

TONG QIU

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Ecosystem Science & Management
Penn State University
University Park, PA, 16802, USA

EDUCATION

- May 2020 **Ph.D., Geography, University of North Carolina at Chapel Hill, NC, USA**
Dissertation: Characterizing responses of land surface phenology to urbanization, climate change, and extreme weather events using remote sensing and Bayesian models.
Committee: Drs. Conghe Song (chair and adviser), James S. Clark (Duke), Erika Wise, Diego Riveros-Iregui, and Allen Hurlbert (UNC Biology)
- June 2015 **B.Eng., Remote Sensing, Wuhan University, China**
(Graduated with the Highest Honor, GPA Ranking: 1/229)
Thesis: Water body extraction based on ZY-3 satellite imagery
Advisor: Drs. Yue Wang and Zhongqiu Liu

ACADEMIC APPOINTMENTS

- 2022 – **Pennsylvania State University, University Park, PA**
Tenure-track Assistant Professor
- 2020 – 2022 **Duke University, Durham, NC**
Postdoc Associate (NASA-AIST 18-0063, NSF-DEB 1754443)
- 2015 – 2020 **University of North Carolina at Chapel Hill, Chapel Hill, NC**
Instructor (2019 Fall); Graduate research and teaching assistant

PUBLICATIONS

PUBLISHED JOURNAL ARTICLES

2022

T. Qiu, R. Andrus, M.-C. Aravena, D. Ascoli, Y. Bergeron, R. Berretti, D. Berveiller, M. Bogdziewicz, T. Boivin, R. Bonal, D. C. Bragg, T. Caignard, R. Calama, J. J. Camarero, C.-H. Chang-Yang, N. L. Cleavitt, B. Courbaud, F. Courbet, T. Curt, A. J. Das, E. Daskalidou, H. Davi, N. Delpierre, S. Delzon, M. Dietze, S. Donoso Calderon, L. Dormont, J. Espelta, T. J. Fahey, W. Farfan-Rios, C. A. Gehring, G. S. Gilbert, G. Gratzner, C. H. Greenberg, Q. Guo, A. Hackett-Pain, A. Hampe, Q. Han, J. Hille Ris Lambers, K. Hoshizaki, I. Ibanez, J. F. Johnstone, V. Journé, D. Kabeya, C. L. Kilner, T. Kitzberger, J. M.H. Knops, R. K. Kobe, G. Kunstler, J. G.A. Lagueard, J. M. LaMontagne, M. Ledwon, F. Lefevre, T. Leininger, J.-M. Limousin, J. A. Lutz, D. Macias, E. J.B. McIntire, C. M. Moore, E. Moran, R. Motta, J. A. Myers, T. A. Nagel, K. Noguchi, J.-M. Ourcival, R. Parmenter, I. S. Pearse, I. M. Perez-Ramos, L. Piechnik, J. Poulsen, R. Poulton-Kamakura, M. D. Redmond, C. D. Reid, K. C. Rodman, F. Rodriguez-Sanchez, J. D. Sanguinetti, C. L. Scher, W. H. Schlesinger, H. Schmidt Van Marle, B. Seget, S. Sharma, M. Silman, M. A. Steele, N. L. Stephenson, J. N. Straub, I-Fang Sun, S. Sutton, J. J. Swenson, M. Swift, P. A. Thomas, M. Uriarte, G. Vacchiano, T. T. Veblen, A. V. Whipple, T. G. Whitham, A. P. Wion, B. Wright, S. J. Wright, K. Zhu, J. K. Zimmerman, R. Zlotin, M. Zywiec, and J. S. Clark. Limits to reproduction and seed size-number trade-offs that shape forest dominance and future

recovery (2022), *Nature Communication*, 13:2381; doi: 10.1038/s41467-022-30037-9

