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Guofeng Cao

Curriculum Vitae

Updated: March 2018

Education

- **Ph.D.: Department of Geography** 2011
  University of California, Santa Barbara *Santa Barbara CA, U.S.A.*
  - Specialization: GIScience and Environmental Statistics
  - Dissertation Co-Advisors: Phaedon C. Kyriakidis and Michael F. Goodchild
- **M.A.: Department of Statistics and Applied Probability** 2009
  University of California, Santa Barbara *Santa Barbara CA, U.S.A.*
  - Specialization: Applied Statistics
- **M.Sc.: Institute of Geographic Sciences and Natural Resources Research** 2004
  Chinese Academy of Sciences *Beijing, China*
  - Specialization: Cartography and GIS
- **B.Sc.: Department of Earth Sciences** 2001
  Zhejiang University *Hangzhou, China*
  - Specialization: Remote Sensing Geology
- **B.Sc.(Minor): Department of Computer Science** 2001
  Zhejiang University *Hangzhou, China*

Academic Experiences

- **Co-Director** October 2015-
  Texas Tech University *Lubbock TX, U.S.A.*
  - Center for Geospatial Technology
- **Faculty Affiliate** August 2013-
  Texas Tech University *Lubbock TX, U.S.A.*
  - National Wind Institute
- **Assistant Professor** August 2013-
  Texas Tech University *Lubbock TX, U.S.A.*
  - Department of Geosciences
- **Postdoctoral Research Associate** August 2011- August 2013
  University of Illinois *Urbana IL, U.S.A.*
  - CyberInfrastructure and Geospatial Information Laboratory

- **Graduate Research Assistant** 2007 - 2010
  University of California,Santa Barbara *Santa Barbara CA, U.S.A.*
  - Department of Geography and Center for Spatial Studies
- **Graduate Research Assistant** Jun.2008 - Sept.2008
  Los Alamos National Laboratory *Los Alamos NM, U.S.A*
  - High Energy Physics (T-8) Group
- **Teaching Assistant** 2006 - 2007
  University of California,Santa Barbara *Santa Barbara CA, U.S.A.*
  - Department of Geography
- **Research Scientist** July. 2004 - Sept. 2006
  Institute of Geographic Sciences and Natural Resources Research *Beijing, China*
  - GIS Industrial Development Center of China, Chinese Academy of Sciences

Industrial Experiences

- **Graduate Research Assistant** Jun.2010 - Sept.2010
  TeleNav Inc. *Sunnyvale, CA, U.S.A*
  - Map matching/conflation methods
  - Crowd-source traffic data mining for map updating and traffic modeling
- **Graduate Research Assistant** Jun.2007 - Aug.2007
  ESRI Inc. *Redlands CA, U.S.A*
  - Geostatistics Group of ESRI
- **Team Leader** Jul. 2001 - Sept. 2006
  SuperMap Software Co., Ltd *Beijing, China*
  - As one of the founding contributors to SuperMap software (the leading GIS platform in China), I led the research and development of a national award winning (of China) 3D GIS and spatial analysis software
  - Main research efforts include high performance spatial analysis, efficient 3D reconstruction and geovisualization, large scale spatial database and spatial statistics

Honors & Awards

- **National Scientific Technology Progress Award of China (second-class)** 2005
  as a member of *SuperMap* *China*
- **Scholarship for Excellent Students** 1998, 1999, 2000
  Zhejiang University *Hangzhou, China*

Grants

(∗ indicates the leading principle investigator of the proposal)

Funded:

10. USGS: Toward Near Real-time Monitoring and Characterization of Land Surface Change for the Conterminous US (2017-2022). Amount: **$1,062,069**. Role: **co-I** (with Z. Zhu*, Z. Yang).

9. CH Foundation: Mapping Local Community Preparedness to Tornado Hazards in Lubbock, Texas (2018-2019). Amount: **$29,500**. Role: **PI** (with D. Liang).

8. CH Foundation: Immersive VR Experience for Teaching, Learning, and Researching. Amount: **$17,989**. Role: **co-PI** (with Litsey R.* and P. Solis).

7. Texas Tech: Story Maps of Humanitarian Projects around the World (2017-2018). Amount: **$90,000**. Role: **co-PI** (with P. Solis, L. Jones, C. Portillo-Quintero, C. Griffith and L. Griffith).

