

IEIS2022

Final Program

9th International Conference on Industrial Economics System and
Industrial Security Engineering

21-23 July, 2022

Hosted by

IEEE SMC Technical Committee on Logistics, Informatics and Industrial Security Systems
National Academy of Economic Security of Beijing Jiaotong University, China
The International Center for Informatics Research of Beijing Jiaotong University, China
China Center for Industrial Security Research of Beijing Jiaotong University, China
School of Economics and Management of Beijing Jiaotong University, China

In cooperation with

Beijing Wuzi University, China
The Hong Kong Polytechnic University, China
Informatics Research Centre, University of Reading, UK

Supported by

IEEE Systems, Man, and Cybernetics Society
K. C. Wong Education Foundation (Hong Kong)
Sino-EU Doctoral School for Sustainability Engineering (Program in Logistics, Information,
Management and Service Science)
Beijing Logistics Informatics Research Base
Key Laboratory of Logistics Management and Technology of Beijing

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Foreword

Welcome to participate in the virtual conference of the 9th International Conference on Industrial Economics System and Industrial Security Engineering (IEIS2022). The conference is hosted by IEEE SMC Technical Committee on Logistics Informatics and Industrial Security Systems, China National Academy of Economic Security of Beijing Jiaotong University, The International Center for Informatics Research of Beijing Jiaotong University (ICIR), China Center for Industrial Security Research of Beijing Jiaotong University (CCISR), and School of Economics and Management of Beijing Jiaotong University (SEM), in cooperation with Beijing Wuzi University, China, The Hong Kong Polytechnic University, China, Informatics Research Centre, University of Reading, United Kingdom, and supported by IEEE SMC, K. C. Wong Education Foundation (Hong Kong), Sino-EU Doctoral School for Sustainability Engineering (Program in Logistics, Information, Management and Service Science), Beijing Logistics Informatics Research Base, Beijing Laboratory of National Economic Security Early-warning Engineering and Key Laboratory of Logistics Management and Technology of Beijing.

This conference is to provide a forum for scholars and practitioners in the world to discuss the problems in industrial economics and industrial security theories and practices. It aims to provide insights in solving the problems in national economy, social development and economic security. The conference has two simultaneous tracks, which cover different aspects and include: “*industrial economics*” and “*industrial security*”. Papers in each track describe state-of-art research works that are often oriented towards real world applications and highlight the benefits of related methods and techniques for the emerging field of industries. The conference theme is “industrial development, industrial security and national economic security under the background of globalization”

Many people have made dedicated efforts for the conference, we would like to take this opportunity to give our grateful thanks for them. First, we would like to thank the authors, whose research and development efforts are recorded here. Second, we thank the members of the program committee and the additional reviewers for their valuable help with their professional reviewing of all submissions. Third, we thank the invited speakers for their invaluable contribution and the time for preparing their talks. Many thanks are given to the colleagues from Beijing Jiaotong University, Budapest University of Technology and Economics and Shandong University for their hard work in organizing this event.

Although being impacted by COVID-19, we wish you all enjoy an exciting conference online in this special period. We hope to meet you again next year for the IEIS2023 online, and the details will soon be available at <http://icir.bjtu.edu.cn/ieis2023>.

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Weixi Zhang, Tianjin Polytechnic University, China
Zhuo Zhang, Nanjing University of Aeronautics and Astronautics, China
Xia Zhao, China Agricultural University, China
Jing Zhao, Beijing Forestry University, China
Shenghua Zheng, Zhejiang University of Technology, China
Yaodong Zhou, Beijing Jiaotong University, China
Zhiwen Zhu, Tianjin University, China
Shubin Zhu, Jiangxi Agricultural University, China

Opening ceremony

July 21, 2022

Beijing Time

08:00 p.m.-08:30 p.m.

VooV Meeting ID: 709-779-880 (Password: 072101)

Backup VooV Meeting ID: 231-992-528 (Password: 072101)

Keynote Lectures

July 21, 2022

Beijing Time

08:30 p.m.-09:10 p.m.

VooV Meeting ID: 709-779-880 (Password: 072101)

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Valuing Supply-Chain Responsiveness and Resilience

Suzanne de Treville

Professor, Editor-in-Chief of Journal of Operations Management, University of Lausanne

Supply-chain decision making is usually driven by cost. Recent events, however, have brought a new awareness of the value of both responsiveness and resilience. Responsiveness refers to the flexibility to adjust to known unknowns, resilience to the ability to survive dramatic and unexpected shocks---or to be positioned to take advantage of unexpected advantages. Both responsiveness and resilience are easier to achieve when the decision about what to produce can be postponed. Such postponement creates real options. In this talk, I will describe the use of quantitative-finance models to value these options. Valuing options requires that we make assumptions about the demand volatility and other sources of risk, especially how they evolve as the time between deciding what will be produced and knowing demand increases. The talk will review use of the Cost-Differential Frontier (CDF), which is a tool that my lab has created and made generally available to aid decision makers in incorporating lead time into decision making. The Cost-Differential Frontier is available at Cost Differential Frontier Calculator, and has also been made available through the inventory section of the US Department of Commerce's website (referred to as the "cost of lead time calculator"). The CDF illustrates that reducing the decision lead time (the time between when a decision about what to produce or what capacity to have available needs to be made and when demand is known) has value when demand volatility is high and the residual value of leftover goods or capacity at the end of the demand period is low. Products can thus be categorized as being more or less time sensitive. Incorporating option value into decision making is facilitated by use of option-based costing. Consider two products, one highly time sensitive and the other time insensitive. The producer decides to hold capacity reactively to ensure that demand for the time-sensitive product can be met. The fixed costs (labor and overhead) of that capacity are allocated to the time-sensitive product as the cost of having the option to meet demand. Leftover capacity can then be profitably used to produce a time-insensitive product as long as the price received covers variable cost. I will illustrate how reconsidering what costs are allocated to which product can facilitate local production in a high-cost environment.



Suzanne de Treville is Emeritus Professor of Operations Management at the University of Lausanne. Professor de Treville has played a pioneering role in the application of quantitative-finance methods to valuing supply chain responsiveness. She created OpLab to facilitate the implementation of these research insights and tools for managers and policy makers. She is currently Coeditor in Chief for the Journal of Operations Management. Professor de Treville is using tools from quantitative finance to value the options that are created by supply-chain resilience or responsiveness. Such tools allow decision-makers to incorporate resilience and responsiveness in supply-chain decision-making. The cost-differential frontier she

has created answers the question of how much a company should be willing to pay to design a supply chain to

make it possible to postpone a decision. To support firms worldwide and demonstrate that the real options created by postponement may be surprisingly valuable, an app has been developed with the US Department of Commerce. Further decision tools support managers in creating portfolios that combine products that are more and less time sensitive, and competitive games that allow decision-makers to gain skill at making these investment decisions in a realistic and safe environment.

July 21, 2022

Beijing Time

09:10 p.m.-09:50 p.m.

VooV Meeting ID: 709-779-880 (Password: 072101)

Backup VooV Meeting ID: 231-992-528 (Password: 072101)

A flow-based formulation for parallel machine scheduling using decision diagrams

Roel Leus

Professor of operations research, KU Leuven

We present a new flow-based formulation for identical parallel machine scheduling with a regular objective function and no idle time. We use a decision diagram that contains all the possible sequences of jobs that follow specific ordering rules to construct the new formulation. These rules, taken from work by Baptiste and Sadykov, are based on a partition of the planning horizon into, generally non-uniform, intervals. The new formulation will have numerous variables and constraints, and hence we apply a Dantzig-Wolfe decomposition in order to compute the linear programming relaxation of the new flow-based formulation in a reasonable amount of time. Moreover, we will see that the lower bound will be stronger than the lower bound obtained by the classical time-indexed formulation. We develop a branch-and-price framework to solve the new formulation, which allows to solve several instances from the literature for the first time. We also compare with the arc-time indexed formulation; we find that the two formulations are not comparable (meaning that neither of the two is stronger than the other).



Roel Leus is a full professor at Faculty of Economics and Business, University of Leuven. He is the head of ORSTAT (Research Center for Operations Research and Business Statistics). His research interest sequencing and scheduling, project planning and scheduling and combinatorial optimization. He has published more than 160 papers in peer reviewed journals, including *Informatics Journal on Computing*, *Management Science*, *Omega-International Journal of Management Science*, *European Journal of Operational Research*, *Decision Support Systems*, *OR Spectrum*, etc.

July 21, 2022

Beijing Time

09:50 p.m.-10:30 p.m.

