Workplan and Operating Guidelines

from

The Advisory Committee to the
Stratospheric Controlled Perturbation Experiment (SCoPEx) Project

Updated: July 27, 2021

Introduction

As a first step in its public-facing work, the Stratospheric Controlled Perturbation Experiment (SCoPEx) Advisory Committee is providing information on its scope of work. This information is intended to provide transparency into the work of the Committee and to serve as an invitation to interested parties to engage with the Committee.

This document includes the following topics:

Members of the Advisory Committee

Michael Gerrard, Andrew Sabin Professor of Professional Practice, Columbia Law School

Michael Kleeman, Visiting Scholar, University of California San Diego and Senior Fellow, UC Institute on Global Conflict and Cooperation

Robert Lempert, Principal Researcher, RAND Corporation and Director, Frederick S. Pardee Center for Longer Range Global Policy and the Future Human Condition

Katharine Mach, Associate Professor, Environmental Science and Policy, University of Miami Rosenstiel School of Marine and Atmospheric Science, and Faculty Scholar, Abess Center for Ecosystem Science and Policy

Leonard Nurse, Retired Professor, University of The West Indies, Centre for Resource Management and Environmental Studies, Faculty of Science and Technology

Raj Pandya, Director, Thriving Earth Exchange, American Geophysical Union

Sally Klimp, Executive Coordinator, SCoPEx Advisory Committee

Advisory Committee Mission and Values

The Committee developed and agreed to the following mission and values through a consensus process.

Mission Statement

The purpose of the Advisory Committee is to provide oversight on the appropriateness of the research and advice on the governance of SCoPEx, operating independently from the Research Team. The Committee's goal is to ensure that any and all SCoPEx project is undertaken in a transparent, responsible, and legitimate manner by ensuring that it contributes to scientific understanding and is guided by meaningful public engagement.

Values

The Advisory Committee embraces the following values to support the mission and guide the decision-making process and the conduct of this research:

Integrity and Impartiality

To meet its goals, the Committee's work must be respected and credible. Each member on the Committee was chosen for their experience as well as their reputation for integrity in international environmental research and governance. The Committee membership is intended to represent a wide range of perspectives, experiences, and expertise that are relevant to governing the experiment. Any circumstance that may present bias in the Committee process must be clearly identified and satisfactorily resolved to avoid inappropriate influence in the review process.

Expert and Evidence-Based Assessment

The Committee will invite and consider diverse scientific, cultural, philosophical, geographic, and ethical input while conducting their work in evaluating the governance and scientific review of SCoPEx. It will make decisions and recommendations based on this input, using its own expertise, while maintaining fidelity to the evidence and striving to be impartial.

Transparency

The Committee membership, terms of reference, operating guidelines, important updates, and relevant materials will be posted and shared on the Advisory Committee's website in a timely manner.

Advancement of Science

The Committee will consider and evaluate the potential contributions of additional solar geoengineering research based on the current state of knowledge. The Committee is committed to advancing knowledge through its work and will assess and, to the extent feasible, identify strategies and options to mitigate any risks associated with SCoPEx.

Engagement, Collaboration, and Social Responsibility

Given the broad societal implications of solar geoengineering research and its potential contribution to the eventual deployment of solar geoengineering at scale, the public should be involved in decisions involving such research. Accordingly, the Committee is committed to embedding principles of engagement, collaboration, and social responsibility into its own work as well in our recommendations to the Research Team and Harvard University.

The Committee will seek engagement from a diverse range of stakeholders, inviting and welcoming diverse perspectives into the conversation. We will make concerted efforts to consult, especially with those who have experienced historical barriers to participation, including Indigenous and local leaders, environmental justice communities, scientific experts, informal and formal community leaders, legal experts, moral and ethical teachers, and environmental leaders, prior to any release of materials in the atmosphere taking place. We recognize that some people or communities may have larger barriers to overcome in an engagement process and we are committed to finding ways around those barriers.

The Committee operates to increase all interested communities' understanding of solar geoengineering, to understand the perspectives of different communities and stakeholders, to gain and attend to input from all interested persons.

The Committee will also work with a view to ensuring that the Research Team establishes a similar goal and process for engagement and collaboration.

SCoPEx Advisory Committee Framework and Deliverables

The SCoPEx project plan includes two primary phases. The Advisory Committee is organizing its work around these two phases.

- Phase 1: Engineering and Platform Test Flight - During this first portion of the project, the Research Team is designing and building the balloon-launched aerial platform (i.e., the gondola) that would be used to conduct the experiment. The culmination of this phase is a Platform Test Flight, which would be conducted to test the durability and maneuverability of the gondola.

