Centre for the Study of Existential Risk

UNIVERSITY OF CAMBRIDGE

A report for CSER supporters

MAY 2023

The University of Cambridge extends its sincere thanks for your support of the activities of the Centre for the Study of Existential Risk (CSER).

Supported by your generosity, the work of CSER researchers is increasing our understanding of, and preparedness for, existential threats to our world.

Navigation

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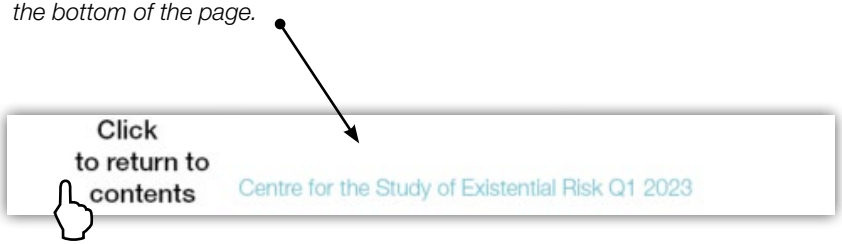


Contents

****This report is confidential and only for the information of the intended recipient****

An introduction from **Seán Ó hÉigeartaigh**

Executive Director, CSER

The Centre for the Study of Existential Risk (CSER) is an interdisciplinary research centre within the University of Cambridge dedicated to the study and mitigation of risks that could lead to civilizational collapse or human extinction. We work primarily on catastrophic biological risks, environmental risks, and on risks from artificial intelligence, as well as on cross-cutting methodologies for the analysis and governance of global risks. Our work is shaped around three main goals:

- **Understanding:** we study existential and global catastrophic risk.
- **Impact:** we develop collaborative strategies to reduce these risks.
- **Field-building:** we foster a global community of academics, technologists and policy makers who share our goals.

This report covers the period January – March 2023 and outlines our activities and future plans. Highlights of the last three months include:

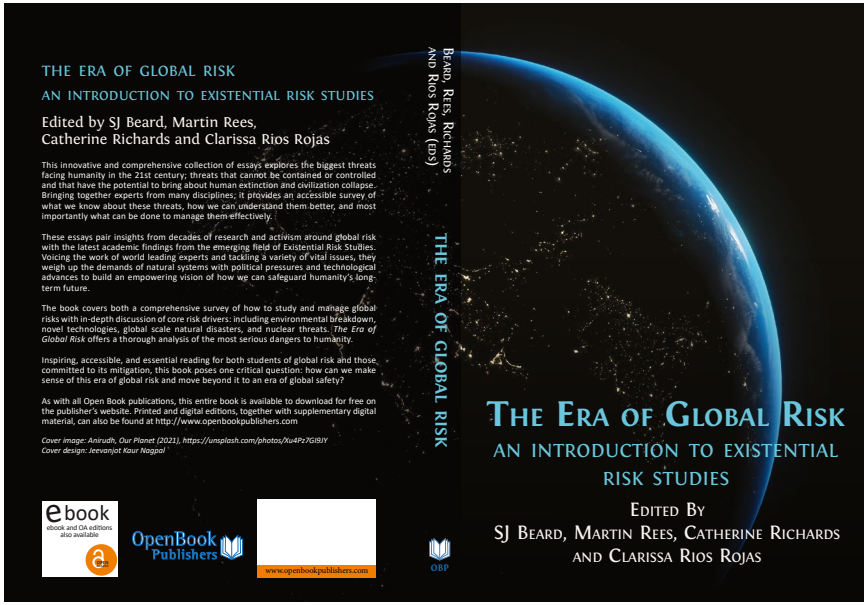
- CSER and affiliates published **five papers** and chapters. CSER researchers also led the production of **three reports**, providing new advice and input into key public and policy discussions.

- Researchers have been involved in important reviews and evaluations of policy, internationally and in the UK. Freya Jephcott was part of a multilateral effort to **refresh WHO guidelines** on emergency response. Clarissa Rios Rojas reported on the outcomes of the pilot programme to **align scientific and policy communities** engaged with Global Catastrophic Risk. AI researchers Shahar Avin and Seán Ó hÉigeartaigh were authors of **responses to UK Government reviews**.

- We hosted a watch-party for the **2023 Doomsday Clock Announcement** along with a live blog on the outcome, a panel discussion to **launch the new CSER book 'The Era of Global Risk'**, two workshops (on space, sustainability and security and geoengineering governance) and a panel discussion launching the new CSER book as part of the Cambridge Festival.

