

Curriculum Vitae ■ Ariel Cintrón-Arias

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Department of Mathematics and Statistics

East Tennessee State University

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US Citizen

Education

Ph.D., Center for Applied Mathematics, Cornell University. August, 2006.

- Dissertation: Modeling and Parameter Estimation of Contact Processes.
- Advisor: Carlos Castillo-Chavez.

M.S., Center for Applied Mathematics, Cornell University, January, 2004.

B.S. with honors, Mathematics, University of Puerto Rico-Cayey, May, 1999.

Professional Experience

Associate Professor.

- Department of Mathematics and Statistics, East Tennessee State University (ETSU), Johnson City, Tennessee. Fall 2015 through present.

Assistant Professor.

- Department of Mathematics and Statistics, ETSU, Johnson City, Tennessee. Fall 2009 through Summer 2015.

Postdoctoral Research Associate.

- Center for Quantitative Sciences in Biomedicine, North Carolina State University, Raleigh, North Carolina. Fall 2007 through Summer 2009.

Mentor to Graduate Students. Industrial Mathematical and Statistical Modeling Workshop for Graduate Students 2008.

- Center for Research in Scientific Computation, North Carolina State University, Raleigh, North Carolina. July 21-29, 2008.

Instructor of Mathematics.

- Department of Mathematics, North Carolina State University, Raleigh, North Carolina. Fall 2007.

Mentor to Undergraduate Students. SAMSI/CRSC 2007 Undergraduate Workshop.

- Statistical and Applied Mathematical Sciences Institute, Research Triangle Park, North Carolina.
- Center for Research in Scientific Computation, North Carolina State University, Raleigh, North Carolina. May 21-25, 2007.

Postdoctoral Research Associate.

- Statistical and Applied Mathematical Sciences Institute, Research Triangle Park, North Carolina. Center for Research in Scientific Computation, North Carolina State University, Raleigh, North Carolina. Fall 2006 through Summer 2007.

Instructor of Mathematical Biology.

- Institute for Strengthening the Understanding of Mathematics and Science, Arizona State University, Tempe, Arizona. Summer 2006.

Instructor of Mathematics.

- Department of Mathematics and Statistics, Arizona State University, Tempe, Arizona. Spring 2006, Fall, 2005 and 2004.

Assistant to the Directors of Mathematical and Theoretical Biology Institute (MTBI).

- Los Alamos National Laboratory, Los Alamos, New Mexico. June-August, 2005 and 2004.

Instructional Teaching Assistant.

- Department of Mathematics, Cornell University, Ithaca, New York. Fall 2002.

Research Interests

My research interests include: nonlinear dynamics, mathematical modeling, computer simulation, and parameter estimation. I am interested in mathematical formulations (deterministic and stochastic) that describe time-evolution of contact processes including population models for single species (e.g. logistic) and population models for interacting species (e.g. predator-prey systems, transmission dynamics of infectious diseases, within-host dynamics, and the social dynamics of scientific discovery and drinking behavior).

