

Curriculum Vitae

José Miguel Ponciano

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1 Education

- 2006. PhD. in Bioinformatics and Computational Biology, University of Idaho, Mathematics Department. Advisor: Paul Joyce (1958-2016). Dissertation: “On the use of stochastic population dynamics models in microbial ecology”.
- 2004. MS. in Statistics, University of Idaho. Thesis: “Estimation of density dependence, process noise and observation error: a comparison of modified maximum likelihood, restricted maximum likelihood and ML from replicated sampling”. Advisor: Dr. Brian C. Dennis (brian@uidaho.edu).
- 2001. MS. in Ecology, Universidad Austral de Chile. Thesis: “Modeling the population dynamics of a Host-Parasite System: a study case in the Southern Chilean Intertidal”. Advisor: Dr. Carlos A. Moreno (cmoreno@uach.cl).
- 1998. Licenciatura en Biología, Universidad del Valle de Guatemala. Thesis title: “Bird species composition as a function of the life zone and the distance to the agricultural frontier at the Reserva de Biósfera Sierra de las Minas, Guatemala”.
- B.S. Biology (1993-1996), Universidad del Valle de Guatemala.

2 Professional Appointments

- 2016-present: Associate Professor, Biology Department, University of Florida.
- 2010-2016: Assistant Professor, Biology Department, University of Florida.
- 2007-2010: Investigador (Researcher) Titular “A” at the Center for Research in Mathematics of México, CIMAT A.C.
- 2006-2007: Post-doctorate researcher at Montana State University, department of Ecology with Mark L. Taper, PhD.
- 2002-2006: Research Assistant (IBEST program-Initiative for Bioinformatics and Evolutionary Studies).
- 1993-1998: Field Ornithologist at the Guatemalan NGO FUNDAECO. Trained/supervised by Dr Chandler Robbins and Barbara Dowell.

3 Research interests

I am an ecologist and evolutionary biologist whose area of specialization is statistical inference for stochastic processes in Ecology and Evolution. I both develop novel, statistical approaches based on fundamental, stochastic processes, and apply these tools to basic and applied problems. My currently (2020) funded research projects are a reflection of the three main areas I have sought out to grow during my career:

- 1) Using stochastic processes to model the evolution of antibiotic resistance in plasmid-bacteria population dynamics. This was the topic of my dissertation, which I have developed in collaboration with Dr. Eva M Top over more than 16 years.
- 2) Evidential statistics and statistical science. The use of statistics in science is a topic dear to my heart. Although mathematics has been recognized as a fundamental tool ecologists can use to learn from the natural world, the central tenet of this second area of my research program is that effective use of this tool requires learning to filter scientific arguments through the sieve of statistical argumentation.
- 3) Stochastic population dynamics in ecology and its links to evolutionary dynamics. This study area encompasses extinction dynamics, community ecology and statistical phylogenetics. Though seemingly disparate, these topics are unified because they all involve stochasticity at a fundamental level. These topics share multiple conceptual threads that go well beyond the methodological and stochastic processes is the tool that bridges the gap between theory and common, practical questions confronted routinely by empiricists in these areas.

3.1 Awarded Grants

- 15) (May 2018) **Plasmid-bacteria coevolution promotes the spread of antibiotic resistance** 2 R01 AI084918-06 (Eva M. Top, PI at University of Idaho). Dates: 5/15/2018-4/30/2023. NIH-NIAID: \$1,816,801 total, and \$80,400 for UF. Project goals: (1) Test the generality of (i) increased plasmid permissiveness after host/plasmid coevolution, and (ii) helicase mutations as a mechanism of host adaptation to novel MDR plasmids.; (2) determine the effects of plasmid persistence and permissiveness on the emergence of expanded drug resistance; (3) determine the molecular mechanism of plasmid cost amelioration resulting from mutations in accessory helicases
- 14) (July 2016) **Elucidating causes of vaginal symptoms using a multi-omics approach** NIH-NINR, R01NR01595. \$493,125 Total, 4 years. PIs: Larry J. Forney (University of Idaho), Jacques Ravel (University of Maryland). Awarded institution: University of Maryland. Consortia: University of Idaho and University of Florida. The goal of this project is to identify genomic features of the vaginal microbiome (gene content, gene expression, metabolites), host gene expression and immunological factors, as well as metadata (such as modifiable factors like behaviors and diet) that predict the onset and predisposition to vaginal symptoms. My role is to investigate novel approaches to model selection in complex model spaces. Role: Co-PI.
- 13) (August 2015) **Dimensions: Collaborative Research: Community genomic drivers of moss microbiome assembly and function in rapidly changing Alaskan ecosystems.** NSF 15-533, \$851,840 total, 5 years. PI: Stuart McDaniel, UF Biology. Co-PIs: Noah Fierer (U Colorado at Boulder), Michelle Mack (Northern Arizona University). This proposal presents a comprehensive plan to model first the role of bryophyte genetic and phylogenetic variation in driving the assembly and function of their associated microbial community, and second the interactions between these dimension of biodiversity that influence Arctic and boreal ecosystem processes. Although it is clear that microbes are critical components of living systems at all levels of biological organization, the long-term role of the interdependencies between host

genotype and microbiome in the generation and maintenance of biodiversity are poorly understood. To fill this gap, the PIs will combine genomic and metagenomic tools with new phylogenetic and distribution modeling approaches to determine the role of microbiome niche conservatism and host local adaptation in shaping the response of Arctic and boreal biodiversity to planetary re-engineering climate change.

- 12) (July 2015) **Spatio-temporally explicit estimation of R0 for pathogens with environmentally-mediated transmission.** NSF 14-592 DEB/NIH EEID, \$2,100,000, 4 years. PI: Jason Blackburn, Geography department, UF, Ponciano, Co-PI. The major goals of this project are to synthesize animal movement data, pathogen persistence data, and environmental covariates in a mathematical modeling framework to better predict indirect transmission in long-lived environmental pathogens. We specifically focus on a general model of indirect, environmentally mediated, pathogen transmission. In this context, transmission results from animals contacting the pathogen from an environmental reservoir, which is promoted by host resource-selection and differential foraging across landscapes. Traditional threshold calculations become insufficient in this case. Therefore, we propose a novel spatially and temporally explicit mathematical model to track the lagged effects of the reproduction number of new environmental reservoirs from a single reservoir. Such a model integrates the intra-annual zoonotic seasons with inter-annual dynamics and readily accommodates the effects of environmental fluctuations, host movement and behavior. By construction, the model allows for a straightforward evaluation of the effect of different control measures. Other co-PI's: Robert Holt (UF), Sadie Ryan (UF), Wayne Getz (UC Berkeley), Holly Ganz (UC Davis)

- 11) (June 2015) **EAGER: The evolutionary consequences of subtle biases in the outcome of meiosis.** PI: Stuart McDaniel, Co-PI, Ponciano. NSF 15-1. \$150,000. Our long-term goal is to understand how biased segregation ratios contribute to the maintenance of genetic variation within species or reproductive isolation between recently diverged species. The objective of this proposal is to test for genetic correlations between meiotic segregation ratio and other fitness components in the highly polymorphic moss model system *Ceratodon purpureus*.

