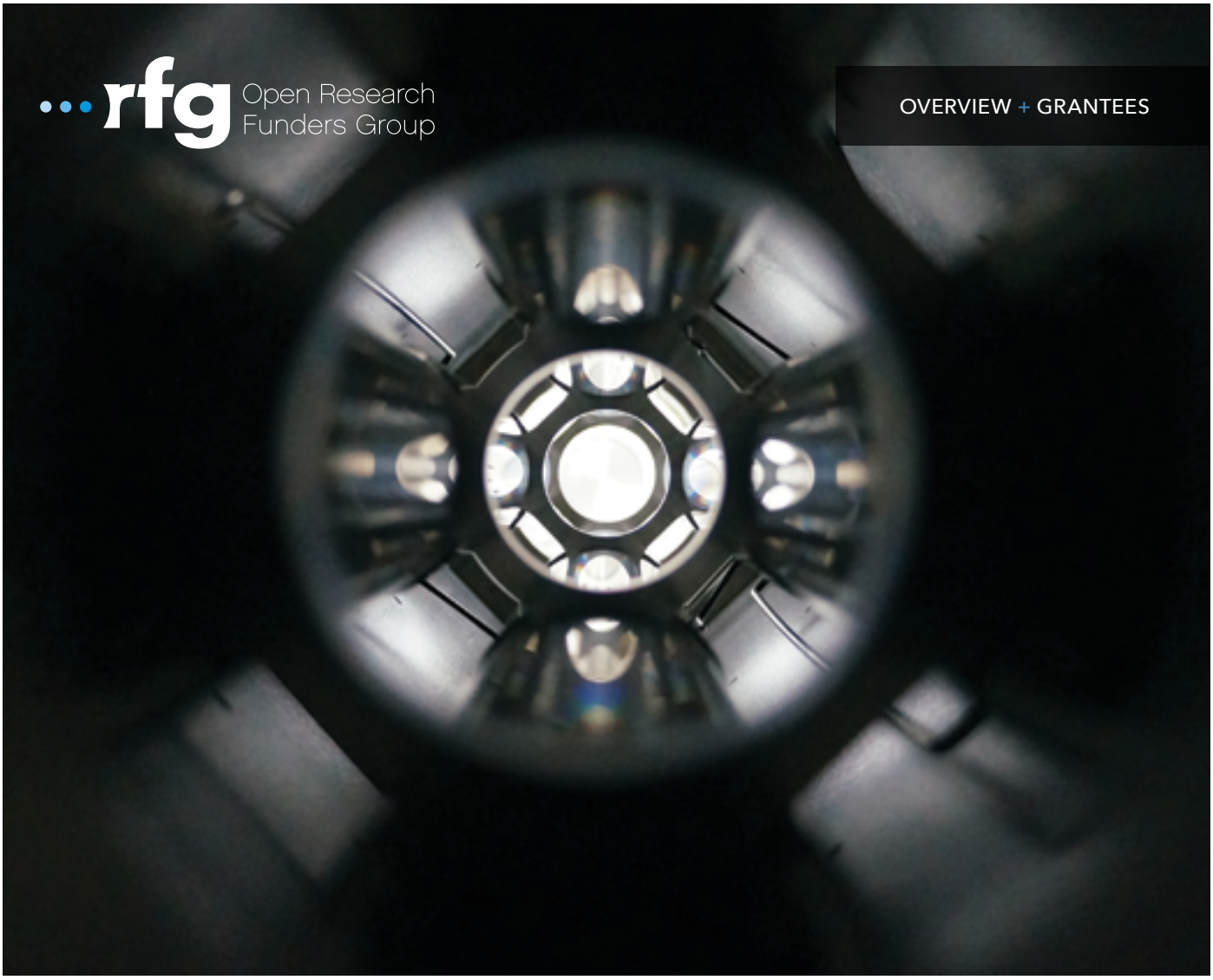

Image credit: Simos Xenitellis

Open Policies 101

What is an "open" policy? Open policies promote the unfettered distribution and sharing of research outputs. These policies typically encompass both research articles that summarize the results of scientific and scholarly investigation (commonly known as "open access") and the factual information from which research findings are derived, including datasets, software, and code ("open data").

