

Impact case study (REF3)

Institution: University of Kent		
Unit of Assessment: 20: Social Work and Social Policy		
Title of case study: Promoting Policy and Curriculum Change on the Public Engagement of Science in China		
Period when the underpinning research was undertaken: 2014–2020		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s):	Role(s) (e.g. job title):	Period(s) employed by submitting HEI:
Joy Y. Zhang	Reader of Sociology	2012–present
Period when the claimed impact occurred: 2018–2020		
Is this case study continued from a case study submitted in 2014? No		
1. Summary of the impact (indicative maximum 100 words)		
<p>Despite being the world's second largest investor in science and technology, China's scientific credibility suffers from a lack of transparency and public engagement. University of Kent research conducted by Zhang between 2014 and 2020 has:</p> <ol style="list-style-type: none"> 1. Achieved a significant breakthrough in promoting national policy change on the transparency and public engagement of science in China. 2. Initiated cultural and curriculum change in the Life Sciences in China's higher education sector. 3. Raised international awareness of China's public engagement deficit and informed high-level science funding and governance strategies in the UK and in continental Europe. 		
2. Underpinning research (indicative maximum 500 words)		
<p>China is now the world's second-largest investor in science and technology, and overtook the United States as the largest producer of scientific papers in 2018. Yet, cases such as the CRISPR-baby scandal, in which a Chinese scientist applied illegal reproductive germ-line editing to produce the birth of twin girls, was but one example of how China's deficiency in anticipating, guiding, and responding to social concerns casts a shadow on the public attitude towards research carried out in, and with, China. A series of studies on China's science governance between 2014 and 2020 led by Zhang have identified three key issues that have hindered China from becoming a trusted player in global science:</p>		
Finding 1: 'Post-hoc pragmatism' and the negligence of public engagement		
<p>Despite being a global scientific power, China's public engagement (PE) programme is still at a nascent stage. This is a direct consequence of what Zhang identified as '<i>post-hoc pragmatism</i>', which has been a central regulatory ethos in China's science sector [R1]. The stronghold of pragmatism is exhibited in the fact that the primary aim of scientific research and research oversight has been to minimise public concerns and disputes – delivering technological fixes to social problems without 'unnecessarily' opening up or engaging with public discussion. Unless there is concrete evidence of wrongdoing, Chinese regulators and the scientific community limit their interaction with the public. Consequently, Chinese bio-governance is often <i>post hoc</i> in the sense of being reactive to international criticisms as opposed to being precautionary. Science communication and public outreach have never been included in research funding decisions, and have not been recognised as part of any science curriculum in Chinese higher education [R1].</p>		

Finding 2: The ‘credibility paradox’ in science communication and the need for capacity building

Almost all of the scientists Zhang interviewed explicitly acknowledged the importance of PE, but they also pointed out a ‘credibility paradox’, which significantly discouraged their participation [R3]. That is, scientists felt that contributing to formal channels of public outreach often incurred more public scepticism and contention, as institutional-led communication was often perceived as propaganda. Conversely, scientists without visible institutional and official endorsements seemed to receive more public credibility. This highlights that for China to develop effective science communication that matches its research capacities, institutional cultural change and communicative capacity-building among scientific practitioners are needed [R4].

Finding 3: The need to promote social embeddedness of new biotechnologies in and with China

Through the pilot launch of the Educational Module Resource on PE in leading Chinese universities [R4, R5], and through a series of workshops between the British and Chinese life scientists, ethicists, and regulators in 2017, 2018, and 2019 [R6], Zhang found that, despite increasing transnational collaborations between China and the UK, hitherto there had been no real attempt to develop PE in a transnational manner. This significantly constrains the capacity for both countries to work with intermediaries across different cultural-political contexts and share good practice for better social embeddedness of new biotechnologies.

