EXHIBIT 2
DECLARATION OF DEREK CUMMINGS

I, Derek Cummings, hereby declare under the penalty of perjury pursuant to 28 U.S.C. § 1746:

1. I make this declaration based on my personal knowledge except where I have indicated otherwise. If called as a witness, I could and would testify competently and truthfully to these matters.

2. I am a Professor of Biology at the University of Florida and at the Emerging Pathogens Institute. I am a specialist in infectious disease epidemiology. I specialize in influenza, dengue and other mosquito-borne pathogens, and other respiratory illnesses. Before the pandemic of COVID-19, I had worked on multiple aspects of coronaviruses including an outbreak investigation of the first major outbreak of MERS (genetically related to SARS and SARS-CoV-2) in a hospital setting (in Saudi Arabia), efforts to estimate the extent of outbreaks of MERS and work to estimate the natural history of SARS. I have also conducted a large, multisite study of personal protective equipment to protect health care personnel from respiratory viruses including coronaviruses. My work on coronaviruses has been published in the New England Journal of Medicine, the Journal of American Medical Association and the Proceedings of the National Academy of Science.
Presently, I am providing guidance to the US CDC on personal protective equipment policy for the SARS-CoV-2 outbreak and providing input on models of the outbreak as part of a CDC working group.

3. COVID-19 is a disease caused by a novel zoonotic coronavirus, called SARS-CoV-2. It emerged in the Chinese province of Hubei in late 2019 and has since spread to 173 countries. The World Health Organization declared COVID-19 a pandemic on March 11, 2020. As of March 25, 2020, over 468,000 confirmed cases have been reported worldwide, causing over 21,000 deaths. The United States has had local transmission since January 2020, and since March has been experiencing an exponential rise in confirmed cases and widespread transmission across the country.

4. COVID-19 can cause severe symptoms, in particular pneumonia (inflammation of the lungs associated with infection), and can lead to death. Certain populations are at particularly high risk of severe outcomes. The CDC advises that individuals over 65 years old, individuals who are immunocompromised, and individuals with certain comorbidities including lung disease, heart disease, obesity, diabetes are at high risk for severe COVID-19 illness. Various studies have examined the time from symptom onset to hospitalization or severe symptoms, with estimates of the average
currently ranging from 7-9 days.

5. The case fatality rate among individuals presenting with symptoms has been estimated at 1.4% in Wuhan, the capital city of Hubei province, with higher rates in those over 65 and those with comorbidities. Case fatality rates are likely to vary from setting to setting, increasing as the healthcare system in an area becomes overburdened and sick patients are unable to be prioritized. Case fatality rates are also affected by surveillance practices in any setting which affect the number of cases included in the denominator of this rate.

6. Hospitalization with COVID-19 commonly is associated with need for intensive care and a ventilator to assist breathing. There are currently estimated to be ~45,000 ICU beds and ~160,000 ventilators in the USA, many of which are occupied by individuals sick with illnesses other than COVID-19. Uncontrolled spread of the virus would likely result in over 50% of the population becoming infected. Model projections, except under the most strict control measures, predict incidence of patients requiring hospitalization or ventilators rising well above the US capacity.

7. SARS-CoV-2 is a respiratory pathogen, meaning that it is spread through respiratory secretions, for example droplets expelled by an infected individual coughing or sneezing, in which the pathogen can remain viable
for at least 3 hours. Transmission can occur either by direct person-to-person contact, inhalation of these droplets, or by touching surfaces contaminated with these droplets.

8. There are multiple sources of evidence documenting pre-symptomatic transmission (i.e. the ability of an infected individual to infect others before their symptoms appear). A study in Singapore and Tianjin, China, estimated that 50% of transmission is due to pre-symptomatic individuals. Interventions targeting only transmission by sick individuals (such as isolation of those with symptoms) are therefore unlikely to contain transmission.

