Dr. Omar Saucedo

Department of Mathematics
460 McBryde Hall; Blacksburg, VA 24061-0123

CURRENT POSITION

Assistant Professor, August 2019-
Department of Mathematics
Virginia Polytechnic Institute and State University
Email: osaucedo@vt.edu

EDUCATION

Postdoctoral Fellow, August 2016-August 2019
Mathematical Biosciences Institute
The Ohio State University
Advisor: Joseph H. Tien

Doctor of Philosophy
University of Florida, August 2016
Concentration: Applied Mathematics
Advisor: Dr. Maia Martcheva

Bachelor of Science
Texas A&M University, May 2010
Concentration: Applied Mathematics
Minor: Statistics

RESEARCH INTERESTS

- Mathematical Epidemiology
- Avian Influenza
- Vector-Borne Diseases
- Data Fitting

GRANTS

- **CALS Strategic Plan Advancement: 2021 Integrated Internal Competitive Grants Program**, Virginia Tech, March 2021-June 2022. $60,000
  - PI: Gillian Eastwood; Co-PIs: Omar Saucedo, Alexandra Cumbie, Kevin Lahmers, Tom Stanley, Leslie Prillaman, Timothy Mize.
- **2021 Jeffress Trust Awards Program in Interdisciplinary Research**, August 2021-August 2022, $100,000
  - PI: Gillian Eastwood; Co-PIs: Alexandra Cumbie, Omar Saucedo, Kevin Lahmbers.
- **2021 CeZAP Interdisciplinary Team-Building Pilot Grant Program**, October 2021-June 2022, $19,989.
  - PI: Nick Ruktanoncha; Co-PIs: Ryan Calder, Omar Saucedo.

AWARDS

- **American Institute of Mathematics-Structured Quartet Research Ensembles**, American Institute of Mathematics (AIM), June 8-12, 2020
- **Mathematical Biosciences Institute Postdoctoral Fellowship**, The Ohio State University (OSU), August 2016-August 2019

- **International Congress on Industrial and Applied Mathematics Student Travel Award**, March 2015
- **Integrative Graduate Education and Research Traineeship (IGERT) Research Assistantship**, University of Florida (UF), January-August 2015
- **Society for Industrial and Applied Mathematics (SIAM) Student Travel Award**, August 2014
- **Integrative Graduate Education and Research Traineeship Fellowship**, University of Florida, August 2012-August 2014
- **Bridge to the Doctorate Fellowship**, University of Florida, August 2010-August 2012
- **Florida Board of Education Fellowship**, University of Florida, Summer 2010
- **National Science and Mathematics Access to Retain Talent Grant**, Texas A&M University, 2008-2010
- **Academic Competitive Grant**, Texas A&M University (TAMU), 2006-2008
- **Salutatorian Scholarship**, Texas A&M University, 2006
- Environmental Health and Safety Department Safety Recognition Award at TAMU for **A Vaccination Strategy and Optimal Control for Seasonal and H1N1 Influenza Outbreak** by Olivia Prosper, Omar Saucedo, and Doria Thompson, 2010
- 1^{st} place Taxonomy Winner in Student Research Week at TAMU for **A Vaccination Strategy and Optimal Control for Seasonal and H1N1 Influenza Outbreak** by Olivia Prosper, Omar Saucedo, and Doria Thompson, 2010

RESEARCH EXPERIENCE

- Collaborating with Dr. Linda Allen, Dr. Angela Peace, Dr. Christina Edholm, Dr. Blessing Emerenini, Dr. Nika Shakiba, Dr. Anarina Murillo, and Dr. Xueying Wang on modeling superspreading events, Spring 2017
- Participated in the Women Advancing Mathematical Biology workshop, Spring 2017-Present
- Collaborating with Dr. Joseph H. Tien's lab, Fall 2016
- Collaborated with Chanda Littles and Madelon Van De Kerk in Shrimp Population Model for IGERT Workshop, Fall 2012
- Collaborated in Dr. Juliet Pulliam's research lab in the Biology Department, Spring 2011-Summer 2016
- Collaborated with Dr. Xue-Zhi LI and Dr. Liming Cai at Xinyang Normal University, Xinyang City, China, Summer 2012
- Participated in the Mathematical and Theoretical Biology Institute (MTBI) research program at Arizona State University, Summer 2009