3. References to the research (indicative maximum of six references)

[R1] Zhang, J. Y. (2017). ‘Lost in Translation? Accountability and Governance of Clinical Stem Cell Research in China’. *Regenerative Medicine*. doi:10.2217/rme-2017-0035. Grant reference: ESRC ES/L009803/1. <https://kar.kent.ac.uk/id/eprint/62238>

[R2] Zhang, J. Y. (2017). ‘Transparency Is a Growth Industry’, *Nature*. 545, S65. Grant reference: ESRC ES/L009803/1. <https://kar.kent.ac.uk/61541/1/S65-Commentary-Joy-Zhang.pdf>

[R3] Zhang, J. Y. (2015). ‘The “Credibility Paradox” in China’s Science Communication: Views from Scientific Practitioners’, *Public Understanding of Science*, 24(8): 913-927. Grant reference: ESRC ES/L009803/1. <https://kar.kent.ac.uk/50567>

[R4] Zhang, J. Y. (2018). *Governing Scientific Accountability in China. Final Report of the ESRC Research Project*. Canterbury: GSA-China. Grant reference: ESRC ES/L009803/1. <https://blogs.kent.ac.uk/gsa-news/files/2018/01/GSA-Project-Report.pdf>

[R5] Liao, M., and Zhang, J. Y (2017). Educational Module Resource for Chinese Scientific Practitioners. Grant reference: ESRC ES/L009803/1, University of Kent GCRF Impact Fund. <https://www.kent.ac.uk/gsa/emr/index.html>

[R6] Zhang, J. Y. (2020). ‘Promoting Social Embeddedness of New Biotechnologies: Co-Developing Public Engagement in and with China’. Grant reference: British Council 2018-RLWK10-10359. <http://blogs.kent.ac.uk/gsa-news/files/2020/05/Newton-Project-Report.pdf>

Funding that supported the above research

[G1] Economic and Social Research Council, Future Research Leaders Grant, Grant Number: ES/L009803/1 (2015-18). Value: £290,171.00.

[G2] University of Kent GCRF Impact Fund: ‘Creating Norms of Public Engagement of Science in Leading Chinese Institutions’ (Spring 2019). Value: £4,482.

[G3]: British Council, Newton Researcher Links Fund, Grant Number: 2018-RLWK10-10359 (January 2019 – February 2020). Value: £44,800.

4. Details of the impact (indicative maximum 750 words)**1) Promoting national policy change on the transparency and public engagement of science in China**

On 3 January 2019, China's Ministry of Science and Technology officially accepted a set of five policy recommendations that were lead-authored by Zhang (a British citizen) as their '*Neican*' [a]. *Neican* refers to valued official policy submissions that are put forward to high-level government officials, this being 'a critical channel for the making and revision of politics and other regulatory changes' in China [b]. The details of the five policy recommendations are as follows (each recommendation's connection to Zhang's underpinning research is noted in parentheses):

1. Building ethics and public engagement teaching into the curriculum of undergraduate and postgraduate science and technology degrees (corresponding to underpinning research Findings 1, 2).
2. Incorporating public engagement into research funding decisions and project management (Finding 2).
3. Improving research and responsiveness to public attitudes towards science (Finding 1).
4. Capacity-building through interdisciplinary and international exchanges (Finding 3).
5. A more proactive approach in joining international ethical governance discussions (Findings 1, 3).

Given the closed nature of Chinese politics, for social research to be featured in *Neican* is highly uncommon, even for academic projects funded by China. To accept *Neican* from a British sociologist and based on a UK-funded project is exceptional.

Given that the writing of this *Neican* spanned over 15 months, and that it was 'reviewed and commented on by officials at various levels at the ministry', the process itself 'has instrumentally brought forward serious deliberations on improving public engagement of science' [b]. For example, the national curriculum changes proposed in the *Neican* have already been followed by coordinated institutional actions. In March 2019, China's Research Institute for Science Popularization (CRISP), a science media centre with direct Government backing, decided to systematically introduce textbooks on science communication, with Zhang as an external expert [c]. Given CRISP's unique nationwide platform, when this textbook series is released in the next two years, it is expected to reach an audience of more than four million [c].

In sum, as a direct result of Zhang's research, a set of nationwide policy recommendations have been accepted through a highly significant official channel, and this has already led to material changes in science education in the most populated country in the world.

2) Ongoing science curriculum change in Chinese higher education

To assist Chinese universities in incorporating PE into their curriculums, Zhang developed a pilot Educational Module Resource (EMR) on PE with detailed teaching instructions in 2017. This set of seven lectures are freely available online, and combine both international experience and Chinese case studies to support scientific practitioners and educators to learn about PE skills and how best to utilise existing communicative platforms [R5].

