

# Rachel Sippy

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## Education

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- 2013–2018      **University of Wisconsin-Madison**, G.P.A. 3.86  
PhD in Epidemiology; Minor in Medical Microbiology & Immunology  
Advisors: Jonathan Patz & Jorge Osorio  
Graduate Certificate in Global Health
- Dissertation: Climate & Environmental Drivers of Dengue Seasonality in Ecuador
  - National Center for Complementary & Integrative Health Fellowship
  - William E. Scheckler, MD Research Writing Award
- 2011–2013      **University of Utah**, G.P.A. 3.98  
Master of Public Health  
Advisor: Christy Porucznik
- Capstone: Contact Among School-aged Children in Utah
  - Phi Kappa Phi Honor Society, Delta Omega Honor Society
- 2003–2007      **Iowa State University**, G.P.A. 3.46  
Bachelor of Science in Genetics; Minor in Philosophy
- Dean's List, Alpha Lambda Delta Honor Society, Phi Eta Sigma Honor Society

## Research Experience

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- Present      Postdoctoral Researcher, **University of Florida & SUNY-Upstate**
- Developing and executing research projects related to mosquito-borne illness in collaboration with local communities and public health institutions in southern coastal Ecuador
  - Studying relationship between microclimates and regional climate patterns
  - Determining dual roles of climate and built environment on mosquito-borne illness and mosquito exposure risk at varying spatial scales
- 2013–2018      Epidemiology Graduate Student, **University of Wisconsin-Madison**
- Developed projects with local non-profit to address needs in rural Ecuador
  - Developed and executed research plan for fieldwork on mosquito surveillance
  - Preparation of grants and protocols for hospital-based case-control study on socioeconomic risk factors and patient knowledge of acute febrile illness
  - Analyzed data and prepared manuscripts regarding seasonality of mosquitos, climate, and dengue using generalized linear models, spatiotemporal analyses and predictions using machine learning
- 2013–2018      NCCIH Fellow, **University of Wisconsin-Madison**, Bruce Barrett
- Analyzed data from a randomized controlled trial on the effect of mindfulness meditation and exercise on acute respiratory illness using longitudinal and mediation approaches
  - Participated in weekly trainings on research and professional development
- 2015–2016      Surveillance and Outbreak Support, **Wisconsin Division of Public Health**
- Completed follow-up interviews with persons diagnosed with reportable diseases
  - Conducted telephone follow-up with laboratories and health care providers
  - Assisted staff with data entry, cleaning, and analysis of enteric disease reports
- 2012–2013      Research Intern, **University of Utah**, Molly Leecaster
- Assisted with Contact among Utah's School-aged Population Study of influenza
  - Briefed children and distributed proximity sensors and subjective contact logs to determine social contacts and mixing patterns for influenza transmission models

- 2012 Visiting Scientist, **Charles Darwin Research Station**, Patty Parker
- Sampled mosquito populations to determine potential vectors of avian malaria and correlations between environmental factors and prevalence of avian malaria
  - Captured and sampled Galápagos hawks for study of correlation between hawk social interactions and transfer of parasites between and among social groups
  - Prepared biological samples for inspection and international airline transportation
- 2011 Student Researcher, **Gamma West Cancer Services**
- Collected data on post-intervention patient satisfaction and health outcomes for prostate cancer patients treated with radiation brachytherapy
- 2008–2011 Assistant Scientist, **Iowa State University**, Qijing Zhang
- Performed multi-locus sequence typing, pulsed-field gel electrophoresis, and minimum inhibitory concentration determination of isolates collected from sheep, cattle, and goats for epidemiological study
  - Analyzed data using statistical methods to examine genetic and evolutionary relationships between isolates
  - Generated expression vectors for and obtained purified recombinant proteins CmeA and CmeC for future study of antibiotic resistance in *Campylobacter*
  - Assisted in handling, inoculation, and sampling of lab animals for study of abortifacient *Campylobacter*
  - Completed genome sequence of ovine abortion-associated isolate of *Campylobacter* for research of virulence factors and abortion-causing genetics
  - Performed cell culture infection/cytotoxicity studies of *Campylobacter* strains
  - Wrote and contributed to several publications and grants
  - Trained and supervised undergraduates, graduates, and visiting scholars on techniques, safety, procedures, and research
  - Responsible for general lab maintenance of supplies, orders, repairs and calibration of equipment, and upkeep of safety certifications in BSL-2 laboratory with a \$100,000 budget
- 2007–2008 Research Assistant, **University of Iowa**, Jeff Murray, Richard Smith, and Ed Stone
- Utilized simple sequence conformation polymorphism testing to find causal mutations of rare childhood blindness disorder Leber's congenital amaurosis
  - Performed linkage analysis among family with autosomal dominant glaucoma to determine causal mutation
  - Used simple sequence repeat polymorphism testing to find gene causing familial autosomal dominant deafness
  - Completed linkage study of immune system genes to find mutations associated with premature birth
- 2006–2007 Undergraduate Research Assistant, **Iowa State University**, James Reecy
- Collected tissues from wild-type and myostatin mutant mice
  - Compared DNA, RNA, and protein content levels of collected tissues for studies of dwarfism in Angus cattle
- 2006 Technology Transfer Intern, **Fort Dodge Animal Health**
- Maintained tissue culture of MDCK and CRFK cells with varying growth conditions
  - Designed and executed propagation optimization of six antigens in serum-free media for development of improved feline vaccines
- 2006 Undergraduate Research Assistant, **Iowa State University**, Richard Robson
- Characterized interaction of human muscle proteins  $\alpha$ -actinin and synemin
  - Purified protein domains of  $\alpha$ -actinin and synemin and performed blot overlays
- 2004–2008 Seasonal Research Assistant, **University of Iowa**, Mike Feiss
- Performed burst size studies of bacteriophage lambda DNA packaging mutants

