Fausto Andres Bustos Carrillo, PhD

INFECTIOUS DISEASE EPIDEMIOLOGIST & DATA SCIENTIST

Education _____

University of California, Berkeley	Berkeley, CA
PhD in Epidemiology	May 2020
 Advisors: Dr. Eva Harris & Dr. Arthur Reingold Dissertation: Epidemiological, clinical, and spatial insights into Zika, chikungunya, and dengue Nicaragua 	virus infections in Managua,
University of California, Berkeley	Berkeley, CA
MA IN BIOSTATISTICS	May 2019
• Advisor: Dr. Alan Hubbard	
• Thesis: Case definitions and clinical manifestations of Zika in a large pediatric cohort in Managu	ıa, Nicaragua
Harvard University	Cambridge, MA
MS IN EPIDEMIOLOGY, CONCENTRATION IN INFECTIOUS DISEASE EPIDEMIOLOGY	May 2014
Advisor: Dr. Marc Lipsitch	
• Thesis: Estimating the extent and burden of non-pandemic, non-seasonal avian influenza tran- mans: a systematic review of the literature	smission from poultry to hu-
Stanford University	Stanford, CA
BA IN HUMAN BIOLOGY AND POLITICAL SCIENCE	Jun 2012

• Advisors: Dr. Douglas Brutlag & Dr. Virginia Walbot

Professional Experience

Oak Ridge Institute for Science and Technology

Emerging Leaders in Data Science Fellow at the National Institute of Allergy

OF INFECTIOUS DISEASES

- Collaborated with the National Institute of Allergy of Infectious Diseases (NIAID) to provided data science expertise, computational assistance, and substantive scientific knowledge to advance the research mission of NIAID
- Analyzed the depth of data science usage in the scientific literature across 212 priority areas for NIAID
- Led the serological assessment of a large observational study quantifying the impact of COVID-19 infections and vaccinations on immunocompromised system

Sustainable Sciences Institute

DIRECTOR OF EPIDEMIOLOGY AND STATISTICS, PROGRAM MANAGER

- Researched the clinical and spatial aspects of dengue, chikungunya, Zika, and COVID-19 epidemics in Managua, Nicaragua
- Contributed to many research projects at the Sustainable Sciences Institute and the Harris research program at UC Berkeley
- Provided epidemiological and biostatistical support to colleagues in Ecuador, at the University of Michigan, Ann Arbor, and at the National University of Singapore
- Worked closely with financial, accounting, and administrative personnel to ensure the timely submission of grants, publications, and reports necessary to the continued operation of ongoing scientific projects
- Organized, led, and conducted workshops on the use of the R statistical programming language for data entry, cleaning, visualization, and analysis at the novice and intermediate levels

California Department of Public Health

COVID-19 Modeling and Non-pharmaceutical Intervention Team

COVID-19 Epidemic Intelligence and Rapid Assessment Team

Analyzed daily COVID-19 case, death, and testing data to aid California state and county planning purposes
Provided epidemiological, statistical, and data visualization support for the release of COVID-19 data to the public

San Francisco, CA

Washington, DC

Sep 2021 – present

Jun 2020 – Aug 2021

Richmond, CA

Apr 2020

May 2020 – Jun 2020

US Department of State

OFFICE OF INTERNATIONAL HEALTH & BIODEFENSE, INTERN

- · Authored internal research and policy/economic analysis papers on polio eradication and neglected tropical diseases · Compiled data across federal government to develop a public diplomacy portfolio and embassy outreach materials for
- ambassadors to promote US public health research and assistance for World TB Day 2012 • Attained Secret-level security clearance to work in this position

College Aces

CO-FOUNDER AND SENIOR CONSULTANT

- Prepared high school students for college success by advising them on the selection of classes and extra-curricular activities
- · Produced original content for clients, fundraised, and developed the long-term vision for the company

Research Experience

Graduate Student Researcher, UC Berkeley School of Public Health

DIVISION OF INFECTIOUS DISEASES AND VACCINOLOGY, Dr. Eva Harris

- Analyzed the clinical, epidemiological, and spatio-temporal aspects of Zika virus, chikungunya virus, and dengue virus epidemics that impacted the Pediatric Dengue Cohort Study (N = 4,050) from 2004 - 2019
- Worked collaboratively with ~200 colleagues in Managua, Nicaragua to design new studies and publish research findings
- Taught R and applied statistics workshops to research group members
- Mentored 3 Master's students during the course of their thesis projects
- Provided biostatistical and epidemiological support to colleagues' biological, virological, anthropometric, and metabolic projects
- Created an accurate map of the study area to facilitate household visits by study staff
- Helped write, edit, and review 4 grant proposals submitted to the National Institutes of Health