As of March 2020, the EMR has been fully or partially adopted into the teaching of at least six Chinese higher education institutions, with an annual reach of more than 1,000 science students [d, e]. This includes two institutes at the Chinese Academy of Sciences (Institute for Microbiology and the Institute for the History of Natural Sciences); Tsinghua University; Communication University of China; Yantai University; Beijing University of Chemical Technology; and Beijing Institute of Technology. The EMR was designed not simply to impart 'factual' knowledge on international experience, but to set up a model on 'how to inspire and sustain discussions' within the Chinese context [e]. Students and instructors have described the EMR as an 'eye opener' on how PE can be effectively delivered in China, a country with a limited tradition of public debate [d].

The 'demonstrative effect' [d] of the successful experimentation with the EMR has further convinced CRISP's aforementioned investment in 'systematically introducing teaching materials and channeling educational changes in China' [c].

3. Raising international awareness of China's public-engagement deficit and informing high-level science funding and governance strategies in the UK and in continental Europe

In 2018 and 2019, Zhang's research has been cited at length in *Nature's* annual special review on China [R2, f]. In addition, Zhang was one of the 50 delegates worldwide invited to present at the Second International Summit on Human Genome Editing, the most significant global meeting on the future of gene research governance [g]. She also spoke at the 13th Berlin Debate on Science and Science Policy, an annual non-public forum that aimed for open and critical debate with a small number of high-ranking German and international decision-makers in science such as the President of the European Research Council and *Nature's* Editor-in-Chief [h]. In particular, China is the UK's key strategic partner in science. Since 2018, Zhang has been invited to share her research findings with the Royal Society's Foreign Secretary, the Executive Director and the Science Policy Expert Advisory Committee. Her inputs 'have all been materially helpful in informing the Society's strategic approach to China' [i].

5. Sources to corroborate the impact (indicative maximum of 10 references)

[a] Zhang, J.Y., He, G., and Zhang, W. (2019). 'Revising the priorities of "doings" and "talkings": How to enhance China's voice and leadership role in global science governance.' *Reference on Strategy Research (Zhanlue Yanjiu Cankao)*. 386, 1-4 (This is the *Neican* publication that is not accessible to the public. Details of the policy recommendations are explained in Director He's statement [b], and a photo of the first page of this publication is available).

[b] Statement from the Director of the Chinese Academy of Science and Technology, an in-house research arm for the Ministry of Science and Technology. He is a co-author of the *Neican* publication. His statement corroborates the content and policy significance of the *Neican* publication.

[c] Statement from the Deputy Director of China's Research Institute for Science Popularization. This statement confirms that Zhang's research and her experiment with the EMR have led to the Institute's commitment to textbook development at the end of 2019 and the textbook's expected outreach.

[d] Statement from a Professor at the Chinese Academy of Sciences. The Professor explains that six institutions have fully or partially adopted the EMR, and corroborates the student outreach and feedback.

[e] Statements from a Professor at the Communication University in China. The Professor states how she adopts EMR in her teaching, and her assessment of the value of EMR and international knowledge sharing on public engagement.

[f] Mallapaty, S. (2018). 'Engineering a biomedical revolution', *Nature* 564, S66-S68. *Nature* cited Zhang at length on how China's pragmatic regulatory ethos and ignorance of public communication has facilitated the spread of misconceptions and distrust in science.

[g] The National Academics of Science, Engineering and Medicine (2019) Second International Summit on Human Genome Editing: Continuing the Global Discussion. Proceedings in Brief. This records Zhang's warning on the risk of China's public engagement deficit on global gene research. See especially p. 6.

[h] 13th Berlin Debate on Science and Science Policy Summary Report, March 2018. This is one example of how Zhang's research had fed into the funding and regulatory discussions in the

Impact case study (REF3)

European research community. This is shown in Section 2 of the report (see especially pp. 11-12).

[i] Statement from the Director of International Affairs and Global Strategy at the UK's Royal Society. It details how Zhang's research has been instrumental in the Society's bilateral engagement with China since 2018.