- [Editors' Highlights](#) and News coverage: [Science Daily](#), [Terra Daily](#), [Phys.org](#), [EurekAlert!](#), [NSF](#), [Mirage News](#), [True Viral News](#), [AZO Cleantech](#), [Thinking port](#), [Duke News](#)

V. Journe, ..., **T. Qiu**, ..., J. S. Clark (101 co-author listed alphabetically, I am one of the five authors that co-write the paper), Globally, tree fecundity exceeds productivity gradients (2022), *Ecology letters*, 25, no. 6, 1471-1482; doi: 10.1111/ele.14012

2021

T. Qiu, M. Aravena, R. Andrus, D. Ascoli, Y. Bergeron, R. Berretti, M. Bogdziewicz, T. Boivin, R. Bonal, T. Caignard, R. Calama, C. Julio, C. Clark, B. Courbaud, S. Delzon, C. Donoso, W. Farfan-Rios, C. Gehring, G. Gilbert, C. Greenberg, Q. Guo, R. Hille, K. Hoshizaki, I. Ibanez, V. Journe, C. Kilner, R. Kobe, W. Koenig, G. Kunstler, J. LaMontagne, M. Ledwon, J. Lutz, R. Motta, J. Myers, T. Nagel, C. Nunez, I. Pearse, L. Piechnik, J. Poulsen, R. Poulton-Kamakura, M. Redmond, C. Reid, K. Rodman, C. Scher, V. Schmidt, B. Seget, S. Sharma, M. Silman, J. Swenson, M. Swift, M. Uriarte, G. Vacchiano, T. Veblen, A. Whipple, T. Whitham, A. Wion, S. Wright, K. Zhu, J. Zimmerman, M. Zywiec, J. S. Clark. Is there tree senescence? The fecundity evidence (2021) *Proceedings of the National Academy of Sciences (PNAS)* 118(34); doi: 10.1073/pnas.2106130118

- [From the Cover](#) and News coverage: [TheScientist](#), [News Break](#), [Phys.org](#), [Le Figaro](#), [Mirage News](#), [Green Report](#), [France Inter](#), [Sciences et Avenir](#), [Duke News](#), [WUSTL News](#)

T. Qiu, S. Sharma, C. Woodall, J. S. Clark. The niche shifts from trees to fecundity to recruitment that determine species redistribution with climate change (2021), *Frontiers in ecology and evolution*; doi: 10.3389/fevo.2021.719141

M. Jiang, Y. He, Y. Pan, **T. Qiu**, S. Tian. Disaggregating climatic and anthropogenic influences on vegetation changes in Beijing-Tianjin-Hebei region of China (2021), *Science of the total environment* 786: 147574; doi: 10.1016/j.scitotenv.2021.147574

2020

T. Qiu, C. Song, J. S. Clark, B. Seyednasrollah, N. Rathnayaka, J. Li. Understanding the continuous phenological development at a daily time step with a Bayesian hierarchical space-time model: impacts of climate change and extreme weathers (2020). *Remote Sensing of Environment* 247: 11956; doi: 10.1016/j.rse.2020.111956

T. Qiu, C. Song, J. Li. Deriving Annual Double-Season Cropland Phenology Using Landsat Imagery (2020). *Remote Sensing*, 12: 3275; doi: 10.3390/rs12203275

T. Qiu, C. Song, Y. Zhang, H. Liu, and J. M. Vose. Urbanization and climate change jointly shift land surface phenology in the mid-latitude large cities (2020), *Remote Sensing of Environment* 236: 111477; doi: 10.1016/j.rse.2019.111477

Q. Zhang, Y. Wang, S. Tao, R.E. Bilborrow, **T. Qiu**, C. Liu, S. Sannigrahi, Q. Li, and C. Song, Divergent socioeconomic-ecological outcomes of China's conversion of cropland to forest program in the subtropical mountainous area and the semi-arid Loess Plateau (2020). *Ecosystem Services* 45: 101167; doi: 10.1016/j.ecoser.2020.101167

