NSF Future Manufacturing Webinar (NSF 21-564)

February 26, 2021

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Solicitation page: https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505737

Proposals due May 14, 2021

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

If you require captions, please open this URL in a separate browser page:
https://www.captionedtext.com/client/event.aspx?EventID=4701514&CustomerID=321

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Why Future Manufacturing?

- Worldwide competition in manufacturing has emphasized maturation, commoditization, and automation
- *Next* generation of manufacturing will require new materials, devices, systems, processes, machines, design methods, social structures, and business practices

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

Future Manufacturing awards support:

- Fundamental research *and*
- Education of a future workforce
- To overcome scientific, technological, educational, economic and social barriers
- To enable **new manufacturing capabilities that do not exist today**

- 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

Future Manufacturing FY20 awards

- Total 24 awards, Total value over $40M
  - 7 research grants, 13 seed grants, 4 networks
  - 44 unique institutions in 18 states and DC
- A selection of award topics by thrust area:
- Cyber:
  - AI-driven manufacturing of quantum material architectures
  - Robot-assisted modular construction
  - Bioinspired swarm manufacturing
- Eco:
  - Biomaterials for printed electronics & sensors
  - Sustainable cement production through electrochemical process
  - Upcycling waste nitrates into useful chemicals
- Bio:
  - DNA-based origami for bottom-up electronics manufacture
  - Generate functional materials in cells to regrow nerves or other tissue
  - Mass production of extracellular vesicles for therapeutic delivery
- Networks:
  - Data analytics, AI and modeling tools for biomanufacturing
  - Rapid scaling of production for crisis response

More information on FY20 awards:
https://www.nsf.gov/news/special_reports/announcements/100220.jsp

Research must be in ≥1 of these 3 thrust areas
(examples not intended to be limiting or indications of preferred areas)

- Cyber Manufacturing
  - Manufacturing as a service (customization, access/democratization, security)
  - Autonomy (control, modeling, sensors, algorithms, analytics)

- Eco Manufacturing
  - Material lifecycle (reprocessing, recycling, circular economy)
  - Bio-inspiration (bio mechanisms, efficiency)

- Biomanufacturing
  - Proteins (cell-free, customizable, deterministic)
  - Integrated processes (robust, connected, scalable)

Award tracks

- **Research Grant** (FMRG): Fundamental, multidisciplinary, and integrative research and education
  - 4 years, $750k/yr (change from last year)
  - 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 thrust names, e.g., FMSG: Bio:
- A person may be PI/co-PI/Sr Personnel on only one proposal per track
- No FM Network track this year

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 14, 2021, 5pm local time:
  - For multiple institutions: one proposal with sub-awards, no collaborative proposals permitted
  - No Letters of Intent required this year
- 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
- Scope and scale (FMRG only)
  - Justify the resources requested
- Enabling future manufacturing
  - Significant changes from practice, social/economic/education impacts
  - Put in a global context (publications, centers of excellence, translation to practice, etc.)
- Project management and collaboration plan
  - Describe roles, institutions, contributions, coordination
- Education and workforce development plan
  - 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
- Solicitation-specific criteria:
  - Eliminates barriers that limit manufacturing today and enables new manufacturing capabilities
  - 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
- 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

For more information:

- Funding opportunity page with links to solicitation and announcements: https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505737
- 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

Submit questions using the Q&A icon in Zoom 

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