

Eric T. Lofgren

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Research Interests

Computational and mathematical modeling of infectious diseases, with a focus on hospital epidemiology as well as emerging, enteric, and respiratory pathogens

Education

Virginia Tech, Virginia Bioinformatics Institute, Blacksburg, Virginia Network Dynamics and Simulation Science Laboratory

Postdoctoral Associate: September 2013 to present

Supervisor: Dr. Stephen Eubank

University of North Carolina at Chapel Hill, UNC Gillings School of Global Public Health, Chapel Hill, North Carolina

Department of Epidemiology

PhD: May 2013 Advisor: Dr. David Weber

MSPH: December 2009 Advisor: Dr. Jennifer Smith

Tufts University, Medford, Massachusetts

BA: January 2007

Major: Biology with Highest Thesis Honors

Research Experience

Postdoctoral Research, Virginia Tech, Virginia Bioinformatics Institute, Network Dynamics and Simulation Science Lab. September 2013 to present.

- Developed and extended agent-based simulations of hospital acquired pathogens and emerging infectious diseases including Ebola.
- Prepared grant applications to support current and new computational epidemiology research programs within the lab.

Doctoral Research, UNC Gillings School of Global Public Health, Department of Epidemiology. August 2011 to May 2013.

- Designed and proposed a mathematical modeling study of the impact of routine fecal microbiota transplantation on the transmission of *Clostridium difficile*.
- Obtained grant support from university and private industry sources.
- Supervised post-graduate research assistant working on obtaining parameter estimates from the existing literature.

Summer Lab Manager, Rutgers University, Center for Discrete Mathematics and Theoretical Computer Science. Fefferman Lab. May 2008 to August 2013.

- Conducted the design, analysis and interpretation of infectious disease and emergency response models.
- Supervised computational/mathematical research lab involving undergraduate, graduate and post-doctoral students as well as visiting faculty.
- Drafted and prepared grants for submission to the NIH and the Department of Homeland Security.

Research Assistant, UNC Gillings School of Global Public Health, Department of Epidemiology. January 2009 to May 2009.

University Merit Assistantship, UNC Gillings School of Global Public Health, Department of Epidemiology. August 2007 to May 2008.

Research Assistant, Tufts University, Initiative for the Modeling and Forecasting of Infectious Disease. August 2005 to July 2007.

Teaching Experience

Session Organizer, “A gentle introduction to mathematical modeling: Lessons from the living-dead”, American Public Health Association Annual Meeting Learning Institute. November 2011, 2012 and 2014.

- Organized and taught a half-day (2011) and full-day (2012 and 2014) learning institute introducing public health professionals to mathematical modeling.
- Developed course materials using common cultural references to obviate the need for students to have disease-specific knowledge.
- Emphasized the use of approachable methods and hands-on implementation to allow students to produce models that speak to their research interests.

Teaching Assistant, UNC Gillings School of Global Public Health, Department of Epidemiology. 2008 – 2010

- EPID 722: Epidemiologic Analysis of Time-to-Event Data
- EPID 750: Fundamentals of Public Health Surveillance

Publications

Lofgren, E.T. et al. 2014. Mathematical Models: A Key Tool for Ebola Outbreak Response. *Proceedings of the National Academy of Sciences*. In press.

Halloran, M.E. et al. 2014. Ebola: Mobility data. *Science*, 346(6208): 433

Rivers, C.M., E.T. Lofgren, M. Marathe, S. Eubank, B.L. Lewis. 2014. Modeling the Impact of Interventions on an Epidemic of Ebola in Sierra Leone and Liberia. *PLOS Currents Outbreaks*.

Lofgren, E.T., S.R. Cole, D.J. Weber, D.J. Anderson, R.W. Moehring. 2014. Estimating All-cause Mortality and Length of Stay in Incident, Healthcare Facility-associated *Clostridium difficile* Cases Using Parametric Mixture Models. *Epidemiology*, 25(4): 570-575

Lofgren, E.T., R.W. Moehring, D.J. Weber, D.J. Anderson, N.H. Fefferman. 2014. A Mathematical Model to Evaluate the Routine Use of Fecal Transplantation to Prevent Incident and Recurrent *Clostridium difficile* Infection. *Infection Control and Hospital Epidemiology*, 35(1):18-27

Moehring, R.W., E.T. Lofgren, D.J. Anderson. 2013. Impact of Change to Molecular Testing for *Clostridium difficile* Infection on Healthcare Facility-Associated Incidence Rates. *Infection Control and Hospital Epidemiology*, 34(10): 1055-1061

Lofgren, E.T. 2012. Visualizing Results from Transmission Models: A Case Against "Confidence Intervals". *Epidemiology*, 23(5): 738-741

Chu, H., E.T. Lofgren, M.E. Halloran, P.F. Kuan, M. Hudgens, S.R. Cole. 2011. Performance of Rapid Influenza H1N1 Diagnostic Tests: a Meta-analysis. *Influenza and Other Respiratory Viruses*, 6(2): 80-86

Lofgren, E.T., J.B. Wenger, N.H. Fefferman, D. Bina, S. Gradus, S. Bhattacharyya, Y.N. Naumov, J. Gorski, E.N. Naumova. 2010. Disproportional Effects in Populations of Concern for Pandemic Influenza: Insights from Seasonal Epidemics in Wisconsin, 1967-2004. *Influenza and Other Respiratory Viruses*, 4(4): 205-12.

