

June 10, 2020

Dear Advisory Committee,

In response to the SCoPEX Advisory Committee's request regarding the Research Team's and Harvard's Solar Geoengineering Research Program's (SGRP) financials and conflict of interest principles, I have enclosed three documents:

- The Statement
- Appendix A
- Appendix B

The Statement and Appendix A can be made public at your discretion. Appendix B can be shared privately with the SCoPEX Advisory Committee with the agreement that the information not be released publicly.

Please don't hesitate to reach out with questions. I am happy to setup a call to discuss.

Yours,



David Keith
Gordon McKay Professor of Applied Physics, School of Engineering and Applied Sciences (SEAS); and,
Professor of Public Policy, Kennedy School of Government,
Harvard University

To: SCoPEX Advisory Committee
From: David Keith
Date: June 10, 2020
Subject: Statement Regarding Financials and Conflict of Interest

In response to your request regarding the Research Team's and Harvard's Solar Geoengineering Research Program's (SGRP) financials and conflict of interest principles, I have enclosed a statement detailing the information you requested. This statement can be made public at your discretion.

Separately, I have shared Appendix A and Appendix B. You are welcome to make Appendix A public. You can review Appendix B privately with the agreement that this information not be released publicly. Such a structure is meant to ensure that the SCoPEX Advisory Committee has the ability to review certain details while at the same time protecting donor privacy. We hope this serves as a useful template for other institutions if they carry out small scale outdoor solar geoengineering research.

Financial Disclosure

Question: Identify all sources of monetary and in-kind support for the proposed experiment.

Response: Experimental hardware and operations are funded from internal Harvard research funds provided to Professors David Keith and Frank Keutsch. Additional research funding is provided by Harvard's Solar Geoengineering Research Program (SGRP).

SGRP is funded by the following foundations and individuals. All donations are philanthropic gifts.

J. Baker Foundation
The Blue Marble Fund
OW Caspersen Foundation
The Crows Nest Foundation
The William and Flora Hewlett Foundation
Constance C. and Linwood A. Lacy Jr. Foundation
The Open Philanthropy Project
Pritzker Innovation Fund
Ronin Private Investments LLC
The Alfred P. Sloan Foundation
The Tansy Foundation
Teza Technologies LLC
VoLo Foundation
The Weatherhead Center for International Affairs

Laura and John Arnold
G. Leonard Baker, Jr.
Alan Eustace
Howard Fischer
Ross Garon
Bill Gates
Jonathan Goldberg

Drew Myers
John Rapaport
Chris and Crystal Sacca
Michael Smith
Andrew Stark
Bill Trenchard

SCoPEX also received in-kind support from NOAA, which provided the POPS instrument that will provide size-resolved measurements of particle concentration. These measurements are important for understanding the physical and chemical interactions of stratospheric aerosols under ambient and perturbed conditions.

Question: Are all funding sources, including level of support, clearly identified and publicly listed?

Response: Yes. All funding sources are publicly listed online.

The [SCoPEX FAQ](#) states the following: “Who is providing the funding? Experimental hardware and operations are funded from internal Harvard research funds provided to Professors David Keith and Frank Keutsch. Additional research funding is provided by Harvard’s Solar Geoengineering Research Program (SGRP). All donations to SGRP are philanthropic.”

The [SGRP website](#) publicly lists all of the foundations and individual donors who have supported the program. It does not publicly list levels of support to protect our donor’s privacy, which is common practice amongst NGOs that accept philanthropic gifts, including those that currently support solar geoengineering research, such as the Environmental Defense Fund, Natural Resources Defense Council, and Union of Concerned Scientists. However, because it is important for the SCoPEX Advisory Committee to be able to assess the proportional make up of donations, we have provided the amounts of each donation to the committee in Appendix B. Note that we provide that information solely for the use of the committee to assess conflicts of interest and other financial implications of the donations, but that we do so under the agreement that the committee not release this information publicly. We have also included the SGRP gift letter in Appendix A.

