Ting Lei

Curriculum Vitae

Personal Information

Associate Professor

Department of Geography and Atmospheric Science, University of Kansas

1450 Jayhawk Blvd, 1021 Malott Hall

Lawrence, KS 66045

Web Address: https://lei.ku.edu

Email Address: lei@ku.edu

Education

- Ph.D., Geography, December 2010, University of California, Santa Barbara

Dissertation/Thesis: "Location modeling utilizing closest and generalized closest transport/interaction assignment constructs"

Advisor: Richard L. Church

- M.S., Computer Science, 2007, University of California, Santa Barbara

- M.E., Remote Sensing and Photogrammetry, 2000, Wuhan Tech. University of Surveying and Mapping

- B.E., Geographic Information Systems, 1997, Wuhan Tech. University of Surveying and Mapping

Employment History

1. **- present**
- University of Kansas, Lawrence, KS

   Associate Professor, Geography, Aug. 2021 – present

- University of Kansas, Lawrence, KS

   Assistant Professor, Geography, Aug. 2015 – Aug. 2021

- School of Sustainable Engineering and the Built Environment, Arizona State University

   Associate Research Scientist, Aug. 2014 to Aug. 2015

- School of Geography and Development, University of Arizona

   Postdoctoral research associate, Jan. 2014 to Aug. 2014

- Department of Geography, University of South Carolina
Postdoctoral research associate and lecturer, April 2012 to Dec 2013

- Center for Spatial Analysis, University of Oklahoma
Postdoctoral research associate and lecturer, Aug. 2011 to Mar. 2012

- Depart of Geography, University of California, Santa Barbara
Postdoctoral researcher, Sept. 2010 to Aug. 2011

- Department of Geography, University of California, Santa Barbara
Graduate Research Associate (adviser: Dr. Richard Church)
and Teaching Assistant/Associate, Sep. 2002 to Dec. 2010

- Department of Computer Science, University of California, Santa Barbara
Graduate student, 2006 to 2007

- Electrical & Computer Engineering department, University of California, Santa Barbara.
Research associate 2006 to 2007

1997 to 2002
- National Key Laboratory of Information Engineering in Surveying Mapping and Remote Sensing, Wuhan University

Courses Taught at University of Kansas
- GEOG 358, Principles of Geographical Info Systems

- GEOG 528, Spatial Databases

- GEOG 558, Intermediate Geographical Information Systems

- GEOG 648, Location Modeling

- GEOG 726, Remote Sensing of Environment II

Courses Taught prior to work at University of Kansas
- Geography 345-001 Interpretation of Aerial Photographs, University of South Carolina, Spring 2013

- GIS 4970/5970, Principles & Applications of GIS, University of Oklahoma, Fall 2011

- Geography 128, Analytical and Computer Cartography, UC Santa Barbara (Instructor)

- Geography 13, Introduction to Computing, UC Santa Barbara (Instructor)

Publications (Peer-reviewed Journals)

Lei Z. and Lei, T. L.* (2024), Large-scale integration of remotely sensed and GIS road networks: A full image-vector conflation approach based on optimization and deep learning. *Computers, Environment and Urban Systems*, vol. 113, p. 102174.

Lei Z., Yuan Z., and Lei T. L. * (2024), On the theoretical link between optimized geospatial conflation models for linear features. *ISPRS International Journal of Geo-Information*, vol. 13, no. 9, p. 310.

Lei, T. L. and Lei, Z.* (2023), Linear feature conflation: An optimization-based matching model with connectivity constraints. *Transactions in GIS*, vol. 27, no. 4, pp. 1205-1227.

Lei, Z. and Lei, T. L.* (2023), "Towards topological geospatial conflation: An optimized node-arc conflation model for road networks," ISPRS International Journal of Geo-Information, vol. 13, no. 1, p. 15.

Lei T.L., & Lei Z. (2022). Harmonizing Full and Partial Matching in Geospatial Conflation: A Unified Optimization Model. *ISPRS International Journal of Geo-Information*, 11 (7), 375

Lei, T.L. (2021). Integrating GIS and location modeling: A relational approach. *Transactions in GIS*, 25 (4), 1693-1715.

