3rd International Workshop on Geographic Modeling and Simulation

Modeling and Simulation for a Sustainable World

PROGRAMME

🕐 25–27 October 2024

📍 Nanjing, China

ORGANIZERS:

SCHOOL OF GEOGRAPHY, NANJING NORMAL UNIVERSITY, CHINA
KEY LABORATORY OF VIRTUAL GEOGRAPHIC ENVIRONMENT(MINISTRY OF EDUCATION OF PRC), NANJING NORMAL UNIVERSITY, CHINA
INTERNATIONAL GEOGRAPHICAL UNION - MODELING GEOGRAPHICAL SYSTEMS COMMISSION

CO-ORGANIZERS:

INTERNATIONAL ENVIRONMENTAL MODELLING AND SOFTWARE SOCIETY
THE INTERNATIONAL ASSOCIATION OF CHINESE PROFESSIONALS IN GEOGRAPHIC INFORMATION SCIENCES
GEOGRAPHIC MODEL AND GEOGRAPHIC INFORMATION ANALYSIS COMMISSION, THE GEOGRAPHICAL SOCIETY OF CHINA
WORKING GROUP ON EDUCATION AND CAPABILITY BUILDING FOR DIGITAL EARTH, INTERNATIONAL SOCIETY FOR DIGITAL EARTH
YOUNG SCIENTIST INNOVATION NETWORK, INTERNATIONAL SOCIETY FOR DIGITAL EARTH
JIANGSU CENTER FOR COLLABORATIVE INNOVATION IN GEOGRAPHICAL INFORMATION RESOURCE DEVELOPMENT AND APPLICATION, CHINA
NATIONAL EARTH SYSTEM SCIENCE DATA CENTER - YANGTZE RIVER DELTA SUBCENTER
SCHOOL OF ENVIRONMENT, NANJING NORMAL UNIVERSITY

Contents

In a sustainable world, it is imperative to meet people's needs without causing chronic harm to the environment or compromising the ability of future generations. Achieving sustainability requires extensive research encompassing various theories and approaches from diverse domains. This research requires not only real-time observation but also a profound understanding of global evolution, enabling long-term analysis and forecasting. The complexities of understanding and forecasting evolutionary processes necessitate geographic modeling and simulation, which have emerged as potent tools for addressing critical issues such as climate change and sustainable resource use. Research in this field spans disciplines including geomorphology, hydrology, soil science, biology, climate science, and social science, all focused on unraveling the interactive mechanisms of surface processes. Contemporary geographical modeling and simulation encounter significant challenges, including grasping the intricacies of the geographic world, integrating simulations across diverse domains, and fostering participatory modeling with multiple stakeholders. However, existing theories and approaches struggle to adequately address these challenges. In response, a promising solution for tackling complex geographical problems involves engaging dispersed multidisciplinary experts and resources for collaborative problem-solving. This approach facilitates experimentation and the pursuit of optimal solutions through joint research efforts, proving not only feasible but also highly effective in advancing geographic research. To further support this collaborative approach, there is a pressing need for an open geographical modeling and simulation framework. Such a framework would serve as a catalyst, attracting more scholars and encouraging their collective efforts to address geographic challenges. This workshop is meticulously designed to explore pertinent theories, approaches, and potential applications, while fostering communication among experts from diverse domains. Its primary objectives include stimulating extensive discussions regarding the potential directions of the field and promoting further research, thus paving the way for a promising future in collaborative geographic modeling and simulation.

Time\Date (UTC+8)	Friday 25 OCT	Saturday 26 OCT Place: Yifang Lecture Hall	Sunday 27 OCT Place: Nanshan Experts Building
08:30 - 12:00	Registration (Venue: Nanshan Experts Building, Nanjing Normal University, Suiyuan)	**Registration** 08:30 - 12:00	
		Opening Ceremony 08:30 - 08:50 **Group Photo** 08:50 - 09:10 **Keynote Speech** 09:10 - 09:40 Speech 1 09:40 - 10:10 Speech 2 10:10 - 10:40 Speech 3	**Parallel Session** 08:30 - 10:00
		Tea Break 10:40 - 11:00	**Tea Break** 10:00 - 10:20
		Keynote Speech 11:00 - 11:30 Speech 4 11:30 - 12:00 Speech 5	**Parallel Session** 10:20 - 11:50
12:00 - 14:00		**Lunch**	**Lunch**
14:00 - 17:50		**Keynote Speech** 14:00 - 14:30 Speech 6 14:30 - 15:00 Speech 7 15:00 - 15:30 Speech 8 15:30 - 16:00 Speech 9	**Parallel Session** 14:00 - 15:30
		Tea Break 16:00 – 16:20	**Tea Break** 15:30 - 15:50
		Keynote Speech 16:20 - 16:50 Speech 10 16:50 - 17:20 Speech 11 17:20 - 17:50 Speech 12	**Parallel Session** 15:50 - 17:35 **Closing Ceremony & Paper Award Ceremony** 17:35 - 17:50
18:00 - 20:00		**Gala Dinner & Award Ceremony**	**Dinner**

Organizers

☐ Organizers

➢ School of Geography, Nanjing Normal University, China

➢ Key Laboratory of Virtual Geographic Environment (Ministry of Education of PRC), Nanjing Normal University, China

➢ International Geographical Union - Modeling Geographical Systems Commission

☐ Co-organizers

➢ International Environmental Modelling and Software Society

➢ The International Association of Chinese Professionals in Geographic Information Sciences