- 10) (Jan 2015) **NSF-Dissertation Research Grant to my student, Rosana Zenil-Ferguson, and her co-advisor, J.G Burleigh: Stochastic modeling approaches to evaluate the evolution of the chromosome number and genome size in plants.** Few mathematical models are available to estimate the tempo of chromosomal and/or genome size changes in plants, and none have accommodated different mechanisms that potentially shape chromosomes and genome. The goal of this project is to develop new stochastic models of chromosome number and genome size change that will enable scientists to infer the evolutionary mechanisms responsible for the variation in chromosome number and genome size as well as an inferential procedure that will allow estimation of the frequency of such evolutionary processes. Rosana is co-advised by J. Gordon Burleigh and myself.

- 9) (June 2014) **Direct determination of the distribution of fitness effects of spontaneous mutation in *C. elegans*,** RFA PA11-260. \$1,825,165.00, 4 years. PI: Dr. Charles Baer, University of Florida. Role: Co-investigator. The goals of the project are: 1) To determine the mean strength of selection against new spontaneous mutations when homozygous or heterozygous, and how that selection depends on the environmental context. 2). Experimentally determine the distribution of homozygous effects of new mutations on non- competitive AND competitive fitness, the distribution of heterozygous effects on non-competitive AND competitive fitness, and how the effects depend on the environmental context. 3). Computationally determine the distribution of fitness effects from the site frequency spectrum ("DFE from SFS") from whole-genome sequence of >160 wild isolates of *C. elegans*. Erik C. Andersen and J.M. Ponciano, Co-investigators.

- 8) (April 2013) NIH grant: **Plasmids as Vectors of Antibiotic Resistance: The Evolution of Plasmid Host-Range**. The grant was awarded to the PI, Dr. Eva M. Top from University of Idaho (R01AI084918, University of Idaho # ABK908, \$1,755,405.00). She requested a change of Co-PI to NIH, and invited me to participate. Funds for UF amount to \$84,661.00. This work aims at determining the evolutionary mechanisms of host range shifts by broad-host-range and narrow-host-range plasmids. To do that, we proposed to develop mathematical and statistical models and simulations of plasmid evolutionary dynamics and couple these models with experimental data measuring the stability of the plasmid and seeking to understand the molecular mechanisms of observed host range shifts. Project role: co-PI
- 7) (Jan 2013) NIH, NIGMS. R01-GM103604. **Modeling diversity and stability of vaginal microbial communities**. The long-term goal of this work is to develop a novel, data driven modeling framework that will allow the identification of fundamental biological processes responsible for the complex microbial community dynamics of the vaginal microbiota and the mechanisms that lead to community shifts. With this work, we seek to achieve a better understanding of the mechanisms, ecological processes and evolutionary routes behind the genesis of distinct bacterial species associations and temporal fluctuations in their relative abundances. Project role: PI. Consortia from whom the data will be obtained: Larry J. Forney, U. of Idaho and Jacques Ravel, U. of Maryland. Total awarded: \$1,090,915.00, 4 years.
- 6) Feb. 2014: NIMBioS Working group: **Evaluating the Association between Shifts in Antimicrobial Use Practices and Antimicrobial Resistance Resulting from FDA’s Risk Mitigation Strategy**. PIs: Craig Lewis (biological/policy expertise) and Yrjo Grohn (analytical epidemiology/mathematical modeling expertise). This NIMBioS Working Group will develop a framework to analyze the relationship between observed changes in antimicrobial use practices and resistance patterns over time, allowing the prioritization of additional data to for targeted collection and providing a framework to integrate federal, academic and industry activities aimed at mitigating the risks associated with antimicrobial resistance.
- 5) Awarded a start up package grant from the College of Liberal Arts and Sciences of University of Florida, starting Fall 2010
- 4) Concluded project. Summer 2008. Economical support for the first probability and statistics research summer from Guanajuato’s State Council for Research and Technology (CONCYTEG). Project number 08-02-K662-PE003, 15000 Pesos.
- 3) Concluded project. Two years support from Guanajuato’s State Council for Research and Technology for young researchers. Project title: “Modeling the evolution of antibiotic resistance”. Project number 09-02-K662-073, 60000 Pesos.
- 2) Concluded project. Montana State University subcontract to CIMAT (7000.00 U.S. dollars): estimation of genotype relative frequencies in 164 salmonids populations.
- 1) (1997) Won a Grant from the Guatemalan National Fund for Conservation (Fideicomiso para la conservación) to carry out my Biology thesis project. The project was selected among around 100 proposals.

4 Journal Publications

- My last name and that of PhD students/postdocs/alumni in my lab appears in [blue](#).
- Undergraduate, graduate students and postdocs that I’ve helped and mentored through their stats-learning journey appear with a double dagger (§), dagger (†) and a star (★) respectively.
- Two asterisks (**) denote colleagues from UF.