Assuming a successful Platform Test, the experiment would move into its second phase:

- Phase 2: Experimental Flight(s) - This phase would include experimental launches in which the platform would carry experimental equipment, including particle deployment and measurement equipment and the release of a small amount (<2 kg) of calcium carbonate into the stratosphere. This phase may include more than one experimental flight.

  The Advisory Committee will focus its work on the first potential experimental flight, but consider activities over the course of long-term research, as appropriate.

Review Process Framework

1. Technical and Scientific Merit Review
    a. Phase I: Engineering Integrity and Safety Review
    b. Phase II: Scientific Merit Review
2. Financial Disclosure
3. Regulatory and Legal Review
4. Societal Engagement and Review

Each review activity is described, briefly, below. The Committee will further develop each work area and share these developments with stakeholders through regular updates to the Committee's website.

1. Technical and Scientific Merit Review

a. Engineering Integrity and Safety Review - Complete

The Engineering Integrity and Safety Review assessed the first proposed platform launch for the SCoPEx project. The Advisory Committee recruited three scientists with expertise in balloon flight dynamics to review SCoPEx's experiment plan. Based on the feedback from reviewers and responses from the research team, the Committee has found no significant or imminent safety concerns. In terms of this technical review, the Committee agrees the research team has successfully met the requirements of this review.

b. Scientific Merit Review - In Progress

The Scientific Merit Review will evaluate the project plan and scope of SCoPEx and its potential contributions to knowledge and understanding of stratospheric particle dynamics. Reviewers will be chosen from appropriate academic fields to assess the Research Team's justification for this small scale field research project and data management plans.

2. Financial Disclosure - Ongoing

The Advisory Committee has worked with the SCoPEx Research Team to conduct a review of the project's funding sources to ensure transparency and public disclosure of all funding information.The Research Team has also agreed to update the Committee with any additional donors over the course of the project.

We will update you as we continue to work with the Research Team on this ongoing process. We hope this information helps the public understand the financial review process and can provide guidance for assessing funding for future solar geoengineering projects.

3. Regulatory and Legal Review - In Progress (dependent on proposed location)

The Advisory Committee will also review applicable local, state, federal and international regulatory requirements for the experiment and evaluate that the experiment is consistent with all applicable regulations and requirements. Lawyers in any countries where outdoor experiments (including platform tests) will be conducted must be involved in this review.

4. Societal Engagement and Review - In Progress

The Committee shares a belief that societal engagement and review is a critical and essential piece of our work and one that we hope will serve as a model for others. To respect that importance, we are committed to an inclusive collaborative process to further develop and refine work in this area. The Committee has developed an outline for the Societal Engagement Process for SCoPEx based on feedback from the public as well as experts in the social sciences, including governance scholars. The Committee will recruit an engagement expert to finalize this process and carry out the engagement process for both the proposed platform launch and scientific flight.

With those considerations, the Committee will make recommendations for a robust engagement process that will provide the opportunity for mutual dialogue and create a pathway to connect the feedback from stakeholders to Harvard University and the Research Team's decision making. We believe that such a process must be responsive to different perspectives, social values, and needs. The Committee's recommended approach will include guidance for consultation with residents and stakeholders in the immediate vicinity of the planned balloon launch. The consultation will be informed by a global perspective.

The Committee will present its societal engagement and review recommendations to the Research Team and Harvard University and consider the implementation of the strategy and feedback from participants. The Committee will evaluate the extent to which the experiment aligns with the feedback and input collected using this strategy and make recommendations for improving that alignment.

The planning, scope and results for each of these review processes will be publicly available for stakeholders and other interested parties.We commit to carrying out this work throughout the duration of the SCoPEx project and we will continue to update our website to share where we are in that process.

Advisory Committee Operating Guidelines

The purpose of the SCoPEx Advisory Committee is to advise on the research and governance of SCoPEx. To ensure the Committee contributes to building an international, transparent, and sustainable solar geoengineering research program, the following guidelines will outline the format for future work. For more information on Committee appointments, please visit the SCoPEx Governance page.

Description of Duties

1. The Committee will engage in formal and public communication with the SCoPEx Research Team. For example, the Committee will receive a formal experiment plan from the Research Team and will produce a formal evaluation in a process that may involve several public iterations. Separately, the Committee may publicly pose questions or recommendations to the Research Team.
    a. Committee deliberations can be private even though their formal statements will be made public.
    b. The Committee will strive for consensus in its findings and recommendations but will present, as needed, dissenting views. It may be appropriate and useful, for example, to produce a primary report and one or more dissenting reports.
    c. The Committee will produce an initial report and set of findings and recommendations in advance of any initiation of SCoPEx field experiments.
    d. The Committee Chairperson will rotate for each meeting and work with the Executive Coordinator to establish the agenda and take on additional responsibilities as needed.
2. The Committee may conduct other activities, such as those related to stakeholder engagement, if they deem them necessary to implement good governance over the experiment.