VooV Meeting ID: 709-779-880 (Password: 072101)

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Digital Transformation: Case Studies

Robin Qiu

Professor of Information Science, Penn State, USA

This talk has two parts. Case Study 1: Buildings account for roughly 40% of the total energy consumption in the world, out of which heating, ventilation, and air conditioning are the major contributors. By focusing on smart and improved building operations with a focus on building energy efficiency, I will discuss a binary programming optimization model that incorporates actual occupancy patterns for different zones in a building as well as equipment interdependence to systematically determine the optimal schedule for each equipment while maintaining a minimum required service level to meet occupant needs. Case Study 2: Clinical notes typically contain medical jargons and specialized words and phrases that are complicated and technical to most people, which is one of the most challenging obstacles in health information dissemination to consumers by healthcare providers. It is therefore crucial to bridge the gap in information dissemination between both sides for better care delivery. I will discuss how to leverage computational methods to transform clinical notes of interest into understandable expressions so as to help healthcare consumers with a better understanding of their medical information from clinical notes.



Robin Qiu holds a Ph.D. in Industrial Engineering and a Ph.D. (minor) in Computer Science both from The Pennsylvania State University (graduated in 1996), where he is currently Director of Big Data Lab and Professor of Information Science. He is the Editor-in-chief of SpringerBriefs in Service Science. He has had over 180 peer-reviewed publications, including 3 books. He is on the advisory board of Service Science and serves as an associate editor of IEEE Transactions on Systems, Man and Cybernetics and IEEE Transactions on Industrial Informatics. He was the Editor-in-Chief of Service Science and the Editor-in-Chief of International Journal of Services Operations and Informatics. He founded and served as General co-Chair of the 2009 INFORMS International Conference on Service Science. He founded the annual IEEE International Conference on Service Operations and Logistics, and Informatics (SOLI) and served as its General co-Chair from 2005 to 2008. He also co-founded the bi-annual IEEE International Conference on Grey Systems and Intelligent Service in 2007. He was also the founding chair of the Logistics and Services Technical Committee, IEEE Intelligent Transportation Systems Society and the founding chair of Service Science Section of the INFORMS. His research interests include Big Data, Data Analytics, Smart Service Systems, Service Science, Service Operations and Management, Information Systems, and Manufacturing and Supply Chain Management.

July 21, 2022

Beijing Time

10:30 p.m.-11:10 p.m.

VooV Meeting ID: 709-779-880 (Password: 072101)

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Digital twinning and Artificial Intelligence: Recent trends and applications

About Ella Hassanein

Professor at Cairo University, Faculty of Computers & Artificial Intelligence, Founder and Chair of the Scientific Research Group in Egypt

The digital twin creates virtual copies of physical locations, plant processes, business processes as well as assets, and, paired with AI, enables plant operators to find value within plant data that they can then leverage to drive improvement across various operations. This talk reviews the basic concepts of digital twinning, its classification, applications and prospects of AI in digital twins. We discuss the applications of digital twins in the many areas of drug discovery, medicine, manufacturing in production workshops, cultural heritage, smart city transportation, and we review the current challenges and topics that need to be looked forward to in the future.



Aboul Ella Hassanein is the Founder and Head of the Egyptian Scientific Research Group (SRGE) and a Professor of Information Technology at the Faculty of Computer and AI, Cairo University. Professor Hassanien has more than 1000 scientific research papers published in prestigious international journals and over 60 books covering such diverse topics as data mining, medical images, intelligent systems, social networks and smart environment. His other research areas include computational intelligence, medical image analysis, security, animal identification, space sciences and telemetry mining and multimedia data mining.

July 22, 2022

Beijing Time

08:00 p.m.-08:40 p.m.

VooV Meeting ID: 670-323-687 (Password: 072209)

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Green Packaging and Communication: The Implications of Bring-Your-Own-Container

Jian Chen

*Lenovo Chair Professor at Department of Management Science and Engineering
Tsinghua University*

In this talk, we will exam the impacts of one specific type of consumer pro-environmental behavior, i.e., bring-your-own-container (BYOC), on a firm's packaging and communication decisions, as well as on the environment. Based on our analysis, we provide some operational insights on how firms should make green packaging and communication decisions in the presence of the BYOC trend, and also generate some insights on how governments should regulate firms' green claims.



Chen Jian is Lenovo Chair Professor and Chairman of Management Science Department, Director of Research Center for Contemporary Management, Tsinghua University. He received the B.Sc. degree in Electrical Engineering from Tsinghua University, Beijing, China, in 1983, and the M.Sc. and the Ph.D. degree both in Systems Engineering from the same University in 1986 and 1989, respectively. His main research interests include supply chain management, E-commerce, decision support systems and systems engineering. Dr. Chen has published over 200 papers in refereed journals and has been a principal investigator for more than 50 grants or research contracts with National Science Foundation of China, governmental organizations and companies. He has been invited to present several plenary lectures at international conferences. He has been elected to IEEE Fellow (2008). He serves as Chairman of the Service Systems and Organizations Technical Committee of IEEE Systems, Man and Cybernetics Society, and Vice President of Management Science and Engineering of China (2017-). He also serves as editor-in-chief/senior editor/editorial board member for some international journals.

July 22, 2022

Beijing Time

08:40 p.m.-09:20 p.m.

VooV Meeting ID: 670-323-687 (Password: 072209)

Backup VooV Meeting ID: 288-316-501 (Password: 072209)

Translational Informatics for Interoperability and Connectivity: A Healthcare Case Study

Sabah Mohammed

Professor, Senior Member of IEEE, Professional Engineer of Ontario, Information Processing Professional with CIPS, Editor in Chief of the IJEACH, Associate Editor of the IEEE Access, Founder of the JETWI, Supervisor of the Smart Health FabLab at Lakehead University, Canada Smart Health FabLab, Department of Computer Science, Lakehead University, Ontario P7B 5E1, Canada

Translational informatics (TM) and its sub-area Translational Medical Informatics is an emerging research area that focuses on the application of information technology (IT)-based methods to facilitate collaboration between fundamental sciences at the benchside and the clinical practice at the bedside. TMI uses IT to support the two goals of translational research: (1) to support basic sciences to improve our understanding of the biological mechanisms of disease and to efficiently discover new drugs and therapies, and (2) to facilitate the implementation of research findings in medical practice. This invited speech provides the trends of using GraphQL to develop the next generation translational medical informatics through connectivity with POMR, HL7 FHIR and Bio-Medical Research Repositories like OpenTargets.



Dr. Sabah Mohammed research interest is in intelligent systems that have to operate in large, nondeterministic, cooperative, highly connected, survivable, adaptive or partially known domains. His continuous research is inspired by his PhD work back in 1981 from Brunel University (UK) on the employment of the Brain Activity Structures for decision making (planning and learning) that enable processes (e.g. agents, mobile objects) and collaborative processes to act intelligently in their environments to timely achieve the required goals.

Having trained in medicine with a computer science PhD in Artificial Intelligence (AI), Dr. Mohammed is full Professor at the department of Computer Science at Lakehead University (Ontario Canada) since 2002 and core professor at the BioTechnology program at Lakehead. Dr. Mohammed efforts in establishing healthcare related programs at Lakehead are notable like the specialization Health informatics, BioTechnology and the Bioinformatics programs at Lakehead. With a research background in industry and academia, he has a strong international research reputation for his work on clinical decision support systems supporting remote areas, ubiquitous and extreme environments. Prior to his work at Lakehead University, Dr. Mohammed was the chair of three computer science departments at HCT, Philadelphia and Applied Science Universities. Dr. Mohammed is the Editor in Chief of the of the IGI Global International Journal of Extreme Automation and Connectivity in Healthcare (IJEACH), Associate Editor of the IEEE Access and the founding EiC of the Int. J. of Emerging Technologies of Web Intelligence (JETWI) . He is currently the supervisor of the Smart Health FabLab at Lakehead University. Dr. Mohammed chair the special interest group on Smart and Connected Health with the IEEE ComSoc eHealth TC. Dr. Mohammed is currently working on the development

of IoT and mobility technologies that have impact on improving healthcare services at remote areas like Northwestern Ontario region. Dr. Mohammed is also a Professional Engineer of Ontario, Information Processing Professional with CIPS and Senior Member of IEEE with research supported by major granting organizations like NSERC and CFI. More information on Dr. Mohammed can be found on his institution website <http://flash.lakeheadu.ca/~mohammed>.

July 22, 2022

Beijing Time

09:20 p.m.-10:00 p.m.

