

Chonggang XU

Staff Scientist II

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EDUCATION

- May 2009** **PhD in Modeling & Quantitative Analysis**
Department of Natural Resources and Environmental Sciences
University of Illinois at Urbana-Champaign, Urbana, IL
Dissertation title: "Understanding Forest Landscape Response to Global Climatic Change: An Uncertainty Evaluation Based on Spatial Modeling"
Advisor: George Z. Gertner
- May 2008** **MS in Statistics**
University of Illinois at Urbana-Champaign, IL
- July 2000** **BS in Ecology**
Northeast Normal University, Changchun, China

RESEARCH EXPERIENCES

- Sep 2011– Current** **Staff Scientist II**
Division of Earth and Environmental Sciences
Los Alamos National Laboratory
- May 2010 – Sep 2011** **Post-doctoral Fellow**
Division of Earth and Environmental Sciences
Los Alamos National Laboratory
Position involved integrating a permafrost model (ARCHY) and a dynamic vegetation model (ED) aimed to understand the interactions between permafrost thawing and vegetation growth under future climatic change, data assimilation and uncertainty analysis by integrating the ARCHY-ED model with remote sensing, forest inventory, and eddy flux tower data.
- May 2009 - May 2010** **Post-doctoral Fellow**
Department of Entomology and Center for Quantitative Sciences in Biomedicine,
North Carolina State University

Position involved building and testing stochastic, spatially explicit simulation models that link insect population dynamics, disease epidemiology, and population genetics aimed to release transgenic mosquitoes to reduce the incidence of human disease.
- Sep. 2000 - Aug. 2004** **Research Assistant**
Institute of Applied Ecology, Chinese Academy of Sciences, Shenyang, China.

Position involved model parameterization and uncertainty analysis for a spatially explicit landscape model application in Northeastern China. Other responsibility includes data management, remote sensing classification and field sampling.

RELEVANT EXTRACURRICULAR ACTIVITIES

- Feb 2011-Current** **Deputy Coordinator**, the International Union of Forest Research Organizations (IUFRO) Working Party 4.03.01: Uncertainty analyses of spatial and non-spatial models
- Jul. 2008 - Aug. 2008** **Statistical Analysis Internship**
ImageTree Corporation, USA
- Position involved uncertainty evaluation for an LIDAR and Infrared based forest inventory system.
- Mar. 2004 - Aug. 2004** **GIS Consultant**
Information Center in Chinese State Environmental Protection Administration (SEPA) at Liaoning Province, Shenyang, China
- Position involved building criteria to collect pollution data for better data management at the provincial level and providing GIS consultancy for the 14 regional cities in Liaoning Province to Information Center data managers at the Environmental Protection Administration.
- 2004 - 2011** **Journal Reviewer**
Ecological Applications
Landscape Ecology(6)
Global Change Biology
Canadian Journal of Forest Research
Computational Statistics and Data Analysis
Reliability Engineering and System Safety
International Journal of Geographic Information System,
Land Use Policy
Applied Mathematical Modeling
Industrial & Engineering Chemistry Research
Environmental Monitoring and Assessment
Plos One, Okios, Ecosphere, Computer Physics Communications
Climatic Change
- Grant Reviewer: NSF, DOE EARLY AWARD**

TEACHING EXPERIENCES

- As a GIS consultant for Information Center in Chinese State Environmental Protection Administration at Liaoning Province (2004), I taught pollution data management using ARCMAP and MS ACCESS during a two-week workshop (about 20-30 persons).
- I have been a teaching assistant for the course Quantitative Methods in Natural Resources and Environmental Sciences for spring 2008. During the course, I helped the weekly LAB sessions and independently lectured for two weeks about ecological modeling.
- I have lectured and organized lab sessions for the course Earth System Modeling to teach uncertainty and sensitivity analysis for one week period in fall 2007.