Guest Researcher, Centers for Disease Control and Prevention

ENTERIC DISEASE EPIDEMIOLOGY BRANCH, Dr. Patricia Griffin

• Provided largest update to campylobacteriosis surveillance in the US since 1987 by analyzing case data and creating figures/tables for the research publication

Summer Intern, Centers for Disease Control and Prevention

ENTERIC DISEASE EPIDEMIOLOGY BRANCH, Dr. Patricia Griffin

Collated all reported campylobacteriosis case data covering the 2004 – 2012 time period from federal and state databases

Assisted in the design of CDC data intake forms used for American travelers returning from areas with a MERS-CoV outbreak

Graduate Student Researcher, Harvard School of Public Health

DEPARTMENT OF EPIDEMIOLOGY, Dr. Marc Lipsitch

· Conducted a systematic review of influenza to estimate the risk of avian influenza virus transmission from birds to humans, finding that transmission at the human-animal interface is rare

Undergraduate Student Researcher, Stanford University

DEPARTMENT OF POLITICAL SCIENCE, Dr. Shanto lyengar

 Collected political and biographical information for candidates who ran in the 2010 primary and general elections for federal or state-wide positions

Undergraduate Student Researcher, UC San Diego

DEPARTMENT OF BIOLOGY, Dr. Robert Schmidt

• Extracted hundreds of DNA samples from maize mutants and genotyped them to characterize maize genes responsible for maize ear development

Undergraduate Student Researcher, Stanford University

DEPARTMENT OF BIOLOGY, Dr. Virginia Walbot

- Performed a genetic screen of ~70,000 maize plants looking for Mu transposition mutagenesis-induced male sterility
- Characterized double mutants developmentally via laser capture microdissection, fluorescent staining, frozen section histology, scanning electron microscopy, and confocal microscopy

FAUSTO ANDRES BUSTOS CARRILLO, PHD · CV

Washington, DC

San Francisco, CA

Dec 2008 - Dec 2017

Jan – Apr 2012, Jul – Aug 2012

Aug 2016 - May 2020

Berkeley, CA

Aug 2013 - Feb 2017

May 2013 – Aug 2013

Feb 2013 - May 2014

Boston, MA

Atlanta, GA

Stanford, CA June – Aug 2011

San Diego, CA Jun – Aug 2010

Stanford, CA May 2009 – Jun 2012

Berkeley, CA

Talks and Presentations _____

Conference Talks and Posters

Nov 2021	Four epidemics of chikungunya, Zika, and COVID-19 in Nicaragua reveal bias in case-based mapping
	American Society of Tropical Medicine and Hygiene (ASTMH), National Harbor, MD, Talk
Jun 2021	Tyroler Prize Talk: Four epidemics of chikungunya, Zika, and COVID-19 in Nicaragua reveal bias in case-based mapping
	Society of Epidemiologic Research (SER), San Diego, CA, Talk
Jun 2021	Four epidemics of chikungunya, Zika, and COVID-19 in Nicaragua reveal bias in case-based mapping
	Society of Epidemiologic Research (SER), San Diego, CA, Talk
Dec 2020	Casual causal inference: Descriptive, risk factor, & spatial epidemiology in a time of pandemic crisis
	Society of Epidemiologic Research (SER), Boston, MA, Talk
Dec 2020	The non-spatial, spatial, and spatiotemporal epidemiology of explosive chikungunya and Zika epidemics in Managua, Nicaragua
	American Society of Tropical Medicine and Hygiene (ASTMH), Toronto, Ontario, Canada, Poster
Dec 2020	A comparative analysis of dengue, chikungunya, and Zika manifestations in a pediatric cohort
	American Society of Tropical Medicine and Hygiene (ASTMH), Toronto, Ontario, Canada, Poster
Nov 2019	Pediatric Zika is mild, varies by age, and is often missed under current case definitions American Society of Tropical Medicine and Hygiene (ASTMH), National Harbor, MD, Poster
Oct 2018	Seroprevalence, risk factor, and spatial analyses of Zika virus infection after the 2016 epidemic in Managua
	American Society of Tropical Medicine and Hygiene (ASTMH), New Orleans, LA, Talk American Society of Tropical Medicine and Hygiene (ASTMH), New Orleans, LA, Poster
Nov 2017	An index cluster study of chikungunya in Nicaragua with Bayesian and risk factor analyses American Society of Tropical Medicine and Hygiene (ASTMH), Baltimore, MD, Talk
Invited, N	on-conference Presentations
Nov 2019	Using statistics and models to discern the epidemiology of chikungunya and Zika viruses Georgetown University, Washington, DC, Talk
Aug 2019	Age-dependent manifestations and case definitions of pediatric Zika: a prospective cohort study
	Pan American Health Organization, Surveillance of Arboviral Diseases Meeting, Washington, DC, Talk
Jan 2018	High seroprevalence of anti-Zika virus antibodies in children and adults in Managua, Nicaragua after the 2016 epidemic
	University of California, Berkeley, Epidemiology Department Annual Retreat, Berkeley, CA, Talk