2017

T. Qiu, C. Song, and J. Li, Impacts of urbanization on vegetation phenology over the past three decades in Shanghai, China (2017). *Remote Sensing* 9.9: 970; doi:10.3390/rs9090970

MANUSCRIPTS IN REVISION OR UNDER REVIEW

T. Qiu, ..., J. S. Clark (103 authors in total). Mutualist dispersers and the global distribution of masting: mediated by climate and fertility. *Under review, Nature Plants*

T. Qiu, A. Bell, J. J. Swenson, J. S. Clark. Habitat-trait interactions that control response to climate change: North American ground beetles (Carabidae). *Under review, Global Ecology and Biogeography*

MANUSCRIPT IN PROGRESS

T. Qiu, Conghe Song. Projecting future land surface phenology in the Continental United States, *Manuscript ready upon request*

T. Qiu, J. S. Clark, Philip R. Townsend, J. J. Swenson. Combined LiDAR and hyperspectral imagery for landscape forest reproduction across the United States. *Manuscript ready upon request*

T. Qiu, Conghe Song (invited special issue on *remote sensing*). Direct and indirect effects of climate change on crop yield in the corn belts. *Results available upon request*

CONFERENCE ARTICLE AND OTHER PUBLICATIONS

J.J. Swenson, **T. Qiu**, A. Schwantes, C. Kilner, C. Nunez. L. Scher, S. Sharma, and J.S. Clark. Community reorganizing response to climate change: species interactions, state-space model, and food webs. 2020 IEEE International Geoscience and Remote Sensing Symposium (IGARSS)

TEACHING EXPERIENCE

UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL

2019: Instructor of Record

GEOG 391: Quantitative methods for geographers (Fall 2019, 25 students)

- Teaching the concepts of fundamental statistics and their applications, including descriptive statistics, data visualization, probability theory, probability distribution, point estimation, hypothesis testing, ANOVA, and basic spatial statistics.
- Creating slides and notes from scratch
- Designing in-class activities (e.g., simulation games and on-line visualization) to help students better understand statistical concepts.
- Designing and grading five homework, two mid-terms, and one final exam.

Course evaluation: **4.45/5.0**, *report available upon request*

2018 – 2019: Teaching Assistant (*holding office hours and grading*)

GEOG 477: Introduction to Remote Sensing (Fall 2018)

GEOG 577: Advance Remote Sensing (Spring 2018)

GEOG 370: Introduction to Geographic Information (Spring 2019)

2019: Recitation Instructor (*teaching the usage of ArcGIS and leading problem-solving recitations*)

GEOG 370: Introduction to Geographic Information (Spring 2019)

2018: Lab Designer (*writing lab instructions and providing sample codes*)

Advanced course on Google Earth Engine (GEE). Labs (*available upon request*):

- Introduction to JavaScript on GEE platform
- Introduction to Application Programming Interface (API) on GEE platform
- Characteristics and basic operation on Image and Imagecollection on GEE platform
- Spectral transformation on GEE platform
- Time series analysis on GEE platform

2016 – 2020: Guest Lecture

ENVI 558: Image classification on Google Earth Engine (Fall 2020, Fall 2021, Duke)

GEOG 370: Introduction to geographic information (Spring 2019, UNC)

GEOG 577: Advanced Remote Sensing (Spring 2018, Spring 2019, UNC)

GEOG 441: Introduction to Watershed Systems (Spring 2016, UNC)

INVITED TALKS & SCHOLARLY PRESENTATIONS

SELECTED CONFERENCE PRESENTATIONS (only first author presentations are included)