Why are research funders adopting open policies? The open sharing of research outputs benefits society by getting more information quickly and widely into the hands of researchers, practitioners, patients, students, and policy makers. This accelerates the pace of discovery, reduces information-sharing gaps, and encourages innovation. Ensuring that open sharing includes data and code has the additional benefit of promoting research reproducibility. This helps validate new findings and suggest ways to strengthen experiments for follow-on research. Research funders are adopting open policies because these policies align with their missions. Many funders have bold strategic goals, trying to tackle society's most challenging problems. Open policies lower knowledge barriers and make it easier for interested parties to pursue promising investigative directions. These policies lessen the likelihood that multiple research teams will be pursuing duplicative investigations in siloed environments. They decrease the potential for data miscalculation, misinterpretation, manipulation, and fraud by opening raw results up to the broader community. Getting more research outputs into the

hands of more researchers with fewer barriers makes it easier for more scientists and scholars to do their jobs. This, in turn, makes it more likely that funders will attain their goals.

What basic elements might a funder policy include? A well-considered funder policy will explicitly contemplate how and when a funder expects its grant recipients to share research articles resulting from funding, as well as the underlying data, code, and software needed for independent verification of research results. Further, such a policy will detail expectations for how these materials can be reused, how costs associated with policy compliance will be borne, and the extent to which the funder will monitor policy compliance.

It is critical to note that funder policies need not adhere to a rigid ideology in order to be considered "truly open". Funders can take a range of approaches to each of these issues. What matters most is affirming a commitment to the open sharing of research outputs and underscoring this commitment's consistency with organizational values.

What are some of the common misconceptions about open policies? ***Prospective grant applicants will respond negatively to new requirements.*** There is no evidence to suggest, drawing from the hundreds of funding bodies that have adopted open policies, that the quantity or quality of grant applicants has been adversely affected by these additional requirements. Every organization already places certain conditions on the projects it funds. Examples include periodic reporting, acknowledgement of funding support on public outputs, and biosecurity risk mitigation. The implementation of an open policy is an incremental addition to these terms and conditions. Many federal agencies and universities are adopting similar policies, which means that prospective grant applicants are becoming increasingly familiar with these types of requirements.

Open policies are a hassle to administer. There are a range of activities that funders can take to oversee open policies. At the low-touch end of the spectrum, funders can require grant recipients to document how they intend to comply. Depending on internal resources, some funders spot-check these plans, while other simply rely on the honor system. Other organizations take a more engaged approach, requiring proof of compliance from grant recipients and checking this against internal expectations and guidelines. Funders without open policies may view administration and compliance as daunting tasks. However, many organizations with open policies have initially implemented procedures that have a minimal impact on staffing and resources. As these funders went through several grant cycles, they adjusted their administrative activities to reflect what they have learned along the way. Funders also have created or leveraged current tools to help manage the policy and compliance.

Open policies are a challenge to reconcile with privacy concerns. Different disciplines have different data privacy considerations. These concerns are most common in subjects such as biomedicine; projects that involve human subjects may appear to fundamentally conflict with data sharing policies. However, many funding bodies, including the National Institutes of Health and the National Science Foundation, have adopted recommendations for de-identifying study participants. These procedures are commonly understood and accepted within the research community. Many funders allow grant applicants to apply for a waiver in the event that de-identification is either prohibitively expensive or renders the data meaningless. Such exceptions provide a mechanism for truly private data to be safeguarded while simultaneously placing the onus on the grant applicant to explain why his/her data cannot be openly shared.

