# Joan Ponce

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| CONTACT INFORMATION | Arizona State University<br>School of Mathematics and Statistical Sciences<br>900 Palm Walk<br><br>Tempe, AZ 85281 |

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**EDUCATION**

**Purdue University**, West Lafayette, Indiana, USA

Ph.D., Mathematics,                August 2014 – December 2020
Thesis Advisor: Zhilan Feng

Dissertation: Structured Epidemiological Models with Applications to COVID-19, Ebola, and Childhood-Diseases

**University of Florida**, Gainesville, Florida, USA

B.S., Mathematics, Magna Cum Laude,           August 2011 – May 2013
Thesis Advisor: Maia Martcheva

**National Polytechnic**, Quito, Ecuador

B.S., Mathematics (not completed, transferred),      September 2008 – June 2011

**RESEARCH INTERESTS**

Differential Equations and Dynamical Systems, Mathematical Biology, Infectious Disease Modeling, Spatial Epidemic Modeling

**APPOINTMENTS**

**Arizona State University**, Tempe, AZ, USA
*Presidential Postdoctoral scholar*                         **Jan 2023** – *Present*

**University of California, Los Angeles**, Los Angeles, CA, USA
*Postdoctoral scholar*                              **Feb 2021** – **Dec 2022**

**Purdue University**, West Lafayette, Indiana, USA
*Research Assistant*                              **June 2020** – **Aug 2020**
*Teaching Assistant*                              **Aug 2016** – **May 2020**

**MODEMAT**, Quito, Ecuador
*Research Assistant*                              **Jan 2014** – **June 2014**

**University of Florida**, Gainesville, Florida, USA
*Independent Studies*                             **Aug 2012** – **May 2013**

**McGuire Center for Lepidoptera and Biodiversity**, Gainesville, Florida, USA
*Research Assistant*                              **Aug 2011** – **May 2012**

**AWARDS AND HONORS**

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| 2012 | Dean's List |
| 2013 | President's Honor Roll |
| 2022 – 2024 | MGB-SIAM Early Career (MSEC) Fellow |

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| FELLOWSHIPS AND SCHOLARSHIPS | 2014 – 2015 | Ross Fellowship, Purdue University |
| | 2014 – 2019 | NSF Graduate Research Fellowship |
| | 2019 | Purdue University College of Science Graduate Student International Travel Grant |
| | 2019 | SMB Landahl-Busenberg program Travel Grant |
| | 2020 | Grad Student Travel Grant to the Joint Mathematics Meetings |
| | 2020 | Math Research Communities, MSRI |
| | 2022 | 2022 Convergence Accelerator Team (CAT) award, NSF-Simons Center for Multiscale Cell Fate Research |
| | 2022 | AWM Travel Grant, Association for Women in Mathematics, Amount: $3000 |
| | 2022 | ECMTB Landahl-Busenberg Award, European Conference on Mathematical and Theoretical Biology. |

SERVICE

Conference Sessions Organized:

1. Advances in Numerical Optimization, Control and Applications
   Co Organizer
   SIAM Conference on Optimization, Seattle, Washington, USA       May 31 – June 3, 2023

2. Women in Math Biology
   Co Organizer
   SIAM Conference on the Life Sciences, Garden Grove, California, USA June 8 – 11, 2020

3. Mathematical Models for Infectious Diseases at Population Level
   Organizer
   SMB Annual Meeting, Montreal, Canada                           July 22, 2019

4. Mathematical models for infectious diseases at population and individual levels
   Co-organizer with Kyle Dahlin
   6th International Conference on Mathematical Biology            June 23, 2018

Panels attended:

1. Math Path Workshop
   Georgia State University Math Path program (Online panel)       July 18, 2022

2. Maximizing Opportunities for BIPOC
   Field of Dreams Conference, St. Louis, Missouri, USA           Nov 15-17, 2019

3. NSF GRFP information session
   Purdue University, West Lafayette, Indiana, USA                Sept 8, 2016

PUBLICATIONS IN PRINT

1. **Ponce, J.** and Thieme, H.
   Can infectious diseases eradicate host species? The effect of infection-age structure. Mathematical Biosciences and Engineering, 20(10): 18717-18760. doi: 10.3934/mbe.2023830. (2023)

2. Song, J., Okano, J. T., **Ponce, J.**, Busang, L., Seipone, K., Valdano, E., Blower, S.
   The role of migration networks in the development of Botswana's generalized HIV epidemic. eLife, 12, e85435 (2023).