- 2022 **T. Qiu**, A. Bell, J. J. Swenson, J. S. Clark. Habitat-trait interactions that control response to climate change: North American ground beetles (Carabidae), Ecological Society of America annual meeting, Aug. 14th – 19th, (**virtual talk**)
- 2022 **T. Qiu**, “Usage of joint species modeling in understanding regeneration niche shifts”. ESA Statistical Seminar (**invited virtual talk**, Ecological Forecast Seminar, [link](#)).
- 2021 **T. Qiu**, J. S. Clark, P. R. Townsend, J. J. Swenson, “Combined LiDAR and hyperspectral imagery for landscape forest reproduction across the United States”, American Geophysical Union Fall meeting, Dec 13st – 17th (**virtual poster**, [link](#))
- 2021 **T. Qiu**, J. J. Swenson, J. S. Clark, “Combined LiDAR and hyperspectral Imagery in tree reproduction and ground beetle’s abundance modeling”, NASA Biodiversity Forecast Team Meeting, Oct 19th – 21st (**virtual poster**)
- 2021 **T. Qiu**, B. Courbaud, V. Journe, G. Kunstler, C. L. Scher, J. J. Swenson, J. S. Clark, “Global analysis of reproductive investment in trees: effects of soil nutrients, species traits, and phylogeny”, Ecological Society of America annual meeting, Aug. 2rd – 5th, (**virtual talk**)
- 2020 **T. Qiu**, C. Kilner, J. J. Swenson, J. S. Clark, “Dynamic response of ground beetles to climate change and habitat characteristics”, American Geophysical Union Fall meeting, Dec 11st – 16th (**virtual talk**)
- 2020 **T. Qiu**, “Tracking and forecasting the seasonal rhythms of terrestrial ecosystem: insights from remote sensing”, Duke University, Durham, NC, Sep 8th (**invited virtual talk** for University Program in Ecology Seminar)
- 2020 **T. Qiu**, C. L. Scher, M. E. Swift, J. J. Swenson, J. S. Clark, “Capturing emergent interactions that govern food web dynamics with climate change”, Ecological Society of America annual meeting, Aug 3rd – 6th, (**virtual talk**)
- 2019 **T. Qiu**, C. Song, B. Seyednasrollah, N. Rathnayaka, “A Bayesian hierarchical space-time model in characterizing the impacts of climate change and extreme weather events on land surface phenology”, American Geophysical Union Fall meeting, Dec 9th – 13th (**Poster**)
- 2019 **T. Qiu**, “Extraction of Water Bodies using remotely sensed spectral signature: A case study in Wuhan City”, Winston Salem, NC, Feb 27th – Mar 1st (**invited talk** for G. Herbert Stout Award)
- 2019 **T. Qiu**, “The combined effects of urbanization and climate change on vegetation phenology in the northern mid-latitude large cities”, Chapel Hill, NC, Mar. 21st (**invited talk** for UNC Geography Graduate Research Celebration Colloquium)
- 2018 **T. Qiu**, C. Song, Y. Zhang, and H. Liu “Characterizing the impacts of urbanization and climate change on land surface phenology in the Northern Hemisphere. *American Geophysical Union Fall Meeting*, Washington, DC, Dec. 10th –14th, (**poster**)
- 2018 **T. Qiu**, “The usage of remote sensing in understanding our environment”, Chapel Hill, NC, Oct. 26th (**invited talk** for UNC-CH and UNC-G Joint Geography Colloquium)
- 2018 **T. Qiu**, C. Song, Y. Zhang, and H. Liu “How urban vegetation responded to land use change and climate change?” *UNC 6th Annual Climate Change & Resilience Symposium*, Chapel Hill, NC, Apr. 12th (**poster**)

