

## A few useful references on agent-based modelling

[References marked with “\*\*\*” are the most important and should be read before the workshop]

### **General overview**

\*\*\* Castle, C. J. E. & A. T. Crooks. 2006. Principles and concepts of agent-based modelling for developing geospatial simulations. In *Working Papers Series*, ed. Centre for Advanced Spatial Analysis - London: University College. Available from: [www.casa.ucl.ac.uk](http://www.casa.ucl.ac.uk) .

Macal, C. M. & M. J. North. 2008. Agent-based modeling and simulation: ABMS examples. In: S. J. Mason, R. R. Hill, L. Mönch, O. Rose, T. Jefferson, J. W. Fowler eds., *Proceedings - Winter Simulation Conference*, p. 101-112.

Samuelson, D. A. & C. M. Macal (2006) Agent-Based Simulation Comes of Age: Software opens up many new areas of application. *Operations Research Management Science*, 33, 34-38.

Although the next three references are listed also in separate sections, they are extremely useful for an overview of the approaches

Macy, M. W. & R. Willer (2002) From Factors to Actors: Computational Sociology and Agent-Based Modeling. *Annual Review of Sociology*, 28, 143-166.

\*\*\* Heckbert, S., T. Baynes & A. Reeson (2010) Agent-based modeling in ecological economics. *Annals of the New York Academy of Sciences*, 1185, 39-53.

\*\*\* Parker, D., S. M. Manson, M. A. Janssen, M. J. Hoffmann & P. Deadman (2003) Multi-agent systems for the simulation of land-use and land-cover change. *Annals of the Association of American Geographers*, 94, 314-337.

### **Land use change**

Matthews, R., N. Gilbert, A. Roach, J. Polhill & N. Gotts (2007) Agent-based land-use models: a review of applications. *Landscape Ecology*, 22, 1447-1459.

Parker, D., S. M. Manson, M. A. Janssen, M. J. Hoffmann & P. Deadman (2003) Multi-agent systems for the simulation of land-use and land-cover change. *Annals of the Association of American Geographers*, 94, 314-337.

### **Ecosystems, natural resources**

Bousquet, F. & C. Le Page (2004) Multi-agent simulations and ecosystem management: a review. *Ecological Modelling*, 176, 313-332.

Jager, W. & H. J. Mosler (2007) Simulating Human Behavior for Understanding and Managing Environmental Resource Use. *Journal of Social Issues*, 63, 97-116.

Speelman, E. N. & L. E. García-Barrios (2010) Agrodiversity v.2: An educational simulation tool to address some challenges for sustaining functional agrodiversity in agro-ecosystems. *Ecological Modelling*, 221, 911-918.

### **Urban systems**

Crooks, A., C. Castle & M. Batty (2008) Key challenges in agent-based modelling for geo-spatial simulation. *Computers, Environment and Urban Systems*, 32, 417-430.

Ligmann-Zielinska, A. & P. Jankowski (2007) Agent-based models as laboratories for spatially explicit planning policies. *Environment and Planning B: Planning and Design*, 34, 316-335.

Zellner, M. L. (2008) Embracing Complexity and Uncertainty: The Potential of Agent-Based Modeling for Environmental Planning and Policy. *Planning Theory & Practice*, 9, 437-457.

### **Ecological economics, agricultural economics, technology diffusion**

Heckbert, S., T. Baynes & A. Reeson (2010) Agent-based modeling in ecological economics. *Annals of the New York Academy of Sciences*, 1185, 39-53.

Nolan, J., D. Parker, G. C. van Kooten & T. Berger (2009) An Overview of Computational Modeling in Agricultural and Resource Economics. *Canadian Journal of Agricultural Economics/Revue canadienne d'agroeconomie*, 57, 417-429.

Schwarz, N. & A. Ernst (2009) Agent-based modeling of the diffusion of environmental innovations -- An empirical approach. *Technological Forecasting and Social Change*, 76, 497-511.

### **Documenting ABMs, software development**

Grimm, V., U. Berger, D. L. DeAngelis, J. G. Polhill, J. Giske & S. F. Railsback (2010) The ODD protocol: A review and first update. *Ecological Modelling*, 221, 2760-2768.

Polhill, J. G., D. Parker, D. Brown & V. Grimm (2008) Using the ODD Protocol for Describing Three Agent-Based Social Simulation Models of Land-Use Change. *Journal of Artificial Societies and Social Simulation*, 11.

Nikolai, C. & G. Madey (2009) Tools of the Trade: A Survey of Various Agent Based Modeling Platforms. *Journal of Artificial Societies and Social Simulation*, 12, 2.

### **Other disciplinary perspectives: sociology, geography, biology**

Macy, M. W. & R. Willer (2002) From Factors to Actors: Computational Sociology and Agent-Based Modeling. *Annual Review of Sociology*, 28, 143-166.

Tang, W. & D. A. Bennett (2010) Agent-based modeling of animal movement: a review. *Geography Compass*, 4, 682-700.

Torrens, P. (2010) Geography and computational social science. *GeoJournal*, 75, 133-148.

### **"Top-down" land use models**

Verburg, P. & K. Overmars (2009) Combining top-down and bottom-up dynamics in land use modeling: exploring the future of abandoned farmlands in Europe with the Dyna-CLUE model. *Landscape Ecology*, 24, 1167-1181.

### ***Complex human-natural systems***

Liu, J., T. Dietz, S. R. Carpenter, M. Alberti, C. Folke, E. Moran, A. N. Pell, P. Deadman, T. Kratz, J. Lubchenco, E. Ostrom, Z. Ouyang, W. Provencher, C. L. R. S. H. Schneider & W. W. Taylor (2007) Complexity of Coupled Human and Natural Systems. *Science*, 317, 1513-1516.

### ***Examples from the IAI region***

Berger, T. (2001) Agent-based spatial models applied to agriculture: a simulation tool for technology diffusion, resource use changes and policy analysis. *Agricultural Economics*, 25, 245-260.

Mena, C. F., S. J. Walsh, B. G. Frizzelle, Y. Xiaozheng & G. P. Malanson (2011) Land use change on household farms in the Ecuadorian Amazon: Design and implementation of an agent-based model. *Applied Geography*, 31, 210-222.

### ***WWW Resources***

Netlogo: [ccl.northwestern.edu/netlogo](http://ccl.northwestern.edu/netlogo)

Open ABM: [www.openabm.org](http://www.openabm.org)