中 国 测 绘 学 会
Chinese Society for Geodesy Photogrammetry and Cartography

Chinese Society for Geodesy, Photogrammetry and Cartography

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Prof. Thomas Schulz

Secretary General and Treasurer

International Cartographic Association (ICA)

Nomination of Dr. LIU, Xintao for Chair of the Commission on Geospatial Analysis and Modeling (2023-2027)

March 3, 2023

ICA Executive Committee,

On behalf of the Chinese Society for Geodesy Photogrammetry and Cartography (CSGPC), I am writing to nominate Dr. LIU, Xintao to serve for the first term as the Chair of the Commission on Geospatial Analysis and Modeling for the period of 2023-2027.

Dr. LIU, Xintao is an Associate Professor in Department of Land Surveying and Geo-Informatics at The Hong Kong Polytechnic University, Hong Kong, China. Dr. Liu's teaching and research interest focuses on GIScience, Cartography and Urban Informatics, and his research goal is to use state-of-art technologies to advance smart city for a better urban life.

Dr. LIU has been actively organizing and contributing to academic events. For instance, he is now the Managing Editor of journal Urban Informatics, and he is also programme leader of MSc in Geomatics in his department. Dr. LIU demonstrated his organizational skills and grace under

pressure, and he constantly seeks to serve our academic communities with his diligence, passion and commitment to professional service. He also holds membership with the CSGPC.

We will support Dr. LIU to lead the commission as its chair if he is elected at the General Assembly this year. CSGPC, as a national member, will work closely with ICA to fulfill its obligations.

Yours sincerely,

Zhenzhong Peng

Vice President and Secretary General

Chinese Society for Geodesy Photogrammetry and Cartography

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Xintao Liu (P.R. China)

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Personal website: https://geoxlab.github.io/

Education

2009.01 – 2012.03   *PhD* in Geoinformatics, Royal Institute of Technology (KTH), Sweden
2000.09 – 2003.06   *MSc* in Geographic Information Science, Nanjing Normal University, China
1994.09 – 1998.07:   *BEng* in Engineering Surveying, Hohai University, China

Appointments held

2022.07 – present   Associate Professor (*Geo-Informatics*), Hong Kong Polytechnic University
2016.08 – 2022.06   Assistant Professor (*Geo-Informatics*), Hong Kong Polytechnic University
2012.09 – 2016.07   Research Fellow/sessional lecturer, Ryerson University, Canada
2007.12 – 2008.12   Research Assistant, Hong Kong Polytechnic University, Hong Kong

Research interest

My research interest focuses on *GIScience, Cartography, and complexity science*. My research goal is to use state-of-art technologies to advance smart city for a better urban life. I am particularly interested in integrating advances in machine learning into human mobility modeling, human-environment interactions analysis and human behavior analysis across physical and virtual spaces.

Selected research grants/projects as PI

1. Modelling Human Interactions in Physical and Virtual Spaces Using Multilayer Approaches, *RGC General Research Fund (GRF)*, budget HK$840,000, 2022-2024, **PI**
2. Dynamic Modeling of Urban Structure by Integrating Human Activities in a Hybrid Physical-Virtual Space, *NSFC General Program*, budget HK$591,390, 2022-2025, **PI,**
3. Evaluation of 'Over-tourism' Phenomenon in Hong Kong Using Machine Learning and Social Media Data, *Public Policy Research (PPR)*, (HK$ 223,100), **PI**
4. User Satisfaction-based Urban Freight Sharing Optimization Using Crowdsourced Big Data and Machine Learning. Funded by *The Research Grants Council of Hong Kong (ECS)*, (HK$ 358,115), 2019-2022, **PI**.
5. Development of Web GIS for Disaster Analysis and Prediction, Funded by *Innovation and Technology Fund (ITF)*, 5/2017-5/2019 (HK$ 5.3 million), **PI**, completed.
6. Sensing Human Behaviour for Better Understanding of Urban Structures, Funded by *The Hong Kong Polytechnic University*, 11/2016-10/2018 (HK$ 630,000), **PI**, completed.