Question: Does the project have any anonymous individual supporters? If so, why?

Response: No, we do not accept anonymous donations.

Question: Have institutional donors identified all sources of funds, including individual donors, corporations, etc.?

Response: No, while we do ask a range of questions, we have not asked foundations or individual donors to provide information as to where *all* of their funds (in the case of foundations) or wealth (in the case of individuals) was generated from. This is in part because it would not be possible as a matter of privacy to ask individual donors to share their *entire* financial portfolio. That said, we do research to identify all publicly available sources of funding, and we ask a range of questions to determine whether the potential foundation or donor has a conflict of interest and could benefit significantly from slowing down the rate of greenhouse gas reductions. In such a case, we would not accept the donation. We provide more information about this latter piece below.

Question: Are any project funders associated with an institution that stands to benefit, financially or politically, from the results of this work? If yes, explain.

Response: Not to our knowledge.

Question: Was any of the funding directed to specific activities?

Response: There was one case in which a donation was directed to a specific activity. Before SGRP formally launched, The Alfred P. Sloan Foundation provided funding to SGRP and the Emmett Center on Climate Change and the Environment at the University of California, Los Angeles to host the Forum on U.S. Solar Geoengineering Research. This Forum was held at the Conference Center of the Carnegie Endowment for International Peace in Washington, DC on March 24, 2017. All information about the Forum, including the funding source, was and is listed [publicly online](#). The event was also livestreamed at the time to ensure the conversations were transparent.

Otherwise, to date, all funds donated to SGRP have supported the program broadly.

Question: Does the project intend to create any new or novel technology and how will it be shared with the public? Is there an intention to create intellectual property?

Response: No, we do not intend to create intellectual property.

One of SGRP's core principles is to operate in a way that is open access across all activities. As we list publicly on [our website](#), we aim to provide "full transparency with open-access publications and liberal data sharing," and we "discourage patents and any form of IP protection."

Because of this, key SCoPEX personnel have personally committed to not file for patents associated with SCoPEX, including Frank Keutsch, David Keith, Norton Allen, Martin Breitenlechner, John Dykema, Mike Greenberg, Michael Litchfield, Terry Martin, Marco Rivero, and Yomay Shyur. In fact, David Keith and John Dykema authored [a blog post](#) on this topic, explaining why they oppose commercial work on solar geoengineering and will not file solar geoengineering patents.

To be clear, SGRP actually would have liked to forbid patenting for any solar geoengineering related technologies it supported, but there is not a legal way to do so. Still, while it technically may be true that Harvard owns intellectual property arising from research conducted using university resources, based on [Harvard's IP Policy](#) and the individual Participation Agreements faculty and researchers sign, as a practical matter the university will not file to protect or enforce intellectual property against the wishes of the contributing faculty member. Moreover, neither SGRP nor its donors can make any claim on the intellectual property related to the experiment or other research endeavors.

As it relates to activities outside of Harvard, we cannot prevent third-party contractors from filing for patents. That said, the work currently being carried out by the third-party contractors is generally not directly related to the science or hardware that would be useful in *actual* solar geoengineering deployment; their work is more focused on balloon designs and other hardware that is highly unlikely to be used if solar geoengineering were implemented on a large scale (since aircraft are more likely to be used for deployment compared to balloons). For example, our balloon flight provider could file for a patent for a new technology they create related to their balloon design, but that would not be relevant to actual solar geoengineering deployment.

On this point, we would like to make clear that we are not conducting SCoPEX to develop hardware that can be used for deployment. In fact, this is one of the reasons why we chose to loft the particles using a balloon rather than an aircraft. Overall, the purpose of SCoPEX is NOT to advance our understanding of the aircraft or other platforms for deployment of solar geoengineering. It aims to reduce the uncertainty around specific science questions by making quantitative measurements of some of the aerosol microphysics and atmospheric chemistry required for estimating the risks and benefits of solar geoengineering in large atmospheric models.

Question: What are the relevant policies around funding?