## Research Funding & Awards

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Total funds raised: \$19,980

2017	William E. Scheckler, MD Research Writing Award
2017	American Society for Tropical Medicine & Hygiene Travel Award (\$2560)
2017	Twin Cities Women's Philanthropy Council International Research Travel Award (\$1500)
2017	Best Oral Presentation - Great Plains Emerging Infectious Disease Conference (\$100)
2017	Skatrud/Rankin Research Conference Travel Award (\$1000)
2016	Ira and Ineva Reilly Baldwin Wisconsin Idea Endowment (\$4000)
2016	Global Health Institute Research Support (\$3100)
2016	Private Donations (\$4530)
2014	Genetic Analysis Workshop 19 Travel Scholarship (\$1000)
2013	American Public Health Association Council of Affiliates Poster Award
2013	Utah Public Health Association Scholarship (\$500)
2013	F. Marian Bishop Scholarship (\$1500)
2012, 2013	Utah Public Health Association Conference Scholar (\$95)

## Publications (in preparation)

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- Sippy R**, Herrera D, Gaus D, Bartholomay L, Gangnon R, Osorio J, Patz J. Prediction of Microclimate Variables in Rural Ecuador.
- Sippy R**, Herrera D, Gaus D, Bartholomay L, Gangnon R, Osorio J, Patz J. Relationship Between Microclimate and Environmental Variables and Mosquito Abundance in Rural Ecuador
- Sippy R**, Gangnon R, Barrett B. Impact of Meditation or Exercise on Risk of Acute Respiratory Infections.
- Farovitch L, **Sippy R\***, Beltrán-Ayala E, Endy TP, Stewart-Ibarra AM, Leydet B. Tick-borne Disease in Southern Coastal Ecuador: Detection of Antibodies to Spotted Fever Group Rickettsia in Febrile Individuals in 2014 - 2015. Submitted to EID January 2019.
- Sippy R**, Herrera D, Gaus D, Gangnon R, Osorio J, Patz J. Seasonal Patterns of Dengue Fever in Rural Ecuador: 2009-2016. In review at PLoS NTD.

## Publications (published)

- Jaramillo-Ochoa R, **Sippy R\***, Farrell DF, Cueva-Aponte C, Beltran-Ayala E, Gonzaga JL, Ordoñez León T, Quintana FA, Ryan SJ, Stewart-Ibarra AM. Effects of political instability in Venezuela on malaria resurgence at Ecuador-Peru border, 2018. *Emerg Infect Dis.* 2019 Apr.
- Sippy R**, Moreira F. *Aedes albopictus* en América del Sur y su relación con la distribución, y mantenimiento de enfermedades. *Práctica Familiar Rural.* 2016; 3.
- Oh CS, Sippy J, Charbonneau B, Hutchinson JC, Romero OE, Barton M, Patel P, **Sippy R**, Feiss M. DNA Topology and the Initiation of Virus DNA Packaging. *PLoS One.* 2016 May 4;11(5):e0154785.
- Sippy R**, Kolesar JE, Darst BF, Engelman CD. Prioritization of Family Member Sequencing for the Detection of Rare Variants. *BMC Proceedings.* 2016;10(Suppl 7):11.
- Sippy J, Patel P, Vahanian N, **Sippy R**, Feiss M. Genetics of critical contacts and clashes in the DNA packaging specificities of bacteriophages  $\lambda$  and 21. *Virology.* 2015 Feb;476:115-23.
- Wu Z, **Sippy R**, Sahin O, Plummer P, Vidal A, Newell D, Zhang Q. Genetic diversity and antimicrobial susceptibility of *Campylobacter jejuni* isolates associated with sheep abortion in the United States and the United Kingdom. *J Clin Microbiol.* 2014 Jun;52(6):1853-61.
- Sippy R**, Sandoval-Green CMJ, Sahin O, Plummer P, Fairbanks WS, Zhang Q, Blanchong JA. Occurrence and molecular analysis of *Campylobacter* in wildlife on livestock farms. *Veterinary Microbiology.* 2012 Jun 15;157(3-4):369-75.

