NSF 23-541 ASCENT Webinar Division of Electrical, Communications and Cyber Systems (ECCS)

Starting at 3:00 pm EST Jan. 26, 2023

ECCS, ENGINEERING, NSF

Please use the **Q&A** icon in Zoom to submit questions. After the webinar, email questions to <u>ascent@nsf.gov</u> Webinar Materials and updated FAQ will be <u>available online</u>

Electrical, Communications and Cyber Systems (ECCS)



Division of Electrical, Communications and Cyber Systems (ECCS)

Mission and Priorities

- Address fundamental research issues at the nano, micro, and macro scales underlying device and component technologies for energy and power, controls, networks, communications, computation and sensing applications.
- Support research on systems and networks for advanced engineering applications.
- Support education of a diverse workforce in electrical and computer engineering to meet the technological challenges of a 21st century global economy.



Each ECCS Core Program Supports a Range of Research Areas

More details at <u>https://www.nsf.gov/funding/programs.jsp?org=ECCS</u> or consult an ECCS Program Officer

Electronics, Photonics and Magnetic Devices



- Electronic Devices
- Photonic Devices
- Magnetic Devices
- Cross-Cutting Activities

Communications, Circuits, and Sensing Systems



• RF Circuits and

- Antennas for
- Communications and Sensing
- Communication Systems and Signal Processing
- Dynamic Bio-Sensing Systems

Energy, Power and Control Networks



NOVA

 Power Elect., Motors and Storage

- Power Systems
 & Controls
- Cyber Physical Systems
- Machine learning & Robotics

ASCENT Program

One of the **principal strategic investments** of ECCS

"The intent of the ASCENT program is to stimulate collaborations among different ECCS sub-communities and to enable synergistic effort addressing **large-scale cross-disciplinary** problems whose solutions are beyond the scope of individual or divided efforts."

- Emphasizes on new collaboration modalities among various subdisciplines of ECCS-supported research
- Is envisioned to bring significant impact on a variety of application domains

ASCENT Active Awards Geographic Distribution FY20 (5), FY21 (5), FY22 (6)



State/Territory	Awards*	Award Amount
Arizona	1	\$1,500,000
California	4	\$3,926,611
Illinois	1	\$1,300,000
Massachusetts	4	\$3,466,000
Minnesota	1	\$1,500,000
North Carolina	1	\$1,499,908
New York	2	\$2,999,921
Pennsylvania	1	\$849,996
Texas	1	\$1,500,000
Virginia	3	\$4,298,658

* Awards & Subawards

PBS CEL

, INSF

ASCENT 2023 – Reduce Greenhouse Emissions

Total U.S. Greenhouse Gas Emissions by Economic Sector in 2020



- National Priority Tackling the Climate Crisis & Building a Clean Energy Economy
- Goal: reduce the greenhouse gas emissions responsible for climate change.
 - Enhance the generation and adoption of clean/green/renewable energy
 - Efficient distribution of energy

PBS CLEEL

- Efficient use of energy
- Manufacturing innovation in the energy sector

https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions

ASCENT 2023 – Reduce Greenhouse Emissions

Generation

• Coal

- Oil
- Natural Gas
- Hydro
- Wind
- Solar
- Energy-harvesting
- Combustible renewables
- etc.

Distribution

Transmission

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- Grid-Tied Systems
- Wired/Wireless Systems
- Energy Storage Systems
- Security/Reliability
- Cyber Physical Systems
- etc.

Data Centers

- Automotives
- Communication Systems

End Use

- Radar Systems
- Microgrids & Smart Grids
- Sensors/smart devices
- Computers
- etc.

PBS CLEEL

ECCS: ASCENT 2023

Addressing Systems Challenges through Engineering Teams (ASCENT)

FY2023

Solicitation page:

NSF 23-541: Addressing Systems Challenges through Engineering Teams

https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf23541

Letter of Intent Deadline: Feb. 01, 2023 (Required) Full Proposal Deadline: April 19, 2023



ASCENT 2023 – Energy Efficient Systems



• 3 or more collaborators

Transmission &

Distribution

- Grid-Tied Systems
- Wired/Wireless Systems
- Energy Storage Systems
- Security/Reliability
- Cyber Physical Systems
- etc.

End Use

- Data Centers
- Automotives
- Communication Systems
- Radar Systems
- Microgrids & Smart Grids
- Sensors/smart devices
- Computers
- etc.

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ECCS: ASCENT 2023

ASCENT 2023 - Two Themes

Theme 1: Integrated Electronic Systems enabled by WBG/UWBG Semiconductors for Climate Change Mitigation

Theme 2: Integrated Power Systems for Clean Energy.

• In your proposal, specify the Research Theme selected in the overview section using the first line



Theme 1: Integrated Electronic Systems enabled by WBG/UWBG Semiconductors for Climate Change Mitigation.

- The electrical and thermal properties of WBG/UWBG semiconductors enable the design of circuits and systems with performance well beyond what can be obtained using their narrow-bandgap counterparts (e.g., Si).
- This theme seeks proposals on novel approaches for heterogeneous integration of systems involving WBG/UWBG devices for enhanced functionality and efficiency compared to the state-of-the-art.

Examples of topics include, but are not limited to:

- RF communication, radar, and imaging systems;
- Ultra-high-capacity optical communication systems.
- Sensor systems for extreme environments of temperature, pressure, and radiation; and

* Proposals should clearly articulate the advantages in relation to climate change mitigation.