Response: In addition to Harvard's standard funding policies, SGRP follows two further policies:

- 1) We do not accept anonymous donations.
- 2) We do not accept donations from corporations, foundations, or individuals if the majority of their current profits or wealth come from the fossil fuel industry unless they can clearly demonstrate that they do not have a conflict of interest and present a strong track record of supporting efforts to address climate change.

We are concerned that fossil fuel companies or other interests will seek to exploit solar geoengineering as a pretext for delaying reductions in greenhouse gas emissions. We do not want donors who are (or could reasonably be construed as being) motivated to support solar geoengineering research to protect fossil fuel industries. For purposes of excluding such donors, we consider a rough weighting system as a guide. We rate the donor's ties to fossil fuels on a 1 to 5 scale, where 1 has no connection with fossil fuels and 5 has nearly all of their current wealth and social connections tied to coal. Then, we rate the donor's commitment to climate from 1 for a donor who has long devoted a majority of their time and resources to climate action to 5 for a donor who has no visible interest in climate. We then take the product of the two ratings, rejecting donors with a multiplicative combined rating that is larger than 10.

We would like to elaborate on this last point. We take issues of conflict of interest very seriously. And we take the "moral hazard" concern very seriously—the idea that research or even discussion on solar geoengineering could reduce incentives to mitigate. The world must reduce greenhouse emissions to zero, and remove carbon dioxide from the atmosphere, to address the root cause of climate change. Solar geoengineering does and will not change this fact.

We offer a few examples of our funding decisions:

- We would not accept funding from Exxon both because the company would benefit from prolonging the use of fossil fuels and because it has clearly undermined efforts to meaningfully address climate change. In other words, we would rate Exxon with a $5 \times 5 = 25$.
- We would accept funding from Tom Steyer or The Rockefeller foundation because they no longer would benefit from a delay in fossil fuel use even though their wealth was generated from investments in the fossil fuel industry (N.B. neither have donated to SGRP, this is illustrative.) Here, we would rate Rockefeller as $3 \times 2 = 6$.

Question: The Research Team will provide a conflict of interest statement for experiment and major funding sources.

Response:

Conflict of Interest – “Moral Hazard”

As we noted above, we take issues of conflict of interest very seriously. And we take the “moral hazard” concern very seriously—the idea that research or even discussion on solar geoengineering could reduce incentives to mitigate.

The world must reduce greenhouse emissions to zero, and remove carbon dioxide from the atmosphere, to address the root cause of climate change. Nothing about solar geoengineering changes this fact. But we, like others, are concerned that fossil fuel companies or other interests will seek to exploit solar geoengineering to slow down or block mitigation.

To address this concern in our own work, SGRP does not accept donations from corporations, foundations, or individuals if the majority of their profits or wealth come from the fossil fuel industry unless they can clearly demonstrate that they do not have a conflict of interest and present a strong track record of supporting efforts that address climate change.

Conflict of Interest – Harvard University

Harvard University also has a strict set of policies regarding institutional conflict of interest. SGRP embraces these policies.

Below, we offer an example when we initially questioned whether there was a conflict of interest. We immediately and proactively reached out to university officials, who then independently followed established policies and principles and ultimately determined there was not a conflict.

Background

Last year David Keith had the opportunity to serve on Harvard’s university-wide committee to develop guidelines for Institutional Conflict of Interest. This process evaluated conflicts of interest that reflect on the institution as a whole and created a policy for dealing with them. One of the topics discussed at length was dealing with fellowships and similar affiliations from people with ties to donors. That experience alerted David to the importance of this issue and to the various ways it is handled at Harvard and other institutions. His view is that the way the Mossavar-Rahmani Center for Business and Government and SGRP handled Wake Smith’s fellowship application was consistent with the way Harvard’s conflict of interest policy will eventually emerge and with the way these matters are treated at peer institutions.