VooV Meeting ID: 670-323-687 (Password: 072209)

Backup VooV Meeting ID: 288-316-501 (Password: 072209)

Planning for Facility Collaboration in Logistics Network Design

Francisco Saldanha da Gama
University of Lisbon, Portugal

The concept of collaboration in Logistics has been associated with different stakeholders sharing their resources for a common benefit. In this presentation we discuss a different perspective in which facilities of a production and distribution system help by the same enterprise cooperate in case this can result in overall savings to the entire system. This is accomplished by assuming that facilities with surplus capacity or production can cooperate with those facing shortage by transferring part of that capacity/production. Such a transfer incurs a cost that nonetheless may be compensated by savings both in setup costs and in the transportation costs. Mixed-integer mathematical programming models are discussed. A distinction is made between the case in which the triangle inequality holds for the transfer costs and the case in which it does not. Different compact models are compared, which are enhanced with valid inequalities that are separated in a branch-and-cut procedure. A comprehensive computational study with several hundreds of instances is reported showing the value of transferring capacities. Overall, this work investigates a problem that is at the core of more comprehensive models emerging in the context of logistics network design.



Francisco Saldanha da Gama is professor of Operations Research in the Department of Statistics and Operations Research at the Faculty of Science, University of Lisbon. He has a large teaching experience both in terms of undergraduate and post-graduate programs focusing on the fields of Operations Research, Mathematical Programming, Discrete Optimization, Stochastic Optimization, and Logistics. He has published dozens of articles in international scholarly journals mostly in the areas of location analysis, supply chain management, logistics and combinatorial optimization. His work has resulted in approximately 3200 citations in Scopus with an h-index of 26. He has co-edited the two editions of the volume “Location Science” published by Springer International Publishing. He has presented more than 150 contributed talks in scientific events being invited to innumerable scientific events as a plenary/semi-plenary/keynote speaker. He has been awarded several prizes and honors. He has been member of innumerable scientific committees of international conferences and other scientific events. He is member of various international scientific organizations such as INFORMS and EWGLA--EURO Working Group on Locational analysis, of which he is one of the past coordinators. Currently he is the Editor-in-Chief of Computers & Operations Research as well as member of the Editorial Advisory Board of the Journal of the Operational Research Society (UK), Operations Research Perspectives, and Algorithms. His research interests include stochastic mixed-integer optimization, location theory and project scheduling.

July 25, 2022

Beijing Time

10:00 p.m.-10:40 p.m.

VooV Meeting ID: 670-323-687 (Password: 072209)

Backup VooV Meeting ID: 288-316-501 (Password: 072209)

Airline Strategies During the Pandemic: What Worked?

Martin Dresner

Professor, Chair of the Logistics, Business and Public Policy Department

R.H. Smith School of Business, University of Maryland, USA

The onset of the covid-19 pandemic significantly impacted the airline industry. Passenger demand plummeted due to government-imposed travel restrictions and general safety concerns. Airlines employed various strategies to generate revenues, reduce costs, and improve safety. Using data from the U.S. airline industry, we provide descriptive statistics at the airline level demonstrating the diverse strategies used by the airlines. Then, at the route level, we examine the middle seat blocking strategy in more depth. Our analysis shows that this strategy resulted in revenue losses for the airlines, as increased yields realized from the strategy did not fully compensate for lower load factors. Our results highlight why airlines ultimately abandoned this strategy.



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Conference Organisers

National Academy of Economic Security, Beijing Jiaotong University

National Academy of Economic Security (NAES) is a non-profit research institution, focusing on the integrated social scientific research. Based on the 12-year great achievements of China Center for Industrial Security Research, NAES is established to safeguard national economic security under the guidance of constructing “overall National Security”, a proposal from Chinese President Xi Jinping.

As an adherer to “rigorousness in academics and strictness in requirements”, an academic tradition of Beijing Jiaotong University (BJTU), NAES serves both as a defender to the supreme strategy of the national security and as a new national high-end think tank that conducts comprehensive and systematic research on major issues to the national economic security and provides visionary and practicable advice for scientific research, industrial practices and national security decisions.

Co-construction Mechanism:

Under the support of BJTU, NAES is constructed on the joint efforts of more than thirty scientific research institutes in university and enterprises, aiming to achieve the synergic innovation by the integration of advantage disciplines resources from all sides involved and work together to build a high-end think tank in the national economic security field.

NAES Council:

To ensure NAES’s daily operation and management, a strong leading body, NAES council, has been founded accordingly. Under its leadership, the director accountability system is adopted. A vice national-level scholar-type leader, former Vice Chairman of CPPCC Mr. Qi Xuchun, is currently the head of the Council.

Chief Expert System:

To ensure a bellwether’s position in predominant disciplines, NAES creates “Chief Scientist” and “Chief Economist” systems. NAES plans to employ ten academicians as chief scientists in cross-disciplinary fields, ten famous economists and counsellors of the State Council as chief economists in research fields of humanities and social sciences.

Ministerial and Provincial Platforms:

NAES has two ministerial provincial platforms: “Beijing Philosophy and Social Sciences Beijing Industrial Security and Development Research Base” and “Beijing Laboratory of National Economic Security Early-warning Engineering”.

Research Centers:

With all research proceeding orderly in China Center for Industrial Security Research, NAES strives to set up “Research Center for Credit Rating”, “Research Center for China Listed Company Development”, “Research Center for Big Data and Cloud Computing”, “Research Center for Regional Economic”, “Research Center for Economic Security Simulation”, “Research Center for Environmental Science and Water Security” and “Research Center for Carbon Capital and New Energy Security”, some of which have been established.

Postdoctoral Research Station:

NAES owns an independent postdoctoral station: China Center for Industrial Security Research Postdoctoral Research Station, with an accumulation of 509 postdoctoral researchers.

Talents Cultivation:

NAES adheres to the cultivation idea of “cultivating the brilliant and integrating the high-end”, adopting “learning plus practice” and “individual plus platform” innovative master-doctor cultivation models to develop comprehensive innovative management talents. Under the guidance of “integrating the high-end”, NAES strives to build a training brand of “BJTU Leaders” and promote the “Post-EMBA” training.

NAES is committed to safeguard the national economic security, conducting innovative research on the theoretical system construction in economic security fields such as, monitoring, prediction, simulation, prewarning and prevention, countermeasures and solutions. NAES targets to gradually become a national security think tank and a new national high-end think tank at last by leading in theories and serving to the decision-making.

International Center for Informatics Research, Beijing Jiaotong University

The International Center for Informatics Research (ICIR) of Beijing Jiaotong University was jointly founded in March 2009 by Beijing Jiaotong University and University of Reading (UK). Taking talent training, scientific research, serving our society and cultural inheritance as the responsibilities, ICIR is established as a respected international teaching and research base, in information technology, logistics management and other related areas, through international cooperation and communication. International partners of ICIR include Liverpool University, UC Berkeley, The Pennsylvania State University, University of Maryland, Universitat Politècnica de Catalunya, BarcelonaTech, Université Paris VI, University of Macau as well as more than ten other famous universities in the world. Domestically, ICIR has established cooperation with many research institutes such as Development Research Center of the State Council, Academy of China, Xinhua News Agency etc.

The research areas of ICIR target information management, service science and logistics management and engineering in IT environment. The information management and service science includes topics of information industry theories and policies, E-Business and enterprise informatization, smart space and smart city, cloud computing technologies and applications. The logistics management and engineering includes topics of logistics economy and policies, design and optimization of regional and industrial logistics systems, internet of things (IoT) technology and logistics informatization, logistics planning and architecture design.

The key members of ICIR are Prof. Zhenji Zhang, Prof. Runtong Zhang, Prof. Shifeng Liu, Prof. Xianliang Shi, Prof. Juliang Zhang, Prof. Yisong Li, Prof. Hongjie Lan, Prof. Dan Chang, Prof. Guowei Hua, Prof. Xiaochun Lu and others, in total 15 full professors and associate professors from China. Prof. Gerhard Wäscher, Prof. James M. Tien, Prof. Kecheng Liu, Prof. Lida Xu, Prof. C. L. Philip Chen, Prof. Martin Dresner, Prof. T. C. Edwin Cheng, Prof. Therese Libourel, Prof. Vicenc Fernandez Alacon, Prof. Zuojun Max Shen, Prof. Yannis A. Phillis, Prof. Jiuh-Biing Sheu, Prof. Tae Hoon OUM as well as other more than 20 professors from overseas.

