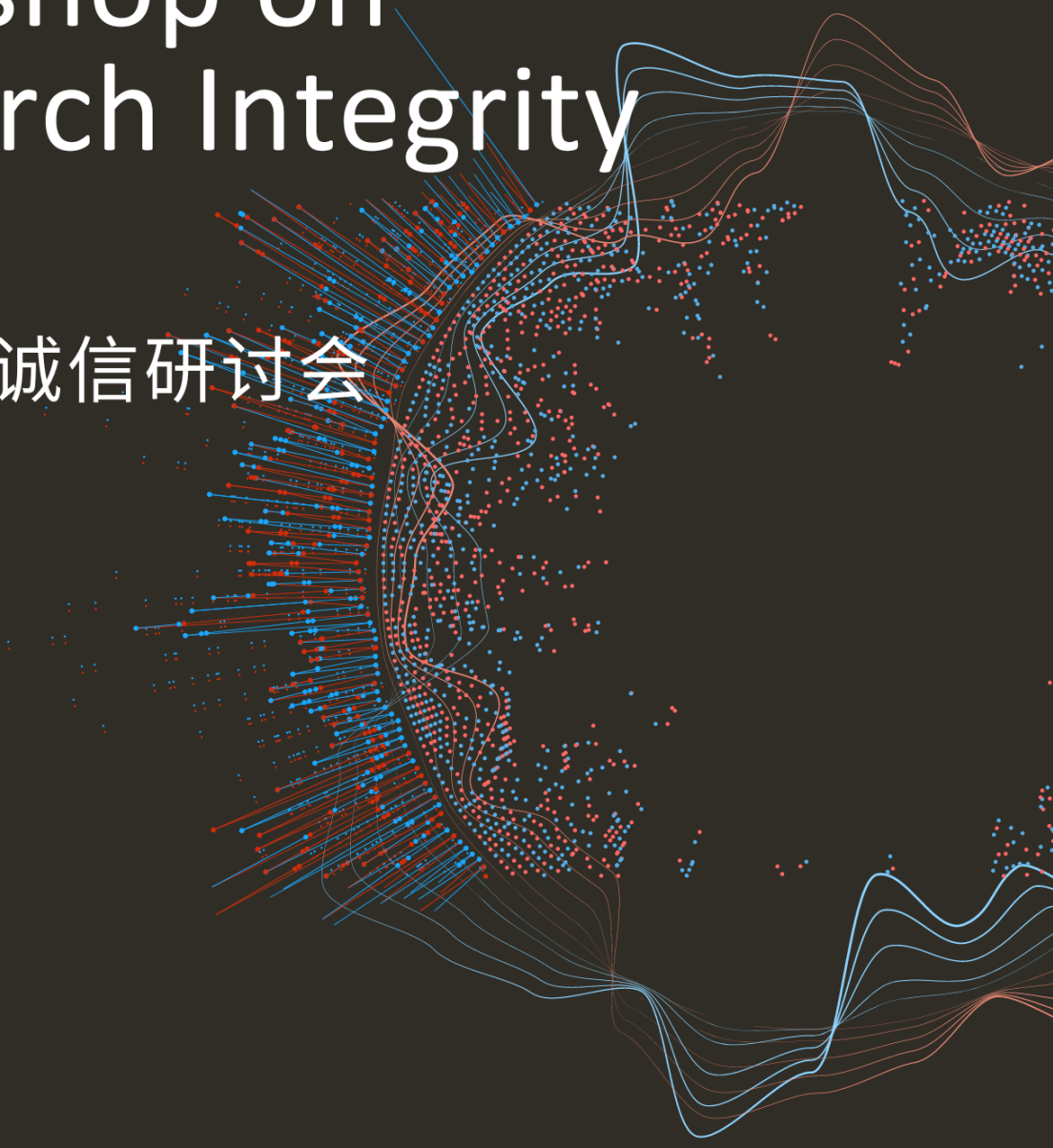
2023

Sino-Swiss Workshop on Research Integrity

中瑞科研诚信研讨会



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Executive Summary

China and Switzerland share some differences, but also many commonalities regarding promoting, safeguarding, and strengthening research integrity. Representatives from the parties of both countries stress reliability, honesty, respect, and responsibility as key values. They also agree that maintaining research integrity is in the collective responsibility of universities, researchers, funding agencies, and publishers. Both countries invest a lot to develop policies and guidelines on research integrity and make efforts to foster a healthy and transparent research culture. Differences remain between the countries' approaches, particularly regarding the sanctioning of academic misconduct. While Switzerland pursues a decentralised approach, leaving sanctioning to the individual institutions, China has established a centralised national reporting body.