- Media engagement continues to strengthen, including global coverage of a survey of attitudes to nuclear winter in the UK and US. CSER researchers were featured by the **BBC, TRT World News, *Forbes*, the *Daily Mail* and Vox**, among others. CSER produced **five infographics** to explain our work to a wider network, which were widely shared on social media.

- CSER researchers contributed to **conferences in the Southern Hemisphere**. Other CSER researchers gave presentations to European scholarly networks. A group of CSER-affiliated researchers continue to build leadership on the topic of **epistemic security**.



The Era of Global Risk book cover.

1. People

1.1 New Members of Staff

This term we have welcomed two new members to the CSER team.

Maurice Chiodo addresses the ethical challenges and risks posed by mathematics, mathematicians, and mathematically powered technologies. His research looks at the ethical issues arising in all types of mathematical work, including AI, finance, modelling, surveillance, and statistics. He set up the Ethics in Mathematics Project in 2016 and has been its principal investigator since then, delivering seminar series, giving invited talks, and producing scholarly articles in the area. Maurice has direct industry experience with more than 30 startups, having been a member of the Ethics Advisory Group at Machine Intelligence Garage UK for more than 2 years. He comes from a background in research mathematics, holding two PhDs in mathematics, from the University of Cambridge and the University of Melbourne, and has more than a decade of experience working as an academic mathematician on problems in algebra and computability theory.

Alex Marcoci is part of the AI:FAR research project. He studies collective decision-making, argumentation and foresight. He worked on structured expert elicitation techniques for predicting the reliability of research in the social and behavioural sciences (the repliCATS project) and on decision-support tools for measuring and improving the quality of argumentation in intelligence reports (the SWARM project). Alex is the Principal Investigator of the Measuring the Quality of Collective Reasoning project, funded by the British Academy/Leverhulme Small Research Grants (July 2023–December 2024).

He was a Research Associate in Linguistics and Argumentation Theory in the Centre for Argument Technology at the University of Dundee, a Teaching Assistant Professor and core faculty member in the Philosophy, Politics and Economics Program at the University of North Carolina, Chapel Hill and a Fellow in the Department of Government at LSE. He has a PhD in Philosophy from LSE.

1.2 Visiting Scholars

We have welcomed four new visitors during this period:

Mel Cowans researches global catastrophic risk, futures, emerging technologies, and their interactions with contemporary religion. This ranges from the relationships of apocalyptic and millenarian movements to WMDs to techno-eschatological perspectives on 'deific' AI and the Singularity. At CSER, they will be working on 'apocalyptic' terrorism, information hazards, and existential risk from emerging technologies. Mel will be visiting from February to August 2023.

Thomas Moynihan works on the history of ideas, primarily the ways changing theories about the wider universe have transformed human self-conceptions and practical priorities throughout the past, as a building sense of our placement within wider ranges of space, time, and natural history has been pieced together. Currently, he is working on a book project exploring how history's horizons have expanded throughout the past, as people have slowly woken up to the ways present action can scar the entire future for life on Earth, whether through climate disruption, biodiversity loss, or other means. He will be visiting from February 2023 to February 2024.

Gideon Futerman's research interests primarily lie in the interaction of Solar Radiation Modification (SRM/Solar Geoengineering) and existential risk, both assessing how SRM increases and decreases risk, with particular reference to the impacts of near term actions, researching this through the RESILIENCER Project. At CSER, Gideon will primarily be working on scenarios of SRM and Climate Change's interaction with existential risk, and how this relates to research and governance considerations, as well as organising a workshop to further the conversation. He is also interested in how we study existential risk and working on how to best organise the discipline to be suited to its purpose and will also be researching this at CSER. He will be visiting from February to March 2023.

Laura Bullon-Cassis works on youth and future generations' involvement in local and global governance, with a focus on tracing institutional responses to climate justice movements. She draws on postcolonial, feminist, and anti-racist literature to analyse how the social category of "youth" operates in policy spaces along gendered and racial lines.

At CSER, she will participate in a workshop on climate activism as well as in broader discussions around youth movements and climate justice. She has first-hand exposure to multilateral fora through her work with the United Nations, and, as a team leader and writer for the International Institute for Sustainable Development's (IISD) Reporting Services, continues to attend UN environmental conferences worldwide. She was visiting from March to April 2023.

1.2 Research Affiliates

We have welcomed five new research affiliates:

James Ginns is the Head of Risk Management Policy at the Centre for Long-Term Resilience. He was previously Chief Risk Officer of Cathay Pacific and has held a number of other senior leadership positions at the Swire Group. As well as having significant risk management expertise in the private sector, James has extensive experience in the non-profit sector, through a previous advisory role at the Mekong Club, and a previous management role at a UNHCR centre for Vietnamese refugees – both in Hong Kong.