The platforms of research and international collaborations include

- IEEE Technical Committee on Logistics Informatics and Industrial Security Systems
- Sino-EU Doctoral School for Sustainability Engineering (Program in Logistics, Information, Management and Service Science)
- Beijing Planning Base of Philosophy and Social Science--Beijing Research Base for Logistics and Informatics
- Beijing Key Lab for Logistics Management and Technology
- LISS/IEIS International Conferences
- Over 15 Cooperative SCI/SSCI/EI Journals

Up to now, ICIR has been undertaking over 160 projects, including those supported by EU seventh framework, Critical and Major Program of National Natural Science Foundation of China (NSFC), National High Technology Research and Development Program of China (863 Program), Major State Basic Research Development Program of China (973 Program), National Key Technology Research and Development Program of the Ministry of Science and Technology of China, Major Program of Social Science Foundation of Beijing,

with a total grant of over 34 Million CNY (5.5 Million US dollar). In addition, the members of ICIR published more than 600 papers in refereed journals and conferences, such as IEEE Trans. Systems, Man and Cybernetics, IEEE Trans. Fuzzy Systems, International Journal of Production Economics, European Journal of Operations Research, Naval Research Logistics, as well as 10 scientific monographs. ICIR has been granted 1 Science and Technology Progress Award at national level and 2 Science and Technology Progress Awards at provincial and ministerial level, 2 Teaching Achievement Awards at national level and 4 Teaching Achievement Awards at provincial and ministerial level, 2 Best Courses Awards and 9 Best Textbook Awards at the national level. There are 23 post-doctorals and 41 Ph.D. candidates at ICIR.

Beijing Wuzi University



BWU was founded in 1980. It was successively subordinate to the State General Administration of materials, the Ministry of materials and the Ministry of domestic trade, and was under the administration of Beijing in October 1998. In February 2018, with the approval of Beijing Municipal People's government, Beijing School of business science and technology was incorporated into Beijing Wuzi University.

Beijing Wuzi University (BWU) is located in the east of Chaoyang North Road, the core area of the Beijing subcenter, the source of the ancient Beijing Hangzhou Grand Canal, with profound cultural heritage and beautiful, pleasant surroundings. The campus covers an area of 45 hectares with a floor space of 200,000 square meters, with complete teaching, scientific research and living facilities.

BWU is the first university in China to set up the specialties of Futures, Logistics Management and Purchasing Management in 1993, 1994 and 2010 respectively. The university consists of 8 schools: School of Economics, School of Logistics, School of Informatics, School of Business, School of Law, School of Foreign languages and Cultures, School of International Communication, School of Continuing Education. In addition, there are teaching institutions such as School of Marxism and sports department. Now the university has 28 specialties for undergraduates: economics, international economy and trade, finance, logistics management, logistics engineering, mechanical design and manufacturing and automation, procurement management, quality management engineering, supply chain management, computer science and technology, information engineering, Internet of things engineering, information and computing science, applied statistics, information management and information system, e-commerce, data science and big data technology big data management and application, accounting, financial management, business management, marketing, human resource management, labor and social security, labor relations, law, English, business English.

Since 1986, BWU has been admitting postgraduates. At present, it has five master's degree majors authorizations (Applied Economics, theoretical economics, management science and engineering, business administration, computer science and Technology) with 20 secondary disciplines. Among these specialties and programs, 2 are awarded Beijing Municipal key construction disciplines. The discipline of management science and engineering has been selected into the "top-notch" discipline construction queue of Beijing University and jointly built with Beijing Jiaotong University. BWU has 1 joint doctoral program with Capital University of Economics and Business and Beijing Jiaotong University respectively.

BWU now has 8,000 enrolled students, which includes undergraduates, postgraduates and students from foreign countries. The amount of undergraduates is around 6000. The amount of postgraduates is around 1000. The students come from 30 provinces or regions. The university has trained a large number of senior professionals in the field of circulation for the country in decades, especially in the logistics, securities and futures industries, graduates enjoy a high social reputation.

At present, the university has 775 staff members, 489 who are full-time teachers. There are 276 professors and associate professors in BWU, representing 56.4% of the full-time teachers. 282 teachers have been awarded doctoral degrees, representing 57.7% of full-time teachers. 93% of full-time teachers have master's degree or above. There are 9 experts with special government allowance, 6 great wall scholars, 1 National May 1st Labor Medal winner, 1 Beijing model worker, 1 capital labor medal winner, 51 key teachers and talents in Beijing, 24 young talents and top-notch young talents in Beijing, 7 innovative talents in Beijing, 15 outstanding talents funded and cultivated in Beijing, 3 new technological stars in Beijing, There are 3 famous teachers in Beijing higher education, 10 famous teachers in Beijing higher education, 1 famous young teacher in Beijing higher education, 2 outstanding young talents in Beijing higher education program, 1 pioneer in Beijing Teachers' morality, 3 advanced individuals in Beijing Teachers' morality, 4 excellent teachers in Beijing, 2 excellent educators in Beijing, 12 excellent moral education workers in Beijing higher education, and excellent assistant in Beijing Guide 13 people.

Shandong University, under the direct jurisdiction of the Ministry of Education, is a key comprehensive university with a long history, a variety of disciplines, strong academic strength, and distinctive characteristics, which has great influence both at home and abroad. In 2017, SDU was chosen as one of the 36 Class A universities on the list of Double First Class University Plan released by the central government of China.

Shandong University is one of the initiative universities of modern Chinese higher education. Its medical school, established in 1864, signified the beginning of modern Chinese higher education. Its main body, Shandong Imperial College (Shandong Da Xue Tang) established in 1901, was the second national university in China, only after the Imperial University of Peking. Moreover, it was the first university to be established and run in accordance with a chartered constitution.

Since its birth, Shandong University has gone through several stages of significant growth and change: starting as the Shandong Imperial College, it was then reborn as the National Qingdao University, the National Shandong University, Shandong University, and the Shandong University in its present form, which is the result of the merger of Shandong University, Shandong Medical University and Shandong Industrial University. For more than 100 years, Shandong University has been following the mission of "Reserve talents for the world, and seek prosperity for the nation" and the motto of "Noble in spirit, endless in knowledge." For this aim, it has cultivated over 600,000 talented young people of various specialties, and has been making significant contributions for the country and the regional economic and social development.

Shandong University has been developing by leaps and bounds in recent years, and each of its undertakings has reached unprecedented levels. The educational quality and competitiveness of the university have been remarkably improved.

At present, 18 disciplines have reached the top 1% of ESI in terms of academic influence and contribution ability, and we have signed collaboration agreements with nearly 200 universities in more than 30 countries and regions.

Shandong University comprises 8 campuses (Jinan Central Campus, Hongjialou Campus, Baotuquan Campus, Qianfoshan Campus, Software Park Campus, Xinglongshan Campus, Qingdao Campus and Weihai Campus) in three different cities (Jinan, Qingdao and Weihai), covering an area of over 533 hectares (including 200 hectares of the Qingdao campus).

The university currently has 4 affiliated hospitals, 15 non-subordinate affiliated hospitals. Its full-time student population totals up to 70,000, of which 42,268 are full-time undergraduates, 26,818 are postgraduates and 1,560 are international students. It also has an excellent faculty team of 1,246 professors, including 897 doctoral supervisors.

And now there are 19 academicians of the Chinese Academy of Sciences or the Academy of Engineering(double-hired academicians included), 40 Chair Professors of Cheung Kong Scholars Programme, 5 winners of the Youth Project, 53 winners of the "National Outstanding Youth Foundation" award, and 29 winners of the "Outstanding Youth Science Foundation" award.The university boasts 12 state scientific research platforms, four key social science research bases approved by the Ministry of Education, and a large number of provincial key laboratories and provincial engineering technology research centers.

Shandong University is a comprehensive university in China with full-fledged academic disciplines. There are at present 12 general disciplines for undergraduates and postgraduates, namely philosophy, economics, law, education, literature, history, science, engineering, agriculture, medicine, management, and fine arts. There are 44 first-level doctoral programs, 51 first-level master degree programs, 93 programs for undergraduates and 42 post-doctoral research programs, forming a complete system for cultivation of talent. 18 disciplines are ranked in the top 1% of ESI Global Ranking in terms of academic influence and contribution capacity. Moreover, inter-school partnership has been forged with more than 200 schools in over 30 countries and regions.

The growth of the university over the years has seen SDU rise to the forefront of many fields in China. In the 1930s and 1950s, when Shandong University was located in Qingdao, it was the home to many nationally famous scholars who paved the way for great success especially in the fields of literature and history. Up to this day, Shandong University is well-known for its strong liberal arts programs, and published the highly reputable academic journal Literature, History & Philosophy. These two periods also laid a good foundation for the university in natural sciences, enabling it to find itself among the noted institutions in China. In August 2015, SDU successfully held the 22nd International Congress of Historical Sciences, reputed as the "Olympics of Historiography". This is the first time that the Congress was introduced to Asian, African and Latin American countries since its establishment. Another record high was also made in terms of its numbers of participating registered countries, historians from developing countries and young scholars.Since the merger at the end of the last century, the university's newly-developed disciplines of financial mathematics, crystal materials, condensed matter physics, colloid and surface chemistry, micro-biology, machinery, material science, cardiovascular functional recovery, new drug manufacturing, and classical Chinese philosophy have all risen to the first-class level within the country, and some are even known abroad.

