CHIPS Research and Development Office

CHIPS Manufacturing USA Program

Overview

On May 6, 2024, the Biden-Harris Administration issued a Notice of Funding Opportunity (NOFO) seeking proposals from eligible applicants for activities to establish and operate a CHIPS Manufacturing USA institute focused on digital twins for the semiconductor industry. Digital twins are virtual models that mimic the structure, context, and behavior of a physical counterpart. The CHIPS for America Program anticipates up to approximately $285 million for a first-of-its kind institute focused on the development, validation, and use of digital twins for semiconductor manufacturing, advanced packaging, assembly, and test processes.

President Biden signed the bipartisan CHIPS and Science Act into law on August 9, 2022. The Department of Commerce (the "Department") is overseeing $50 billion to revitalize the U.S. semiconductor industry and strengthen the country's economic and national security. CHIPS for America's Research and Development (R&D) program office within the Department is responsible for administering $11 billion to advance U.S. leadership in semiconductor R&D.

The CHIPS R&D Office's third funding opportunity seeks activities that are expected to include, but not necessarily be limited to operational activities to run the institute; basic and applied research related to semiconductor digital twin development; establishing and supporting shared physical and digital facilities; industry-relevant demonstration projects; and digital twin-related workforce training.

CHIPS Manufacturing USA Institute Funding Opportunity

Program Priorities

Semiconductors are arguably the smallest, most complex products ever made in one of the world's most sophisticated manufacturing environments. Although U.S. innovation created the sector, domestic manufacturing currently accounts for about 12% of global production, compared to 37% approximately thirty years ago. To improve its manufacturing competitiveness, the United States must address key challenges, such as the time and cost of chip development and manufacturing processes, as well as talent shortages.

Unlike traditional, physical research models, digital twins can exist in the cloud, which enables collaborative design and process development by engineers and researchers across the country, creating new opportunities for participation, speeding innovation, and reducing costs of research and development. Digital twin-based research can also leverage emerging technology like artificial intelligence to help accelerate the design of new U.S. chip development and manufacturing concepts and significantly reduce costs by improving capacity planning, production optimization, facility upgrades, and real-time process adjustments.

By convening the manufacturing ecosystem to solve shared technology challenges, a new Manufacturing USA institute aims to unlock the full potential of digital twins for the semiconductor industry and benefit manufacturers of all sizes.

To facilitate the creation of the CHIPS Manufacturing USA institute, this NOFO seeks proposals from eligible applicants for activities to establish and operate the institute, consistent with the mission and vision, to achieve the following specific objectives:

- Convene stakeholders across the semiconductor manufacturing, advanced packaging, assembly, and test industry to address shared challenges relevant to digital twins, in a collaborative environment.
- Improve the state of the art in manufacturing-relevant digital twins, for both unit-level digital twins and the combination of multiple digital twins.
- Significantly reduce U.S. chip development and manufacturing costs by improving capacity planning, production optimization, facility upgrades, and real-time process adjustments using digital twins.
- Improve development cycle times of semiconductor manufacturing, advanced packaging, assembly, and test and accelerate the development and adoption of relevant innovative technologies, including breakthrough tools, materials, and manufacturing processes.
- Advance digital twin-enabled curricula, best practices, and hands-on opportunities for training the next generation of the domestic semiconductor workforce.
- Create a digital twin marketplace for industry to access digital models and manufacturing process flows and to de-risk digital twin development and implementation.

Process + Application

There are two main components to this application:

- **Mandatory Concept Paper:** Applicants will be asked to submit a concept paper. Concept papers are due on **June 20, 2024.**
    - Concept papers will only be accepted through Grants.gov.
    - Eligible applicants may only submit one Concept Paper for the institute award under this NOFO.
    - The deadline for receipt of a concept papers at Grants.gov is **11:59 p.m. Eastern Time, June 20, 2024.**
    - Concept papers received after this deadline will not be reviewed or considered.
    - Please note that an active SAM.gov registration is required to submit application materials through Grants.gov.
- **Full Application Process:** Full proposals are due **September 9, 2024.**
    - Full applications will be accepted only from those applicants invited after concept paper evaluation.

Can Applicants form teams and submit applications?

- CHIPS R&D encourages collaborative proposals under this NOFO.
- Though not required, CHIPS R&D expects that effective institutes will likely include expert representatives from for-profit and non-profit organizations (including industry-led consortia), research universities, community colleges, career and technical education schools, Federal laboratories, and State, local, and Tribal governments.

Eligibility

Who is eligible for this NOFO?

- Eligible applicants (i.e., lead applicant) may only submit one Concept Paper for the institute award under this NOFO.
- Eligible entities (e.g, team members such as subrecipients, contractors, and/or unfunded collaborators) may participate on multiple concept papers and applications as a subrecipient. See Section 3.1 for more information.
- Applicants and recipients are required to have an active registration in SAM.gov and are encouraged to begin the process of registering as early as possible.

What types of projects would typically be funded under this NOFO?

- Applicants to this NOFO must propose to establish a CHIPS Manufacturing USA institute with integrated physical assets and computational capabilities (digital assets) to tackle important semiconductor-industry manufacturing challenges.
- The institute will manage a portfolio of Institute-led projects and competitively funded Member-led projects, including Education and Workforce Development activities. Projects also may include basic and applied research and technology demonstrations.