人工智能与 STEM 教育 线上国际研讨会

The International Forum of Artificial Intelligence and STEM Education (IFAISE2020, online conference)

会议手册

Program Book

2020.12.26

中国西安 | Xi'an, China

会议信息

　　人工智能与 STEM 教育线上研讨会（IFAISE2020，线上会议）由王宽诚教育基金会资助，由陕西师范大学（http://www.snnu.edu.cn）主办、中国科学院科普与教育研究支撑中心（http://www.casisd.cn）合办、陕西师范大学教育学院（http://edu.snnu.edu.cn/）承办。本次国际研讨会旨在为人工智能、STEM 教育与科学教育领域的专家学者提供一个分享研究成果、讨论存在的问题与挑战、探索前沿科技的国际性合作交流平台，加强中国科学教育界与国际科学教育界的交流，从不同视角分享、探讨和解决这三个领域所面临的挑战和困难，互相交流借鉴。在技术支持的科技人才培养领域，很多问题有待进一步探索。我们诚挚邀请您与会，与同行们分享您在人工智能与 STEM 教育领域的研究与实践，并将新思路、新研究结论和方法带到会议。

➢ **会议主题：人工智能重新兴起与 STEM 教育发展**

　　人工智能与 STEM 教育主题研究将促进我国新一轮的基础教育改革，可以有效地提升教育教学质量，人工智能融合了一系列前沿技术，为可持续发展和社会变革带来了新的可能，并且对教育产生了深刻的影响，在教育教学方式、教学空间、教育评价等方面进行重大变革，传统的师生"二元关系"走向人机共存的"多元关系"。2015 年，中国教育部发布的《关于"十三五"期间全面深入推进教育信息化工作的指导意见(征求意见稿)》中明确提出：要"探索 STEAM 教育、创客教育等新教育模式"，由此 STEM 教育初步进入我国国策视野，和众多其他国家一样，STEM 教育备受教育研究者关注。STEM 教育，作为跨学科融合教育的典型代表，对我国创新人才培养和科技发展具有重要意义。我国 STEM 教育在教育实践、理论研究和教育政策方面也取得较为明显进展，但是在落实 STEM 教育的实践中仍面临很多挑战。因此，本次国际研讨会旨在加强中国科学教育界与国际科学教育界的交流，使中外学者互相了解各国在人工智能教育应用、STEM 教育与科学教育的现状，分享、探讨和解决这三个方面所面临的挑战和困难，互相交流借鉴。

➢ **大会议题**

　　✓ 人工智能与 STEM 教育的联系
　　✓ 人工智能赋能教育的机遇与挑战
　　✓ 教育大数据与人工智能
　　✓ STEM 教育理论与实践
　　✓ STEM 教育国际比较研究
　　✓ STEM 教育与创客教育
　　✓ 人工智能与未来教育
　　✓ STEM 教育与未来教育

➢ **会议形式**

　　✓ 主旨报告
　　✓ 圆桌论坛
　　✓ 分论坛

About the Forum

The International Forum of Artificial Intelligence and STEM Education (IFAISE2020, online conference) is funded by K. C. WONG Education Foundation, supported by the Ministry of Education of China. It will be hosted by the School of Education, Shaanxi Normal University, Xi'an, China. The conference is co-organized by Shaanxi Normal University (http://english.snnu.edu.cn), and Science Popularization and Education Research Support Center, Chinese Academy of Sciences (http://www.casisd.cn/). We hope IFAISE 2020 (Xi'an) can be a good platform for international science education scholars to share their ideas, experiences, strategies to address opportunities, challenges, especially solutions for science education, artificial intelligence-enabled education and STEM education.

➢ **The Conference Theme：The resurgence of artificial intelligence (AI) and the development of STEM education**

Artificial intelligence (AI) integrates a series of advanced technologies, and brings new possibilities for sustainable development and social change, thus making a profound impact on education. In China, STEM education has initially entered the field of national policy in 2015, at that time, the Ministry of Education issued the "*Guiding Opinions on Comprehensively and Deeply Promoting Educational Informatization during the 13th Five-Year Plan Period (Draft for Solicitation of Comments)*" which clearly stated: "Explore new education models such as STEAM education and maker education". As in some places in other parts of the world, STEM has raised the interests of science and technology educators in China. Significant progress has been made in educational practice, theoretical research and the educational policy of STEM education. However, we are still facing many challenges in the practice of STEM education, especially when we can apply many AI technologies in education. Therefore, this international forum aims to enhance international collaboration and discuss the development, problems and challenges in science and technology education, STEM education, and Artificial intelligence-enabled education.

➢ **Main foci**

✓ The relationship between AI and STEM education
✓ Opportunities and Challenges of Artificial Intelligence-Enabled Education
✓ Big Data and Artificial Intelligence in Education
✓ Theory and Practice of STEM Education
✓ International Comparative Study of STEM Education
✓ STEM Education and Maker Education
✓ STEM Education and Future Education
✓ Artificial Intelligence and Future Education

➢ **Activities on the Forum**

✓ Keynote Speeches
✓ RoundTable
✓ Parallel Sessions

组织机构

陕西师范大学

陕西师范大学是教育部直属、世界一流学科建设高校，是国家培养高等院校、中等学校师资和教育管理干部以及其他高级专门人才的重要基地，被誉为"教师的摇篮"。

学校前身是 1944 年成立的陕西省立师范专科学校，1954 年更名为西安师范学院，1960 年与陕西师范学院合并，定名为陕西师范大学，1978 年划归教育部直属。建校 70 多年来，学校秉承"西部红烛精神"和"厚德、积学、励志、敦行"的优良传统，立足西部，服务全国，已发展成为一所有重要影响的综合性一流师范大学，为国家培养各类毕业生 41.7 万余人，形成了"抱道不曲、拥书自雄"的学风和"淳厚博雅、知行合一"的校风。现任党委书记李忠军教授，校长游旭群教授。

学校位于古都西安，占地面积 2800 余亩，建有长安、雁塔两个校区。长安校区从 2000 年开始建设，目前已成为学校的主校区。长安校区现代开放、气势恢宏，雁塔校区古朴典雅、钟灵毓秀。学校先后被教育部、陕西省人民政府授予"文明校园"称号。

学校不断加大对外交流与合作的力度，先后与美国、加拿大、英国、法国、德国、俄罗斯、澳大利亚、日本、韩国、哈萨克斯坦等 30 多个国家以及香港、澳门、台湾地区的 160 余所高校和教育机构建立了友好合作关系，开展形式多样的交流与合作；积极响应国家"一带一路"倡议，首倡成立了丝绸之路"教师教育联盟""人文社会科学联盟""图书档案出版联盟"。学校自 1965 年开始招收外国留学生，至今已培养了来自全球 103 个国家的各类来华留学生 7900 余人。学校设有"国务院侨办华文教育基地"、国家汉办"HSK 汉语能力考试中心"，作为中方合作院校在美国建有 1 所孔子学院。

2020 年是我国全面建成小康社会、实现第一个百年奋斗目标的决胜之年，也是学校"十三五"规划的收官之年、"双一流"建设的关键之年。陕西师范大学正在全面深入学习贯彻党的十九大和十九届二中、三中、四中全会精神，落实习近平总书记关于教育的重要论述，聚力立德树人根本任务，传承弘扬师大精神，积极推进"双一流"建设，全面提高教育教学质量、科研水平、社会服务能力和国际化水平，努力开创学校事业发展新局面。

About the Organizers

Shaanxi Normal University

Directly administered by the Ministry of Education of China, Shaanxi Normal University, a key university under China's construction plan of "World-class Discipline" and a university under China's Innovation Platform Construction Plan of the"985" Superior Discipline of Teacher Education, is a major base for training teachers and administrators of higher learning institutes and secondary schools as well as other high-level professionals in China, and is known as the "Cradle of Teachers" in China.

The University, situated in the ancient capital city of Xi'an, one of the four internationally renowned historical and cultural cities, was founded in 1944 under its original name "Shaanxi Provincial Teachers' College", and then renamed "Xi'an Teachers' College" in 1954. In 1960, it merged with "Shaanxi Teachers' College" to become "Shaanxi Normal University". In 1978, it was brought under the direct administration of the Ministry of Education of China.

During its more than 70-year history in education, the University, rooted in China's West and embracing the whole country, has developed the "Western Red Candle Spirit" and lived by the motto of "Morality, Learning, Aspiration and Action". It has seen itself become firmly established in Western China as an influential top-tier comprehensive teacher training university, as it strives to achieve the goal of building itself to be a major comprehensive research university distinguished by its teacher education.

The current University CPC Commitee secretary is Prof. LI Zhongjun, while Prof. YOU Xuqun serves as the university president.