- Luo Y, Sahin O, Dai L, **Sippy R**, Wu Z, Zhang Q. Development of a loop-mediated isothermal amplification assay for rapid, sensitive and specific detection of a *Campylobacter jejuni* clone. *Journal of Veterinary Medical Science*. 2012 May;74(5):591-6.
- Sahin O, Fitzgerald C, Stroika S, Zhao S, **Sippy R**, Kwan P, Plummer P, Han J, Yaeger M, Zhang Q. Molecular Evidence for Zoonotic Transmission of an Emergent Highly Pathogenic *Campylobacter jejuni* Clone in the United States. *Journal of Clinical Microbiology*. 2012 Mar;50(3):680-7
- Plummer P, Sahin O, Burrough E, **Sippy R**, Mou K, Rabenold J, Yaeger M, Zhang Q. LuxS in the fitness and virulence of *Campylobacter jejuni*. *Infection & Immunity*. 2012 Feb;80(2):585-93.

## Book Chapters

- Greenwood C, **Sippy R**, Weinert B, and Adams A. Diet and Nutrition. In Remington PL, Brownson R, Wegner MV: *Chronic disease epidemiology and control*. 4<sup>th</sup> Edition. Chapter 8. 2016.

## Oral Presentations

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| 2018 | <p>Relationship between household characteristics and mosquito abundance in Ecuador<br/> Relationship between microclimates, environment, and mosquito abundance in Ecuador<br/> Seasonality of dengue fever in rural Ecuador: 2009–2016<br/> <i>International Congress of Infectious Disease &amp; Tropical Medicine</i>, Quito, Ecuador</p> <p>Estudio del Cohorte<br/> <i>Research Collaboration Day</i>, Machala, Ecuador</p>  |
| 2017 | <p>Men &amp; Women in MEPARI-II<br/> <i>Family Medicine &amp; Community Health Fellowship Symposium</i>, Madison, WI</p> <p>Communicating health issues under a changing climate at the bedside and beyond<br/> <i>Family Medicine &amp; Community Health Fellowship Symposium</i>, Madison, WI</p> <p>Seasonality of arboviral illness in rural Ecuador: 2009–2016<br/> <i>University of Wisconsin-Madison One Health Colloquium</i>, Madison, WI<br/> <i>Great Plains Emerging Infectious Disease Conference</i>, Iowa City, IA</p> <p>Adherence to treatment: a mediation analysis<br/> <i>Family Medicine &amp; Community Health Fellowship Symposium</i>, Madison, WI</p> |
| 2016 | <p>Validity of self-reported body mass index<br/> <i>Family Medicine &amp; Community Health Fellowship Symposium</i>, Madison, WI</p>  |
| 2015 | <p>Acute febrile illness in Santo Domingo, Ecuador<br/> <i>Family Medicine &amp; Community Health Fellowship Symposium</i>, Madison, WI</p> <p>PersonTime: visualizing health &amp; disease for your cohort<br/> <i>Family Medicine &amp; Community Health Fellowship Symposium</i>, Madison, WI</p>   |
| 2014 | <p>Sensitivity analysis of potential differential disease misclassification in MEPARI data<br/> <i>Family Medicine &amp; Community Health Fellowship Symposium</i>, Madison, WI</p> <p>Secondary analyses of the effect of exercise or meditation on the incidence of acute respiratory infections<br/> <i>Family Medicine &amp; Community Health Fellowship Symposium</i>, Madison, WI</p> <p>Prioritization of family member sequencing for the detection of rare variants: extreme phenotypes<br/> <i>Genetic Analysis Workshop 19</i>, Vienna, Austria</p>   |
| 2013 | <p>Infections among MEPARI participants<br/> <i>Family Medicine &amp; Community Health Fellowship Symposium</i>, Madison, WI</p>   |

Bridging the gap: engaging public health students and professional organizations in Utah