4.1 Published/In press articles

- 43) Jordt†, H., Stalder, T.†, Kosterlitz, O., [Ponciano, J.M.](#), Top E.M. and B. Kerr. 2020. Coevolution of host plasmid pairs facilitates the emergence of novel multidrug resistance. *Nature Ecology & Evolution*, pp.1-7
- 42) Easterday, R.†, [Ponciano, J.M.](#), [Gómez, J.P.](#), Van Ert, M.N., Hadfield, T., Bagamian, K., Blackburn, J.K., Stenseth, N.C. and W.C. Turner. 2020. Coalescence modeling of intrainfectoin *Bacillus anthracis* populations allows estimation of infection parameters in wild populations. *Proceedings of the National Academy of Sciences*. In Press.
- 41) [Gómez, J.P.](#), [Ponciano, J.M.](#), Londoño, G.† and Robinson, S.K. 2019. The biotic interactions hypothesis partially explains bird species turnover along a lowland Neotropical precipitation gradient. *Global Ecology and Biogeography*. Vol 00:1-12. DOI: 10.1111/geb.13047
- 40) [Ponciano, J.M.](#) and M.L. Taper. 2019. Model Projections in Model Space: A geometric interpretation of the AIC allows estimating the distance between truth and approximating models. *Frontiers in Ecology and Evolution*. Vol 7, article 413, doi: 10.3389/fevo.2019.00413
- 39) Dennis, B., [Ponciano, J.M.](#), Taper, M.L. and S.R. Lele. 2019. Errors in statistical inference under model misspecification: evidence, hypothesis testing, and AIC. *Frontiers in Ecology and Evolution*. Vol 7, article 372, doi: 10.3389/fevo.2019.00972
- 38) Blackburn, J.K.** , Ganz, H.H., [Ponciano, J.M.](#), Turner, W.C., Ryan, S.J**., Kamath, P., Cizauskas, C., Kausrud, K., Holt, R.D.** , Stenseth, N.C and Getz, W.M. 2019. Modeling Ro for pathogens with environmental transmission: animal movements, pathogen populations and Local Infectious Zones. *International Journal of Environmental Research and Public Health* 16(254);doi:10.3390/ijerph16060954.
- 37) Picardi, S.†, Basille**, M., Peters**, W., [Ponciano, J.M.](#), Boitani, L. and F. Cagnacci. 2019. Movement Responses of Roe Deer to Hunting Risk. *The Journal of Wildlife Management* 83(1): 43-51
- 36) [Blohm, G*](#). Gulbudak, H.†, Martcheva, M.** and J.M. Ponciano. 2019. Modeling intracellular replication of Falviviruses. In “Mosquitos: Species, Distribution and Disease”. Tabitha Terry, Editor. Nova Publishers.
- 35) [Gomez, J.P*](#)., Nekorchuk, D.M.†, Mao, L., Ryan, S.J**., [Ponciano J.M.](#) and Blackburn, J.K**. 2018. Decoupling environmental effects and host population dynamics for anthrax, a classic reservoir-driven disease. *PLOS ONE*. 13(12):e0208621.
- 34) [Zenil-Ferguson, R.](#), Burleigh, J.G.** and [J.M. Ponciano](#). 2018. Chromploid- an R package for chormosome number evolution across the plant tree of life. *Applications in Life Sciences*. 6(3): e1037.
- 33) [Ponciano J.M](#), Taper, M.L. and B. Dennis. 2018. Ecological change points: the loss of history and the strength of density dependence. *Theoretical Population Biology*.A121: 45-59.
- 32) [Ponciano, J.M.](#). 2018. A parametric interpretation of Bayesian Nonparametric Inference from Gene Genealogies: linking ecological, population genetics and evolutionary processes. *Theoretical Population Biology*.122:128-136
- 31) H.J. Brockmann**, St. Mary, C.M.** and [José Miguel Ponciano](#). 2018. Discovering structural complexity and its causes: breeding aggregations in Horseshoe Crabs. *Animal Behaviour*. 143:177-191

- 30) Loftie-Eaton W[†], Bashford K, Quinn H, Dong K, Millstein J, Hunter S, Thomason M, Merrikk H, [Ponciano J.M.](#) and Eva M. Top. (Ponciano and Top corresponding authors). 2017 . Compensatory mutations improve general permissiveness to antibiotic resistance plasmids. *Nature Ecology & Evolution*. DOI: s41559-017-0243-2
- 29) [Gómez, J.P.](#) [†], Robinson, S.K.^{**}, Blackburn, J.K.^{**} and [José M. Ponciano](#) (corresponding author). 2017. An efficient extension of N-mixture models for multi-species abundance estimation. *Methods in Ecology and Evolution*, DOI:10.1111/2041-210X.12856
- 28) [Zenil-Ferguson, R.](#) [†], [José M. Ponciano](#) and J. Gordon Burleigh^{**}. 2017. Testing the association of phenotypes with polyploidy: an example using herbaceous and woody eudicots. *Evolution*. DOI:10.1111/evo.13226 . Rosana Zenil-Ferguson won the Ernst Mayr Award at the Evolution meetings 2017 with this paper.
- 27) Gill, M.[†], Zill, J.[‡] and [J.M. Ponciano](#). 2017. Context-dependent landscape of fear: algal density elicits risky herbivory in a coral reef. *Ecology*. DOI 10.1002/ecy.1668.
- 26) [Zenil-Ferguson, R.](#), [José M. Ponciano](#) and J. Gordon Burleigh^{**}. 2016. The role of genome downsizing and genome size thresholds on the distribution of Angiosperms genome sizes .*American Journal of Botany*, 103 (10):1-12, doi:10.3732/ajb.1500408 .
- 25) Martinez, A.[†], [Gomez-Echeverri, J.P.](#), [Ponciano, J.M.](#) and Robinson^{**}, S. 2016 Quantitative traits, sociality and perceived predation risk in an Amazonian understory bird community. *The American Naturalist* Vol 187 (5). DOI: 10.1086/685894
- 24) Loftie-Eaton, W.^{*}, Yano, H.^{*}, Burleigh, S.[‡], Simmons, R.[‡], Hughes, J., Rogers, L.[‡], Hunter, S., Settles, M.L., Forney, L.J., [José M. Ponciano](#)^{*} and Eva M. Top^{*} . 2016. Evolutionary paths that expand plasmid host-range: implications for spread of antibiotic resistance. *Molecular Biology and Evolution* Vol 33 (4): 885-897. ^{*} denotes joint corresponding authors.
- 23) Taper, M.L. and [Ponciano J.M.](#) 2016. Projections in model space: multi-model inference beyond model averaging. In Bandyopadhyay, P., Brittan, G. and Mark L. Taper. 2016. *Belief, Evidence and Uncertainty: Problems of Epistemic Inference*. Springer Monographs in Philosophy of Science.
- 22) Taper, M.L. and [Ponciano J.M.](#) 2016. Evidential Statistics as a statistical modern synthesis to support 21st century science. *Population Ecology* 58 (1):9-29.
- 21) [Ferguson, J.](#), [Carvalho, F.](#), Murillo, O[†], Mark L. Taper and [Ponciano J.M.](#) Population growth, density dependence and environmental autocorrelation in animal populations. *Theoretical Ecology* DOI 10.1007/s12080-015-0276-6. 22pp.
- 20) [Ferguson, J.M.](#) and [J.M. Ponciano](#). 2015. Evidence and implications of higher order scaling in the environmental variation of animal population growth. *PNAS*. 112(9). doi: 10.1073/pnas.1416538112.
- 19) Etienne, V.[†], Andersen, E., [Ponciano J.M.](#), Blanton, D., Cadavid, Joyner-Matos, J., Chikako, M., Tabman, B. and C. Baer^{**}. 2015. The red death meets the abdominal bristle: Polygenic mutation for susceptibility to a bacterial pathogen in *Caenorhabditis elegans*. *Evolution*, 69(2):508-519.
- 18) Dennis, B. and [J.M. Ponciano](#). 2014. Density dependent state space model for population abundance data with unequal time intervals using the Ornstein Uhlenbeck process. *Ecology* 95(8):2069-2076.
- 17) [Ferguson, J.M.](#) and [J.M. Ponciano](#). 2013. Predicting the process of extinction in experimental microcosms and accounting for interspecific interactions in single-species time series. *Ecology Letters* 17:251-259.

