**FW 508: Agent based modeling**

**Netlogo preparation and read ahead material**

Hi everyone!

We are super excited about our upcoming class on agent-based models (ABMs) and simulation. Agent-based modeling is great approach for natural resource questions, and we have put together a list of material to peruse before the class, including links to the software and some articles on evaluating and designing ABMs.

Please don’t hesitate to contact us if you have any questions.

Best,

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**Software**

We will be using Netlogo, which is a software package and language designed for agent-based modeling. Please have Netlogo v6.2.2 downloaded and installed on your computer before the class.

Download link: <https://ccl.northwestern.edu/netlogo/download.shtml>

Before the class, we strongly recommend working through the Beginner’s Guide for Netlogo. This will familiarize you with the language and syntax.

Link: <http://ccl.northwestern.edu/netlogo/bind/>

There are also lots of example models in the model library. Chances are that an example exists for things you’re interested in, so check those out too.

**Articles**

Two of the most difficult things about agent-based simulation are evaluating and documenting models. We will be evaluating our models using an approach called *Pattern Oriented Modeling*, and documenting them using approaches outlined by the *ODD protocol* and *TRACE documentation*. Please read the following articles before our class, prioritizing *Pattern Oriented Modeling* over ODD and TRACE.

*Pattern Oriented Modeling*

Grimm et al. 2005. Pattern-Oriented Modeling of Agent-Based Complex Systems: Lessons from Ecology. *Science* 310: 987-991 <https://doi.org/10.11.26/science.1116681>

Grimm, V., Frank, K., Jeltsch, F., Brandl, R., Uchmański, J., & Wissel, C. (1996). Pattern-oriented modelling in population ecology. *Science of the Total Environment*, *183*(1-2), 151-166. <https://doi.org/10.1016/0048-9697(95)04966-5>

Railsback, S. F., & Johnson, M. D. (2011). Pattern-oriented modeling of bird foraging and pest control in coffee farms. *Ecological modelling*, *222*(18), 3305-3319. <https://doi.org/10.1016/j.ecolmodel.2011.07.009>

*Model Documentation*

Schmolke, A., Thorbek, P., DeAngelis, D. L., & Grimm, V. (2010). Ecological models supporting environmental decision making: a strategy for the future. *Trends in ecology & evolution*, *25*(8), 479-486. <https://doi.org/10.1016/j.tree.2010.05.001>

Grimm, V., Augusiak, J., Focks, A., Frank, B. M., Gabsi, F., Johnston, A. S., ... & Railsback, S. F. (2014). Towards better modelling and decision support: documenting model development, testing, and analysis using TRACE. *Ecological modelling*, *280*, 129-139. <https://doi.org/10.1016/j.ecolmodel.2014.01.018>

Grimm, V., Berger, U., Bastiansen, F., Eliassen, S., Ginot, V., Giske, J., ... & DeAngelis, D. L. (2006). A standard protocol for describing individual-based and agent-based models. *Ecological modelling*, *198*(1-2), 115-126. <https://doi.org/10.1016/j.ecolmodel.2006.04.023>

Grimm, V., Railsback, S. F., Vincenot, C. E., Berger, U., Gallagher, C., DeAngelis, D. L., ... & Ayllón, D. (2020). The ODD protocol for describing agent-based and other simulation models: A second update to improve clarity, replication, and structural realism. *Journal of Artificial Societies and Social Simulation*, *23*(2). [10.18564/jasss.4259](http://dx.doi.org/10.18564/jasss.4259)