HONORS AND AWARDS

- PhD Student Research Award (awarded to one outstanding PhD student every year out of ~250 PhD students), College of Agricultural, Consumer and Environmental Sciences, University of Illinois at Urbana-Champaign, 2008.
- Spaeth & Boggess Graduate Fellowship, University of Illinois at Urbana-Champaign, 2006.
- Winner of the Student Paper Competition for the Bohrer Statistic Workshop, University of Illinois at Urbana-Champaign, 2006.
- Honor of Sigma Alpha Gamma Membership, University of Illinois at Urbana-Champaign, 2005.
- Spaeth & Boggess Graduate Fellowship, University of Illinois at Urbana-Champaign, 2004.

RESEARCH INTERESTS

Methodology Bayesian Data Analysis
 Model Uncertainty & Sensitivity Analysis
 Spatial-Temporal Modeling (state-space based data assimilation)
 Semi-supervised Learning
 Computational Statistics
 Spatial Statistics

Applications Dynamic Vegetation Modeling
 Carbon Cycle Modeling
 Global Change Biology/Forest Ecology
 Landscape/Spatial Ecology
 Spatial Epidemiology
 GIS & Remote Sensing

SKILLS

Programming/Software *SAS, Matlab, C/C++/C#, Fortran, Excel, ACCESS, R/S-Plus, ArcMap 9.0, Erdas 8.0, Stella and Vensim, WinBugs, GsLib, Python*

Modeling Techniques Spatial modeling using GIS, Statistical modeling using SAS and R, System dynamic modeling using Stella and Vensim, Matrix population modeling, General modeling using C/C++/C#

Quantitative Analysis Techniques Uncertainty and sensitivity analysis, Bayesian data analysis (especially Hierarchical Bayesian modeling and Bayesian network), Data mining (especially classification & clustering), Categorical data analysis, Multivariate analysis, Time series analysis, Spatial data analysis (Geostatistics & Point pattern analysis), Dominant loop analysis, Computational statistics (e.g., Markov Chain, Monte-Carlo Method, E-M algorithm and Kalman Filter), Longitudinal data analysis, Hierarchical linear modeling, Bioinformatics (especially DNA microarray data analysis)

PROFESSIONAL MEMBERSHIPS

Ecological Society of America (2007-present)
International Association of Landscape Ecology (2003-present)

RESEARCH/GRANTS INVOLVED (in total of ~\$50 Million)

1. Next Generation Carbon-Nitrogen Model

July 2012- July 2015

Funding: UC Laboratory Fee, \$ 1 million; PI: Chonggang Xu; Co-PI: Jasper Vrugt

The impact of energy use on climate depends in large part on the response of terrestrial ecosystems that regulate atmospheric CO₂ and climate through exchange and storage of carbon and energy. Nitrogen is a dominant regulator of vegetation dynamics and the terrestrial carbon cycle, yet rather simplistic empirical-type models are still used to predict the effect of nitrogen limitation and light competition on vegetation growth. Therefore, a large uncertainty exists in the current simulation of nitrogen related processes (e.g., photosynthesis and soil carbon storage response to nitrogen addition), which substantially affects the reliability of predicted terrestrial carbon fluxes. To reliably assess energy impacts on the global carbon cycle and future climates, we propose to develop, test, and calibrate a next generation carbon-nitrogen dynamics model and integrate this model into the Community Earth System Model (CESM) developed mainly by the National Center of Atmospheric Research (NCAR), Los Alamos National Laboratory (LANL) and many other universities. Our dynamic carbon-nitrogen model will incorporate recent advances in nitrogen modeling and use recent advances in Markov Chain Monte Carlo simulation to rigorously calibrate and evaluate the developed model against observations, including soil fertilization and free air CO₂ enrichment (FACE) observations across a range of different forest types. The calibrated model will be used to assess the effects of different energy use scenarios on global climates.