3. Qu, Z., Patterson, D., Childs, L., Edholm, C., **Ponce, J.**, Prosper, O., Zhao, L.,
   Modeling Immunity to Malaria with an Age-Structured PDE Framework.
   SIAM Journal on Applied Mathematics, 83(3), 1098-1125, (2023).

4. Okano, J., **Ponce, J.**, Kronke, M., Blower S.,
   Lack of ownership of mobile phones could hinder the rollout of mHealth interventions in Africa.
   Elife 11 (2022): e79615.

5. Agusto, F., Erovenko, I., Fulk, A., Abu-Saymeh, Q., Romero-Alvarez, D., **Ponce, J.**, Sindi, S., Ortega, O., Onge, J., Peterson, A.,
   To isolate or not to isolate: The impact of changing behavior on COVID-19 transmission.
   BMC Public Health 22, 138 (2022).

6. Zhang S., **Ponce, J.**, Zhang Z., Lin G., Karniadakis G.,
An integrated framework for building trustworthy data-driven epidemiological models: Application to the COVID-19 outbreak in New York City. PLOS Computational Biology 17(9): e1009334, (2021).

7. Agusto F., Goldberg A., Ortega O., **Ponce, J.**, Zaytseva S., Sindi S., Blower S.,
How do interventions impact malaria dynamics between neighboring countries? A case study with Botswana and Zimbabwe. In Using Mathematics to Understand Biological Complexity (pp. 83-109). Springer, Cham, (2020).

8. **Ponce, J.**, Zheng Y., Lin G., Feng Z.,
Assessing the effects of modeling the spectrum of clinical symptoms on the dynamics and control of Ebola. Journal of Theoretical Biology, 467, 111-122, (2019).

9. Gulbudak, H., **Ponce J.**, Martcheva M.
Coexistence Caused by Culling In a Two-Strain Avian Influenza Model. Advances in Medicine and Biology: Vol 108 (Leon V. Berhardt), Nova Science Publishers, (2016).

Publications in Progress

1. Jastrebski, M., **Ponce, J.**, Burkow, D., Udiani, O., and Arriola, D.,
Ticks, Deer, Mice, and a Touch of Sensitivity: A Recipe for Controlling Lyme Disease.
arXiv:1308.2190v1[q-bio.PE]

2. **Ponce, J.**, Okano, J., Low, A., Dullie L., Mzumara W., Blower S.
Health geographics, epidemiology and the emergence of HIV treatment deserts.
(In Preparation).

3. Matsena Zingoni, Z., Okano, J., **Ponce, J.**, Dullie L., Blower S.
Travel-time inequities and hierarchical analysis of factors associated with HIV treatment in Malawi.
(In Preparation).

Teaching experience

**Instructor, Arizona State University**                              Jan 2023 – *Present*

- Modern Differential Equations, MAT 275.

**Teaching Assistant, Purdue University**                              Aug 2016 – May 2020

- Recitation section for Linear Algebra And Differential Equations, MAT 262.

