CoMSES Digest: Fall 2021

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Editor's Note

Greetings from a (currently) cool and rainy Arizona! We hope this newsletter finds you and your loved ones in good health and spirits through this historic pandemic. Here in Arizona we simultaneously experienced the hottest June in recorded history as well as one of the wettest monsoon seasons since the turn of the century, underscoring the extreme unpredictability of climate change. Transparency, clear documentation, and designing for interoperability and reuse are all critical aspects of the science needed to effectively model and understand our complex world and we are grateful for your continuing efforts in these arenas.

The October 1st application deadline for our upcoming 2022 CoMSES Winter School is rapidly approaching - please feel free to share with any interested

colleagues! Dr. Michael Barton has also provided additional updates on the Open Modeling Foundation and the future of CoMSES.Net.

Best regards,
Allen Lee & Kelly Claborn, CoMSES Net Digest Editors

CoMSES News

CoMSES Winter School on Agent-Based Modeling of Social-Ecological Systems

January 17-28, 2022

Purpose of the Winter School
The winter school will teach participants about the opportunities and challenges of agent-based modeling of social-ecological systems. Participants will engage intensely with a few comprehensive agent-based models, learn best practices for modeling within a team, and learn how to successfully navigate modeling challenges across the social and natural sciences.

Content of the Course
The winter school has two primary components: lectures and group project work. Participants will also have the opportunity to present their own work in lightning talks. Lectures will introduce concepts in the social and natural sciences essential to modeling social-ecological systems including human behavior, collective behavior, resilience, and land cover change. Students will also learn and apply best practices for computational modeling with respect to reproducibility, model documentation, analysis of models and how to collaborate effectively in remote teams using Git and GitHub. Participants will be introduced to various stylized agent-based models used in actual research projects on social-ecological systems. Participants will chose one of the models and form groups to adapt, expand, and analyze the model to better understand the impact of particular assumptions on the social-ecological system in question. All models are developed in NetLogo so **participants must be comfortable with reading and writing NetLogo code**.

Schedule
The 2022 Winter School will be be virtual once again like the 2021 Winter School, spread out over 2 weeks from January 17-28, 2022. The online live and

interactive component will be kept at four hours a day during the morning of the Arizona, USA timezone (UTC-7). The first week will focus on lectures, hands-on training in best practices and the start of group projects. The second week will focus on group projects and presentation of results.

For more information and to submit your application by October 1, please visit https://complexity.asu.edu/cbie/winterschool

Open Modeling Foundation Update

Michael Barton, CoMSES Net Director

This past June I provided updates on the Open Modeling Foundation (OMF) initiative that CoMSES.Net is coordinating. I noted that after a series of strategic planning meetings, we hoped to organize a meeting to officially establish the OMF, adopt a charter with a clear mission and governance, and get started on activities to adopt community standards for computational modeling. Following discussions with our partners who have been working with CoMSES.Net to coordinate this international initiative, we are planning this foundational meeting for early December 2021. Our partners include the Community Surface Dynamics Modeling System (CSDMS); the Analysis, Integration, and Modeling of the Earth System (AIMES) project; the DSSAT Crop Modeling team; and the Alfred P. Sloan Foundation. We have contacted all of the organizations that have expressed interest and participated in the planning workshops, and invited them to send a voting representative to the meeting. We are tentatively planning to hold it in a hybrid in-person and remote format, with the in-person part in Washington, DC. We will continue to keep the CoMSES.Net community informed about this exciting initiative to help enable next generation modeling. If you are a member of a formally constituted organization that supports computational modeling and/or modeling scientists, and your organization would like to learn more about the initiative or the upcoming meeting please contact me - I would be happy to provide more information (michael.barton at asu.edu).

CoMSES.Net Receives Five-Year US NSF Grant

A few weeks ago we were notified that CoMSES.Net and collaborators (CSDMS, the Community Surface Dynamics Modeling System and CUAHSI, the Consortium of Universities for the Advancement of Hydrologic Science) will receive $4.2 million over the next five years to develop advanced cyberinfrastructure and educational programs to enable innovative next-

generation modeling of human and natural systems, and build capacity in modeling science. This project will involve a suite of activities that integrate the human and technological components of cyberinfrastructure.

1) We will develop new software tools that will enable modeling scientists to augment model codebases in the CoMSES.Net Model Library with modern software development scaffolding to facilitate reuse, integration, and validation of model code.

2) We will collaborate with the NSF-supported Open Science Grid to provide high-throughput computing (HTC) resources for modeling science to support simultaneously running numerous iterations of models needed to capture stochastic variability, explore parameter space, and generate alternative scenarios.

