# National Science Foundation CARES Act Spending Plan
April 9, 2020

Coronavirus Aid, Relief, and Economic Security Act Funding
*(dollars in millions)*

| NSF by Account | Amount |
|---|---|
| Research & Related Activities | $75 |
| *Fast-Track & Transformational Research* | *70* |
| *Proposed Transfer to Education & Human Resources Account* | *5* |
| Agency Operations & Award Management | 1 |
| Total, CARES Act | $76 |

As part of the third emergency supplemental appropriation bill to support the Coronavirus Aid, Relief, and Economic Security (CARES) Act (P.L. 116-136), the National Science Foundation (NSF) received $76 million "to prevent, prepare for, and respond to coronavirus". This document outlines the NSF plan to invest these funds in accordance with both our underlying authorities as well as those provided in the CARES Act.

## *Research and Related Activities - $75 million*
NSF will use the Research and Related Activities (R&RA) supplemental resources to support additional fast-track, fundamental, and transformational research activity associated with (i) improving our understanding of SARS-CoV-2, the coronavirus causing COVID-19; (ii) developing a predictive understanding of the spread of the virus; and (iii) enabling approaches that mitigate the negative impacts of COVID-19 on public health, society, and the economy. Attachment A provides examples of the research to be supported in these three areas.

Fast-track and Transformational Research ($70 million):
NSF supports research activities at over 2,000 research institutions across the United States and will spend $70 million in emergency supplemental appropriations to mobilize the full force of the academic community by means of the Rapid Response Research (RAPID) and Early-Concept Grants for Exploratory Research (EAGER) mechanisms. NSF anticipates obligating these resources in FY 2020.
- RAPID. This proposal mechanism is for research that requires urgent access to data, facilities or specialized equipment. RAPID awards provide quick-response research on natural or anthropogenic disasters and similar unanticipated events such as the emergence of the coronavirus. It enables a diversity of scientists to pursue innovative, novel ideas for critical needs research. These awards are limited to a duration of 1 year.
- EAGER. This funding mechanism is for exploratory work in its early stages on untested, but potentially transformative, research ideas or approaches. This work could be considered especially "high risk-high payoff" in the sense that it, involves radically different approaches, applies new expertise, or engages novel disciplinary or interdisciplinary perspectives. These awards are limited to a duration of 2 years.

If NSF exhausts meritorious RAPID and EAGER proposals before expending CARES Act Funding, the Foundation will utilize other mechanisms for awarding the balance.

Within the $70 million, $2.75 million is set-aside for SBIR/STTR program and the funds will be awarded in accordance with those specific requirements.

Transfer to Education and Human Resources Account ($5 million):
Given the impacts of the coronavirus, STEM education and workforce are experiencing unique challenges that warrant study. Therefore, NSF will use the transfer authority provided in P.L. 116-93, the FY 2020 appropriations bill, to transfer $5 million to the EHR budget account. Like the intent of the R&RA funds, these will support fast-track, fundamental and transformational research activities that align with the three identified research areas. These investments will be awarded across both FY 2020 and FY 2021.

Acknowledging the one-time nature of the emergency supplemental appropriation, standard grants will be used in all cases to eliminate any impact on regular appropriations in the out-years.

*Agency Operations and Award Management - $1 million*
The $1 million provided to the Agency Operations and Award Management will support measures taken by NSF to secure ongoing continuity of operations during this period, including additional oversight, management, and reporting requirements for COVID program funding. This includes costs stemming from changes to NSF agency operations in a virtual working environment and returning to normal operations after an extended period.

NSF anticipates obligating the funds on an as needed basis throughout the period of availability, with all funds being obligated by September 30, 2021.

*Financial Controls*
In making awards, NSF will adhere to guidance issued to ensure that these emergency supplemental resources are not comingled with regular appropriations. NSF will maintain appropriate financial controls and track the funds using the GTAS Disaster Emergency Fund Code (DEFC) provided.

Coronavirus Aid, Relief, and Economic Security (CARES) Act
Public Law 116-136
Third Supplemental Appropriations Act


## NATIONAL SCIENCE FOUNDATION

### RESEARCH AND RELATED ACTIVITIES

For an additional amount for ''Research and Related Activities'', $75,000,000, to remain available until September 30, 2021, to prevent, prepare for, and respond to coronavirus, domestically or internationally, including to fund research grants and other necessary expenses: *Provided*, That such amount is designated by the Congress as being for an emergency requirement pursuant to section 251(b)(2)(A)(i) of the Balanced Budget and Emergency Deficit Control Act of 1985.

### AGENCY OPERATIONS AND AWARD MANAGEMENT

For an additional amount for ''Agency Operations and Award Management'', $1,000,000, to prevent, prepare for, and respond to coronavirus, domestically or internationally, including to administer research grants and other necessary expenses: *Provided*, That such amount is designated by the Congress as being for an emergency requirement pursuant to section 251(b)(2)(A)(i) of the Balanced Budget and Emergency Deficit Control Act of 1985.

