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Ben G Fitzpatrick* (bfitzpatrick@lmu.edu), 1 LMU Drive, UH 2700, Loyola Marymount University, Los Angeles, CA 90045. *Systems Approaches to Optimization and Control with Agent-Based Models.*

Agent-based models (ABMs) have become an increasingly important mode of inquiry for the life sciences. They are particularly valuable for systems that are not understood well enough to build an equation-based model. These advantages, however, are counterbalanced by the difficulty of analyzing and using ABMs, due to the lack of the type of mathematical tools available for more traditional models, which leaves simulation as the primary approach. Rather than viewing the ABM as a model, it is to be viewed as a surrogate for the actual system. For a given optimization or control problem (which may change over time), the surrogate system is modeled instead, using data from the ABM and a modeling framework for which ready-made mathematical tools exist, such as differential equations, or for which control strategies can be explored more easily. Once the optimization problem is solved for the model of the surrogate, it is then lifted to the surrogate and tested. The final step is to lift the optimization solution from the surrogate system to the actual system. In this talk, we illustrate this process using two different strategies to optimize a simple agricultural pest control problem built on an ABM with predator-prey structure. (Received September 22, 2017)