Publications

- Cintron-Arias, A.: To Go Viral. (Submitted to The College Mathematics Journal, February 13, 2014.)
- Lunsford, J., Cintron-Arias, A.: Assessing Treatments in Epidemics of Heavy Drinking. (Submitted to Mathematical Biosciences and Engineering, Sep. 16, 2013.)
- Cintron-Arias, A., Godbole, A.: A Decade of Undergraduate Research for All ETSU Mathematics Majors. *Involve* **7**, 281-293 (2014).
- Cameron, S.M., Cintron-Arias, A.: Prisoner's Dilemma on Real Social Networks: Revisited. *Mathematical Biosciences and Engineering* **10**, 1381-1398 (2013).
- Banks, H.T., Cintron-Arias, A., Kappel, F.: Parameter selection methods in inverse problem formulation. In: J.J. Batzel, M. Bachar, F. Kappel (eds.) *Mathematical Modeling and Validation in Physiology: Application to the Cardiovascular and Respiratory Systems*, Lecture Notes in Mathematics, Mathematical Biosciences Subseries, Springer-Verlag, Berlin, 2013.
- Cintron-Arias, A., Banks, H.T., Capaldi, A., Lloyd, A.L.: A sensitivity matrix based methodology for inverse problem formulation. *J. Inv. Ill-Posed Problems* **17**, 545-564 (2009).
- Banks, H.T., Holm, K., Wanner, N.C., Cintron-Arias, A., Kepler, G.M., Wetherington, J.D.: A mathematical model for the first-pass dynamics of antibiotics acting on the cardiovascular system. *Math. Comput. Model.* **50**, 959-974 (2009).
- Cintron-Arias, A., Sanchez, F., Wang, X., Castillo-Chavez, C., Gorman, D.M., Gruenewald, P.J.: The role of nonlinear relapse on contagion amongst drinking communities. In *Mathematical and Statistical Estimation Approaches in Epidemiology*, (Chowell et al., eds.), Springer, New York, 2009.
- Cintron-Arias, A., Castillo-Chavez, C., Bettencourt, L.M.A., Lloyd, A.L., Banks, H.T.: The estimation of the effective reproductive number from disease outbreak data. *Math. Biosci. Eng.* **6**, 261-282 (2009).
- Chowell, G., Cintron-Arias, A., Del Valle, S., Sanchez, F., Song, B., Hyman, J.M., Hethcote, H.W., Castillo-Chavez, C.: Mathematical applications associated with the deliberate release of infections agents. In: Gumel, A., Castillo-Chavez, C., Clemence, D.P., Mickens, R. E. (eds.) *Mathematical studies on human disease dynamics: emerging paradigms and challenges*. *Contemp. Math.*, 410, pp. 51-72. Amer. Math. Soc., Providence (2006).
- Lloyd, A., Valeika, S., Cintron-Arias, A.: Infection dynamics on small world networks. In: Gumel, A., Castillo-Chavez, C., Clemence, D.P., Mickens, R. E. (eds.) *Mathematical studies on human disease dynamics: emerging paradigms and challenges*. *Contemp. Math.*, 410, pp. 209-234, Amer. Math. Soc., Providence (2006).
- Bettencourt, L.M.A., Cintron-Arias, A., Kaiser, D.I., Castillo-Chavez, C.: The power of a good idea: quantitative modeling of the spread of ideas from epidemiological models. *Physica A* **364**, 513-536 (2006).

Grant Funding

- National Science Foundation grant number DUE-1356397 (\$622,498). August 1, 2014—July 31, 2019.
- US Department of Energy, Visiting Faculty Program at Oak Ridge National Laboratory (\$13,000). May 27—August 1, 2014.
- Tennessee Board of Regents, Access and Diversity Initiative, grant number E210024 (\$39,965). July 1, 2013—June 30, 2014.
- National Science Foundation grant number DMS-1040928 (\$38,726). May 1, 2011—April 30, 2012.

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- ETSU Honors College Research Discovery Student Worker (\$1,000). August 2011—May 2012.
- ETSU Honors College Research Discovery Federal Work Study (\$3,000). August 2010—July 2011.
- ETSU Presidential Grant-in-Aid (\$1,500), July 2010.
- ETSU Research Development Committee Small Grant (\$1,500). October 2009.

Awards and Honors

- Outstanding Faculty Member in Service, Department of Mathematics and Statistics, East Tennessee State University, 2013—14.
- Outstanding Faculty Member in Research, Department of Mathematics and Statistics, East Tennessee State University, 2010—11.
- Postdoctoral Research Supplement, National Institutes of Health and North Carolina State University, Raleigh, North Carolina, Fall 2007 through Summer 2009.
- Postdoctoral Fellowship, Statistical and Applied Mathematical Sciences Institute (funded by the National Science Foundation), Research Triangle Park, North Carolina, Fall 2006 through Summer 2007.