9. Timely and widespread testing of symptomatic individuals and their contacts is therefore essential to slowing transmission of the virus. The success of massive testing, active contact tracing, and isolation of individuals showing any COVID-19 symptoms has been demonstrated by the case of the Republic of Korea, which appears to have controlled local transmission. The scale and extent of transmission in the United States makes these tactics on their own infeasible, as contact tracing is very resource-intensive. However, without widespread availability of testing for individuals experiencing symptoms, it is impossible to know if local transmission is occurring in a
county or city and impossible to refine interventions in a specific location with the information that accurate surveillance provides.

10. There is no vaccine against SARS-CoV-2 infection, nor are there prophylactic pharmaceutical interventions or treatments that have been shown to reduce infection risk or symptom severity. Experimental treatments are, at a minimum, months from widespread availability due to the need to demonstrate effectiveness and obtain regulatory approval.

11. In the absence of pharmaceutical interventions, the only way to slow the rate of transmission is through a combination of preventive measures, chiefly social distancing, hygiene and isolation of cases. The lockdown in Wuhan, an extreme form of social distancing, was followed by a sustained decrease in transmission, and two months later the daily number of reported cases has dropped to zero, and lockdown restrictions will be lifted on April 8, 2020.

12. The goal of social distancing is to reduce the average number of contacts that individuals in the population have. All individuals should practice social distancing to the extent they can, not just to reduce their own risk of acquiring COVID-19, but to reduce their risk of infecting others. Reduced transmission reduces the growth rate of cases, easing pressure on hospitals and giving institutions more time to prepare.
13. Detained populations, including those in immigration detention facilities, are at high risk for infectious disease compared to the general population. Factors contributing to this excess risk include poor sanitation, lack of access to hygiene precautions, and high population density. In addition, transfer of detained immigrants between facilities complicates efforts to control infection and trace contacts. A recent outbreak of mumps in immigration detention facilities demonstrate the ability of an infectious agent to spread rapidly between centers, infecting at least 900 people from September 2018-August 2019.

14. The ability of SARS-CoV-2 to spread rapidly and widely in a closed population is demonstrated by the experience of cruise ships, including the Diamond Princess, on which around 700 (19%) of passengers and crew on board were infected over the course of three weeks despite the initiation of quarantine protocols. 11 of these individuals subsequently died.

15. Transmission of SARS-CoV-2 in detention facilities in the United States would lead to widespread and severe illness among the detained population, particularly among those considered at high risk.

16. Personal hygiene measures are effective at reducing infection risk, but for a virus as transmissible as SARS-CoV-2 they will be not be sufficient on their
own to curtail its spread. Furthermore, hygiene measures are only effective when there is sufficient access to them, and many individuals in incarcerated populations do not have adequate access to soap and water. Finally, other measures, such as regular disinfecting of surfaces, should supplement these efforts.

17. Due to the substantial amount of pre-symptomatic transmission observed in other settings, it is impossible to prevent intake of infectious individuals through screening for symptoms alone. Moreover, due to inadequate rates of COVID-19 testing in the United States, it is not possible to rule out local transmission because of lack of confirmed cases. Merely asking about travel history to areas with sustained community transmission, or contact with infected individuals, cannot rule out the possibility that an individual is infected with SARS-CoV-2 upon intake into a detention center.

18. Moreover, staff members who may be living in areas with sustained community transmission are able to transmit the disease to detained immigrants. This transmission too could occur while the staff members are asymptomatic, and thus cannot be controlled by screening for symptoms or contact history.

19. These concerns are not hypothetical: a detained immigrant in the Bergen
County Jail, NJ, tested positive for SARS-CoV-2 on March 24, 2020, and that staffers at Elizabeth Detention Center, NJ, and Aurora Detention Center, CO, have also tested positive for SARS-CoV-2.

Isolation of symptomatic individuals within detention settings similarly will not stop transmission before symptom onset. As there are several modes of transmission other than direct person-to-person contact, it is not possible to identify all individuals who have had contact with a COVID-19 case. Quarantine of suspected contacts will therefore likely reduce the rate of spread of the virus in a facility but will not eliminate transmission.

Pursuant to 28 U.S.C. 1746, I declare under penalty of perjury that the foregoing is true and correct.

Executed this 29 day in March, 2020 in Gainesville, Florida.