➢ Geographic Model and Geographic Information Analysis Commission, The Geographical Society of China

➢ Working Group on Education and Capability Building for Digital Earth, International Society for Digital Earth

➢ Young Scientist Innovation Network, International Society for Digital Earth

➢ Jiangsu Center for Collaborative Innovation in Geographical Information Resource Development and Application, China

➢ National Earth System Science Data Center - Yangtze River Delta Subcenter

➢ School of Environment, Nanjing Normal University

International Scientific Committee

☐ Chair

➢ Michael Batty, University College London

➢ Huadong Guo, Aerospace Information Research Institute, Chinese Academy of Sciences

➢ Bojie Fu, Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences

☐ Members (alphabetize by last name)

➢ Daniel P. Ames, Brigham Young University

➢ Ioannis Athanasiadis, Wageningen University & Research

➢ Carlos Granell Canut, Jaume I University

➢ Stewart Fotheringham, Arizona State University

➢ Juliana Freire, New York University

➢ Jonathan Goodall, University of Virginia

➢ Quillon Harpham, HR Wallingford

➢ Anthony Jakeman, Australian National University

➢ Albert Kettner, University of Colorado Boulder

➢ Peter Khaiter, York University

➢ Xin Li, Institute of Tibetan Plateau Research, Chinese Academy of Sciences

➢ Hui Lin, Jiangxi Normal University

➢ John C. Little, Virginia Polytechnic Institute and State University

➢ Michael Meadows, University of Cape Town

➢ Stefan Reis, DLR Projektträger

➢ Paul Torrens, State University of New York

➢ Gregory E. Tucker, University of Colorado Boulder

➢ Alexey Voinov, University of Twente

➢ Changlin Wang, Aerospace Information Research Institute, Chinese Academy of Sciences

➢ Jinfeng Wang, Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences

Chair

- Guonian Lü, Nanjing Normal University
- Min Chen, Nanjing Normal University

Members (alphabetize by last name)

- Min Cao, Nanjing Normal University
- Xufeng Cui, Zhongnan University of Economics and Law
- Qiang Dai, Nanjing Normal University
- Fei Guo, Nanjing Normal University
- Changchun Huang, Nanjing Normal University
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- Zhaoyuan Yu, Nanjing Normal University
- Songshan Yue, Nanjing Normal University
- Fengyuan Zhang, Nanjing Normal University
- Jun Zhang, Nanjing Normal University

Place: Yifang Lecture Hall			
Time: 08:30 - 17:50, 26 Oct			
Time (UTC+8)	**Content**		
08:30 - 08:50	Welcome Speech	Prof. Linwang Yuan	Vice principal, Nanjing Normal University
	Chair:	Prof. Michael Meadows	Past-President of the international geographical union, University of Cape Town
	Prof. Changchun Huang	Prof. Val Snow	President of the IEMSs, AgResearch
08:50 - 09:10	Group Photo		
		Speaker	**Title**
09:10 - 09:40	Keynote Speech	Prof. Stewart Fotheringham	Measuring the unmeasurable: models of geographic context
09:40 - 10:10	Chair: Prof. Min Chen	Prof. Jun Xia	Developing water systems science and technology in large river basins
10:10 - 10:40		Prof. Xin Li	Modeling complex human–natural system at the river basin scale in the AI and big data era
10:40 - 11:00	Tea Break		
11:00 - 11:30	Keynote Speech	Prof. Paul Longley	Individual level modelling and simulation
11:30 - 12:00	Chair: Prof. Jian Liu	Prof. Josef Strobl	Online DEMs: terrain representations for modeling and simulation
	Lunch		
14:00 - 14:30		Prof. Anthony Jakeman	Managing and reducing uncertainty for grand challenge problems: focus on water quality modelling
14:30 - 15:00	Keynote Speech Chair: Prof. Pankaj Kumar	Prof. Jinfeng Wang	Beyond the 1st & 2nd laws of geography: modelling for spatial stratified heterogeneous data
15:00 - 15:30		Prof. Mei-Po Kwan	Advanced geospatial modeling in human mobility and health research
15:30 - 16:00		Prof. Kazuhito Ichii	Monitoring terrestrial carbon cycle across Asia in the era of earth observation big data
16:00 - 16:20	Tea Break		
16:20 - 16:50	Keynote Speech	Prof. Niklas Boers	Machine learning for earth system modelling
16:50 - 17:20	Chair: Prof. Yilan Liao	Prof. Stefan Reis	Integrated environmental modelling and simulation to tackle the triple existential crisis
17:20 - 17:50		Prof. Min Chen	Geographic modeling and simulation in the AI era

Keynote Speakers

Speaker:

Prof. Stewart Fotheringham

Institution:

Arizona State University

Topic: Measuring the unmeasurable: models of geographic context

Prof. A. Stewart Fotheringham is the Director of the Spatial Analysis Research Center (SPARC) in the School of Geographical Sciences and Urban Planning at Arizona State University. He is also the Distinguished Professor of Global Futures in the School of Global Futures. His research interests are in the analysis of spatial data sets using statistical, mathematical and computational methods. He is a member of the U.S. National Academy of Sciences and Academia Europaea and an Academician in the UK's Academy of Social Sciences. He has been awarded Fellowships in the American Association of Geographers, the University Consortium for GIS, and both a Lifetime Achievement Award and an Honorary Membership by the Chinese Professionals in GIS. He was awarded the first Science Foundation Ireland Research Professorship in 2004 and has been awarded more than $15 million in funding, published 12 books and over 200 research papers and book chapters. He currently has over 43,000 citations to this research and was awarded a prestigious Highly Cited Researcher award.