中国科学院科技战略咨询研究院简介

　　中国科学院科技战略咨询研究院（以下简称"战略咨询院"）是中国科学院学部发挥国家科学技术方面最高咨询机构作用的研究和支撑机构，是中国科学院率先建成国家高水平科技智库的重要载体和综合集成平台，并集成中国科学院院内外以及国内外优势力量建设创新研究院。

　　战略咨询院设有科技发展战略研究所、创新发展政策研究所、可持续发展战略研究所、系统分析与管理研究所、科技战略情报研究所等 5 个研究所。设有学部咨询研究支撑中心、学部学科研究支撑中心、学部科学规范与伦理研究支撑中心、学部科普与教育研究支撑中心等 4 个学部研究支撑中心，另有第三方评估研究支撑中心，为学部和中科院院部开展第三方评估任务提供支撑。战略咨询院还建有 6 个中科院院级研究中心，包括中国科学院中国创新战略和政策研究中心、中国科学院战略研究中心、中国科学院创新发展研究中心、中国科学院自然与社会交叉科学研究中心、中国科学院管理创新与评估研究中心、中国科学院知识产权研究与培训中心。

　　战略咨询院拥有广泛的学术交流与合作网络。先后与日本、韩国、朝鲜、德国、英国、美国、印度等 20 多家研究机构签署合作交流谅解备忘录，深化与国际著名智库和学术研究机构交流与合作。挂靠管理中国科学学与科技政策研究会、中国优选法统筹法与经济数学研究会等全国一级学会，以及中国发展战略学研究会、中国高技术产业发展促进会等。主办国家自然科学基金委"中国管理科学 A 级重要期刊"《中国管理科学》《科研管理》《科学学研究》，与学部共同主办《科学与社会》学术期刊。《中国科学院院刊》是中科院主办的综合科技类刊物，是国家科学思想库的核心媒体，该刊编辑部挂靠战略咨询院。

　　面向未来，战略咨询院将发挥中国科学院集科研院所、学部、教育机构为一体的优势，从科技规律出发研判科技发展趋势和突破方向，从科技影响的角度研究经济社会发展和国家安全重大问题，聚焦科技发展战略、科技和创新发展政策、生态文明与可持续发展战略、预测预见分析、战略情报等领域，汇聚国内外优秀人才，建设开放合作的战略与政策国际研究网络，为国家宏观决策提供科学依据和政策依据，努力成为全球科学技术和创新发展政策思想引领者。

Pooling elite research forces in related fields both in and outside the Chinese Academy of Sciences (CAS), the CAS Institutes of Science and Development (CASISD) is a research organization supporting the Academic Divisions of CAS (CASAD) to play its role as China's highest advisory body in science and technology, and a comprehensive integration platform for CAS to build a high-level national S&T think tank.

The newly established CASISD has five research institutes (specializing in S&T development strategy, innovation development policy, sustainable development strategy, systems analysis and management, and S&T strategy information, separately), four research centers to support CASAD with their studies (in consultation, academic disciplinary development, scientific norms and ethics, and science publicity and education, separately), and a center of the third-party evaluation to undertake assessment projects from the CAS headquarters and CASAD. Furthermore, CASISD is home to five Academy-level research centers, namely, the CAS Center for Strategic Studies, the CAS Center for Innovation and Development, the CAS Center for Interdisciplinary Studies of Social and Natural Sciences, the CAS Center for Management Innovation and Evaluation Research, and the CAS Center for Intellectual Property Rights Research and Training.

CASISD boasts an extensive network of academic cooperation and exchanges. It has MOU with more than 20 research institutions and universities in different countries, including Japan, Republic of Korea, Democratic People's Republic of Korea, Germany, the UK, the US and India. Some national learned bodies are affiliated to CASISD, such as the Chinese Association for Science of Science and S&T Policy Research, the Chinese Society of Optimization, Over-all Planning and Economic Mathematics, the China Association for Development Strategy, and the Chinese High-tech Industries Promotion Society. It also houses editorial offices for a number of academic journals, including *Journal of Science Research Management*, *Chinese Journal of Management Science*, *Journal of Studies of Science of Sciences*. It joins hands with CASAD in running *Sciences and Society*, as well as *Bulletin of the Chinese Academy of Sciences*, a key media for national S&T think thanks.

Looking into the future, CASISD will commit itself to the analysis of S&T development trends and breakthrough directions in line with the law of S&T development, and the examination of major issues concerning socioeconomic progress and national safety by giving full play to CAS advantages of integrating a comprehensive research and development network, a merit-based academic society and a system of higher education. Focusing on areas such as S&T development strategy, S&T and innovation development policy, ecological civilization and sustainable development, foresight analysis, and strategic information, CASISD will provide science-based reference for national macroscopic decision-making and strive to build itself into a global leader in science, technology and innovation development policy thinking by bringing together outstanding talent and establishing an international network for strategy and policy research featuring opening up and cooperation.

陕西师范大学教育学院

陕西师范大学教育学院与陕西师范大学一同经历了七十余年的发展历程，最早发端于1944的国立西北大学文学院教育学系，后历经西安师范学院、陕西师范大学教育系、陕西师范大学教育科学学院等历史变迁，1999年开始与香港田家炳基金会开展合作，以教育科学学院为依托，冠名田家炳教育书院，以铭记田家炳先生的无私捐赠。2009年独立建制的教育学院（田家炳教育书院）组建成立。

教育学院分设教育学系、课程与教学系、教育管理系、学前教育系、特殊教育系、教育技术系。设置和挂靠的研究机构有：西部教育研究中心、陕甘宁教育研究中心、教育法治研究中心、现代教学技术教育部重点实验室、"一带一路"教育高等研究院、特殊儿童认知与行为研究中心、陕西高校哲学社会科学重点研究基地、西北基础教育与教师教育研究中心等。学院专家作为主编、副主编和编辑，为学校创办了《当代教师教育》、《中国艺术教育》、《西部教育报告》等学术期刊。

学院目前开设有5个本科专业，设有12个学术型硕士学位授权点，6个教育硕士专业学位授权点，11个学术型博士学位授权点和1个教育博士专业学位授权点，另有教育学一级学科博士后流动站。学院先后获批4个省级教学团队，培育出一批国家级精品资源共享课、国家级精品在线开放课程、省级精品课程以及校级信息化示范课程。

近五年来，先后承担国家级科研项目31项，承担省部级及重要横向科研项目105项，发表CSSCI来源学术论文539篇（核心及以上），出版专著139部，获省部级以上教学、科研奖33项。郝文武教授的教育哲学研究、陈鹏教授的教育法律与政策研究、栗洪武教授的陕甘宁边区教育研究、陈晓端教授的教学论研究、司晓宏教授的教育管理研究、龙宝新教授的教师教育研究、田建荣教授的考试研究、赵微教授的学习困难儿童教育干预研究、傅钢善教授的网络与远程教育研究、张文兰教授的信息技术在中小学的教学应用研究等在国内已经产生了较大影响。陕甘宁边区教育研究与西部教育研究等特色研究领域在国内外具有显著影响。

学院建有教育学省级实验教学中心，包括教育技术学实验教学中心、学前教育实验教学分中心、学生发展实验教学分中心、教师发展实验教学分中心和实验教学中心支持系统。另有钢琴房、舞蹈室、美术室等，硬件资源完备，图书资料丰富，为教学和科研提供了良好的支撑。

学院以"打造西部教育研究高地，跻身国际一流教育学科行列，培养高层次教育人才，服务国家与区域教育发展"为目标，以学科建设为龙头，以教学科研为中心，立足西部，面向全国，放眼全球，不断增强对西部教育的影响力、辐射力与竞争力，力争成为我国西部教育研究的重镇、卓越教师培养的摇篮。

The School of Education of Shaanxi Normal University and Shaanxi Normal University have experienced more than 70 years of development together. Originated in 1944, the Department of Education of the Faculty of Arts of the National Northwestern University, went through historical changes of its names, such as Xi'an Normal University, the Department of Education of Shaanxi Normal University and the School of Educational Science of Shaanxi Normal University, it began to cooperate with the Tin Ka Ping Foundation of Hong Kong in 1999. Based on the School of Educational Science, it was named Tin Ka Ping School of Education to remember Mr. Tin Ka Ping's selfless donation. In 2009, an independent School of Education (Tin Ka Ping School of Education) was established.

The School of Education set up the Department of Education, the Department of Curriculum and Teaching, the Department of Education Management, the Department of Preschool Education, the Department of Special Education and the Department of Educational Technology. The research institutions set up and affiliated include: Western Education Research Center, Shaanxi-Gansu-Ningxia Education Research Center, Educational Law Research Center, Key Laboratory of Modern Teaching Technology, Ministry of Education, "One Belt and Road Initiative" Higher Institute of Education, Cognitive and Behavioral Research Center for Special Children, Key Research Base of Philosophy and Social Sciences in Universities of Shaanxi Province, Northwest Basic Education and Teacher Education Research Center, etc. As editor-in-chief, deputy editor-in-chief and editor-in-chief, experts of School of Education have established academic journals such as *Contemporary Teacher Education*, *Chinese Art Education* and annual research report series of *Western Education Report*.

At present, The School of Education has 5 undergraduate programs, 12 academic master's degree programs, 6 professional master's degree programs, 11 academic doctor's degree programs and 1 education doctor's degree programs, as well as a post-doctoral station for education. The college has successively established four provincial teaching teams and cultivated a number of national quality resource sharing courses, national level high quality online open courses, provincial level high quality courses and school-level information exemplar courses.

In the past five years, it has successively undertaken 31 national scientific research projects, 105 provincial and ministerial-level and important horizontal scientific research projects, published CSSCI 539 academic papers (the Core Journals of China and above), published 139 monographs, and won 33 teaching and scientific research awards of the provincial and ministerial levels. Professor HAO Wenwu's research on educational philosophy, Professor CHEN Peng's research on educational law and policy, Professor LI Hongwu's educational research in Shaanxi-Gansu-Ningxia border region, Professor CHEN Xiaoduan's research on teaching theory, Professor SI Xiaohong's research on educational management, Professor LONG Baoxin's research on teacher education, Professor TIAN Jianrong's research on examination, Professor ZHAO Wei's research on educational intervention for children with learning difficulties, Professor FU Gangshan's research on network and distance education, and Professor ZHANG Wenlan's research on the application of information technology in primary and secondary schools have had a great impact in China. The characteristic research fields such as educational research in Shaanxi-Gansu-Ningxia border region and educational research in the west have significant influence at home and abroad.