Dennis Müller is a graduate student of mathematics at RWTH Aachen University, Germany. Before that, he attended Bonn University and obtained his undergraduate degree from the University of Cambridge. He also has a professional background in software development. Dennis's current research focuses on ethics in mathematics and operations research. He studies ethical challenges and societal risks related to modern mathematical technologies, including AI, modelling, and finance.

Andrew Tanentzap is Canada Research Chair in Climate Change and Northern Ecosystems at Trent University. He was previously based at the University of Cambridge where he was Professor of Global Change Ecology and led the Ecosystems and Global Change Group in the Department of Plant Sciences and Conservation Research Institute from 2013 to 2023. He is internationally recognised for work at the interface of ecology, evolutionary biology, and biogeochemistry, making fundamental discoveries in understanding how environmental change impacts both biodiversity and the benefits people receive from nature, including carbon sequestration, food production, and drinking water. His recent research has begun tracking the emergence of environmental pathogens in a warming Arctic with a focus on empowering community-led surveillance systems.

Sarah Dryhurst is a Senior Research Fellow at the UCL Institute for Risk and Disaster Reduction. Her background is in psychology and ecology, and her current research forms part of the EU RiskPACC project, focusing on developing and evaluating co-created solutions to build disaster resilience by bridging the risk perception action gap between citizens and civil protection authorities. She also researches how people understand and respond to communications of risk and uncertainty across domains, from climate change to earthquakes to COVID-19, and how misinformation may influence how people think about these issues, and act in response to them. Prior to joining IRDR, Sarah was a Research Associate at the Winton Centre for Risk and Evidence Communication at the University of Cambridge.

Allan Dafoe's mission is to help steer AI for the benefit of all humanity. Allan is lead of the Long-term Strategy and Governance Team at DeepMind; President, Centre for the Governance of AI; Co-Founder, Cooperative AI Foundation; former faculty University of Oxford and Yale.

1.3 Leavers

We have sadly said goodbye to two of our researchers, who will remain CSER Research Affiliates.

Clarissa Rios Rojas secured a place on the Chief Technology Officer Programme at Cambridge Judge Business School.

Luke Kemp has a research fellowship at the University of Notre Dame, starting in August 2023. He continues to work on the manuscript for his second book.

2. Events, Engagement and Outreach

2.1 Academic engagement

This period saw substantive engagement with a growing range of academic networks. Haydn Belfield, Lara Mani and Tom Hobson contributed to conferences in the Southern Hemisphere. Other CSER researchers gave presentations to European scholarly networks, including through networks at UCL and the Cambridge Judge Business School. A group of CSER affiliated researchers continue to build leadership in epistemic security with a well-received contribution to discussions of automated influence operations.

- 6 to 8 January: Haydn Belfield attended EAGx Latin America
- 10 January: Paul Ingram gave a talk about the latest research on the global effects of nuclear war and examine some of the consequences for strategic risk management.at UCL Institute for Risk and Disaster Reduction
- 17 January: Shahar Avin, CSER affiliate Elizabeth Seger, LCFI's Giulio Corsi and Aviv Ovadya wrote a detailed response to OpenAI, CSET, and SIO's report on 'Generative language models and automated influence operations', investigating the impacts of Large Language Models (LLMs) like GPT-4, ChatGPT or BLOOM
- 17 January: Professor Yamashiki and student Kiana Tomita visited CSER to extend our memorandum of understanding on an academic partnership with Kyoto University's Graduate School of Advanced Integrated Studies in Human Survivability (GSAIS). CSER affiliate Julius Weitzdörfer, a previous visitor to Kyoto, joined the event
- 19 January: Lalitha Sundaram lectured on 'Social Dimensions of Synthetic Biology' for Imperial College London's Undergraduate Synthetic Biology course
- 30 January to 3 February: Lara Mani attended the scientific assembly of the International Association of Volcanology and Chemistry of the Earth's Interior in Auckland, New Zealand. She spoke about research on 'A unified approach for improving global preparedness for large magnitude volcanic eruptions'. She met with high-level representatives from the World Meteorological Organization and academic leaders in volcanology
- 30 January: Jessica Bland and Maurice Chiodo attended a workshop on entrepreneurship, governance and existential risk, organised by the Cambridge Judge Business School in Cambridge with colleagues from Ludwig Maximilian University of Munich
- 31 January: Lalitha Sundaram met Richard Milne from the Kavli Centre for Ethics, Science and the Public
- 13 to 19 February: Tom Hobson attended a workshop in South Africa hosted by the Synbio Africa Global Catastrophic Biological Risks Initiative

