University of Michigan
Department of Mathematics
530 Church St
Ann Arbor, MI 48109
✆ 707.799.9564
✉ jrconrad@umich.edu
http://jessicarconrad.github.io/

Jessica R. Conrad

Curriculum Vitae

Summary of Qualifications

Ms. Conrad works on developing and analyzing mathematical, computational, and statistical models for the spread of infectious diseases such as smallpox, Ebola, dengue, Zika, Chikungunia, malaria, Chagas, influenza, and SARS-CoV. She is interested in research problems pertaining to dynamical systems and epidemiology, particularly modeling emerging and re-emerging infectious diseases and determining effective control strategies to halt disease transmission.

Education

Jan 2020 - Present	**PhD in Applied & Interdisciplinary Mathematics and Scientific Computing**, *University of Michigan*, Advisor: Dr. Marisa Eisenberg.
Jan 2016 - May 2018	**Master of Science in Public Health, Biostatistics**, *Tulane University*, Advisors: Dr. John Lefante and Dr. Latha Rajan, Public Health Analysis: An Assessment of Polynomial Distributed Lag in Mosquito-Born Disease Risk Modeling, GPA: 3.97.
Aug 2013 - Dec 2016	**Bachelor of Science, Mathematics**, *Tulane University*, Advisors: Dr. James (Mac) Hyman and Dr. Claudia Herrera, Thesis: Mitigating Chagas Disease: Fighting an Infection with an Infection, GPA: 3.88.
Aug 2013 - Dec 2016	**Bachelor of Science, Public Health**, *Tulane University*, GPA: 3.88.

Grants and Fellowships

2019	Clare Boothe Luce Fellowship
	Michigan Institute for Computational Discovery and Engineering Fellowship
2015	Louisiana Supervised Undergraduate Research Experience (SURE) Grant
Select Travel Grants	SIAM-SEAS Conference (2018), Penny Jessop Travel Grant (2017), Student Government Association Grant (2017), ICMA-VI Conference (2017), SAMSI Undergraduate Workshop (2017), Newcomb-Tulane College Travel Grant (2015), SACNAS First Time Travel Grant (2015), Research Training Group Workshop on Agent-Based Modeling (2015)

Competitive Awards

2018	Los Alamos 2018 Post-Masters Internship in Infectious Disease Modeling
2017	Tulane 34 Award
	NSF's SEES Fellows: Modeling for sustainability in a changing environment
2013	Presidential Scholar Award for Tulane University
	Air Force Type II Four Year Scholarship

Professional Experience

July 2018 – Aug 2019
Postmasters Research Assistant, *Theoretical Division, T-6*, Los Alamos Naitonal Laboratory (LANL), I developed a database and models for 30 diseases of interest to the Defense Threat Reduction Agency; conducted anomaly analysis for driving factors of mosquitos carrying West Nile Virus prevalence in the United States through internal LANL funding; and collected clinical, syndromic, and genomic data for the seasonal flu; also conducted preliminary research in accuracy and prediction of influenza diagnosis in clinical settings for the Department of Homeland Security.
PI: Dr. Paul Fenimore; **Role:** Research Assistant

Jan – Dec 2017
Public Health Analysis Masters Thesis, *School of Public Health and Tropical Medicine*, Tulane University, I constructed a polynomial distributed lag model under different truncation lag criteria (simple, marginal, and minimized AIC) to predict reported dengue cases in Ceará, Brazil. I determined which predictors were most significant for dengue transmission in Ceará.
Advisor(s): Dr. John Lefante Dr. Latha Rajan; **Role:** Research Assistant

May – Dec 2017
Graduate Research Assistant, *SEES Fellows*, New Mexico Consortium and LANL, I processed and analyzed raw data from climate, satellite imagery, Google Health Trends, Twitter, demographic information, and reported Dengue fever case counts in Brazil; generated ARMA prediction models in R for future dengue incidence from provided data streams; created database to store raw data using MySQL for easier data access and manipulation; and culminated in poster talk, âĂĲUsing Satellite Imagery and Internet Data for Dengue Surveillance in Brazil." I received funding through SEES Fellows: Modeling for sustainability in a changing environment: emerging infectious diseases.
PI: Dr. Carrie Manore; **Role:** Research Assistant