The college aims to "build a highland for educational research in the west, join the ranks of first-class educational disciplines in the world, train high-level educational talents, and serve the development of national and regional education development". Taking discipline construction as the leader, teaching and scientific research as the center, based on the west of China, facing the whole country and looking at the whole world, we will continuously enhance our influence, radiation and competitiveness on the education in the west, and strive to become an important organization in the education research in the west of our country and the cradle for the cultivation of outstanding teachers.

组委会

会议国际组委会委员：

- 蔡奕渔（Yiyu Cai）副教授，南洋理工大学，新加坡，国际模拟和游戏学会联合主席
- Eric Hamilton，教授，佩珀代因大学，美国，美国国家科学基金会（NSF）前项目主管
- Manabu Sumida，教授，日本科学教育学会秘书长，国际科学教育学会理事会(ICASE)亚洲区域代表，日本
- Virgilio U. Manzano，教授，乌达内塔城市大学研究生院和高级研究院院长，国际科学教育学会理事会(ICASE)会员常务委员会主席, 菲律宾
- Bulent Cavas，教授，九月九大学，国际科学教育学会理事会(ICASE)通信常务委员会主席, 土耳其
- Declan Kennedy，高级讲师，爱尔兰考克大学，国际科学教育学会理事会(ICASE)总部协调委员会主席, 爱尔兰
- Steven Sexton，高级讲师，奥塔哥大学，《国际科学教育》杂志主编，国际科学教育学会理事会(ICASE)大专及非正式科学教育常务委员会主席, 新西兰
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- Teresa J. Kennedy，教授，德克萨斯大学泰勒分校，国际科学教育学会理事会(ICASE)联合国教科文组织和北美地区代表, 美国
- Sue Dale Tunnicliffe，伦敦大学学院，国际科学教育学会理事会(ICASE)学前 STEM 教育常务委员会主席, 英国

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- 郭龙江，教授，陕西师范大学计算机科学学院, 西安，中国
- 秦健，副教授，陕西师范大学教育学院，西安，中国
- 宋怡，副教授，南京晓庄学院，南京，中国

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- Yiyu Cai, Associate Professor, Nanyang Technological University, Singapore, co-president of the International Simulation and Gaming Association
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- Manabu Sumida, Professor, Secretary-General of Japan Society for Science Education, Asia Regional Representative, International Council of Associations for Science Education (ICASE) (2020-2023), Japan
- Virgilio U. Manzano, Professor, Dean, Graduate School and Advanced Studies of the Urdaneta City University, Chair of Membership Standing Committee, International Council of Associations for Science Education (ICASE) (2020-2023), Philippines
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- Declan Kennedy, Senior Lecturer in Science Education, University College Cork, President-Elect & Chair of World Headquarters Coordinator Standing Committee, International Council of Associations for Science Education (ICASE) (2020-2023), Ireland
- Steven Sexton, Senior Lecturer in Science Education, University of Otago, Editor of Science Education International Journal & Chair of Pre-secondary & Informal Science Education Standing Committee ,International Council of Associations for Science Education (ICASE) (2020-2023), New Zealand
- Manuel Filipe Pereira Cunha Martins Costa, Professor, Universidade do Minho, Campus de Gualtar Braga, Europe Regional Representative,, International Council of Associations for Science Education (ICASE) (2020-2023), Portugal
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- Sue Dale Tunnicliffe, Reader in Science Education, Institute of Education, University College London, Chair of Early Years STEM Education Standing Committee, International Council of Associations for Science Education (ICASE) (2020-2023), London, UK

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- GUO Longjiang, Professor, School of Computer Science, Shaanxi Normal University, Xi'an, China
- SONG Yi, Associate Professor, Nanjing Xiaozhuang University, Nanjing, China
- YANG Mei, Associate Professor, Wuhan City Polytechnic, Wuhan, China
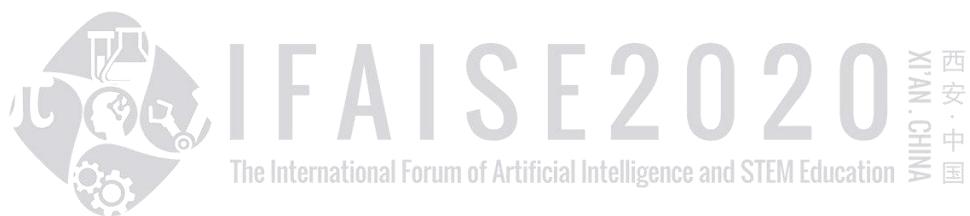
会议日程

	时间	内容	主持人
上午	8:30-8:55	大会开幕式：领导致辞(1)董治宝副校长致辞(2)周建中主任致辞、（3）陈鹏院长致辞	张宝辉
	8:55-9:00	嘉宾拍照	––
	9:00-9:30	主题报告一（中文）（熊璋教授）	赵璐
	9:30-10:00	主题报告二（中文）（张进宝副教授）	赵璐
	10:00-10:30	主题报告三（中文）（秦健副教授）	赵璐
	10:30-10:40	中场休息	––
	10:40-11:40	平行分论坛一	周红霞
		平行分论坛二	乔翠兰
		平行分论坛三	肖静
		平行分论坛四	梁超
下午	14:00-15:00	平行分论坛五	宋怡
		平行分论坛六	刘玲玲
		平行分论坛七	陈鹏鹤
	15:00-15:30	主题报告四（英文）（Prof. Yiyu Cai）	Sarfraz Aslam
	15:30-16:00	主题报告五（英文）（Prof. Eric Hamilton）	Sarfraz Aslam
	16:00-16:30	主题报告六（中文）（黄国祯教授）	Sarfraz Aslam
	16:30-16:35	嘉宾拍照	––
	16:35-16:40	中场休息	––
	16:40-17:40	圆桌论坛（陈鹏鹤副研究员、Prof. Manuel Filipe Pereira Cunha Martins Costa、Prof. Bulent Cavas、Dr.Steven Sexton）	张宝辉
	17:40-18:00	颁奖仪式 闭幕致词（张宝辉教授）	张宝辉

Conference Program

	Time	Activity	Host
Morning	8:30-8:55	Opening ceremony(Welcome speeches)（SNNU Vice President Dong Zhibao, China Science Academy's Center Director Zhou Jianzhong, SNNU SOE Dean Chen Peng）	ZHANG BaoHui
	8:55-9:00	Photo time	--
	9:00-9:30	Keynote speech 1 in Chinese（Prof. XIONG Zhang）	ZHAO Lu
	9:30-10:00	Keynote speech 2 in Chinese（Associate Prof. ZHANG Jinbao）	ZHAO Lu
	10:00-10:30	Keynote speech 3 in Chinese（Associate Prof. QIN Jian）	ZHAO Lu
	10:30-10:40	Break	--
	10:40-11:40	Parallel Session 1	ZHOU Hongxia
		Parallel Session 2	QIAO Cuilan
		Parallel Session 3	XIAO Jing
		Parallel Session 4	LIANG Chao
Afternoon	14:00-15:00	Parallel Session 5	SONG Yi
		Parallel Session 6	LIU Lingling
		Parallel Session 7	CHEN Penghe
	15:00-15:30	Keynote speech 4 in English（Prof. Yiyu Cai）	Sarfraz Aslam
	15:30-16:00	Keynote speech 5 in English（Prof.Eric Hamilton）	Sarfraz Aslam
	16:00-16:30	Keynote speech 6 in Chinese（Prof. Gwo-Jen Hwang）	Sarfraz Aslam
	16:30-16:35	Photo time	--
	16:35-16:40	Break	--
	16:40-17:40	RoundTable（Prof. Manuel Filipe Pereira Cunha Martins Costa, Prof. Bulent Cavas, Dr.Steven Sexton, Prof..ZHANG BaoHui, Dr. Chen Penghe）	ZHANG BaoHui
	17:40-18:00	Closing ceremony（Prof. ZHANG BaoHui）	ZHANG BaoHui

大会网络会议室信息汇总

2020.12.26 星期六 8:30–10:30		
开幕式及大会主题报告	ZOOM 会议系统 https://zoom.us/j/93112526037?pwd=aVRSTDB5dE1rV1Joblp6b296Q1kzZz09 会议号：931 1252 6037 密码：066589	刘秋苹 +（86）18275027592
2020.12.26 星期六 10:40–11:55		
平行分论坛一	腾讯会议系统 https://meeting.tencent.com/s/8McfM13WsgNi 会议 ID：209 853 771 会议密码：1234	徐江灏 +（86）15977401864
平行分论坛二	腾讯会议系统 https://meeting.tencent.com/s/HpJLPDKGeuSH 会议 ID：660 907 672 会议密码：1234	金文翰 +（86）17843816884
平行分论坛三	腾讯会议系统 https://meeting.tencent.com/s/eeBpXg0TYmVk 会议 ID：536 111 041 会议密码：1226	向双 +（86）18398261861
平行分论坛四	ZOOM 会议系统 https://zoom.com.cn/j/93731417190?pwd=QkVRRzBRL1ViNmpKMFJ4U0xCNEtidz09 会议 ID：937 3141 7190 会议密码：727240	吴燕青 +（86）18485505905
2020.12.26 星期六 13:45–15:00		
平行分论坛五	腾讯会议系统 https://meeting.tencent.com/s/ZTqHUhgBY4RE 会议 ID：459 976 661 会议密码：200012	张舒心 +（86）13572061079
平行分论坛六	ZOOM 会议系统 https://zoom.com.cn/j/91930008186?pwd=Q0NnSmxiaVFVb1NHMTljdkVUd1dwQT09 会议 ID：919 3000 8186 会议密码：626019	吴燕青 +（86）18485505905
平行分论坛七	ZOOM 会议系统 https://zoom.com.cn/j/66437775780?pwd=aWJxZWoyM0pBNWhPUmd4a0thWWlkUT09 会议 ID：664 3777 5780 会议密码：862477	金文翰 +（86）17843816884