Lei, T.L., & Wang, R. (2021) Conflating linear features using turning function distance: A new orientation sensitive similarity measure. *Transactions in GIS*, 25 (3), 1249-1276.

Lei, T.L. (2021). Large scale geospatial data conflation: A feature matching framework based on optimization and divide-and-conquer. *Computers, Environment and Urban Systems*, 87, 101618.

Gao P., Terando A.J., Kupfer J.A., Varner J.M., Stambaugh M.C., Lei, T.L., & Hiers, J.K. (2021). Robust projections of future fire probability for the conterminous United States. *Science of the total environment*, 789, 147872

Lei, T.L. (2020). Geospatial data conflation: a formal approach based on optimization and relational databases. *International Journal of Geographical Information Science*, 34 (11), 2296-2334.

Lei, T.L., & Lei, Z. (2019). Optimal spatial data matching for conflation: A network flow-based approach. Transactions in GIS, 23(5), 1152-1176. https://doi.org/10.1111/tgis.12561

Lei, T.L., Evaluating the Vulnerability of Time-Sensitive Transportation Networks: A Hub Center Interdiction Problem. Sustainability, 2019. 11(17): p. 4614. https://doi.org/10.3390/su11174614

Plane, D. A.*, Tong D., & Lei, T. (2018, in press). Inter-person Separation: A New Objective Standard for Evaluating the Spatial Fairness of Political Redistricting Plans. *Geographical Analysis*, 0, 1-29. https://doi.org/10.1111/gean.12175

Lei, T. L. (2016). Designing Reliable Center Systems: A Vector Assignment Center Location Problem. *Geographical Analysis*, 8(4), 411-426.

Lei, T. L., Church, R. L., & Lei, Z. (2016). A unified approach for location-allocation analysis: integrating GIS, distributed computing and spatial optimization. *International Journal of Geographical Information Science*, 30(3), 515-534.

Li, W., Song, M., & Lei, T. L. (2016). Spatiotemporal data representation and its effect on the performance of spatial analysis in a cyberinfrastructure environment. *Computers & Geosciences*, 87, 11-21.

Lei, Z., Wang, M., Lei, T. L., & Li, D. (2016). Tracking moving weak objects in celestial image sequences. IEEE Transactions on Aerospace and Electronic Systems, 52(3), 1257-1266.

Lei, T. L. *, & Church, R. L., (2015), On the Unified Dispersion Problem: Efficient Formulations and Exact Algorithms. *European Journal of Operational Research*, 241(3):622-630.

Lei, T.L.* and Church, (2015), R.L., On the finite optimality set of the vector assignment *p*-median problem. *Geographical Analysis*, 47(2): (134-145).

Lei, T.L.*, Tong, D. and Church, R.L., (2014), Designing robust coverage systems: A maximal covering model with geographically varying failure probabilities. *Annals of the Association of American Geographers*, 104(5):922-938.

Lei, T. L. * and Church, R. L., (2014), Vector Assignment Ordered Median Problem: a unified median problem. *International Regional Science Review*, 37(2): 194-224.

Lei, Z., Wang, M*., Li, D., & Lei, T. L. (2014). Stream Model based Ortho-Rectification in GPU Cluster Environment. *IEEE Transactions on Geoscience & Remote Sensing Letters,* 1-5.

Lei, T.L. * and Tong, D., (2013), Hedging against service disruptions: an expected median location problem with site-dependent failure probabilities, *Journal of Geographical Systems*, 15: 491-512

Lei, T. L., (2013), Identifying critical facilities in hub-and-spoke networks: A hub interdiction median problem. *Geographical Analysis*, 45 (2): 105-122.

Lei, T.L.* and Church, R.L., (2013), A unified model for dispersing facilities. *Geographical Analysis*, 45(4): 401-418/./

Gao, P.*, Kupfer, J.A., Guo, D., and Lei, T. L., (2013), Identifying Functionally-Connected Habitat Compartments with a Novel Regionalization Technique. *Landscape Ecology,* 28(10): 1949-1959.