Prof. Derek Cummings
EXHIBIT A
CURRICULUM VITAE

DEREK A.T. CUMMINGS

PERSONAL DATA

Business Address: Department of Biology
University of Florida
Bartram Hall
Gainesville, FL 32608

Mobile: (410)-916-1371
Fax: (352)-392-9925
Email: datc@ufl.edu

EDUCATION AND TRAINING

PhD, 2004 Johns Hopkins University, Whiting School of Engineering
Geography and Environmental Engineering

MHS, 2004 Johns Hopkins University, Bloomberg School of Public Health
International Health

MS, 2001 Johns Hopkins University, Whiting School of Engineering
Geography and Environmental Engineering

ScB, 1996 Brown University
Chemistry

PROFESSIONAL EXPERIENCE

UF Preeminence Professor Department of Biology, University of Florida
2015-present

UF Preeminence Professor Emerging Pathogens Institute
2015-present

Adjunct Professor Department of Epidemiology, Johns Hopkins Bloomberg School of
Public Health
2015-present

Adjunct Professor Department of International Health, Johns Hopkins Bloomberg School of
Public Health
2015-present

Associate Professor Department of Epidemiology, Johns Hopkins Bloomberg School of
Public Health
2013-2015
Adjunct Associate Professor  Department of International Health, Johns Hopkins Bloomberg School of Public Health  
2013-2015  
Adjunct Associate Professor  Department of Epidemiology, University of Pittsburgh Graduate School of Public Health  
2013-2015  
Nonresident Fellow  Brookings Institution  
2007-present  
Assistant Professor  Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health  
2007-2013  
Adjunct Assistant Professor  Department of International Health, Johns Hopkins Bloomberg School of Public Health  
2007-2013  
Adjunct Assistant Professor  Department of Epidemiology, University of Pittsburgh Graduate School of Public Health  
2007-2013  
Visiting Assistant Professor  Department of Epidemiology, University of Pittsburgh Graduate School of Public Health, University of Pittsburgh  
2006 – 2007  
Visiting Assistant Professor  Department of Biostatistics, Bloomberg School of Public Health, Johns Hopkins University  
2006 – 2007  
Research Associate  Department of International Health, Bloomberg School of Public Health, Johns Hopkins University  
2004 – 2006  
Program Coordinator  NIH Modeling Infectious Disease Agents Study (MIDAS) Center, University of Pittsburgh/Johns Hopkins University (pre-2006)  
2003 - 2009  
Research Assistant  Department of Geography and Environmental Engineering, GWC Whiting School of Engineering, Johns Hopkins University  
1999-2004  
Case Worker  Coalition for the Homeless, Crisis Intervention Program, NYC  
1998  

**PROFESSIONAL ACTIVITIES**
Society Membership

Society for Epidemiological Research
2004-present

American Academy for the Advancement of Science
2004-present

Asia Pacific Society of Medical Virology
2001-present

American Society of Tropical Medicine and Hygiene
2000-present

DIMACS Focus on Computation and Mathematical Epidemiology
2000-2008

Participation on Advisory Panels

WHO Working Group on Dengue Burden Estimation
2014-present

EcoHealthNet
Member of Steering Committee
2015-present

NIH P01 Flavivirus Infections: Pathogenesis and Prevention
Member of External Advisory Committee
2013-present

WHO Disease Reference Group on Dengue and other Emerging Viral Diseases
2010-2011

Member of the WHO Informal Network for Mathematical Modeling, Working Group on Influenza A (H1N1), 2009
2009

U.S. Department of Health and Human Services, Secretary’s Advisory Council on Public Health Preparedness, Smallpox Modeling Working Group
2000-2002

Consultations

World Health Organization-Immunization and Vaccine-related Implementation Research (IVIR) Advisory Committee Meeting-Consultation on Dengue Risk Maps
2017

MSF/Epicentre
Design of vaccine trial to assess fractional dose of yellow fever vaccine. Trial to be conducted in Uganda and Kenya
2016-present
MSF/Epicentre
Analysis of vaccine trial data from Rotavirus vaccine trial
2016

World Health Organization
Consultation on Mathematical Modeling of Dengue Intervention Impact
2014

Ministry of Health of Liberia
Ebola Outbreak Epidemiological Investigation
2014-2015

