

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.

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

Open ABM: www.openabm.org