PUBLICATIONS

- Shakiba N., Edholm C., Blessing O. E., Murillo A., **Saucedo O.**, Wang X, Peace, A , Allen L.J.S., Effects of Environmental Variability on Superspreading Transmission Events in Stochastic Epidemic Infectious Disease Modelling, Vol 6, 560-583 (2021)
- Choi B., Busch S., Kazadi D., Ilunga B., Okitolonda E., Dai Y., Lumpkin R., **Saucedo O.**, KhudaBuksh W., Tien J., Yotebieng M., Kenah E., Rempala G. Modeling Outbreak Data: Analysis of 2012 Ebola Virus Disease Epidemic in DRC BIOMATH, Vol 8, No 2, 1-12 (2019)

- **Saucedo O.**, Martcheva M., and Annor A. Computing human to human avian influenza $\mathcal{R}_0$ via transmission chains and parameter estimation, Mathematical Biosciences and Engineering, 16(5) 3465-3487, (2019)
- Edholm C., Blessing O. E., Murillo A., **Saucedo O.**, Shakiba N., Wang X, Allen L.J.S., Peace, A. Searching for superspreaders: Identifying epidemic patterns associated with superspreading events in stochastic models, Understanding Complex Biological Systems with Mathematics, Association for Women in Mathematics, Series 14, 1-29, (2018)
- Littles C J., **Saucedo O.**, Van de Kerk M., Lorenzen K. A framework for exploring how Density-dependence early in the life history can affect louisiana's brown shrimp fishery, Marine and Coastal Fisheries, Vol. 9, Issue 1, 419-431, (2017)
- **Saucedo O.**, Martcheva M. Competition between low and high pathogenicity avian influenza in a two-patch system, Mathematical Biosciences, Vol. 288, 52-70, (2017)
- van de Kerk M., Littles C. J., **Saucedo O.**, Lorenzen K. The effect of latitudinal variation on shrimp reproductive strategies, PLoS ONE, Vol. 11, No. 4, (2016)
- Zhi X., Wang J., **Saucedo O.**, and Wang J. A vector-borne disease model with vector controlling and vaccination, Journal of Biological Systems, Vol. 21, No. 4, (2013)
- Prosper O., **Saucedo O.**, Thompson D., Torres-Garcia G., Wang X., and Castillo-Chavez C. Modeling control strategies for concurrent epidemics of seasonal and pandemic H1N1 influenza, Mathematical Biosciences and Engineering, Vol. 8, No. 1, 143-172, (2011)

ARTICLES SUBMITTED

- Investigating the Role of "Silent Spreaders" in COVID-19 Dynamics.
  - Journal: Bulletin of Mathematical Biology
  - Authors: Karen Hwang, Christina Edholm, Omar Saucedo, Linda Allen, Nika Shakiba
- Relating Eulerian and Lagrangian Spatial Models for Vector-host Disease Dynamics through a Fundamental Matrix.
  - Journal: Journal of Mathematical Biology
  - Authors: Esteban Vargas, Omar Saucedo, and Joseph H. Tien
- Host movement, transmission hot spots, and vector-borne disease dynamics on spatial networks.
  - Journal: Bulletin of Mathematical Biology
  - Authors: Omar Saucedo and Joseph H. Tien

ARTICLES IN PROGRESS

- Effects of perturbations on the network structure
  - Authors: Omar Saucedo, Joseph H. Tien
- Spatial influences on Ebola and MERS epidemic dynamics: an agent-based modeling approach
  - Authors: Christina Edholm, Blessing Emerenini, Anarina Murillo, Omar Saucedo, Nika Shakiba, Xueying Wang, Linda Allen, Angelica Peace