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Theme 2: Integrated Power Systems for Clean Energy.

- Fundamental research on modeling, control, sensing and cyber-security of an autonomous electric power grid, with its seamless and massive integration with power electronics, renewables, storage, and charging stations for electric vehicles.
- Cross-cutting research on power electronics, rare-earth-free electric motors, controls and optimization, wireless power transfer, communications, networking, etc.,
- The outcomes of the research should include energy-efficient integrated power systems for clean energy.

Examples of topics include, but are not limited to:

- Power systems integrated with grid-connected converter architectures;
- Power electronics-enabled energy storage systems for the grid and electric vehicles;
- Next-generation wireless power transfer (WPT) and on-board fast charging systems; and
- Integrated power modules for clean energy systems.

* Proposals should clearly articulate the advantages in relation to clean energy.



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PBS (TEEL)

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• 3 or more collaborators

ASCENT: Proposal/Award Characteristics

- **Collaborative:** At least three collaborating PIs and co-PIs contributing complementary expertise relevant to the proposed project .
- Duration: 4 years
- **Total budget:** \$1 million to \$1.5 million
- Estimated Number of Awards: 4 to 5
- Anticipated Funding Amount: \$6 million
- Limit on Number of Proposals per PI/CoPI/SrP: 1
 - The first proposal received will be accepted and the remainder will be returned without review.

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- Limit on Number of Proposals per organization: None
- Additionally, proposals submitted in response to this solicitation may not duplicate or be substantially similar to other proposals concurrently under consideration by other agencies (similar proposals will be returned without review).

Proposals may leverage other activities/resources and broaden opportunities for participations

Collaboration:

- Industrial collaborations*
- International collaborations
- National Laboratories Collaborations

Participation:

Institutions of EPSCoR States Minority-Serving Institutions, HBCUs, HSI These organizations are all qualified to participate but whether they can receive funding, see the ASCENT solicitation and Proposal and Award Policies and Procedures Guide

* Industrial Collaborations - Grant Opportunities for Academic Liaison with Industry (GOALI) mechanism can be used in conjunction with this solicitation.



Timelines for ASCENT 2023

Letter of Intent – Required

- Due February 1, 2023, Submit through Research.gov
 - <u>Do not</u> submit through FastLane

Full Proposals – 15 pages Project Description

- **Due April 19, 2023**, Submit through Grants.gov, or Research.gov
- Project description (15 pages) must contain a section labeled "Addressing ASCENT Solicitation Specific Review Criteria" Requires a Research Integration Plan – 2 pages supplementary document

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Merit Review Criteria (see solicitation for details)

Intellectual Merit: The Intellectual Merit criterion encompasses the potential to advance knowledge; and

Broader Impacts: The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.

The following elements should be considered in the review for both criteria:

1. What is the potential for the proposed activity to

- a. Advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and
- b. Benefit society or advance desired societal outcomes (Broader Impacts)?
- 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?



ASCENT Specific Review Criteria (see solicitation for details)

ASCENT Specific Review Criteria:

- Project Scope: compelling large-scale convergent engineering research that critically integrates more than one ECCS research area
- Commitment of the Investigators: work synergistically to accomplish the project objectives including engaging and training students in collaborative and convergent research
- Composition of the Team: Investigators have the necessary expertise in related research fields to accomplish the project objectives.

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Justification for Support: Project scope commensurate with requested budget, size of the team, and project duration.

Letter of Intent (LOI) – Due Feb. 01, 2023

- Submission of a Letter of Intent (LOI) is mandatory.
- LOIs must be submitted via Research.gov (do not use FastLane).
- The LOI allows the NSF to examine the proposals with respect to the eligibility requirements and to categorize proposals in order to prepare for the proposal review process.
- Letters of Intent are not reviewed for merits and no feedback is provided to the submitters.
- Enter the requested core LOI information as prompted by Research.gov. In the "Synopsis" field briefly describe the intellectual merit, broader impacts, and objectives of proposed research. In the "Other Comments" field outline a clear need for a larger project budget to complete the proposed work.
- LOIs are restricted to the number of data fields and the number of characters that can be entered in Research.gov.
- Submission of multiple Letters of Intent by the same PI/Co-PI is not permitted.



NATIONAL SCIENCE FOUNDATION

PROPOSAL AND AWARD POLICIES AND PROCEDURES GUIDE



Resources and Program Officers are Available to Help

- Be sure to fully read the solicitation 23-541
- Be sure to fully read the PAPPG
 - PAPPG Part 1-Chapter 2 Proposal preparation guide

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- PAPPG Exhibit II-1:
- Proposal Checklist
- Email: ascent@nsf.gov



For More Information

Funding page with links to solicitation and events: <u>https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505853</u>

Contact Program officers listed in the solicitation by email: <u>ascent@nsf.gov</u>









Jenshan Lin Program Director jenlin@nsf.gov

PBS CELL



Usha Varshney Program Director uvarsha@nsf.gov

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Reach out to more ECCS Program Officers: <u>https://www.nsf.gov/staff/staff_list.jsp?org=ECCS&from_org=ECCS</u>

Q&A

- Please use the **Q&A** panel in Zoom to submit questions.
- After the webinar, email your questions to <u>ascent@nsf.gov</u>

 Check Webinar Materials and updated ASCENT FAQ online <u>https://beta.nsf.gov/funding/opportunities/addressing-systems-challenges-</u> <u>through-engineering-teams-ascent-0</u>

THANK YOU

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