Kingdom of Saudi Arabia MERS-CoV Outbreak Investigation Team
2013-2014

Medimmune
Estimation of Burden of Influenza B
2011-2012

World Health Organization.
Disease Reference Group on Dengue and other Emerging Viral Diseases of Public Health Importance.
Scientific Committee.
2009

Epicentre and Medecins Sans Frontieres (MSF)
Outbreak investigation of measles in Maroua, Cameroon
2009

World Health Organization. Center for Vaccine Research.
Preparation of analysis of dengue models to assess future vaccine candidates.
2008

Data Safety and Management Boards (DSMB)
MSF-Epicentre
Randomized, double-blind non-inferiority trial of two antivenoms for the treatment of snakebite with envenoming, Central African Republican
2015-present

MSF-Epicentre
Effect of systematic utilization of antibiotic therapy in the ambulatory treatment of uncomplicated severe acute malnutrition
2013-2014

EDITORIAL ACTIVITIES

Study Sections
Member, NIH Clinical Research and Field Studies of Infectious Disease Study Section
2016-2019

NIH Special Emphasis Panel on International Collaborations in Environmental Health-ad hoc participation
2014, 2015

NIH Clinical Research and Field Studies of Infectious Disease Study Section-ad hoc participation

NIH Director’s Independence Award-ad hoc participation
2014, 2015, 2016

NIH Modeling and Analysis of Biological Systems-ad hoc participation
2013

NIH Infectious Disease, Reproductive Health, and Asthma/Pulmonary Conditions-ad hoc participation
2012, 2013

NSF/NIH Ecology and Evolution of Infectious Diseases-ad hoc participation
2012

Peer Review Activities

Associate Editor:
   American Journal of Epidemiology, 2010-2014

Academic Editor:
   PLoS Computational Biology, 2009-2010, 2014

Referee:
   Epidemiologic Reviews, American Journal of Epidemiology, Biostatistics, Emerging Infectious
   Diseases, Mathematical and Computer Modeling, PLoS Neglected Tropical Diseases, PLoS
   One, Biosecurity and Bioterrorism, Journal of Theoretical Biology, American Journal of
   Tropical Medicine and Hygiene, Journal of the Royal Society Interface, Proceedings of the
   Royal Society B, Physics Review A, Lancet, Proceedings of the National Academy of Science,
   Science, eLife

HONORS AND AWARDS

Awards

   KAVLI Frontiers in Science               2017
   University of Florida Term Professorship 2017
   International Society for Disease Surveillance
      Outstanding Research in Biosurveillance 2015
   JHBSPH Teaching Excellence Award         2015
   Advising, Mentoring, and Teaching Recognition Award (AMTRA) 2012
   Burroughs Wellcome Career Award at the Scientific Interface 2007
   UTRA Fellow, Brown University            1996
   Meikeljohn Fellow, Brown University      1994
   Rotary Scholarship                      1992
   National Merit Scholar                  1992
PUBLICATIONS (*served as advisor/mentor)
127 peer-reviewed papers, cited 12334 times (Google Scholar), 21 papers have been cited more than 100 times, H-index of 44 (44 papers have been cited more than 44 times)

Journal Articles


64. Reich NG, Shrestha S, King AA, Rohani P, Lessler J, Kalayanarooj S, Yoon IK, Gibbons RV,


85. Velasco JMS, Alera MTP, Ypil-Cardenas CA, Dimaano EM, Jarman RG, Chinnawirotpisana P, Thaisomboonsuk B, Yoon IK, Cummings DAT, Mammen P Mammen Jr. Demographic, clinical and


88. Kwok KO, Jiang C, Tan L, Justin L, Read JM, Zhu H, Guan Y, Cummings DAT, Riley S. [An international collaborative study on influenza viruses antibody titers and contact patterns of individuals in rural and urban household of Guangzhou]. *Zhonghua liu zing bing xue za zhi.* 2014 April; 35(4); 433-436.

In Chinese.