2020.12.26 星期六 Saturday 15:00-18:00		
大会主题报告及闭幕式	Zoom 会议系统 https://zoom.us/j/91001605015?pwd=d0hxVEJWOU9OVTlmT2Z2aXRnQ0dJQT09 会议 ID：910 0160 5015 密码：255749	余淑珍 +（86）15901600157

The List of Meeting Room IDs

2020.12.26 Saturday 8:30-10:30[Beijing Time]		
Opening Ceremony & Keynote Speeches	ZOOM meeting system https://zoom. us/j/93112526037?pwd=aVRSTDB5dE1rV1Joblp6b296Q1kzZz09 Meeting ID：931 1252 6037 Password：066589	LIU Qiuping ＋（86）18275027592
2020.12.26 Saturday10：40−11：55[Beijing Time]		
Parallel Session 1	Tenecnt meeting system https://meeting. tencent. com/s/8McfM13WsgNi Meeting ID：209 853 771 Password：1234	XU Jianghao ＋（86）15977401864
Parallel Session 2	Tenecnt meeting system https://meeting. tencent. com/s/HpJLPDKGeuSH Meeting ID：660 907 672 Password：1234	JIN Wenhan ＋（86）17843816884
Parallel Session 3	Tenecnt meeting system https://meeting. tencent. com/s/eeBpXg0TYmVk Meeting ID：536 111 041 Password：1226	XIANG Shuang ＋（86）18398261861
Parallel Session 4	ZOOM meeting system https://zoom. com. cn/j/93731417190?pwd=QkVRRzBRL1ViNmpKMFJ4U0xCNEtidz09 Meeting ID：937 3141 7190 Password：727240	WU Yanqing ＋（86）18485505905
2020.12.26 Saturday13：45−15：00[Beijing Time]		
Parallel Session 5	Tenecnt meeting system https://meeting. tencent. com/s/ZTqHUhgBY4RE Meeting ID：459 976 661 Password：200012	ZHANG Shuxin ＋（86）13572061079
Parallel Session 6	ZOOM meeting system https://zoom. com. cn/j/91930008186?pwd=Q0NnSmxiaVFVb1NHMTljdkVUd1dwQT09 Meeting ID：919 3000 8186 Password：626019	WU Yanqing ＋（86）18485505905

Parallel Session 7	ZOOM meeting system https://zoom. com. cn/j/66437775780?pwd=aWJxZWoyM0pBNWhPUmd4a0thWWlkUT09 Meeting ID：664 3777 5780 Password：862477	JIN Wenhan ＋（86）17843816884
2020.12.26 Saturday 15：00－18：00[Beijing Time]		
Closing Ceremony & Keynote Speeches	ZOOM meeting system https://zoom. us/j/91001605015?pwd=d0hxVEJWOU9OVTlmT2Z2aXRnQ0dJQT09 Meeting ID：910 0160 5015 Password：255749	YU Shuzhen ＋（86）15901600157
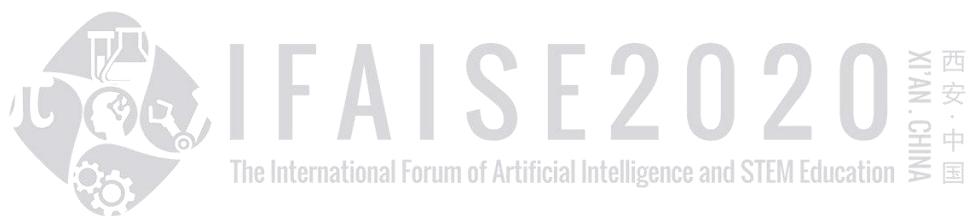
特邀报告人|Keynote Speakers

熊璋

熊璋，教授、博导，现任北京航空航天大学学术委员会副主任、先进计算机应用技术教育部工程研究中心主任、深圳数据活化（智慧城市）重点实验室主任、863计划主题项目"智慧城市（一期）"首席专家，教育部跨世纪人才，全国优秀教师，国家级精品课主讲教师，有突出贡献的回国人员，北京市教学名师，曾赴美国密西根州立大学计算机系学习，并对几十个国家作过技术交流和访问。曾获国家科技进步一等奖、北京市科学技术奖、霍英东青年教师奖等多种国家和部级奖励。近年来在国内外高水平学术期刊和会议发表论文被 SCI/SCIE 收录 60 余篇，已授权国家发明专利 80 余项，多名硕、博士研究生获研究生创新基金资助和国家奖学金奖励。近年已有 8 名研究生获得国家公派留学资格，前往英国剑桥、美国卡耐基梅隆、加州大学伯克利分校、法国格勒诺布尔国立综合理工学院等大学进行交流学习。

XIONG Zhang, professor, PhD supervisor, Beihang University, deputy director of academic committee of Beihang University, director of the Engineering Center of Ministry of Education for Advanced Computer Application Technology, director of Shenzhen Data Activation (Wisdom City) Key Laboratory, chief expert of "Wisdom City" (the first phase) of 863 Program, the Cross-Century Talents of Ministry of Education, the National Outstanding Teacher, instructor of course of national level quality, returnee with outstanding contributions, Master Teacher of Beijing. He has studied in the Department of Computer Science in Michigan State University and made technical exchanges and visits to dozens of countries. He has won the first prize of national Science and Technology progress, Beijing Science and Technology Award, Fok Yingdong Young Teacher Award and many other national and ministerial awards. In recent years, he has published more than SCI/SCIE indexed 60 papers in high-level academic journals and conferences at home and abroad. He has also authorized over 80 national invention patents, and many master and doctoral students under his supervision have been financially supported by postgraduate innovation fund and awarded national scholarships. In recent years, eight graduate students have funded China scholarship Council to study abroad and have gone to University of Cambridge (UK), Carnegie Mellon University (USA), University of California, Berkeley (USA), Grenoble, France) and other universities for exchange and study.

在线社会与人工智能

熊 璋

在线社会作为继农业社会、工业社会、信息社会后第四个社会形态，使新的国际政治、经济发展以及社会行为等模式的形成。同时在线社会具有激流意识、群体创新、在线责任的基本素养特征。在线社会背景下的教与学的方式变革引发社会的广泛关注。基于此，本报告从在线社会的基本特征以及主要表现等方面入手，围绕网课对青少年教育的影响介绍混合教学模式。同时切入人工智能的视角，论述新一代人工智能技术重塑教师的角色定位、教学理念与方式。以期为各级各类学校制定相关政策方针提供理论依据，为一线教师有效开展教育教学工作提供实践思路。

Online society and artificial intelligence

XIONG Zhang

Abstract: As the fourth social form after agricultural society, industrial society and information society, online society has formed new international political, economic development and social behavior patterns. At the same time, the online society has the basic qualities of torrent consciousness, group innovation and online responsibility. The change in the way of teaching and learning in the context of online society has aroused wide concern in the society.

Based on this, this speech starts with the basic characteristics and main manifestations of online society, and introduces the mixed teaching mode around the influence of online courses on the education of teenagers. At the same time, from the perspective of artificial intelligence, this paper discusses the new generation of artificial intelligence technology to reshape the role positioning, teaching philosophy and teaching methods of teachers. In order to provide a theoretical basis for all kinds of schools at all levels to formulate relevant policies and guidelines, for frontline teachers to effectively carry out education and teaching work to provide practical ideas.

黄国祯

黄国祯, 台湾科技大学讲座教授, 任职于数位学习与教育研究所。黄教授的学术专长包括行动与无所不在的学习、游戏式学习、翻转学习及人工智能教育应用。曾主持 100 多个项目计划, 并多次获得研究奖励, 包括 2007、2010 及 2013 年「国科会/科技部杰出研究奖」, 更获得 2015 年「杰出信息人才奖」及 2019 年「教育部师铎奖」。黄教授已发表超过 700 篇的论文, 包括 350 余篇 SCI/SSCI/EI 期刊论文。他目前同时担任 30 多个 SSCI/SCI/EI 学术期刊的论文审查委员, 以及 Australasian Journal of Educational Technology（SSCI）、Computers & Education：Artificial Intelligence（Elsevier）、International Journal of Mobile Learning and Organisation 及 Journal of Computers in Education 的主编。同时, 也担任 IEEE Transactions on Education（SCI）副主编。时代杂志世界大学排名（Times World University Ranking）于 2016 年公布 10 most prolific and most cited researchers, 黄教授是社会科学类排名世界第一的学者。

Professor Gwo-Jen Hwang is a chair professor at Taiwan University of Science and Technology and works in the Graduate Institute of Digital Learning and Education. Professor Hwang's academic expertise includes mobile and ubiquitous learning, flipped learning, digital game-based learning, and artificial intelligence in education. He has also been the principal investigator of more than 100 research projects and won many research awards. Professor Hwang has published more than 700 papers, including more than 350 SCI/SSCI/EI journal papers. At present, he is also the reviewer of more than 30 SSCI/SCI/EI academic journals, and the Editor in Chief of *Australasian Journal of Educational Technology* (SSCI) 、 *Computers & Education: Artificial Intelligence* (Elsevier) 、 *International Journal of Mobile Learning and Organisation* and *Journal of Computers in Education*. At the same time, he is also the Associate Editor of *IEEE Transactions on Education* (SCI). The Times World University Ranking announced 10 most prolific and most cited researchers in 2016. Professor Hwang is #1 prolific and cited researcher in the world in the field of social sciences.

