

**A-Xing Zhu**  
**Associate Professor, Department of Geography**

**Academic and Professional History:**

- Obtained a strong training in physical geography and environmental sciences.
- Completed a Ph.D. in Geography at University of Toronto in 1994, with an emphasis on the integration of GIS/remote sensing techniques with natural resource management and environmental modeling.
- Was a faculty member at Miami University (Ohio) before joining the faculty at the University of Wisconsin-Madison in 1996.
- Has extensive experience in conducting collaborative research with researchers from the Chinese Academy of Sciences. Currently hold three adjunct professorships in China: Institute of Applied Ecology, Institute of Geographical Sciences and Natural Resource Research, Department of Natural Resources and Environment, Beijing Normal University.
- Was awarded the Outstanding Young Oversea Chinese Scholar Fellowship by the Institute of Geographical Sciences and Natural Resource Research of CAS, 2001.

**Research Focus and Major Achievements:** My research focus is 1) the development of modern spatial information processing techniques (such as GIS/remote sensing, artificial intelligence techniques, and fuzzy logic concepts), and 2) the application of these techniques in natural resource management and environmental modeling. Current efforts focus on the quantification of gradual spatial variation of geographic features/phenomena using GIS techniques and fuzzy logic concepts, development of GIS, artificial intelligent, and fuzzy logic techniques for natural resource inventories and landslide analysis.

My work on soil resource mapping using GIS, fuzzy logic, and artificial intelligence, referred to as Soil Land Inference Model (SoLIM), has been well recognized in the research community and government agencies related to natural resource inventory. Recently it has been selected by the University Consortium for Geographic Information Science (UCGIS) to be showcased at a congressional briefing on the role of geographic information science and technology in meeting the nation's scientific, economic and social needs. The Natural Resources Conservation Service of USDA is actively working to adopt this technology as the agency standard. Currently I am developing a training program to transfer this technology to NRCS.

In collaboration with my Chinese colleagues, I have recently successfully developed and applied a method for mapping landslide susceptibility in China using GIS, artificial intelligence and fuzzy logic techniques. The method is in the process of being applied to map the landslide susceptibility over the entire Three Gorges region of China. The methodology and techniques are also being extended to map and study land use and soil erosion over the Three Gorges area.

Recently, I, in collaboration with the Kunming Institute of Zoology in Yunnan, have setup an infrastructure (including hardware, software, personnel training) in Kunming for collecting and managing geospatial (GIS) data and have initiated the work on biodiversity study using GAP analysis.

**Graduate Training Focus:** My focus has been on the integration of modern spatial information processing technology and natural resource disciplines. Most of my students develop a "dual proficiencies," that is, on one hand, they develop a high proficiency in technical fields which allows them to conduct comprehensive spatial analysis using modern information technology. On the other hand, they develop a profound background in disciplines related to the natural resource field (such as forestry, soils, water resources, and ecology) which allows them to apply the spatial analytical techniques effectively.

My teaching has been effective and innovative. By combining the resources on the worldwide web and my own visual materials, I have developed effective web materials to supplement my lectures. As a result, my courses are very popular and have always been over enrolled. For example, the enrollment for

my introductory GIS class was about 20 people when I arrived in Madison in the spring semester of 1996. The enrolment has grown to over 80 students per semester.

For the 7 years I have been at UW-Madison, I have supervised 14 graduate students with 5 of them graduated (1 Ph.D. and four masters). The Ph.D. graduate was offered a faculty position before his graduation and is now teaching at a premier U.S. university. All of my students have excellent track records in terms of their academic performance and progress toward their degrees.

### **Current Research Support:**

#### **Domestic:**

- NRCS-USDA, Soil Survey Update Using GIS, Expert Knowledge, and Fuzzy Logic: A Discovery Prototype, PI, \$417,895; 7/1/99-6/30/04.
- USDA-NRCS, Development of Training Program on SoLIM for Soil Survey, PI, \$202,185; 07/01/02-06/30/04.
- NPS/USDA-NRCS, Development of New Technology for Soil Survey for Great Smoky Mountain National Park, PI, \$117,562; 07/01/01-06/30/03.

#### **International:**

- Institute of Geographical Science and Natural Resource Research, Chinese Academy of Sciences, Quantification of gradual spatial variation of geomorphic features and its application in detailed natural resource management and environmental modeling, PI, \$400,000, 1/01/2003 — 12/30/2006.

### **Select Publications:**

- A.X. Zhu, B. Hudson, J. E. Burt, and K. Lubich, 2001. "Soil mapping using GIS, expert knowledge and fuzzy logic," *Soil Science Society of America Journal*, Vol. 65, pp. 1463-1472.
- A.X. Zhu and D.S, 2001. Mackay. "Effects of spatial detail of soil information on watershed modeling," *Journal of Hydrology*, Vol. 248, pp. 54-77.
- A.X. Zhu. 2000. "Mapping soil landscape as spatial continua: the neural network approach." *Water Resources Research*, Vol. 36, No. 3, pp. 663-677.
- A.X. Zhu, 1999. "A personal construct-based knowledge acquisition process for natural resource mapping using GIS." *International Journal of Geographic Information Science*, Vol. 13, No. 2, pp. 119-141.
- A.X. Zhu, 1997. "Measuring uncertainty in class assignment for natural resource maps using a similarity model." *Photogrammetric Engineering & Remote Sensing*, Vol. 63, pp. 1195-1202.
- A.X. Zhu, 1997. "A similarity model for representing soil spatial information." *Geoderma*, Vol. 77, pp. 217-242.