Role: PI

2. Next Generation Ecosystem Experiments in the Arctic

Oct 2011 -2014

Funding: DOE office of science, \$24 million (8 million per year for 3 years for Phase I and potential extension with another 7 years of Phase); PI: Stan Wullschlegler (ORNL)

This is a joint project among 3 major national labs: Los Alamos National Lab, Oak Ridge National Lab and Lawrence Berkeley National Laboratory. The target of the project is to conduct large-scale warming experiment in the arctic for a better understanding of subsurface, geophysics, ecosystem and landscape dynamics. The NCAR CLM will be used to direct the experimental research and integrate new insights from the experiments. I am involved in vegetation dynamic modeling and synthesis.

Role: Co-investigator and the lead modeler in the dynamic vegetation theme

3. Terrestrial Vegetation, CO₂ Emissions, and Climate Dynamics (co-I)

Oct 2010-present

Funding: LANL, \$ 5 million, PI: Nathan McDowell

I am responsible for data assimilation and uncertainty analysis by integrating the ARCHY-ED model with remote sensing (QUICK Bird and MODIS data), forest inventory, and eddy flux tower data to better understand and predict drought-related mortality and the resulting effects on global carbon cycle.

Role: Co-I, Lead of vegetation modeling and uncertainty analysis

4. Predicting Climate Impacts and Feedbacks in the Terrestrial Arctic

Oct 2011 –Current

Funding: LANL, \$ 5 million, PI: Scott Painter

Develop an advanced Arctic Terrestrial Simulator (ATS) for modeling the complex interactions among thermal, mechanical, biogeochemical, ecological and hydrologic permafrost processes. I am responsible for biogeochemical cycle modeling.

Role: Co-Investigator, Lead of BGC modeling

5. Quantification and reduction of critical uncertainties associated with carbon cycle – climate system feedbacks, May 2010- May 2013

Funding: DOE Office of Science, \$3 million, PI: Peter Thornton, Co-PI: Nathan McDowell

Our objectives in this project are: 1) to quantify critical uncertainties in global-scale climate predictions associated with carbon-climate feedbacks; 2) to improve our understanding and model representation of processes controlling these feedbacks through zonally-specific model-data evaluation exercises; and 3) to extend our data-based evaluation to quantification of carbon-climate feedback responses and uncertainties in the large population of global scale carbon-climate models contributing to the Fifth Climate Model Intercomparison Project (CMIP5). I am responsible to improve the nitrogen effect on soil respirations in the NCAR CLM model by integrating that with observational data.

Role: Co-Investigator

6. Regional Climate Modeling, May 2010-Sep 2011

Funding: DOE \$ 6 million, PI: Cathy Wilson, Co-PI: Nathan McDowell

I am responsible for coupling a 3-D soil hydrological model (ARCHY) and a mechanistic vegetation dynamic model (ED) to understand the interactions between permafrost thawing and vegetation growth under the context of global climatic change.

Role: Post-doctoral Fellow

7. Improving Robustness of a Tactical Model of *Aedes*/Dengue Dynamics 2011-2015

Funding: NIH (\$346,867, 1R01AI091980-01, PI: Fred Gould, North Carolina State University)

I am responsible for model-data integration including parameter estimation, uncertainty analysis and model improvements with new field and experimental data collected from sites from New Mexico, Australia and Peru.

Role: Collaborator, I have been mainly involved in the proposal writing.

8. Population Genetics of Transgenes in Mosquito Vectors May 2009-May 2010

Funding: NIH (R01-AI54954-01A2, \$750,000, PI: Fred Gould, North Carolina State University)

The goal of my task is to quantify uncertainties in the equilibrium population dynamics predicted from a spatial model of mosquito population (Skeeter-Buster) in its application to the Iquitos city in Peru.

Uncertainties in the model predictions come from two major sources: 1) uncertainties in the estimation of 67 parameters accounting for mosquito survival, development, fecundity, environmental thresholds, and spatial dispersal; and 2) uncertainty due to simulated environmental and demographic stochasticity.

