NSF Future Manufacturing Webinar (NSF 22-568)
February 25, 2022

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Solicitation page: https://beta.nsf.gov/funding/opportunities/future-manufacturing-fm

Proposals due May 10, 2022
NSF Future Manufacturing Webinar

Use the Q&A panel in Zoom to send questions—we’ll answer some at the end

After the webinar, send questions to FutureManufacturing@nsf.gov

Live transcript is available through Zoom

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Why Future Manufacturing?

- Worldwide competition in manufacturing has emphasized:
  - Maturation
  - Commoditization
  - Automation
Why Future Manufacturing?

- *Next* generation of manufacturing will be dictated by:
  - Automated methods for ensuring reliable translation of designs to products
  - Process controls derived from massive data streams
  - Inventions of new:
    - Materials
    - Chemicals
    - Devices
    - Systems
    - Processes
    - Machines
    - Design and work methods
  - New social structures and business practices
Future Manufacturing will involve new:

- materials, chemicals, devices and systems
- chemical and biological processes
- semiconductor manufacturing techniques
- supply chains
- scaling
- integration of processes
- process design and control
- sensing
- data mining and predictive analytics
- modalities of work & human factors

Results will help:

- minimize environmental impact
- manage waste
- optimize the use of resources
- speed the product evolution cycle
Future Manufacturing awards support:

• Fundamental **research and**
• **Education** of a future workforce to
• Enable **new** manufacturing approaches which
• Eliminate scientific technological, educational, economic, and social **barriers** that limit current manufacturing

• When translated to practice, results should lead to
  • Formation of new industries and organization structures
  • New manufacturing capabilities among a broad range of producers
  • Enhanced U.S. competitiveness in development and production
  • Economic growth
  • Education of students and other workforce participants with the skills required for leadership in Future Manufacturing
Future Manufacturing distinctions from other programs

• **New**, potentially transformative, capabilities:
  • Significant change from current practice
  • Not improvements or incremental changes to existing processes
  • Complementary to Advanced Manufacturing

• Very low Technical Readiness Level [https://www.nasa.gov/pdf/458490main_TRL_Definitions.pdf](https://www.nasa.gov/pdf/458490main_TRL_Definitions.pdf)

• **Larger-scale** programs
  • intellectual merit and broader impacts commensurate with the size of the award

• **Multidisciplinary** teams and a **convergence** research approach
NSF participants in this solicitation

- Directorate for Engineering
- Directorate for Mathematical and Physical Sciences
- Directorate for Biological Sciences
- Directorate for Education and Human Resources
- Directorate for Computer and Information Science and Engineering
- Directorate for Social, Behavioral and Economic Sciences
- Office of International Science and Engineering
- Office of Integrative Activities
Research must be in ≥1 of these 3 thrust areas

- Cyber Manufacturing
  - Intersection of computing, networking, sensing, AI & manufacturing
- Eco Manufacturing
  - Sustainable manufacturing processes/lifecycles
- Biomanufacturing
  - Biologically-based production and bio-based technologies
Award tracks

- **Research Grant (FMRG):** Fundamental, multidisciplinary, and integrative research and education
  - 4 years, $750k/yr
  - Larger teams doing convergence research

- **Seed Grant (FMSG):** Teambuilding, concept development, and research initiation
  - 2 years, $250k/yr
  - Possibly leading to future FMRG proposals

- Title must contain track and primary thrust names, e.g., FMSG: Bio:
- A person may be PI/co-PI/Sr Personnel on only one proposal per track
  - Check that your co-PIs/subawardees aren’t participating in another proposal
We encourage you to make the most of other institutions, activities, and resources

- Partnering with:
  - Minority-Serving Institutions
  - Primarily Undergraduate Institutions
  - Community Colleges/2-yr institutions
- Industrial collaborations
- International collaborations
- Manufacturing USA Institutes
- NSF Engineering Research Centers
- EPSCoR-supported advanced manufacturing collaborations
- DUE's Advanced Technological Education and Improving Undergraduate STEM Education programs
- Non-Academic Research Internships for Graduate Students
- Research Experiences for Undergraduates or Teachers
- Engineering education programs such as PFE, RFE, REIF, RED
Timeline

• Proposals due by May 10, 2022, 5pm local time:
  • For multiple institutions: one proposal with sub-awards, no collaborative proposals permitted
  • Must submit through Research.gov or Grants.gov, not FastLane
• Aim to make awards by end of September
Required Project Description sections
(See solicitation for details about each section. 15 page limit for either track.)

• Research description
  • Rationale, approach, plans
  • Remember to include results from prior NSF support for all PIs

• Enabling future manufacturing
  • Significant changes from practice, industrial/social/economic/education impacts
  • Put in a global context (publications, centers of excellence, translation to practice, etc.)

• Scope and scale (FMRG only)
  • Justify the resources requested

• Project management and collaboration plan (FMRG only)
  • Describe roles, institutions, contributions, coordination

• Education and workforce development activities
  • Basis for training future workforce, integration of research & education
  • FMRG: 3-page supplement; FMSG: in Project Description
Merit Review Criteria (see solicitation for details)

- Intellectual Merit
- Broader Impacts

**FM-specific criteria for all proposals:**
- Eliminates barriers that limit manufacturing today and catalyzes new manufacturing capabilities

**FM-specific criteria for FMRG proposals only:**
- Educational activities will equip people with the skills for Future Manufacturing and broaden participation
- Anticipates effects of Future Manufacturing on the economy, labor force, industry and/or society at large, including in a global context
- Multidisciplinary team composition appropriate, and activities integrated well

- FMRG reviewers may include educational & social science experts to complement the technical experts
Conditions of award (see solicitation for details)

• Mandatory kickoff meeting for all PIs & co-PIs
• Annual awardee meeting thereafter, at least 1 PI per award must attend
• Be sure to include cost of attendance in your budget
When preparing a proposal, ask yourself:

• Is it Future?
  • Eliminates barriers that limit manufacturing today: not incremental, not “now”
  • Catalyzes new manufacturing capabilities

• Is it Manufacturing?
  • Focus on manufacturing processes or systems
  • Not just new materials

• Does it involve fundamental research?
  • Not development or optimization
  • Produces knowledge and understanding that’s generalizable

• Does it fit one or more of the three thrusts?
  • Cyber, Eco, Bio
For more information:

• Funding opportunity page with links to solicitation and announcements: https://beta.nsf.gov/funding/opportunities/future-manufacturing-fm

• The FAQ list from last year is still relevant: https://www.nsf.gov/pubs/2021/nsf21061/nsf21061.jsp

• Email: FutureManufacturing@nsf.gov

• Contact program officers listed in the solicitation

• A recording and transcript of the webinar, along with the slides, will be accessible from the event page shortly after conclusion of the webinar
Q&A

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