Meetings

1. The Advisory Committee will meet in person or by conference call or webinar on a biweekly basis. The schedule will be adjusted as needed.
2. The Advisory Committee Executive Coordinator will request an RSVP from members.
3. The Coordinator will send out the meeting agenda and materials to Committee members 1-2 days in advance. Additional reading materials will be sent out 5 days prior.
4. Meeting minutes are written by the Coordinator, reviewed by the Chair, and approved by the Committee.

Quorum

1. A quorum consists of a simple majority of voting members. Participation by speaker telephone, videoconference, or electronic means constitutes presence at meetings of the Committee as long as all members can participate in the proceedings, deliberations, and votes of the Committee.

Committee Communications

1. Website
   The Advisory Committee will post regular updates on its website, which will be maintained by the Executive Coordinator, and hosted independently of the SCoPEx Research Team and Harvard University.

2. Committee Statements

   The Committee will make statements to communicate actions and recommendations of the Committee. These will reflect consensus views, unless otherwise noted. The acting Chairperson will be the first point of contact for press inquiries, though all members may speak on Committee activities.

3. Individual Statements

   Committee members may make individual statements to further explain their personal views.

4. Social Media and Press Engagement
   a. Engagement in dialogues on solar geoengineering with the press or on social media is the choice of individual Committee members.
   b. Press inquiries regarding the work of the Advisory Committee will be shared with the Committee. A list of inquiries and responses will be maintained by the Executive Coordinator. The Executive Coordinator will facilitate response to press inquiries.
   c. Statements to press and on social media concerning the ongoing activities and potential decisions of the Committee will not be made unless drawn from publicly available information on the Committee website or Committee statements.
   d. Individual member opinions concerning SCoPEx or the work of the Committee should not be conveyed on social media or to the press until the work of the Committee is complete.
   e. If there are questions on a particular press issue or concerns surrounding a statement made by a Committee member, it will be brought to the Committee for discussion.

Decision Making

1. Voting must take place at a convened meeting, where a quorum is required for all votes. A motion passes by a vote of the majority present. A member who is unable to attend a meeting can ask that his/her opinion be presented by a surrogate (e.g., the Coordinator), and can recommend a course of action (Approved, Disapprove, etc.; this is most relevant to protocol reviews), the absent member is not afforded an actual vote during the meeting.

   a. Consensus

      The Committee will strive for consensus in its findings and recommendations but will present, as needed, dissenting views. It may be appropriate and useful, for example, to produce a primary report and one or more dissenting reports.

      In the event that consensus cannot be reached, the Committee may release multiple statements.

   b. Disagreements

      Resolution of dissenting views will be achieved by a vote of members, with the acting Chair casting the deciding vote in the event of a tie.

Financial Support

1. Service on the Advisory Committee is uncompensated. Harvard University's Solar Geoengineering Research Program is covering expenses for travel, meeting logistics, and administrative support as necessary.

2. Harvard University's Solar Geoengineering Research Program will provide up to $335,000 to support these activities and may provide additional funding as needed over the course of the Committee's work.

3. A full time Executive Coordinator will serve as the administrator for the Advisory Committee. The duties of the Coordinator are to:
   a. Call and convene each meeting of the Committee.
   b. Attend each meeting and work with the acting Chairperson to create the meeting agenda.
   c. Prepare and approve all meeting agendas in coordination with the Committee Chair.
   d. Provide information to the Committee about SCoPEx and Harvard University, and laws and regulations relevant to the Committee's activities.
   e. Transmit the questions, reports, recommendations and evaluations from the Committee to the SCoPEx Research Team.
   f. Manage online communication through the Committee's website and SCoPEx Advisory Committee mailing list.

4. The Advisory Committee may decide to take on additional activities, such as expert meetings, stakeholder workshops or preparation of technical reports to conduct its work.

Review of Committee Member Conflicts of Interest

1. Every committee member must disclose any potential conflicts of interest as they arise to ensure unbiased judgement in review of the SCoPEx Project.
   a. Committee members should not be able to benefit professionally or financially by making a decision one way or the other on the SCoPEx Research Project.
   b. Committee members must be undecided on whether or not small scale field research on solar geoengineering should be conducted until such time that all review materials (enumerated above) are collected, analyzed and discussed by the Committee.

Selection of New Committee Members

1. The Committee may recruit new members as needed with an eye for:
   a. expertise in non-governmental research governance
   b. experience designing and leading equitable and inclusive societal engagement in science, especially climate sciences
   c. knowledge of climate change response strategies
   d. expertise in climate justice.
2. New members may be selected through an open call for applications posted on the Committee's website and/or a targeted recruitment based on the Committee's specific needs. All potential applicants will be reviewed and voted on by the Committee.

