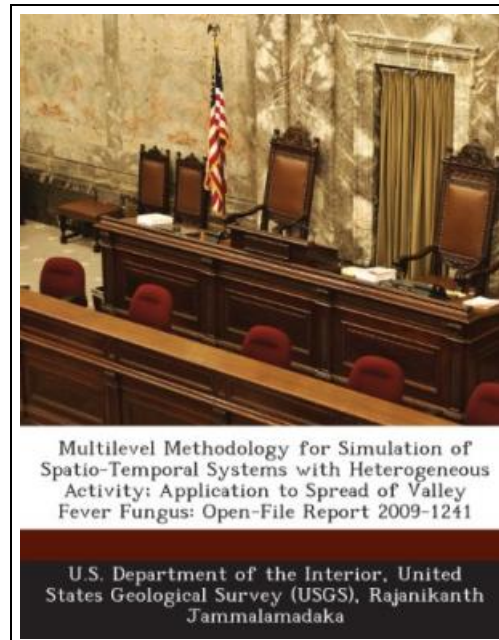


# Multilevel Methodology for Simulation of Spatio-Temporal Systems with Heterogeneous Activity; Application to Spread of Valley Fever Fungus: Open-File Report 2009-1241



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**(Austin O'Connell)**

## MULTILEVEL METHODOLOGY FOR SIMULATION OF SPATIO-TEMPORAL SYSTEMS WITH HETEROGENEOUS ACTIVITY; APPLICATION TO SPREAD OF VALLEY FEVER FUNGUS: OPEN-FILE REPORT 2009-1241



Bibliogov, United States, 2013. Paperback. Book Condition: New. 246 x 189 mm. Language: English . Brand New Book \*\*\*\*\* Print on Demand \*\*\*\*\*.This report consists of a dissertation submitted to the faculty of the Department of Electrical and Computer Engineering, in partial fulfillment of the requirements for the degree of Doctor of Philosophy, Graduate College, The University of Arizona, 2008. Spatio-temporal systems with heterogeneity in their structure and behavior have two major problems associated with them. The first one is that such complex real world systems extend over very large spatial and temporal domains and consume so many computational resources to simulate that they are infeasible to study with current computational platforms. The second one is that the data available for understanding such systems is limited because they are spread over space and time making it hard to obtain micro and macro measurements. This also makes it difficult to get the data for validation of their constituent processes while simultaneously considering their global behavior. For example, the valley fever fungus considered in this dissertation is spread over a large spatial grid in the arid Southwest and typically needs to be simulated over several decades of time to obtain useful information. It is also hard to get the temperature and moisture data (which are two critical factors on which the survival of the valley fever fungus depends) at every grid point of the spatial domain over the region of study. In order to address the first problem, we develop a method based on the discrete event system specification which exploits the heterogeneity in the activity of the spatio-temporal system and which has been shown to be effective in solving relatively simple partial differential equation systems. The benefit of addressing the first problem is that it now makes it feasible to address...

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