6. USAID: Mappers Without Borders (2015-2019). Amount: **$999,000**. Role: **co-PI** (with P. Solis*, K. Mulligan and C. Portillo-Quintero).

5. Texas Tech National Wind Institute: Toward a Geospatial Cyberinfrastructure for Enhancement of Community Resilience to Tornado Hazards (2014-2015). Amount: **$30,500**. Role: **Sole PI**.

4. Texas Tech Transdisciplinary Research Academy: A Big Data Approach for Spatial Environmental Epidemiology (2014-2015). Amount: **$4,000**. Role: **PI** (with J. Vanos and Y. Chen).

3. USDA: Development of Current Hydrologic Data and Analysis of Water Availability in the Ogallala Aquifer over the Next 50 Years (2014-2016). Amount: **$119,895**. Role: **co-PI** (with K. Mulligan* and L. Barbato).

2. USDA: Development of a GIS Model to Project and Map Future Water Availability (2015-2016). Amount: **$40,679**. Role: **co-PI** (with K. Mulligan* and L. Barbato).

1. National Institute on Minority Health and Health Disparities Pilot Research Core: Center of Excellence at Meharry (HDRCOE): The role of climate and air pollution for racial disparities in infant mortality (2014-2015). Amount: **$12,729**. Role: **co-PI** (with L. Gittner* and J. Vanos).

Travel Grants:

4. NSF Travel Grant: Geocomputation 2015.

3. NSF Travel Grant: CyberGIS 2012, 2015.

2. NSF Travel Grant: ACM GIS 2011.

1. Jack Dangermond Travel Grants, UCSB 2007, 2010, 2011.

Publications

(∗ indicates corresponding authors, † indicates graduate or postdoctoral advisee authors)

In Peer-Reviewed Journals

27. Liu, Y.†, **Cao**, G.*, Zhao, N. †, Mulligan, K., Ye, X. (2018) : High Resolution Mapping of Ground-Level $PM_{2.5}$ concentrations: A Random Forests-based Geostatistical Approach. Environmental Pollution, 235, 272-282.

26. Gao, Y., Padmanabhan, A., Wang, S., Yin, J. and **Cao**, G. (2018): Mapping Spatiotemporal Patterns of Events Using Social Media: A Case Study of Influenza Trends. International Journal of Geographic Information Science, 32 (3), 425-449.

25. Liu, Y.†, Zhao, N.†, Vanos, J. and **Cao**, G. (2017), Visualizing changes in nationally averaged $PM_{2.5}$ concentrations by an alluvial diagram. Environment and Planning A: Economy and Space (*Featured graphics*), 50 (2), 259-261.

24. Hardin, A., Liu, Y.†, **Cao**, G. and Vanos, J. (2017) Urban heat island intensity and spatial variability by synoptic weather type in the northeast US. Urban Climate (in press).

23. Zhao, N. † and **Cao**, G.* (2017), Quantifying and visualizing language diversity of Hong Kong using Twitter. Environment and Planning A: Economy and Space (*Featured graphics*), 49 (12), 2698-2701.

22. Mehdipoor, H., Vanos, J., Zurita-Milla, R. and **Cao**, G. (2018) Short communication: Emerging technologies for biometeorology. International Journal of Biometeorology, 61 (1), 81-88.

21. Fisher-Phelps, M.†, **Cao**, G, Wilson, R. and Kingston, T. (2017): Protecting bias: Across time and ecology, open-source bat locality data are heavily biased by distance to protected area. Ecological Informatics, 40, 22-34.

20. Zhao, N.†, Hsu, F., **Cao**, G and Samson, E. (2017), Improving accuracy of economic estimations with VIIRS DNB image products. International Journal of Remote Sensing, 38 (21), 5899-5918.

19. Zhao, N. †, Liu, Y.†, **Cao**, G., Samson, E., Zhang, J. (2017): Forecasting China's GDP at the pixel level using nighttime light time series images. GIScience & Remote Sensing, 54(3), 407-425.

18. Zhao, N. †, **Cao**, G.*, Vanos, J., Vecellio, D. (2018): The Effects of Synoptic Weather on Influenza Infection Incidence: A Retrospective Study Using Influenza Surveillance Data and Spatial Synoptic Classification. International Journal of Biometeorology, 62 (1), 69-84.

17. Liu, Y.†, Zhao, N.†, Vanos, J., and **Cao**, G (2017): Effects of synoptic weather on ground-level PM2.5 concentrations in the United States. Atmospheric Environment (148) 297-305.