- 16) [Carvalho, F.](#), Ahrens, R.** , Murie, D.** , [Ponciano J.M.](#), Aires-da-Silva, A., M. Maunder and F. Hazin. 2014. Incorporating specific change points in catchability in fisheries stoch assessment models: An alternative approach applied to the blue shark (*Prionace glauca*) stock in the south Atlantic Ocean. *Fisheries Research* 154 (2014): 135-146.
- 15) Barbour, A.B.†, [Ponciano J.M.](#) and Lorenzen, K** . 2013. Apparent survival estimation from continuous mark-recapture/resighting data. *Methods in Ecology and Evolution*. 4(9):846-853. doi: 10.1111/2041-210X.12059.
- 14) Tyreman, J.G.†, [Ponciano J.M.](#), Joyce, P., Forney, L.J. and L.J. Harmon. 2013. The evolution of antibiotic susceptibility and resistance during the formation of *Escherichia coli* biofilms. *BMC Evolutionary Ecology* 13:22-28.
- 13) Vander Zanden, H.†, Bjorndal, K.A.** , Musting, W., [Ponciano J.M.](#), Bolten, A.B** . 2012. Inherent variation in stable isotope values and discrimination factors in two life stages of green turtles. *Physiological and Biochemical Zoology* 85(5):431-441.
- 12) [Ponciano J.M.](#), G. Burleigh** , E. Braun** and M.L. Taper. 2012. Assessing parameter identifiability in phylogenetics using Data Cloning. *Systematic Biology* 61(6):955-972.
- 11) [Ponciano J.M.](#) and M. Capistrán. First principles modeling of nonlinear incidence rates in seasonal epidemics. *PLoS Comp. Bio.* 7(2): e1001079. doi:10.1371/journal.pcbi.1001079
- 10) Dennis, B., [Ponciano J.M.](#) and M.L. Taper. 2010. Replicated sampling increases efficiency in monitoring biological populations. *Ecology* 91(2): 610-620.
- 9) [Ponciano, J.M.](#), Mark L. Taper, Brian Dennis and Subhash R. Lele. 2009. Hierarchical models in Ecology: Confidence intervals, hypothesis testing and model selection using data cloning. *Ecology* 90(2): 356-362.
- 8) [Ponciano J.M.](#), La H.J. Joyce P. and L.J. Forney. 2009. Evolution of diversity in spatially structured *E. coli* populations. *Applied and Environmental Microbiology*. *Applied and Environmental Microbiology* 75(19):6047-6054.
- 7) Leen De Gelder, Julia Williams †, [Jose M. Ponciano](#), Sota, M. and Eva M. Top. 2008. Adaptive plasmid evolution results in host range expansion of a broad-host-range plasmid. *Genetics* 178:2179-2190.
- 6) [Ponciano J.M.](#), De Gelder L., Top E. and P. Joyce. 2007. The population biology of bacterial plasmids: a Hidden-Markov model approach. *Genetics* 176(2): 957-968.
- 5) De Gelder L., [Ponciano J.M.](#), Joyce P. and E. Top. 2007. Stability of a promiscuous plasmid in different hosts: no guarantee for a long-term relationship. *Microbiology* 153: 452-463.
- 4) Dennis B., [Ponciano J.M.](#), Lele S., Taper M. and D. Staples. 2006 . Estimating density dependence, process noise and observation error. *Ecological Monographs* 76(3): 323-341.
- 3) P. Joyce, Z.Abdo, [Ponciano J.M.](#), L. De Gelder, L. Forney, and E. Top. 2005. Modeling the impact of periodic bottlenecks unidirectional mutation and observational error in experimental evolution. *Journal of Mathematical Biology* 50: 645-662 (available online since 2004).
- 2) [Ponciano J.M.](#), F. Vandecasteele, T. Hess, L. J. Forney, R. L. Crawford, and P. Joyce. 2005. A stochastic approach to model the effect of environmental factors on bacterial growth. *Appl Environ Microbiol.* 71: 2355-2364.
- 1) De Gelder L., [Ponciano J.M.](#), Abdo, Z., Joyce P., Forney, L.J. and E. Top. 2004. Combining mathematical models and statistical methods to understand and predict the dynamics of antibiotic sensitive mutants in a population of resistant bacteria during experimental evolution. *Genetics* 168: 1131-1144.

4.2 Editorial service

- Currently Associate Editor for Ecology.
- Reviewer for the following journals: American Naturalist, Biological Letters, BMC Ecology, Ecology, Ecological and Environmental Statistics, Journal of Biological Dynamics, Mathematical Biosciences, Journal of Theoretical Biology, PLoS One, the Quarterly Review in Biology and the Proceedings of the Royal Society of London Series B and Oikos, Microbiome, Biology Letters, PLoS-One, Microbiome, Nature Communications, mBio.
- Guest Editor for the Frontiers In Research Topic: Evidential Statistics, Model Identification, and Science with Mark Taper and Yukihiro Toquenaga. We edited 12 papers and worked along 29 authors to put together a special issue on Evidential statistics. All manuscripts are Open Access:

<https://www.frontiersin.org/research-topics/7282/evidential-statistics-model-identification-and-science>

5 Academic Experience

5.1 Teaching

- 2020, Spring, UFL **Graduate**: “Phylogenomics” and “Statistical Principles for the Biological Sciences.”
- 2019, Spring, UFL **Graduate**: “Statistical Principles for the Biological Sciences.”
- 2018, Spring, UFL **Graduate**: “Phylogenomics.”
- 2017, Fall, UFL **Graduate**: “Statistical Principles for the Biological Sciences.”
- 2017, Spring, UFL **Undergraduate**: “General Ecology.”
- 2016, Fall, UFL **Graduate**: “Statistical Principles for the Biological Sciences.”
- 2016, Fall, UFL **Undergraduate**: “General Ecology.”
- 2016, Spring, UFL **Undergraduate**: “General Ecology.”
- 2015, Fall, UFL **Graduate**: “Statistical Principles for the Biological Sciences.”
- 2015, Spring, UFL **Undergraduate**: “Biological models in R.”
- 2014, Fall, UFL **Graduate**: “Statistical Principles for the Biological Sciences.”
- 2014, Spring, UFL **Graduate**: “Statistical principles for the biological sciences II: data analysis and interpretation.”
- 2013, Fall, UFL **Graduate**: “Statistical Principles for the Biological Sciences.”
- 2013, Spring, UFL **Graduate**: “Statistical Principles for the Biological Sciences.”
- 2012, Fall, UFL, IGERT Symposium **Graduate**: “Elements of statistical inference for stochastic processes in Biology.”
- 2012, Spring, UFL **Undergraduate** and **graduate** : “An introduction to Mathematical Biology.”
- 2011, Fall, UFL **Graduate**: “Evidence and Statistical Science.”
- 2011, Spring, UFL **Graduate**: “Statistical Principles for the Biological Sciences.”