Shandong University has already set a grand educational objective: initially becoming a world-class university with Chinese characteristics by its 120th anniversary, and all institutions are standing at a new historic starting point. Facing the unprecedented opportunity, all faculty members, students and medical staff, racing against time in a pioneering and enterprising manner, will focus on the fundamental task of moral education by advancing its comprehensive reform and improving the modern university system. With an already strong academic foundation and even more untapped potential, we are sure to achieve the goal of becoming one of the world's highest ranking universities.

The Hong Kong Polytechnic University



With 85 years of proud tradition and ranking among the world's top 100 institutions, PolyU aspires to be a leading university with world-class research and education.

The Hong Kong Polytechnic University (PolyU) is a home for educating thinkers, discoverers, innovators and communicators in delivering positive impact. We are committed to nurturing tomorrow's leaders today, through a holistic education that provides graduates unrivaled placements to thrive in communities, industries and businesses.

We strive in inter-disciplinary research and impactful innovations to address real-world challenges. Our researchers are developing breakthrough ideas, fostering sustainability, lifting economic outcomes and improving communities' lives for the benefit of Hong Kong, the Nation and the world.

Motto, Vision and Mission

- Our Motto

To learn and to apply, for the benefit of mankind

The above is derived from the Chinese motto, quoted from the great Chinese classic Yijing (Book of Change) and two ancient treatises, one from Han dynasty and the other from pre-Qin times.

The original Chinese text can be paraphrased as follows: "Learn every truth and use the knowledge learned to accomplish every task" and "to learn; to serve".

- Our Vision

Be a leading university that advances and transfers knowledge, and provides the best holistic education for the benefit of Hong Kong, the Nation and the world.

- Our Mission

To pursue impactful research that benefits the world.

To nurture critical thinkers, effective communicators, innovative problem solvers and socially responsible global citizens.

To foster a University community in which all members can excel in their aspirations with a strong sense of belonging and pride.

Key Facts

- Institutional Performance and Analytics

To coordinate major university ranking exercises, conduct and interpret institutional benchmarking studies and comparative studies in higher education, facilitate the accessibility of research output, as well as coordinate various research analytics tools.

- Data and Decision Support

To coordinate the reporting of institutional data to government bodies and external parties, develop advanced data analytics and statistical models for assessment and evaluation, as well as support the senior management to develop and monitor university.

- Communication and Survey Coordination

To coordinate institutional surveys, engage in internal and external communications, host various platforms for the University, as well as formulate and implement marketing strategies on institutional performance.

History

- PolyU today

While PolyU boasts a history of eight decades, we keep moving with the times and addressing real-world challenges, serving the needs of Hong Kong, the Nation and the world.

The Hong Kong Polytechnic University (25 November 1994)

Having gained approval from the University and Polytechnic Grants Committee for the selfaccreditation of degree programmes, the institution assumed full university status, with its name changed to "The Hong Kong Polytechnic University".

- Hong Kong Polytechnic (1972)

The Hong Kong Polytechnic was formally established, with a mandate to provide professional education to meet the community's manpower needs.

- Hong Kong Technical College (1947)

After World War II, the School became the Hong Kong Technical College. 1957 saw the opening of a new premises in Hung Hom, signifying the beginning of a new chapter in industrial education in Hong Kong.

- Government Trade School (1937)

Founding of the Government Trade School, the origin of the Institution. Situated in Wood Road, Wanchai, the School was the first publicly funded, post-secondary technical institution in Hong Kong.

Henley Business School, University of Reading



Founded in 1945, by business for business, Henley was the first business school in the UK and is one of the oldest and most respected schools in Europe.

Our impressive full-service portfolio includes a range of undergraduate degrees and Postgraduate degrees in Accountancy, Business, Management, Finance, Real Estate, Planning, Informatics, and Coaching. We offer a world-class DBA and have a dynamic community of PhD students on postgraduate research degrees. Henley has an impressive track record of growing leaders and developing managers to make the right choices for their organisations and for the society they live in which are delivered through our executive education programme, the Henley Partnership and the Henley MBA.

One of the very few business schools worldwide to hold triple-accredited status from the major UK, European and US awarding bodies (AMBA, EQUIS, AACSB), we are also the world's third largest provider of MBA education and home to the world-ranked Henley MBA.

The School represents the largest unit within the University of Reading, rated among the UK's most research-intensive institutions and ranked among the world's top 200 universities (The Times, 2008).

School of Economics and Management, Beijing Jiaotong University



Beijing Jiaotong University (BJTU) was born with its specialty in railway and developed along with its management disciplines. As early as 1909, the Qing government established Beijing Railway Management Training Institute, the predecessor of BJTU, proclaiming the first institute of higher education that cultivated management talents in the history of China.

The disciplines of economics and management, having started at the very beginning of BJTU, are naturally the most long standing disciplines on campus. Over more than one century, the growths of disciplines have been closely connected to the country's destiny, overlapping endlessly with the university's development, and rising more distinctive through the years of time. In 1996, BJTU integrated School of Economics, Department of Industrial and Construction Management Engineering, and Department of Materials Management Engineering to form School of Economics and Management (SEM). Hence the school has stepped into a new stage growing even stronger. In 2011, SEM was approved by the Ministry of Education as one of the first group of 17 pilot schools. In 2019, SEM was awarded 3 PALMS in the World Best Business Schools Ranking by Eduniversal, being prominent in its 10th position in the best business schools ranking in mainland China. December 28th in 2017, China Academic Degrees and Graduate Education Development Center, the Ministry of Education announced the results of the fourth round of China Discipline Ranking, and the participating disciplines of our school obtained gratifying outcome with three first-level disciplines came up top. Among the list, our discipline of Business Administration ranks top 10% and stands in the A- Rating; Applied Economics, top 20% and B+; and coincidentally, Management Science and Engineering, top 20% and B+. This marks a significant milestone in our school's discipline construction. The economics and management of the School have been ranked in the "Academic Ranking of World Universities", showing a strong comprehensive strength of disciplines.

As the earliest institute of higher education that provides business education in modern China, for over a century SEM has cultivated a large number of top talents and management elites. For example, Xu Jing, pioneer of China's railway transportation economics discipline in China, Yang Rumei, one of China's first four accountants, and Zhao Chuanyun, national reputed expert of railway transportation economics, they are all outstanding figures. At present, SEM has more than 5100 students, including more than 700 doctoral students, more than 2500 master students, nearly 1900 undergraduates (458 of them in Weihai Campus) and nearly 300 international students.

In recent years, the college has been awarded 1 national excellent teaching team, 3 Beijing excellent teaching teams, 1 national-renown teacher, 7 Beijing-renown teachers, 24 national and Beijing teaching achievement awards, 4 national first-class undergraduate specialty construction points, 2 national characteristic specialties, 2 national "comprehensive professional reform pilot project" major, 1 key construction specialty in Beijing. Through the evaluation of the Ministry of housing and urban rural development, there are 1 major, 2 national quality teaching materials, 42 Beijing excellent teaching materials, 9 12th Five Year Plan teaching materials, 2 national quality open video courses, 5 national excellent resource sharing courses, and 1 National virtual teaching experimental center. It has been approved 69 National University Students' innovation experiment projects and 68 Beijing Municipal University Students' innovation experiment projects. Undergraduate students have won 14 national first prizes and 25 provincial first prizes.

Since the establishment of Economics and Management disciplines, the University have gathered a large group of talented scholars and accomplished experts. Zeng Kunhua, founder of the University and the first railway management expert in modern China, Ma Yinchu, famous Chinese Economist and demographer, Hu Liyou, chief professor of Beijing Railway Management School of Chiao Tung University and many other experts have taught here. At present, SEM has 292 members of faculty and staff, with 215 faculty members including 57 professors, 97 associate professors and 51 lecturers. The School recruited faculty members with high-level talents that include academicians of Chinese Academy of Engineering, counselor of the State Council, National Renowned Teachers, Discipline Review Group of State Council members, "Ten Thousand Talents Plan", "New Century Excellent Talents Supporting Program" of the Ministry of Education, etc.