Speaker:

Prof. Jun Xia

Institution:

Wuhan University

Topic: Developing water systems science and technology in large river basins

Prof. Jun Xia is an Academician of the Chinese Academy of Sciences (CAS), the Director of the Research Institute for Water Security (RIWS) at Wuhan University and Chair of the Working Group on Representation of Developing Countries (WGRDC) for IAHS/IUGG. He used to be the Vice President of Chinese National Committee of IUGG, the President of the International Water Resources Association (IWRA), the Honorary Vice President of IAHS, the Board Governor of the World Water Council (WWC), and the Co-Chair of the InterAcademy Council for Water Programme. He has obtained innovative work on developing knowledge and strategies in hydrologic sciences of nonlinear systems and their application to water management and sustainable development and made a major contribution to international society. He has published 420 technical papers and is the editor of 30 books, which have major impacts on hydrology, and water and environmental management practices in the world. He was awarded the International Prize for Outstanding Contributions to Water Management given by The Third World Centre for Water Management (2011), the State Natural Science Award in China (2017) and the International Hydrology Prize-Volker Medal (2014) for his "outstanding contributions to the sciences of Hydrology and application of his research and hydrological expertise to the benefit of society" by IAHS with the support of WMO and UNESCO, and IUGG Fellow (2019).

Speaker:

Prof. Xin Li

Institution:

Institute of Tibetan Plateau Research, Chinese Academy of Sciences

Topic: Modeling complex human–natural system at the river basin scale in the AI and big data era

Prof. Xin Li is the Deputy Director at the Institute of Tibetan Plateau Research (ITP), Chinese Academy of Sciences (CAS), and holds the position of director at the National Tibetan Plateau Data Center at ITP/CAS. He is also the PI of NSF (Natural Science Foundation) for Excellent Young Scholars of China. His primary research focuses on land data assimilation, remote sensing, and integrated modeling of hydrological and cryospheric processes at the river basin scale. He was a member of WCRP GEWEX (World Climate Research Programme/ The Global Energy and Water Exchanges) scientific steering committee and a member of the International Science Advisory Panel of Global Water Futures programme, and is presently the chair of information geography professional committee of GSC (Geographical Society of China). Prof. Li also serves on the editorial boards of Science Bulletin, Science China Earth Science, Big Earth Data and other international journals. Prof. Li is the lead scientist of WATER (Watershed Allied Telemetry Experimental Research, 2007-2010) and HiWATER (Heihe Watershed Allied Telemetry Experimental Research, 2012-2017), which are two comprehensive remote sensing ecohydrology experiments conducted sequentially in recent years in China. He has been a recipient of the First-Class Natural Science Prize, the First-Class Science and Technology Progress Prize of Gansu Province, and the Outstanding Science and Technology Achievement Prize of the CAS.

Speaker:

Prof. Paul Longley

Institution:

University College London

Topic: Individual level modeling and simulation

Prof. Paul Longley is an Academician of the Academy of Social Sciences and Director of the Consumer Data Research Centre at University College London. His research interests are focused on socioeconomic applications of GIScience, in geo-temporal demographics, retailing, genealogy and urban modelling. His publications include 3 books, 127 refereed journal articles and 79 contributions to edited collections. His research has developed through more than 59 research grants (totaling £25.47 million) and 3 teaching grants (totaling £2.37m). He is the past Editor-in-Chief of Computers, Environment and Urban Systems, the past Co-Editor of Environment and Planning B, and is an editorial board member of a number of international journals. He received the Royal Geographical Society Victoria Medal and the Times Higher Education Supplement Annual Awards.

Speaker:

Prof. Josef Strobl

Institution:

University of Salzburg

Topic: Online DEMs: terrain representations for modeling and simulation

Prof. Josef Strobl is the Senior Scientist of the Department of Geoinformatics at the University of Salzburg. He is a full member of the Austrian Academy of Sciences, a member of the European Academy of Sciences and Arts, President of the Austrian Eurasia-Pacific Uninet network, and head of its Commission for Geographic Information Science. He served as a board member for international academic organizations in the geospatial domain and on the editorial boards of leading journals in Geoinformatics and GIScience. His current interests are in the real time and mobile services, terrain analysis and dynamic process modeling, facilitating applications in planning, citizen science and public participation as well as resource management. He has been awarded many prizes including the Erasmus+ Botschafter 2022, Lifetime Achievement Award and Special Achievement in GIS Award: UNIGIS.

Speaker:

Prof. Anthony Jakeman

Institution:

Australian National University

Topic: Managing and reducing uncertainty for grand challenge problems: focus on water quality modelling

Emeritus Prof. Anthony Jakeman is the Director of the Integrated Catchment Assessment and Management (iCAM) Centre at the Australian National University, and a member of the Institute for Water Futures. He is the past President of International Environmental Modelling and Software Society and a Fellow of the American Geophysical Union. He served as the Editor-in-Chief of Socio-Environmental Systems Modelling and the Honorary Editor of Environmental Modelling and Software (Elsevier). He focuses on the methods and applications of integrated assessment and decision support on water resource issues, including hydrological and water quality modelling, particularly in managing and reducing uncertainty in socio-environmental systems problems and good modelling practices. He received the Silver Medal of Masaryk University, the Ray Page Lifetime Achievement Award from Simulation Australia, the MSSANZ Biennial Medal, and the Biennial Medal from the International Environmental Modelling and Software Society.