- 2010, Fall, UFL [undergraduate](#) and [graduate](#): “Experiments in Ecology.”
- 2007-2008, 2008-2009, 2009-2010 [undergraduate](#) and [graduate](#): “Statistical Ecology” course for upper level mathematics undergraduates and for the master in Statistics at CIMAT.
- 2007-2008, 2008-2009, 2009-2010 [Graduate](#): “A graduate course in Multivariate Statistics” for statistics master students at CIMAT.
- 2006-2007 [Graduate](#): Co-teaching “Introduction to practical modeling in ecology”, Montana State University, Ecology department with Dr. Mark L. Taper
- 2001-2002 [Undergraduate](#): Teacher Assistant (Statistics department)
- 2004, 2005 [Undergraduate](#): Instructor “Statistics STAT401: Statistical methods and data analysis”, a graduate level course.
- 1995-1998 [Undergraduate](#): Teacher assistant and Instructor at the Biology department of the Universidad del Valle de Guatemala for various courses.

5.2 Mentored students during my career

To date I am either involved or was involved in the active research mentoring of [47 students](#), 8 of which were my advisees (5 PhD students at UF and 2 Ms and 1 undergraduate at CIMAT). Besides students from my own lab, I have participated in 21 PhD, 4 Ms and one undergraduate thesis committees ([22 at UF](#), [4 at CIMAT](#)). I currently serve in 12 PhD active thesis committees. These students come and have come from 8 different programs: Mathematics, Biology, Zoology, Botany, Fisheries, Geography, Wildlife Ecology and Conservation and Interdisciplinary Ecology and Plant Pathology.

5.2.1 Alumni from my lab at UF and placement:

5 graduated PhDs from UF, 3/5 are Assistant Professors, one is Senior Statistician at NOAA and one is postdoc.

- 1) Gabriela Blohm (Venezuela, Biology, PhD) [UF, 2011-2017](#) Postdoctoral Fellow with Dr. John Lednicky (UF Environmental and Global Health) after graduation and now has a permanent job at a DNA testing company member of the US EPA Compendium of Environmental Testing Laboratories/Environmental Response Laboratory Network (ERLN) that performs water and soil pathogen testing, analysis of foreign soils and environmental isolation techniques.
- 2) Juan Pablo Gomez (Colombia, Biology, PhD) [UF, 2010-2016](#) Now Assistant Professor at Universidad del Norte, Barranquilla, Colombia.
- 3) Rosana Zenil (México, Biology, PhD) [UF, 2010-2016](#) Now Assistant Professor at University of Hawaii, Manoa.
- 4) Jake M. Ferguson, (Seattle, WA, PhD) [UF, 2010-2014](#) Now Assistant Professor at University of Hawaii, Manoa.
- 5) Felipe Carvalho, PhD (Brazil). [UF, 2011-2014](#) Supervisory Research Mathematical Statistician at NOAA, Pacific Islands Fisheries Science Center, Hawaii.

Alumni from my lab at CIMAT and placement:

These were all thesis advisees (mathematics undergrad or masters) that I ushered into doing Mathematical Biology Research

- 6) Alejandra Donají Herrera Reyes (México). [CIMAT, 2008-2009](#) Advised her Mathematics Undergraduate Thesis, then on 2012 went to do a PhD in Mathematical Biology at University of British Columbia.
- 7) Adrian Jinich García (México) [CIMAT 2008-2009](#) Master program in Applied Mathematics. Went on to do his PhD at Harvard, Department of Systems Biology. Now postdoc at Weill Cornell Medicine, Division of Infectious Diseases focused on battling tuberculosis in developing countries. He was named one of last year's "Hanna H. Gray Fellows", a nationwide program established in 2017 by the Howard Hughes Medical Institute (HHMI) to identify and retain young researchers with the potential to make significant contributions in the biomedical and life sciences.
- 8) Rosana Teresa Zenil López (México). [Graduated 2008](#) from CIMAT's master program in Probability and Statistics. Thesis entitled: "A Hidden Markov model of Horizontal Transfer in bacteria". Rosana came with me to UF after her Masters, did her PhD and is now Assistant Professor in Biology (Phylogenetics) at University of Hawaii, Manoa.

5.2.2 Current students:

- 9) Javiera Alarcón-Valenzuela (Biology, PhD)

5.2.3 Participation in PhD, Ms and undergraduate thesis committees (Concluded):

I have mentored [21 PhD students](#), [4 Ms students](#) and [1 undergraduate student](#) through their theses and statistical growth by serving on their committees.

5.2.4 Concluded graduate thesis committees participation:

- 26) Lindsay Johnson, PhD, Biology (May 2020). "Phenotypic Effects of Spontaneous Mutations in *Caenorhabditis elegans*."
- 25) Mirosław Binder, PhD, Mathematics (Dec 2019). "Model of a Co-Circulation of Two Vector Borne Diseases (Zika / Dengue)."
- 24) Simona Picardi, PhD, Wildlife Ecology and Conservation (Dec 2019). "Movement Ecology of Wood Storks in the Southeastern U.S."
- 23) Rashidah Farid, PhD, Wildlife Ecology and Conservation (May 2019). "Demography and Population Dynamics of the Gunnison's Prairie Dog (*Cynomys Gunnisoni*) in the Southwest United States."
- 22) Arthur Rudolph, PhD, Zoology (May 2019). "Ecological and Evolutionary Dynamics of Flocculation in *Saccharomyces cerevisiae*."
- 21) Morgan A. Walker, Ms, Geography (May 2019). "Ungulate Use of Locally Infectious Zones (Lizz) in a Re-Emerging Anthrax Risk Area."
- 20) Anni Yang, PhD, Geography (May 2019). "Multi-Scale Modeling of Zoonoses: Exploring Two Indirectly Transmitted Pathogens in Southwestern Montana."
- 19) Jennifer F. Moore, PhD, Wildlife Ecology and Conservation (Aug 2018). "Ecology and Conservation of Mammalian Communities and the Impact of Illegal Human Activities in Nyungwe National Park, Rwanda."
- 18) Tania Chavarria Pizarro, PhD, Biology (May 2018). "Genetic and Phenotypic Population Structure of an Endemic Mangrove Warbler Subspecies (*Setophaga petechia xanthotera*) along an Environmental Gradient in Costa Rica."