Invited Talks

1. HIV Spread and Treatment Distribution: Two Country Case Studies
Mini symposium: Data-driven modeling approaches to population biology
SIAM Texas-Louisiana Sectional Meeting
Lafayette, LA, USA                              November 2023

2. HIV Spread and Treatment Distribution: Two Country Case Studies
Modeling, Computation, Nonlinearity, Randomness and Waves Seminar
University of Arizona, AZ, USA                              September 2023

3. Optimal control of the COVID-19 pandemic: age-dependent release policies in Ecuador
Mini symposium: AMS Special Session on Understanding COVID-19:
Three Years of Mathematical Models to Address the Global Pandemic I
Joint Mathematics Meetings
Boston, MA, USA                              January 2023

4. Optimal control of the COVID-19 pandemic: age-dependent release policies in Ecuador
Department of Mathematics Colloquium
New Mexico Tech, NM, USA                              November 2022

5. Geospatial modeling of accessibility to healthcare
   Scientific Sessions: Mathematical Biology
   Latinx in the Mathematical Sciences Conference 2022
   IPAM, CA, USA                                                                July 2022

6. An integrated framework for building trustworthy data-driven epidemiological models
   AWM Special Session on Women in Mathematical Biology
   Joint Mathematics Meetings
   Online                                                                       April 2022

7. Transmission dynamics of COVID-19 in Ecuador and age-dependent control strategies
   Claremont Center for the Mathematical Sciences (CCMS) Applied Math Seminar
   Claremont, CA, USA                                                           November 2021

8. An integrated framework for building trustworthy data-driven epidemiological models: Application to the COVID-19 outbreak in New York City
   From Machine Learning to Deep Learning Methods in Biology
   Society of Mathematical Biology Annual Meeting
   Online                                                                       June 2021

9. Dynamics of a Childhood Disease Model with Isolation
   AMS Special Session on If You Build It They Will Come: Presentations by Scholars in the National Alliance for Doctoral Studies in the Mathematical Sciences, I
   Joint Math Meetings
   Denver, Colorado, USA                                                        January 2020

10. Bifurcation analysis of a childhood disease model with isolation
    Claremont Center for the Mathematical Sciences (CCMS) Applied Math Seminar
    Claremont, CA, USA                                                          November 2019

11. Dynamics of a Childhood Disease Model with Isolation
    Canadian Mathematical Society Winter Meeting
    Vancouver, British Columbia, Canada                                         December 2018

12. Epidemiological Models with Quarantine
    Student Colloquium, Purdue University
    West Lafayette, Indiana, USA                                                October 2018

13. Assessing the Effects of Modeling the Spectrum of Clinical Symptoms on the Dynamics and Control of Ebola
    6th International Conference of Math Biology
    Beijing, China                                                              June 2018

14. Optimal Control of a Lyme Disease Model
    Primer Congreso Internacional de Ingenieria Biometica y Modelizacion Matematica en Biociencias
    Quito, Ecuador                                                              May 2014

15. Ticks, Deer, Mice and a Touch of Sensitivity: A recipe for Lyme disease
    Student Colloquium, University of Wisconsin-Whitewater
    Whitewater, Wisconsin, USA                                                  November 2013

CONTRIBUTED
TALKS

16. Assessing the Effects of Modeling the Spectrum of Clinical Symptoms on the Dynamics and Control of Ebola
    Annual Symposium on Biomathematics and Ecology: Education and Research
    Tempe, Arizona, USA                                                         October 2018

WORKSHOPS
ATTENDED

1. AIM workshop: Multi-scale modeling of malaria
   American Institute of Mathematics, San Jose, California        April 10 – 14, 2023

2. Collaborative Workshop for Women in Mathematical Biology
   Institute for Pure & Applied Mathematics (IPAM) UCLA           June 17 – 21, 2019

3. Tutorial Workshop on Parameter Estimation for Biological Models
   NC State University                                            July 25 – 28, 2018

4. The Mathematical and Theoretical Biology Institute (REU)
   Arizona State University                                       June – July, 2013

AFFILIATIONS

American Mathematical Society (AMS)
American Association for the Advancement of Science (AAAS)
Society for Mathematical Biology (SMB)
Society for Industrial and Applied Mathematics (SIAM)