16. Liu, Y.†, Delahunty, T., Zhao, N †. and **Cao**, G. (2016): These lit areas are undeveloped: China's urban extents and urban development patterns from thresholded nighttime light imagery. International Journal of Applied Earth Observation and Geoinformation, 50(8), 39-50.

15. Luo, F.†, **Cao**, G.*, Mulligan, K. and Li, X. (2016): Explore Spatiotemporal and Demographic Characteristics of Human Mobility via Twitter: A Case Study of Chicago. *Applied Geography*, 70 (5), 11-25.

14. **Cao**, G., Wang, S., Hwang, M., Padmanabhan, A., Zhang, Z. and Soltani, K. (2015): A General Framework for Scalable Spatio-temporal Analysis of Location-based Social Media Data, *Computers, Environment and Urban System*, 51(5), 70-82.

13. Padmanabhan, A., Wang, S., **Cao**, G., Hwang, H., Zhao, Y., Zhang Z. and Gao Y. (2014), FluMapper: an interactive CyberGIS environment for massive location-based social media data analysis, *Concurrency and Computation: Practice and Experience*, 26(13) 2253-2265.

12. **Cao**, G., Yoo, E.H., Wang, S. (2014): A statistical framework of data fusion for spatial prediction of categorical variables. *Stochastic Environmental Research and Risk Assessment*, 28 1785-1799.

11. Leetaru, K., Wang, S., **Cao**, G., Padmananabhan, A., Shook, E. (2013): Mapping the global Twitter heartbeat: the geography of Twitter. *First Monday*.

10. Yoo, E.H., Hoagland, B.W., **Cao**, G. and Fagin, T.D. (2013): Spatial distribution of trees and landscapes of the past: a mixed spatially correlated multinomial logit model approach for the analysis of the Public Land Survey data. *Geographical Analysis*, 45(4), pp.419-440.

9. Luo, F., Zhong, E., **Cao**, G., Tellez, R.D. and Gao, P. (2013): VGIS-AntiJitter: an effective framework of solving jitter problems in virtual geographic information systems *International Journal of Digital Earth*, 6(1), pp.28-50.

8. **Cao**, G., Kyriakidis, P.C., and Goodchild, M.F. (2012): Response to 'Comments on 'Combining spatial transition probabilities for stochastic simulation of categorical fields' with communications on some issues related to Markov chain geostatistics', *International Journal of Geographical Information Science*, 26(10), pp.1741-1750.

7. **Cao**, G., Kyriakidis, P.C., and Goodchild, M.F. (2011): A geostatistical framework for categorical spatial data modeling, *The SIGSPATIAL Special*, 2011, 3(3), pp.4-9.

6. **Cao**, G., Kyriakidis, P.C. and Goodchild, M.F. (2011): A multinomial logistic mixed model for prediction of categorical spatial data, *International Journal of Geographical Information Science*, 25(12), pp.2071-2086.

5. **Cao**, G., Kyriakidis, P.C. and Goodchild, M.F. (2011): Combining spatial transition probabilities for stochastic simulation of categorical fields, *International Journal of Geographical Information Science*, 25(11), pp.1773-1791.

4. Li,K., Zhong, E., Zeng, Z. and **Cao**, G.(2006): An optimal path algorithm based on hierarchically structured topographical network, *Journal of Images and Graphics (In Chinese)*, 11(07): 1004-1009.

3. Zhang, X., Zhang, L., **Cao**, G. and Zhong, E.(2006): A study on expressing techniques of battlefield situation evolution and variation based on GIS and its application, *Geo-Information Science (In Chinese)*, 8(4).

2. Zhang,L., Zhu,J., Zeng,Z., and **Cao**, G.(2006): GRID services for large scale elevation derivatives Computation, *Geo-Information Science (In Chinese)*, 8(2), pp.14-29.

1. **Cao**, G., Zhang, L. and Zhong, E. (2005): A discussion on key techniques in 3D GIS rendering engine, *Geo-Information Science (In Chinese)*, 7(1), pp.87-91.

Peer-Reviewed Book Chapters

2. **Cao**, G.: Modeling uncertainty in categorical fields, *International Encyclopedia of Geography*. (in press)

1. Wang, S. and **Cao**, G., Zhang, Z., Zhao, Y., Padmanabhan, A. and Wu, K. (2013): A CyberGIS environment for analysis of location-based social media data, in *Location-Based Computing and Services,2nd Edition*,(edited by A. K. Hassan and H. Amin), CRC Press.

