

Fausto Andres Bustos Carrillo, PhD

INFECTIOUS DISEASE EPIDEMIOLOGIST & DATA SCIENTIST

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Education

University of California, Berkeley

Berkeley, CA

PHD, EPIDEMIOLOGY

May 2020

- **Advisors:** Dr. Eva Harris & Dr. Arthur Reingold
- **Dissertation:** *Epidemiological, clinical, and spatial insights into Zika, chikungunya, and dengue virus infections in Managua, Nicaragua*

University of California, Berkeley

Berkeley, CA

MA, BIostatISTICS

May 2019

- **Advisor:** Dr. Alan Hubbard
- **Thesis:** *Case definitions and clinical manifestations of Zika in a large pediatric cohort in Managua, Nicaragua*

Harvard University

Cambridge, MA

MS, EPIDEMIOLOGY

May 2014

- **Advisor:** Dr. Marc Lipsitch
- **Thesis:** *Estimating the extent and burden of non-pandemic, non-seasonal avian influenza transmission from poultry to humans: a systematic review of the literature*

Stanford University

Stanford, CA

BA, HUMAN BIOLOGY AND POLITICAL SCIENCE

Jun 2012

- **Advisors:** Dr. Douglas Brutlag & Dr. Virginia Walbot

Professional Experience

Sustainable Sciences Institute

San Francisco, CA

DIRECTOR OF EPIDEMIOLOGY AND STATISTICS, PROGRAM MANAGER

Jun 2020 – Present

- Conduct research into the clinical and spatiotemporal aspects of dengue, chikungunya, and Zika epidemics in the Pediatric Dengue Cohort Study in Managua, Nicaragua
- Contribute to many research projects at the Sustainable Sciences Institute and the Harris research program at UC Berkeley
- Provide epidemiological and biostatistical support to colleagues in Ecuador, at the University of Michigan, Ann Arbor, and at the National University of Singapore
- Work 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
- Plan, organize, lead, and conduct 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

Richmond, CA

COVID-19 MODELING AND NON-PHARMACEUTICAL INTERVENTION TEAM

Apr 2020

COVID-19 EPIDEMIC INTELLIGENCE AND RAPID ASSESSMENT TEAM

May 2020 – Jun 2020

- 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

US Department of State

Washington, DC

OFFICE OF INTERNATIONAL HEALTH & BIODEFENSE, INTERN

Jan – Apr 2012, July – Aug 2012

- 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

San Francisco, CA

CO-FOUNDER AND SENIOR CONSULTANT

Dec 2008 – Present

- 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

Berkeley, CA

DIVISION OF INFECTIOUS DISEASES AND VACCINOLOGY, *Dr. Eva Harris*

Aug 2016 – May 2020

- 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

Berkeley, CA

ENTERIC DISEASE EPIDEMIOLOGY BRANCH, *Dr. Patricia Griffin*

Aug 2013 – Feb 2017

- 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

Atlanta, GA

ENTERIC DISEASE EPIDEMIOLOGY BRANCH, *Dr. Patricia Griffin*

May 2013 – Aug 2013

- 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

Boston, MA

DEPARTMENT OF EPIDEMIOLOGY, *Dr. Marc Lipsitch*

Feb 2013 – May 2014

- 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

Stanford, CA

DEPARTMENT OF POLITICAL SCIENCE, *Dr. Shanto Iyengar*

June – Aug 2011

- 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

San Diego, CA

DEPARTMENT OF BIOLOGY, *Dr. Robert Schmidt*

Jun – Aug 2010

- 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

Stanford, CA

DEPARTMENT OF BIOLOGY, *Dr. Virginia Walbot*

May 2009 – Jun 2012

- 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

Research Support

Spatiotemporal Analysis of Arbovirus Infection, Immunity, Disease, and Risk in Nicaragua

SUPPLEMENT TO P01 AI106695, NIAID/NIH

24 Jan 2018 – 31 Dec 2019

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.

Talks and Presentations

Upcoming Conference Talks

- 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

Conference Talks and Posters

- 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, Non-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
- May 2018 **Public health research at Berkeley: Student perspectives**
University of California, Berkeley, School of Public Health 75th Anniversary, Berkeley, CA, 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 – **A2CARES R Workshop Series**, NIH CREID Network (50 students)
Summer 2021

Guest Lectures

Spring 2019 **Foundations of Global Health**, University of California, Berkeley (25 undergraduate students)
Professor: Dr. Arthur Reingold
Data collection and analysis

Fall 2018 **Epidemiology**, California State University, East Bay (25 undergraduate students)
Professor: Dr. Ryan Gamba
Career 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 2017 **Foundations of Global Health**, University of California, Berkeley (25 undergraduate students)
Professor: Dr. Arthur Reingold
Preparing to go abroad as a student researcher

Fall 2016 **Epidemiologic Methods II**, University of California, Berkeley (110 PhD students)
Professor: Dr. John Colford
Advanced tutorial on directed acyclic graphs and information bias in epidemiology

Teaching Assistant

Spring 2018 **Advanced Epidemiological Methods**, University of California, Berkeley (30 PhD students)
Professor: Dr. Patrick Bradshaw
Head TA. Designed teaching material, including an 18-page primer on the \LaTeX typesetting language. Taught R statistical 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 2016 **Epidemiologic Methods II**, University of California, Berkeley (110 PhD students)
Professor: Dr. John Colford
TA. Designed teaching material and planned weekly section activities. Held weekly office hours to review epidemiological 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
- Membership** American Society of Tropical Medicine and Hygiene (ASTMH)
Society for Epidemiologic Research (SER)

Skills

- Languages** *Proficient:* English
Intermediate: Spanish
Beginner: French
- Software** *Proficient:* R
Intermediate: SAS, SaTScan, ArcGIS
- Markup** \LaTeX , knitr
- 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

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:

1. 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.
2. 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.
3. **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.
4. **Bustos Carrillo F**, Gordon A, Harris E. Reply to Gérardin *et al.* *Clinical Infectious Diseases*. 2019 Jan 1; 68(1):172–174.
5. Zambrana JV,* **Bustos Carrillo F**,* Burger-Calderon R, Collado D, Sanchez N, Ojeda S, Monterrey JC, Plazaola 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.
6. 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.
7. 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.
8. 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.
9. 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

Pre-prints and manuscripts under review:

10. **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.
11. 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 transmission dynamics during the 2016 Nicaragua epidemic reveals low levels of household transmission.
 12. 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.
 13. 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. Long-term dynamics of protective and enhancing antibodies after dengue and Zika virus infection

Working papers:

14. **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.
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 gastroenteritis in Managua, Nicaragua, from 2011 to 2019.
16. 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.
17. 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.
18. 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.

* Co-first authors