Contact Information

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Education and Training

- **9/2010 - 7/2012**. Postdoctoral Fellow, Mathematical Biosciences Institute, Ohio State University, Columbus, OH.
- **9/2009 - 8/2010**. Postdoctoral Associate, Institute for Theoretical and Mathematical Ecology, University of Miami, Coral Gables, FL.
- **12/2009**. Ph.D. in Mathematics. Dissertation: *Mathematical Analysis of the Use of Trojan Y Chromosomes as Means of Eradication of Invasive Species*. Advisor: Dr. Monica K. Hurdal. Department of Mathematics, Florida State University, Tallahassee, Florida.
- **05/2005**. M.Sc. in Biomedical Mathematics. Department of Mathematics, Florida State University, Tallahassee, Florida.
- **05/1996**. B.Sc., Civil Engineering, Meritorious Thesis. National Prize of Excellence in B.Sc. Thesis, National University of Colombia.

Research

I am interested in **PDEs**, **ODEs**, **computational mathematics**, **bioinformatics**, and **pattern classification**. More specifically, I am interested in data science and "big data" problems. I am currently co-investigator in the following projects:

1. Malaria Host-Pathogen Interaction Center, MaHPIC, NIH's NIAID contract HHSN272201200031C, 2012-2017. PI Mary Galinski. MaHPIC involves the multidisciplinary study of malaria infections, immunity and pathogenesis of P. falciparum, P. vivax and P. knowlesi in the context of host-pathogen interactions, in humans and nonhuman primates, using a systems biology approach. Three nonhuman primate malaria species will be studied: P. coatneyi to model P. falciparum, P. cynomolgi to model P. vivax, and P. knowlesi, a monkey malaria species that has been causing illness and cases of death in humans in Southeast Asia. My role in MaHPIC: mathematical modeling based on 'omics data (functional genomics, lipidomics, proteomics, metabolomics).
2. International Centers for Excellence in Malaria Research - Center for non-Amazonian regions of Latin America - CLAIM, NIAID cooperative agreement U19AI089702-01, 2010-2017. PI Socrates Herrera. CLAIM is divided into three projects: Project 1 is evaluating the diversity of the ecology and parasite populations related to the epidemiology and clinical findings to establish a scientific framework that supports the development of new intervention strategies for malaria elimination in non-Amazonian areas of Latin America. Project 2 is addressing major gaps in understanding of the ecology, behavior, vector potential, and control of Anopheles malaria vectors to guide the development and implementation of more effective integrated vector management (IVM) strategies of National Malaria Control Programs (NMCPs). Project 3 aims to determine the clinical outcomes and their association with parasite and host features of malaria-infected individuals living in non-Amazon regions of LA with different intensities of malaria transmission. My role in CLAIM: Data manager and mathematical modeler.

Funding

- Subaward from NIH's International Centers for Excellence in Malaria Research, Center for non-Amazonian regions of Latin America (CLAIM), NIAID cooperative agreement #U19AI089702-01, 2013-2017. Total award: $158,960.
- Provost Summer Research Grant, University of Georgia, 2013. Total award: $5,000.
- Wilson Center for the Humanities and Arts, University of Georgia, 2014/15. Cluster Grants. *mSENS: Multisensory Information Design & Data Representation.* Total award: $5,000.

Publications

Submitted for publication as of February 26, 2015:

2015 Juan B. Gutierrez, Ming-Jun Lai, George Slavov. Bivariate Spline Solution of Time Dependent Nonlinear PDE for a Population Density over Irregular Domains. Submitted for Publication.

2015 Yi Yan, Brian Adam, Alberto Moreno, Mary Galinski, Jessica Kissinger, Juan B. Gutierrez. Mathematical model of within-host interaction between a Plasmodium parasite and the immune system. Submitted for Publication.

2015 Rana D. Parshad, Suman Bhowmick, Said Kouachi and Juan B Gutierrez. Global dynamics of a PDE model for mitigation of effects of bioterrorism via introduction of invasive species. Submitted for publication.

2015 Juan B. Gutierrez, Mary R. Galinsky, Stephen Cantrell, Eberhard O. Voit. From Within Host Dynamics to the Epidemiology of Infectious Disease: Scientific Overview and Challenges. Submitted for publication.

Peer-reviewed articles published or accepted for publication in scientific journals:

2015 Juan B. Gutierrez, Omar S. Harb, Jie Zheng, Daniel J. Tisch, Edwin Charlebois, Christian J. Stoeckert Jr., and Deirdre A. Joy. A Framework for Global Collaborative Data Management in Malaria Research. Accepted for publication with revision. Under revision. American Journal of Tropical Medicine and Hygiene.

2015 M Lopez-Perez, A Alvarez, JB Gutierrez, A Moreno, S Herrera and M Arevalo-Herrera. Malaria-Related anemia in patients from unstable transmission areas in Colombia. Am J Trop Med Hyg. 2015 Feb 4;92(2):294-301. DOI: 10.4269/ajtmh.14-0345.

