

# OPPORTUNITIES AND GAPS IN SCIENCE PHILANTHROPY

When deciding which areas to support, funders have often asked, “How do we stay at the cutting edge of science that is being developed?” and “Where is funding needed most?” The Science Philanthropy Alliance (Alliance) diligently works not only to increase funding but also to educate philanthropists in making judicious, effective and satisfying investments in this space.

In June 2023, the Alliance convened its external science advisors (ESAs) and several philanthropic leaders for a virtual discussion. During the meeting, they identified funding opportunities that could play a vital role in advancing scientific knowledge and innovation, especially in areas that are underfunded, risky, or interdisciplinary.

Often, when we pull a dozen researchers together to identify the most important research questions, twelve different priorities are the result. But in this case, our ESAs, chosen for their depth of knowledge and networks and their secure, senior positions, were free to think broadly about the most promising and impactful issues facing society today. One unexpected outcome was the agreement—even from those with a life sciences background—that the physical sciences, especially climate research, were woefully underfunded.

*“Another underfunded area is food security, i.e., plant microbiology, soil dynamics, climate change and its impacts.*



*This is a truly important area.”*

Shirley Tilghman (ESA)

## Research Areas

- Physical Science
- Carbon Sequestration
- Biomedical Science
- Earth Science
- Food Security
- Pathogen Dynamics
- Ocean Science
- Artificial Intelligence
- Brain Disorders
- Plant Science
- Quantum Science

## Approaches & Mechanisms

- Philanthropic Partnerships
- International Collaborations
- Long-term Investments
- Intermediate-Scale Projects
- Single Investigator-Driven Research
- Mid-career Researchers
- Foreign Trainees
- Technology Platforms
- Tabletop Experiments

**THE FOLLOWING IS A COMPILATION OF THE TOPICS AND THEMES EXPLORED DURING THE DISCUSSION (SEE LIST ON PAGE 1 FOR SUMMARY):**

- Challenges and opportunities present themselves in different scientific fields and disciplines, most notably physical/earth/ocean sciences, food security, carbon sequestration/global climate change and brain disorders.

*“We tend to wait until things are burning down to invest.”*

Tom Cech (ESA)



**THERE IS SEVERE UNDERFUNDING OF OCEAN-BASED RESEARCH. FOUR AREAS PARTICULARLY IN NEED OF RESOURCES INCLUDE:**

- Understanding the ocean’s role in the global carbon cycle.
- Developing a lexicon to study marine biodiversity.
- Understanding the ice-free Arctic and melt processes for Antarctic glaciers and ice sheets.
- Developing an ocean internet of things.

*“What happens in the Arctic doesn’t stay in the Arctic.”*

Margaret Leinen (ESA)



**DEPLOYING NEW TECHNOLOGIES TO ACCELERATE DISCOVERY**

- Philanthropists must play a role in better understanding AI and quantum science research, as these areas pose profound questions and challenges that require fundamental research and creative funding.
- Supporting single investigator-driven research, intermediate-scale projects, international collaborations, long-term investments, and technology platforms that may not be well funded by the federal system is imperative.

*“Can we use Machine Learning / Artificial Intelligence for deep chemistry and physics, e.g., on chemical systems?”*

*This could lead to profound understanding.”*

Fleming Crim (ESA)



- Gaps and biases exist in funding distinct types and scales of research, such as tabletop experiments in physics (underfunded) and mega projects (overfunded.)

### On the launching of a biophysics program:

*“So much biology funding comes from NIH, which is disease focused. The challenge is getting fundamental biology into the research ecosystem.”*

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Adam Falk (Alfred P. Sloan Foundation)



### CARLA SHATZ (ESA) AGREED, “PEOPLE AREN’T EVEN PROPOSING SUCH QUESTIONS AND REVIEW PANELS AREN’T EQUIPPED TO REVIEW THEM.”

- Better knowledge of zoonotic transmission is imperative as the time between pandemics grows shorter. COVID-19 demonstrated the need for greater knowledge regarding the dynamics and movement of pathogens between organisms.

*“How early does disease start is an important question for brain disorders, especially neurodegenerative diseases.”*

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Carla Shatz (ESA)



### FUNDAMENTAL QUESTIONS NEED TO BE ANSWERED FOR BOTH PREVENTION AND MITIGATION OF DISEASE

- Monitoring the culture of the scientific enterprise and the role of technology platforms were also cited as leading concerns.

*“Philanthropy would do well to pay attention to enhancing the conduct of science as well as the content.”*

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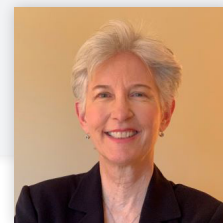
Harvey Fineberg  
(Gordon and Betty Moore Foundation)



- Issues and solutions for funding foreign training and postdocs, indirect cost recovery, and retaining mid-career researchers were identified, as were the benefits of sharing vetted proposals with other funders to leverage resources and expertise.
- Additional challenges include the tension between funding large projects and individual investigator work, the impact of inflation and higher costs on federal funding and graduate students and postdocs.

*“How could we design a program that rewards individual investigators but promotes interdisciplinary work?”*

**Cynthia Friend**  
(The Kavli Foundation)



## **IN ADDITION TO HOSTING THIS DISCUSSION, THIS YEAR THE ALLIANCE HAS PRODUCED A SUITE OF WHITE PAPERS ON UNDERFUNDED RESEARCH AREAS**

Those completed so far include pain, infectious disease, aging, international research talent and cancer (basic research). Our definition of underfunded has three aspects (below) and one or more can be used to characterize a field or area of research as such:

- Funding that is insufficient for the need, i.e., the amount of funding is too small for the scope of the problem.
- Ineligible for other sources of funding, e.g., too risky for public money or other funding sources, or not commercially viable.
- High potential impact of funding; a breakthrough discovery with highly significant implications for a question or field.

If you would like to see any or all the white papers, which include examples of existing examples of funding programs, please reach out to Sue Merrilees, Senior Director, Philanthropic Advising at [smerrilees@sciphil.org](mailto:smerrilees@sciphil.org).

Other participants involved in the discussion were Elizabeth Christopherson (Rita Allen Foundation), France Córdova (Science Philanthropy Alliance), Dan Linzer (Research Corporation for Science Advancement), David Spergel (Simons Foundation), Claire Pomeroy (The Lasker Foundation), Louis Muglia (Burroughs Wellcome Fund), and Caroline Montojo (Dana Foundation).