### TITLE II GENERAL PROVISIONS

SEC. 12002. (a) Funds appropriated in this title for the National Science Foundation may be made available to restore amounts, either directly or through reimbursement, for obligations incurred by the National Science Foundation for research grants and other necessary expenses to prevent, prepare for, and respond to
coronavirus, domestically or internationally, prior to the date of enactment of this Act.

(b) Grants or cooperative agreements made by the National Science Foundation under this title, to carry out research grants and other necessary expenses to prevent, prepare for, and respond to coronavirus, domestically or internationally, shall include amounts to reimburse costs for these purposes incurred between January 20, 2020, and the date of issuance of such grants or agreements.

Attachment A

**Examples of research that may be supported by R&RA resources**

**(i) Understanding of SARS-CoV-2.** NSF-funded research at the molecular, cellular, and physiological levels, leveraging data science, artificial intelligence, and computational modeling and simulation, will enable understanding of coronavirus genetics, modes of action, virulence, and seasonal and environmental stability.

- Understand the structure and function of the coronavirus, including replication proteins, with the goals of determining conserved structures that can serve as targets for pharmaceutical intervention; and contributing to the design of novel diagnostics.
- Determine evolutionary origins of the virus and its genetic variation within host species, in order to determine how molecular variation correlates with host range, and to evaluate risk of further disease emergence.
- Understand how virus and host genomes interact to determine the full spectrum of disease outcomes, with the goals of identifying the cellular basis for host range and pathology; predicting morbidity; and developing effective medical interventions.
- Create genetically tractable animal models and cell lines that are the natural hosts for coronavirus infections, accelerating discovery of genetic, cellular, and organismal bases for host range and disease severity.

**(ii) A predictive understanding of the spread of the virus.** NSF-funded research on quantitative and computational models of coronavirus population dynamics will elucidate a predictive understanding of the SARS-CoV-2 evolution and transmission.

- Develop a large-scale pandemic data and model commons to enable data sharing, AI-based approaches, and predictive modeling. The commons will also contribute to replicability and reproducibility of research results.
- Develop, extend, and apply mathematical and computational models to study the transmission of the virus and evaluate the impact of various interventions on disease spread.
- Understand rates of viral mutation, recombination, and potential for rapid evolutionary change to predict when the coronavirus jumps to new hosts, and which hosts may be susceptible or resilient to infection.
- Pursue automatic and nonintrusive screening of potential viral disease carriers, including chemical probes, optical sensing, and imaging of bioparticles.
- Collect data for and conduct mathematical and computational modeling of survival and transport of the virus in the natural and built environment.
- Model and inform human attitudes and behaviors relevant to disease transmission, including quarantining, social distancing, traveling/migration patterns. In addition, research here will be needed to develop efficient, effective, and privacy-preserving methods of data collection, in order to guide this model development.

**(iii) Enabling approaches that mitigate the negative effects of COVID-19 on public health, society, and the economy.**

- Improve the effectiveness and reliability of personal protective equipment (PPE) for protection from the virus and leverage advanced sensing and robotics systems to support medical professionals in detection, containment, and response.
- Identify new techniques supporting air filtration, disinfection and viral deactivation.
- Develop advanced manufacturing approaches to achieve at-scale implementation of advances in PPE, sensing technology, engineered systems for environmental amelioration, and biomanufacturing needs (vaccines, therapeutics).
- Understand disruptions to global supply chains as well as critical infrastructure and systems, including the energy grid, healthcare, agriculture, and transportation networks; and optimize approaches for addressing these.
- Refine distance learning approaches to minimize disruption in education and workforce development, notably at the K-12 and undergraduate levels.
- Understand the short, medium, and long-term impacts of the digital divide during the COVID-19 pandemic response on educational outcomes for students traditionally underserved in the STEM disciplines as well as students in rural settings. The digital divide broadly refers to the uneven access to digital content and connection as a result of persons who do not own or have easy access to technology, including computers, broadband, and technology that can accommodate disability.
- Evaluate short, medium, and long-term outcomes of variations in Internet access for small business, family farms, people in need of health services, healthcare providers, the gig economy, other forms of employment, and social connectivity generally.
- Conduct computer network (e.g., Internet) measurement and analytics to assess the response, resilience, and scalability of computer systems due to widespread shelter-in-place efforts.
- Assess the impact of COVID-19 on critical social and economic institutions.
- Evaluate the transformation of work necessitated by COVID, assessing the benefits and liabilities, as well as understanding the responses and adaptions of households and businesses.
- Use artificial intelligence and other data scientific techniques to analyze and quantify impacts on people and businesses. Use simulations to experiment with different ways to minimize the negative effects.