Teaching Experience

Instructor

Spring 2021 A2CARES R Workshop Series, NIH CREID Network (50 students)

Guest Lectures

- Spring 2019 **Foundations of Global Health**, University of California, Berkeley (25 undergraduate students) Professor: Dr. Arthur Reingold Data collection and analysis
- Fall 2018Epidemiology, California State University, East Bay (25 undergraduate students)Professor: Dr. Ryan GambaCareer paths and science in global public health
- Spring 2018 Advanced Epidemiological Methods, University of California, Berkeley (30 PhD students) Professor: Dr. Patrick Bradshaw Bayesian methods in epidemiology
- Spring 2017Foundations of Global Health, University of California, Berkeley (25 undergraduate students)Professor: Dr. Arthur ReingoldPreparing to go abroad as a student researcher
- Fall 2016Epidemiologic Methods II, University of California, Berkeley (110 PhD students)Professor: Dr. John ColfordAdvanced tutorial on directed acyclic graphs and information bias in epidemiology

Teaching Assistant

- Spring 2018Advanced Epidemiological Methods, University of California, Berkeley (30 PhD students)Professor: Dr. Patrick BradshawHead TA. Designed teaching material, including an 18-page primer on the ETEX typesetting language. Taught Rstatistical computing skills. Planned weekly section activities to reinforce advanced epidemiology topics.Graded and wrote answer keys for homeworks, midterm, and final exam.
- Fall 2017 Epidemiologic Methods I, University of California, Berkeley (110 Master's students)
 Professor: Dr. Sandra McCoy
 TA. Planned weekly section activities and midterms. Wrote and graded the midterm and final exams.
- Fall 2016Epidemiologic Methods II, University of California, Berkeley (110 PhD students)Professor: Dr. John ColfordTA. Designed teaching material and planned weekly section activities. Held weekly office hours to reviewepidemiological theory topics. Wrote questions for and graded the midterm and final exam.
- Spring 2016 Introduction to Epidemiology & Human Disease, University of California, Berkeley (250
 - undergraduate students)

Professors: Dr. Lisa Barcellos & Dr. Mahasin Mujahid

TA. Designed and led activities for 3 sections of students. Organized and graded the final projects. Held weekly office hours to review introductory epidemiological methods. Planned homework assignments. Wrote and graded the midterm and final exams.

Professional Activities _____

Reviewer	Science
	Nature Microbiology
	New England Journal of Medicine
	American Journal of Epidemiology
	PLOS Neglected Tropical Diseases
	International Journal of Infectious Diseases
	International Journal of Infectious Diseases
Membership	American Society of Tropical Medicine and Hygiene (ASTMH)
	Society for Epidemiologic Research (SER)

Skills _____

Languages	<i>Proficient:</i> English
	Intermediate: Spanish
	<i>Beginner:</i> French
Software	Proficient: R
	Intermediate: SAS, SaTScan, ArcGIS
Other	Microsoft Word, Excel, PowerPoint, Google Documents

Honors and Awards _____

2021	Tyroler Student Prize, Society of Epidemiological Research
2019	Outstanding Graduate Student Instructor Award, University of California, Berkeley
2017	Public Health Alumni Association Scholarship, University of California, Berkeley
2012	Center for Communicable Disease Dynamics Traineeship, Harvard School of Public Health
2012	Chicano Community Senior Award for Academic Excellence, Stanford University
2008 – 2012	Chicano Community Award for Highest Academic Honors, Stanford University
2008	Human Biology Research Exploration Award, Stanford University
2007	Gates Millennium Scholarship, The Bill and Melinda Gates Foundation

Research Support

R01 Al153416 (CO-Investigator)

Living in the post-Zika world: Impact of interactions between dengue and Zika viruses on diagnostics, antibody dynamics, and correlates of disease risk

This project develops new serological assays for the detection of dengue and Zika viruses, uses diverse modeling approaches to characterize viral transmission, and employs state-of-the-art methods for antibody analysis to study samples and data from the longest-running dengue/Zika cohort study. The overarching goal is to understand future flavivirus disease in tropical areas where infection and disease outcomes are modulated by widespread Zika virus immunity.