After years of development, the School now has four first-class disciplines: Applied Economics, Business Administration, Management Science and Engineering, and Public Management. Among them, Applied Economics, Business Administration and Management Science and Engineering have first-class doctoral programs and postdoctoral mobile stations. In each discipline there are professors who are selected as members of the discipline evaluation group of the State Council. It has one national key discipline industrial economics, three Beijing key disciplines: applied economics, management science and engineering, and enterprise management. It has three key research bases of philosophy and Social Sciences in Beijing: "Beijing Transportation Development Research Base", "Beijing Industrial Security Research Base", "Beijing Logistics Informatization Research Base", and one Beijing Social Science and Natural Science Collaborative Innovation Research Base "Beijing Humanities Transportation, Scientific Transportation and Green Transportation Research Base" (all four bases are listed in the index of China Think Tank Index (CTTI)), 1 national and regional research center of the Ministry of Education, "Central and Eastern Europe Research Center of Beijing Jiaotong University", 1 Beijing Laboratory "National Economic Security Early Warning Project Beijing Laboratory", 1 Beijing Key Laboratory "logistics Management And Technology Laboratory", 1 capital high-end think tank

"Beijing Comprehensive Transportation Development Research Institute". 11 university level scientific research institutions are engaged in scientific research and social services.

The School has always been aiming at the needs of national strategy and industrial development, giving full play to the advantages of comprehensive disciplines in the field of economics and management. Through intellectual support, talent guarantee and professional services, the college actively serves the development of national transportation, modern logistics, capital finance, information technology, construction and real estate, tourism and health, and has become an important force to support and lead China's industrial development.

In the past five years, the annual average research funding of the School has exceeded 59 million yuan, with more than 1200 scientific research projects, ranking among the top among similar colleges in China. The college has been approved by 28 national social science funds, 39 National Natural Science Funds, 1 national key R & D project, 17 humanities and social sciences projects of the Ministry of Education, 80 projects of Beijing Philosophy and Social Affairs Office, as well as a number of international projects such as the seventh framework of EU and the world bank. He has published more than 2400 academic papers (including 10 highly cited papers, 151 SCI retrieval papers, 66 SSCI retrieval papers and 214 EI retrieval papers). 238 monographs, textbooks and translations were published. 49 expert suggestions have been selected into the Beijing social Science Fund Achievement Report, the National Social Science Fund Achievement Report, the Ministry of Education University Think Tank Special Issue or People's Daily for internal reference, and 25 of them were approved by the central or local leaders. SEM has won 9 awards above the provincial and ministerial level.

As an important part of social service, SEM has long carried out various professional business training including degree education class and course refresher class, enterprise internal training class, high-end development class, staff continuing education and other professional business training. It has established partnership with more than 200 enterprises and institutions, and signed strategic cooperation agreements with more than 100 local governments, enterprises and institutions.

SEM has established more than 90 cooperative projects with more than 60 internationally renowned universities such as the University of Illinois at Urbana Champaign, Monash University, National University of Singapore and Waseda University. SEM has entered the AACSB and EQUIS accreditation process, and completed the submission of the self-assessment reports of the two major accreditations, and will welcome peer review team's visit in 2020. At the same time, the School is also actively promoting the process of MBA program CAMEA accreditation. In 2013, the School established an International Advisory Committee, comparably earlier than the rest of domestic secondary colleges of higher education. By learning from first-class business schools worldwide, SEM is in full speed for pursuing internationalization of the School.

Beijing Jiaotong University



Beijing Jiaotong University, a national key university under the direct administration of the Ministry of Education, jointly supported by the Ministry of Education, Ministry of Transport, Beijing Municipal Government and China Railway Corporation, is also an active contributor to the development of the “National 211 Project” and the “985 Innovative Platforms for Key Disciplines Project”. The Collaborative Innovation Centre for Rail Transit Safety, established by BJTU, is one of the first 14 collaborative centers recognized by the Chinese government as part of the “National 2011 Projects”. BJTU was one of the first universities selected into the ‘Double First-Class’ National Initiative and has already accomplished its first set of development tasks. The university’s achievements in world-class ‘Smart Transportation’ discipline in particular has gained wide recognition among examining experts and authorities.

As one of the three founding bodies of the Jiaotong University, the history of BJTU can be dated back to 1896. BJTU originated from Beijing Railway Management Institute, China’s first higher education institution committed to fostering railway management talents and was created by the Qing dynasty government. It is regarded as the birthplace of modern China’s education in railway management and telecommunication. In 1917, it transformed into Beijing Railway Management School and Beijing Post and Telecommunication School. In 1921, the school merged with Shanghai Industrial College, Tangshan Industrial College and thusly formed the original Jiaotong University. After the restructuring of Jiaotong University in 1923, the Beijing campus was renamed Beijing Jiaotong University. In 1950, the school was again renamed Northern Jiaotong University with leading bridge expert and scholar Prof. Mao Yisheng as president. In 1952, Northern Jiaotong University was cancelled, the campuses at Beijing and Tangshan therefore became independent and the school was renamed

Beijing Railway Institute. In 1970, the name Northern Jiaotong University was re-adopted. In 2000, the school merged with the Beijing Electric Power College and the administration was transferred from the Ministry of Railways to the Ministry of Education. In 2003, the name Beijing Jiaotong University was resumed. Numerous renowned scholars and inventors in Chinese history received education in BJTU, including LIU Han, founder of China's first radio station; YING Shangcai, inventor of China's first high-power steam engine; JIN Shixuan, author of China's first railway management monograph; XU Jing, pioneer of railway transport economics in China; YANG Rumei, one of the earliest four major accountants in China, and ZHENG Zhenduo, famous writer, literary critic and historian. Certain famous academics also taught at the University, including HSIANG Che-chun, Prosecutor of the Tokyo Trial and MA Yinchu, famous demographer and economist in China.

BJTU has two campuses, the East and the West, in the renowned education district Haidian with a total area of nearly 67 hectares and building floorage of more than 1 million square meters. The Weihai International Campus in Shandong Province covers more than 67 hectares. All campuses are equipped with complete teaching and research facilities and enjoys beautiful scenery. In Huangye, Hebei Province, the BJTU Haibin Rail Transit Comprehensive Research and Development Base was set up with an overall area of approximately 15.5 hectares. The Tangshan Research Institute of Beijing Jiaotong University, established in Tangshan, Hebei Province, is dedicated to developing a demonstration zone of international education for R&D and commercialization of scientific findings.

Through the past 120 years, the university has developed a comprehensive and coordinated education system with strength disciplines in information and management, characteristic disciplines in transportation and other diversified disciplines such as engineering, management, economics, science, liberal arts, law and philosophy. The university is home to 16 schools, including School of Electronic and Information Engineering, School of Computer and Information, School of Economics and Management, School of Traffic and Transportation, School of Civil Engineering, School of Mechanical, Electronic and Control Engineering, School of Electrical Engineering, School of Sciences, School of Languages and Communication Studies, School of Software Engineering, School of Humanities and Social Sciences Marxism, School of Architecture and Design, Law School, School of Information Secret and Security Technology, Weihai International Campus, Zhan Tianyou Emerging Technology College, etc. The university also set up Graduate School, College of International Education and School of Distance Learning and Continuing Education.

BJTU's position in international rankings of world leading universities and disciplines are steadily on the rise. The university has already entered the top 500 list of the ARWU Ranking and for 3 years in a row, BJTU's Transportation Engineering discipline has crowned the world leading discipline ranking and 15 disciplines in total were qualified. 10 disciplines have been selected for U.S News world leading discipline ranking, 7 entered the same ranking of QS, 5 were nominated for the Times ranking. Engineering studies maintained a steady placing in the top 1% of ESI and 5 disciplines in total entered the top 1% list. The System Science discipline remained top 1 for four consecutive years in the National Discipline Evaluation, 5 disciplines were among the top 10% (Category A) in the fourth round of the evaluation, 7 were among the top 20% (Category B+). The university has 17 Post-doc Research Centers, 21 Level-1 Discipline Doctoral Programs and 3 Professional Doctoral Degree Programs. On the graduate level, BJTU is in charge of 33 Level-1 Discipline Master Programs, 2 Level-2 Discipline Master Programs and 19 Professional Master Degree Programs.

The university always sees high quality faculty development as the key to strengthening the school operation

efficiency and has thusly adopted a ‘talent cultivation’ strategy. The university employs 3040 staff, including 1,965 full-time teachers (1,374 with vice-senior or higher professional technical titles, 1,908 with master degree or higher academic qualifications.). The university is home to 4 academicians of Chinese Academy of Science, 9 academicians of Chinese Academy of Engineering, 1 foreign academician of Chinese Academy of Engineering, 5 National Renowned Teachers, 6 Members of State Council Disciplinary Evaluation Committee, 15 experts of National Ten-thousand Talent Plan, 8 state candidates of the National Hundred-Thousand-Thousands of Talents Project, 12 Winners of National Outstanding Youth Funds, 20 winners of Distinguished Young Scholars and 2 talents of the Publicity Department of the CPC Central Committee’s ‘Four First Batch’ project.

