Li An

- Definitions: Trained as a geographer and then ecologist, I investigate my study subject(s) from a complex systems perspective, usually in a spatially explicit manner. My complex systems approach usually breaks the system of interest into subsystems or components that are usually hierarchically interconnected: the components at upper levels usually provide background/context for, and constrain, those at lower levels, which in turn comprise of the ones at upper levels. Thus my recent years have been characterized by resorting to the complexity theory or the study of complex adaptive systems (CAS), especially when dealing with challenges and/or complexities in coupled human and natural systems (CHANS). At the same time, I am a geographer and like to think about things in a spatially explicit manner: where they were, they are, and will be (latitude and longitude if possible). Under this line, lots of GIS and remote sensing techniques are used in my research.

- Tools: My work focuses on testing theory-driven or -related hypotheses (e.g., how does change in component A affect the state or dynamics of component B) as well as envisioning systems dynamics when all possible related pieces are put together, i.e., subsystems or components are interconnected or integrated. I use two types of approaches: 1) equation-based approach, including many types of regression models; and 2) simulation-based approach, including agent-based modeling and cellular automaton. Many times these two types of approaches are used together so as to complement each other.

- Types of research questions I ask: I usually ask questions from a systems perspective, which can be classified into two types: 1) what factors help to explain or predict the variability of one (or more) dependent variable? To answer such questions, usually regression models are used. I have an exemplar paper that aims to explain what socioeconomic, demographic, and environmental/ geographic factors may affect local villagers' willingness to switch from fuelwood to electricity at their houses (An et al. 2002). 2) How would the system of interest (e.g., a certain landscape, human-nature system) change over space and time in response to changes in one or several factors. To answer such questions, usually simulation models such as agent-based modeling are used with input from answering type 1 questions.

- Mentoring and collaborative work: So far I have only one single author paper, which is a review paper for modeling human decision making in coupled human and natural systems. All other papers are from group work. Authorship is determined by who comes up with the major idea(s) and work design, who leads the writing, and who performs data collection, analysis, and/or modeling. Paper writing begins with completion of major datasets and arrival of major analyses/modeling. Students are lead-authors for their thesis or dissertation chapters, if submitted for publication. For non-thesis/dissertation papers, co-authors may claim to write one or more sections and then the lead author combine all related work, or the lead-author write a draft outline and assign different co-authors to write on specific topics.

- Example of my disciplinary approach: In An et al. (2005) I try to interweave different pieces into a holistic systems model (agent-based model), and envision how the system may evolve over both space and time with or without (internal or external) disturbances. Particularly, I explore how demographic (e.g., more children/woman or later childbearing) and socioeconomic changes (e.g., change in electricity price or quality) may affect the amount and spatial distribution of panda habitat over time, and how panda habitat dynamics may feedback into human demographic and socioeconomic decisions.