2014 DA Forero-Pena, P Chaparro, A Vallejo, Y Benavides, JB Gutierrez, M Arevalo-Herrera, and S Herrera. Knowledge attitudes and practices on malaria in Colombia. Malaria Journal 2014, 13:165 DOI: 10.1186/1475-2875-13-165.

2013 JB Gutierrez, S Kouachi, RD Parshad. Global existence and asymptotic behavior of a model for biological control of invasive species via supermale introduction. Communications in Mathematical Sciences. 11(4):971-992. DOI: 10.4310/CMS.2013.v11.n4.a4

2013 JL Teem, JB Gutierrez. Combining the Trojan Y Chromosome and Daughterless Carp Eradication Strategies. Biological Invasions, May 2013. DOI: 10.1007/s10530-013-0476-1.

2013 JL Teem, JB Gutierrez, RD Parshad. A Comparison of the Trojan Y Chromosome and Daughterless Carp Eradication Strategies. Biological Invasions, May 2013. DOI: 10.1007/s10530-013-0475-2

2012 S Herrera, ML Quinones, JP Quintero, V Corredor, DO Fuller, JC Mateus, JE Calzada, JB Gutierrez, A Llanos, E Soto, C Menendez, Y Wu, P Alonso, G Carrasquilla, M Galinski, J Beier, M Arevalo-Herrera. Prospects for malaria elimination in non-Amazonian regions of Latin America. Acta Tropica. Volume 121, issue 3 (March, 2012), p. 315-323. DOI: 10.1016/j.actatropica.2011.06.018

2012 JB Gutierrez, MK Hurdal, RD Parshad, JL Teem. Analysis of the Trojan Y Chromosome Model for Eradication of Invasive Species in a Riverine System. Journal of Mathematical Biology. Volume 64, Numbers 1-2 (2012), 319-340. DOI: 10.1007/s00285-011-0413-9.

2010 RD Parshad, JB Gutierrez. On the Well Posedness of the Trojan Y Chromosome Model. Boundary Value Problems, vol. 2010, Article ID 405816, Nov. 2010. 10.1155/2010/405816

2010 RD Parshad, JB Gutierrez. On the Global Attractor of the Trojan Y Chromosome Model. Communications in Pure and Applied Analysis, 10(10):339-359, January 2010. 10.3934/cpaa.2011.10.339

2008 MK Hurdal, JB Gutierrez, C Laing, and DA Smith. Shape analysis for automated sulcal classification and parcellation of MRI data. *Journal of Combinatorial Optimization*, 15(3):257–275, 2008. DOI: 10.1007/s10878-007-9096-y.

2006 JB Gutierrez and JL Teem. A model describing the effect of sex-reversed YY fish in an established wild population: the use of a Trojan Y chromosome to cause extinction of an introduced exotic species. *Journal of Theoretical Biology*, 241(22):333–341, July 2006. DOI: 10.1016/j.jtbi.2005.11.032.

(a) Featured in Nature News. Louis Buckley. Sex change wipes out invasive species. *Nature*, July 2007. London, UK. http://dx.doi.org/10.1038/news070723-9 [Online; accessed accessed 25-Feb-2015].

(b) Featured in Trends in Ecology & Evolution. Samuel Cotton and Claus Wedekind (Switzerland). Control of introduced species using Trojan sex chromosomes. Trends in Ecology & Evolution 22(9), pp. 441-3, 09-2007. DOI: 10.1016/j.tree.2007.06.010.

(c) Featured in ScienceLine. Rachel Mahan. Supermales to the rescue. *Scienceline*, Jan 2008. New York, NY. http://scienceline.org/2008/01/11/env-mahan-invasives/ [Online; accessed 25-Feb-2015].

(d) Featured in NCR Hansdelsblad. Sander Voormolen. Vrouwtjes verdrijven (Females away). NCR Hansdelsblad, 2007. Rotterdam, Netherlands. http://www.nrc.nl/wetenschap/article1828576.ece/Vrouwtjes_verdrijven [Online; accessed 25-Feb-2015].

(e) Featured in Conservation Magazine. Cynthia Mills (WA, USA). Operation Sex Change. Conservation Magazine, a publication of the Society for Conservation Biology, Sep 2009. http://conservationmagazine.org/2009/07/operation-sex-change/ [Online; accessed 25-Feb-2015]

Refereed articles published in proceedings:

2011 John Teem and Juan B. Gutierrez. A theoretical strategy for eradication of Asian carps using a Trojan Y chromosome to shift the sex ratio of the population. In Duane C. Chapman, editor, *Bigheaded Carps in North America*. Published by the American Fisheries Society, AFS Symposium 74, Bethesda, MD, 2011. ISBN: 978-1-934874-23-3.