BJTU has always attached high importance to talent cultivation, the core of the university’s operation and mission, raising innumerable talents for the country and the industry. Currently, the university has 16,153 undergraduate students, 2,908 doctoral students, 10,014 master students and 5,270 adult college students. The total amount of international exchange students amounts to 1,363. In the teaching achievement award evaluation for latest three years, BJTU has won 3 First Prizes, 8 Second Prizes on the national level. The university employs 5 national level renowned teachers, 2 national ‘Ten Thousand Talent Project’ renowned teachers, 34 Beijing municipal level renowned teachers and 8 Beijing young renowned teachers. 32 teachers were selected into the 2018-2022 Teaching Steering Committee of Higher Education Institutions of the Ministry of Education. BJTU has 34 National Level First Class Program Development Sites, 11 National Level Characteristic Specialties, 7 National Level Comprehensive Reform Pilot Programs, and 8 National Level Outstanding Engineering Education Plan Majors, among which 12 were certified by the National Engineering Education Evaluation and 2 passed the National Civil Engineering Major Assessment. The University has established 6 National Experimental Demonstration Centers, 3 National Centers of Virtual Simulation Experiment Teaching, 3 National University Student Extracurricular Practice Bases, 7 National Engineering Practical Education Centers and 1 National Teaching Development and Demonstration Centre. BJTU offers 32 Nationally-Certified First Class Undergraduate Courses, 19 National Excellent Resource Sharing Courses, and 6 National Excellent Online Video Public Courses. 42 textbooks of 34 categories were qualified as the ‘Twelfth Five-Year Plan’ Normal Higher Education Undergraduate National Teaching Materials. The university insists on creating synergy between its undergraduate and master programs, integration and fusion between disciplines, close relationship between industry and university and international connectivity. By implementing the ‘Highland Project’ and the ‘Peak Project’, the Zhan Tianyou Emerging Technology College was established, further exploring 3+5 integrated undergraduate and master talent cultivation model to a fundamental disciplines’ outstanding student education base. The student quality and education capability continue to improve yearly with a steady employment rate of undergraduate and post-graduate student around 97%, while 56% bachelor graduates continue to pursue higher academic degrees. BJTU was recognized by MOE as one of the first National Entrepreneurship and Innovation Example Universities, and Beijing Municipal Entrepreneurship and Innovation Educational Reform Demonstration University. The “Suite of Songs on the Long March” stage play and the original theatre play “Mao Yisheng” portrayed by BJTU Student Art Troupe was an innovative fusion of artistic expression and teaching that developed into an embodiment of the university patriotism education. BJTU also places great emphasis on the students’ physical education, high level athletes teams and common students teams all earned great results in various competitions. In 2020, the university took home 4 national championships and 23 municipal championships.

BJTU has always targeted the frontier of scientific and technological development and the demands of major national strategies. BJTU actively participated in major historic events of China’s rail transit development

including the Major Railway Speed-up Project, the construction of Qinghai-Tibet Railway, the heavy-haul transportation of Daqin Railway, the construction of high-speed railway and the independent research and development of core technologies regarding urban rail transit. The university has made significant scientific and technological achievements at international leading level with complete intellectual property rights. BJTU has made positive contribution to the development of various industries such as transportation, logistic, information engineering, new energy, etc. Reaping great benefits for Beijing's social and economic development, the university has become a major force for support and leadership of the national, industrial and regional scientific innovation development.

In the past five years, the university received 10 national level awards, 142 provincial level technological awards and hosted 11 first or higher prize winning projects of key academies and societies, among which there were 1 first prize National Science and Technology Progress Award, 2 second prize National Science and Technology Progress Awards, 2 second prize State Technological Invention Awards, 21 Beijing Municipal Philosophy and Social Sciences Research Awards. BJTU undertook major state R&D projects and other research tasks from The National Social Science Fund and the National Natural Science Foundation, total research funds attributed to the university rose above 1 thousand million Yuan. The university was approbated by the National Intellectual Property Administration and Ministry of Education as one of the first National Intellectual Property Demonstration Universities. BJTU boasts more than 70 provincial and ministerial-level research platforms, including 1 Collaborative Innovation Center for Rail Transit Safety, 1 Smart High-speed Railway System Frontier Science Center, 1 National Key Laboratory, 1 National Engineering Research Centre, 6 National Engineering Laboratories (5 of which BJTU is closely involved in), 2 National Base of International Science and Technology Cooperation, 8 Key Laboratories/Education and Engineering Research Centers of the Ministry of Education, 1 National Energy Research Centre, 2 Key Laboratories of Traffic and Transportation Industry, 2 Beijing municipal laboratories, 17 Beijing Key Laboratories/Engineering Technology Research Centers, 3 Railway Industry Key Laboratories, 8 Oversea Expertise Introduction Centers, 1 of the first Capital Advanced Think-Tanks, 1 New Traffic and Transportation Think-Tank of the Ministry of Transport, 1 Beijing Municipal Research Center on Xi Jinping's New Age Socialism with Distinctive Chinese Characteristics Theories, 4 Beijing Municipal Research Bases of Philosophy and Social Sciences, 1 National and Regional Research Center of the Ministry of Education. BJTU holds annually the Advanced Forum on Transportation of China, Lecture Hall of Jiaotong University and the Capital Advanced Think-Tank Forum on Beijing Transportation Development. The university provides kilo mega internet coverage for both cable and wireless connections throughout the campus. Thorough application of innovative high-technologies such as High Performance Computing, Big Data and Artificial Intelligence offers strong boost and support to the university's reform and development. Nowadays, the institution possesses teaching and research equipment of 1.35 billion Yuan worth. The university library stocks paperback monographs, electronic books and online resources of nearly 14.62 million copies. BJTU established a characteristic database of transportation and traffic studies, as well as an Inspection and Research Work Station of Innovative Technologies of the Ministry of Education. It was approbated as one of the first Higher Education Institution National Intellectual Property Information Service Centers.

The university regards international cooperation and exchanges as an important way to improve education quality. Actively responding to the appeal of the "Belt and Road Initiative", BJTU established partnership with 289 universities and renowned cross-national enterprises from 49 countries, including the United States, the United Kingdom, Germany and France. With the purpose of promoting Chinese culture and language teaching,

the university has established 4 Confucius Institutes at Group T of KU Leuven in Belgium, Texas Southern University in the United States, University of Campinas in Brazil and Warsaw University of Technology. For the further improvement of academic influence and authority in the global railway sector, BJTU successively joined international organizations and alliances such as OSJD, UIC and China-CEEC Higher Education Institutions Consortium, and led the establishment of the latter two. In order to enhance international research cooperation, the university also led the creation of the China-US, China-Russia, China-UK and China-Indonesia High-speed Railway Research Centers. BJTU is also actively engaged in undergraduate, postgraduate level degree program cooperation. The university operates 5 Chinese-Foreign Cooperation in Running Schools Programs, 1 Chinese-Foreign Collaboratively Run School and 2 oversea educational institutions. Making full play of the alumni association, the foundation and the university board, BJTU established 53 alumni organizations home and abroad, partnered with 86 various departments and institutions, while setting up strategic partnerships with industries corporations and local government in areas such as transport, logistic, information and energy so as to deepen synergetic innovation between political, industrial, educational and research bodies, carrying out long-term, full-range cooperation in talent cultivation and scientific development. The university's education foundation was certified as a 4A charity group by the Ministry of Civil Affairs.

“Think of the source while drinking the water, love thy country and honor the alma mater.” With 125 years of glorious history, Beijing Jiaotong University, adhering to the university motto of ‘knowing and doing’, is undertaking new missions and embracing a pioneering attitude for its stride towards the goal of world first-class university with distinctive characteristics.

China Center for Industrial Security Research

China Center for Industrial Security Research (CCISR) was founded in Beijing Jiaotong University (BJTU) in November, 2007. It is not only the first but also the only academic institute which specializes in the research on industrial security problems in domestic area. CCISR has achieved leapfrog development in such aspects as education, scientific research, talent cultivation and international cooperation and communication through the joint efforts made by all the staff since its foundation. CCISR aims at building the most authoritative academic institution for industrial security problems; takes the promotion of China's industrial security and development as its own duty; and will unremittingly devote itself to scientific creation, educational research, talent cultivation and international academic cooperation and communication.

In recent years, CCISR values highly on the research of industrial security theory and practice. It publishes series of industrial security and development report according to the development status of the first, the second and the third industries and key industries every year. Meanwhile, CCISR also makes monographic studies on the hot issues and difficult problems in current industrial development under the entrustment by governmental departments, international organizations and enterprises. As a result, it has obtained many provincial and ministerial-level projects and horizontal projects including key tender projects of National Social Science Fund, the significant research projects in the prophase of the 12th Five Year Planning of NDRC, the significant research projects of Ministry of Education, ministerial projects of Ministry of Commerce and the ministerial projects of National Insurance Regulatory Commission.