*Utah Public Health Association Conference, Ogden, UT*

2012 Avian malaria in the Galápagos  
*Division of Public Health Research Roundtable, Salt Lake City, UT*

2010 Emergence of a highly pathogenic *Campylobacter jejuni* clone: insights into pathogenesis and impacts on animal and public health  
*China Agricultural University, Beijing, China*

## Poster Presentations

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2018 Relationship between household characteristics and mosquito abundance in Ecuador  
Relationship between microclimate, environment, and mosquito abundance in Ecuador  
*American Society for Tropical Medicine & Hygiene, New Orleans, LA*  
Seasonal variation in microclimates and the role of regional weather and environmental factors  
*International Society for Environmental Epidemiology Annual Meeting, Ottawa, Canada*

2017 Seasonality of dengue in Ecuador and vaccination timing  
*Epidemics International Conference, Sitges, Spain*  
Seasonality of arboviral illness in rural Ecuador: 2009–2016  
*Epidemics International Conference, Sitges, Spain*  
*American Society for Tropical Medicine & Hygiene, Baltimore, MD*  
*American Society for Tropical Medicine & Hygiene Young Investigator Award Competition, Baltimore, MD*  
*Society for Epidemiologic Research General Meeting, Seattle, WA*  
*Population Health Sciences Departmental Welcome Day Poster Session, Madison, WI*

2016 Mosquito surveillance and population modeling in Santo Domingo, Ecuador  
*Global Health Symposium, Madison, WI*  
*Population Health Sciences Departmental Welcome Day Poster Session, Madison, WI*  
Non-travel associated cases of enteropathogenic or enterotoxigenic *Escherichia coli*  
*Epidemiology Congress of the Americas, Miami, FL*

2015 Exercise or mindfulness meditation decreases risk of acute respiratory infections  
*Society for Epidemiologic Research General Meeting, Denver, CO*  
*Population Health Sciences Departmental Welcome Day Poster Session, Madison, WI*  
PersonTime: visualizing health & disease for your cohort  
*WARF Discovery Challenge Poster Session, Madison, WI*

2014 Secondary analyses of the effect of exercise or meditation on the incidence of acute respiratory infections  
*IDWeek Poster Session, Philadelphia, PA*  
*WARF Discovery Challenge Poster Session, Madison, WI*  
*Population Health Sciences Departmental Welcome Day Poster Session, Madison, WI*

2013 Bridging the gap: engaging public health students and professional organizations in Utah  
*American Public Health Association Conference, Boston, MA*

2011 Genetic diversity of *Campylobacter* isolates associated with sheep abortion in the United States and the United Kingdom  
*American Society for Microbiology General Meeting, New Orleans, LA*

2010 Genetic diversity of *Campylobacter jejuni* in healthy sheep  
*One Health Symposium, Ames, IA*  
*American Society for Microbiology General Meeting, San Diego, CA*

## Invited Presentations

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| 2019 | “Vectorborne Disease and Interactions with Climate: Examples from Ecuador”<br>Roundtable on the Risk of Malaria Reemergence at the Ecuador-Peru Border, Salud Comunitaria |
| 2018 | “Vectorborne Disease and Interactions with Climate: Examples from Ecuador”<br>National Level Adaptation to Climate Change, Escuela Superior Politecnica del Litoral       |
| 2016 | “Epidemiology & Disease Ecology”<br>3 <sup>rd</sup> Annual Wildhaven Biology Field Day, Algona & Bishop Garrigon High Schools   |

## Professional Affiliations

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| Present      | American Society for Tropical Medicine & Hygiene     |
| Present      | International Society for Environmental Epidemiology |
| 2013–Present | Society for Epidemiologic Research                   |
| 2012, 2013   | Utah Public Health Association                       |
| 2012         | American Public Health Association                   |
| 2010, 2011   | American Society for Microbiology                    |
| 2007         | American Society of Human Genetics                   |