Technical Report

1. **Cao**, G., Kyriakidis, P.C., and Goodchild, M.F.: On spatial transition probabilities as continuity measures in categorical fields. (Available at: http://arxiv.org/abs/1312.5391).

Full Papers In Peer-Reviewed Conference Proceedings

15. Yang, Z., Nguyen, L. H., Stuve, J., **Cao**, G., & Jin, F. (2017, December). Harvey flooding rescue in social media. In Big Data (Big Data), 2017 IEEE International Conference on (pp. 2177-2185). IEEE.

14. Liu, Y.†, Luo, F.† and **Cao**, G. (2015). Track Spatiotemporal Spread of Public Concerns on Ebloa in the US via Twitter. In Proceedings of Geocomputation 2015 Conference.

13. Luo, F.†, **Cao**, G., and Li, X. (2014). An interactive approach for deriving geometric network models in 3D indoor environments. In Proceedings of the Sixth ACM SIGSPATIAL International Workshop on Indoor Spatial Awareness (pp. 9-16). ACM.

12. Huang, Q., **Cao,** G., and Wang, C. (2014). From Where Do Tweets Originate?-A GIS Approach for User Location Inference. In Proceedings of the Seventh ACM SIGSPATIAL International Workshop on Location-based Social Media. ACM.

11. **Cao**, G.: A Geostatistical Framework for Heterogeneous Spatatial Data Fusion (2014), in: A. Shortridge, J. Messina, S. Kravchenko and A. Finley (Eds.), *Proceedings of the 11th International Symposium on Spatial Accuracy Assessment in Natural Resources and Environmental Sciences*.

10. Hwang, M., Wang, S., **Cao**, G., Padmanabhan, A. and Zhang, Z.(2013): Spatiotemporal Transformation of Social Media: A Case Study of Twitter for Exploration of Flu Risk Indicators. International Conference on Advances in Geographic Information Systems.

9. Padmanabhan, A., Wang, S., **Cao**, G., Hwang, H., Zhao, Y., Zhang Z. and Gao Y. (2013), FluMapper: an interactive CyberGIS environment for massive location-based social media data analysis. Proceedings of the Conference on Extreme Science and Engineering Discovery Environment: Gateway to Discovery.

8. Shook, E. Leetaru, K, **Cao**, G., Padmanabhan, A and Wang, S. (2012): Happy or not : Generating topic-based geospatial emotional heatmaps for Culturomics using CyberGIS. IEEE 8th International Conference on E-Science, pp. 1-6.

7. **Cao**, G., Wang, S., and Guan, Q. (2012): A state-space model for understanding spatial dynamics represented by areal data *Proceedings of the Seventh International Conference, GIScience 2012*, Columbus, Ohio, September 2012.

6. **Cao**, G., Kyriakidis, P.C., and Goodchild, M.F. (2011): A geostatistical framework for categorical spatial data modeling, in *Proceedings of the 19th ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems*, Chicago, Illinois, November 2011.

5. Kyriakidis, P.C. and **Cao**, G (2010): Generating fine resolution area class maps subject to coarser resolution data constraints, in *Proceedings of the Sixth International Conference, GIScience 2010*, Zurich, Switzerland, Sep.14-17,2010.

4. **Cao**, G., Kyriakidis, P.C., and Goodchild, M.F. (2009): Prediction and simulation in categorical fields: a transition probability combination approach, in *Proceedings of the 17th ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems*, Seattle, Washington, November 2009, pp.496-499.

3. **Cao**, G., and Kyriakidis, P.C. (2008): Combining transition probabilities in the prediction and simulation of categorical fields, in: J. Zhang, and M.F. Goodchild (Eds.), *Proceedings of the 8th International Symposium on Spatial Accuracy Assessment in Natural Resources and Environmental Sciences*, Shanghai, China, June 2008, pp.25-32.

2. Li, K., Zhong, E., Song, G., **Cao**, G., Zhang, L. and Wu, Q. (2007): NDF: An effective mobile GIS physical storage model, in *Proceedings of the SPIE 6754, Geoinformatics 2007: Geospatial Information Technology and Applications 67541W (August 07, 2007)* DOI:10.1117/12.764932

1. Zhang, X., **Cao**, G. and Zhang, L. (2006): Research and improvement on optimal path analysis algorithm based on cost-distance grid, in *Proceedings of the IEEE International Conference on Geoscience and Remote Sensing Symposium*, Denver, Colorado, Aug 2006, pp.869-871.