The concept of research integrity is not static. Switzerland and China are aware of both the potential and the threat artificial intelligence poses to research integrity. The rapid growth of AI underscores the need for dynamic regulations on the use of new technologies in research, such as ChatGPT. On the one hand, both countries offer best practices on how AI can be a powerful tool to detect scientific misconduct. On the other hand, Switzerland and China are aware that AI makes misconduct significantly harder to spot. Participants agree that the human component cannot be completely replaced when safeguarding research integrity.

Three key recommendations or avenues for future discussions emerged from the workshop:

- **Promote sharing of best practices**. A strong bilateral dialogue on best practices can facilitate alignment between China and Switzerland on scientific integrity, and thus support future research exchanges.

- **Enhance knowledge sharing on rapid technological changes**. Fields such as AI can be both beneficial and detrimental to research integrity. Joint cross-border monitoring and knowledge sharing on new AI developments can maximise its benefits for research integrity, while also limiting its threat.

- **Create and promote international partnerships to communicate scientific misconduct.** The workshop highlighted an increasing appetite for more cross-sector and cross-border partnerships on research misconduct issues, from paper mills to paper retraction monitoring.

1. Purpose of the Workshop

Swissnex in China, Frontiers and the National Science Library of Chinese Academy of Sciences joined forces to co-create a workshop on the topic of Research Integrity, which was held at the Swiss Embassy in Beijing on May 10th. The aim was to facilitate the first bilateral dialogue between Switzerland and China on Research Integrity, foster an exchange of best practices and explore strategies to safeguard and strengthen Sino-Swiss research collaboration.

2. Sino-Swiss Workshop on Research Integrity: Summary of Presentations and Discussions

Research integrity spans a wide variety of issues that are crucial to making science credible and reliable, from preventing plagiarism and research fabrication to improving transparency and scientific rigour. Many stakeholders are involved in safeguarding research integrity, including national agencies, libraries, universities, and publishers. At the first Sino-Swiss Workshop on Research Integrity, Swiss and Chinese stakeholders shared their perspectives, experiences and best practices in safeguarding research integrity.

2.1 Setting the Stage for Research Integrity: Perspectives of National Agencies

National agencies – i.e. national-level organisations that promote and support scientific research - set standards and regulations for research integrity. Across China and Switzerland, national agencies stress the importance of transparency around misconduct cases. For example, the speakers called attention to the need for creating fair rules on research misconduct (such as minimising the length of research misconduct investigations), as well as providing regular national reporting on the frequency and outcomes of misconduct investigations. Another key principle for national agencies is the co-creation of research integrity rules with practising researchers. This enables the creation of scientific field-dependent principles and provides researchers with a sense of ownership of the research integrity rules.

In addition to setting the national-level guidelines on research integrity, national agencies also take responsibility for disseminating them. To raise awareness of the latest standards, national agencies have created comprehensive manuals (such as the Swiss Code of Scientific Integrity, 2021) and informational materials for distribution to individual universities.

2.2 The Role of Bibliometrics in Safeguarding Research Integrity: Perspectives of the Libraries

Institutional libraries in both China and Switzerland use bibliometrics and scientometrics – i.e. statistical and big data approaches to publication-related data - to safeguard research integrity. Bibliometrics help detect cases of academic misconduct, for instance by applying citation networks and knowledge graphs to detect anomalies typical of paper mills. These approaches also identify general trends, such as which institutions and fields of science have

more misconduct cases, or what types of academic misconduct are most common, with actionable implications for stakeholders responsible for promoting research integrity.

While advances in bibliometrics have sparked enthusiasm, they have also prompted caution about relying exclusively on data-driven approaches. Bibliometrics can generate a wide variety of promising analytical tools: for example, they can enable a systematic approach to look for conflicts of interest, or provide quantitative monitoring of Open Science initiatives by flagging publications where the associated datasets have not been published. However, the speakers have also cautioned that human judgement needs to stay at the centre of bibliometrics analyses, to ensure that new tools are not misused and that they serve to strengthen the values held by the scientific community. Ideally, data-driven scientometrics are complemented by approaches such as surveys and qualitative studies, in order to provide a more comprehensive picture of the research integrity landscape.

