

# NSF Future Manufacturing Webinar (NSF 20-552)

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Solicitation page: [https://www.nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=505737](https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505737)

Required Letters of Intent due April 10, 2020

Proposals due June 5, 2020



# NSF Future Manufacturing Webinar

After the webinar, send questions to [FutureManufacturing@nsf.gov](mailto:FutureManufacturing@nsf.gov)

If you require captions, please open this URL in a separate browser page:  
<https://www.captionedtext.com/client/event.aspx?EventID=4381578&Customer>

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# Future Manufacturing definition

- **Fundamental research** to enable manufacturing that:
  - Does not exist today
  - or
  - Exists, but only at such small scales that it is not viable
- **New**, potentially transformative, capabilities—not improvements
- 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 with intellectual merit and broader impacts commensurate with the size of the award
- **Multidisciplinary** teams and a **convergence** research approach



# 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

# NSF participants in this solicitation

- Directorate for Engineering
- Directorate for Computer and Information Science and Engineering
- Directorate for Biological Sciences
- Directorate for Mathematical and Physical Sciences
- Directorate for Education and Human Resources
- Directorate for Social, Behavioral and Economic Sciences
- Office of International Science and Engineering
- Office of Integrative Activities



# Future Manufacturing research:

- Grows nascent technologies
- Forges innovative capabilities
- Inspires convergence research with larger, interdisciplinary teams
- Recruits new & diverse participants into manufacturing
- Educates an upskilled workforce





# Examples of possible research in the 3 thrust areas (not intended to be limiting or indications of preferred areas)



- Cyber

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



- Eco

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



- Bio

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





# Award tracks

- **Research Grant (FMRG):** Fundamental, multidisciplinary, and integrative research and education
    - Type I: 5 years, \$500-750k/yr
    - Type II: 5 years, up to \$2M/yr
  - **Seed Grant (FMSG):** Teambuilding, concept development, and research initiation, possibly leading to future proposals
    - 2 years, \$250k/yr
  - **Future Manufacturing Network (FMNet):** Form communities of researchers, educators and stakeholders
    - 5 years, total \$500k
- A person may be PI/co-PI/Sr Personnel on only one proposal per track



# Proposals may leverage other activities/resources

- 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



# Fit of materials-based research

- There must be a significant manufacturing aspect:  
"New materials and new processes may be inextricably linked in some applications of Future Manufacturing. If new materials are involved in Future Manufacturing activities, proposals must address explicitly the coupling between those new materials and new processes that will be required to produce them."
- The Designing Materials to Revolutionize and Engineer our Future (DMREF) program works in the Materials Genome Initiative to integrate materials discovery, development, property optimization, and systems design



# Timeline

- Required Letters of Intent due by April 10, 2020:
  - Submit through FastLane
  - One page identifying track, thrust area, personnel, goals of research
  - Will be used to organize review (no feedback will be provided)
- Proposals due by June 5, 2020:
  - Proposals without corresponding letters of intent will be returned without review
  - Must match track & thrust area of the Letter of Intent
  - For multiple institutions: one proposal with sub-awards, no collaborative proposals permitted
  - Submit through FastLane or grants.gov, but not research.gov
- Aim to make awards by end of September



# Required Project Description sections

(see solicitation for details about each section)

- Research description
  - Scope and scale (FMRG only)
  - Enabling future manufacturing
  - Project management and collaboration plan
  - Education and workforce development plan
- 
- FMRG proposals are allowed 20 pages, others limited to 15 pages



# Merit Review Criteria (see solicitation for details)

- Intellectual Merit
- Broader Impacts
- Enables manufacturing capabilities which don't exist today or aren't presently viable
- Educational activities equip people with skills and broaden participation
- Consider translation of results to practice and the effects on the economy, labor force, industry and/or society at large
- Appropriate composition of the team



# Conditions of award (see solicitation for details)

- Mandatory kickoff meeting for all PIs & co-PIs to be held by December
- Annual awardee meeting thereafter, at least 1 PI per award must attend
- Be sure to include cost of attendance in your budget



# Dear Colleague Letter published today: Developing Long-term Strategies to Transform Manufacturing

- Separate from the Future Manufacturing solicitation
- Funding up to 10 workshops, up to \$100k each
- Purpose:
  - Explore new, potentially transformative, manufacturing capabilities
  - Identify & develop directions for future thrust areas
  - Convergence research; long-term, strategic view
  - Education & workforce development, broadening participation
  - Build international communities to promote future manufacturing research and education
- Proposals will be evaluated as they are received

<https://www.nsf.gov/pubs/2020/nsf20067/nsf20067.jsp>





# For more information:

- Funding opportunity page with links to solicitation and announcements:  
[https://www.nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=505737](https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505737)
- Email: [FutureManufacturing@nsf.gov](mailto: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 funding opportunity page shortly after conclusion of the webinar



# Q&A

Funding opportunity page: [https://www.nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=505737](https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505737)