PRESENTATIONS

- 2021 Virginia Commonwealth University, October 8th (Invited Talk)
  - Session: VCU Biomath Seminar
  - Title: Modeling the Role of Superspreaders in Infectious Disease Outbreaks
- 2021 Society of Mathematical Biology Conference, June 14th (Virtual Invited Talk)
  - Session: From Primate to Vectors to Humans: Understanding the underlying mechanisms of disease transmission and control
  - Title: Tick-borne Diseases in Virginia
- 2021 Duke University, March 12th (Virtual Invited Talk)
  - Session: Mathematical Biology Seminar
  - Title: Modeling the Role of Superspreaders in Infectious Disease Outbreaks
- 2021 Virginia Tech, March 8th (Virtual Invited Talk)
  - Session: Association for Women in Math Research Days
  - Title: The Role of Mathematics in Infectious Disease Modeling
- 2021 Washington State University, February 2nd (Virtual Invited Talk)
  - Session: Mathematical Biology Seminar
  - Title: Computing Human to Human Avian Influenza $\mathcal{R}_0$ via Transmission Chains and Parameter Estimation
- 2021 Joint Mathematics Meetings, January 8th (Virtual Invited Talk)
  - Session: AMS Special Session on Advances in Modeling the Ecology of Infectious Diseases
  - Title: Understanding how structural network change impacts infectious diseases.
- 2020 Texas Tech University, November 5th (Virtual Invited Talk)
  - Session: Biomathematics Seminar
  - Title: Human movement and vector-borne diseases
- 2020 University of Iowa, October 5th (Virtual Invited Talk)
  - Session: MathBio Seminar
  - Title: Modeling the Role of Superspreaders in Infectious Disease Outbreaks
- 2020 SIAM Data Science May (Virtual Invited Talk)
  - Session: Data-Driven Methods and Modeling with Applications to Health Science
  - Title: Movement and Infectious Diseases
- 2020 Virginia Tech, March 25th (Virtual Talk)
  - Session: Math-Bio Seminar
  - Title: Searching for Superspreaders: Identifying Epidemic Patterns Associated with Superspreading Events in Stochastic Models
- 2019 AMS Fall Southeastern Sectional Meeting November 1-3 (Invited Talk)
  - Session: Special Session on New Developments in Mathematical Biology
  - Title: Human movement and vector-borne diseases

- 2019 SIAM Southeastern Atlantic Section Meeting September 21-22 (Invited Talk)
  - Session: Analysis and Simulations in Mathematical Biology Models
  - Title: Human movement and vector-borne diseases
- 2019 Society for Mathematical Biology, July 22-26 (Invited Talk)
  - Session: Vector-Borne Diseases: Improving our understanding of underlying mechanisms and implications for disease control
  - Title: Comparing the Eulerian and Lagrangian Spatial Models for Vector-borne Disease
- 2019 Computational and Mathematical Population Dynamics, May 21 (Invited Talk)
  - Session: Advancing Methods in Epidemiology
  - Title: Comparing the Eulerian and Lagrangian Spatial Models for Vector-borne Disease
- 2019 Spring Central and Western Joint Sectional Meeting, March 23 (Invited Talk)
  - Session: Special Session on What is Happening in Mathematical Epidemiology? Current Theory, New Methods, and Open Questions
  - Title: Comparing the Eulerian and Lagrangian Spatial Models for Vector-borne Disease
- 2018 Virginia Tech, August 29 (Invited Talk)
  - Session: Mathematical Biology Seminar
  - Title: Spatial Dynamics of Vector-borne Diseases
- 2018 Workshop on Disease Ecology and Eco-Epidemiology, March 26-30
  - Session: Poster Session
  - Title: Spatial Dynamics of Vector-borne Diseases
- 2018 University of Kentucky, January 18 (Invited Talk)
  - Session: Applied Mathematics Seminar
  - Title: Spatial Dynamics of Vector-borne Diseases
- 2017 Field of Dreams Conference, November 2-5, St. Louis, (Invited Talk)
  - Session: What is...
  - Title: Introduction to Mathematical Epidemiology
  - Session: Field of Research Panel Discussion
- 2017 Society for Mathematical Biology, July 17-20, Salt Lake City, Utah (Invited Talk)
  - Session: Vector-borne Diseases: What have we learned from them since the discovery of Malaria to the present
  - Title: Spatial Dynamics of Vector-borne Disease
- 2016 SIAM Annual Conference, July 11-15, Boston, Massachusetts (Invited Talk)
  - Session: Workshop Celebrating Diversity

  - Title: Computing Human to Human Avian Influenza $\mathcal{R}_0$ via Transmission Chains and Parameter Estimation