Lei, T.L., Chen, Y. and Goulias, K.G., (2012), Opportunity-based Dynamic Transit Accessibility in Southern California: Measurement, Findings, and a Comparison with Automobile Accessibility. *Transportation Research Record* 2276 (3): 26-37/./

Lei, T.L. and Church, R.L.*, (2011), Locating short-term empty-container storage facilities to support port operations: A user optimal approach. *Transportation Research Part E*, *47*: 738-754.

Lei, T.L. and Church, R.L., (2011), Constructs for multi-level closest assignment in location modeling, *International Regional Science Review*, *34(3)*: 339-367.

Lei, T.L. and Church, R.L.*, (2010), Mapping Transit-Based Access: Integrating GIS, Routes and Schedules, *International Journal of Geographic Information Science*, 24 (2): 283-304.

Chen, Y., Ravulaparthy, S., Deutsch, K., Dalal, P., Yoon, S. Y., Lei, T. L., et al. (2011), Development of opportunity-based accessibility indicators. *Transportation Research Record*

Guo, B., D. Li, Lei, T. and Wang, M.. (1999), Development of ITS and application of 3S in ITS, *Geo-Spatial Information Science* 2(1): 86-89.

Reports and Book Chapters

R.L. Church, V. Noronha, T. Lei, W. Corrigan, S. Burbidge, and J. Marston. Spatial and Temporal Utility Modeling to Increase Transit Ridership. *Final Report prepared for California Partners in Advanced Transit and Highways(PATH)*, 2005.

Conference Proceedings

Wang W., Lei, Z., and Lei, T. L. (2023). Road segmentation for remote sensing images based on global feature attention ResUnet," in 2023 china automation congress (CAC), 2023, pp. 4650-4655.

Lei, Z., Chen, X., & Lei, T. (2016). Sub-Pixel Location of Motion Blurred Weak Celestial Objects in Optical Sensor Image Based on Elliptical 2D Gaussian Surface Fitting. In International Conference on Industrial Informatics - Computing Technology, Intelligent Technology, Industrial Information Integration (ICIICII). Wuhan, China: IEEE.

Lei, T. L., Liang, X., Mascaro, G., White, D., Westerhoff, P., & Maciejewski, R. (2015). An Interactive Web-Based Geovisual Analytics Tool to Explore Water Scarcity in Niger River Basin. In A. Middel, G. Weber, & K. Rink, Workshop on Visualisation in Environmental Science (EnvirVis) (2015). Cagliari, Sardinia, Italy.

Conference Presentations

Lei, T. L. (2024, July 8). Large-scale Integration of Remotely Sensed and GIS road networks: a full image-vector conflation approach based on optimization and deep learning. The 27th ACIS International SummerConference on Software Engineering, Artificial Intelligence, Networking and Parallel/Distributed Computing (SNPD 2024), Beijing, China.

Yang, W., & Lei, T.L. (2021, November 16). Grouping and Optimization-based Matching Strategy of Geospatial Data Conflation. Presented at the Annual Conference of NCASPRS (the North Carolina Chapter of the American Society of Photogrammetry and Remote Sensing, virtual).

Yang, W., & Lei, T.L. (2021, October 15). Grouping Technique in Geospatial Data Matching. Presented at the Annual Applied Geography Conference of AAG (Association of American Geographers, virtual).

Yang, W., & Lei, T.L. (2021, March 31). Application of Grouping in Spatial Data Matching. Presented at the Annual Conference of ASPRS (the Imaging & Geospatial Information Society, virtual).

Koncur, J., & Lei, T. (2017, April 9). County-level Big Data Exploration and Analysis: Property Value Change in Johnson County, KS 2012-2015. Presented at the Annual Meetings of Association of American Geographers, Boston, MA.

Lei, T. (2015, April 25). GIS Modeling for Evaluating Water Scarcity in the Niger River Basin. Presented at the Annual Meetings of Association of American Geographers, Chicago, IL.

