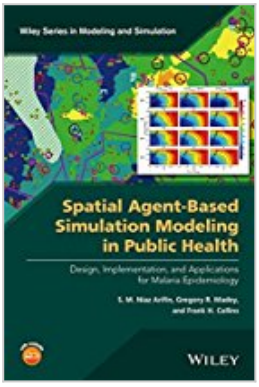

Spatial Agent-Based Simulation Modeling in Public Health: Design, Implementation, and Applications for Malaria Epidemiology (Wiley Series in Modeling and Simulation)

By S. M. Niaz Arifin, Gregory R. Madey, Frank H. Collins

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Presents an overview of the complex biological systems used within a global public health setting and features a focus on malaria analysis

Bridging the gap between agent-based modeling and simulation (ABMS) and geographic information systems (GIS), *Spatial Agent-Based Simulation Modeling in Public Health: Design, Implementation, and Applications for Malaria Epidemiology* provides a useful introduction to the development of agent-based models (ABMs) by following a conceptual and biological core model of *Anopheles gambiae* for malaria epidemiology. Using spatial ABMs, the book includes mosquito (vector) control interventions and GIS as two example applications of ABMs, as well as a brief description of epidemiology modeling. In addition, the authors discuss how to most effectively integrate spatial ABMs with a GIS. The book concludes with a combination of knowledge from entomological, epidemiological, simulation-based, and geo-spatial domains in order to identify and analyze relationships between various transmission variables of the disease.

Spatial Agent-Based Simulation Modeling in Public Health: Design, Implementation, and Applications for Malaria Epidemiology also features:

- Location-specific mosquito abundance maps that play an important role in malaria control activities by guiding future resource allocation for malaria control and identifying hotspots for further investigation
- Discussions on the best modeling practices in an effort to achieve improved efficacy, cost-effectiveness, ecological soundness, and sustainability of vector control for malaria
- An overview of the various ABMs, GIS, and spatial statistical methods used in entomological and epidemiological studies, as well as the model malaria study
- A companion website with computer source code and flowcharts of the spatial ABM and a landscape generator tool that can simulate landscapes with varying spatial heterogeneity of different types of resources including aquatic habitats and houses

Spatial Agent-Based Simulation Modeling in Public Health: Design, Implementation, and Applications for Malaria Epidemiology is an excellent reference for professionals such as modeling and simulation experts, GIS experts, spatial analysts, mathematicians, statisticians, epidemiologists, health policy makers, as well as researchers and scientists who use, manage, or analyze infectious disease data and/or infectious disease-related projects. The book is also ideal for graduate-level courses in modeling and simulation, bioinformatics, biostatistics, public health and policy, and epidemiology.

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Editorial Review

From the Back Cover

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S. M. Niaz Arifin, PhD, is Research Assistant Professor in the Department of Computer Science and Engineering at the University of Notre Dame. A member of The Society for Computer Simulation, and American Society of Tropical Medicine and Hygiene, and the recipient of The American Society of Tropical Medicine and Hygiene Travel Award in 2011, his research interests include agent-based modeling and simulation, public health, data warehousing, and geographic information systems.

Gregory R. Madey, PhD, is Research Professor in the Department of Computer Science and Engineering at the University of Notre Dame. A member of The Society for Computer Simulation, Institute of Electrical and Electronics Engineers Computer Society, and American Society of Tropical Medicine and Hygiene, his

research interests include agent-based modeling and simulation, cyberinfrastructure, bioinformatics, biocomplexity, e-Technologies, open source software, disaster management, and health informatics.

Frank H. Collins, PhD, is Professor in the Department of Biological Sciences at the University of Notre Dame. His research interests include genome level studies of arthropod vectors of human pathogens, the biology of malaria vectors with a focus on the development of molecular tools that will permit better resolution of questions about vector population ecology, ecological genetics, and the epidemiology of malaria transmission.

About the Author
Dr. S. M. Niaz Arifin is currently a Research Assistant Professor in the Department of Computer Science and Engineering at the University of Notre Dame in Indiana, USA. He received a Ph.D. from the University of Notre Dame, an M.S. from the University of Texas at Dallas, and a B.S. from Bangladesh University of Engineering and Technology (BUET). He has a decade of research and teaching experiences at multiple universities. He has been teaching courses including artificial intelligence and topics in parasitology and vector biology at the University of Notre Dame.

Dr. Arifin's interdisciplinary research interests include agent-based modeling and simulation, bioinformatics, data warehouses, geographic information systems, and public health. His research has been published in the simulation, modeling, biology, and ecology literature. He authors over twenty journal articles, conference papers, books, textbooks and book chapters. He has given multiple invited talks, research posters, and research presentations around the globe.

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