Role: Post-doctoral Fellow

9. Forest Landscape Dynamics Under Climate Change **2004-2009**

Funding: USDA McIntire-Stennis funds (MS 875-359, PI: George Gertner, University of Illinois at Urbana-Champaign)

The goal of my task is to examine the potential forest landscape response to climatic change based on a hierarchical response of ecosystem at different levels, including species physiology (e.g. net primary production) and seedling establishment change at the species level, the colonization and competition processes modification at the forest succession level, the species composition change at the community level and finally the landscape pattern change at the landscape level. For this purpose, I have used different statistical methods to examine how lower-scale processes can affect the higher-scale processes and patterns through a coupled modeling system by a forest landscape model (LANDIS-II) and a forest ecosystem process model (PnET-II: include water, carbon and nutrient cycle processes).

Role: Research Assistant

10. Uncertainty and Sensitivity Analysis Methodology Development **2004-2009**

Funding: U.S. Army Corps of Engineers Construction Engineering Research Laboratory (CERL W9132T-06-2-0001, PI: George Gertner, University of Illinois at Urbana-Champaign)

Uncertainty and sensitivity analysis is a statistical method to assess how much uncertainty there is in the model prediction and where the uncertainty comes from. Uncertainty and sensitivity analysis can help scientists target at processes/parameters that make large contributions to ecological/environmental system prediction, which can be very useful for natural resources conservation, management, and general understanding of ecological processes. The previous methods for model uncertainty and sensitivity analysis are commonly based on the assumptions of parameter independence. However, for most of the realistic model applications, the parameters are correlated. The goal of my task is to develop uncertainty and sensitivity methods for models with correlated parameters.

Role: Research Assistant

11. Forest Landscape Modeling in Northeastern China **2000-2004**

Funding: Chinese Academy of Sciences (\$300, 000, PIs: Hong S He and Yunman Hu)

This project is targeted to understand the forest landscape dynamics in both natural and managed forests using a forest landscape model of forest succession, disturbances and management (LANDIS 3.7). I was involved in model parameterization (designed a stochastic algorithm to assign forest stand-based age and species information to individual cell/sites and remote sensing classification), uncertainty and sensitivity analysis, and assessing the forest landscape change under harvesting and fire disturbances.

Role: Research Assistant

12. Soil Erosion and Non-point Pollution **1999-2000**

Funding: Chinese Academy of Sciences (PI: Ning Wang, Northeast Normal University, Changchun, China)

This project is targeted to assess the nitrogen loss as a result of soil erosion in the Songhua watershed, Jilin Province, China. I used ARC/INFO to digitize the topographic maps, based on which I estimated elevations and slopes. After combining the vegetation map, soil type map and precipitation data, I applied the Universal Soil Loss Equation to estimate the soil loss and the corresponding nitrogen release into the Songhua River.

Role: Undergraduate Research Assistant

PUBLICATIONS

Citation # and JIF (Journal Impact Factor) are from all database of Web of Knowledge, June 29, 2012, citations from Google scholar is > 400.

