# Nanotechnology Research Center PPOP

## What are our priorities?

The Nanotechnology Research Center (NTRC) of the National Institute for Occupational Safety and Health (NIOSH) conducts research to understand the potential effects on human health of exposure to engineered nanomaterials. The NTRC also develops methods to control or eliminate exposures. Nanoparticles are extremely small particles (between 1 and 100 nanometers) designed to have certain new or unique characteristics, like strength, elasticity, or reactivity. These new properties make advanced materials and products possible. NTRC focuses on the following areas to help industry move safely and responsibly into the future:

- Increasing the public's understanding of potential health risks to workers making and using nanomaterials.
- Preventing occupational exposures to nanomaterials.
- Evaluating potential worker health risks from advanced materials and manufacturing processes.

## What do we do?

- Identify new types and uses of engineered nanomaterials through market forecasting and research, technology surveillance, and partner and stakeholder input.
- Prioritize the growing number of engineered nanomaterials for lab and field research, focusing on the ones that have the greatest potential for exposure and harm to workers.
- Conduct laboratory research to expand our understanding of the biological mechanisms underlying the effects of exposure over time and across the life cycle.
- Conduct field investigations and epidemiological studies for a realistic understanding of exposure and risks to nanomaterial workers.
- Share recommendations on how to use engineering controls and personal protective equipment to lower exposure to engineered nanomaterials.
- Provide critical input into the U.S. cross-agency National Nanotechnology Initiative (NNI) and other international organizations' strategies to address health and safety of nanomaterials.
- Provide nanomaterial businesses with guidance they can use to keep their workers safe, develop public trust, and in turn accelerate their commercialization.
- Help companies function in the face of uncertainty about potential negative effects of engineered nanomaterials.

## What have we accomplished?

- Published 2 workplace posters: 3D Printing with Metal Powders: Health and Safety Questions to Ask and 3D Printing with Filaments: Health and Safety Questions to Ask.
- Published a paper that provided more consistent grouping of carbon nanotubes and nanofibers (CNT/F) with respect to toxicity outcomes.
- Published a book chapter on monitoring nanomaterials in the workplace to decrease likelihood of occupational exposure.
- Published Current Intelligence Bulletin: *Health Effects from Occupational Exposure to Silver Nanomaterials*.
- Published the first paper describing an engineering control for 3D printers which can reduce ultrafine particle concentrations from an individual printer by 98%.
- Planned and delivered the NNI Environmental Health and Safety Webinar series.
- Hosted a seminar for 120 attendees as part of the NNI webinar series on heath risks across the life cycle of nano-enabled materials.

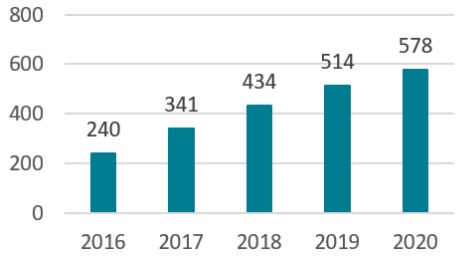
## What's next?

- Conduct an evaluation of biomarkers of nanomaterial exposure and disease.
- Work with industry leaders to develop practical, "real world" evaluation of hazard and risk represented by nanomaterials through their life cycles.
- Conduct external peer review of a draft NIOSH document, *Approaches to Developing Occupational Exposure Limits or Bands for Engineered Nanomaterials: User Manual* and *Technical Report*.
- Contribute to an update of the NNI Strategic Plan.

## At-A-Glance

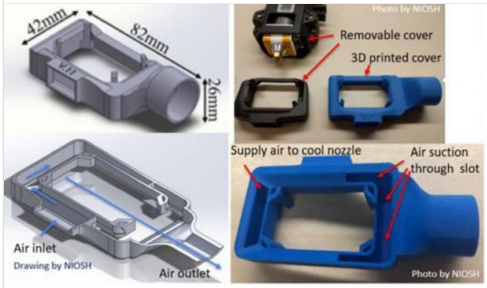
The NTRC develops recommendations that support responsible development of nanotechnology. This snapshot shows recent accomplishments and upcoming work.

### Cumulative Number of NIOSH Nanotechnology and Additive Manufacturing Publications since 2016




Source: NIOSH program records

### Examples of Engineering Controls for 3D Printers:




Source: NIOSH program records. Extruder head emission control design developed to capture emissions at the point of release.


Source: NIOSH program records. Low-cost air cleaner assembly connected to a modified smart extruder cover.

To learn more, visit www.cdc.gov/niosh/programs/nano/default.html
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Centers for Disease Control and Prevention
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