## Generic Programming and Agent-Based Modeling

Generic programming is inspired by the idea of abstract algebras in mathematics. It involves abstracting algorithms from the data structures that they employ. Its foremost implementation at present is the C++ standard template library, but, in fact, Python, with its dynamic typing system, is an ideal language for employing generic programming techniques.

Agent-based modeling (ABM) is ripe for the employment of this technique, as there are certain patterns of interaction that occur again and again in ABMs. In particular, agents in an ABM typically:

1) Exist in an environment.

2) Get called upon to act in a loop.

3) Survey their environment for cues as to what to do.

4) Act based on the results of 3).

This talk will present efforts to realize generic programming in the context of the Indra ABM system, written in Python. Implementing generic programming in Python relies heavily on the use of iterators, and decorator, map, filter, reduce and lambda features of Python. This talk will show examples of how these are used to create generic algorithms.