- 20 February: CSER welcomed Dr Khamarrul Azahari Razak, Director of Disaster Preparedness & Prevention Center at the Malaysia-Japan International Institute of Technology

- 23 February: Lara Mani met with the Environment and Societies group at the University of New South Wales in Sydney and the iCinema, who focus on visualisation of risk

- 28 February: Lara Mani met with the Behaviour Works Group at Monash University

- 1 March: Lalitha Sundaram and Tom Hobson attended a workshop at the University of Brighton on AI and Chemical/ Biological Weapons, hosted by the Harvard-Sussex Program

- 15 March: Lara Mani gave a talk at the University of Exeter Volcanic and Wildfire plumes workshop with the Met Office and Reinsurers on 'How prepared are we for large magnitude volcanic eruptions?'

- 17 to 19 March: Martin Rees, Haydn Belfield, SJ Beard, and Lara Mani spoke at EAxCambridge, along with affiliates Shin-Shin Hua, Sam Hilton and Dave Kreuger. They covered topics from diversity and pluralism in existential risk studies to competition policy and AI governance

- 24 March: Lalitha Sundaram met with Marie Buhl from Rethink Priorities

- 29 March: Lara Mani and colleagues from St Vincent presented 'St Vincent Eruption 2020-2021: Evaluation of the volcanic crisis communications campaign' to stakeholders on the island at Explosions, Ash and Lahars, St. Vincent and the Grenadines Country Conference.

2.2 Policy Engagement

- CSER researchers have been involved in important reviews and evaluations of policy, internationally and in the UK. Freya Jephcott was part of a multilateral effort to refresh WHO guidelines on emergency response. Clarissa Rios Rojas reported on the outcomes of the pilot programme to align scientific and policy communities engaged with Global Catastrophic Risk. AI researchers Shahar Avin and Seán Ó hÉigeartaigh were authors of responses to UK Government reviews. The team continues to meet with high-level policy makers individually.

- 31 January: publication of new WHO guidance for responses to emergencies, developed by a working group of 69 people from more than 20 organisations including CSER's Freya Jephcott

- 31 January: Jessica Bland joined the launch of the 2023 programme of The National Strategy for Next Generations (NSxNG), a joint initiative led by the School of International Futures with CSER as a partner. It is exploring how listening and visioning exercises with young and diverse communities can connect to formal national strategic planning policy processes

- 1 February: Ellen Quigley and colleagues from the Shareholder Commons and Oxford University submitted a response to the UK's Financial Conduct Authority's consultation on measures aimed at clamping down on greenwashing.

- 20 February: Clarissa Rios Rojas and the CSER Science-Policy Interface (SPI) expert group published the outcomes of their pilot programme to investigate and better understand how science and policy communities can become more closely aligned

- 20 February: Lalitha Sundaram met with Isabel Webb, Head of

Technology Strategy at the Department for Science, Innovation and Technology as part of Isabel's CSaP fellowship

- 12 March: Lalitha Sundaram met with Megan Palmer, the Senior Director of Public Impact at Ginkgo Bioworks and previously Executive Director of Bio Policy & Leadership Initiatives at Stanford University

- 13 March: The Centre for Long-Term Resilience, Centre for the Study of Existential Risk, Centre for the Governance of AI and OpenAI published a joint response to the UK's Future of Compute Review

- 14 March: Jochem Rietveld met with Sebastiano Lustig from the European Commission as part of Lustig's CSaP fellowship

- 17 March: Lalitha Sundaram, Lara Mani and affiliate Sarah Dryhurst supported a United Nations Office for Disaster Risk Reduction workshop on Hazards with Global Catastrophic Risk escalation potential as part of their ongoing work for the agency

- 29 March: the United Kingdom Government released its 'AI regulation: A pro-innovation approach' white paper. Research from CSER was cited in the report. Several LCFI and CSER researchers commented on the white paper when it was released.

2.3 Public Engagement

This period saw high-profile media engagements, including several engagements based on Paul Ingram's survey of attitudes to nuclear winter in the UK and US. CSER researchers were featured by the BBC, TRT World News and Vox, among others. Lara Mani was involved in public outreach with a team at the Natural History Museum. Freya Jephcott featured in a panel at the Cambridge Festival. CSER produced five infographics to explain our work to a wider network, which were widely shared on social media.