1. **Xu, C.,**R. Fisher, S. Wullschleger, C. Wilson, M. Cai, and N. McDowell. Toward a mechanistic modeling of nitrogen limitation on vegetation dynamics. PLoS ONE 7: e37914 (**JIF=4.411**, Ranked 12/86 in subject category: Biology).
2. **Xu, C.** Decoupling correlated and uncorrelated uncertainty contributions for nonlinear models with correlated parameters. Applied Mathematical Modelling (In Revision).
3. Williams, PA, **C Xu**, N. McDowell. 2012. Who is the new sheriff in town regulating boreal forest growth? Environmental Research Letters 6: 041004 (**JIF=3.049**, Ranked 33/193 in subject category: Environmental Sciences).
4. **Xu, C.,** G. Z. Gertner, and R. M. Scheller. 2012. Importance of colonization and competition in forest landscape response to global climatic change. Climatic Change 110:53–83 (**JIF=3.016**, Ranked 35/195 in subject category: Environmental Sciences).
5. **Xu, C.,** C. Liang, S. Wullschleger, C. Wilson, and N. McDowell 2011. Importance of feedback loop between soil inorganic nitrogen and microbial community in the heterotrophic soil respiration response to global warming. Nature Reviews Microbiology 9 (3): 222-223 (**JIF= 20.686**, number one monthly review journal in the field of microbiology).
6. **Xu, C.,** G. Z. Gertner. 2011. Understanding and comparisons of different sampling approaches for the Fourier Amplitudes Sensitivity Test (FAST). Computational Statistics and Data Analysis 55: 184-198 (**JIF= 1.089**, the Official Journal of the International Association for Statistical Computing, ranks 41/110 in subject category: Statistics and Probability).
7. **Xu, C.,** G. Z. Gertner. 2011. Reliability of global sensitivity indices. Journal of Statistical Computation and Simulation 81:1939-1969.
8. Legros, M., K. Magori, A. C. Morrison, **C. Xu**, T. W. Scott, A. L. Lloyd, F. Gould. 2011. Evaluation of location specific predictions by a detailed simulation model of *Aedes aegypti* populations. PLoS ONE 6: e22701 (**JIF=4.411**, Ranked 12/86 in subject category: Biology).
9. **Xu, C.,** G. Z. Gertner, B. Güneralp, and R. M. Scheller. 2010. Elasticity and loop analysis: tools for understanding forest landscape response to climatic change in spatial dynamic models. Landscape Ecology 25: 855-871 (**JIF= 3.200**, the Official Journal of International Association of Landscape Ecology, ranks 17 of 167 in subject category: Geosciences, Multidisciplinary).
10. **Xu, C.,** M. Legros, F. Gould, A.L. Lloyd. 2010. Understanding uncertainties in model-based predictions of *Aedes aegypti* population dynamics. Plos Neglected Tropical Diseases 4(9): e830 (**JIF= 4.752**, ranks 1 of 19 in subject category: Tropical Medicine)
11. **Xu, C.,** G. Z. Gertner, and R. M. Scheller. 2009. Uncertainty in the response of a forest landscape to global climatic change. Global Change Biology 15, 116–131(**Times Cited: 20, JIF=6.346**, ranks 3/193 in subject category: Environmental Sciences).