Context

Wake Smith is a retired aerospace executive who has become interested in advancing solar geoengineering research. In 2018, Wake collaborated with Gernot Wagner to write an article that drew upon his experience in the aerospace industry. After Wake independently began his research, he and his family wished to support solar geoengineering research and donated funds to SGRP through their personal foundation “The Crows Nest Foundation” (though which they make nearly all of their philanthropic donations). Last fall, Wake became a M-RCBG Senior Fellow at the Harvard Kennedy School’s Mossavar-Rahmani Center for Business and Government (M-RCBG).

This circumstance presents the appearance of a conflict of interest in that people might conclude that the decision to grant the M-RCBG Senior Fellowship was influenced by Wake’s donation. But this was not the case, and internal documentation demonstrates this.

First, Wake's donation was explicitly acknowledged in the Wagner and Smith paper. It stated: "WS began work on this analysis independently. He subsequently became a donor of Harvard's Solar Geoengineering Research Project, co-directed by GW."

Second, David Keith raised the issue of potential conflict of interest in writing as soon as he heard about Wake's formal application from colleagues at M-RCBG. They discussed it and the Harvard Kennedy School independently carried out a review process and concluded that there was not substantive conflict of interest for the following reasons. (a) Wake's donation was to SGRP and no SGRP funds have flowed to M-RCBG. (In other words, Wake's contribution did not go to or benefit the program that he applied to.) (b) Wake's donation to SGRP was small, less than 0.5% of total funds raised by that date. (c) Wake's application was exceptionally strong and would have been awarded based on merit (had a donation never been made). Nevertheless, because of reasonable concerns about the appearance of conflict of interest M-RCBG added a note disclosing the donation on [the webpage](#) that announced Wake's fellowship.

Separately, after Wake was accepted, we took action related to a different matter. After Wake's acceptance, M-RCBG listed David as Wake's faculty mentor because of his subject-matter knowledge of solar geoengineering. David, however, did not realize this was the case, so once he was alerted to this fact, he corresponded with M-RCBG and they immediately replaced him with Joe Aldy as Wake's faculty mentor. In hindsight, David should have understood that he was to be listed as Wake's faculty mentor and declined that duty.

We hope this example demonstrates the often complex questions that can be raised around potential conflict of interest, and how SGRP and Harvard University handles these circumstances, following established policies and principles.

Appendix A

Appendix A may be made public.



Solar Geoengineering Research Program Fund

The gifts of alumni and friends of Harvard University establish the *Solar Geoengineering Research Program Fund*. Housed in the Harvard University Center for the Environment (HUCE), this current-use fund shall support the activities of Harvard's Solar Geoengineering Research Program (SGRP), a research endeavor currently under the leadership of David Keith, Gordon McKay Professor of Applied Physics and Professor of Public Policy, to bring together an interdisciplinary group of faculty from schools such as the Faculty of Arts and Sciences, the Harvard Paulson School of Engineering and Applied Sciences, and the Harvard Kennedy School of Government, to accelerate the understanding of the effectiveness and risks of solar geoengineering.

Toward this end, this fund may support any costs of the project including, but not limited to:

- student research and support;
- exploratory seed grants for faculty;
- post-doctoral fellows, visiting scholars and researchers;
- experimental research and associated equipment;
- workshops, symposia, and conferences;
- administration and staff.

The fund will be managed by Harvard in accordance with its policies, including gift policies. The investment, administration, and distribution of the fund shall be accomplished in accordance with University policies, including gift policies, governing endowment and certain other institutional funds, which may be amended from time to time. Under current policies, a portion of the amount made available for annual spending may be applied to defray direct and indirect facilities and administrative costs.

If, at some time in the future, the designation of these funds is no longer appropriate, the Edgerley Family Dean of the Faculty of Arts and Sciences, in consultation with the Faculty director(s) of HUCE, may direct the fund to another purpose deemed to be best in keeping with the original purpose of this fund.

The following page offers information on how to make a gift to this fund. If you have questions about how to make a gift, please visit the Harvard [website](#) or contact Jane Van Velden at jane_vanvelden@harvard.edu.