

# Board on Physics and Astronomy National Academy of Sciences

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**ALFRED P. SLOAN  
FOUNDATION**

Driven by the promise of great ideas

## **Mission**

The Alfred P. Sloan Foundation makes grants primarily to support original research and education related to science, technology, engineering, mathematics, and economics.

The Foundation believes that these fields—and the scholars and practitioners who work in them—are chief drivers of the nation's health and prosperity.

The Foundation also believes that a reasoned, systematic understanding of the forces of nature and society, when applied inventively and wisely, can lead to a better world for all.



# Sloan Grant Programs

▪ RESEARCH (~\$50M/year)		▪ TECHNOLOGY	
<ul style="list-style-type: none"><li>▪ Economic Institutions, Behavior &amp; Performance</li><li>▪ Energy &amp; Environment</li><li>▪ <b>Matter-to-Life</b></li></ul>	<ul style="list-style-type: none"><li>▪ <b>Tabletop Particle Physics</b></li><li>▪ <b>Sloan Digital Sky Survey</b></li><li>▪ <b>Sloan Research Fellowships</b></li></ul>	<ul style="list-style-type: none"><li>▪ Better Software for Science</li><li>▪ Data &amp; Computational Research</li><li>▪ Scholarly Communication</li><li>▪ Exploratory Efforts</li></ul>	
▪ PUBLIC UNDERSTANDING		▪ STEM HIGHER ED	▪ LOCAL
<ul style="list-style-type: none"><li>▪ Books</li><li>▪ Film</li><li>▪ Radio</li></ul>	<ul style="list-style-type: none"><li>▪ Television</li><li>▪ Theater</li><li>▪ New Media</li></ul>	<ul style="list-style-type: none"><li>▪ <b>Diversity, Equity &amp; Inclusion in STEM Higher Education</b></li></ul>	<ul style="list-style-type: none"><li>▪ NYC Civic Program</li></ul>



## General considerations

The scale of Sloan funding for research is dwarfed by federal agencies  
So identify gaps where Sloan funding can be meaningful

- Research that is very interdisciplinary, or that falls between disciplines
  - Focused individual programs
  - Typically time-limited (5-10 years)
- Research that is speculative or risky
- Support directed to general field-building

Broad discretion in setting overall priorities and making individual grants—  
this a strategic advantage and also a reason for caution



## **Matter-to-Life**

Program launched in 2021

\$8-10M/year for 5-10 years

“To sharpen our scientific understanding of the physical principles and mechanisms that distinguish living systems from inanimate matter, and to explore the conditions under which physical principles and mechanisms guide the complexification of matter towards life.”

National Academy consensus report 2022, “The Physics of Life”



Matter-to-Life focus areas have significant physics/astrophysics elements

*Building Life*: construct systems with life-like features, not restricted to biology

e.g. Cornell University, “To develop magnetic-digital-polymers as an abiotic platform for exploring life-like behaviors”

*Principles of Life*: explore key physical principles that govern living systems

e.g. MIT, “To explore how nonequilibrium dynamics can structure biological systems across scales from molecules to ecosystems”

*Signs of Life*: identify physical principles underlying general signatures of life

e.g. Carnegie Institution, “To advance our understanding of abiotic atmospheres on sub-Neptune and rocky planets, the most common planets in our galaxy”



## Sloan Digital Sky Survey

- Initially (early 1990s), a new (and unproven) way of doing astronomy
- Sloan-anchored, membership-based collaboration (over 50 partners)
- Not time-limited, but periodically reconsidered; currently SDSS-V
- First “big data” astronomy project; innovation in data sharing
- Almost 11,000 papers published with SDSS data, over 600,000 citations
- Intermediate scale – neither a mega-collaboration nor a single investigator
- Recent Sloan grant of \$6M to redress impact of pandemic on SDSS-V



## **Sloan Research Fellows**

- Modest (\$75K) but truly unrestricted grants to untenured faculty
- Selections made by independent committees external to Sloan
- More than 50 Nobel Prize winners, including Andrea Ghez and Donna Strickland

## **Diversity in STEM Higher Education**

- Strengthening scholarly communities for the present and future
- Dedicated programs, primarily for graduate education
  - University Centers of Exemplary Mentoring
  - Sloan Indigenous Graduate Partnerships
- Commitment to diversity is a required part of every proposal Sloan considers







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