- 17) Kristen Sauby, PhD, Biology (Dec 2017). “The Demographic Consequences of Native and Invasive Insect Herbivory for Native Cacti in Florida.”
- 16) Rebecca Borchering, PhD, Biology (May 2017). “Population Thresholds and Disease Ecology.”
- 15) Ruslandi Ruslandi, PhD Biology, (June 2016). “Silvicultural Intensification in Natural Forests in Indonesia: Consequences for Timber Yields, Carbon Dynamics, Tree Species Composition, and Profits.”
- 14) Gonzalo Rivas, PhD Wildlife Ecology and conservation (August 2015). “Ecological and Socioeconomic Effects of an Invasive Canopy Tree in the Galapagos Islands.”
- 13) Juan Torres, PhD Mathematics, University of Florida (Spring 2015). “Dynamics of Low and High Pathogenic Avian Influenza in Birds.”
- 12) Oscar Murillo García, PhD Wildlife Ecology and Conservation, University of Florida (Aug 2014). “Demography of Population Recovery: Discerning Pesticide Effects on Survival, Territory Occupancy and Breeding Success of Peregrine Falcons (*Falco Peregrinus*) in South Scotland.”
- 11) Alexander Shenkin, PhD, Interdisciplinary Ecology (May 2014). “Fates of Trees and Forests in Boliva Subjected to Selective Logging, Fire, and Climate Change.”
- 10) Carrie Vath, PhD, Wildlife Ecology and Conservation, University of Florida (May 2014). “Social and Economic Dimensions of the Bushmeat Trade in Cross River State Nigeria: An Ethno-Biological Approach to Conservation.”
- 9) Andrew Barbour, PhD, Fisheries and Aquatic Sciences, University of Florida (Dec 2013). “Processes Affecting Nursery Habitat Value of an Estuarine-Dependent Fish.”
- 8) Ari Martinez, PhD, Biology (May 2013). “Interspecific Communication and Its Consequences for the Organization of Permanent Mixed-Species Bird Flocks.”
- 7) Olivia Prosper, PhD, Mathematics (May 2012). “Modeling heterogeneities in Malaria.”
- 6) Mónica Itzuri Delgado Carrillo, Undergraduate Thesis, Mathematics (Dec 2009). “Mathematical modeling of bacterial growth curves for heavy-metal resistant strains”.
- 5) Isabel Cristina García Arboleda, Ms, Probability and Statistics (Dec 2008) “Unified estimation for the Galton-Watson process with immigration.”
- 4) Lidia Ery Toledo Rodriguez Ms, Probability and Statistics (Dec 2008). “Modeling of Cerambicids population dynamics in *Agave* plantations.”
- 3) José Arturo Montoya Laos, PhD, Probability and Statistics (Dec 2008). “The Likelihood profile in statistical inference.”
- 2) Juan Carlos Hernández Gómez, PhD, Applied Mathematics (Dec 2008). “ R_0 and some generalizations in cellular automata.”
- 1) Francisco Javier Rubio Álvarez, Ms Probability and Statistics (Dec 2008). “Statistical modeling of the ratio of two means from two normal random variables.”

5.2.5 Current participation in PhD committees: 12 active PhD students

5.3 Service to undergraduate students

- 2018-2020: Isabella Plummer: Isabella was my student in undergraduate Ecology. Then I involved her in a big data effort to compare avian biodiversity after 30 years in Perú. I taught her how to do geo-referencing and use R to characterize avian territories. She digitized the territories for 300 and some species from old and new maps. She is now at University of Texas.

- Summer 2019: Summer stats mentoring in the field to 4 Peruvian and 4 British undergraduate students at the Cocha Cashu reserve.
- Summer 2018: Field course on Statistical Ecology for ~ 20 Peruvian undergraduates taught at the Cocha Cashu reserve.
- 2017-2018 academic year: Kaila Paulay, Florina Wijekoon and Justin Cox: I mentored them through the design of biomath outreach material for elementary school kids.
- Statistical advising to undergraduates doing research in our department, in particular to those participating in the long-term Mockingbird monitoring project directed by Scott Robinson.
- Summer 2015 to Spring 2016: Participation in University of Florida's "University Minority Mentor Program" in which I will offer regular mentoring to minority undergraduate students transitioning to UF, in particular to those from hispanic origin.

6 Departmental service at UF

I have served in the graduate students admissions committee, the departmental seminar committee, the IT committee and the committee in charge of re-structuring the Zoology degree at UF. Besides these committees, I have actively participated in the recruitment of our new Assistant Professor hires. I currently serve on the recruitment committee and am slated to serve on the Chair recruitment committee in the coming year.

Organized academic visits at UF

I have facilitated the academic visits to our Biology department of professors Cécile Ané (statistical phylogenetics), Bruce Rannala (Statistical phylogenetics and population genetics), Larry Forney (microbial ecology), Paul Joyce (theoretical population genetics and statistical genetics), Eva Top (evolutionary and ecological dynamics of plasmid-bacteria systems), Mark Taper (population dynamics) and Brian Dennis (population dynamics).

7 Service at CIMAT

7.1 Organized events

- Organized the First meeting of statistical methods for mark-recapture experiments in wildlife at CIMAT, March 15-19 2010.
- Member of the organizing committee for the X^{th} CIMAT School in Probability and Statistics: "Stochastic modeling and inference in Science, with applications in population genetics". I invited professors Paul Joyce and Warren Ewens to teach the main bulk of the workshop, see

<http://www.cimat.mx/Eventos/xepe>

- Participation in the organizing committee of the second research summer in probability and statistics at CIMAT. See

<http://www.cimat.mx/Eventos/svpec09/>

7.2 Organized academic visits

- August 2009-May 2010: Awarded a fund to invite Dr. Brian Dennis to spend a sabbatical year at CIMAT.
- February 2008. Awarded funds from CIMAT to invite Drs. Brian Dennis (University of Idaho), Mark L. Taper (Montana State University) and Subhash R. Lele (University of Alberta) for a 10 days trip to CIMAT. I organized research meetings between them and various colleagues and students at CIMAT.
- March 2008. I hosted the visits of Drs. Paul Joyce and Larry Forney (Mathematics and Biology departments at the University of Idaho) to work on modeling bacterial biofilm evolution.
- June 2008. I hosted the visits of Drs. Mark Taper and Steven Kalinowski (Ecology Department, Montana State University) to work on a salmon stock identification problem.

7.3 Statistical Ecology Research Group at CIMAT

Along with three other colleagues in the Probability and Statistics Department at CIMAT we conceived the organization of diverse activities during an entire academic year with the objective of consolidating a research group in statistical ecology. To do that, we decided to potentiate the following items

- a physical environment for the interaction between students and researchers from every Department at CIMAT
- the institutional involvement from other universities and try to form a partnership for the development of our program and the exchange of students.
- the demand and curiosity of the students at a national level with respect to topics such as statistical ecology.