96. Lessler JT, Salje H, Van Kerkhove MD, Ferguson NM, Cauchemez S, Rodriguez-Barraquer I,


107. Rodriguez-Barraquer I, Salje H, Lessler J, Cummings DAT. Predicting intensities of Zika infection and microcephaly using transmission intensities of other arboviruses. bioRxiv, 041095


*Articles and Editorials not peer reviewed*


*Letters*


Chapters


Meeting abstracts and presentations

*served as advisor/mentor; presenting author)


2. Cummings DAT, Burke DS. Spatial Synchrony and Phase Coherency of Seasonal Variation in Temperature, Rainfall and Dengue in Thailand. GEOMED, 2003, Baltimore, MD


*21. Reich NG, Shrestha S, King AA, Rohani P Gibbons RV, Cummings DAT. Using a discrete-time state-space model to estimate the degree of cross-protection between serotypes of dengue virus due to infection. 3rd International Conference on Infectious Disease Dynamics, Boston, MA, 2011.


*45. What proportion of dengue virus infections result in no apparent disease? Clapham HE, Cummings DAT, Johansson MA. American Society of Tropical Medicine and Hygiene. 2014


Scientific Presentations (without abstracts)


2. Spatial coherence and association of temperature, rainfall and the incidence of dengue hemorrhagic fever in Thailand. DIMACS Workshop on Facing the Challenge of Infectious Diseases in Africa: The Role of Mathematical Modeling, 2006, Johannesburg, South Africa

3. Modeling new vaccines for measles. DIMACS Workshop on Facing the Challenge of Infectious Diseases in Africa: The Role of Mathematical Modeling, 2006, Johannesburg, South Africa


8. Location-specific patterns of exposure to recent pre-pandemic strains of influenza A in southern China: the Fluscape project. *Ecology and Evolution of Infectious Diseases, National Institutes of Health and National Science Foundation, 2011, Madison, WI*


10. Location-specific patterns of exposure to recent pre-pandemic strains of influenza A in southern China: the Fluscape project. *Ecohealth, 2011, Baltimore, MD*


12. Estimates of the degree and length of cross-protection between dengue serotypes from time series models. *American Society of Tropical Medicine and Hygiene, 2011, Philadelphia, PA*

13. Immunological landscapes of influenza in southern China: the Fluscape project. *NIH MIDAS annual meeting, 2012, Boston, MA.*


18. Mechanistic models of transmission utilizing contact data. *Society for Epidemiologic Research. 2013, Boston, MA.*


22. Spatiotemporal patterns of Dengue and Chikungunya virus. MIDAS Annual meeting. 2014. Atlanta, GA.

23. Middle Eastern Respiratory Syndrome (MERS): Investigating a Novel Coronavirus. MIDAS Annual meeting. 2014. Atlanta, GA.


25. Transmission dynamics of dengue at multiple scales. WHO Consultation on Dengue Burden. 2014. Atlanta, GA.


31. Treatment as prevention strategies for HCV will require massive scale up to see benefits in prevention. Luis Mier-y-Teran-Romero, Derek Cummings, David Thomas, Carl Latkin, John Wong, Greg Kirk, David Thomas, Shruti Mehta. CROI, February, 2016. Boston, MA.


Invited Seminars


*Virginia Bioinformatics Institute, 2004, Blacksburg, VA*

5. Processes impacting the incidence of dengue hemorrhagic fever on multiple temporal and spatial scales.  
*33rd Annual Meeting of the American Society of Tropical Medicine and Hygiene, 2004, Miami, FL*

6. Dynamic effects of antibody dependent enhancement on the fitness of dengue viruses.  
*Fogarty International Center, 2005, Washington, DC*

7. Spatial synchrony of the waves of incidence of influenza in 1918.  

8. Can pandemic influenza be contained with antivirals?  

9. Dynamic effects of antibody dependent enhancement on the fitness of dengue viruses.  
*Center for Infectious Disease Dynamics, Penn State University, 2005, State College, PA*

10. Strategies for containing an emerging influenza pandemic in Southeast Asia.  
*Modeling Working Group, Johns Hopkins Department of Biostatistics, 2005, Baltimore, MD*

11. Simulating Pandemic Influenza.  
*Global Pandemic Initiative, IBM Industry Solutions Laboratory, 2005, Hawthorne, NY*