Speaker:

Prof. Jinfeng Wang

Institution:

Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences

Topic: Beyond the 1st & 2nd laws of geography: modelling for spatial stratified heterogeneous data

Prof. Jinfeng Wang is a researcher at the State Key Laboratory of Resources and Environmental Information Systems, Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, and the Distinguish Professor at the University of Chinese Academy of Sciences. He is the Chair of the Geographical Modeling and Geographic Information Analysis Committee of the Geographical Society of China, and serves as the Chair of the Theories & Methods Committee of the China Association of GIS (2004-2011). Prof. Wang has published over 230 papers indexed by SCI/SSCI, including papers published in the Lancet Infectious Diseases, Lancet Planetary Health, and Nature Communications. He proposed the concept of Spatial Stratified Heterogeneity (SSH) and designed the Geodetector model for measuring and analyzing SSH. The Geodetector model has been used by many scholars in over 60 countries. There are more than 7,000 articles related to Geodetector and many of them were published in famous international journals (www.geodetector.cn). His publications include the most cited paper in the international flagship journal IJGIS and the highest-cited paper across all disciplines in the Chinese Science Citation Database (CSCD).

Speaker:

Prof. Mei-Po Kwan

Institution:

Chinese University of Hong Kong

Topic: Advanced geospatial modeling in human mobility and health research

Prof. Mei-Po Kwan is the Head of Chung Chi College at the Chinese University of Hong Kong, the Director of the Institute of Space and Earth Information Science, and the Choh-Ming Li Professor of Geography and Resource Management. Prof. Kwan is the Guggenheim Fellow and the Fellow of the Academy of Social Sciences, the American Association for the Advancement of Science (AAAS), the Royal Geographical Society, the American Association of Geographers (AAG), and the Geographical Society of China. She has received many prestigious awards and honors from the AAG, including the Distinguished Scholarship Honors, the Anderson Medal of Honors in Applied Geography, the Wilbanks Prize for Transformational Research in Geography, the Stanley Brunn Award for Creativity in Geography. Prof. Kwan has published about 500 journal articles, books, and book chapters. She has received research grants of more than USD 64.5 million and has delivered over 400 keynote addresses and invited lectures in more than 20 countries. Prof. Kwan has made ground-breaking contributions to research on environmental health, human mobility, transport and health issues in cities, and geographic information science (GIScience).

Speaker:

Prof. Kazuhito Ichii

Institution:

Chiba University

Topic: Monitoring terrestrial carbon cycle across Asia in the era of earth observation big data

Prof. Kazuhito Ichii is the Deputy Director of the Center for Environmental Remote Sensing at Chiba University, a Professor at the Institute of Industrial Science, University of Tokyo, and a Visiting Professor at Tokyo Institute of Technology. Currently, he serves as the Chair of AsiaFlux, Chair of JapanFlux, and Committee Member of ILEAPS-Japan. He is conducting research to examine environmental changes occurring on the Earth's land surface, particularly in vegetation, in response to climate change. His research involves utilizing data from Earth observation satellites and conducting computer simulations to understand the absorption and emission of greenhouse gases, such as CO2. He has published over 130 papers indexed by SCI, including papers in Nature and its sub-journals. He has also contributed as a lead author to Chapter 2 of the IPBES Global Assessment Report.

Speaker:

Prof. Niklas Boers

Institution:

Technical University of Munich

Topic: Machine learning for earth system modelling

Prof. Niklas Boers works in Earth system modelling at the Technical University of Munich. He studies theoretical questions of Earth system science focusing on the analysis, modelling, and prediction of extreme events and abrupt transitions ('tipping points'). In his research, he develops methods rooted in Mathematics and Theoretical Physics, in particular Complexity Science and Machine Learning, to combine process-based and data-driven models. His work finds applications in climate dynamics, paleoclimatology, and in the context of anthropogenic climate change. He received the Brandenburg Postdoc Award and Outstanding Early Career Scientist Award from the Nonlinear Processes in Geosciences (NP) Division.

Speaker:

Prof. Stefan Reis

Institution:

DLR Projektträger

Topic: Integrated environmental modelling and simulation to tackle the triple existential crisis

Prof. Stefan Reis is a UKCEH Fellow and the head of Environment and Sustainability at the DLR Projektträger. He focuses on improving understanding and quantifying sustainable development, environmental impact, climate change and spatial analysis. His research focuses on the integrated modelling and assessment of the impacts of air pollution and climate change on human health and ecosystems. He is the past President of the International Society for Environmental Modelling & Software Systems (iEMSs), a Member of the editorial board of the journal Environmental Research Letters (ERL), a Fellow of the Modelling and Simulation Society of Australia and New Zealand (MSSANZ), the Royal Society for the encouragement of Arts, Manufactures and Commerce (RSA) and a Member of the NERC Science Committee.