8 Graduate Academic Curriculum

- June-July 2006: I participated at the “Summer school in probability” at Cornell, organized by R. Durrett. Topic of the course: Mathematical population genetics. Taught by W. Ewens, R. Griffiths, S. Tavaré and five more speakers.
- Bioinformatics PhD and Statistics MS degrees coursework (University of Idaho): Stochastic Differential Equations, Measure theoretic probability theory (MATH536), Measure theory (MATH535), Evolutionary computation (in C/C++), Stochastic processes, Mathematical population genetics, Computational Biology, Systematic Biology, Bayes and Empirical Bayes methods for data analysis (Bradley P. Carlin), Statistical Ecology, Computer intensive methods in Statistics, Theory of linear models, Multivariate statistics, Ecological modeling, Mathematical Statistics, Probability theory (MATH451), Experimental Design, SAS programming, Statistics seminars (6), Biocomplexity seminars (3).
- Ecology MS coursework (Universidad Austral de Chile): Population Dynamics and Analysis of population trends, Prof. Alan Berryman (WSU), Generalized Linear Models using S-plus, Ecology and evolution of parasitism (by Michael Hochberg, Anders Pape Möller, François Renaud, Jean-François Guégan and M. George-Nascimento), Population genetics, Population Ecology, Ecology of Ecosystems, Community Ecology, Evolutionary Systematics, Experimental Design, Behavioral genetics, Biogeography, Multivariate statistics.

9 Talks and Poster Presentations outside UF and Short Courses taught

- 55) February 12, 2020. Invited Seminar Speaker at Cal State Long Beach's Biology department. Title of the talk: "Causes and consequences of temporal changes in the vaginal microbial flora."
- 54) December 13th 2019. Invited Speaker at University of Hawaii, Manoa's Biology department. Title of the talk: "Causes and consequences of temporal changes in the vaginal microbial flora."
- 53) April 10, 2019. Invited as a Seminar Speaker at Yale's EEB department. Title of the talk: "Bacterial community dynamics models in model space: Multi-model inference beyond model averaging."
- 52) November 7-10 2018. I was selected and invited by the graduate students of University of Kansas, Biology department to give the departmental talk. Talk title: "Multi-model inference through projections in model space".
- 51) September 12-October 2 2018. Cocha Cashu Research station in Peru: Statistical Ecology course taught on the field to a select group of Peruvian undergraduate students that received a scholarship for a three-months intensive field course.
- 50) 25-30 May 2018: I was invited by professor Gabriel Colorado from the Universidad Nacional in Leticia, Colombia to teach a one week course in Statistical Ecology. Between the postdoctoral researcher then working in my lab -Juan Pablo Gomez- and I, we planned the lectures and coding material. While there, we advised three students regarding their planned thesis, statistical analyses and we were invited to participate in a public and formal PhD thesis project report. Chatting with the student advisor, I realized that formalizing these periodic and public project report presentations can help a lot structuring a student's pace towards completing their dissertation work.
- 49) Scotland, July 2018: Invited talk. Model projections in model space: multi-model selection beyond model averaging. International Statistical Ecology meeting,
- 48) Scotland, July 2018: Invited talk. Inferring processes from dynamic time series abundances. International Statistical Ecology meeting.
- 47) Moscow, Idaho April 17th 2018. Invited to give a talk in the Applied Statistics Seminar Series of University of Idaho, which is a very long-standing seminar at the Statistics department of U of I. Talk title: "Multi-model inference through projections in model space".
- 46) February 21st 2018. Invited talk at Virginia Tech, Statistics Department weekly departmental Seminar in Blacksburg Virginia. Talk title: "Multi-model inference through projections in model space".
- 45) January 12th 2018. Invited talk at the Joint Mathematical Meetings in San Diego, special session "AMS Special Session on Mathematical Modeling of Natural Resources." Talk title: "Multi-model inference through projections in model space."
- 44) June 28 to July 1st 2016, Seattle, Washington Invited talk. Evidence, errors and information criteria. International Statistical Ecology Conference.
- 43) June 28 to July 1st 2016, Seattle, Washington. Brian Dennis, José M. Ponciano and Mark L. Taper. Invited talk. Stability, resilience and the strength of density dependence in stochastic populations. International Statistical Ecology Conference.

- 42) June 28 to July 1st 2016, Seattle, Washington. Mark L. Taper and José M. Ponciano. Invited talk. Model projections in model space: Multimodel inference beyond model averaging. International Statistical Ecology Conference.
 - 41) January 12 2016, Tokyo, Japan. Invited Lecture. Evidence under complex settings. Institute of Statistical Mathematics, International Symposium “What is a good model? Evidential statistics, information criteria and model evaluation”.
- <https://sites.google.com/site/symposium16shima/home>
- 40) January 13 2016, Tokyo, Japan. Invited Lecture. The strength of evidence and the probability of misleading evidence for information criteria. Institute of Statistical Mathematics, International Symposium “What is a good model? Evidential statistics, information criteria and model evaluation”.
- <https://sites.google.com/site/symposium16shima/home>
- 39) January 2016, Tokyo, Japan. Using stochastic population dynamics models to estimate bacterial interaction strengths and model the stability properties of the human microbiome. Kyoto University, Japan. International symposium of the Kanto Branch of Ecological Society of Japan: “Ecological Statistics”.
 - 38) May 2015: Stochastic models for the community dynamics and stability of the vaginal microbial flora. Talk at the Institute for Bioinformatics and Evolutionary Studies (IBEST), University of Idaho, by invitation.
 - 37) September 19 2014. Stochastic models for the evolution of antibiotic resistance, Knoxville, Tennessee at NIMBioS Working group Evaluating the Association between Shifts in Antimicrobial Use Practices and Antimicrobial Resistance Resulting from FDA’s Risk Mitigation Strategy.
 - 36) August 17th 2014. Parameter identifiability and the structure of variability in ecological and evolutionary time series. Lansing, MI. Invited talk for the annual meeting Beacon initiative for the Study of Evolution in Action
 - 35) April 7 2014: Ecological change points: the loss of history and the strength of density dependence?, Mathematical Biology Institute at Ohio State University.
 - 34) Feb. 17th 2014: The loss of history and the strength of density dependence. UF Wildlife, Ecology and Conservation Seminar.
 - 33) November 2013 Data Cloning and statistical inference for modern ecological and evolutionary stochastic models. UF Statistics departmental seminar.
 - 32) April 22-23 2013: I was invited by prof. John Drake to the Odum School of Ecology at the University of Georgia to teach a workshop on statistical inference for stochastic processes in Ecology, and give a seminar to the group: Population biology of infectious diseases, REU(Population Biology of Infectious Diseases REU Site). This research group normally deals with epidemiological diseases and does not usually deal with modeling of microbial population dynamics. I used the results of our research on population dynamics of bacterial communities as examples in the lectures to students and faculty in the group, both in a computer lab and in a regular seminar setting.
 - 31) August 2013: Presentation at the Joint Statistical Meeting, US-Canada, by invitation to the contributed session on Statistical Computing: “Recent advances in likelihood-based inference in Mixed Models using Data Cloning”. The title of the talk was “Data Cloning, Parameter identifiability and the structure of variability in ecological and evolutionary time series”. In the talk, I presented the setting of the time series of bacterial population dynamics of the vaginal flora as the prime setting to tackle new, relevant statistical questions using the methodology of Data Cloning.

