ZEWEI MIAO, PH.D.

Global Environment & Modeling • Monsanto • 700 Chesterfield Parkway West, Chesterfield, MO 63017 • 636-7371999 (O)/ 217-8199287 (M) • miaozewei@gmail.com

Career Goal

- To gain a position as faculty, research scientist, research engineer or technology manager at a university, private firm, governmental or non-governmental organization.

Research Areas

Meta-data analysis including data mining, fusing, assimilating, bootstrapping and machine learning; ecological modelling; geographic information system (GIS), remote sensing (RS), spatio-temporal data analysis; sustainable water use and pesticide/herbicide fate simulation; biomass feedstock mechanical pre-processing, handling and supply logistics.

Education

- **Post-doctorate**, Research Centre for Eco-Environmental Sciences, Chinese Academy of Sciences, Beijing, China. July 1998
- **Ph.D.,** Agro-ecological Institute, Zhejiang University, Hangzhou, China. July 1996
- **M.Sc.** & **B.Sc.** in Agroecology and agronomy, Department of Agronomy, Hebei Agricultural University, Baoding, China. July 1993 and 1990

Work Experience

- **Global environmental modeling scientist (contractor),** Monsanto Company, Chesterfield, Missouri. April 2015~ present

  --Meta-data analysis, spatio-temporal data analysis, corn growth and harvest predictions with Python, R, Sqlite, Gdal, SQL, and ArcGIS;

- **Research scientist and data analyst**, Nicholas School of the Environment, Duke University, Durham, North Carolina. April 2014 ~ March 2015

  --Meta-data analysis of west African tropical forestry ecosystems including data mining, fusing, anomaly detection, spatial analyzing, non-linear curve fitting, spatial-auto-correlation analysis, bootstrapping, Monte Carlo simulating. I developed 8000+ lines R program to assimilate the database, calculate and plot our results;

  --With ArcGIS python, I developed a program to design wildlife monitoring transects and forest degradation transects;

  --With R and ArcGIS, developed a linear model and mapped forestry biomass production and its relationships with environmental variables and disturbances.

- **Visiting research assistant professor**, Energy Biosciences Institute, University of Illinois at Urbana-Champaign, Urbana, Illinois. June 2008~May 2014

  --Data analysis and interpretations of the experimental results with MatLab;

  --With Pro-E and SolidWorks software, design conceptual prototype of biomass processing and transportation equipment;

  --Combining with Google Map API, I involved in development of web-based transportation management systems;

--Biomass feedstock mechanical preprocessing, handling, biomass property, digestibility sensing technology, supply logistics and modeling.

- **Research associate**, Grant F. Walton Centre for Remote Sensing and Spatial Analysis, Rutgers University, New Brunswick, New Jersey. June 2005~ May 2008
  --With UNIX-based parallel computation technology, improved and calibrated the WxBGC terrestrial ecological model of New Jersey Pinelands by combining GIS, remote sensing and GPS data. This included text analytics and EFAST (Extended Fourier Amplitude Sensitivity Test). The work was based on Microsoft C platform.
  --With R and ArcGIS, developed general additive model, logistic model, machine learning models (CART (classification and regression trees) and RandomForest models for the Kirkwood-Cohansey Aquifer Project funded by the State Government of New Jersey. The meta-data analysis included text analytics, collaborative filtering, anomaly detection, time-series optimization, and spatial-autocorrelation analysis.
  --With SAS, Microsoft Access and ArcGIS, processed US STATSGO, SSURGO, and ISRIC (International Soil Reference and Information Centre) soil data;
  --Developed a SAS-based plant photosynthesis curve model.

- **Research associate**, Department of Biology & the McGill School of Environment, McGill University, Montréal, Québec, Canada. August 2004~ June 2005
  --With Microsoft Visual Basic, developed a stochastic spread ecological model of alien invasion for the USDA ERS (Economic Research Service) project;

- **Postdoctoral fellow**, Northern Forestry Centre, Canadian Forest Service, Natural Resources Canada (Government of Canada), and Department of Renewable Resources, University of Alberta, Edmonton, Alberta, Canada. October 2002~ July 2004
  --With ArcInfo AML and SAS, predicted response of biomass growth to climate change and developed GIS-based non-timber value models for the PERD-CCIES project (the Canadian Federal Panel on Energy Research and Development--Climate Change Impact on Energy Sector)

- **Visiting professor and research associate**, Institute of Agricultural and Environmental Chemistry, Università Cattolica del Sacro Cuore (University of Catholic), Piacenza, Italy. January 2001~October 2002
  --With FORTRAN, improved and validated numerous pesticide/herbicide fate models in paddy field and surrounding water bodies for FOCUS programs (FOrum for the Co-ordination of pesticide fate models and their USe) at EU (the European Union) level (Università Cattolica del Sacro Cuore).