List of courses previously taught,

(1) Smart Cities and Urban Informatics (LSGI653, graduate)
(2) Advanced Mobile GIS and LBS (LSGI541, graduate)
(3) Principles of GIS (LSGI521, graduate)
(4) Spatial data visualization and modeling (LSGI532, graduate)
(5) Utility Data Management (LSGI4652A, undergraduate)
(6) Building Information Modelling & 3D GIS (LSGI3220, undergraduate)
(7) Mobile GIS and LBS (LSGI3211A, undergraduate)
(8) Geomatics Algorithms and Programming (LSGI3230A, undergraduate)

Selected Publications

JOURNAL ARTICLES (Google Scholar citation 1230; h-index: 19, and the full publications list can be referred to: https://scholar.google.com/citations?user=BhcMunkAAAAJ&hl=en)

1. Shi, W., Goodchild, M., Batty, M., Li, Q., **Liu, X**. and Zhang, A., (2022). Prospective for urban informatics. *Urban Informatics*, *1*(1), pp.1-14.
2. **Liu, X.**, Chen, M., Claramunt, C., Batty, M., Kwan, M.P., Senousi, A.M., Cheng, T., Strobl, J., Arzu, C., Wilson, J. and Bandrova, T., (2022). Geographic information science in the era of geospatial big data: A cyberspace perspective. *The Innovation*, *3*(5), p.100279.
3. Zhang, J., **Liu, X**. * and Senousi, A.M., (2021). A multilayer mobility network approach to inferring urban structures using shared mobility and taxi data. *Transactions in GIS*, *25*(6), pp.2840-2865.
4. **Liu, X.**, Wu, J., Huang, J., Zhang, J., Chen, B.Y. and Chen, A., 2021. Spatial-interaction network analysis of built environmental influence on daily public transport demand. *Journal of Transport Geography*, *92*, p.102991.
5. Zhao, P., **Liu, X**. *, Shi, W., Jia, T., Li, W., & Chen, M. (2020). An empirical study on the intra-urban goods movement patterns using logistics big data. *International Journal of Geographical Information Science*, 1-28.
6. Huang, J., **Liu, X.** *, Zhao, P., Zhang, J. and Kwan, M.P., 2019. Interactions between bus, metro, and taxi use before and after the Chinese Spring Festival. *ISPRS International Journal of Geo-Information*, *8*(10), p.445.
7. Zhao, P., **Liu, X.** *, Kwan, M. P., & Shi, W. (2018). Unveiling cabdrivers' dining behavior patterns for site selection of 'taxi canteen' using taxi trajectory data. *Transportmetrica A: Transport Science*, 1-24.
8. **Liu, X.**, Chow, J. Y., & Li, S. (2018). Online monitoring of local taxi travel momentum and congestion effects using projections of taxi GPS-based vector fields. *Journal of Geographical Systems*, 20 (3), pp 253–274.
9. Zhao P., **Liu X**. *, Shen J., & Chen M. (2017). A Network Distance and Graph-Partitioning-Based Clustering Method for Improving the Accuracy of Urban Hotspot Detection. *GeoCarto International, 34*(3), pp.293-315.

10. Harvey, M., **Liu, X**. & Chow, J. (2016). A tablet-based surrogate system architecture for "in-situ" evaluation of cyber-physical transport technologies. *IEEE Intelligent Transportation Systems Magazine*.
11. **Liu, X**., Yan, W. Y. & Chow, J. (2015). Time-geographic Relationships between Vector Field Densities of Activity Patterns and Transport Systems. *Journal of Transport Geography*, 42, 22-33.
12. **Liu, X**., & Jiang, B. (2012). Defining and generating axial lines from street center lines for better understanding of urban morphologies. *International Journal of Geographical Information Science*, 26(8), 1521-1532.
13. Jiang, B., & **Liu, X**. (2012). Scaling of geographic space from the perspective of city and field blocks and using volunteered geographic information. *International Journal of Geographical Information Science*, 26(2), 215-229.
14. Jiang, B., **Liu, X**. and Jia, T. (2012). Scaling of Geographic Space as a Universal Rule for Mapping or Cartographic Generalization, *Annals of the Association of American Geographers*, DOI:10.1080/00045608.2013.765773.
15. Jiang, B., & **Liu, X**. (2011). Computing the fewest-turn map directions based on the connectivity of natural roads. *International Journal of Geographical Information Science*, 25(7), 1069-1082.
16. Jiang, B. and **Liu, X**. (2010). Automatic generation of the axial lines of urban environments to capture what we perceive, *International Journal of Geographical Information Science*, 24(4), 545-558.