Speaker:

Prof. Min Chen

Institution:

Nanjing Normal University

Topic: Geographic modeling and simulation in the AI era

Prof. Min Chen is the Vice Director of the Key Laboratory of Virtual Geographic Environment (Ministry of Education of PRC), Nanjing Normal University, China. His research interests are geographic modeling and simulation and virtual geographic environments (VGEs). He now serves as the President of the International Association of Chinese Professionals in Geographic Information Sciences (CPGIS), the Vice-President of the International Environmental Modelling and Software Society (iEMSs), the Chair of Modeling Geographic System Committee of the International Geographical Union (IGU), and the Chair of Young Scientist Working Group in Asian Geographic Associate (AGA). He is a co-editor in Chief of Environmental Modeling & Software and the executive editor of Annals of GIS. He is also a Fellow of Association of American Geographers (AAG), a Fellow of iEMSs, and a Fellow of Royal Geographical Society (with the Institute of British Geographers). He is the PI of the NSF for Excellent Young Scholars of China and has received several prestigious awards, including the Biennial Medal of iEMSs, the 'Waldo Tobler Young Researcher Award' in GIScience, the 2021 Global Frontier Science and Technology Young Scientist, and the Top Prize for Progress in Chinese Geographic Information Technology. His achievements were selected as the 2023 top ten research advances of Chinese Society of Land Economics and the 2021 top ten research advances in Chinese geographical science.

Parallel Session

Room A: *Nanshan Experts Building - Conference Room (3rd Floor)* 08:30 - 11:50 (UTC+8), Oct 27, 2024			
Time	**Session**	**Speaker**	**Title**
08:30 - 08:45	**Title:** Theories, Methodologies and Applications of Earth System Model **Chair:** Prof. Jian Liu Prof. Liang Ning Dr. Weiyi Sun	Yongyun Hu	Simulation studies of deep-time climate and monsoon
08:45 - 09:00		Tianjun Zhou	Precipitation regime changes in High Mountain Asia driven by cleaner air
09:00 - 09:15		Hailong Liu	A Perfomance-Portable Kilometer-Scale Global Ocean Model Across Various Heterogeneous Supercomputers
09:15 - 09:30		Miao Fang	Paleoclimate data assimilation and its application in understanding past climate
09:30 - 09:45		Jun Cheng	Winter insolation regulates the orbital-scale changes of East Asian Summer Monsoon
09:45 - 10:00		Bin Liu	Simulation of the effects and mechanisms of a single mega-volcanic eruption on polar temperature change
10:00 - 10:20	**Tea Break**		
10:20 - 10:35	**Title:** Theories, Methodologies and Applications of Earth System Model **Chair:** Prof. Jian Liu Prof. Liang Ning Dr. Weiyi Sun	Yanmin Qin	Influnce of Decadal Pacific Variability on decadal megadrought over eastern China and its multi-periodicity since the last millennium
10:35 - 10:50		Kefan Chen	Simulation Analysis of the Impacts of Volcanic Activities on different Ocean Patterns over the Past Millennium
10:50 - 11:05		Beichen Zhang	Estimation of diurnal evapotranspiration across the Asia-Pacific region using the Japanese Himawari-8 satellite
11:05 - 11:20		Wei Li	Estimating Land Surface Reflectance from a Next-Generation Geostationary Meteorological Stellite, Himawari-8/9 AHI

Room A: *Nanshan Experts Building - Conference Room (3rd Floor)* 14:00 - 17:35 (UTC+8), Oct 27, 2024			
Time	**Session**	**Speaker**	**Title**
14:00 - 14:15	**Topic:** Big Data Analytics Modeling, Simulation, and AI in Health Geography **Chair:** Prof. Yilan Liao Assoc. Prof. An Zhang	Yuanhao Shi	A new disease mapping method for improving data completeness of syndromic surveillance
14:15 - 14:30		Li He	Using eigenvector spatial filtering approach to analyze the determinants of larceny-theft
14:30 - 14:45		Xiaohuan Li	InSAR surface deformation modeling and analysis based on temporal decomposition model
14:45 - 15:00	**Title:** Intelligent Simulation of Spatiotemporal Processes **Chair:** Prof. Zeqiang Chen Assoc. Prof. Chunxiao Zhang	Shaohua Wang	Deep reinforcement learning for geospatial optimization problems with sustainable development goals
15:00 - 15:15		Yuqian Hu	Using physics-encoded GeoAI to improve the physical realism of deep learning's rainfall-runoff responses under climate change
15:15 - 15:30		Wenhao Chu	SHAP-powered insights into spatiotemporal effects: unlocking explainable Bayesian-neural-network urban flood forecasting
15:30 - 15:50	**Tea Break**		
15:50 - 16:05	**Title:** Process-oriented Geographical Analysis and Simulation **Chair:** Assoc. Prof. Haiping Zhang Assoc. Prof. Peichao Gao Assoc. Prof. Xingxing Zhou	Tianyao Fang	Spatiotemporal process simulation model for cultural transmission and acculturation
16:05 - 16:20		Nuozhou Shen	Multiscale process simulation for infectious disease transmission
16:20 - 16:35		Haiping Zhang	Socio-Geographic process model: theory, methods, and applications
16:35 - 16:50		Yushu Xu	Intercity human dynamics during holiday weeks throughout the Covid-19 pandemic: a perspective of hybrid physical-virtual space
16:50 - 17:05		Xingxing Zhou	Spatiotemporally contiguous clustering of origin-destination flows weighted by interaction strength to reveal interregional association patterns
17:05 - 17:20		Yifan Gao	Land-N2N: an effective and efficient model for simulating the demand-driven changes in multifunctional lands
17:20 - 17:35		Yongqi Xia	A research on the construction method of typhoon disaster knowledge graph driven by large language models

