... a node in the CoMSES Network

CoMSES Digest: Winter 2015

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We are nearing the end of 2015, and the end of the second full year of the CoMSES Digest. We end 2015 on a high note: the Satellite Session organized by Marco Janssen and Michael Barton for the Conference on Complex Systems was a very strong success. The session, entitled "Computational Transparency in Modeling Complex Systems," brought together many scientists from CoMSES's extensive network of modelers and researchers. A wide array of topics were presented, including an overview of current archiving practices, infrastructure for visualization, training in ABM, and using big data to generate agent rules, to name a few. The discussion was energetic and enthusiastic. Modeling in the Socio-Ecological Sciences is a lively field, and the attendees' commitment to transparency and reproducibility is a good indication of the domain's growth into a mature science. The CoMSES Network is not only following good scientific practice but, in many cases, contributing to establishing standards of practice that other fields will emulate.

Models and Modules in OpenABM

Two particularly salient points arose in the satellite session. First, a presentation given by Andrew Bell introduced a theme of 'modularization' for model sharing; my own presentation, immediately following Andrew's, essentially paralleled his, and the topic led to a ripe discussion. The idea, boiled down to its elements, is that the community should work toward sharing not only full models, but components of models that can be applied in different combinations and in different contexts. This raises a number of issues, for example how to set standards for how model components would be 'packaged,' but also offers a strong set of both practical and theoretical advantages for pushing SES modeling forward. Per the discussion at the sessions, CoMSES will begin to explore these possibilities.

CoMSES Digest Expansion

Second, there is an interest in publishing versions of the talks in the CoMSES Digest. The hope is that this small newsletter might be supplemented with something meatier and more formal. The papers presented at the satellite session may become the first examples; the topic of sharing model modules is likely to jump to the fore, and the other topics will follow, in turn. The Spring 2016 edition of the Digest will be the first to include a

research discussion article. But the discussion needn't wait: visit the general discussion forums on the OpenABM site (https://www.openabm.org/forum/general-forum) to see more about model modules and to offer topics for future Digest research articles.

Model Uploads and Downloads

Ten new models were added to the library in the past three months. Topics as wide-ranging as biomass flows, charcoal dispersion, irrigation, spending among the elderly in the U.K., dual-market dynamics, influence spread, and public health information are represented. A test of parallelized ABM performance is included as well. (Parallelization in ABMs was also discussed at the CSS Satellite Session, with CoMSES Board Member Mariam Kiram presenting work on cloud-based modeling, sparking an excellent and spirited discussion.)

The top five models downloaded turned over almost completely: only one from the top five this quarter was in the top five last quarter (the Edali and Yasarcan model of the Beer Game); three others joined the top five for the first time, while the top spot was reclaimed by Janssen's Artificial Anasazi simulation.

To close out the year, here is another way to look at the OpenABM downloads. This table shows the count of unique code files that were downloaded at least one time during each quarter:

	2013 Downloads	2014 Downloads	2015 Downloads
1st Quarter	171	255	329
2nd Quarter	112	274	355
3rd Quarter	213	286	400
4th Quarter	237	314	424

If this rate of increase holds steady, we can hope to see more than 500 unique files downloaded in 2nd Quarter 2016, and nearly 600 in the last three months of 2016.

CoMSES is looking forward to a bright 2016- and we hope all of you are as well.

Best regards,
John T. Murphy,
CoMSES Digest Editor

Newly Published Models in the Model Library

Irrigation Equity and Efficiency

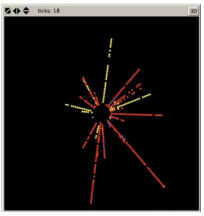
Andrew Reid Bell

This framework addresses the question of how productivity of irrigated agricultural landscapes and the distribution of agricultural opportunity would shift if fees assessed to irrigators were raised to better cover costs of system maintenance. While it is a mantra

that farmers are not able to pay the costs of water, recent experimental evidence from Pakistan suggests that they would often be willing to pay much more if it meant receiving a reliable supply.

EthnoCultural Tag model (ECT)

David Hales and Bruce Edmonds



Ethnocentrism denotes behavior and beliefs that are positive towards those who share the same ethnicity and negative towards others. The model considers short-term cultural evolution, where agents may interact in a population and do not die or give birth but imitate and innovate their behaviors. While agents retain a fixed ethnicity they have the ability to form and join cultural groups and to change how they define their in-group based on both ethnic and cultural markers (or tags).