- **Associate professor**, Research Centre for Eco-Environmental Sciences, Chinese Academy of Sciences, Beijing, China. August 1998~ January 2001
  --With Turbo C and ArcGIS, developed a GIS-based regional sustainable development decision support system in north China.

Reviewer or Panelist for Journals & Academic Conferences

- **Certificate of Excellence in Reviewing** for 2013 issued by Elsevier and the journal of *Ecological Modeling*
- **2004 SAWADA Prize**, Ansan, South Korea, October 2004. (The SAWADA Prize was established on the basis of Dr. Toshio SAWADA's donation. Dr. SAWADA is a professor emeritus and former president of Kyoto University, a member of the Japan Academy, a former president of the Japanese Society of Irrigation, Drainage and Reclamation Engineering).
- Ecological Modeling; Climatic Change; Science of the Total Environment; Environmental Science & Technology; Forest Science; Computers and Electronics in Agriculture; Agronomy Journal; Geoderma; Arctic; Applied Energy; Biofuels; Global Biology Change—Bioenergy; Industrial Crops and Products; Transactions of the ASABE; Transportation Research Part D: Transport and Environment; Biotechnology Progress; Journal of Agricultural Science and Technology A & B; Rapid Communications in Mass Spectrometry; Energy & Fuels;

Selected Refereed Publications (Total 50 papers)

1. **Miao, Z.**, R.G. Lathrop, M. Xu, I.P. La Puma, K.L. Clark, J. Hom, N. Skowronski, and S. Van Tuyl. 2011. Simulation and sensitivity analysis of carbon storage and fluxes in the New Jersey Pinelands. Environmental Modeling and Software 26: 1112–1122. DOI: 10.1016/j.envsoft.2011.03.004.
2. **Miao, Z.**, M. Xu, R.G. Lathrop, and Y. Wang. 2009. Comparison of the *A–C*c curve fitting methods in determining maximum ribulose 1·5-bisphosphate carboxylase/oxygenase carboxylation rate, potential light saturated electron transport rate and leaf dark respiration. Plant, Cell & Environment 32:109–122. DOI: 10.1111/j.1365-3040.2008.01900.x.
3. Su Y., G. Zhu, **Z. Miao**, Q. Feng, and Z. Chang. 2009. Estimation of parameters of a biochemically based model of photosynthesis using a genetic algorithm. Plant, Cell and Environment 32: 1710–1723. DOI: 10.1111/j.1365-3040.2009.02036.x.
4. Wang, C., Q. Meng, **Z. Miao**, X. Gu, T. Yu, Y. Zhan, M. Liu, L. Zheng, and Q. Liu. 2015. Variability and sensitivity analyses of spring wheat evapotranspiration measurements in Northwest China. Environmental Earth Sciences. DOI: 10.1007/s12665-015-4557-6.
5. Zhang, Y., **Z. Miao**, J. Bognar, R.G. Lathrop. 2011. Landscape scale modeling of the potential effect of groundwater-level declines on forested wetlands in the New Jersey Pinelands. Wetlands 31: 1131–1142. DOI: 10.1007/s13157-011-0223-2.
6. **Miao, Z.**, M. Trevisan, E. Capri, L. Padovani, and A.A.M. Del Re. 2004. Uncertainty assessment of the model RICEWQ in northern Italy. Journal of Environmental Quality 33: 2217–2228.
7. **Miao, Z.**, A. Vicari, E. Capri, F. Ventura, L. Padovani, and M. Trevisan. 2004. Modeling the effects of tillage management practices on herbicide runoff in northern Italy. Journal of Environmental Quality 33: 1720–1732.
8. **Miao, Z.**, M.J. Cheplick, M.W. Williams, M. Trevisan, L. Padovani, M. Gennari, A. Ferrero, F. Vidotto, and E. Capri. 2003. Simulating pesticide leaching and runoff in rice paddies with the RICEWQ-VADOFT model. Journal of Environmental Quality 32: 2189–2199.
9. **Miao, Z.**, L. Padovani, C. Riparbelli, A.M. Ritter, M. Trevisan, and E. Capri. 2003. Prediction of the environmental concentration of pesticide in paddy field and surrounding surface water bodies. Paddy and Water Environment 1: 121–132.
10. Capri, E., and **Z. Miao**. 2002. Modelling pesticide fate in rice paddy. Agronomie (Paris) 22:

363–371.
11. Karpouzas, D.G., and **Z. Miao**. 2007. Chapter 6: Higher tier exposure assessment in rice paddy areas – a European perspective. p: 125–165. *In:* E. Capri and D.G. Karpouzas (ed.). Pesticide risk assessment in rice paddies: theory and practice. Elsevier, Amsterdam, the Netherlands (ISBN-10: 0-444-53087-8 / ISBN-13: 978-0-444-53087-5).
12. **Miao, Z.**, Q. Meng, and Z. Miao. 2011. Models, driving forces and developmental strategies of Chinese homestead garden ecosystems. Spanish Journal of Rural Development 2(3): 51–60. DOI: 10.5261/2011.GEN3.05.
13. **Miao, Z.**, and C. Li. 2010. Predicting tree growth dynamics of boreal forest in response to climate change. p: 176–205 (Chapter 8). In: C. Li, R. Lafortezza, and J. Chen (eds). Landscape Ecology in Forest Management and Conservation. Springer-HEP Publisher (ISBN (Springer): 978-3-642-12753-3; ISBN (Higher Education Press): 978-7-04029136-0).
14. Hyder, A., B. Lueng, and **Z. Miao**. 2008. Integrating data, biology and decision models for invasive species management: application to leafy spurge (Euphorbia esula). Ecology and Society 13(2): 12.
15. **Miao, Z.**, and R. Marrs. 2000. Ecological restoration and land reclamation in open-pit mine of Shanxi Province, China. Journal of Environmental Management 59: 205–215.
16. **Miao, Z.**, Y.N. Shastri, T.E. Grift, A.C. Hansen, and KC Ting. 2012. Lignocellulosic biomass feedstock transportation alternatives, logistics, equipment configuration and modeling. Biofuels, Bioproducts and Biorefining 6: 351–362.
17. **Miao, Z.**, T.E. Grift, A.C. Hansen, and KC Ting. 2014. Flow performance of ground biomass in a commercial auger. Powder Technology 267: 354–361.
18. Shastri, Y.N., **Z. Miao**, A.C. Hansen, L.F. Rodríguez, K.C. Ting, and T.E. Grift. 2014. Determining optimal size reduction and densification for biomass feedstock using the BioFeed optimization model. Biofuels, Bioproducts and Biorefining 8:423–437.

Technical Skills

- Proficient in statistical analysis and data mining/fusing/assimilating using SAS/Macro, R, SQL, Microsoft Office VB Macro, SigmaPlot, S-plus, SPSS, etc. I have successfully applied genetic algorithm, simulation annealing, grid search plus non-linear curve fitting, spatio-temporal auto-correlation analysis, Monte-Carlo Simulation, bootstrapping error propagation and EFAST (Extended Fourier Amplitude Sensitivity Test) into my researches.
- Professional programming skills in Unix/Linux script development, Python, MatLab, ArcGIS, ArcGIS Python, ARC/INFO AML, ERDAS Imagine, Google Map/Earth API, Javascript, Pro-E, SolidWorks, Visual Basic, FORTRAN, Microsoft C, FuzzyLogic, etc.
- I have treated enormous GIS, GPS and remote sensing geo-referenced data including land cover classification and distribution, surface river systems and underground water resource, DEM/DTM, STATSGO and SSURGO soil, ISRIC (International Soil Reference and Information Centre) soil, etc.
- Professional knowledge and skills in agricultural field and lab experimental design, agricultural machinery equipment setup and equipment operation, sensing technology and automation, data acquisition, imaging processing and analysis.

Personal Data: Permanent resident in the United States of America