Room B: *Nanshan Experts Building - Multifunctional Hall (1st Floor)* 08:30 - 11:50 (UTC+8), Oct 27, 2024			
Time	**Session**	**Speaker**	**Title**
08:30 - 08:45	**Title:** Geomorphology Modeling and Application for DDE **Chair:** Prof. Liyang Xiong Prof. Xianyan Wang Prof. Haopeng Geng	Xin Yang	Global basic landform units derived from multi-source digital elevation models at 1 arc-second resolution
08:45 - 09:00		Ge Yan	A novel depression restricting model in ArcGIS to optimize the shape of drainage networks, sub-basins and slope units
09:00 - 09:15		Xiaohui Huang	Large-scale mapping of gully affected areas in loess landforms and quantifying their landscape patterns
09:15 - 09:30		Hong Wei	Research on the landform classification and regional variability of the Tibetan Plateau oriented to landform entities
09:30 - 09:45		Fengyize Yu	Submarine landform mapping driven by terrain knowledge at the global scale
09:45 - 10:00		Ziyue Guo	Refined delineation of drainage patterns and characterizing river topography in the Tibetan endorheic basin
10:00 - 10:20	**Tea Break**		
10:20 - 10:35	**Title:** Geomorphology Modeling and Application for DDE **Chair:** Prof. Liyang Xiong Prof. Xianyan Wang Prof. Haopeng Geng	Hao Chen	Past anthropogenic land use change caused a regime shift of the fluvial response to Holocene climate change in the Chinese Loess Plateau
10:35 - 10:50		Xiaolu Dong	Dependence of erosion processes on the magnitudes of outburst floods: evidence from 2D hydrodynamic simulations
10:50 - 11:05		Zhengchen Li	Knickpoint dynamics during the outward growth of the NE Tibetan Plateau
11:05 - 11:20		Wanying Xu	Mechanism exploration and modeling of loess cave development across the Chinese Loess Plateau
11:20 - 11:35		Xuanru Zhao	A dramatic 800 m retreating on a lake-terminating glacier of the Tibetan Plateau during 2014–2015, caused by glacier calving
11:35 - 11:50		Liyang Xiong	DDE geomorphology community platform: data, models and applications

Room B: *Nanshan Experts Building - Multifunctional Hall (1st Floor)* 14:00 - 17:35 (UTC+8), Oct 27, 2024			
Time	**Session**	**Speaker**	**Title**
14:00 - 14:15	**Title:** Urban Simulation With Artificial Intelligence Methods **Chair:** Prof. Yimin Chen Dr. Guangzhao Chen	Qin Ma	Mapping 3D tree structure for urban environment using multi-source remote sensing
14:15 - 14:30		Guangzhao Chen	Fine-scale urban simulation based on local climate zones and its applications
14:30 - 14:45		Chao Wu	Identifying nighttime vitality through multisource geodata: an explainable AI perspective
14:45 - 15:00		Mingxiao Li	Spatial cooperative simulation of land use-population-economy in the Greater Bay area
15:00 - 15:15		Shu Wang	AIGC modeling's image features: can they replace real features? preliminary testing of elements, colors, and spatial structure in downstream recommendation tasks
15:15 - 15:30		Zihao Zhou	A Maps-to-Maps approach for simulating urban land expansion based on convolutional long short-term memory neural networks
15:30 - 15:50	**Tea Break**		
15:50 - 16:05	**Title:** Intelligent Modeling and Simulation of Trajectory Big Data **Chair:** Prof. Yao Yao Prof. Zipei Fan Assoc. Prof. Ding Ma	Minmin Li	Construction of spatio-temporal knowledge graphs and intelligent Q&A for carbon sources and sinks in Megacities
16:05 - 16:20		Zhaoya Gong	Learning spatial interaction representation with heterogeneous graph convolutional networks for urban land-use inference
16:20 - 16:35		Zipei Fan	Prediction and simulation by trajectory retrieval
16:35 - 16:50		Zhiwen Zhang	A deep expert framework using conditional diffusion model for vessel trajectory generation
16:50 - 17:05		Cheng Cheng	Maritime freight carbon emission in the U.S. using AIS data from 2018 to 2022
17:05 - 17:20		Zidong Yu	Characterizing the virtual human activities in megaregional context
17:20 - 17:35		Renyu Chen	Spatiotemporal transmission modeling for interregional epidemic dynamics and applications

Room C: *Nanshan Experts Building - Lecture Hall (5th Floor)*
08:30 - 11:50 (UTC+8), Oct 27, 2024