- 30) October 2013. Talk by invitation at the Multi-Model Inference Symposium entitled “Multi-model inference: trends and future directions”, held at the annual Wildlife Society Meeting (TWS) at Milwaukee this year. I presented the talk: “Fundamental questions in biology, stochastic processes and multi-model inference.” Here again, the talk was done to a crowd not used to the topic of bacterial population dynamics but I traced again the conceptual and mathematical foundations that make of modeling bacterial population dynamics of relevance to this community.
- 29) October 2012: Invited to present my work on “On using spatial satellite tags information to estimate CPUEs” at Montpellier, France, within the framework of the EU MADE project (<http://www.made-project.eu>).
- 28) March 2012: Invited to give a talk at the Mathematical Biology Institute at Ohio State University in Columbus, Ohio, during the workshop: “Evolution and spread of diseases”.
- 27) March 2011: Invited to teach a Short Course at NIMBioS: Tutorial on Stochastic Models with Biological Applications, taught along with Jie Xiong, Linda Allen and Edward Allen (<http://www.nimbios.org/>).
- 26) November 2009. Short Course: “Probability Generating Functions in Ecology”. Presented at the Second Biostatistics Workshop held at CIMAT.
- 25) June 2009. Invited talk: “An integral approximation to epidemiological modeling, with applications to the dynamics of the syncytial virus”. Presented at the Second National Forum of mathematics Theses held at CIMAT.
- 24) June 2009. One Week Short Course: “The Coalescent Process”. Presented at the second summer for research in Probability and Statistics at CIMAT. Intended for the best graduate mathematics students from all over the country.
- 23) November 2008. Invited Talk: “Adaptive Evolution in bacterial biofilms”. CIMAT’s Biostatistics Workshop.
- 22) November 2008. Invited Talk: “Inference for hierarchical models in Ecology”. Presented at the Mexican Ecology Society Meeting in Mérida, Mexico.
- 21) October 2008. Invited Talk: “Adaptive Evolution in bacterial biofilms”. Presented at the seminar of CIMAT’s Computer Science Department.
- 20) September 2008. Invited Talk: “Stochastic population modeling in Ecology and Conservation Biology”. Presented at the Mathematics Department of the Unviuersidad de Guanajuato.
- 19) July 2008. Accepted Talk from an author-blinded, abstract selection process for the First International Statistical Ecology Conference (ISEC) held at the University of Saint Andrews, Scotland. Title: “Inference for hierarchical models in ecology: confidence intervals, hypothesis testing and model selection using data cloning”.
- 18) April 2008. Invited Talk: “Demographic stochasticity, environmental variability and genetic heterogeneity: implications for conservation biology”. Presented at the Institute for Research in Mathematics and Systems (IIMAS) at Mexico’s National University (UNAM), Mexico City.
- 17) April 2008. Invited Talk: “Adaptive evolution in bacterial biofilms”. Presented at CIMAT’s Pure Mathematics seminar.
- 16) March 2008. Invited Talk: “Demographic stochasticity, environmental variability and genetic heterogeneity: implications for conservation biology’.’ Presented at CIMAT’s Applied Mathematics’ seminar

- 15) November 2007. Invited Talk: “Challenges and opportunities for Statistical Science in Bioinformatics”. Presented at the first bioinformatics meeting at the Colegio de Post Graduados, Texcoco, México.
- 14) October 2007. Invited Talk: “Challenges and opportunities for Statistical Science in Bioinformatics”. Presented at the Annual Meeting of the Mexican Mathematics Society. Monterrey, Nuevo Leon.
- 13) December 2006. Talk: “Modeling the ecology and evolution of population dynamics: a stochastic approach”. Seminar of the Ecology Department at Montana State University.
- 12) July 2006: Chosen to present in the special Poster Presentation Session at the 1st Biennial IDEa Symposium of Biomedical Research Excellence (National Institutes of Health) in Washington D.C.
- 11) August 2006: Invited to an oral presentation at the Ecological Society of America meeting: “On the use of stochastic population models in experimental evolution”.
- 10) 2006, January: public thesis oral defense (approved).
- 9) 2005: Presentation for the IBEST group: Modeling bacterial plasmid dynamics using a State-Space model approach.
- 8) 2005: Presentation for the IBEST biofilm group: Extensive diversification occurs in biofilms of *Escherichia coli*.
- 7) 2004: Presentation for the IBEST group: Simple ecological models and statistical methods for bacterial growth cultures
- 6) 2004: Poster presentation of my Statistics Master thesis at the Annual Meeting of the Ecological Society of America at Portland, Oregon.
- 5) 2004: Public defense of Statistics masters thesis.
- 4) 2002-2004: Annual poster presentations of current research with Dr. Paul Joyce at the IBEST research group of the University of Idaho, before the project evaluators: Bruce Levin, Joseph Felsenstein and J. Roth.
- 3) 2001, April: Presentation of my Master Thesis work at the Annual Meeting of the Chilean and Argentinean Ecology Society held at Bariloche, Argentina.
- 2) 2001, May: Public defense of my Ecology Masters thesis at the Universidad Austral de Chile.
- 1) 1998: Public defense of my biology thesis at the Universidad del Valle de Guatemala.

10 Honors and Awards

- University of Idaho 2005-2006 Alumni Award for Excellence (one among 55 other honored students from a population of 10000).
- Graduated First student from the Ecology master’s degree. Awarded the R.A. Phillip 2001 “Best Scientific Thesis of the year” for my masters’ thesis at the Universidad Austral de Chile.
- Recipient of a scholarship from the President’s Guatemalan Secretary Office to carry out my Master’s studies in Chile.
- Best Biology Thesis of the Biology Department (1998), Universidad del Valle de Guatemala

11 Computer Skills

- In my published work, so far I have written programs in a variety of languages: Python, R & S-plus, Matlab, C/C++, SAS , Mathematica, Perl and Fortran.
- Experience with parallel computing since 2002 at University of Idaho and the HPC facilities at UFL.
- Experience with operating systems Windows, MaC OS and Unix.

Languages:

Fluent in French, Spanish and English (spoken and written).

Senior Faculty/Reference contacts

- Dr. Mark L. Taper (markltaper@gmail.com), Retired from Ecology Department at Montana State University.
- Dr. Robert D. Holt, (rdholt@ufl.edu), Department of Biological Sciences, University of Florida.
- Dr. Paul Joyce (joyce@uidaho.edu), Department of Mathematics and Dean of the College of Sciences, University of Idaho. Dr. Joyce died in a tragic accident in Spring 2016. He is and will be sorely missed.
- Dr. Larry J. Forney (lforney@uidaho.edu), Head Biology Department, University of Idaho.
- Dr. Brian Dennis (brian@uidaho.edu), Department of Statistics, University of Idaho.