- 1 January 2023: Lara Mani's interview about the Tonga eruption appeared on DW Espanol

- 7 January: Lara Mani was part of a group of researchers from the Volcano and Magmatic Studies group leading public engagement workshops to learn how to study volcanoes and get hands-on experience with specimens at the Natural History Museum as part of Volcano Day

- 18 January: Lara Mani was interviewed as part of a BBC Future article on 'Malacca Strait: How one volcano could trigger world chaos'

- 14 February: There was international, tabloid and broadsheet coverage (end of page) of Paul Ingram's survey of awareness in UK and US populations of 'nuclear winter', including in the Daily Mail, Forbes and El Mundo

- 17 February and 20 March: CSER produced five infographics on key areas of research, from trends and governance in biorisk to climate change. These have been widely shared on social media. For example, the AI:FAR infographic was viewed more than 600 times on LinkedIn during the first week it was posted

- 24 February: Paul Ingram wrote an opinion piece for NATO Watch on the Russian suspension of the NewSTART treaty

- 27 February: Paul Ingram appeared on Turkish broadcaster TRT (from 20:00), commenting on the potential consequences of suspending the NewSTART treaty for the global population

- 7 March: Haydn Belfield wrote an article 'What Peter Thiel gets wrong about existential risk' that was published on Vox

- 23 March: Martin Rees co-authored a piece in the Hindustanian Times with Shivaji Sondhi and K VijayRaghavan arguing that the G20 set up an international panel on technological change

- 27 March: Freya Jephcott joined other experts on a panel at the Cambridge Festival to discuss reasons why a zoonotic infection may occur and what kind of protective strategies we might adopt in the future

- 30 March: CSER researchers Sean Ó hÉigeartaigh, Shahar Avin and John Burden responded to the 'Pause Giant AI Experiments: An Open Letter' led by the Future of Life Institute in interviews with several media outlets, including BBC World at One and the BBC World Service

- 30 March: John Burden spoke to the Bulletin of Atomic Scientists about using GPT-4 for unconventional weapons.

2.4 Events

In this period, we hosted a watch-party for the 2023 Doomsday Clock Announcement, a panel discussion to launch the new CSER book 'The Era of Global Risk', two workshops (on space, sustainability and security and geoengineering governance) and a panel discussion launching a new CSER book as part of the Cambridge Festival. Researchers are taking full advantage of the return to fully in-person events, attending many other conferences and giving talks during this period, and many of these events have led to further collaboration and research initiatives.

- 24 January 2023: CSER hosted a watch-party for 2023 Doomsday Clock Announcement and researchers wrote a joint response, posted that day, commenting on specific risks from nuclear to biosecurity. They emphasised how multilateral and interdisciplinary approaches can make progress even in times of unrest

Martin Rees and Haydn Belfield at EAXCambridge, as referenced on page 9

- 13 and 14 March: Tom Cernev and Jess Bland hosted a workshop on space sustainability and security with experts from space research and policy space workshop, exploring the risks and additional opportunities posed by space technology for sustainable development goals

- 21 March: CSER hosted a panel discussion to launch the new CSER book 'The Era of Global Risk' as part of the Cambridge Festival. The panel included three of the book's contributing authors, with SJ Beard acting as chair and Martin Rees providing introductory remarks. A video of the discussion is available online

- 28 and 29 March: SJ Beard and Gideon Futerman hosted a workshop on Managing the Contribution to Global Catastrophic Risk from Climate Change and Solar Radiation Modification (SRM). The workshop will critically reflect upon the results of a participatory futures exercise looking at possible forms of SRM governance.

3. Publications

3.1 Papers

Freya Jephcott published a paper in *Medical Anthropology* presenting the case of a fictional monkey-filled forest that was identified as the source of a zoonotic outbreak in Ghana in 2010. The paper demonstrates how the outcomes of an infectious disease investigation are not always easily reconcilable with empirical evidence – in this case the urban environment where the outbreak began.