Time	Session	Speaker	Title
08:30 - 08:45	**Title:** Modeling and Spatiotemporal Analysis of Land Use for Sustainable Development **Chair:** Assoc. Prof. Xufeng Cui Dr. Basanta Paudel Assoc. Prof. Tonghui Yu Assoc. Prof. Jianxin Fu	Xufeng Cui	From tradition to smart: a comprehensive review of the evolution of land use planning tools for sustainable and efficient land use practices
08:45 - 09:00		Basanta Paudel	Synergy of high-resolution remote sensing and social surveys to screen farmland abandonment
09:00 - 09:15		Chudech Losiri	Modelling urban growth pattern of the twin cities in the southern of Thailand through markov cellular automata and spatial metrics
09:15 - 09:30		Tonghui Yu	Dynamic analysis of land use functions in the Yellow River basin: spatial and temporal evolution, influencing factors, and zoning identification strategies based on the "production-living-ecological" perspective
09:30 - 09:45		Watcharapong Wongkaew	Spatiotemporal dynamics of land use and ridership: a geographically weighted regression analysis of Bangkok's MRT blue line
09:45 - 10:00		Jianxin Fu	Study on regional differences and influencing factors of green and low carbon utilisation of cultivated land in Shanxi under the background of carbon neutrality
10:00 - 10:20	**Tea Break**		
10:20 - 10:35	**Title:** Modeling and Spatiotemporal Analysis of Land Use for Sustainable Development **Chair:** Assoc. Prof. Xufeng Cui Dr. Basanta Paudel Assoc. Prof. Tonghui Yu Assoc. Prof. Jianxin Fu	Yujia Chen	Urban Resilience Spatial Network Structure Using DPSIR Model: A Case of the Yellow River inverted U-shaped Belt Metropolitan Area
10:35 - 10:50		Yu Zhang	Spatio-temporal evolution and spatial optimization of land use functions based on multi-scale analysis - a case from Zhengzhou metropolitan area
10:50 - 11:05		Zhiping Wu	Spatial and temporal differences and driving forces for high-quality development of urbanisation in the Jiziwan metropolitan area of the Yellow River.
11:05 - 11:20		Shuai Bai	Urban Resilience Optimization Measurement Based on Flow Space Theory: A Case Study of the Central Plains Urban Agglomeration
11:20 - 11:35		Zhangzhi Tan	Simulating urban land use change using travel data and vector cellular automata based on graph convolutional neural networks
11:35 - 11:50		Zhewei Liang	Balancing simulation performance and computational intensity of CA models for large-scale land-use change simulations

Room C: *Nanshan Experts Building - Lecture Hall (5th Floor)*
14:00 - 17:35 (UTC+8), Oct 27, 2024

Time	Session	Speaker	Title
14:00 - 14:15	**Title:** Modelling and Simulating the Land Use/Land Cover Dynamics in the Himalayan Region: Insights, Impacts, and Prospects **Chair:** Assoc. Prof. Pankaj Kumar Assoc. Prof. Manish Kumar	Pankaj Kumar	Glacial lake outburst floods threatens livelihoods in the Himalaya
14:15 - 14:30		Ankur Yadav	Establishing linkage between potential, actual evapotranspiration and Landsat-derived indices: a case of Himachal Himalaya, India
14:30 - 14:45		Rumi Rongpi	Modeling of water and soil resources for sustainable development in Pasol Gad watershed of Uttarakhand Himalaya, India
14:45 - 15:00		Ajay Kumar	Long term spatio-temporal precipitation trends and forecast over Pauri Garhwal district of Uttarakhand, India
15:00 - 15:15		Manish Kumar	Unraveling the dynamics of soil erosion in the Greater Himalayas using an innovative fusion of RUSLE, machine learning, and SHAP-based game theory
15:15 - 15:30		Sourav Bhadwal	Geospatial modelling and mapping of groundwater potential zones in Western Himalayan region of India using GIS based Fuzzy Analytical Hierarchy Process
15:30 - 15:50	**Tea Break**		
15:50 - 16:05	**Title:** Interactions among Sustainable Development Goals: Assessment, Modeling, and Policy Implications **Chair:** Prof. Min Cao Dr. Junze Zhang Prof. Jian Lin	Syed Irtiza Majid	Centennial scale simulation of top soil organic carbon sequestration rate in Kashmir Himalayas using random forest regression
16:05 - 16:20		Kai Wu	Simulation of land use change along the Silk Road under the constraint of sustainable development goals
16:20 - 16:35		Zifeng Yuan	Finding synergistic ways for sustainable development of water-energy-food-ecosystem nexus in China's coastal areas
16:35 - 16:50		Wei Xie	Vectorized rooftop area data for 90 cities in China and its applications
16:50 - 17:05		Jie Ling	Urban renaissance: a twin simulation approach for revitalizing early urban agglomerations through digital evaluation and agent-based modeling
17:05 - 17:20		Chayn Sun	Advancing Flood Resilience: A Responsive Digital Twin Framework for Real-Time Flood Modelling and Immersive Interaction
17:20 - 17:35		Dajiang Wang	Unveiling the dynamic changes in sentiments and opinions regarding Israel and Palestine from geo-tagged tweets worldwide

Room D: *Nanshan Experts Building – Meeting Room (2nd Floor)* 08:30 - 11:50 (UTC+8), Oct 27, 2024			
Time	**Session**	**Speaker**	**Title**
08:30 - 08:45	**Title:** Hydrological Modeling in Changing Environments **Chair:** Prof. Qiang Dai Assoc. Prof. Jun Zhang	Xifu Sun	Bridging complexity and efficiency: surrogate-based sensitivity analysis in hydrological modelling
08:45 - 09:00		Yuanyuan Xiao	Microphysical characteristics estimation of the Yangtze River Delta based on GPM dual-frequency radar remote sensing
09:00 - 09:15		Wei Si	Real-time flood forecasting based on runoff correction by dynamic system response curve
09:15 - 09:30		Heng Li	A differentiable runoff simulation framework for learning hydrological processes and parameters
09:30 - 09:45		Zhengxu Guo	PyMTRD: a python package for calculating the metrics of temporal rainfall distribution
09:45 - 10:00		Dawei Xiao	Development of a rapid modeling tool for watershed-scale flood inundation simulation
10:00 - 10:20	**Tea Break**		
10:20 - 10:35	**Title:** Geospatial Data Analysis for Sustainable Development **Chair:** Assoc. Prof. Yang Li Prof. Jiaxin Jin Assoc. Prof. Haijing Shi	Ming Shen	Satellite reveals nearly half of global lakes with poor ambient water quality
10:35 - 10:50		Xindong He	Evaluation of sustainable development in the Chengdu Chongqing economic circle using multi-source geographic data
10:50 - 11:05		Yuehong Chen	A 100 m gridded population dataset of China's seventh census using ensemble learning and big geospatial data
11:05 - 11:20		Haijing Shi	Spatial downscaling of SMAP soil moisture to high resolution using machine learning over China's Loess Plateau
11:20 - 11:35		Yingqiang Zhong	Causal effect of urban expansion on extreme heat, case study of Wuhan, China
11:35 - 11:50		Daojun Zhang	A novel indicator for detecting vegetation cover pattern changes and its implications for vegetation restoration stages