Supplement to P01 Al106695 (Graduate Student) NIAID/NIH

Spatiotemporal analysis of arbovirus infection, immunity, disease, and risk in Nicaragua

This project uses immunological, clinical, and location data from the longstanding Pediatric Dengue Cohort Study to characterize the spatial and spatiotemporal aspects of the dengue, chikungunya, and Zika epidemics observed in the cohort, with the goal of identifying spatial commonalities inherent to the epidemics and locales within the study area where interventions could reduce future epidemic potential.

Scientific Publications

Book chapters:

1. Harris E, **Bustos Carrillo F**. (2020). Migration of dengue and Zika: Across continents, around cities, and within the human host. In Knolle J. & Poskett J. (Eds.), *Migration*. Cambridge, UK: Cambridge University Press.

Published journal articles:

- Wraith S, Balmaseda A, Bustos Carrillo F, Guillermina K, Huddleston J, Kubale J, Lopez R, Ojeda S, Schiller A, Lopez B, Sanchez N, Webby R, Nelson M, Harris E, Gordon A. Homotypic protection against influenza in a pediatric cohort in Managua, Nicaragua. *Nature Communications*. 2022 March 4; 13:1990
- Katzelnick L, Zambrana JV, Elizondo D, Collado D, Garcia N, Arguello S, Mercado JC, Miranda T, Ampie O, Mercado BL, Narvaez C, Gresh L, Binder R, Ojeda S, Sanchez N, Plazaola M, Latta K, Schiller A, Coloma J, **Bustos Carrillo F**, Narvaez F, Halloran E, Gordon A, Kuan G, Harris E. Dengue and Zika virus infections in children elicit cross-reactive protective and enhancing antibodies that persist long term. *Science Translational Medicine*. 2021 October 6; 13(614):eabg9478
- 3. Sun H, Binder R, Dickens B, Florez de Sessions P, Rabba M, Xin Pei Ho E, Cook A, **Bustos Carrillo F**, Carey J, Kuan G, Balmaseda A, Ooi E, Harris E. *Sessions O. Viral genome-based Zika virus transmission dynamics in a paediatric cohort during the 2016 Nicaragua epidemic.* 2021 October 1; 72
- 4. E Maier H, Guillermina K, Saborio S, **Bustos Carrillo F**, Plazaola M, Barilla C, Sanchez N, Lopez R, Smith M, Kubale J, Ojeda S, Zuniga Moya J, Carlson B, Lopez B, M Gajewski A, Chowdhury M, Harris E, Balmaseda A, Gordon A. Clinical spectrum of SARS-CoV-2 infection and protection from re-infection. *Clinical Infectious Diseases*. 2021 August 19
- Echegaray F, Laing P, Hernandez S, Marquez S, Harris A, Liang I, Chambers A, McLennen N, Sugiharto V, Chen H, Vivero Villagran S, Collingwood A, Montoya M, Bustos Carrillo F, Simons M, Lopez A, Cooper P, Trueba G, Eisenberg J, Wu S, Messer W, Harris E, C Josefina, Katzelnick L. Adapting rapid diagnostic tests to detect historical dengue virus infections. *Frontiers in Immunology*. 2021 July 23; 12:703887
- Warnes C, Santacruz E, Bustos Carrillo F, Dario Velez I. The epidemiology and surveillance of dengue in Medellin, Colombia, 2009-2017. *American Journal of Tropical Medicine and Hygiene*. 2021 May 5; 104(5):1719-1728