> Propagating Visions of a Forest Reservoir in *Medical Anthropology* on 25 January 2023 by Freya Jephcott.
>
> When examined closely, the backgrounds of some of the most widely cited origin stories for zoonotic disease outbreaks have been found to be irreconcilable with empirical data. Stated simply, these explanatory landscapes do not appear to have existed. Here, I present a detailed case study of one such fictional landscape, that of a monkey-filled forest which was identified as the source of a suspected zoonotic outbreak in the Brong-Ahafo Region of Ghana in 2010. Taking my approach from cultural epidemiology, I elucidate the mechanisms by which this fictional landscape was constructed and transmitted among the professionals involved in the response.
>
> In early 2011, an epidemiological investigation was undertaken into an apparent outbreak of B virus, a monkey-borne simian herpes virus, in children in the then Brong-Ahafo Region (BAR) of Ghana. The investigating team reported that the affected children were all from communities bordering a forest-belt and that the children had likely become infected interacting with the wild monkeys that inhabited it. Over the following two years, a variety of research coalitions, comprised of both Ghanaian and foreign doctors and researchers, investigated the outbreak. When subsequent laboratory testing cast doubt on B virus being the causative agent, these projects pivoted to consider other zoonotic diseases associated with animals believed to inhabit the forest-belt. These later projects were never fully realised and attention around the outbreak petered out without any generalizable knowledge having been generated nor any public health intervention taking place. This series of events is curious for a number of reasons, not least because there was no forest-belt in the affected area. In fact, the majority of affected children come from the sprawling, largely barren, city of Techiman and none of the children nor their families had encountered any wild monkeys. In short, these protracted public health responses were organised in response to a landscape that did not exist.

Lara Mani and CSER affiliate Mike Cassidy were co-authors of a literature review and reconstruction simulations of the Tambora eruption in 1815. Islands saw fewer climatic impacts than continental sites, with the smallest temperature anomalies in the Indian Ocean and the tropics and subtropics of the Southern Hemisphere.

> Impact of the Tambora volcanic eruption of 1815 on islands and relevance to future sunlight-blocking catastrophes in *Nature Scientific Reports* on 4 March 2023 by Nick Wilson, Veronika Valler,

Michael Cassidy, Matt Boyd, Lara Mani and Stefan Brönnimann.

Island nations may have potential long-term survival value for humanity in global catastrophes such as sun-blocking catastrophes from nuclear winter and large magnitude volcanic eruptions. One way to explore this issue further is to understand the impact on islands after the largest historically observed volcanic eruption: that of Mt Tambora in 1815. For each of the 31 large, populated islands selected, we conducted literature searches for relevant historical and palaeoclimate studies. We also analysed results from a reconstruction (EKF400v2), which uses atmospheric-only general circulation model simulations with assimilated observational and proxy data. From the literature review, there was widespread evidence for weather/climate anomalies in 1815–1817 for these islands (29/29 for those with data). But missing data was an issue for other dimensions such as impaired food production (seen in eight islands out of only 12 with data). Based on the EKF400v2 reconstruction for temperature anomalies (compared to the relatively "non-volcanic" reference period of 1779 to 1808), the islands had lower temperature anomalies in the 1815–1818 period than latitudinally equivalent continental sites (at 100 km and 1000 km inland). This was statistically significant for the great majority of the comparisons for group analyses by hemisphere, oceans, and temperate/tropical zone. When considering just the islands, all but four showed statistically anomalous temperature reductions in the 1816–1817 period (for most $p<0.00001$). In the peak impact year of 1816, the lowest anomalies were seen for islands in the Southern Hemisphere ($p<0.0001$), the Indian Ocean ($p<0.0001$), and in the tropics and subtropics of the Southern Hemisphere ($p=0.0057$). In conclusion, the findings of both the literature review and reconstruction simulations suggest climatic impacts of the Tambora eruption for nearly all these 31 large islands, albeit less than for continental sites. Islands with the smallest temperature anomalies were in the Southern Hemisphere, in particular the Indian Ocean and the tropics and subtropics of the Southern Hemisphere.

A WHO paper reviewed outbreaks of unknown origin in complex settings, based on a study by Freya Jephcott. It highlights concerns about the current state of outbreak responses and significant challenges for pandemic prevention. Three of 10 investigations that were reviewed identified no convincing cause of the outbreak. All investigations were complicated by factors such as malnutrition, co-infections, poor infrastructure, and degraded environments. In most cases these were also driving the outbreaks.

Investigating outbreaks of initially unknown aetiology in complex settings: findings and recommendations from 10 case studies in *International Health* on 11 January 2023 by Anne Perrocheau, Freya Jephcott, Nima Asgari-Jirhanden, Jane Greig, Nicolas Peyraud and Joanna Tempowski.

Background

Outbreaks of unknown aetiology in complex settings pose challenges and there is little information about investigation methods. We reviewed investigations into such outbreaks to identify methods favouring or impeding identification of the cause.

Methods

We used two approaches: reviewing scientific literature and soliciting key informants. Case studies were developed through interviews with people involved and triangulated with documents available from the time of the investigation.

Results

Ten outbreaks in African or Asian countries within the period 2007–2017 were selected. The cause was identified in seven, of which two had an unclear mode of transmission, and in three, neither origin nor transmission mode was identified. Four events were caused by infectious agents and three by chemical poisoning. Despite differences in the outbreaks, similar obstacles were noted: incomplete or delayed description of patients, comorbidities confounding clinical pictures and case definitions wrongly attributed. Repeated rounds of data collection and laboratory investigations were common and there was limited capacity to ship samples.