2008 Monica K. Hurdal, Juan B. Gutierrez, Christian Laing, Aaron D. Kline, and Deborah A. Smith. Geometric invariants for classification of cortical sulci. In *IEEE International Conference on Image Processing*. IEEE, pages 1156–1159, San Diego, CA, October 2008. DOI: 10.1109/ICIP.2008.4711965

2008 Juan B Gutierrez and Mark C Marino. Literatronica. Adaptive Digital Narrative. In ACM's Hypertext'08. Creating '08: Proceedings of the hypertext 2008 workshop on Creating out of the machine: hypertext, hypermedia, and web artists explore the craft, pages 5-8, New York, NY, USA. DOI: 10.1145/1379153.1379156

2006 Juan B. Gutierrez. Literatronic: Use of Hamiltonian cycles to produce adaptivity in literary hypertext. In *The Bridges Conference 2006: Mathematical Connections in Art, Music, and Science*, pages 215–224, London, UK, August 2006. The Bridges Organization. http://archive.bridgesmathart.org/2006/bridges2006-215.html.

Teaching Experience

At the University of Georgia:

2015 Instructor of MATH2700. Spring - Differential Equations.

2014 Instructor of MATH4780/6780. Fall - Computational Skills for Biology.

2014 Instructor of MATH4750/6750. Spring - Transforms.

2013 Instructor of MATH4780/6780. Fall - Computational Skills for Biology.

2013 Instructor of MATH4780/6780. Spring - Mathematical Biology.

2012 Instructor of BINF4005/6005. Fall - Computational Skills for Biology.

At other institutions:

2011 Instructor of MAT152. Spring - Calculus I, Ohio State University, Columbus, Ohio.

2010 Instructor of MTH300/BIL385. Spring - Mathematical Models in Biology and Medicine, University of Miami, Coral Gables, Florida.

2009 Instructor of MAC-1140.23 Spring - Pre-calculus, Florida State University, Tallahassee, Florida.

2008 Instructor of MAP-2480.02,04 Fall - Biocalculus Computer Laboratory, Florida State University, Tallahassee, Florida.

2008 Online instructor of the Máster de estudios literarios en la era digital (M.A. Literary Studies in the Digital Age, *Universitat Oberta de Catalunya* (UOC), Barcelona, Spain.

Professional Experience

- Assistant Professor of Mathematics and Bioinformatics, University of Georgia, Athens, Georgia. August 2012 to Present.
- Postdoctoral Fellow, Mathematical Biosciences Institute, Ohio State University, Columbus, OH. Sept 2010 - July 2012.
- Postdoctoral Associate, Institute for Theoretical and Mathematical Ecology, University of Miami, Coral Gables, FL. Sept 2009 - August 2010.
- Research Fellow. President. CAVIIAR Inc. Tallahassee, FL. Duties: Build mathematical models and their computational implementation (dynamical systems, partial differential equations, pattern classification, operations research). 2005 - 2010.
- Programmer/Analyst, Information Systems of Florida. Tallahassee, FL. Duties: Architect and programmer for MERLIN, the Communicable Disease Reporting System of the Bureau of Epidemiology, Florida Department of Health. Design enterprise web systems architecture, set development standards, design enterprise relational databases, write specifications for programmers, program according to specifications, design web pages, design and develop GIS applications. 2001 - 2008.
- Independent Engineer. Structural design, hardware, and software design for petroleum industry. 1999 - 2000.
- Author. Fiction writer funded with grants by the Colombian Ministry of Culture and the Bogotan Institute of Culture. Produced two novels and one story book. 1997 - 1998.
- Design Engineer. Inprotekto Ltda. Geographic Information Systems (GIS) and transportation models. 1996
- Engineering Assistant. Inprotekto Ltda and PCA Ltda. Several activities involving GIS data acquisition, structural design, aqueducts. 1992 - 1995

Service

- Editor for the Journal of Mathematical Biosciences (Elsevier).
- Member of the Executive Committee of the Latin American and Caribbean Studies Institute, University of Georgia.
- Consultant for the GrantsMART office, charged with coordinating large research grants, Office of the Vice President for Research, University of Georgia.

Information Technology Skills

I have know-how and experience in designing and implementing complex multi-tier information systems that integrate numerical algorithms (microcontrollers to supercomputers), relational databases, data mining, remote sensing & GIS, telecommunication, and user interfaces.

- *Operating Systems*: OS compatibles with the Portable Operating System Interface (POSIX) (UNIX, Linux, MacOS, Windows), DOS.
- *Computer Languages*: C++, C, Fortran, VB.NET, C#, ASP.NET, Java, JSP, JavaScript, SQL (ANSI and vendor variants such as T-SQL and PL-SQL).
- *Mathematics Software*: MATLAB, Mathematica, Maple, Scilab, R.
- *Database Management Systems*: SQL Server, Oracle, MySQL, MS Access.
- *Geographic Information Systems*: Map Windows, ArcGIS, MATLAB Mapping Toolbox.
- *Development Tools and Technologies*: Visual Studio, Eclipse, and productivity tools (MS Project/Office, HTML, XML/XSL, ArcXML).
- *Certifications*: MCSD.NET - Microsoft Certified Solution Developer for .NET.