be submitted as a **Supplementary Document** and may not exceed **two pages**.

- **Proposals that fail to submit a Research Integration Plan will be returned without review.**

- Provide a list of the PI, co-PIs, and Senior/Key Personnel, with a description of the expertise ….

- Identify the key disciplines involved to achieve the objectives of the proposed research, ….

- Outline the management approach to the integration of these disciplines, ….

Refer to the solicitation for details.

Letters of Collaboration

- Follow the format specified in the PAPPG Chapter II.D.2.

- Must NOT include letters of collaboration from Intel.

- Any proposal that deviates from these guidelines will be returned without review.

Single Copy Documents

- **Proprietary or privileged information** must be provided in the proposal as a Single-Copy Document.
- That is, this information shall not appear in other parts of the proposal.
- **Single Copy Documents will not be shared with reviewers or Industry Funding Partners.**
- Because proprietary or privileged information may only be specified in the Single Copy Document, PIs should not check the "Proprietary or Privileged Information" box on the Cover Sheet; that box applies only to such content appearing in the body of a proposal.

Budget

- Project period should be **four years**.

- Total budget should be no more than **$1.5M** and no less than **$1M**.

- Proposed budgets must include funds for travel by at least one PI or co-PI and at least one graduate student or researcher to attend a **biennial grantees' meeting** in the Washington, DC area and another in the San Jose, California area, held within the first two years of the award and two years thereafter.

- Additionally, a virtual program kickoff meeting and virtual annual grantees' meetings may be held in alternate years to the planned biennial grantees' meetings (no impact on budget).

Review and Selection Process

NSF Merit Review Principles and Criteria

- Two merit review criteria: **Intellectual Merit** and **Broader Impacts**

- Additional Solicitation Specific Review Criteria:
  - **Project Scope**: The extent to which the project scope presents a compelling large-scale convergent engineering research problem that critically integrates research areas of more than one ECCS cluster.
  - **Commitment of Investigators**: The degree to which the Research Integration Plan and Project Description demonstrates the commitment of the participating investigators to work synergistically to accomplish the project objectives including engaging and training students in collaborative and convergent research.
  - **Composition of Team**: The degree to which the Research Integration Plan demonstrates that the participating investigators have the necessary expertise covering related research fields sufficient to accomplish the project objectives.
  - **Justification for support**: The extent to which the project scope justifies the requested budget and is unsuitable for smaller teams or shorter duration.

Partner Pre-award Engagement

- Intel personnel will not participate in nor observe the merit review of proposals.

- After the completion of the merit review process, NSF may share with Intel representatives a subset of proposals which are under consideration for funding by NSF, along with corresponding unattributed reviews and panel summaries.

- Proprietary or privileged information provided by the PI in the separate "Single Copy Documents" section of the proposal will not be shared with reviewers or Intel representatives.

- NSF will take into consideration the input of Intel prior to making final funding decisions but will retain final authority for making all award decisions.

Special Award Conditions

Travel

Acknowledgement of Support

- Travel
  - Award budget must include funds for travel to two biennial grantees' meetings.
- Acknowledgement of Support
  - Recipients will be required to include appropriate acknowledgment of NSF and Industry Funding Partners support in reports and/or publications on work performed under an award.
  - Example: *"This material is based upon work supported by the National Science Foundation under grant no. (NSF grant number) and is supported in part by funds from Intel as specified in the Addressing Systems Challenges through Engineering Teams (ASCENT) program."*

Industry Funding Partner Engagement with Program Recipients

Once the Program awards have been issued, Intel may engage with the recipients in the following way:

- Attend biennial **grantees' meetings**. One of the grantees' meetings may be held at an Intel site.

- Arrange to host and/or attend a program **kickoff meeting** and annual grantees' meetings thereafter which may be held virtually in years when biennial face-to-face grantees' meetings are not held.