- 2018 T. Qiu, C. Song, “Using Google Earth Engine to estimate impervious surface area in the U.S. big cities.” *1st UNC Google Earth Engine Symposium*, Chapel Hill, NC, Jul. 27th (**talk**)
- 2017 T. Qiu, C. Song, “Understanding the effects of urban expansion on spatio-temporal variations of vegetation phenology at global scale from 1993 to 2014.” *American Geophysical Union 2017 Fall Meeting*, New Orleans, LA, Dec. 11th – 15th (**talk**)
- 2017 T. Qiu, C. Song, J. Li, “Spatial-temporal patterns of landscape phenology in the urban vegetation and the surrounding agricultural regions.” *2017 Annual Meeting of the American Association of Geographers*, Boston, MA, Apr. 5th – 9th (**talk**)
- 2017 T. Qiu, C. Song, J. Li, “Impacts of landscape metrics on vegetation phenology over the past three decades.” *UNC 3rd Annual Climate Change & Resilience Symposium*, Chapel Hill, NC, Mar. 21st (**poster**)
- 2016 T. Qiu, C. Song, J. Li, “Characterizing urbanization effects on landscape phenology along a rural-urban gradient using Landsat time series data.” *American Geophysical Union 2016 Fall Meeting*, San Francisco, CA, Dec. 12nd – 16th (**poster**)
- 2016 T. Qiu, C. Song, J. Li, “Detecting spatial and temporal variation of urban phenology over the past three decades using Landsat time series data.” *2nd Congress of the Society of Urban Ecology*, Shanghai, China, Jul. 7th – 11th (**talk**)

HONORS, AWARDS, & GRANTS

- 2019 Graduate Student Transportation Grant, UNC-Chapel Hill
- 2019 Finalist for 3-minute Thesis Competition, UNC-Chapel Hill
- 2019 James Carlton Ingram Summer Research Fellowship, UNC-Chapel Hill
- 2019 G. Herbert Stout Award for Innovative Use of GIS
- 2016/17/18/19 Conference Travel Award (*five times*), Dept. of Geography, UNC-Chapel Hill
- 2017 Finalist in Student Honors Paper, AAG Remote Sensing Specialty Group
- 2016 Best Student Paper, Second Congress of the Society for Urban Ecology
- 2016 Best Undergraduate Thesis (3%), Hubei Province of China
- 2015 Presidential Fellowship, equivalent to Full-ride Scholarship (0.4%), Wuhan University
- 2015 Geoway Remote Sensing Academic Star (0.4%), Wuhan University
- 2012/13/14 National Fellowship (2%, *three times*), Ministry of Education of China
- 2012/13/14 First-Class Scholarship (5%, *three times*), Wuhan University
- 2013/14 Pacemaker for Outstanding Student (0.4%, *two times*), Wuhan University
- 2012/13/14 Outstanding Student (5%, *three times*), Wuhan University
- 2013/14 Outstanding Engineer Fellowship (10%, awarded a summer school study in the U.K.)
- 2013 Best Group Presentation (10%), The University of Cambridge
- 2012 National Undergraduate Innovative Fellowship (2%), Wuhan University

SERVICE

SERVICE TO DEPARTMENT

2015-2016 Technology committee representative, Department of Geography, UNC Chapel Hill

Ad-hoc REVIEWER

PNAS (2), Remote sensing of environment (4), Agricultural and Forest Meteorology (3), ISPRS Journal of Photogrammetry and Remote sensing (1), Journal of Ecology (1), Remote sensing (17), Forests (4), Science of the Total Environment (3), Global and Planetary Change (1), Frontiers in Environmental Science (1), Journal of Marine Science and Engineering (1), Plos One (2), Sustainability (1), PeerJ (1)

REFERENCES

Dr. Jim Clark (Postdoc advisor),
Nicholas Professor,
Nicholas School of the Environment,
Duke University, jimclark@duke.edu
Tel: 919-613-8036
<https://sites.nicholas.duke.edu/clarklab/>

Dr. Conghe Song (Ph.D. advisor),
Professor,
Department of Geography,
UNC-Chapel Hill, csong@email.unc.edu,
Tel: 919-843-4764
<http://csong.web.unc.edu/>

Dr. Diego Riveros-Iregui (Ph.D. Committee)
Bowman and Gordon Gray Distinguished Professor,
Department of Geography,
UNC-Chapel Hill, diegori@email.unc.edu,
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