## Teaching Experience

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| 2018      | Discussion Section Leader, <b>University of Wisconsin-Madison</b> , Pat Remington <ul style="list-style-type: none"><li>• Led weekly discussion sections for undergraduate-level course in public health</li></ul>  |
| 2018      | Teaching Assistant, <b>University of Wisconsin-Madison</b> , Laurel Legenza <ul style="list-style-type: none"><li>• Assisted with graduate-level course in global health field work in Ecuador</li></ul>  |
| 2016–2018 | John Snow Society President, <b>University of Wisconsin-Madison</b> <ul style="list-style-type: none"><li>• Founded epidemiology and statistics methods club, with an emphasis on engaging early master’s and PhD students</li><li>• Held monthly learning sessions for newly developed methods for research in infectious disease, environmental health, genetic epidemiology, data management, and chronic disease</li></ul>  |
| 2017      | Teaching Assistant, <b>University of Wisconsin-Madison</b> , Karen Solheim, Maureen Durkin <ul style="list-style-type: none"><li>• Assisted with graduate-level courses in international public health and global health epidemiology, helping students to understand material</li><li>• Managed online course materials, created class assignments, graded assignments</li><li>• Lectured on climate change, migration, &amp; conflict, and health indicators</li></ul>  |
| 2017      | Guest Lecturer, <b>University of Wisconsin-Madison</b> <ul style="list-style-type: none"><li>• “Infectious Disease Epidemiology Research: A Roadmap”, Ajay Sethi</li><li>• “Mediation Analysis”, Leonelo Bautista</li></ul>   |
| 2013      | Teaching Assistant, <b>University of Utah</b> , Jim VanDerslice <ul style="list-style-type: none"><li>• Assisted with graduate-level course in environmental public health, primarily helping students to understand material and addressing student questions</li><li>• Managed online course materials, created class assignments, helped write exam questions, graded assignments and exams, and lectured on course topics including food production &amp; foodborne illness and the built environment</li></ul> |
| 2012      | Biostatistics Tutor, <b>University of Utah</b> <ul style="list-style-type: none"><li>• Successful tutoring for MPH students in biostatistics, including descriptive statistics, probability, and hypothesis testing</li></ul>   |

## Training & Certifications

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2018	<b>Institute for Disease Modeling</b> Agent-based Modeling
2018	<b>VectorBiTE Working Group</b> Density Dependence and Size Structured Mosquito Populations
2013–2018	<b>University of Wisconsin-Madison</b> Teaching Philosophies Workshop Women in One Health Workshop Breaking the Prejudice Habit: Creating Inclusion and Overcoming Bias Biological & Hazardous Materials Shipping National Center for Complementary & Integrative Health Fellowship Health Insurance Portability and Accountability Act Compliance
2008–2018	<b>Collaborative Institutional Training Initiative</b> Human Subjects Research Life Sciences Responsible Conduct of Research Biomedical Institutional Review Board Good Clinical Practice for Drug/Device Researchers
2017	<b>National Center for Atmospheric Research/Centers for Disease Control &amp; Prevention</b> Workshop on Weather, Climate and Health
2016	<b>Society for Epidemiologic Research</b> Estimation and Interpretation: Introduction to Parametric and Semi-parametric Estimators for Causal Inference
2015	<b>Summer Institute in Statistics and Modeling in Infectious Diseases</b> Mathematical Models of Infectious Diseases Stochastic Epidemic Models with Inference
2014–2015	<b>Genetic Analysis Workshop 19</b> Familial Phenotypes & Sequence Data
2008–2011	<b>Wilderness Medicine Institute</b> Wilderness First Responder

## Service & Outreach

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2018–Present	<b>Society for Epidemiologic Research</b> Communications Committee
2018	Social Media Contributor
2017	Annual Meeting Abstract Reviewer
2015, 2016	Annual Meeting Volunteer
2015–Present	<b>Journal Reviewer</b> Journal of Infectious Disease, PLoS One, BMC Infectious Diseases
2018	<b>University of Wisconsin-Madison</b> Campus Climate Committee
2017–2018	MPH Curricular Transformation Committee
2017–2018	Population Health Sciences Student Representative
2013–2018	Family Medicine & Community Health Fellowships Social Chair
2013–2018	Population Health Sciences Student Organization
2017	Supervisory Collaborator for iForward Student Spaceflight Experiment Program Proposal
2016–2017	Go Big Read Review Committee
2015–2017	Curriculum Committee Member
2014–2015	Work Environment Committee Member
2012	<b>University of Utah</b> Student Advisory Committee Vice President

## **Skills**

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Languages: Spanish, French, German, Czech

Software: R, SAS, EpiInfo, GoogleEarth, Tableau, Engauge Digitizer, HOBOWare, EndNote, Microsoft Office

Laboratory: DNA/RNA isolation, PCR (gradient/touchdown/real-time), primer design, plasmid construction, PFGE, MLST, MIC, SDS-PAGE, sequence alignment, immuno-staining, blotting, blood smear slides, cell culture

Field work: GPS, HOBO/iButton Climate Data Loggers, sample collection from humans/mice/birds/guinea pigs/cattle, mosquito trapping (gravid/light/CO<sub>2</sub>/BG Sentinel traps), mosquito dissection and slide preparation

## **International Work Experience**

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Ecuador (31 months), Czech Republic (3 months)