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Dr. M. Goodchild
Department of Geography
University of California, Santa Barbara
5707 Ellison Hall
Santa Barbara, CA 93106-4060

Dear Dr. Goodchild (Mike),

I write to apply to the **Agent-Based Modeling of Complex Spatial Systems Meeting** to be held in Santa Barbara, April 14-16, 2007. I would like to attend this workshop and feel that I could contribute to it because my research overlaps the workshop topics of agent-based modeling of spatial systems and representation of complex dynamic systems.

While I bring to the table expertise in the workshop areas, I am also very interested in hearing how our colleagues deal with the conceptual and methodological challenges I note below:

- Much of my work centers on using modeling to identify the patterns, processes, and impacts of ***land change*** as a pivotal component of global environmental change. In particular, I develop dynamic models of deforestation in Mexico and urbanization in the United States. Solo and with other researchers, I gather data with multiple methods ranging from household interviews to satellite observations of the earth. I then use these data to conduct computer modeling to advance our understanding of the roles played by individual decision makers in the broader social and environmental dynamics of land change. In terms of the workshop, land change is an ideal topic for discussion because it combines approaches from the social, natural, and information sciences. It is also a phenomenon that is not so small-scale as to be well understood through qualitative methods yet not so large-scale as to be best suited to established statistical or mathematic approaches.

- My land change research spans conceptual and methodological challenges in ***modeling and geographic information science***, namely spatial analysis, geostatistics, agent-based modeling, cellular modeling, dynamic systems simulation, and computational intelligence. While these research areas are germane to the workshop in and of themselves, I am also very interested in the challenges of scaling agent-based models to handle large and complex systems. In particular, there is a considerable gulf between agent-based models of tens or

hundreds of sophisticated agents and models with millions of very simple or abstract agents. Many coupled human-environment systems fall within this medium range – having thousands of heterogeneous decision makers that necessitate cognitive modeling of some sophistication. I have similarly devoted considerable time to the challenge of integrating agent-based models with traditional ecological and population models that draw on approaches such as systems dynamics simulation and finite element modeling.

- I also contribute to *complexity science*, which argues that systems such as economies or ecologies emerge from the 'bottom-up' through local interactions among autonomous individual actors. While I am a proponent of complexity thinking, I also use the rubric of land change to try temper the more hyperbolic claims made of what is increasingly called a "New Kind of Science." I have written a fair amount on complexity as it relates to scale, space, and modeling. Especially relevant to the workshop are the linkages between complexity and space/place research, complexity and model validation, and the epistemological dimensions of scale in complex systems.

Overall, the combination of agent-based modeling, complex modeling, and complexity science is a fundamentally new and powerful approach to examining interactions among individuals, organizations, and larger social and environmental systems.

I will be able to contribute to the workshop because, per my enclosed CV and topic descriptions above, I have a solid record of original and innovative research. I also look forward to this workshop as a natural follow on to one of the first workshops of its kind, the CSISS and NAS sponsored *Agent-Based Models of Land-Use and Land-Cover Change* (2002), and its subsequent related sessions at many conferences, special journal issues, and research papers.

If you wish to discuss my experience or objectives in further detail, please do not hesitate to contact me. I look forward to hearing from you.

Yours truly,

Steven M. Manson
McKnight Land-Grant Professor of Geography