13 Jul 2021 – 1 Sept 2021

24 Jan 2018 - 31 Dec 2019

NIAID/NIH

- Katzelnick L, Narvaez C, Arguello S, Lopez Mercado B, Damaris C, Ampie O, Elizondo D, Miranda T, Bustos Carrillo F, Mercado JC, Latta K, Schiller A, Segovia-Chumbrez B, Ojeda S, Sanchez N, Plazaola M, Coloma J, Halloran ME, Premkumar L, Gordon A, Narvaez F, de Silva A, Kuan G, Balmaseda A, Harris E. Zika virus infection enhances future risk of severe dengue disease. *Science*. 2020 Aug 28; 369(6507):1123–1128.
- Burger-Calderon R,* Bustos Carrillo F,* Gresh L,* Ojeda S, Sanchez N, Plazaola M, Katzelnick L, Mercado BL, Monterrey JC, Elizondo D, Arguello S, Nuñez A, Gordon A, Balmaseda A, Kuan G, Harris E. Age-dependent manifestations and case definitions of paediatric Zika: a prospective cohort study. *The Lancet Infectious Diseases*. 2020 Mar 1; 20(3):371–380.
- Bustos Carrillo F, Collado D, Sanchez N, Ojeda S, Lopez Mercado B, Burger-Calderon R, Gresh L, Gordon A, Balmaseda A, Kuan G, Harris E. Epidemiological evidence for lineage-specific differences in the risk of inapparent chikungunya virus infection. *Journal of Virology*. 2019 Feb 5; 93(4):e01622– e01618.
- 10. **Bustos Carrillo F**, Gordon A, Harris E. Reply to Gérardin *et al. Clinical Infectious Diseases*. 2019 Jan 1; 68(1):172–174.
- Zambrana JV,* Bustos Carrillo F,* Burger-Calderon R, Collado D, Sanchez N, Ojeda S, Monterrey JC, Plazaolo M, Lopez B, Arguello S, Elizondo D, Aviles W, Coloma J, Kuan G, Balmaseda A, Gordon A, Harris E. Seroprevalence, risk factor, and spatial analyses of Zika virus infection after the 2016 epidemic in Managua, Nicaragua. *Proceedings of the National Academy of Science*. 2018 Sep 11; 115(37):9294–9299.
- Carlson CJ, Getz WM, Kausrud KL, Cizauskas CA, Blackburn JK, Bustos Carrillo F, Colwell R, Easterday WR, Ganz HH, Kamath PL, Økstad OA, Turner WC, Kolstø AB, Stenseth NC. Spores and soil from six sides: interdisciplinarity and the environmental biology of anthrax (*Bacillus anthracis*). *Biological Reviews*. 2018 Nov; 93(4):1813–1831.
- Burger-Calderon R, Gonzalez K, Ojeda S, Zambrana JV, Sanchez N, Cruz CC, Laguna HS, Bustos Carrillo F, Plazaola M, Mercado BL, Elizondo D, Arguello S, Monterrey JC, Nuñez A, Coloma J, Waggoner JJ, Gordon A, Kuan G, Balmaseda A, Harris E. Zika virus infection in Nicaraguan households. *PLOS Neglected Tropical Diseases*. 2018 May 31; 12(5):e0006518.
- 14. Geissler AL,* **Bustos Carrillo F**,* Swanson K, Patrick ME, Fullerton KE, Bennett C, Barrett K, Mahon BE. Increasing *Campylobacter* infections, outbreaks, and antimicrobial resistance in the United States, 2004-2012. *Clinical Infectious Diseases*. 2017 July 20; 65(10):1624–1631.

In press:

15. Zambrana Madriz JV, **Bustos Carrillo F**, Ojeda S, Lopez M, Latta K, Brandt A, Kuan G, Gordon A, Reingold A, Harris E. Epidemiologic features of acute pediatric diarrhea in Managua, Nicaragua, from 2011 to 2019. *American Journal of Tropical Medicine and Hygiene*.

Pre-prints and manuscripts under review:

16. Bustos Carrillo F, Lopez Mercado B, Carey Monterrey J, Collado D, Saborio S, Miranda T, Barilla C, Ojeda S, Sanchez N, Plazaola M, Suazo Laguna H, Lopez M, Elizondo D, Arguello S, Gajewski A, Maier H, Latta K, Carlson B, Coloma J, Katzelnick L, Gordon A, Sturrock H, Balmaseda A, Kuan G, Gordon A, Harris E. Epidemics of chikungunya, Zika, and COVID-19 reveal bias in case-based mapping.

Working papers:

17. **Bustos Carrillo F**, Ojeda S, Sanchez N, Plazaola M, Collado D, Miranda T, Saborio S, Lopez Mercado B, Carey Monterrey J, Katzelnick L, Elizondo D, Arguello S, Brandt A, Campredon L, Latta K, Gordon A, Balmaseda A, Kuan G, Harris E. A comparative analysis of dengue, chikungunya, and Zika manifestations in a pediatric cohort.

- 18. Glennon E, Jephcott F, Oti A, Carlson C, **Bustos Carrillo F**, Hranac C, Parker E, Wood J, Restif O. Syndromic detectability of haemorrhagic fever outbreaks.
- 19. Narvaez F, Elizondo D, **Bustos Carrillo F**, Balmaseda A, Saborio A, Medina J, Videa E, Binder R, Harris E. Evaluation of pediatric metabolic syndrome criteria in Nicaragua.
- 20. Bustos Carrillo F, Harris E, Gordon A. Risk, immunity, and bias in infectious disease epidemiology.

* Co-first authors