结合 AI 与 STEM 的教学设计模式与研究议题

黄国祯

本演讲主要介绍人工智慧(AI)与 STEM 的教育目标与发展趋势，以及结合 AI 与 STEM 的教学活动设计模式及研究议题。黄教授将透过实际在教学现场应用的实例，来展现结合 AI 与 STEM 的不同学习设计方式及测量工具。本演讲对于有志于发展人工智能教育应用及 STEM 教育的研究人员及学校教师极具参考价值。

Instructional Design Mode and Research Topic Combining AI and STEM

Gwo-Jen Hwang

This lecture mainly introduces the educational objectives and development trend of artificial intelligence (AI) and STEM, as well as the design mode and research topics of teaching activities combining AI and STEM. Professor Hwang will demonstrate the different learning design methods and measurement tools combined with AI and stem through practical application examples in teaching field. This speech is of great reference value to researchers and school teachers who are interested in developing the application of artificial intelligence in education and STEM education.

Eric Hamilton

Eric Hamilton is a professor of education at Pepperdine University, with courtesy appointment in mathematics. He specializes in research around creation and use of interactive digital media. His main current work involves leading a research effort with sites in the US, Brazil, Finland, Namibia, Kenya, Mexico, and India, connecting adolescents in a virtual digital makerspace to study participatory teaching and international collaboration. He serves on the governing board of Boulder Learning, Inc., focusing on natural language processing in literacy development, and has lectured on artificial intelligence in education. Hamilton co-led a major initiative of Finnish and US governments in education innovation and technology. He served as division director at the US National Science Foundation, and research center director at the US Air Force Academy.

Eric Hamilton 是佩珀代因大学（Pepperdine University）的数学教育教授，致力于交互式媒体的创新与应用，目前主要工作是通过虚拟创客空间将来自美国、巴西、芬兰、纳米比亚、肯尼亚、墨西哥和印度等地的青少年联系起来，进行参与式教学与国际协作的研究。任职于博尔德学习公司（Boulder Learning，Inc.）董事会，致力于素养培养的自然语言处理，并教授人工智能教育课程。曾联合领导了芬兰和美国政府在教育创新和技术方面的一项重大倡议。曾担任美国国家科学基金会（NSF）部门负责人，及美国空军学院研究中心主任。

人工智能赋能 **STEM** 教育的机遇与挑战

埃里克·汉密尔顿

本报告的目的之一是介绍人工智能在 STEM 教育中所取得的重大进展。人们对了解人工智能在 STEM 教育中的近期和长期的未来有着深刻的兴趣。本报告还将预估人工智能在教育领域的未来趋势，其中有一些是可知的，也有一些是大部分不可知的。人工智能在 STEM 教育中的应用划分为数据挖掘、智能增强、个性化学习和交互式学习等领域，所有这些都是在人类与人工智能交互的总体结构中进行的。最后，它将回顾有关人工智能支持 STEM 教育变革的重大问题，以推进全球公平和繁荣的目标。

Opportunities and Challenges of AI-Enabled STEM Education

Eric Hamilton

One objective of this talk is to survey major advances that artificial intelligence has enabled in STEM education. There is a profound interest in understanding the near-term and long-term future of AI in STEM education. The talk will also identify future trends in AI in education that are knowable and some that are mostly unknowable. It will partition AI in STEM Education in to areas such as data mining, intelligence augmentation, personalized learning, and interactive learning, all within the overarching construct of human-AI interaction. It will close by reviewing large questions about AI-enabled transformations in STEM education that advance global goals of fairness and prosperity.
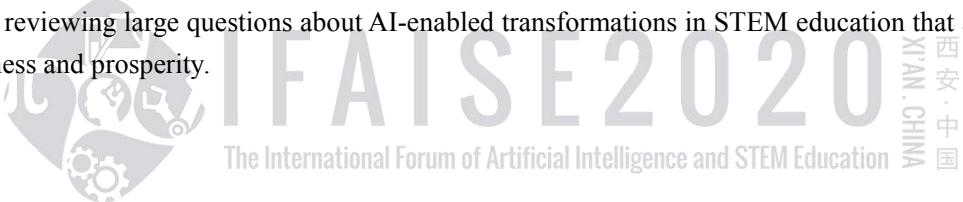
Yiyu Cai (蔡奕渔)

蔡奕渔副教授是虚拟现实与软件计算策略研究项目负责人，南洋理工大学增强与虚拟现实中心副主任，担任多个由国家研究基金会及教育部所支持项目的核心研究人员。在虚拟与增强现实、仿真&严肃游戏、人工智能及其教育应用方面拥有20多年的研发经验，拥有8项国际联合发明专利，发表技术类文章超过200篇。曾组织20多项国际会议，担任 Interactive Learning Environments、International Journal of Serious Games 及 the Visual Computers 等期刊编委委员会成员。

Associate Professor Yiyu Cai directs the Strategic Research Program of VR & Soft Computing. He is also deputy director of NTU's Center of Augmented & Virtual Reality. He is principal investigators with numerous projects supported by National Research Foundation, Ministry of Education. Dr Cai has over 20 years' experience doing R&D in Virtual & Augmented Reality, Simulation & Serious Games, Artificial Intelligence, and their education application. He has 8 international patents co-invented, and over 200 technical articles published. He has organized more than 20 international conferences. He sits in the journal editorial boards of Interactive Learning Environments, International Journal of Serious Games, the Visual Computers, etc.
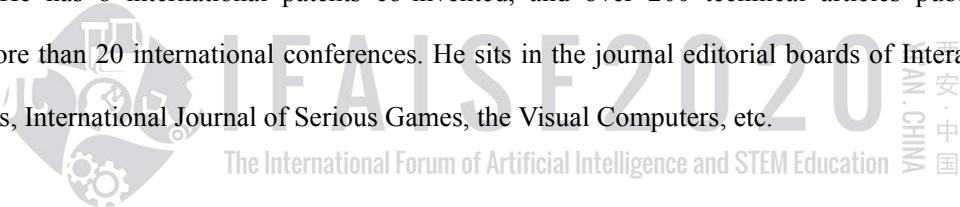
虚拟与增强现实技术在智能 STEAM 教育中的应用

蔡奕渔

新加坡在 2008 年启动了一项关于未来学校的国家计划。在这个主题演讲中，我将首先分享我的项目"未来学校"（FutureSchool @ Hwa Chong Institution），然后我将讨论教学创新和学习空间创新。然后，我将讨论教学创新和学习空间创新。随后，我将介绍教育科技创新，我的团队多年来一直在开发的虚拟与增强现实技术强化学习（VARTeL），我们专注在新加坡，欧洲和非洲的精英或社区学校的 STEAM 教育的 VARTeL 案例研究。演讲最后将介绍我最近在网上组织的第五届 VARTeL 模拟和严肃游戏（Serious Games）研讨会的最新情况。

## Virtual & Augmented Reality Technology for Intelligent STEAM Education

Yiyu Cai

Singapore kickstarted a national initiative on Future Schools in 2008. In this keynote, I will first share my project FutureSchool @ Hwa Chong Institution. I will then discuss pedagogical innovation, and learning space innovation. This will be followed by EduTech innovation with an emphasis placed on Virtual & Augmented Reality Technology-enhanced Learning (VARTeL) my team has been developing over the years. Efforts will be made on the case studies on VARTeL for STEAM education with my partners both elite or neighborhood schools in Singapore, Europe, and Africa. The presentation will end up with an update from the 5th VARTeL Symposium on Simulation and Serious Games recently I organized online.