In Conference Proceedings (not peer-reviewed)

1. **Cao**, G., Yu, Z., Yang, Z. (2002), Spatially visualized Internet management system based on GIS technologies. *Proceedings of International Conference on Computer Graphics & Spatial Information System*, Beijing, China, August 2002.

Presentations

In Conferences and Symposia (presenter is underlined)

35. **Cao**, G.: High Resolution Mapping of Ground-level $PM_{2.5}$ concentrations. *Annual Meeting of American Association Geographers*, New Orleans, LA, April 2018.

34. **Cao**, G.: Uncertainty Modeling in Geospatial Data Science. *NSF SI2-S2I2 Conceptualization: Geospatial Software Institute*, Los Angeles, CA, January 2018.

33. **Cao**, G.: High Resolution Mapping of Ground-level $PM_{2.5}$ concentrations. *The Third International Conference on CyberGIS and Geospatial Data Science*, Boston, MA, April 2017.

32. **Cao**, G.: Explore Spatiotemporal and Demographic Characteristics of Human Mobility via Location-based Social Media. *NSF Workshop on Advancing Movement and Mobility Science by Bridging Research on Human Mobility and Animal Movement Ecology*, Columbus, Ohio, May 2017.

31. **Cao**, G.: Learning Deep of Remote Sensing Imagery for High-Resolution Mapping of Ground-Level $PM_{2.5}$ Concentrations. *Annual Meeting of American Association of Geographers*, Boston, MA, April 2017.

30. **Cao**, G.: Statistical Modeling of Animal Movement Trajectory: A Functional Data Analysis Approach. *NSF Workshop on Advancing Movement and Mobility Science by Bridging Research on Human Mobility and Animal Movement Ecology*, Austin, TX, November 2016.

29. **Cao**, G.: High Resolution Mapping of Ground-level $PM_{2.5}$ concentrations. *The Third International Conference on CyberGIS and Geospatial Data Science*, Urbana, IL, July 2016.

28. **Cao**, G.: Exploring Biases in Location-Based Social Media. *International Workshop of Cloud Computing and Big Data*, Fairfax, VA, July 2016.

27. **Cao**, G.: Integrating CyberGIS for Spatiotemporal Uncertainty Modeling. *CyberGIS All Hands Meeting*, Reston, VA, September 2015.

26. **Cao**, G.: A Scalable Framework for Scalable Spatiotemporal Analysis of Location-based Social Media Data *Texas Tech University 2015 Symposium on Big Data*, Lubbock, Texas, April 2015.

25. **Cao**, G.: Representing spatiotemporal uncertainty in function spaces. *110th Annual Meeting of the Association of American Geographers*, Chicago, IL, April 2015.

24. Ying Liu and **Cao**, G.: Geostatistical Downscaling of Gridded PM2.5 Concentration Datasets Using Nighttime Light Imagery. *110th Annual Meeting of the Association of American Geographers*, Chicago, IL, April 2015.

23. Liu, Y., Luo, F. and **Cao**, G.: Track Spatiotemporal Spread of Public Concerns on Ebloa in the US via Twitter. *The 13th International Conference of Geocomputation*, Dallas, TX, May 2015.

22. Luo, F., **Cao**, G., and Li, X.: An interactive approach for deriving geometric network models in 3D indoor environments. *ACM GIS 2014*, Dallas, Texas, November 2014.

21. Huang, Q., **Cao,**, G., and Wang, C.: From Where Do Tweets Originate?-A GIS Approach for User Location Inference. *ACM GIS 2014*, Dallas, Texas, November 2014.

20. **Cao**, G., Wang, S. : A Scalable Framework for Scalable Spatiotemporal Analysis of Location-based Social Media Data *109th Annual Meeting of the Association of American Geographers*, Tampa, FL, April 2014.

19. **Cao**, G.: A Geostatistical Framework for Heterogeneous Spatatial Data Fusion, *11th International Symposium on Spatial Accuracy Assessment in Natural Resources and Environmental Sciences*, Lansing, Michigan, July 2014.