Jan 2017– May 2018
Graduate Teaching Assistant, *Department of Public Health*, Tulane University, I mentored and tutored 60 students per semester of the undergraduate "The Cell, the Individual, and the Community" course. This including preparing teaching materials before class, organizing course records, and grading quizzes, as well as providing tutoring assistance outside of class hours.
Professor: Dr. Latha Rajan; **Role:** Teaching Assistant

Jan – Dec 2016
Undergraduate Research Assistant, *Honors Thesis*, Tulane University, I researched theoretical mitigation strategies for Chagas disease in the USA using deterministic Susceptible-Infected-Removed (SIR) modeling techniques; programmed Matlab to research host-vector competing infection model; generated comprehensive project technical report in LaTex; and presented a final paper and poster, "Mitigating Chagas Disease: Fighting an Infection with an Infection." In addition, I conducted field research collecting data on Chagas prevalence in the greater New Orleans area.
Advisor(s): Dr. James Hyman and Dr. Claudia Herrera; **Role:** Research Assistant

May – Aug 2015
Undergraduate Research Assistant, *Mathematical and Theoretical Biology Institute (MTBI)*, Arizona State University, I conducted research on incentivizing reform programs in the Louisiana prison system, created a compartmental model and analysis using Matlab, Maple, and Mathematica programming, and culminated in paper, presentation, and poster talk titled "Minimizing recidivism by optimizing profit: a theoretical case study of incentivized reform in a Louisiana prison".
Advisor(s): Dr. Christopher Kribs and Dr. Benjamin Morin, **Role:** Research Assistant

Aug 2014 – May 2015	**Undergraduate Research Assistant**, *Mathematical Modeling of Biological Systems*, Tulane University, I published a paper, "Modeling the Impact of Behavior Change on the Spread of Ebola." I constructed epidemiological models using SIR techniques to summarize the impact of behavior change on Ebola incidence rates during the 2014 West Africa epidemic; compared results to stochastic model; developed analytical and numerical simulations to solve linear and nonlinear differential equations; and received a Louisiana Supervised Undergraduate Research Experience grant to fund research project. **PI:** Dr. James Hyman, **Role:** Research Assistant
Sep – Dec 2014	**Smoke Free Ban Needs Assessment Coordinator**, *Louisiana Public Health Institute (LPHI)*, Tulane University, I conducted a needs assessment of New Orleans bar owners for LPHI, produced a literature review on the financial impact of smoking bans on bars and clubs, and reported results to LPHI to be used in the development of government policy, the Smoke Free Ban. **Advisor(s):** Dr. Elisabeth Gleckler, **Role:** Needs Assessment Coordinator

