MICHAEL GOEDECKE

Summary of Professional Experience

Michael Goedecke is a mathematical modeler who began working for RTI in 2005. He has been modeling the spread of influenza and the human immunodeficiency virus (HIV). Dr. Goedecke enhanced his data modeling and analysis skills by earning his doctorate in biomathematics from North Carolina State University in 2005. Prior to joining RTI, he designed, conducted, and analyzed research experiments in the field of microbial fermentation for the biotechnology firm Amgen, Inc.

Education

PhD, Biomathematics, North Carolina State University, Raleigh, NC, 2005.
MBMA, Biomathematics, North Carolina State University, Raleigh, NC, 2001.
BS, Biology, California Institute of Technology, Pasadena, CA, 1988.

Selected Project Experience

Catalogue Automation Tool™ (CAT™) (2007 to date)—*Mathematical Modeler*. The purpose of this tool is improve and customize a user's Internet-search experience by classifying and filtering search results according to that user's previous Internet use behavior. More relevant search results will be grouped together and promoted up the list of returned results, while irrelevant results will be filtered out. Programs a neural network model to learn a user's Internet searching preferences and to classify and filter new results.

Future Smoking Attributable Mortality Study (Future-SAM) (2006 to date)—*Mathematical Modeler*. This study aims to model future mortality that can be attributed to smoking-related behavior, and the effects of various smoking intervention and prevention measures. Provides technical modeling advice and helps train other mathematical modelers.

Models of Infectious Disease Agent Study (MIDAS) (2005 to date)—*Mathematical Modeler*. The purpose of the MIDAS research network is to develop a Web-based portal, mathematical models, and a set of computational and analytical tools for researchers and public health officials to model emerging infectious diseases and appropriate public health responses. The goal of the initiative is to provide policy makers, public health officials, and others within the scientific community with the analytical tools and computer models required to respond effectively to infectious disease outbreaks. RTI is establishing a central database taking information supplied by other groups and also supports the development of user-friendly computer modeling tools for the broader scientific community, policy makers, and public health officials to use to simulate epidemics and response strategies. As one of the project's mathematical modelers, designs and builds computer models investigating the spread of various infectious diseases.

Modeling HIV Diffusion Through Drug Using Networks—Sexual Acquisition and Transmission of HIV Cooperative Agreement Program (SATH-CAP) (2005 to date)—*Mathematical Modeler*. This 5-year multimethod study is identifying and modeling factors associated with the sexual diffusion of the human immunodeficiency virus (HIV) and other sexually transmitted infections (STIs) within drug-using

groups and from drug users to non-drug users in rural and urban settings in North Carolina. Designs and builds computer models of the sexual transmission of HIV.

Professional Experience

2005 to date — RTI International, Research Triangle Park, NC.

Research Statistician. Performs mathematical modeling for a variety of tasks and projects.

1999 to 2005 — North Carolina State University, Raleigh, NC.

Graduate Research Assistant (2000 to 2004). Proposed, developed, and analyzed a model of movement of the motor protein dynein, combining experimental results from biology, biochemistry, and physics. Worked with biochemistry graduate students to model signal transduction pathway used in bacterial chemotaxis. Modeled competitive growth of strains of *E. coli* in chemostat with and without inhibitor present.

Graduate Teaching Assistant (1999 to 2000). Taught computer modeling laboratory of biomathematics course to first-year graduate students. Led recitation section, tutored students, and graded coursework for an undergraduate business statistics course.

1989 to 1998 — Amgen, Inc., Thousand Oaks, CA.

Research Associate, Process Development (1994 to 1998). Designed, optimized, and characterized *E. coli* fermentations for transfer to clinical and commercial manufacturing. Provided technical support for commercial microbial manufacturing facilities. Modeled historical data and wrote report to eliminate lot-to-lot process variability in commercial manufacturing.

Fermentation Associate, Commercial Manufacturing (1989 to 1994). Produced Neupogen® and Infergen® for clinical trials and commercial use. Worked in teams with Process Development, QA, QC, and regulatory personnel to improve manufacturing processes. Installed, programmed, and used Labview process-monitoring system. Developed and maintained standard operating procedures.

Professional Associations

Society for Mathematical Biology
Biophysical Society

Computer Skills

Proficient with AnyLogic, Matlab, SAS JMP, LaTeX. Familiar with XPP, SAS

Peer-Reviewed Journal Articles

Bobashev, G., Morris, R. J., & Goedecke, D. M. (2008). Sampling for global epidemic models and the topology of an international airport network. *PLoS ONE, 3*(9), e3154.

Epstein, J. M., Goedecke, D. M., Yu, F., Morris, R. J., Wagener, D. K., & Bobashev, G. V. (2007). Controlling pandemic flu: The value of international air travel restrictions. *PLoS ONE, 2*(5), e401.

Goedecke, D. M., & Elston, T. C. (2005). A model for the oscillatory motion of single dynein molecules. *Journal of Theoretical Biology, 232*(1), 27–39.

Presentations and Proceedings

Goedecke, D. M., Bobashev, G. V., & Yu, F. (2007, December). *A stochastic equation-based model of the value of international air-travel restrictions for controlling pandemic flu.* Presented at Winter Simulation Conference, Washington, DC.

Goedecke, D. M. (2007). *Los efectos de la red escogida de ciudades en la extensión global de la influenza.* Presented at Décimocuartas Jornadas en Estadística e Informática, Guayaquil, Ecuador.

Bobashev, G. V., Goedecke, D. M., Costenbader, E., & Zule, W. M. (2006). *Comprehensive mathematical model of HIV/STD spread in communities.* Presented at Joint Statistical Meeting, Seattle, WA.

Bobashev, G. V., Goedecke, D. M., Costenbader, E., Morris, R. J., & Zule, W. M. (2006). *Scalable mathematical models of substance use: From social networks to whole populations.* Presented at College on Problems of Drug Dependence (CPDD) Workshop, Scottsdale, AZ.

Bobashev, G. V., Goedecke, D. M., Costenbader, E., & Zule, W. M. (2006). *Mathematical model of HIV/STD spread in a community with embedded sexual, drug and social networks.* Presented at AIDS/HIV and Public Health, St. Petersburg, Russia.

Goedecke, D. M. (2006). *Aplicación de modelos estocásticos a la epidemiología: Un ejemplo ilustrativo actual.* Presented at Décimoterceras Jornadas en Estadística e Informática, Guayaquil, Ecuador.