2.3 The Role of Technologies in Safeguarding Research Integrity: Perspectives of the Journals

Journals contribute to upholding research integrity standards and ensure that published research is transparently and accurately reported. Keynote speakers stressed the important role of journals not only in strengthening ethical standards for the acceptance of manuscripts but also in creating clear and fair mechanisms for the withdrawal of fraudulent publications and for implementing these mechanisms in a timely and transparent manner.

Journal publishers are increasingly using technology to detect scientific misconduct. Scientific fraud has been on the rise in recent years, in part due to the constantly increasing number of publications, thus requiring the development of automated anti-fraud tools. One such tool is the Artificial Intelligence Review Assistant (AIRA) developed by Frontiers. AIRA uses artificial intelligence to detect not only image duplication issues that may be difficult to identify for a human eye, but also peer review manipulations by analysing geographic networks. While automated tools can be powerful for detecting fraud in scientific publications, it is important to note that human judgement remains essential. Some types of image duplications are relevant and useful for scientific publications, and human experts are still needed to determine the context and validity of the detected issues. In short, while technology speeds up and scales up the detection of fraud, it should be used in conjunction with human-centred approaches to ensure research integrity.

2.4 Teaching Research Integrity to the Next Generation: Perspectives of the Universities

Universities and research institutes train the next generation of researchers and are crucial to promoting research integrity. Many universities in Switzerland and China have already designed educational materials on a broad variety of fundamental topics, from ethical issues in modern science to institute-specific regulations on misconduct and whistleblowing. The wealth of existing materials highlights an abundance of valuable best practices and ideas on how to teach research integrity, with many common principles being shared across both countries. The diversity of teaching and training resources also underscores how important it is to adapt the training materials to local contexts so that they reflect the institutional

research culture where they are used. In summary, teaching and training are powerful tools to establish a common and standardised knowledge of research integrity within an institution and across institutions.

2.5 AI-assisted Research: Ready for the New Normal?

AI is set to transform current research ecosystems, for better and for worse. Discussions during the workshop tackled many positive aspects of new developments in AI. AI is used to fight against counterfeits, and Chinese labs have already produced an app to detect AI forgery in scientific publications. Generative AI, in particular, could transform the publishing industry by enabling rapid synthesis of existing literature, thus making scientific knowledge more equally accessible and available to broader audiences, independent of their language or scientific background. Developments in generative AI such as ChatGPT are currently viewed in China mostly as a positive trend, especially given that ChatGPT has not yet caused substantial damage to scientific research practice. However, the potential of future AI technologies is still unclear, and there are some concerns that generative AI could be used to generate counterfeit images, especially in life sciences and medical publications, which could pose a threat to public trust in science.

The rise of AI underscores a need for dynamic regulations on the use of new technologies in research. Panellists agreed that the boundary between AI-assisted research and AI-assisted forgery is currently ill-defined and needs further clarification. For example, ChatGPT can be used to generate entirely new and fictitious texts, but also to polish existing texts and ideas produced by researchers. Similarly, life science researchers regularly use data creation methods to ensure anonymity and to improve statistical inferences in biomedical research. In the near future, it will be increasingly important to build a consensus and draft regulations on how AI should and should not be used in research.

3. The Way Forward on Research Integrity in China and Switzerland

3.1 Common Challenges

China and Switzerland face many common challenges in safeguarding research integrity. Both countries are undergoing efforts to:

- Strengthen research culture;
- Optimise and standardise policies around the investigation, sanctioning and reporting of research misconduct;
- Implement and improve automated detection methods for research fraud;
- Monitor new developments in AI to maximise its benefits for, and limit its threat to, research integrity.

3.2 Shared Principles

Speakers emphasized many commonalities between China and Switzerland in their approaches to safeguarding research integrity. Universities in both countries prioritize reliability, honesty, respect, and responsibility in their research practices, and are similarly focused on improving research culture and strengthening training and awareness around scientific integrity. Additionally, bibliometrics and cutting-edge technologies, such as AI, are used to detect and prevent academic misconduct in both countries and are considered fundamental for the future of research integrity. Moreover, cross-sector and global collaboration is also highly valued in both nations. These similarities constitute potent enabling factors for further bilateral dialogue and collaborations on research integrity.

3.3 Different Approaches

The workshop also highlighted that Switzerland's approaches to safeguarding research integrity tend to be more decentralised than China's. In Switzerland, sanctions against research misconduct are made by individual institutions, whereas in China they are reported via a centralised national reporting body. Similarly, scientometrics approaches in Switzerland are deployed by individual university libraries (e.g. the ETH Library), whereas in China they are carried out centrally by the National Science Library.