- Provide **software** (prototypes or products), **hardware** (prototypes or products), semiconductor design collateral, data sets, other computing infrastructure, and/or other such support to all awardees, although awardees will not be required to use these offered contributions.

- Provide **resources** (e.g., **fabrication** and/or **packaging of research prototypes**, **access to test and/or instrumentation facilities**) and opportunities (e.g., **seminars**, **internships**) to all awardees, although awardees will not be required to use these offered contributions.

- NSF requires award recipients to submit annual project reports and, at the completion of the award, a final annual project report. **NSF will share these reports with Intel** after they have been reviewed and accepted by the cognizant NSF Program Officer. Intel may opt to decline to receive these reports. Further, Intel agrees not to disclose any non-public information to any institution of higher education or organization outside of the company.

- **Intel may also arrange to fund its own personnel as researchers to directly participate, part-time or full-time, with awardee project personnel**. These arrangements will be optional and upon the mutual consent of Intel and respective awardee institutions. No award recipient will be required to accept an Intel researcher.

Intellectual Property

- (2025 ASCENT Award) Recipients shall grant to Intel, a non-exclusive, worldwide, paid-up, non-transferable, irrevocable royalty-free license to all intellectual property rights in any inventions conceived or first reduced to practice in the performance of the Program work under the funding agreement.

- The license to Intel will include its subsidiaries and contractors, at its discretion, to the extent that such use is specifically in connection with Intel's products and/or services.

- Recipients shall grant the license to Intel unless Intel opts to decline the license. Such license shall not extend to recipients' background intellectual property; however, individual recipients and Intel may negotiate, voluntarily, in good faith, a mutually acceptable resolution to background intellectual property, if desired, …

- Refer to the solicitation for details.

Intellectual Property
(continued)

- Recipients shall agree to distribute all final source code that has been authored while working on an ASCENT program award under a Berkeley Software Distribution (BSD), Apache, or other equivalent open-source license.

- Refer to the solicitation for details.

Contacts

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Questions?

FAQ 1

Question

- Is a PI or co-PI on a current or past ASCENT award eligible to participate in a new ASCENT proposal in this cycle?

Answer

- Yes, current and past ASCENT award PIs/co-PIs/Senior Personnel can submit proposals to this new solicitation, as long as the eligibility requirements listed in the solicitation are met.

FAQ 2

Question

- Does a proposal submitted to ASCENT 2025 must address the new focus (Wafer-Scale or Panel-Scale Heterogeneous Integration of Innovative Semiconductor Systems through Advanced Packaging)?

Answer

- Yes, proposals submitted to ASCENT 2025 should align with the new focus. Novel ideas to advance wafer-scale or panel-scale heterogeneous integration technologies are also encouraged.

- In addition, the topic at the heart of the proposal must lie within the scopes of at least two of the three ECCS clusters (CCSS, EPMD, EPCN).

FAQ 3

Question

- The IP licensing clauses in this solicitation is different from previous years' ASCENT solicitations. Our university might not accept it. Is there any way around this?

Answer

- The solicitation this year is different.
- The award conditions were adjusted because of the partnership with Intel and will apply to all new ASCENT awards in this competition.
- 35 U.S.C. Chapter 18 PATENT RIGHTS IN INVENTIONS MADE WITH FEDERAL ASSISTANCE provides a similar license to the U.S. Government for patents on inventions made under federal funding as well as other rights.

FAQ 4

Question

- Is it possible that Intel will provide access for fabrication?

Answer

- Intel's engagement with award recipients include providing "resources (e.g., fabrication and/or packaging of research prototypes, access to test and/or instrumentation facilities) and opportunities (e.g., seminars, internships) to all awardees, although awardees will not be required to use these offered contributions.".

FAQ 5

Question

- Can an Intel employee participate as a non-paid collaborator or provide a Letter of Collaboration?

Answer

- No. Please refer to the "Additional Eligibility Info" and the "Letters of Collaboration" sections in the solicitation.