NSF Future Manufacturing Webinar (NSF 22-568)

February 25, 2022

Bill Olbricht ENG/CBET

Andy Wells ENG/CMMI

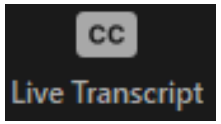
Solicitation page: https://beta.nsf.gov/funding/opportunities/future-manufacturing-fm

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

STRATEGY FOR AMERICAN LEADERSHIP IN ADVANCED MANUFACTURING

A Report by the

SUBCOMMITTEE ON ADVANCED MANUFACTURING

COMMITTEE ON TECHNOLOGY

of the

NATIONAL SCIENCE & TECHNOLOGY COUNCIL

October 2018

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

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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
- **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

Funding opportunity page:

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