张进宝

张进宝，北京师范大学教育学部副教授，教育技术专业、科学与技术教育专业硕士生导师，北京师范大学计算思维教育研究中心主任，北京师范大学科学教育研究院院长助理，兼任中国教育学会中小学信息技术教育专业委员会副理事长，国际计算思维挑战赛中国区主席。近期关注数字化学习环境下的教学创新成功案例研究、人工智能社会性议题及其教育实践、幼儿及青少年不插电的计算思维教育、计算思维与数学建模为核心的 STEM 教育。

ZHANG Jinbao, Associate Professor, Department of Education, Beijing Normal University, supervisor of master students majoring in Educational Technology, Science and Technology Education, Director of Computational Thinking Education Research Center of Beijing Normal University, Assistant to Dean of Beijing Normal University Science Education Research Institute, concurrently serving as Vice Chairman of Information Technology Education in Primary and Secondary School Professional Commission of Chinese Society of Education, Chairman of the International Computational Thinking Challenge in China. Recently, his research has focused on successful case studies of teaching innovation in the digital learning environment, artificial intelligence social issues and educational practices of AI, unplugged computational thinking education for early childhood and teens, and STEM education to promote computational thinking and mathematical modeling.
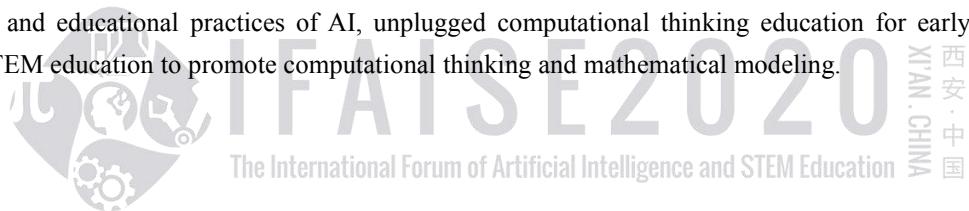
人工智能与 STEM 教育：是否还会重复过去的故事？

张进宝

近些年，与信息技术、计算机有关的 STEAM 教育主题日渐受到重视。但需理性探讨人工智能与 STEM 教育的相关性。本报告分为：第一部分 明确目标；第二部分 三个研究——（1）中小学教师准备好开设 AI 课程了吗？（2）"人工智能+教育"支持的新教育，还是坏教育？（3）让 AI 社会性议题成为 STEM 教育的核心情景； 第三部分 我们的思考。

Artificial Intelligence and STEM Education: Will the story of the past be repeated?

ZHANG Jinbao

In recent years, STEAM education topics related to information technology and computers have received increasing attention. But it is necessary to rationally explore the relevance of artificial intelligence and STEM education. This report is divided into: the first part, clarify the goal; the second part, three studies-(1) are primary and secondary school teachers ready to offer AI courses? (2) Is "AI+Education" supporting new education or bad education? (3) Let AI social issues become the core scenario of STEM education; the third part is our thinking.

秦健

秦健，陕西师范大学教育学院教育技术系副教授，硕士生导师，任陕师大园丁创客空间及中小学机器人实验室负责人，陕西师范大学科学教育仪器研发中心教育机器人方向负责人；多次出任省赛国赛机器人创客教育评审和裁判，出任评审长等。兼任中国人工智能学会智能教育技术专业委员会常务理事（1996 至今 CBE）；中国教育发展战略协会人工智能与机器人教育专委会理事；工业和信息化学部"RoboMaker"机器人创客培训专家组成员。

QIN Jian, Associate Professor of Educational Technology Department, School of Education, Shaanxi Normal University. She is the head of Shaanxi Normal University's Gardening Creativity Space and Robotics Laboratory in primary and secondary schools, and the head of the educational robotics of Shaanxi Normal University's Science Education Instrument Research and Development Center. She is also the executive director of the Professional Committee of Intelligent Education Technology of the Chinese Society of Artificial Intelligence (1996-present CBE); a director of the Special Committee of Artificial Intelligence and Robotics Education of the China Education Development Strategy Association; a member of the "RoboMaker" Robot Maker Training Group of the Ministry of Industry and Information Technology; and a member of the expert group of the Chinese Artificial Intelligence Association.

IFAISE2020 西安·中国 XI'AN.CHINA
The International Forum of Artificial Intelligence and STEM Education

中小学校开展人工智能和 **STEM** 教育的路径探析

秦健

人工智能的科技浪潮已经席卷了社会的各个领域，引起经济、生活和工作方式的深刻变革。教育领域也不例外，人工智能技术正在重塑教育新形态。伴随着技术的发展，STEM 教育也在不断深入中小学，我国中小学该如何开展人工智能和 STEM 教育是目前需要面对的迫切问题。本讲座基于团队多年来教学与竞赛实践的经验，探讨在人工智能和 STEM 教育背景下中小学校开展人工智能和 STEM 教育的路径，以期为中小学教师们开展人工智能和 STEM 教育提供思路。

The Implementation Approach of Developing Artificial Intelligence and STEM Education in Primary and Secondary Schools

QIN Jian

Artificial intelligence has made huge impact and caused profound changes on all fields of society. The education field is no exception. Artificial intelligence is reshaping a new form of education. With the development of technology, STEM education continues to penetrate into primary and secondary schools. We still need to explore more about how to develop artificial intelligence and STEM education in primary and secondary schools in our country. Based on our experience in teaching and competition practice, this lecture explores the implementation approach to the development of artificial intelligence and STEM education in primary and secondary schools in the context of artificial intelligence and STEM education, in order to provide guidance for primary and secondary school teachers.

圆桌论坛嘉宾|Speakers of RoundTable Session

ZHANG BaoHui (张宝辉)

张宝辉，陕西师范大学教育学院教授，博士生导师，"曲江学者"特聘教授，国际科学教育学会理事会（ICASE）主席。在美国和新加坡学习和工作 12 年，2011 年回国后，连续两届当选中国高等教育学会学习科学分委员会副理事长。每年主讲《教育研究方法》和《学习科学》中文、双语、或英语系列课程。主持研发的《教育文献的检索与分析》慕课课程于 2019 年 7 月上线，已完成六轮慕课的授课，累计有2.2 万余人参与课程学习。

Qujiang Scholar Professor, School of Education, Shaanxi Normal University, doctoral student supervisor, President of the International Council of Associations for Science Education (ICASE). After studying and working in the United States and Singapore for 12 years, after returning to China in 2011, he was elected as the vice chairman of the Learning Sciences Subcommittee of the China Higher Education Association for two consecutive terms. He teaches "Educational Research Methods" and "Learning Sciences" in Chinese, bilingual, or English courses every year. The MOOC course "Retrieval and Analysis of Educational Literature" developed by him was launched in July 2019. Six rounds of MOOC teaching have been completed, and more than 22,000 people have participated in the course.
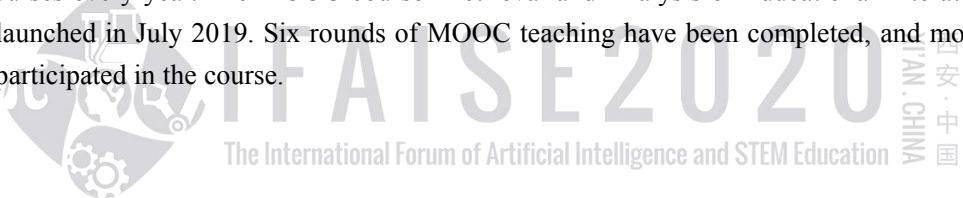
人工智能重新兴起与 STEM 教育发展

张宝辉

在历经一年，与团队研发面向中小学教师的《跨学科融合（STEM）教育》慕课的过程中，在考虑各种课程内容的过程中，我们对目前在中国教育领域同样火热的人工智能与 STEM 教育的关系、二者如何共同促进科学与技术教育变革等问题产生了浓厚的兴趣，人工智能发展中从由热变冷、再变热的过程也引起了我们的思考，由此引发了我们召开此次国际研讨会的需求。本报告抛砖引玉，希望从圆桌论坛发言人与会议代表的分享中集思广益，理清思路，为人工智能与 STEM 变革基础教育阶段的科学与技术教育提供思路和方法。

The resurgence of artificial intelligence (AI) and the development of STEM education

ZHANG BaoHui

Over the last year, my team and I have been developing a MOOC course for mainly pre-service and in-serve K-12 teachers, it is currently titled: Foundations of Interdisciplinary and Integrated (STEM) Education. When deciding the content of the course, we raised questions on the relationship between Artificial intelligence (AI) and STEM education, both are hot topics in China's basic education, we were also curious about the resurgence of AI and its implications for STEM education. This led to the application of funding to hold this conference. This report is intended to stimulate sharing of ideas towards answering the above questions. With the participation of the panelists and other conference participants, we hope to provide ideas and methods for artificial intelligence and STEM to transform science and technology education in basic education.
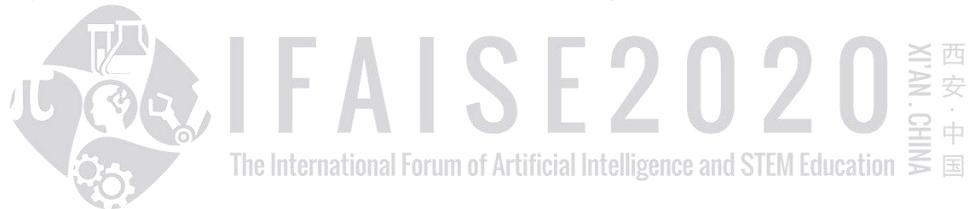
Manuel Filipe Pereira Cunha Martins Costa

曼纽尔·科斯塔(Manuel F. M. Costa)获得葡萄牙米尼奥大学科学（物理学）博士学位，自 1985 年起在该校物理系工作，从事光学测量、图像处理、薄膜纳米结构和应用、太阳能、光学仪器和科学教育与科学素养的教学和应用研究。他是伊比利亚-美洲光学网络（RIAO）主席（任期 2019-2022 年）；实践科学网络（HSCI）主席，欧洲光学学会科学顾问委员会副主席；葡萄牙光学和光子学学会（SPOF）主席以及国际光学委员会（ICO）葡萄牙分委员会主席。2013 年成为欧洲光学学会会员。

Manuel F. M. Costa hold a PhD degree in Science (Physics) from the University of Minho (Portugal) where he works since 1985 at its Physics Department teaching and performing applied research in optical metrology, image processing, thin films nanostructures and applications, solar energy, optometric instrumentation and science education and literacy. He is President of the Ibero-American Optics Network, RIAO, for the term 2019-2022 President of the Hands-on Science Network, HSCI; Deputy Chair of the Scientific Advisory Board of the European Optical Society; President of the Portuguese Society for Optics and Photonics, SPOF; and, President of the Portuguese Territorial Committee of the International Commission for Optics, ICO. He is a Fellow of European Optical Society since 2013.