18. Hwang, M., Wang, S., **Cao**, G., Padmanabhan, A. and Zhang, Z.: Spatiotemporal Transformation of Social Media: A Case Study of Twitter for Exploration of Flu Risk Indicators. *ACM GIS 2013*, Orlando, Florida, November 2013.

17. **Cao**, G.and Wang, S.: A Statistical Framework for Spatiotemporal Dynamics Modeling. *AAG 2013*, Los Angels, CA, April 2013.

16. **Cao**, G., Wang, S., and Guan, Q.: A state-space model for understanding spatial dynamics represented by areal data. *GIScience 2012*, Columbus, Ohio, September 2012.

15. **Cao**, G., Wang, S.: A CyberGIS-enabled statistical framework for spatiotemporal data fusion *The First International Conference on Space, Time and CyberGIS*, Champaign, Illinois, August 2012.

14. **Cao**, G., Goodchild, M.F., Wang, S., Kyriakidis,P.C.,: A spatial multinomial logistic mixed model for mapping thematic classification uncertainty. *107th Annual Meeting of the Association of American Geographers*, New York City, New York, February 2012.

13. **Cao**, G., Kyriakidis,P.C., Goodchild, M.F.: A geostatistical framework for categorical spatial data modeling. *The 19th ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems*, Chicago, Illinois, November 2011.

12. **Cao**, G., Goodchild, M.F., Kyriakidis,P.C.: A multinomoial mixed model for prediction of categorical saptial data. *National Geospatial-Intelligence Agency Academic Research Program Symposium (NARP)*, National Academy of Sciences, Washington, D.C., September 2011.

11. **Cao**, G., Goodchild, M.F., Kyriakidis,P.C.: A computer package for modeling, prediction and simulation of categorical spatial data. *107th Annual Meeting of the Association of American Geographers*, Seattle, WA, April 2011.

10. Marston, J. R., **Cao**, G., Brabyn, J. A. Evaluation of an online mapping program with user-defined map features for persons with low vision. *First European Congress On Visual Impairment*, Valladolid, Spain, October 2010.

9. **Cao**, G., Goodchild, M.F., Kyriakidis,P.C.: A geostatistical framework for geospatial data analysis and modeling across multiple spatial and temporal scales. *National Geospatial-Intelligence Agency Academic Research Program Symposium (NARP)*, National Academy of Sciences, Washington, D.C., September 2010.

8. Kyriakidis, P.C. and **Cao**, G: Generating fine resolution area class maps subject to coarser resolution data constraints, in *Proceedings of the Sixth International Conference, GIScience 2010*, Zurich, Switzerland, Sep.14-17,2010

7. **Cao**, G., Kyriakidis,P.C., Goodchild, M.F..: Transition probability-based geostatistical methods for modeling categorical spatial data. *106th Annual Meeting of the Association of American Geographers*, Washinton, D.C., March 2010.

6. Marston, J.R. and **Cao**, G.: Making geographical information accessible for people with low vision. *106th Annual Meeting of the Association of American Geographers*, Washinton, D.C., March 2010.

5. **Cao**, G., Kyriakidis,P.C., Goodchild, M.F.: Prediction and simulation in categorical fields: A transition probability combination approach. *The 17th ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems*, Seattle, Washington, November 2009.

4. **Cao**, G., Kyriakidis,P.C., Goodchild, M.F.: Prediction and simulation in categorical fields: A transition probability combination approach. *2009 Annual Conference of the International Association for Mathematical Geosciences*, Stanford, CA, August 2009.

3. **Cao**, G., and Kyriakidis, P.C.: Combining transition probabilities in the prediction and simulation of categorical fields. *105th Annual Meeting of the Association of American Geographers*, Las Vegas, NV, March 2009.

2. **Cao**, G., and Kyriakidis, P.C.: Combining transition probabilities in the prediction and simulation of categorical fields, *The 8th International Symposium on Spatial Accuracy Assessment in Natural Resources and Environmental Sciences*, Shanghai, China, June 2008.

1. **Cao**, G.: Distributed GIS based on Google's MapReduce. *104th Annual Meeting of the Association of American Geographers*, Boston, MA, April 2008.

In Colloquia

5. **Cao**, G.: A Scalable Framework for Scalable Spatiotemporal Analysis of Location-based Social Media Data. *Chinese University of Geosciences*, Wuhan, Hubei, China, June 2014.