Sabin Roman contributed the chapter on Collapse in a new dictionary that brings together terms used in ecological economics. Assembling contributions from distinguished scholars, it provides an intellectual map to this evolving subject ranging from the practical to the philosophical.

Collapse in the *Dictionary of Ecological Economics: terms for the New Millennium* edited by Brent M. Haddad and Barry D. Solomon on 23 February 2023 by Sabin Roman.

Former CSER affiliate Bonnie Wintle was co-author on a paper detailing how groups of experts can predict replicability of scientific results without the costs of full replication of that scientific experiment.

Predicting reliability through structured expert elicitation with the repliCATS (Collaborative Assessments for Trustworthy Science) process in 'PLoS ONE' on 26 January 2023 by Hannah Fraser, Martin Bush, Bonnie C. Wintle, Fallon Mody, Eden T. Smith, Anca M. Hanea, Elliot Gould, Victoria Hemming, Daniel G. Hamilton, Libby Rumpff, David P. Wilkinson, Ross Pearson, Felix Singleton Thorn et al.

As replications of individual studies are resource intensive, techniques for predicting the replicability are required. We introduce the repliCATS (Collaborative Assessments for Trustworthy Science) process, a new method for eliciting expert predictions about the replicability of research. This process is a structured expert elicitation approach based on a modified Delphi technique applied to the evaluation of research claims in social and behavioural sciences. The utility of processes to predict replicability is their capacity to test scientific claims without the costs of full replication. Experimental data supports the validity of this process, with a validation study producing a classification accuracy of 84% and an Area Under the Curve of 0.94, meeting or exceeding the accuracy of other techniques used to predict replicability. The repliCATS process provides other benefits. It is highly scalable, able to be deployed for both rapid assessment of small numbers of claims, and assessment of high volumes of claims over an extended period through an online elicitation platform, having been used to assess 3,000 research claims over an 18-month period. It is available to be implemented in a range of ways and we describe one such implementation. An important advantage of the repliCATS process is that it collects qualitative data that has the potential to provide insight in understanding the limits of generalizability of scientific claims. The primary limitation of the repliCATS process is its reliance on human-derived predictions with consequent costs in terms of participant fatigue although careful design can minimise these costs. The repliCATS process has potential applications in alternative peer review and in the allocation of effort for replication studies.

3.2 Reports

WHO guidance for responses to emergencies co-authored by Freya Jephcott. This operational guidance aims to guide decision-making on when and how to implement and strengthen Early Warning Alert and Response (EWAR) in preparation for and response to emergencies.

Early Warning Alert and Response in Emergencies: an operational guide published on 31 January by the World Health Organization.

Populations affected by emergencies are continually at risk of outbreaks of epidemic-prone diseases and other public health hazards. This operational guidance aims to guide decision-making on when and how to implement and strengthen Early Warning Alert and Response (EWAR) in preparation for and response to emergencies. Each module aims to provide updated operational guidance for EWAR practices, which may be more easily understood and applied during emergencies. Through its application, this operational guidance aims to contribute to:

- Earlier detection of acute public health events
- Earlier and more effective response
- Reduced impact of emergencies on health
- Increased trust of the population in the (public) health system
- Fulfilling our collective commitments to the International Health Regulations (IHR, 2005).

Paul Ingram from CSER published an opinion poll on nuclear winter awareness suggesting a low public awareness of likely global 'nuclear winter' climate effects from mass nuclear detonations, yet a strong reluctance to support nuclear retaliation in response to a fictional Russian nuclear attack on Ukraine.

Public awareness of nuclear winter and implications for escalation control a CSER report on 14 February 2023 by Paul Ingram.

In an opinion poll released by Paul Ingram, CSER Senior Research Associate, it was found that despite risks of a nuclear exchange being at their highest for 40 years, there is a lack of awareness among UK and US populations of "nuclear winter", the potential for catastrophic long-term environmental consequences from any exchange of nuclear warheads. This sees detonations from nuclear exchanges throw vast amounts of debris into the stratosphere, which ultimately blocks out much of the sun for up to a decade, causing global drops in temperature, mass crop failure and widespread famine. Combined with radiation fall-out, these knock-on effects would see millions more perish in the wake of a nuclear war – even if they are far outside of any blast zone.