Ageing and Spending

Tony Lawson

In the UK, as in several other countries, increasing life expectancy is leading to a shift in the age distribution of the population. Meanwhile, at the level of individuals, spending patterns change as people age. This model investigates the extent to which demographic change is likely to affect household spending patterns by combining the techniques of dynamic microsimulation with an imputation method known as random assignment. While there has been significant concern about the economic cost of the ageing population, this paper finds a potentially beneficial effect in the form of an increase in total spending for most expenditure categories.

Micro-level Adaptation, Macro-level Selection, and the Dynamics of Market Partitioning

Cesar Garcia-Diaz

This model provides a micro-foundation for dual market structure formation through partitioning processes in marketplaces by developing a computational model of interacting economic agents. We propose an agent-based modeling approach, where firms are adaptive and profit-seeking agents entering into and exiting from the market according to their (lack of) profitability.

Influence with over-confident agents

Juliette Rouchier and Emily Tanimura

This model was built from a huge simplification of a previous model (published in “Simulation” on the difficulty to learn from an environment with too confident agents), so as to make an analytical proof and new simulations from this simplified model. Agents can be in three states of knowledge (0 being ignorant, 1 medium, 2 perfect knowledge) and can influence each other only if they are close enough - with more knowledgeable agents being able to influence more.

The relationship between product information quantity and diversity of consumer decisions

Takao Sasaki, Marco Janssen, David Vaughn Becker and Rebecca Neel

We generated populations of consumer agents, each with a specific cognitive capacity for

processing information. An agent's probability of picking the best option declined once product information content exceeded its cognitive capacity. If the agent had access to popularity information, it could compensate for this cognitive overload by using a social learning strategy. We used the model to determine how behavioral clustering and decision performance varied with the amount of product information and with the agents' access to popularity information.

A multithreaded PPHPC replication in Java

Nuno Fachada

A multithreaded Java implementation of the PPHPC Agent-Based Model, developed with two goals in mind: compare the performance of this implementation with an existing NetLogo implementation. Study how different parallelization strategies impact simulation performance on a shared memory architecture.

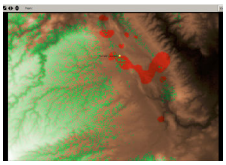
Health and social public information office (SPUN) simulation

Manuela Vinai and Emilio Sulis

The cases arrive to the office with the random frequency as indicated by specific selectors in the set-up phase. Four weeks are represented in the screen, for each day, as selected in the set-up. Cases can be more or less difficult. Operators works to solve the cases which remain in the red area until they are dismissed going in the green bottom part of the screen. The right part of the screen report indicators of the cases and the hours worked by the employees in the selected simulation.

Model of Charcoal Dispersion and Deposition in Eastern Spain

Grant Snitker



This model creates simulated charcoal records based on differing patterns of ignitions during the transition to agriculture in Eastern Spain. Overall, it integrates both agent-based models of agricultural burning drawn from ethnographic examples and GIS (geographical information systems) data/models of climate, vegetation, topography, and charcoal dispersion and deposition. The ultimate goal of this modeling effort is to compare multiple patterns of landscape burning (both climate driven and human land-use driven) and the simulated charcoal records they produce to actual, published charcoal concentration data.

AMBAWA, an Agent-based Model of Biomass flows in Agropastoral areas of West Africa

Tidiane Diarisso, Nadine Andrieu, Christophe Le Page, Marc Corbeels, François Bousquet and Pablo Tittonell

In the agropastoral areas of West Africa crop residues are a common property resource grazed by free-roaming village or transhumant livestock during the dry season. New crop management practices based on recycling of crop residues as compost or their use in conservation agriculture are promoted by research and development programs in order to improve soil fertility. These practices can potentially improve crop yields for individual farmers but can also lead to conflicts for the access of this resource, especially between non-livestock owners and livestock owners. AMBAWA (Agent-based Model of Biomass flows in Agropastoral areas) allows representing the flows of biomass between crop and livestock systems at the field, farm, and village scales in order to assess the effect of

innovating management practices on farm productivity in West Africa.

Most Downloaded Models in the Model Library
(September 16, 2015 – December 15, 2015)

1. (41 downloads) Artificial Anasazi ***by Marco A. Janssen***

2. (40 downloads) A Mathematical Model of the Beer Game ***by Mert Edali and Hakan Yasarcan***

3. (34 Downloads) Collective Behavior of In-Group Favoritism **by *Meysam Alizadeh, Claudio Cioffi-Revilla and Andrew Crooks***

4. (33 downloads) Cultural Group Selection of Sustainable Institutions ***by Tim Waring, Sandra H. Goff and Paul E. Smaldino***

5. (33 Downloads) (De-)stabilising Effect of Diffusions **by J. Kasmire, Bert van Meeuwen and Cornelis Eikelboom**

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