葡萄牙的机器人学和 STEM 教育

曼纽尔·科斯塔

20 多年前，葡萄牙大学的机器人、工业自动化和人工智能研究小组开始了一系列倡议和活动，以便将这些学科引入葡萄牙高中，推广了大量讲座和示范活动。机器人的完成产生了重大的积极影响。最初以 K12 学生为重点，在参与机器人世界杯（RoboCup）竞赛的研究小组、国家生命科学署和实践科学网络以及许多学校和专业学校的共同努力下，这些活动很快扩展到所有学校级别。2004 年春季在里斯本举行的世界机器人竞赛(RoboCup 2004)是葡萄牙 STEM 教育中教育机器人和人工智能过去二十年快速发展的关键时刻。本报告将简要概述这一演变过程。

Robotics and STEM education in Portugal

Manuel Filipe Pereira Cunha Martins Costa

Over 20 years ago the robotics, industrial automation and artificial intelligence research groups of the Portuguese universities began a number of initiatives and activities in order to bring these subjects into the Portuguese high schools. A large number of lectures and demonstration activities were promoted. Robotics completions had a major positive effect. Initially focused on K12 students soon the activities were extended to all school levels with the combined efforts of the research groups involved in the ROBOCUP competitions, the National Ciência Viva Agency and Hands-on Science Network, as well as many schools and professional schools. The World Robotics Competition, ROBOCUP2004 in the Spring of 2004 in Lisbon was a key moment to the fast development on last two decades of educational robotics and artificial intelligence in STEM education in Portugal. A short overview of this evolutionary process will be given in this presentation.
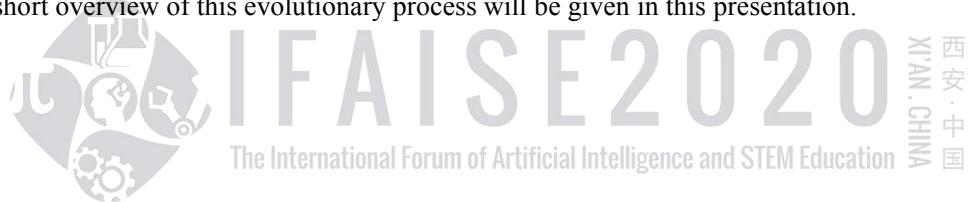
Bulent Cavas

布伦特-卡瓦斯教授于 1998 年在九月九大学教育学院科学教师培训项目中获得了科学教育领域的硕士和博士学位。他在土耳其安卡拉中东技术大学进行了关于探究式科学教育的博士后研究。他在国际上发表了 150 多篇论文，并撰写了 10 本关于科学和科学教育的书籍。目前，他的研究兴趣是负责任的研究和创新、开放学校教育、基于探究的科学教育以及科学教育中的虚拟现实。他是国际科学教育学会理事会（ICASE - www.icaseonline.net）的前任主席。他是 CMAS 科学部的秘书。他在比利时布鲁塞尔担任欧盟委员会项目评估的外聘专家。目前在土耳其伊兹密尔的九月九大学（www.deu.edu.tr）担任科学教育专业的教授。

Prof. Bulent Cavas (Male) Bulent Cavas completed his Master and Ph.D. studies in the field of science education at DokuzEylul University, Faculty of Education, Science Teacher Training Programme in 1998. He made his Post-Doc on Inquiry Based Science Education in Middle East Technical University, Ankara-Turkey. He has over 150 national and international publications and written 10 books on science and science education. Currently, his research interests are Responsible Research and Innovation, Open Schooling, Inquiry Based Science Education, Virtual Reality in Science Education. He is the Past-President of International Council of Associations for Science Education (ICASE -www.icaseonline.net). He is secretary of Science section of CMAS. He works as external expert for evaluating European Commission Projects in Brussels-Belgium. He is working as Professor of Science Education at Dokuz Eylul University (www.deu.edu.tr) in Izmir-Turkey.

从"社会中的科学"到"科学与社会共存":欧洲科学教育的挑战与实现

布伦特·卡瓦斯

欧洲面临着不同的挑战,包括 STEM 领域科学家数量减少,大学与企业之间的关系等。负责任的研究与创新(RRI)意味着社会行为者(研究人员,公民,政策制定者,企业,第三部门组织等)在整个研究和创新过程中共同努力,以使该过程及其结果与社会的价值、需求和期望更好地保持一致。欧盟国家需要改善学校可用的人力和物力资源,以向学生介绍 STEM 和 AI 的职业。欧盟各国政府应大力投资于科学教育评估中的研究与开发。因此,为了应对这些挑战,要增加科学教育和相关职业对年轻人的吸引力,增强社会对科学技术素养的意识,提供创新的正式和非正式科学教育平台,促进科学教育中的创新教学法以及发展科学课程中负责任的研究和创新(RRI)。

From "Science in Society (sis)" to "Science with and for Society (swafs)": Challenges and Implementations in European Science Education

Bulent Cavas

Europe is facing different challenges, including decreasing the number of scientists in STEM fields, the relationship between university and industry, etc. Responsible Research and Innovation (RRI) implies that societal actors (researchers, citizens, policymakers, business, third sector organizations, etc.) work together during the whole research and innovation process in order to align better both the process and its outcomes with the values, needs, and expectations of society. EU countries need to improve the human and physical resources available to schools to inform students about STEM & AI careers. EU governments should invest significantly in research and development in assessment in science education. So, making science education and careers attractive for young people, science and technology-literacy awareness in the society, availability of innovative formal and informal science education platforms, promoting innovative pedagogies in science education, and developing responsible research and innovation in science curricula could overcome these challenges.

Steven Sexton

Steven Sexton 博士目前是新西兰奥塔哥大学教育学院教师教育专业负责人，有着丰富的教学经验（年龄在 5-13 岁之间），曾在日本，沙特阿拉伯，泰国，澳大利亚和新西兰任教。完成了博士学位后，2007 年在悉尼大学任专职教师。他的博士学位论文探讨了教师身份认同的作用，并探讨了为什么男性进入初等教育，女性进入中学数学和科学领域以及成年人为何将职业转变为教育。他目前的研究领域是教师认知，科学教育和学校的异规范性。他在许多期刊上都发表相关研究，并且承担不少出版书籍中章节著作工作。除了在奥塔哥大学担任职务外，Steven Sexton 还是《科学教育国际》杂志的现任编辑。

Dr Steven Sexton is currently the Head of Teacher Education at the University of Otago College of Education in Dunedin, New Zealand. He is a primary (students aged 5-13 years old) trained teacher who has taught in Japan, Saudi Arabia, Thailand, Australia, and New Zealand. He completed his Ph.D. in 2007 at the University of Sydney while working as a full-time classroom teacher. His Ph.D. thesis explored the role of teacher identity and investigated why males enter primary education, females enter secondary maths and science fields, and why mature adults change careers into education. His current research areas are in teacher cognition, science education, and heteronormativity in schools. He has research publications in a range of journals and has been the author of several chapters in published books. In addition to his roles at the University of Otago, Dr Sexton is the current Editor of Science Education International journal
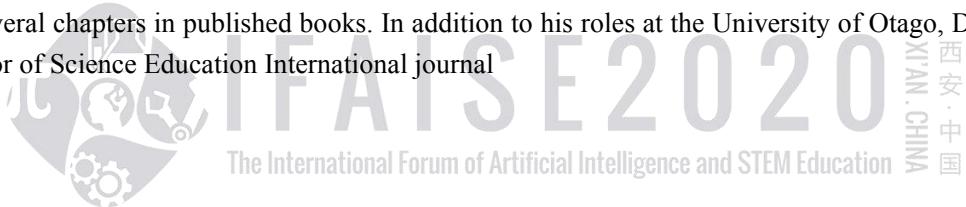
新西兰国家课程中的技术：事实，虚构和框架

史蒂芬-塞克斯顿

2017 年，新西兰国家课程的更改要求学校教师在面向 1 至 10 年级的学生（6 至 15 岁的学生）的新西兰课程的技术领域中实施新的内容。这将在 2020 学年开始之前完全实施。但是，除非这是个人能力范围，否则新西兰只有极少数的老师接受过任何正式培训或为新成员做准备。本报告介绍了事实，虚构和框架，探讨了小学教师如何能够在真实的合作关系中相互支持，以实现新的课程要求，而该要求不受任何部级专业发展的支持。小学教学侧重于正规教育的前八年（年龄在 6 至 13 岁之间的学生），要求教师实施整个国家课程。此报告基于 2019 年的一项研究，该研究为那些参与的老师指出，在课程的一个未知领域进行教学需要情感，政治和教学工作。在 2019 学年的课程中，参加协作专业发展课程的那些老师探索、试验并制定了数字技术。结果表明，教师在学习计划中有意义且有目的的数据技术集成，可以提升学生的学习效果。

Technology in the New Zealand Curriculum: Facts, Fiction, and Framework

Steven Sexton

In 2017, a change to the national curriculum of New Zealand required school teachers to implement a new component into the Technology area of *The New Zealand Curriculum* for students in Years 1 to 10 (students aged 6 to 15 years old). This was to be fully implemented by the start of the 2020 school year. However, unless this was a personal area of ability, only a very few teachers in New Zealand have had any formal training or preparation for this new addition. This presentation addresses the facts, fiction, and framework into how primary teachers were able to work in authentic collaborative relationships to support each other in how to implement a new curriculum requirement that was not supported by any ministerial professional development. Primary teaching focusses on the first eight years of formal schooling (students aged 6 to 13 years old) and teachers are required to implement the entire national curriculum. This presentation builds on a 2019 study that noted for those participating teachers, teaching an unknown area of the curriculum required emotional, political, and pedagogical work. Over the course of the 2019 school year, those teachers in collaborative professional development sessions explored, experimented with, and enacted digital technology. Results showed that students' learning was enhanced through teachers' meaningful and purposeful integration of digital technology in their programmes of learning.