Selected Activities

Professional Associations	**Rotary International**, *Rotary Club of New Orleans Riverbend, New Orleans, LA*, An international service organization that provides humanitarian service to advance goodwill and peace around the world (**2018**). **Role:** Volunteering through Rotary since January 2014. Currently works with the Rotary Youth Exchange program as a Local Youth Exchange Coordinator
	Delta Omega National Honorary Society, *Eta Chapter of Tulane University, New Orleans, LA*, Public health honorary society for accredited schools and programs of public health. (**2018**).
	Omicron Delta Kappa Honors Fraternity, *Circle of Tulane University, New Orleans, LA*, National leadership honor society in the United States. (**2017**). **Role:** Served as President of the Tulane Circle from Jan.–Dec. 2017. Organized and coordinated advisory board meetings with Tulane administrators
	Rotaract, *Rotaract of Tulane, New Orleans, LA*, A service, leadership, professional and community service organization sponsored by Rotary International. (**2014**). **Role:** Founding member of the Rotaract at Tulane club. Served as President from July 2016 – July 2017. Organized volunteer events with over 30 organizations in the New Orleans area and abroad, including transportation, event details, and recruitment of volunteers for each event, and received $2000 grant funding for community outreach in Kisumu, Kenya, for a water well project
Volunteer Activities	**Refugee Health Program of the New Mexico Department of Health**, *Santa Fe, NM*, (**2018-19**). **Role:** Organized joint database for clinical and mental health information on refugees in New Mexico, and analyzed data from 2013-2018 for a 5-year retrospective EpiReport on the status of programs offered by the Refugee Health Program.
	Graduate Student Government Association Networking Subchair, *Tulane University, New Orleans, LA*, (**2017-18**). **Role:** Solely planned networking event with the aid of SGA for students of the Tulane School of Public Health and Tropical Medicine (SPHTM) for 150 guests with $6000 budget, and organized hotel contract and space, contacted alumni and students, and managed the budget for the Preceptor Thank You and Networking event.
	Diversity Committee Member, *Tulane University, New Orleans, LA*, (**2017-18**). **Role:** Served on graduate school diversity committee to improve student life.

President, Academic Tutoring for Roots of Music, *Tulane University, New Orleans, LA*, (**2014-15**).
Role: Provided academic tutoring assistance to elementary and middle school students, supervised and coordinated transportation of volunteers to and from the tutoring site 4 days a week, and coordinated with the director of Roots of Music to create fun outdoor events for tutors and students.

Other Positions Held

Residential Advisor, *Tulane University, New Orleans, LA*, (**2015-17**).
Role: Managed 70 residents, including conflict resolution, resource connections, and life advice, worked with a wide range of students from undergraduate sophomores to Masters students, and organized programs to meet individual needs including community integration and mental health.

Invited Presentations

2019 Workshop Speaker, **Workshop on Modeling the Spread of Infectious Diseases**, Tulane University, New Orleans, Louisiana (February 22)

Guest Speaker for Class, **SPHU 1010: Introduction to Public Health**, Tulane University, New Orleans, Louisiana (February 22)

2018 Seminar Speaker, **Michigan Institute for Data Science Seminar**, University of Michigan, Ann Arbor, Michigan (September 27)

2016 Seminar Speaker, **Applied Mathematics Seminar**, Vassar College, Poughkeepsie, New York (October 28)

Private Presentation Speaker, **Ministry of Education of El Salvador**, San Salvador, El Salvador (February 24)

Conference Speaker, **Primer Congreso Internacional de Modelaje Matematico**, La Universidad de Francisco Gavidia, San Salvador, El Salvador (February 23)

Contributed Presentations

2018 Society for Industrial and Applied Mathematics, **42nd SIAM Southeastern Atlantic Sectional Conference**, Chapel Hill, North Carolina

Seminar Speaker, **CNLS Summer Talk Series**, Center for Nonlinear Studies (CNLS), Los Alamos National Laboratory, Los Alamos, New Mexico

Scientific Computing Around Louisiana, **SCALA 2018**, Baton Rouge, Louisiana

2017 American Geophysics Union **2017 AGU Fall Meeting**, New Orleans, Louisiana

American Society of Tropical Medicine and Hygiene, **2017 ASTMH Annual Meeting**, Baltimore, Maryland

International Conference on Mathematical Modeling and Analysis of Populations in Biological Systems, **2017 ICMA-IV Conference**, Tuscon, Arizona

Seminar Speaker, **CNLS Summer Talk Series**, Center for Nonlinear Studies (CNLS), Los Alamos National Laboratory, Los Alamos, New Mexico

2015 Society for the Advancement of Chicanos and Native Americans in Science **2015 SAC-NAS National Conference**, Washington, D.C.

