



**Jointly with QMRG of
RGS/IBG (UK) and Education
Section UCGIS (USA)**



Autumn/Fall
e-seminars series

Dynamic Modeling in a GIS Environment

This year's joint e-seminar series will return to the topic of dynamic modelling in a GIS environment. The series has been organized by Dr Steve Carver and his colleagues in the University of Leeds (s.j.carver@leeds.ac.uk) and we are grateful for this help in assembling a programme of presentations by some of the world's best researchers in the field.

Although organized by WUN, the seminars are open to all interested faculty and graduate students, world-wide. Because we use the Marratech™ desk top conferencing environment, it is very easy to participate using just a standard desk-top computing environment with headset and optionally a webcam. Details of how to set up your machine to participate and a note on some of the protocols we have developed are on our website at <http://www.wun.ac.uk/ggisa/seminars.html>.

Dynamic spatial modeling is not a scientific discipline in itself; instead spatial modeling techniques are used in many fields such as ecology and transport research. In these separate domains spatial modeling methods are applied and developed, often on an ad hoc basis. How can we make sure that these efforts lead

to an accumulation of knowledge and avoid missing important developments in parallel worlds? Can we promote spatial modeling as a domain in itself by seeking common ground in concepts, methods and software? Can we share out knowledge? The series will make a start on these agendas.

The seminars

Each seminar will commence at 1700 GMT. The dates, presenters and topics are as follows:

28th Oct

Ling Bian (Buffalo): A dynamic social network model for disease transmission.
Chair: Kirk Harland (Leeds)

4th Nov

Mark Birkin (Leeds): GENeSIS: Generative simulation for the spatial and social sciences. Chair: Alison Heppenstall (Leeds)

11th Nov

Nick Mallenson (Leeds): Agent-based modelling of UK crime
Chair: Andrew Evans (Leeds)

18th Nov

Raja Sengupta (McGill): What's so spatial about Agent-Based Models? Chair: Steve Carver (Leeds)

25th Nov

Derek Karessenberg (Utrecht): Integrating spatio-temporal GIS data with spatio-temporal models. Chair: Mark Birkin (Leeds)

2nd Dec

Alex Hagen-Zanker (Technische Universiteit Eindhoven): Validation and calibration of spatial simulation models. Chair: John Stilwell (Leeds)

Some references and resources

Nick Mallinson maintains a blog on his research at www.crimesim.blogspot.com which contains a wealth of information.

There is a recent book with some agent-based crime models published by Lin Liu and John Eck (editors, 2008) as *Artificial Crime Analysis Systems: Using Computer Simulations and Geographic Information Systems*". (Information Science Reference, 485 pages)

Albert R, Jeong H and Barabasi A L 2000 Error and attack tolerance of complex networks. *Nature* 406: 378-82.

SEE: www.nature.com/nature/journal/v406/n6794/full/406378a0.html

An, L., Linderman, M., Qi, J., Shortridge, A., Liu, J. (2005) Exploring complexity in a human-environment system: An agent-based spatial model for multidisciplinary and multiscale integration. *Annals of the Association of American Geographers*, 95 (1): 54-79.

Bennett, D.A., Tang, W. (2006) Modelling adaptive, spatially aware, and mobile agents: Elk migration in Yellowstone. *International Journal of Geographical Information Science*, 20 (9): 1039-1066.

Bian, L. (2003) The representation of the environment in the context of individual-based modeling. *Ecological Modelling*, 159 (2-3): 279-296.

Bian L 2004 A conceptual framework for an individual-based spatially explicit epidemiological model. *Environment and Planning B* 31(3): 381-95.

SEE: www.envplan.com/abstract.cgi?id=b2833

Bian, L., Liebner, D. (2004) A network model for dispersion of communicable diseases . *Transactions in GIS* , 11(2): 155-173.

SEE: www3.interscience.wiley.com/journal/118490206/issue

Brown, D.G., Xie, Y. (2006) Spatial agent-based modelling. *International Journal of Geographical Information Science*, 20 (9), pp. 941-943.

Brown, D.G., Riolo, R., Robinson, D.T., North, M., Rand, W. (2005) Spatial process and data models: Toward integration of agent-based models and GIS. *Journal of Geographical Systems*, 7 (1): 25-47.

Evans, T.P., Kelley, H. (2004) Multi-scale analysis of a household level agent-based model of landcover change. *Journal of Environmental Management*, 72 (1-2): 57-72.

Groff, E.R. (2007), 'Situating' simulation to model human spatio-temporal interactions: An example using crime events. *Transactions in GIS*, 11(4): 507-530.

Karszenberg, D., Schmitz, O., de Vries, L.M., and de Jong, K (2008) A tool for construction of stochastic spatio-temporal models assimilated with observational data. 11th AGILE International Conference on Geographic Information Science

2008, University of Girona, Spain. 7 pages, (see PDF available on request from Dave Unwin)

Parker, D. C., S. M. Manson, M. A. Janssen, M. J. Hoffman, and P. Deadman (2003) Multi-agent systems for the simulation of land-use and land-cover change: a review. *Annals of the Association of American Geographers*, 93(2):316-340.

Sengupta, R., and Bennett, D.A.(2003) Agent-based modeling environment for spatial decision support. *International Journal of Geographical Information Science*, 17(1): 157-80

Sengupta, R., Sieber, R. (2007) Geospatial Agents, Agents Everywhere.... *Transactions in GIS* , 11(4): 483-506.

Watts D J and Strogatz S H 1998 Collective dynamics of 'small-world' networks. *Nature* 393: 440–2

SEE: www.nature.com/nature/journal/v393/n6684/full/393440a0.html

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Need to know more?

Further information about the Global GISc academy can be found at our website, which is

www.wun.ac.uk/ggisa/index.html

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