Lofgren, E.T., J. Rogers, M. Senese, N.H. Fefferman. 2008. Pandemic Preparedness Strategies for School Systems: Is Closure Really the Only Way? *Annales Zoologici Fennici*, 44(6): 449-458.

Lofgren, E.T. and N.H. Fefferman. 2007. The Untapped Potential of Virtual Game Worlds to Shed Light on Real World Epidemics. *The Lancet Infectious Diseases*, 7(9):625-629.

Lofgren, E.T., N.H. Fefferman, Y.N. Naumov, J. Gorski, E.N. Naumova. 2007. Influenza Seasonality: Underlying Causes and Modeling Theories. *Journal of Virology*, 81(11):5429-5436.

Lofgren, E.T., N.H. Fefferman, M. Doshi, E.N. Naumova 2007. Assessing Seasonal Variation in Multisource Surveillance Data: Annual Harmonic Regression. *Lecture Notes in Computer Science*. BioSurveillance 2007. Eds D. Zeng et al. 4506:114-123.

Manuscripts in Submission

Lofgren, E.T., C.M. Rivers, M.V. Marathe, S.G. Eubank, B.L. Lewis. The Potential Impact of Increased Hospital Capacity to Contain and Control Ebola in Liberia.

Lofgren, E.T., A.M. Egizi, N.H. Fefferman. Patients as Patches: Urban Ecology and Epidemiology in Healthcare Environments.

Majumder, M.S., C.M. Rivers, E.T. Lofgren, D.N. Fisman. Estimation of MERS-Coronavirus Reproductive Number and Case Fatality Rate for the Spring 2014 Saudi Arabia Outbreak: Insights from Publically Available Data.

Rivers, C.M., M.S. Majumder, D.N. Fisman, E.T. Lofgren. Risk of Death and Severe Disease in Patients with MERS-CoV, 2012 to 2014.

Lofgren, E.T. and N.H. Fefferman. Leveraging Insight from Centuries of Outbreak Preparedness to Improve Modern Planning Efforts.

Lofgren, E.T. Pools versus Queues: The Variable Dynamics of Stochastic “Steady States”.

Invited Talks and Organized Workshops

Lofgren, E.T. 2013. Mathematical Modeling of In-Hospital Transmission of Infectious Diseases. Infectious Disease Grand Rounds, Duke University School of Medicine, Durham, NC.

Lofgren, E.T. 2011. Defining Epidemics: Detection, Behavior, and Intervention. Department of Homeland Security US-Sweden Workshop “A Visualization and Analytics Approach to Flooding and Pandemics”. Norrköping, Sweden.

Lofgren, E.T. 2011. The Plagues of Azeroth: Outbreaks and Epidemiology in Virtual Worlds. UNC Gillings School of Global Public Health, Chapel Hill, NC.

Lofgren, E.T. 2009. Epidemiology and Online Multiplayer Games: Case Studies and Challenges. UNC Chapel Hill, Department of Computer Science, UNC Chapel Hill, Chapel Hill, NC.

Funding

Merck Investigator Studies Program. “Agent-based Modeling of Healthcare Associated *Clostridium difficile* Infection”. 2012-2013. PI: David Weber.

North Carolina Translational & Clinical Sciences Institute. “Agent-Based Modeling of *Clostridium difficile* Transmission in Healthcare Settings”. 2012-2013. PI: Eric Lofgren.

PiCloud Academic Research Program. “The Mathematical Modeling and Simulation of *Clostridium difficile* in Healthcare Settings”. 2012-2013. PI: Eric Lofgren.

Other Experience and Service

Manuscript Referee: *Epidemiology, American Journal of Epidemiology, Infection Control and Hospital Epidemiology, BMJ Open, Environmental Health Perspectives, Annales Zoologici Fennici.*

U.S. Research Delegate: DHS US-Sweden Workshop ‘A Visualization and Analytics Approach to Flooding and Pandemics’. Norrköping, Sweden. 2010.

Graduate Study Institutes:

University of Washington Summer Institute in Statistics and Modeling of Infectious Disease. 2010.

Center for Discrete Mathematics and Theoretical Computer Science (DIMACS) US–African Initiative: Advanced Study Institute and Workshop on Economic Epidemiology. 2009.

Press Coverage

Television: BBC World News, CBS News, Canada Television, Discovery Channel

Radio: BBC UK News, National Public Radio, North Carolina Public Radio

Print/Online News: ABC News, ABS CBN News, Canadian Press, The Economist, Forbes, Fox News, New Scientist, Science News, Reuters, TIME, the Washington Post