Technical Program

Technical Program at a Glance

July 21, 2022		
Beijing Time 08:00 p.m.-08:30 p.m.	Opening Ceremony	Prof. Zhongliang Guan Prof. Mingke He Prof. Xiaowen Fu Prof. Runtong Zhang Chiar: Prof. Guowei Hua
Beijing Time 08:30 p.m.-11:10 p.m.	Keynote Speech	Prof. Suzanne de Treville Prof. Roel Leus Prof. Robin Qiu Prof. Aboul Ella Hassanien Chiar: Prof. Xiaowen Fu
July 22, 2022		
Beijing Time 08:30 a.m.-12:00 p.m.	Parallel Sessions IE1	
Beijing Time 02:00 p.m.-05:30 p.m.	Parallel Sessions IE2	
Beijing Time 08:00 p.m.-10:40 p.m.	Keynote Speech	Prof. Jian Chen Prof. Sabah Mohammed Prof. Francisco Saldanha da Gama Prof. Martin E. Dresner Chiar: Prof. Francisco Saldanha da Gama
Beijing Time 10:40 p.m.-11:10 p.m.	Closing Speech	Prof. Runtong Zhang Prof. Xiaowen Fu Chair: Prof. Runtong Zhang

Final Program

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July 21, 2022

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Chair: *Prof. Guowei Hua*

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Backup VooV Meeting ID: 231-992-528 (Password: 072101)

Plenary Session 1 (Beijing Time 08:30 p.m.-09:10 p.m.)

Title: Valuing Supply-Chain Responsiveness and Resilience

Speaker: *Suzanne de Treville*

Chair: Prof. Xiaowen Fu

VooV Meeting ID: 709-779-880 (Password: 072101)

Backup VooV Meeting ID: 231-992-528 (Password: 072101)

Plenary Session 2 (Beijing Time 09:10 p.m.-09:50 p.m.)

Title: A flow-based formulation for parallel machine scheduling using decision diagrams

Speaker: *Roel Leus*

Chair: Prof. Xiaowen Fu

VooV Meeting ID: 709-779-880 (Password: 072101)

Backup VooV Meeting ID: 231-992-528 (Password: 072101)

Plenary Session 3 (Beijing Time 09:50 p.m.-10:30 p.m.)

Title: Digital Transformation: Case Studies

Speaker: *Robin Qiu*

Chair: Prof. Xiaowen Fu

VooV Meeting ID: 709-779-880 (Password: 072101)

Backup VooV Meeting ID: 231-992-528 (Password: 072101)

Plenary Session 4 (Beijing Time 10:30 p.m.-11:10 p.m.)

Title: Digital twinning and Artificial Intelligence: Recent trends and applications

Speaker: *Aboul Ella Hassanien*

Chair: Prof. Xiaowen Fu

VooV Meeting ID: 709-779-880 (Password: 072101)

Backup VooV Meeting ID: 231-992-528 (Password: 072101)

July 22, 2022

Plenary Session 1 (Beijing Time 08:00 p.m.-08:40 p.m.)

Title: Green Packaging and Communication: The Implications of Bring-Your-Own-Container

Speaker: *Jian Chen*

Chair: Prof. Francisco Saldanha da Gama

VooV Meeting ID: 670-323-687 (Password: 072209)

Backup VooV Meeting ID: 288-316-501 (Password: 072209)

Plenary Session 2 (Beijing Time 08:40 p.m.-09:20 p.m.)

Title: Translational Informatics for Interoperability and Connectivity: A Healthcare Case Study

Speaker: *Sabah Mohammed*

Chair: Prof. Francisco Saldanha da Gama

VooV Meeting ID: 670-323-687 (Password: 072209)

Backup VooV Meeting ID: 288-316-501 (Password: 072209)

Plenary Session 3 (Beijing Time 09:20 p.m.-10:00 p.m.)

Title: Planning for Facility Collaboration in Logistics Network Design

Speaker: *Francisco Saldanha da Gama*

Chair: Prof. Francisco Saldanha da Gama

VooV Meeting ID: 670-323-687 (Password: 072209)

Backup VooV Meeting ID: 288-316-501 (Password: 072209)

Plenary Session 4 (Beijing Time 10:00 p.m.-10:40 p.m.)

Title: Airline Strategies During the Pandemic: What Worked?

Speaker: *Martin E. Dresner*

Chair: Prof. Francisco Saldanha da Gama

VooV Meeting ID: 670-323-687 (Password: 072209)

Backup VooV Meeting ID: 288-316-501 (Password: 072209)

Parallel Sessions (Beijing: 08:30 a.m.-12:00 p.m.)

VooV Meeting ID: 944-262-141 (Password: 072204)

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IE1: Industrial Economics 1

Chair: Min Zhang

- IEIS2022_66: Research on the importance evaluation of factors for the railway accidents based on TF-K*
(*Dan Chang, Min Zhang, Daqing Gong*)
- IEIS2022_36: Establishment of Evaluation System to Ensure the Safety of Environmental Industry in China under the New Development Pattern
(*Weizhen Gao, Menggang Li, Xiaojun Jia, Yuejiao Zhao, Chengzhang Zou*)
- IEIS2022_71: Research and application status of text generation tasks based on generative adversarial network
(*Weiqi Wang, Dan Jiang, Shaozhong Cao*)
- IEIS2022_38: Research on industry and carbon emission gradient in the Beijing, Tianjin and Hebei region under the background of "Carbon Peaking"
(*Zijian Zhou, Borui Cui, Huichun Che*)
- IEIS2022_69: Blockchain Deposition And Copyright Protection Method For Self-published Content Infringement
(*Keke Qu, Liang Wang*)
- IEIS2022_41: The Determinants of Carbon Emissions in Macau: Based on the Analysis of STIRPAT, EKC, and LMDI models
(*Wenlan Liang, Ruizhen Pan, Yilin Cao, Wentong Wang, Shixuan Lin, Yujia Zhao*)
- IEIS2022_74: Research on the mode and framework of college entrance examination and undergraduate smart teaching in the environment of smart media integration
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Chair: Jun Wang

- IEIS2022_11: The Impact of Digitalization on Teleworking Communication and Trust in the Post Epidemic Era*
(*Yuejiao Zhao, Menggang Li, Weizhen Gao, Li Zheng*)
- IEIS2022_70: Research on Copyright Protection of Digital Publications Based on Blockchain Technology
(*Ning Wang, Liang Wang*)
- IEIS2022_67: Literature Review of Audio-Driven 2D Avatar Video Generation Algorithms
(*Yuxuan Li, Han Zhang, Shaozhong Cao, Dan Jiang, Meng Wang, Weiqi Wang*)
- IEIS2022_37: Study on Food Safety Supervision Countermeasure of Agricultural Wholesale Market
(*Sanyang Gu, Zhen Ding, Huichun Che*)
- IEIS2022_72: Research on copyright protection of we media based on blockchain
(*Ruidan Yang, Liang Wang*)
- IEIS2022_75: Literature Review of Research on Common Methods of Grapheme-to-Phoneme
(*Yating Zhang, Han Zhang, Shaozhong Cao*)
- IEIS2022_73: Study on Copyright Infringements of We Media based on Media Integration Blockchain
(*Tongtong Yu, Liang Wang*)
- IEIS2022_40: The contradiction between Private tutoring Industry and Capitalization
(*Lu Yu*)
- IEIS2022_68: A Novel Multi-Attribute Decision-Making Method Based on Linguistic Fermatean Fuzzy Sets and Power Average Operator
(*Xue Feng, Jun Wang, Yuping Xing*)

July 22, 2022

Conference Closing Speech (Beijing Time 10:40 p.m. - 11:10 p.m.)

Chair: *Prof. Runtong Zhang*

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36	Weizhen Gao, Menggang Li, Xiaojun Jia, Yuejiao Zhao, Chengzhang Zou	IE1	Industrial Economics 1	VooV Meeting ID: 944-262-141 (Password: 072204) Backup VooV Meeting ID: 243-171-224 (Password: 072204)
71	Weiqi Wang, Dan Jiang, Shaozhong Cao	IE1	Industrial Economics 1	VooV Meeting ID: 944-262-141 (Password: 072204) Backup VooV Meeting ID: 243-171-224 (Password: 072204)
38	Zijian Zhou, Borui Cui, Huichun Che	IE1	Industrial Economics 1	VooV Meeting ID: 944-262-141 (Password: 072204) Backup VooV Meeting ID: 243-171-224 (Password: 072204)
69	Keke Qu, Liang Wang	IE1	Industrial Economics 1	VooV Meeting ID: 944-262-141 (Password: 072204) Backup VooV Meeting ID: 243-171-224 (Password: 072204)
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