Tulane School of Science and Engineering, **SSE Research Day** , New Orleans, Louisiana

Publications

Book Chapters

[1]**Conrad, J. R.**, Xue, L., Dewar, J., & Hyman, J. M. "Modeling the Impact of Behavior Change on the Spread of Ebola." Mathematical and Statistical Modeling for Emerging and Re-emerging Infectious Diseases. (2016) *Springer.*

Conference Proceedings

[1]**Conrad, J. R.**, Ziemann A., Refeld, R., Parikh, N., Siraj, A., Generous, N., Del Valle, S., Fairchild, G., & Manore, C. "Understanding polynomial distributed lag models: truncation lag implications for a mosquito-borne disease risk model in Brazil." Algorithms, Technologies, and Applications for Multispectral and Hyperspectral Imagery XXV. (2019) *International Society for Optics and Photonics.*

[2] Ziemann, A., Fairchild, G., **Conrad, J.**, Manore, C., Parikh, N., Del Valle, S., and Generous, N. "Predicting Dengue Incidence in Brazil Using Broad-Scale Spectral Remote Sensing Imagery." IGARSS 2018-2018 IEEE International Geoscience and Remote Sensing Symposium. (2018) *IEEE.*

Technical Reports

[1] **Conrad, J. R.**, Guan, L., and Geneus, C. "Parameters Estimation, Identification and Uncertainty Quantification for Epidemic Models." (2018) Tulane University.

[2] **Conrad, J. R.**. "Public Health Analysis: An Assessment of Polynomial Distributed Lag in Mosquito-Born Disease Risk Modeling." (2018) Tulane University.

[3] **Conrad, J. R.**. "Honors Thesis: Mathematical Analysis for a Model to Control Chagas Disease: Fighting as Infection with an Infection." (2017) Tulane University.

[4] Hamins-Puertolas, M., **Conrad, J. R.**, Islas, G., Bossogo-Egoume, A., Kribs, C., and Morin, B. "Minimizing recidivism by optimizing profit: a theoretical case study of incentivized reform in a Louisiana prison." (2015) Mathematical and Theoretical Biology Institute.

[5] **Conrad, J. R.**, Hajmurad, F., Patel, N., Reddy, A., and Shukla, A. "Needs Assessment: The Louisiana Institute of Public Health Tobacco Free Living Campaign." (2014) Tulane University and the Louisiana Public Health Institute.

Proficiencies

Computer Skills

R, LaTex, SAS, SQL, Matlab, Mac OS, Windows

Languages

Spanish (Conversational)

Professional

Grant writing, mentorship, event planning, fundraising, disaster relief, media production

Selected Media Coverage

2017

New Mexico Consortium, **Student Research Seeks to Predict Dengue Fever Outbreaks**, 5 December 2017.

Scientific American, **Forecasting Outbreaks–1 Image at a Time**, 10 Aug 2017.

Tulane New Wave, **The Power of Tulane - Jessica Conrad**, 13 July 2017.

Tulane New Wave, **2017 grad applies math to track Ebola outbreak**, 28 Apr 2017.

Hobbies

Salsa dancing instructor, Hiking, Skiing, Karate instructor

References

Marisa Eisenberg, Ph.D., M.S.
Associate Professor
Epidemiology, Complex Systems, and Mathematics Departments, University of Michigan
Email: marisae@umich.edu, Phone: (734) 763-2991
Dr. Eisenberg is my PhD advisor.

James "Mac" Hyman, Ph.D.
Evelyn and John G. Phillips Distinguished Professor
Mathematics Department, Tulane University
Email: mhyman@tulane.edu, Phone: (504) 862-3433
Dr. Hyman was my undergraduate mathematics advisor and headed two of my research projects, including my undergraduate thesis.

Carrie Manore, Ph.D.
Scientist
Information Systems and Modeling, LANL
Email: cmanore@lanl.gov, Phone: (541) 207-7969
Dr. Manore is the PI for the research project investigating driving factors for mosquitos and West Nile.

Paul Fenimore, Ph.D.
Scientist
Theoretical Biology and Biophysics, LANL
Email: paulf@lanl.gov, Phone: (505) 665-7744
Dr. Fenimore is the PI for the research developing a universal model for 30 diseases of interest to the Defense Threat Reduction Agency.