4. **Cao**, G.: A Scalable Framework for Scalable Spatiotemporal Analysis of Location-based Social Media Data. *Institute of Geographic Research and Natural Resource Research, Chinese Academy of Sciences*, Beijing, China, June 2014.

3. **Cao**, G.: A geostatistical framework for categorical spatial data modeling. Department of Geography, University of Illinois at Urbana-Champaign, October 2011.

2. **Cao**, G.: Markov chain-based geostatistical methods for modeling categorical spatial data. Geography Department Colloquium, UCSB, October 2007.

1. Marston, J. R., **Cao**, G., Brabyn, J. A. (2010) Accessible maps customized for the visually impaired person. Atlanta Vision Seminar, Atlanta, GA

Teaching

Texas Tech University

3. GEOG 5330: Applied Spatial and Spatiotemporal Analysis
    - Fall 2016, Fall 2017
2. GEOG 3340: Introduction to Human Geography Research
    - Fall 2015
1. GIST 4302/5302: Spatial Analysis and Modeling:
    - Fall 2013, Spring 2014, Fall 2014, Spring 2015, Fall 2015, Spring 2016, Fall 2017, Spring 2018

University of Illinois at Urbana-Champaign

2. Geog 480: Principles of GIS
    - Spring 2013.
1. Course Development of Geog 379 (*on-line course*): Introduction to GIS
    - Summer 2012.

University of California at Santa Barbara

2. TA of Geog 183 (for Prof. Martin Raubal): Cartographic Design and Geovisualization
    - Spring 2008.
1. TA of Geog 172 (for Prof. Phaedon Kyriakidis): Intermediate Geographical Data Analysis
    - Winter 2007.

Advising and Mentoring

(∗∗ indicates serving the Chair of the Committee, and ∗ the co-Chair of the Committee)

Postdoctoral Scholar

1. Dr. Naizhuo Zhao*: Center for Geospatial Technology and Department of Geosciences, Texas Tech (In progress)

Ph.D. Advisees

13. Congliang Zhou **: Department of Geosciences, Texas Tech (in progress).
12. Jimin Chun *: Department of Geosciences, Texas Tech (in progress).
11. Ying Liu**: Department of Geosciences, Texas Tech (Expected in Summer 2018).
10. Hasan Almekdash *: College of Higher Education, Texas Tech (Expected in Summer 2018)
9. Bogdan Duda: Department of Soil and Plant Science, Texas Tech (In progress).

8. Chad Kronkosky: Department of Petroleum Engineering, Texas Tech (In progress).
7. Mehdi Jamali: Department of Civil and Environmental Engineering, Texas Tech (In progress).
6. Prudence Venner: Department of Geosciences, Texas Tech (In progress).
5. Jason Post: Department of Geosciences, Texas Tech (Fall 2017).
4. Thu Nguyen: Department of Geosciences, Texas Tech (Fall 2017).
3. Fahad Abdulaziz F Almutlaq: Department of Geosciences, Texas Tech (Fall 2017).
2. Marina Fisher-Phelps: Department of Biological Sciences, Texas Tech (Fall 2017).
1. Lionel Plummer: Department of Natural Resource Management, Texas Tech (Fall 2014). Dissertation: *An Examination of Hydrologic Restoration Efforts for Wetland Mitigation Banks*.

Ph.D. Dissertation Examiner

1. Azadeh Mousavi: Department of Infrastructure Engineering, University of Melbourne. Dissertation: *Decentralized Data Mining for Event Detection in Spatiotemporal Fields*. (June, 2015)

M.S./M.A. Committees

10. Hannah Greenberg: Department of Environmental Toxicology , Texas Tech (Spring 2018).
9. Alexandria Herdt*: Atmospheric Science, Department of Geosciences, Texas Tech (Summer 2017). Thesis: *A Multi-Index Investigation of the Spatiotemporal Relationships Between Heat andEMS Calls During the 2015 Pan American Games in Toronto, Canada*
8. Ashley Morris**: Geography, Department of Geosciences, Texas Tech (Spring 2017). Thesis: *Mapping Local Community Preparedness to Tornado Hazards in Lubbock, Texas*
7. Vaughn Smith: Department of Natural Resource Management, Texas Tech (Fall 2017).
6. Evan Levine: Geography, Department of Geosciences, Texas Tech (Spring 2016).
5. Feixiong Luo**: Geography, Department of Geosciences, Texas Tech (on leave).
4. Morgan Kraft**: Geography, Department of Geosciences, Texas Tech (Summer 2016).Thesis: *Exploring Biases in Location-Based Social Media A Case Study of Twitter in the 2012 U.S. Presidential Election*.
3. Aaron Hardin: Atmospheric sciences, Department of Geosciences, Texas Tech (Summer 2015). Thesis: *Assessment of Urban Heat Islands During Hot Weather in the U.S. Northeast and Linkages to Microscale Thermal and Radiational Properties*.
2. Jason Post: Geography, Department of Geosciences, Texas Tech (Spring 2014). Thesis: *Environmental Inequality in Lubbock Texas*.
1. Tiffany Lambert: Geography, Department of Geosciences, Texas Tech (Spring 2014). Thesis: *Analysis of Marine Stratus Surges in the Pacific Northwest*.