The survey, conducted online on 25 January 2023, asked 3,000 participants – half in the UK, half in the US – to self-report on a sliding scale whether they felt they knew a lot about "nuclear winter", and if they had heard about it from:

- Contemporary media or culture, of which 3.2% in the UK and 7.5% in the US said they had.
- Recent academic studies, of which 1.6% in the UK and 5.2% in the US claimed they had.
- Beliefs held during the 1980s, of which 5.4% in the UK and 9% in the US said they still recalled.

The survey also presented all participants with fictional media reports from the near future (dated July 2023) relaying news of

nuclear attacks by Russia on Ukraine, and vice versa, to gauge support in the UK and US for western retaliation. In the event of a Russian nuclear attack on Ukraine, fewer than one in five people surveyed in both countries supported in-kind retaliation, with men more likely than women to back nuclear reprisal: 20.7% (US) and 24.4% (UK) of men compared to 14.1% (US) and 16.1% (UK) of women.

The survey used infographics summarising nuclear winter effects laid out in a recent study led by Rutgers University (published by Nature in August 2022). Half the survey sample in each country (750 in the UK and US) were shown the infographics before they read the fictional news of nuclear strikes, while the other half – a control group – were not.

Support for nuclear retaliation was lower by 16% in the US and 13% in the UK among participants shown the "nuclear winter" infographics than among the control group. This effect was more significant for those supporting the parties of the US President and UK Government. Support for nuclear retaliation was lower by 33% among UK Conservative Party voters and 36% among US Democrat voters when participants were briefly exposed to recent nuclear winter research.

Following a pilot project and workshop in 2022, Clarissa Rios Rojas led the publication of a CSER report on the complex challenge of the multi-region and trans-cultural governance of Global Catastrophic Risks and Existential Risks. Paul Ingram and former CSER visitor Yee Kuang Heng are co-authors.

Building a Science-Policy Interface for tackling the Global Governance of Catastrophic and Existential Risks a CSER report on 20 February 2023 by Clarissa Rios Rojas, Benjamin Payne, Yee Kuang Heng, Adam Fysh, Angela Kane, Jean-Marc Rickli, Kristel Fourie, Paul Ingram, Juan B. García Martínez, Mayleen Cabral, Jake Okechukwu Effoduh.

As recent literature and reports outlined, achieving action and transformative change from science outputs is often impeded by misalignment across networks and communities of practice. This frequently restricts the advancement of both science-in-policy and policy-in-science. The complex, cascading, and system issues in the global risk context demand major transformation in mindset and policy implementation. Yet, this is impeded by the scarce communication and reduced accessibility of scientific evidence/policy ideas between researchers and policymakers.

We need to reinforce more significant synergies between science/knowledge production and policy practice to ensure that research outputs are more relevant to decision-making and support more resilient governance outcomes. Consequently, the CSER Science-Policy Interface (SPI) expert group was created as a multi-organisational collaboration that sought to investigate and better understand how science and policy communities can become more closely aligned. Its main aim is to inform and enhance the co-delivery of policy approaches and recommendations that more actively support global (as well as regional and more localised) governance of GCRs.

This report summarises the collective work of colleagues from more than 30 organisations from different continents (Asia, America, Africa and Europe) from 2021 to 2023. This work started with a scoping exercise (February 2021), followed by establishing the GCR-SPI expert group (July 2021). We then hosted an online workshop (October 2021), monthly meetings (January to May 2022) and an in-person workshop (October 2022) at the University of Cambridge.

As outlined and evaluated in the following report, the CSER-SPI was able to:

- Increase awareness about GCRs beyond academia through knowledge sharing among members from different backgrounds and disciplines.
- Foster trust between our members working in academia and policy.
- Identify critical points in GCR research and policy that can be improved.
- Amplify the views from the Global South in regard to GCR management.
- Produce this report, so the lessons learned can be shared with the broader community.

Thanks to the creation of the GCR-SPI expert group, our members have engaged in various collaborative initiatives. Some include working with various UN offices, collaborations with the World Economic Forum members and wider-reaching regional organisations such as the Inter-American Institute for Global Change Research and the Asian Disaster Preparedness Center, as well as various universities and professional networks. In addition, our members have supported each other in their work on GCRs, by creating policy guides for academics, offering feedback on new grant proposals or giving feedback on policy efforts like the GCR Policy Ideas database created by one of our members.

To think that creating a Science-Policy Interface alone is the solution to complex global challenges would be naive: this is one tool among many. What an SPI like ours does, above all and very successfully, is to facilitate an environment where new relationships can be fostered, where members can think about aligning agendas, re-think old dogmas, build trust, and inspire each other to innovate in research and policy.

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