12. Containing Pandemic Influenza.  
*Pandemic Influenza Preparedness Training, Johns Hopkins Center for Preparedness, 2006, Cumberland, MD*

13. Dengue dynamics in Thailand over the last 20 years.  
*Thailand Centers for Disease Control, 2006, Bangkok, Thailand*

14. Containing Pandemic Influenza.  
*Infectious Disease Informatics, Surveillance, Modeling and Response, National Center for Supercomputing Applications, 2006, Urbana-Champaign, IL*

*Five decades of discovery: A symposium to honor the contributions of Monto Ho, 2006, Pittsburgh, PA*

*University of Pittsburgh, Department of Epidemiology, 2007, Pittsburgh, PA*

17. Dengue and the demographic transition.  
*NIH Fogarty Center, 2008, Bethesda, MD*

18. Open questions in dengue research.  
*Penn State University: Research and Policy for Infectious Diseases Dynamics, 2008, University Park, PA*

*CDC Branch, 2008, Puerto Rico*
*WHO Scientific Consultation of Dengue Vaccines, 2008, Belem, Brazil*

*Johns Hopkins University, 2009, Baltimore, MD*

22. Recent findings of transmission dynamics of dengue. 
*WHO Dengue Reference Group, 2009, Havana, Cuba*

23. Dynamics and natural history of H1N1 influenza. 
*Grand Rounds, Welch Center, Johns Hopkins University, 2010, Baltimore, MD*

24. The impact of spatial heterogeneity in the transmission of dengue on the synchrony of incidence. 
*University of Michigan MAC-EPI D Annual Seminar, Ann Arbor, MI 2010.*

*Harvard School of Public Health, 2010, Boston, MA*

*University of Michigan, 2010, Ann Arbor, MI*

27. Spatial heterogeneity in the transmission of dengue at multiple spatial scales. 
*National Center for Medical Intelligence, 2011, Frederick, MD*

*WHO, 2011, Geneva*

*Harbin School of Public Health, 2011, Harbin, China*

*WHO, 2011, Geneva*

31. Dengue modeling work at Johns Hopkins and the Vaccine Modeling Initiative. 
*Secretaría de Salud (Ministry of Health), 2011, México*

32. Spatial heterogeneity of influenza immunity and infection: the effect of population density and effective neighborhood size. 
*University of Massachusetts Amherst, 2012, Amherst, MA*


34. Spatial heterogeneity of influenza immunity and infection: the Fluscape study. 
*Ecology and Evolution of Infectious Disease Meeting. 2013. State College, PA.*

35. Techniques and Opportunities in Infectious Disease Modeling. 

37. Social Mixing and Respiratory Transmission in Schools Study. US Centers for Disease Control. 2013. Atlanta, GA.


46. Spatial scales of influenza immunity: Results from the Fluscape project. RAPIDD Group. 2015. Washington, DC.


CURRICULUM VITAE
DEREK A. T. CUMMINGS

TEACHING

Advisors

Current Advisors

Post-doctoral
Leah Katzelnick Biology/joint with UC Berkeley 2016-present
Rebecca Borchering Biology 2017-present
Bingyi Yang Biology 2017-present
Alex Kirpich Biology 2017-present
Bernardo Garcia-Carreras Biology 2017-present
Diana Rojas-Alvarez Biology/joint with UF Biostats 2017-present

PhD
Angkana Huang Biology 2017-present
Diana Rojas-Araya Entomology 2017-present

Undergraduate (undergraduates doing research with me)
Carlos Moreno Applied Physiology and Kinesiology 2015-present
Silvio Martinez-Daniel Biomedical Engineering 2017-present
Francesca Maurici Biology 2016-2017
Chastity Perry Biology 2017

Past Advisors

Post-doctoral
Hannah Clapham 2013-2016
Current Position: Mathematical Epidemiologist
Oxford University Clinical Research Unit

Henrik Salje 2014-2016
Current Position: Faculty, Institut Pasteur

Luis Mier-y-Teran-Romero 2010-2014
Current Position: US CDC Staff Scientist

Isabel Rodriguez-Barraquero 2012-2014
Current Position: Assistant Professor, University of California San Francisco