University Services

Texas Tech University

4. Textbook Committee in the Department of Geosciences
3. Search Committee of Atmospheric Science position in the Department of Geosciences, Spring 2017.
2. Search Committee of Climate Science position in the Department of Geosciences, Spring 2015.
1. Organizer of Geography Seminar in the Department of Geosciences.

University of California at Santa Barbara

3. Graduate representative in the search Committee of GIS position in the Department of Geography.
2. Executive Board of CSSA (Chinese Students and Scholars Association)
1. Executive President of CSSA (Chinese Students and Scholars Association)

Professional Services

Refereeing

Grants

3. NSF GSS Program
2. NSF DIBBS Program
1. Louisiana Board of Regents Support Fund

Journals and Conferences

26. Nature
25. Environmental Science & Technology
24. Atmospheric Environment
23. IEEE Transactions on Parallel and Distributed Systems
22. International Journal of Geographical Information Science
21. Applied Geography
20. Environmetrics
19. The Annals of the American Association of Geographers
18. Transactions in GIS
17. Geoinformatica
16. Journal of Medical Internet Research
15. Journal of Geographical Systems
14. Computers, Environment and Urban Systems

13. Science of Total Environment
12. ISPRS International Journal of Geo-Information
11. Mathematical Geosciences
10. Journal of Marine and Petroleum Geology
9. Arabian Journal of Geosciences
8. International Journal of Remote Sensing
7. Stochastic Environmental Research and Risk Assessment
6. XHPC 2012
5. eScience 2012
4. GIScience 2012
3. The 2nd International Workshop on HPDGIS
2. The International Workshop on Location-based Social Network, 2014, 2015, 2016
1. The 1st International Workshop on Spatiotemporal Computing

Conference Program Committee and Session Organizer

Program Committee

- ACM GIS International Workshop on Location-based Social Networks 2014, 2015, 2016
- CyberGIS Symposium, AAG 2015
- The Third International Conference on CyberGIS and Geospatial Data Science, 2016

Session Organizer

- Computational and Statistical Methods for Spatiotemporal Data Analytics, AAG 2012, 2013
- CyberGIS and Digital Epidemiology, AAG 2014
- CyberGIS and Spatiotemporal Uncertainty, AAG 2015, 2016
- Classification Methods and Accuracy Assessment in Land Cover Mapping, AAG 2016

Professional Society Memberships

- Americal Geophysical Union, 2015-
- ACM SIGSPATIAL, 2009-
- Association of American Geographers (AAG) 2007-
- International Association for Mathematical Geosciences, 2009-2010

Technical Skills

Total Experiences: 10+ years

Programing Languages: C/C++, Java, Matlab/Octave, R, Python, MPI

Programing IDE: Eclipse, Visual Studio, gcc/g++, vim

Operating Systems: Linux/Windows/MacOSX

Software Packages: ArcGIS, GDAL/OGR, OpenLayers, Geoserver, Mapnik, SuperMap

Others: Hadoop (MapReduce), MongoDB, Redis, Hive, MySQL, OpenGL, GSLIB, SGeMS, Latex

Media Mentions

- "40 more maps that explain the world" by Washington Post: the 25th map in https://www.washingtonpost.com/news/worldviews/wp/2014/01/13/40-more-maps-that-explain-the-world/
- http://www.poynter.org/news/mediawire/213847/study-twitter-has-a-distinct-geographic-profile-from-mainstream-media/
- http://globalnews.ca/news/613788/researchers-map-the-geography-of-twitter-with-geo-referencing/
- http://news.abs-cbn.com/lifestyle/06/17/13/manila-among-top-20-most-tweeting-cities