- 2016 American Institute of Mathematical Sciences (AIMS) Conference, July 1-5, Orlando, Florida (Invited Talk)
  - Session: Population Dynamics and Epidemiology
  - Title: Computing Human to Human Avian Influenza $\mathcal{R}_0$ via Transmission Chains and Parameter Estimation
- 2015 American Mathematical Society (AMS) Spring Southeastern Sectional Meeting, March 27-29, Huntsville, Alabama. (Invited Talk)
  - Session: Recent Trends in Mathematical Biology, III
  - Title: Competition Between Low Pathogenic and High Pathogenic Avian Influenza in a Two Patch System
- 2015 SIAM Computational Science and Engineering, March 14-18, Salt Lake City, Utah
  - Session: National Student Chapters Meeting with SIAM Leadership
- 2015 Emerging Pathogens Institute (EPI) Research Day, February 26, Gainesville, Fl (Poster)
  - Title: Competition Between Low Pathogenic and High Pathogenic Avian Influenza in a Two Patch System
- 2014 SIAM Life Science Conference, August 4-7, Charlotte, North Carolina (Invited Talk)
  - Session: Advances in Mathematical Modeling of Complex Aspects and Control of Some Prevalent Infectious Diseases - Part I of II
  - Title: A Two-Patch Avian Influenza Model
- 2014 IGERT Symposium, April 24-25, Gainesville, Florida (Invited Talk)
  - Session: Cohort 5 IGERT Symposium Workshop
  - Title: Population Dynamics of Brown Shrimp (Penaeus aztecus) in The Gulf of Mexico
- 2011 Florida-Georgia Louis Stokes Alliance for Minority Participation, February 3-6, Jacksonville, Florida (Poster)
- 2010 National Joint Conference AMS, January 13-16, San Francisco, California (Poster)
- 2009 National Society for Advancing Hispanic and Native Americans in Science Conference, October 15-18, Dallas, Texas (Poster)
- 2009 National SIAM Conference, July 6-10, Denver, Colorado (Poster)

TEACHING AND MENTORING

- Instructor: Math 5516 Math Model and Sim of Bio Systems- Spring 2021
- Instructor: Math 2214 Differential Equations- Fall 2019, Spring 2020, Spring 2021
- Instructor: Math 2568 Linear Algebra- Fall 2018, Fall 2017
- Instructor: MAC 2311 Calculus 1- Summer 2016
- Discussion Leader: MAC 2311 Calculus 1- Fall 2014, Fall 2015
- Private Tutor: Calculus 1- Spring 2015

- Co-mentor: Undergraduate student, Karen Wang, to conduct research over the summer with advisor Nika Shakiba and co-mentors: Christina Edholm and Linda Allen. Summer 2020-Present
- Mentor: Undergraduate student, Sydney Busch, in summer research program. Summer 2017
- Mentor: Undergraduate student, Abena Annor, to conduct research on Mathematical Biology, Spring 2015-Summer 2016
- Mentor: Help One Student To Succeed (HOST) program, 2007

SERVICE ACTIVITIES

- Judge: Layman Prize Competition, May 2020.
- VT COVID-19 Task Force.
- Career Panelist in the MORE workshop at Virginia Tech, October 2019.
- Reviewer: Reviewed multiple manuscripts for the following journals- Journal of Biological Systems, Mathematical Biosciences, Journal of Biological Dynamics, and SIAM.
- Speaker: Field of Dreams, Under represented minorities in Mathematics, St. Louis, November 2017
- Judge: The Ohio State Math Contest for Modeling, tOSU, November 2017
- Lecturer: Summer Research for Undergraduates
  - Program Title: Mathematical Biology Bootcamp 2017
  - Talk: Introduction to Mathematical Epidemiology
- Organizer: The 3^{rd} SIAM Gators Conference, UF, March 2014
- Volunteer: MAES Concession Stands/Fundraisers, 2009
- High School Math Contest Grader (TAMU) 2007-2009

COMPUTER EXPERIENCE

- Programming Languages: Java, Pascal, LaTeX
- Computer Algebra Systems: Maple, Matlab, Mathematica
- Statistical Packages: R Studio
- MS Word, MS Excel, MS Powerpoint

SOCIETY MEMBERSHIPS

- Society for Industrial and Applied Mathematics, Student Chapter President, UF, 2014-2016
- Society for Industrial and Applied Mathematics, Student Chapter Vice President, UF, 2012-2014
- Society for Industrial and Applied Mathematics, Student Chapter Secretary, UF, 2010-2012
- Society of Mexican American Engineers and Scientist (MAES), 2009
- Society for Advancing Hispanic and Native Americans in Science (SACNAS), 2009