CONFERENCES

1. Sun, H., Ji, G., Zhao B., **Liu X**. (2017). A Parallel Algorithm for Mining Time Relaxed Gradual Clustering Pattern Based on Spatio-Temporal Trajectories. In the *Fifth International Conference on Advanced Cloud and Big Data*, Aug 2017, Shanghai, China.
2. Harvey, M.J., **Liu, X**., Chow, J.Y.J., 2016. A tablet-based surrogate system for "in-situ" evaluation of cyber-physical transport technologies. In: Proc. 95th Annual Meeting of the Transportation Research Board, Washington DC.
3. **Liu, X**. and Li, S., (2013). Towards a Spatiotemporal Database Model for Canadian Ice Service Portal. In *Proceeding of the Canadian Institute of Geomatics Annual Conference and the 2013 International Conference on Earth Observation for Global Changes (EOGC'2013)*, 5-7 June 2013, Toronto, Canada.
4. **Liu, X.** and Ban, Y. (2013). Exploring the hierarchical spatial structure of cities, In *Proceeding of the 2013 Canadian Institute of Geomatics Annual Conference and the 2013 International Conference on Earth Observation for Global Changes (EOGC'2013)*, 5-7 June 2013, Toronto, Canada.
5. **Liu, X**. and Ban, Y. (2012). Analyzing and Predicting Human Movement: A Temporal Scaling Perspective. In *Workshop of Progress in Movement Analysis - Experiences with Real Data.* 15-16.11.2012, Zurich, Switzerland.

6. Jiang, B. and **Liu, X**. (2009), AxialGen: a research prototype for automatically generating the axial map. *The 11ᵗʰ International Conference on Computers in Urban Planning and Urban Management (CUPUM)*, Hong Kong, 16-18 June 2009, arxiv.org/abs/0902.0465.

TALKS AND PRESENTATIONS

1. Ji, X. and **Liu, X**. (2017). From Indoor to Outdoor in 3D Space: A New Perspective of Spacy Syntax. *Third International Conference on Spatial Data Mining and Geographical Knowledge Services*, September 20-22, Wuhan China.
2. **Liu, X.**, Chow, J.Y.J., Yuan, X.-X. (2016). Real-Time Monitoring of Transit Passengers' Travel Behavior for Interactive Visualization of Travel Patterns and Transit Route Flow Estimation. In: ISPRS 2016 - XXIII ISPRS Congress, Prague, Czech Republic.
3. **Liu, X.** and Chow, J.Y.J. (2015). City monitoring with travel demand "momentum" vector fields: theoretical and empirical findings. In: *Transportation Technology Symposium: Innovative Mobility Solutions,* November 20, 2015, NYIT, New York.
4. Chow, J. and **Liu, X.** (2015). City monitoring with dynamic UAV-based sweep coverage as a stochastic arc-inventory routing policy. In the *4ᵗʰ INFORMS TSL Workshop*, July 6-8, 2015, Berlin, Germany.
5. Satter, S., Li, S. and **Liu, X.*** (2014). Towards an Automatic Ice Navigation System on the Arctic Sea. In *Proceeding of ISPRS/IGU Joint International Conference on Geospatial Theory, Processing, Modelling and Applications*, 6-8 Oct. 2014, Toronto, Canada.
6. **Liu, X.**, and Chow J. (2014). Exploring spatio-temporal patterns of urban human mobility using travel survey data. In *Proceeding of ISPRS/IGU Joint International Conference on Geospatial Theory, Processing, Modelling and Applications*, 6-8 Oct. 2014, Toronto, Canada.
7. Li, S. and **Liu, X.**, (2014), Serving Historical Ice Information Online for Interactive Knowledge Discovery, ISPRS Mid-Term Symposium Commission IV 2014, May, 2014, Suzhou, China.
8. **Liu, X**. and Jiang, B. (2011). A video presentation on generating the fewest turn route for navigation. In the *4th International Cartographic Association Workshop on Geospatial Analysis and Modeling*, 10-12 August 2011, Simon Fraser University, Canada.
9. **Liu, X**. and Jiang, B. (2009). A poster on demonstrating Geo-Visualization using Isovist. In the *7th International Space Syntax Symposium (SSS7)*, 8-1 June 2009, Stockholm, Sweden.