12. **Xu, C., G. Z. Gertner.**2009.Uncertainty analysis of transient population dynamics. Ecological Modelling. **220**: 283-293 (**JIF=1.769**, the most prestigious journal of modeling in ecology, ranks 68/130 in subject category: Ecology).
13. Li, Q., **C. Xu**, W. Liang, S. Zhong, X. Zheng, and J. Zhu. 2009. Residue incorporation and N fertilization affect the response of soil nematodes to the elevated CO₂ in a Chinese wheat field. Soil Biology & Biochemistry **41**: 1497–1503. (**Times Cited: 14, JIF= 3.424**, ranks 1/32 in subject category: Soil Sciences).
14. **Xu, C., G. Z. Gertner.** 2008. A general first-order global sensitivity analysis method. Reliability Engineering and System Safety **93**:1060-1071 (**Times Cited: 11, JIF= 1.899**, ranks 4 /38 in subject category: Industrial, Engineering).
15. **Xu, C., G. Z. Gertner.** 2008. Uncertainty and sensitivity analysis for models with correlated parameters. Reliability Engineering and System Safety **93**:1563-1573 (**Times Cited: 17, JIF= 1.899**, ranks 4 /38 in subject category: Industrial, Engineering).
16. Wang, J.S., D. A. Grimley, **C. Xu**, and J. O. Dawson. 2008. Soil magnetic susceptibility reflects soil moisture regimes and the adaptability of tree species to these regimes. Forest Ecology and Management **255**:1664-1673.(**JIF= 1.992**, ranks 6/54 in subject category: Forestry)
17. **Xu, C., G. Z. Gertner.** 2007. Extending a global sensitivity analysis technique to models with correlated parameters. Computational Statistics and Data Analysis **51**:5579-5590 (**Times Cited: 15, JIF= 1.089**, the Official Journal of the International Association for Statistical Computing, ranks 41/110 in subject category: Statistics and Probability).
18. **Xu, C., G. Z. Gertner,** and R. M. Scheller. 2007. Potential effects of interaction between CO₂ and temperature on forest landscape response to global warming. Global Change Biology **13**:1469–1483 (**Times Cited: 22, JIF=6.346**, ranks 3/193 in subject category: Environmental Sciences).
19. Chen, M., **C. Xu**, and R. Wang. 2007. Key natural impacting factors of China’s human population distribution. Population & Environment **28**:187-200.
20. Chang, Y., H. S. He, Y. Hu, R. Bu, **C. Xu**, X. Li 2007. Long-term forest landscape responses to fire exclusion in the Great Xing’an Mountains, China. International Journal of Wildland Fire **16**: 34-44 (**Times Cited: 17, JIF=2.215**, Ranked 5/54 in subject category: Forestry).
21. Liu, M., Y. Hu, X. Li, H. S. He, **C. Xu**, W. Zhang. 2007. Ecological footprint and biological capacity time series assessment for a forest region in northeastern China. The International Journal of Sustainable Development and World Ecology **14**: 493-502.
22. Zhang, W., Y. Hu, B. Chen, Z. Tang, **C. Xu**, D. Qi, J. Hu. 2007. Evaluation of habitat fragmentation of giant panda (*Ailuropoda melanoleuca*) on the north slopes of Daxiangling Mountains, Sichuan province, China. Animal Biology **57**:485-500.
23. Chen, M., R. Wang, L. Zhang, **C. Xu**. 2006. Temporal and spatial assessment of natural resource use in China using ecological footprint method. The International Journal of Sustainable Development and World Ecology **13**: 255-268 (Times Cited: 5).
24. Wang, X., H. S. He, X. Li, Y. Chang, Y. Hu, **C. Xu**, R. Bu ; F. Xie. 2006. Simulating the effects of reforestation on a large catastrophic fire burned landscape in Northeastern China. Forest Ecology and Management **225**:82-93 (Times Cited: 15).
25. **Xu, C., H. S. He, Y. Hu, Y. Chang, X. Li, R. Bu.** 2005. Latin hypercube sampling and geostatistical modeling of spatial uncertainty in forest landscape model simulation. Ecological Modelling **185**:255-269 (**Times Cited: 20, JIF=1.769**, the most prestigious journal of modeling in ecology, ranks 68/130 in subject category: Ecology).
26. **Xu, C., H. S. He, Y. Hu, Y. Chang, D. R. Larsen, X. Li, R. Bu.** 2004. Assessing the effect of cell-level uncertainty on a forest landscape model simulation in northeastern China. Ecological Modelling **180**:57-72 (**Times Cited: 40, JIF=1.769**, the most prestigious journal of modeling in ecology, ranks 68/130 in subject category: Ecology).
27. **Xu, C., Y. Hu, Y. Chang, et al.** 2004. Sensitivity analysis in ecological modeling. Chinese Journal of Applied Ecology. **15(6)**:1056-1062 (In Chinese with English Abstract).