4. Recommendations: what can be done to promote further dialogue and collaborations on Research Integrity between China and Switzerland?

4.1 Promote sharing of best practices

The Workshop highlighted a clear enthusiasm for platforms to share best practices on research integrity issues faced by China and Switzerland. The concept of research integrity is not static, and in recent years it has grown to include new concepts such as Findable, Accessible, Interoperable, and Reusable (FAIR) data sharing and the idea of public oversight on scientific integrity. The field of bibliometrics also shows that our understanding of human-centred approaches is constantly evolving. Given these dynamic changes, continuous international exchange of experiences and lessons learned is of paramount importance. Strong bilateral dialogue on best practices can also facilitate alignment between China and Switzerland on scientific integrity, and thus support future research collaborations between the two countries.

4.2 Enhance knowledge-sharing on rapid technological changes

Rapid technological changes in fields such as AI can have both beneficial and detrimental impacts on research integrity. To reap the benefits of AI, knowledge-sharing will be essential to take advantage of new opportunities in a timely manner, for instance by enabling new uses of AI to improve the detection of various types of research misconduct. To minimise potential damages from AI technologies, raising awareness and sharing information on novel examples

of AI-assisted forgery will also be crucial to update anti-fraud systems and to make them robust to AI-generated research fabrication. Moreover, with AI being used increasingly both for genuine research purposes and for research misconduct, there is a clear need for dialogue and for consensus-building about the boundary between AI-assisted research and AI-assisted forgery. Given that China and Switzerland both play a leading role in the development of AI, close technology-focused partnerships in this field may be particularly fruitful for safeguarding research integrity.

4.3 Create and promote international partnerships to communicate about scientific misconduct

There is an increasing appetite for more cross-sector and cross-border partnerships on how to tackle research misconduct. A recent example of this has been the joint report by the Committee on Publishing Ethics (COPE) and the International Association of Scientific, Technical, and Medical Publishers (STM) on paper mills. The report provides detailed guidance on what paper mills are and what types of evidence to look for and aims to help editors and publishers who are managing paper mill cases to navigate common challenges. These practical guidelines were the result of a cross-disciplinary collaboration between publishers, editors, and researchers, and highlight the high potential for broader partnerships and collaborations in tackling research integrity issues. Future partnerships could extend further, and also take place at the level of policy-making bodies such as national agencies, for example, to co-create guidelines on academic misconduct, or to strengthen global retraction monitoring.

Appendix 1. Brief Profiles Of Workshop Creators

Swissnex in China

Swissnex in China, as part of the Swissnex global network, connects Switzerland, China and the world in science, research, education and innovation. Our mission is to support the outreach and active engagement of our partners in the international exchange of knowledge, ideas and talents. The six main Swissnex locations are established in some of the world's most innovative regions: Boston, Brazil, China, India, Japan and San Francisco. Swissnex is an initiative of the State Secretariat for Education, Research and Innovation of Switzerland and is part of the Swiss Confederation's network abroad managed by the Federal Department of Foreign Affairs.

Frontiers

Frontiers is the world's 3rd most-cited and 6th largest research publisher and open science platform. Its research journals are community-driven and peer-reviewed by editorial boards of over 202,000 top researchers. Featuring pioneering technology, artificial intelligence, and rigorous quality standards, its research articles have been viewed more than 1.9 billion times, reflecting the power of open research. The mission of Frontiers is to make science open – so that scientists can collaborate better and innovate faster to deliver the solutions that enable healthy lives on a healthy planet.

National Science Library of Chinese Academy of Sciences

The National Science Library, Chinese Academy of Sciences (NSLC) is the research library service system of CAS as well as the National Library of Sciences in Chinese National Science and Technology Libraries (NSTL) system. NSLC functions as the national reserve library for information resources in natural sciences, interdisciplinary fields, and high-tech fields, serving the researchers and students of CAS and researchers around the country. It also provides services in information analysis, research information management, digital library development, scientific publishing (with its 15 academic and professional journals), and promotion of sciences.

Appendix 2. List of participating institutions

Company or Institution Name	Stakeholder type
Frontiers	Publisher
Science China Press	Publisher
Swiss Academies of Arts and Sciences	National Agency
Natural Science Foundation of China	National Agency
National Science Library, Chinese Academy of Sciences	Library
ETH Library	Library
EPFL Research Office	University
Chinese Academy of Social Sciences (CASS)	University
Society of Chinese University Journals	Society of Publishers

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