Service

East Tennessee State University

- Department of Mathematics and Statistics
 - 2011-to-present:
 - Technology Coordinator
 - Webmaster
 - 2009-10: Search Committee of one tenure-track position in applied mathematics
- College of Arts and Sciences
 - 2012-to-present: Educational Affairs Committee
- Division of Academic Affairs
 - 2013-to-present: High Performance Computer Cluster Advisory Committee
 - 2011: Research Development Committee (proposal reviewer)

Reviewer

- Computational and Mathematical Methods in Medicine
- Epidemiology and Infection
- Journal of Biological Systems
- Journal of Engineering Mathematics
- Journal of Mathematical Modelling and Algorithms in Operations Research
- Journal of Theoretical Biology
- International Journal of Computer Mathematics
- Mathematical Biosciences and Engineering
- Mathematical Biosciences
- Rose-Hulman Undergraduate Mathematics Journal
- SIAM Online Undergraduate Research Journal

Workshop Organization

Co-organizer: *Parameter Estimation for Dynamic Biological Models*

- National Institute for Mathematical and Biological Synthesis, University of Tennessee. May 19-21, 2014.

Co-organizer: *2013 MBI-NIMBioS-CAMBAM Summer Graduate Workshop: Connecting Biological Data with Mathematical Models*

- National Institute for Mathematical and Biological Synthesis, University of Tennessee. June 17-28, 2013.

Conference Organization

Co-organizer and Principal Investigator: *CBMS Mathematical Epidemiology with Applications*.

- East Tennessee State University. July 25-29, 2011.

Sessions co-organized at Conferences

- *Mathematical Modeling of Immunization Programs*, 2012 Society for Mathematical Biology Annual Meeting, July 25-28, 2012 (with Eunha Shim).

Invited Presentations

Conference Oral Presentation

- *Sensitivity Analysis and Treatment of Hepatitis C Virus Infection*
 - SIAM Life Sciences Meeting, August 5, 2014.
- *Revisiting Daley-Kendall Model for Information Spread*
 - Joint Mathematics Meetings, January 17, 2014.
- *Revisiting Daley-Kendall Model for Information Spread*
 - Southeastern Atlantic Regional Conference on Differential Equations, September 21–22, 2013.
- *Assessing Control Strategies in Heavy-Drinking Epidemics*
 - Society for Mathematical Biology Annual Meeting, June 10–13, 2013.
- *A Study of Prisoner's Dilemma on Real Social Networks*
 - Arizona State University, June 3, 2011.
- *Parameter Selection for Ordinary Least Squares Estimation of Epidemiological Models*
 - Arizona State University, May 11, 2011.
- *Parameter Selection for Inverse Problem Formulation*
 - Blackwell-Tapia Conference, November 6, 2010.
- *Network Epidemic Models*
 - Math Institutes Modern Math Workshop, 2010 SACNAS Conference, September 30, 2010.
- *A Sensitivity Matrix Based Methodology for Inverse Problem Formulation*
 - 2010 SIAM Annual Meeting, July 12–16, 2010.
- *Parameter Selection Methods in Inverse Problem Formulation*
 - 2010 SIAM Annual Meeting, July 12–16, 2010.
- *The Estimation of Effective Reproductive Number from Disease Outbreak Data, Parameter Estimation from Epidemic Data*
 - 2009 SIAM Annual Meeting, July 6–10, 2009.
- *The Estimation of Effective Reproductive Number from Disease Outbreak Data*
 - 2009 Joint Mathematics Meetings, January 5–9, 2009.
- *Parameter Estimation of Epidemic Processes*
 - 2008 Inverse Problems: Modeling and Simulation, May 26–30, 2008.
- *Seasonal Influenza Transmissibility in the US*
 - 2007 Joint Statistical Meetings, July 29 – August 2, 2007.
- *Estimation of Seasonal Reproductive Numbers and Transmission Rates*
 - SAMSI Transition Workshop, May 14 -16, 2007.
- *Analysis of Oscillatory Patterns in Disease Transmission*
 - SAMSI/MUCM Mid-Program Workshop, April 2-3, 2007.
- *Epidemiology of Information Spread*
 - 2005 SIAM Annual Meeting, July 11, 2005.
- *Epidemic Parameter Estimation via Ensemble Stochastic Search Methods*
 - 2005 SIAM Annual Meeting, July 13, 2005.
- *Rumors in Complex Attractors*
 - 2004 SIAM Annual Meeting, July 12-16, 2004.
 - International Conference in Complex Systems, May 16–21, 2004.
- *Initial Growth for Epidemics and Rumors*
 - Iowa Conference in Biomathematics, University of Iowa. November, 2003.
- *Rumor Propagation in Random Networks*
 - Computational and Mathematical Approaches to Homeland Security, Public Health, Policy and Control: Challenges Posed by Emerging and Re-emerging Diseases. June 30–July1, 2003.
- *Homogeneous Mixing versus Social Structure in Rumor Spreading*
 - 2003 SIAM Annual Meeting, June 17, 2003.