28. **Xu, C.**, Y. Hu, Y. Chang, *et al.* 2004. Mechanism and application of spatially explicit landscape model: I. Mechanism. Chinese Journal of Applied Ecology. **15(5)**: 837-844 (In Chinese with English Abstract).
29. Hu, Y., **C. Xu**, Y. Chang, *et al.* 2004. Mechanism and application of spatially explicit landscape model - LANDIS: II. A case study in Huzhong Area in Da Hinggan Ling. Acta Ecologica Sinica, **24(9)**: 1846-1857 (In Chinese with English Abstract).
30. **Xu, C.**, Y. Hu, Y. Chang, *et al.* 2004. Linking RUSLE with a spatially explicit forest landscape model to simulate the soil erosion in the boreal forest land in northeastern China. Chinese Journal of Applied Ecology. **15(10)**: 1821-1828 (In Chinese with English Abstract).
31. **Xu, C.**, Y. Hu, Y. Chang, *et al.* 2004. Study of the effect of cell-level uncertainty on the forest landscape model simulation. Acta Ecologica Sinica. **24(9)**: 1938-1950 (In Chinese with English Abstract).
32. **Xu, C.**, Y. Hu, Y. Chang, *et al.* 2004. The application of spatially explicit landscape model in the soil loss study. Chinese Journal of Applied Ecology. **15(10)**: 1821-1828 (In Chinese with English Abstract).
33. Li, X., R. Bu, Y. Chang, Y. Hu, Q. Wen, X. Wang, **C. Xu**, *et al.* 2004. The response of landscape metrics against pattern scenarios. Ecological Sinica. **24(1)**:123-134 (In Chinese with English Abstract).
34. Liu, M., Y. Hu, **C. Xu**, 2003. Quantitative study of forest soil erosion based on GIS, RS and RUSLE. Research of Soil and Water Conservation. **11(3)**: 21-24 (In Chinese with English Abstract).
35. **Xu, C.**, Y. Hu, Y. Jiang, *et al.* 2003. Principles and methods of spatially explicit landscape model validation. Chinese Journal of Ecology. **22(6)**:127-131 (In Chinese with English Abstract).
36. Chang, Y., R. Bu, Y. Hu, **C. Xu**. 2003. Quantitative determination of landscape boundary between Mountain Birch and Tundra in the northern slope of Changbai Mountain. Scientia Geographica Sinica. **23(4)**: 477-483 (In Chinese with English Abstract).
37. Chang, Y., R. Bu, Y. Hu, **C. Xu**. 2003. Using GIS and RS to determine the abiotic range of forest landscapes distribution in Changbai Mountain Natural Reserve. Chinese Journal of Applied Ecology. **14(5)**: 671-675 (In Chinese with English Abstract).
38. Chang, Y., Y. Li, Y. Hu, **C. Xu**. 2003. The preliminary reconstruction of historical forest landscapes in Changbai Mountain Natural Reserve. Quaternary Science. **23(3)**:73-81(In Chinese with English Abstract).
39. Hu, Y., **C. Xu**, R. Bu, Y. Chang, 2002. Application of Remote Sensing and GIS to the study of heat island effect in City - a case study in Shenyang. Environmental Protection Science. **28(2)**:1-3 (In Chinese with English Abstract).
40. Wang N., Y. Zhu, **C. Xu**. 2001. The application of GIS to the quantitative study of pollutant in a drainage area. Journal of Northeast Normal University (NATURAL SCIENCE EDITION). **34(2)**:84-92 (In Chinese with English Abstract).

Software Manual

- Xu, C.**, G. Z. Gertner. 2007. UASA Toolbox—Uncertainty and Sensitivity Analysis Toolbox. Version 0.9.1.0. <http://xuchongang.googlepages.com/uasatoolbox>.
- Xi, W., **C. Xu**. 2010. PnET-II for LANDIS-II 5.1 User Guide. Pp. 15. <https://sites.google.com/site/xuchongang/pnetiiforlandisii>

Reports

- Xu, C.**, G. Z. Gertner and G. Wang. 2008. Uncertainty Analysis for the LIDAR-based Forest Inventory System. ImageTree Corporation Report.

CONFERENCE PRESENTATIONS/POSTERS

1. **Xu, C.**, Fisher, R., Wilson, C., and McDowell, N. Toward a mechanistic nitrogen limitation on a dynamic vegetation model. NCAR CLM workshop. Boulder, CO. March 19-21, 2012 (Oral Presentation).