CHEN Penghe (陈鹏鹤)

陈鹏鹤副研究员已完成新加坡国立大学计算机科学学士和博士学位。目前担任北京师范大学未来教育高精尖创新中心大数据研究员。在此之前，他一直在新加坡高级数字科学中心（ADSC）工作。他的研究兴趣包括知识图谱构建、数据挖掘和学习分析。

CHEN Penghe received the B.S. and Ph.D. degrees in Computer Science from the National University of Singapore (NUS). He currently serves as the big data researcher at the Advanced Innovation Center for Future Education, Beijing Normal University (BNU), China. Before that, he had been working at the Advanced Digital Sciences Center (ADSC), Singapore. His research interests include knowledge graph construction, data mining and learning analytics.

将人工智能技术应用于 STEAM 教育

陈鹏鹤

作为一种利用科学、技术、工程、艺术和数学作为指导学生探究、对话和批判性思维的接入点的教育方法，STEAM 催生了教育中新的教学和学习范式。最近，人工智能的研究也取得了重大进展。许多已知的模型和算法已经被设计和提出用于知识表示、自然语言处理、计算机视觉等领域。这些技术也可以应用于解决教育任务。因此，本报告试图讨论人工智能技术如何与 STEAM 教育中的教与学整合。

Applying AI Technologies on STEAM Education

CHEN Penghe

As an education approach utilizing Science, Technology, Engineering, the Arts and Mathematics as access points for guiding student inquiry, dialogue, and critical thinking, STEAM promotes new teaching and learning paradigms in education. Recently, the research of artificial intelligence has also made great progress. Many knew models and algorithms have been designed and proposed for domains like knowledge representation, natural language processing, computer vision, and so on. Those techniques may also be applied to solve educational tasks. Hence, this presentation tries to discuss how the AI technologies can be integrated with STEAM education for teaching and learning.

分论坛一

Parallel Session 1

- 时间：12 月 26 日上午 10：40-11：55 Date：Dec 26th 10：40-11：55
- 会议平台：腾讯会议   Platform：Tencent Meeting
- 主持人：北京教科院教育发展研究   Host：Education Development Center,
  中心，周红霞博士   Beijing Academy of Educational
  Sciences，Dr. ZHOU Hongxia

主题：指向核心素养培养的 STEM 教育 Theme: STEM Education to Cultivate Students' Core literacy	
作者 Presenter	报告题目 Title
郑智勇、宋乃庆	STEAM 教育理念下小学生创新能力的内涵、价值意蕴与表现形式
牛蒙阳	基于科学素养导向的科技馆 STEM 项目设计---- 以"甩干机制作"为例
张晓顺、于海波	STEM 理念融入：物理核心素养教学的有效路径 ——基于美国利伯蒂维尔高中两节 STEM 课例的分析
林泽珊，赵腾任	基于 TPACK 的中小学教师计算思维教学能力调查
陈珊	国际比较视野下的 STEM 素养：背景、内涵及启示

分论坛二

Parallel Session 2

➢ 时间：12 月 26 日上午 10:40-11:55　　Date: Dec 26th 10:40-11:55

➢ 会议平台：腾讯会议　　Platform: Tencent Meeting

➢ 主持人：华中师范大学物理学院副教授，乔翠兰　　Host: Associate Professor, Central China Normal University, QIAO Cuilan

主题：STEM 课程设计与开发	
Theme: The Design and Development of STEM Courses	
作者 Presenter	报告题目 Title
魏娜，王凯	基于小学科学课的 stem+案例设计与开发——《植物工厂》主题活动案例分析
姜和丽，张丽锦	融合少数民族文化与 3D 打印技术的 STEAM 课程实践
邹晴，张进宝，张敏玥	融入技术本质的初中生桥梁主题活动设计与实践---以北京市（亦庄）地区 S 中学初一年级学生为例
姜玲	一所学校 STEM 普惠课程的研发与实践路径

分论坛三

Parallel Session 3

- 时间：12 月 26 日上午 10：40-11：55 Date：Dec 26th 10：40-11：55
- 会议平台：腾讯会议   Platform：Tencent Meeting
- 主持人：武汉城市职业学院信息工 Host：   Professor, Wuhan   City
  程学院教授，肖静   Polytechnic，XIAO Jing

主题：人工智能赋能教育实践	
Theme: The Empowerment of AI in Education	
作者	报告题目
徐莉、梁震	人工智能+教育融合的困境与出路——复杂系统方法视角
沈苑	一间只有带上面具才能打开的教室——算法偏见如何影响智能时代的教育？
张凯悦	提高心流体验的机器学习项目设计与实践
崔东伟	人工智能教育与初中信息技术学科课程融合研究

分论坛四

Parallel Session 4

➢ 时间：12 月 26 日上午 10:40-11:40 Date: Dec 26th 10:40-11:40

➢ 会议平台：ZOOM Platform: ZOOM

➢ 主持人：武汉大学计算机院人工智能系副主任，梁超 Host: Deputy director of the Department of Artificial Intelligence, School of Computer Science, Wuhan University, LIANG Chao

主题：人工智能实践探索 Theme: Artificial Intelligence in Practice	
Presenters	Title
SHEN Xia，XIA Haojie	The Optimization of Operating Mechanism of Global Education Governance through Big Data for SDG 4——China's Participation and Practice in Era Artificial Intelligence
Khalida Parveen, Sarfraz Aslam	Future of Artificial Intelligence in the Education Industry
Muhammad Shafiq, Khalida Parveen	Alarming future of increasing gap in student learning among developing and advance countries
Tyene Houston	STEM Challenges: An Exploration of Barriers Female Engineers Face in Industry

分论坛五

Parallel Session 5

时间：12 月 26 日下午 14:00-15:00　　　Date: Dec 26th 14:00-15:00

会议平台：腾讯会议　　　　　　　　　Platform: Tencent Meeting

主持人：南京晓庄学院副教授，宋怡　　Host: Associate Professor, Nanjing Xiaozhuang University, SONG Yi

主题：跨学科融合教育实践 Theme: Practice of Integrated Interdisciplinary Education	
作者	报告题目
张宝辉，余淑珍	中国 K-12 阶段 STEM 相关理科课程设置情况概述
梁凯华，陈梅，贾越，王东英	STEAM 视域下中国西部民族地区创客课程开设的现状研究——以鄂尔多斯市为例
王梦倩，崔鸿	基于同伴学习的小学 STEM 教育现状与对策研究
胡源龙	STEM 教育与博物馆结合的路径分析

分论坛六

Parallel Session 6

时间：12 月 26 日下午 14:00-15:00

会议平台：ZOOM

主持人：凯蒙学院 STEAM 项目中国区负责人，南京乐思得信息科技有限公司经理，刘玲玲

Date: Dec 26th 14:00-15:00

Platform: ZOOM

Host: Manager of Nanjing LASTEAM Information Technology Co., Ltd., LIU Lingling

主题：STEM 教育实践探索 Theme: STEM Education in Practice	
Presenters	Title
ZHU Yilin	STEM Teachers＇SWOT Analysis of STEM Education: The Bureaucratic - Professional Conflict---A Case Study of Zhejiang Province
Hao Kun, Yuan Liu, Qian Qian	Constructing Interlinked Learning Resources for Integrated STEM Education Environment
QIAN Qian ,YUAN Liu , HAO Kun	Supporting Exploratory Learning with Questioning and Computational Thinking in Integrated STEM Education
Huma Akram, Yang Yingxiu	Analysis of Synchronous and Asynchronous approaches in online Learning satisfaction during Covid-19 Pandemic

分论坛七

Parallel Session 7

时间：12 月 26 日下午 14:00-15:00

会议平台：ZOOM

主持人：北京师范大学未来教育高精尖创新中心大数据研究员，陈鹏鹤

Date: Dec 26th 14:00-15:00

Platform: ZOOM

Host: Beijing Normal University (BNU),

Big Data Researcher, Dr.CHEN Penghe

主题：国际视野下的 STEM 教育 Theme: STEM Education from international comparative perspective	
Presenters	Title
Beaton Galafa	Current Trends in STEM Education in Sub-Saharan Africa: A Comparative Study of Malawi, Nigeria, Kenya, and South Africa
Phuc Quang Bao Tran, Khalida Parveen	Leadership and STEM Education in Pakistan and Vietnam: Challenges and Strategies
Latiba Khanum	Current Practices of STEM education and Students' Learning: A Case study of Islamia University Bahawalpur, Pakistan
GONG Xiaoyang	A Comparative Case Study of Elementary School Science Lessons between China and Finland

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