Ting Lei, On the Vulnerability of Minimax Networks: An Interdiction Center Problem, presented at the Annual meetings of Association of American Geographers, Tampa, FL, April 2014.

R.L. Church and T.L. Lei, a generalized structure for a p-median: merging the vector assignment and the ordered median problems, presented at Western Regional Science Association, Kauai, HI February 2012 (presented by co-author).

K.G. Goulias, C.R. Bhat, R.M. Pendyala, Y, Chen, R, Paleti, K.C. Konduri, T. Lei, D. Tang, S.Y. Yoon, G. Huang, and H. Hu, Simulator of Activities, Greenhouse Emissions, Networks, and Travel (SimAGENT) in Southern California, Paper presented at the 91st Annual Transportation Research Board Meeting, Washington D.C., January 23-27, 2011

R.L. Church and T. Lei, Optimizing the disruption of a median service system, Presented at the INFORMS Annual Meeting at Austin, Texas, Nov 2010.

T. Lei and R.L. Church, Reducing traffic in handling empty containers: a case study of the Los Angeles basin, Presented at the 3rd National Urban Freight Conference at Long beach, Oct. 2009

T. Lei and R.L. Church, Vector Assignment *r*-interdiction model, Presented at the AAG annual conference at Las Vegas, March 2009.

T. Lei and R.L. Church, Generalized Constraints for Closest Assignment in Location Modeling, 2009 INFORMS annual conference at San Diego, Nov 2009

T. Lei and R.L. Church, A new class of dispersion-based facility location models, Presented at the 56th Annual North American Meetings of the Regional Science Association at San Francisco, Nov 2009

R.L. Church and T. Lei, Minimizing the impact of port operations: a new location model for away-from-port container storage yards, *Presented at the 2008 NARSC Conference, Brooklyn, NY, Nov. 2008* (presented by co-author).

T. Lei, D. Li, and J. Gong, The Expression of Road Network for Vehicle Navigation, Proceedings of ISPRS 19 Congress , B4/2, 567-571, 2000

Funding

External:

Lei, T. (Principal), & Wang, R. (Co-Principal). Optimized spatial data conflation with topological conditions. National Science Foundation, $372,621, Submitted Jan 18, 2022 (Aug 1, 2022 - Aug 1, 2025).

Lei, T. (Principal), Ho, A. (Co-Principal), Kondyli, A. (Co-Principal), Fowles, J. (Co-Principal), & Sutley, E. (Co-Principal). Exploring the Factors Influencing Property Value Changes and Neighborhood Health in Johnson County, Kansas. Johnson County, Kansas $39,746, Submitted November 5, 2015 (June 1, 2016 - June 1, 2017).

Internal:

Lei, T. (Principal). Facilitating transportation network conflation using GIS and spatial optimization. $8,000 (2016 - 2017). (Refereed/Competitive)

Referee Experience

International Journal of Geographic Information Science

Transactions in GIS

Geographical Analysis

European Journal of Operational Research

Optimization and Engineering

Transportation Research, Part E

Transportation Research Letters

Networks and Spatial Economics

GeoJournal

PLOS One

Affiliations

Association of American Geographers

Technical Skills

Programming Languages:

C, C++, C# .NET, Java, Python, JavaScript, R,

Lisp/Scheme, Matlab

GIS & Spatial Databases:

ESRI ArcGIS, ERDAS IMAGINE, Leica Photogrammetric Suite, AutoCAD, Arc Objects

QGIS, pyQGIS, GeoServer, ArcPy, OGR/GDAL, GeoPandas, R/sf

PostgresSQL, PostgreSQL Server Programming, PostGIS, MySQL

High performance computing:

MPI, UPC, CUDA

Artificial Intelligence:

TensorFlow, PyTorch

Web GIS programming:

HTML5/JavaScript, PHP, NodeJS, OpenLayers, Leaflet

Cloud Computing:

AWS EC2, Docker, Kubernetes, Jupyter Hub

Optimization and Operations Research:

IBM-ILOG CPLEX/OPL, LINGO/LINDO, AMPL, GNU GLPK