2. **Xu, C.**, Fisher, R., and McDowell, N. Uncertainty quantification using the Ecosystem Demography model. Workshop on forest mortality. Santa Fe, NM. November 1-3, 2011(**Invited Oral Presentation**).
3. **Xu, C.**, Travis, B., Fisher, R., Wilson, C., and McDowell, N. A dynamic ecosystem process model for understanding interactions between permafrost thawing and vegetation responses in the arctic. AGU Fall meeting 2010, Dec 13-17, 2010, San Francisco, CA (Poster).
4. **Xu, C.***, Legros, M, Lloyd, A.L., Gould, F. Uncertainty analysis of an *Aedes aegypti* population model. NIH RAPIDD Workshop on Model Complexity and Dimension Reduction. March 25-26, 2010, Washington DC (**Invited Oral Presentation**).
5. **Xu, C.***, Legros, M, Lloyd, A.L., Gould, F. Understanding uncertainties in the equilibrium population dynamic of *Aedes aegypti*: a model-based analysis. The *American Society of Tropical Medicine and Hygiene (ASTMH)* Conference, November 18-22, 2009, Washington, D.C. USA (Poster).
6. **Xu, C.***, G. Z. Gertner and R.M. Scheller. Pathways of forest landscape response to climatic change: competition or colonization. Ecological Society of America (ESA) Annual Conference. August 1-8, 2008, Milwaukee, WI (Oral Presentation).
7. **Xu, C.***, G. Z. Gertner and R.M. Scheller. Pathways of forest landscape response to climatic change: competition or colonization. GEEB symposium. February 9, 2008, University of Illinois at Urbana-Champaign (Oral Presentation).
8. **Xu, C.***, B. Güneralp, G. Z. Gertner and R.M. Scheller. Elasticity and loop analysis: Tools for understanding forest landscape response to climatic change in spatial dynamic models. US-IALE 23rd Annual Landscape Ecology Symposium Landscape Patterns and Ecosystem Processes. Madison, Wisconsin. April 6-10, 2008 (Oral Presentation)
9. **Xu, C.***, G. Z. Gertner and R.M. Scheller. Uncertainty in forest landscape response to climatic change. LANDIS-II Workshop, Rhinelander, WI, October 15-17, 2007 (**Invited Oral Presentation**).
10. **Xu, C.***, G. Z. Gertner and R.M. Scheller. Uncertainty in forest landscape response to climatic change (Session: COS 102). The ESA/SER Joint Meeting, August 5-10, 2007, San Jose, CA, USA (Oral Presentation).
11. **Xu, C.** and G.Z. Gertner *. A general first-order global sensitivity analysis method. Fifth International Conference on Sensitivity Analysis of Model Output. Budapest, Hungary, June 18-22, 2007 (Oral Presentation).
12. **Xu, C.***, G. Z. Gertner, R.M. Scheller, B. Güneralp. LANDIS evaluation and applications. LANDIS-II Model Workshop in Madison, WI, October 30 - November 1, 2006 (Oral Presentation).
13. **Xu, C.*** and G. Z. Gertner. Computational improvement of a global sensitivity analysis technique: Fourier Amplitude Sensitivity Test. Bohrer Workshop, UIUC, April 15, 2006 (**Invited Oral Presentation**).
14. **Xu, C.***, Y. Hu, Y. Chang, *et al.* The application of spatially explicit landscape model in the soil loss study. The Fourth Chinese Association of Landscape Ecology Congress, Beijing, China, December 12-15, 2003 (Oral Presentation).
15. **Xu, C.***, H.S. He, Y. Hu, *et al.* Assessing the effect of cell-level uncertainty on a forest landscape model simulation in northeastern China. International Association of Landscape Ecology 2003 Congress, Darwin, Australia, July 13-17, 2003 (Oral Presentation and Poster).