Room D: *Nanshan Experts Building – Meeting Room (2nd Floor)* 14:00 - 17:35 (UTC+8), Oct 27, 2024			
Time	**Session**	**Speaker**	**Title**
14:00 - 14:15	**Title:** Modeling and Simulation Systems and Tools **Chair:** Prof. Fengyuan Zhang Dr. Zaiyang Ma	Fengyuan Zhang	OpenGMS-based interoperability engine design for reusing geo-analysis models
14:15 - 14:30		Jin Wang	Research on open web-based data sharing method for geographic modeling and simulation
14:30 - 14:45		Zaiyang Ma	Extracting and reusing knowledge during the geographic simulation process to assist broader collaboration
14:45 - 15:00		Zihao Tang	A resource management tree architecture for coupling multi-model processes in a middle platform
15:00 - 15:15		Yucheng Shu	A localized reordering strategy to enhance reusibility and interoperability in dynamic geo-modeling solutions
15:15 - 15:30		Junfeng Gu	ASTS: an R package for adaptive spatiotemporal sampling method
15:30 - 15:50	**Tea Break**		
15:50 - 16:05	**Title:** Modeling and Simulation Systems and Tools **Chair:** Prof. Fengyuan Zhang Dr. Zaiyang Ma	Guangjin Ren	Research on methods for ensuring computational reproducibility in service-based geographic simulation experiments
16:05 - 16:20		Kaili Yu	Chart interaction: a novel approach to geographic data analysis
16:20 - 16:35		Peilong Ma	Facilitating sensitivity analysis of hydrological models through knowledge-driven configuration and distributed online model services
16:35 - 16:50		Zhuo Sun	A method for model resource aggregation and automated execution for regional decision-making
16:50 - 17:05		Tianyu Sheng	Examining urban agglomeration heat island with explainable AI: an enhanced consideration of anthropogenic heat emissions
17:05 - 17:20		Jinzhao Guo	Measuring spatial association in geographical processes with spatial time-series data

Closing Ceremony

☐ **Date**

October 27, 2024 (Sunday)

☐ **Time**

17:35-17:50

☐ **Venue**

Conference Room, 3rd Floor, Nanshan Expert Building, Nanjing Normal University (Suiyuan Campus)

☐ **Chair**

Prof. Min Chen, Nanjing Normal University

Award ceremony

➤ The *IGU Outstanding Achievement Awards in Modeling Geographical Systems,* and *IGU Excellent Young Scholar Awards in Modeling Geographical Systems* will be presented during the Gala Dinner on the 26th.

➤ The *IGU Modeling Geographical Systems Commission Best Paper Awards* (Excellent Paper Awards of the 3rd International Workshop on Geographic Modeling and Simulation) will be presented at the closing ceremony on the 27th.

Local & Transportation

The conference venue will be Nanjing Normal University (Suiyuan Campus), No.122, Ninghai Road, Nanjing, 210097, China.

Transportation:

1.Nanjing Railway Station to Conference Venue

Take Metro Line 1 to Zhujiang Station. Then transfer to bus route 65 and get off at the "Ninghai" stop. Walk 400 meters south to reach your destination.

2.Nanjing South Railway Station to Conference Venue

Take Metro Line 1 to Zhujiang Station. Then transfer to bus route 65 and get off at the "Ninghai" stop. Walk 400 meters south to reach your destination.

3.Nanjing Lukou International Airport to Conference Venue

Take Metro Line S1 (Airport Line) to Nanjing South Railway Station. Then take Metro Line 1 to Zhujiang Station, and finally transfer to bus route 65. Get off at the "Ninghai" stop and walk 400 meters south to reach your destination.

Contact Us

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☐ **Volunteers**

Dajiang Wang	Zhuo Sun	Yucheng Shu	Zihao Tang	Wei Xie
Peilong Ma	Hengyue Li	Guangjin Ren	Xuan Zhang	Kaili Yu
Fangzhuo Mu	Renyu Chen	Qingjun Guo	Bowen Yin	Shuai Zhang
Huanyu Lu	Zongwei Xu	Tianyu Sheng	Yifeng Li	Jiaxing Li
Du Ling	Mingkang Da	Wanhao Li	Lingkai Shi	Zhuoran Sun
Jinkun Tang	Dichen Liu	Xinyong Li	Yanchi Zhang	Xiaohan Kong
Ruoyu Tao	Yazhou Wang	Guangze Fan	Chenyang Zhu	