Seminars

- *Assessing Control Strategies in Heavy-Drinking Epidemics*
 - ETSU Institute for Quantitative Biology Seminar. February 27, 2014.
- *Mathematical Modeling of Contact Processes*

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- Department of Physics and Mathematics, Tennessee State University. February 20, 2014.
- *Modeling Infectious Diseases*
 - ETSU Department of Mathematics and Statistics Colloquium. November 30, 2012.
- *A Study of Prisoner's Dilemma on Real Social Networks*
 - Department of Mathematics, Valparaiso University. June 24, 2011
- *The Role of Space on Some Dynamical Processes*
 - ETSU Institute for Quantitative Biology Seminar. February 4, 2011.
- *Network Epidemic Models*
 - Colloquium of ETSU Department of Mathematics and Statistics. September 17, 2010.
- *Quantitative Modeling of the Spread of Scientific Ideas from Epidemiological Models*
 - Physics and Astronomy Seminar, Department of Physics and Astronomy, East Tennessee State University. October, 2009.
- *Parameter Estimation from Epidemic Data*
 - Institute for Quantitative Biology Seminar, Department of Mathematics and Statistics, East Tennessee State University. September, 2009.
- *Rumors in Complex Attractors*
 - Mathematical Biology Seminar, Department of Mathematics, Arizona State University. May, 2004.
- *A Mathematical Study for the Spread of Rumors*
 - Mathematical Sciences Graduate Student Seminar Series, Center for Applied Mathematics, Cornell University. October, 2003.
- *There is Something about Rumors*
 - Mathematical Epidemiology Graduate Student Seminar Series, Center for Nonlinear Studies, Los Alamos National Laboratory. April, 2003.
- *Informational Cascades*
 - Mathematical Epidemiology Graduate Student Seminar Series, Center for Nonlinear Studies, Los Alamos National Laboratory. March, 2003.
- *Epidemics in Random Graphs*
 - Mathematical Epidemiology Graduate Student Seminar Series, Center for Nonlinear Studies, Los Alamos National Laboratory. February, 2003.
- *Using Filter Methods in a Nonlinear Interior-Point Algorithm*
 - Mathematical Sciences Graduate Student Seminar Series, Center for Applied Mathematics, Cornell University. September, 2001.

Professional Membership

- Society for Industrial and Applied Mathematics.
- Society for Mathematical Biology.

Computer Skills

- Languages: MATLAB (fluent) and Python (basic).
- Tools: LaTeX, R, Sage, Maple, Minitab, Mathematica.
- Platforms: Unix/Linux, Windows, Mac OS X.
- Online course management: WebAssign, StatsPortal, Desire to Learn, WebWork.

References

- Robert Price Jr.: pricejr@etsu.edu
- Anant Godbole: godbolea@etsu.edu
- Suzanne Lenhart: lenhart@math.utk.edu
- H.T. Banks (Postdoctoral supervisor): htbanks@ncsu.edu
- Alun Lloyd: alun_lloyd@ncsu.edu
- Carlos Castillo-Chavez (Ph.D. advisor): ccchavez@asu.edu