1163-60-1393 **Eric Truslow*** (eric.truslow@ll.mit.edu), MIT-Lincoln Laboratory, 244 Wood St., Lexington, MA 02421, and **Dimitris Manolakis** (dmanolakis@ll.mit.edu), MIT-Lincoln Laboratory, 244 Wood St., Lexington, MA 02421. *Modeling Patterns of Life Using Count Time Series Models.*

Recent advances in image processing and object recognition have made it possible to rapidly extract objects of interest from imagery. The counts of objects in an area can be used to understand the pattern of life within an area and between disparate areas. Tracking object counts over time leads to count time series of the area and of the different object types. Two challenges in modeling this type of data are: irregular sampling in time due to collection timing, and differing sampling times among various areas. Our main goals in this work are to adequately model observed count time series as well as find relationships among different areas. Both goals require handling the irregular time sampling of the data and the mismatch in sampling times among different areas. First, we examine modifications to discrete-valued models that incorporate non-uniform time steps by treating the time steps as a random variable. Then, we use a coupled model to simulate two sets of irregular, unsynchronized measurements and explore the conditions on the sampling pattern needed to determine if the patterns are related. Finally, we explore how these techniques could be used in a workflow for finding areas with related patterns of life in large datasets (Received September 15, 2020)