Appendix

Terms of Reference Established by Harvard University

[NOTE: The materials from this point forward were drafted by Harvard University and not the Advisory Committee]

Background and Function

The SCoPEx Research Team sought external advice from a range of stakeholders for governing SCoPEx. Based on this guidance, the Advisory Committee was established as an independent body to provide advice on the research and governance of SCoPEx.

This Advisory Committee has been established under the auspices of the Harvard Dean of the School of Engineering and Applied Sciences, Frank Doyle, and the Harvard Vice Provost for Research, Richard McCullough, who will work as liaisons between the Advisory Committee and the SCoPEx Research Team. The Advisory Committee is providing advice to the Harvard Dean of the School of Engineering and Applied Sciences, the Harvard Vice Provost for Research, and the SCoPEx Principal Investigator, Frank Keutsch.

Transparency and Publicity

The composition and remit of the Search Committee (which selected the Chair of the Advisory Committee), the composition and terms of reference of the Advisory Committee, the reports from the Advisory Committee, and other appropriate materials will be posted on the Harvard University website in a timely manner, in consultation with the Advisory Committee.

In the interest of fostering open dialogue within the Committee, Harvard University and the SCoPEx Research Team will not promote or draw attention to non-public statements of these Committees or their members in the media or other public venues without the express written consent of Search and Advisory Committee members.

Process for establishing the SCoPEx Advisory Committee

An independent Search Committee supported the establishment of the Advisory Committee. This was intended to ensure its independence from the SCoPEx Research Team.

The mandate of the Search Committee was as follows:

- To advise Harvard University about the need for an Advisory Committee and the consequential attributes of that Committee.
- To review the draft terms of reference (ToR) of the SCoPEx Advisory Committee and recommend adjustments to them.
- To identify and recommend one or more candidates to chair the SCoPEx Advisory Committee to the Harvard University Dean of the School of Engineering and Applied Sciences and Vice Provost for Research.
- To assist the Chair in identifying Advisory Committee members to be appointed by the Harvard Dean of the School of Engineering and Applied Sciences and the Harvard Vice Provost for Research.
- To work with the Chair, the Harvard Dean of the School of Engineering and Applied Sciences, the Harvard Vice Provost for Research, and the SCoPEx Principal Investigator to ensure that the Search Committee, the Chair, and the Principal Investigator were satisfied with the final ToR.

Additional notes:
Service on the Search Committee was uncompensated. Search Committee service did not preclude serving on the Advisory Committee itself.
The Principal Investigator provided the Search Committee with a summary of external advice he had previously received about Advisory Committee membership, but the Search Committee was not bound by this advice or other suggestions the Principal Investigator made.

Members of the Search Committee
Chris Field, Stanford University; Peter Frumhoff, Union of Concerned Scientists; Jane Long, Lawrence Livermore National Laboratory (retired)

Advisory Committee Selection
The Search Committee recommended an Advisory Committee Chair who has deep experience and a reputation for balance in international environmental research and governance, and has no significant ties to the SCoPEx Research Team. Search Committee members then supported the Chair in recommending potential Advisory Committee members.

The purpose of the Advisory Committee is:

1. To advise the Harvard Dean of the School of Engineering and Applied Sciences, the Harvard Vice Provost for Research, and the SCoPEx project Principal Investigator on the research and governance of SCoPEx.
2. To advise Harvard University and the SCoPEx Research Team on several arenas, including: (a) The scientific quality and importance of the proposed experiments, including scientific review and processes and standards for transparency; (b) Risks associated with the proposed research program, including environmental and social risks; (c) Effectiveness of risk management including regulatory compliance management of environmental health and safety; (d) The need, objectives and possible formats for stakeholder engagement; and (e) Other issues as deemed necessary by the Advisory Committee.
3. To provide a periodic public written evaluation of the experiment plan in the arenas described above.
4. To ensure that mechanisms are established to share both research outcomes and governance lessons learned from SCoPEx with researchers and diverse stakeholders.

The role of the SCoPEx Research Team in relation to the Advisory Committee is:

1. Take the Advisory Committee's questions and recommendations with the utmost seriousness.
2. Respond publicly and in a timely manner to the Advisory Committee's public questions and recommendations.
3. Not initiate field experiments until after they have responded to the Advisory Committee's questions and recommendations in its initial report.
4. Alter, delay, or cancel the experiment if, taking into account Committee recommendations, Harvard University or the SCoPEx Research Team conclude that failing to do so would imperil Harvard's goal of an international, transparent, and sustainable research program.

The role of Harvard University and specifically the Vice Provost for Research is: 1. Support the Committee in recruiting international Committee members. 2. Facilitate a scientific peer review on behalf of the Committee.