3) Working with the US NSF Big Data Hub/Spoke network, the Science Gateways Community Institute, and the Software and Data Carpentries organizations, we will develop and administer online trainings to build capacity and expertise in making effective use of these resources.

4) The partnerships supported by this grant will engage a global modeling science community to provide professional incentives that encourage researchers to adopt best practices and catalyze innovative science. Building on prior efforts by CoMSES.Net, we aim to help early career researchers shift from creating models only to solve problems specific to a particular project to models that are also useful for others.

By integrating technology with intellectual capacity-building, the planned cyberinfrastructure and educational programs aim to stimulate innovation and diversity in modeling science by letting creative researchers build on each other's work more readily and combine it in new ways to address societal-environmental challenges we have not yet perceived. CoMSES.Net and its partners remain firmly committed to transparent, open science. The tools and training resources developed in this new work will be openly accessible not just to leading research institutions but also to the many smaller colleges, state and local governments, and a broader audience beyond science. They will provide decision-makers and the data scientists who support them access to a much larger and more varied toolkit with which to explore potential solution spaces to social and environmental policy issues. We envision project as a key step to help support a future evolving ecosystem of diverse, reusable, and integrable, models that are transparently accessible to anyone in the world.

Calendar of Events

Please follow the links to the local event organizers for the latest information or go to https://comses.net/events/ for a listing of all recent events. You can also subscribe to new events by following us on Twitter or subscribing to our RSS Events feed.

Upcoming Deadlines

Using Qualitative Data and Methods in Social Simulation
Registration Deadline: October 3rd, 2021
A series of seminars happening the first Tuesday of every month @ 1pm CET (noon UK). Registration for the series free but necessary to get the Zoom link. Seminars begin October 5th.
https://www.comses.net/events/609/

Call for applications to organize a 2022 CECAM-Lorentz funded workshop on modeling
Submission Deadline: November 1, 2021
The CECAM-Lorentz collaboration calls for scientists who want to organize the eighth annual CECAM-Lorentz Workshop 2022, to be held at CECAM HQ, Lausanne, Switzerland, in the second half of 2022 or the start of 2023.
https://www.comses.net/events/606/

Model Library

Newly Reviewed

Two models passed CoMSES's peer review process this quarter. Some are still unpublished while their companion publications undergo journal peer review; others are currently under review by CoMSES. If you would be willing to serve as a peer reviewer for comses.net models please let us know! We are actively seeking more reviewers across a wide range of programming languages and disciplines.

- **The** Circular Business Model experimentation: local biodigestion network **explores the influence of the design of circular business models (CBMs) on CBM viability. The model represents an Industrial Symbiosis Network (ISN) in which a processor uses the organic**

waste from suppliers to produce biogas and nutrient-rich digestate for local reuse (Kasper Pieter Hendrik Lange, Gijsbert Korevaar, Igor Nikolic, Paulien Herder)

- **The** Small-Trade Model **seeks to understand the role of trade networks and their interaction with different fish resources, for fish provision. It can be used to investigate both how trade network structures are embedded in a social-ecological context and the trade processes that occur within them, to analyze how they lead to emergent outcomes related to the resilience of fish provision (Emilie Lindkvist)**

New Model Uploads

23 new models were published in the CoMSES Model Library on a wide variety of topics that illustrate the depth and breadth of our community. These include:

- **an exploration of the** interaction of individual and environmental risk on youth
- simulating flood events in urban areas
- COVID-19 infection control in hospitals
- farmland transfer **in the context of urbanization and aging**
- collective opinion dynamics **and decision making processes on social networks**

These models and more can be discovered at the CoMSES Model Library - you can also keep up-to-date with newly published models on our Twitter and RSS feeds.

Most Downloaded Models

7,190 published models were downloaded this quarter, across 894 unique codebases. Here are the top 5:

1. A land-use model to illustrate ambiguity in design **by Julia Schindler (110 downloads)**
2. Circular Business Model experimentation: local biodigestion network **by Kasper Pieter Hendrik Lange, Gijsbert Korevaar, Igor Nikolic, Paulien Herder (92 downloads)**

3. An Agent-Based Model of Flood Risk and Insurance **by J Dubbelboer, I Nikolic, K Jenkins, J Hall (86 downloads)**
4. Aqua.MORE **by Lisa Huber, Nico Bahro (85 downloads)**
5. Hybrid Agent-Based and Equation Based Model for Infectious Disease Spread **by Elizabeth Hunter, Brian Mac Namee, John Kelleher (73 downloads)**

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