Open policies are an annoyance that have little relevance to the real world. Policies that promote the open sharing of research outputs are changing the world. Philanthropic organizations fund research to advance human thought, to fuel breakthroughs, and to improve the way we interact with each other and our world. When that research is shared quickly and openly, it gets discussed, tested, validated, and built upon. Open policies maximize return on investment by ensuring that the work a funder supports reaches the widest possible audience, with as few barriers to access and reuse as possible.

> *"Open science is the key to reducing waste, accelerating meaningful solutions to the biggest problems faced by our communities, states, nations, business and civic institutions, and to save the lives of millions of people around the world."*– DR. BRIAN NOSEK, PROFESSOR, DEPARTMENT OF PSYCHOLOGY, UNIVERSITY OF VIRGINIA

Grantees

This amounts to little more than an additional hassle for me. The open sharing of research outputs may require some adjustments to your behavior, but the upside far outweighs these incremental activities. In addition to the benefits you accrue by being a grantee in good standing, the open sharing of research outputs has been shown to increase citations, surface potential collaborators, and invigorate the scientific discourse. It also allows both the current and future generations of researchers to easily access your work, test it, and advance it. The net advantage of this approach - for you, your colleagues, your discipline, and your funder - is significant.

Open access limits my freedom to publish in the journal of my choosing. There are thousands of journals across scores of disciplines that publish fully open access journals. Additionally, a very large percentage of subscription journals offer "hybrid" open access that allows authors to make their individual articles freely available to readers. In virtually every academic subject area, authors can choose from a plethora of high-quality, reputable open access publishing options.

Open access is expensive. Research funders with open access policies often cover the costs associated with open access publishing. This may be part of the original grant proposal budget or a separate disbursement. It is worth noting that many open access journals charge no fees at all. Many others provide waivers for authors who cannot pay an article processing charge (APC). Additional ways to openly and inexpensively share your publication include posting a preprint and archiving a post-publication manuscript.

I just want to put a copy of my article up on my personal website. Open policies are designed to promote the widest possibility accessibility of your research outputs, both today and in the future. To accomplish this, it is critical that articles are made available on sites that have carefully crafted preservation and reuse strategies. Copyright, archiving, machine readability, and similar considerations are complex to navigate. Third parties (e.g., open access publishers, repositories) are typically more suitable vehicles for sharing your articles.

My data will have limited or no value to others. The entire concept of open data is grounded in the notion that the market for the building blocks of research outputs should not be artificially restricted. Who knows where the next innovation will come from, or what combination of datasets will produce a breakthrough? Data sharing has the additional benefit of promoting research reproducibility. This helps validate new findings and suggest ways to strengthen experiments for follow-on research. Open data policies maximize the information the research community has at its disposal to pursue new leads, build upon the scholarly record, and accelerate discovery.

I have no place to deposit my research data. Research data is highly specialized, meaning no single deposit location is universally applicable. That said, researchers can choose from thousands of data repositories to fit their specific needs. Primary considerations should include reuse policies (does the repository allow any interested party to freely access the data without restriction), security measures (how are datasets and how is any confidential information protected), stability (what funding mechanisms are in place to ensure that the data will be available for the indefinite future), and file format flexibility (can the repository accommodate all aspects of the grant recipients' dataset, regardless of file type). Additionally, it is good practice for researchers to deposit their data in a repository that is appropriate for the subject matter in question. This optimizes the ability of others to discover and build upon the data.

Others will scoop and steal my intellectual property if I make my research open. There is no evidence to suggest that openly sharing your data and papers leads to others claiming priority over your research ideas. To specifically address this concern, many open policies give researchers ample opportunity to develop their findings and publish results under an exclusive window. After a certain period of time, however, the granting body must also consider how the work it funds can be utilized by the wider research community to accelerate the pace of discovery. The principle of a lengthy but not indefinite period in which you have sole rights to extract value from your work is a sufficient safeguard against scooping.

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rfg Open Research Funders Group

Greg Tananbaum
Coordinator
greg@orfg.org