Service to the profession

Professional services plays an important role in promoting sustainable research and collaboration throughout a range of international and local activities.

   a. Journal editorship
- **Managing Editor**, *Urban Informatics (UI)*
- **Guest Editor** of Special Issue on "Urban Informatics" at *Environment and Planning B: Urban Analytics and City Science (EPB)*.
- **Guest Editor** of Special Issue "Challenges in the Integrated Physical–Virtual Modeling of Sustainable Smart Cities" of "*Sustainability*"

- **Associate Editorial Board Member** of "*The Open Transportation Journal*"
- **Editorial Board Member** of "*Earth Sciences"*
- **Editorial Board Member** of "*Civil Engineering Beyond Limits (CEBEL)"*

b. *Conference programme committee*
- Organization committee, International Symposium on Geospatial Approaches to Combating Covid-19, https://gam.icaci.org/symposium2021
- ICCDE 2021 International Conference: http://www.iccde.org
- ICAIS 2020 Workshop: http://www.icaisconf.com/workshops
- FSDM 2020 International Conference on Fuzzy Systems and Data Mining: http://www.academicconf.com/tpc?confname=fsdm2020
- ISWEE 2020 International Symposium: http://www.confiswee.com
- ICUI 2019 International Conference: https://www.polyu.edu.hk/lsgi/icui2019.
- ICUI 2017 International Conference: http://event.lsgi.polyu.edu.hk/ICUI2017.
- Invited Speaker at Forum of Surveying Science and Technology, Nanjing, China
- Session Chair of the first Regional Conference on Environmental Modeling and Software (Asian Region), Nanjing, China: https://www.iemss.org/2019-nanjing.

c. *Membership*
- **Treasure**, International Society of Urban Informatics (ISUI)
- **Vice Chair**, Commission on Geospatial Analysis and Modeling, International Cartographic Association (ICA)
- **Secretary**, Modeling Geographical Systems Commission of International Geographical Union (IGU)
- **Member**, Institute of Electrical and Electronics Engineers (IEEE)
- **Member**, Canadian Association of Geographers
- **Member**, American Association of Geographers
- **Member**, Hong Kong Society for Transportation Studies (HKSTS)
- **Member**, Chinese Professional in Geographic Information Systems

d. *Reviewer of international and local journals*

I actively helped review for many high-quality journals in GIS (e.g., AAG, IJGIS, CEUS, TGIS, Cities, EPB, etc.), Transportation (JTG, TRPC, etc.) and other fields.

ICA commission of Geospatial Analysis and Modeling (GAM)

Declaration of the proposed chair

Dear President,

I am speaking to express my willingness to serve as the Chair for the GAM for four years from 2023 to 2027. During the first term, I will lead the GAM community by following the Terms of Reference to provide professional services. I will try my best to enhance the research agenda of the community by incorporating the state-of-art new spatial theory and technologies, and further improve the visibility of the community worldwide.

Sincerely,

Xintao Liu, Ph.D.

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ICA commission of Geospatial Analysis and Modeling

Terms of Reference (2023-2027)

In the term 2023-2027, the commission of Geospatial Analysis and Modeling will maintain its original over-arching goals and will add some specific objectives. The goals and objectives are listed below.

1. foster a community for geospatial analysis, modeling, and data analytics research, with strong links to the use of maps and visualization techniques
   - develop a medium-term research agenda for the commission, which will serve as the guiding basis for commission events.
   - organize academic events for community members to share ideas and research findings.
   - maintain social media accounts to promote the commission and attract more members to increase the visibility of the commission for a better professional service.

2. develop and maintain connections and joint efforts with other ICA commissions as well as other related GIScience and geographic academic organizations
   - organize special sessions and workshops at ICC on a biennial basis.
   - organize special sessions and workshops with other GIScience or geography conferences (e.g., AutoCarto, IGU, ISPRS, AAG, etc.) more frequently.
   - collaborate with commissions within ICA or other academic associations to organize joint workshops on topics of shared interest.

3. encourage concerted efforts on new & interdisciplinary research topics (e.g., autonomous driving, metaverse, AI).

4. publish research findings in the community through various outlets including special issues of academic journals, books, and open-source projects such as GitHub.