Kaitlin Rainwater-Lovett 2012-2013
Current Position: Research Associate, Johns Hopkins School of Medicine
<table>
<thead>
<tr>
<th>Name</th>
<th>Position/Title</th>
<th>Years</th>
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<tbody>
<tr>
<td>Nicholas Reich</td>
<td>Associate Professor, University of Massachusetts, Biostatistics</td>
<td>2010-2011</td>
</tr>
<tr>
<td>Justin Lessler</td>
<td>Associate Professor, Johns Hopkins Bloomberg School of Public Health</td>
<td>2008-2011</td>
</tr>
<tr>
<td>Carl Laird</td>
<td>Associate Professor, Texas A&amp;M University, Department of Chemical Engineering</td>
<td>2007-2008</td>
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</table>

**PhD**

<table>
<thead>
<tr>
<th>Name</th>
<th>Field</th>
<th>Years</th>
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<tbody>
<tr>
<td>Stephanie Cinkovich</td>
<td>Biology</td>
<td>2015-2018</td>
</tr>
<tr>
<td>Thesis title:</td>
<td>The role of host composition and asymptomatic infection on the transmission dynamics of zoonotic diseases.</td>
<td></td>
</tr>
<tr>
<td>Jacob Ball</td>
<td>Epidemiology</td>
<td>2015-2018</td>
</tr>
<tr>
<td>(co with Xinguang Chen)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thesis title:</td>
<td>Epidemiological models of infectious diseases for clinical and public health decision support.</td>
<td></td>
</tr>
<tr>
<td>Talia Quandelacy</td>
<td>Epidemiology</td>
<td>2013-2017</td>
</tr>
<tr>
<td>Thesis title:</td>
<td>Characterizing micro-scale transmission dynamics of influenza</td>
<td></td>
</tr>
<tr>
<td>Henrik Salje</td>
<td>Epidemiology</td>
<td>2009-2014</td>
</tr>
<tr>
<td>Thesis title:</td>
<td>Insights into the microscale spatial dynamics of dengue and chikungunya in Southeast Asia</td>
<td></td>
</tr>
<tr>
<td>Andrew Azman</td>
<td>Epidemiology</td>
<td>2009-2014</td>
</tr>
<tr>
<td>(co with Justin Lessler)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thesis title:</td>
<td>Heterogeneities in Cholera Transmission</td>
<td></td>
</tr>
<tr>
<td>Ben Althouse</td>
<td>Epidemiology</td>
<td>2009-2013</td>
</tr>
<tr>
<td>Thesis title:</td>
<td>Mechanistic Modeling of Sylvatic Arboviruses in Senegal</td>
<td></td>
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<tr>
<td>Su-Hsun Liu</td>
<td>Epidemiology</td>
<td>2008-2012</td>
</tr>
<tr>
<td>Thesis title:</td>
<td>Detectable Human Papillomavirus DNA: Prevalent vs. Incident Infection</td>
<td></td>
</tr>
<tr>
<td>Isabel Rodriguez-Barraquer</td>
<td>Epidemiology</td>
<td>2007-2012</td>
</tr>
<tr>
<td>Thesis title:</td>
<td>The Shifting Epidemiology Of Dengue: Insight From Serological Surveys</td>
<td></td>
</tr>
<tr>
<td>Justin Lessler</td>
<td>Epidemiology</td>
<td>2004-2008</td>
</tr>
<tr>
<td>Thesis title:</td>
<td>Detection and characterization of respiratory pathogens in institutions</td>
<td></td>
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</tbody>
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**Masters**

<table>
<thead>
<tr>
<th>Name</th>
<th>Field</th>
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<tbody>
<tr>
<td>Jordan Johnson</td>
<td>MS in Epidemiology</td>
<td>2013-2015</td>
</tr>
<tr>
<td>Thesis title:</td>
<td>Co-infections with multiple respiratory viruses in children in 9 Pittsburgh area schools in the</td>
<td></td>
</tr>
</tbody>
</table>
winter of 2012-2013

Jacob Carey  MS in Epidemiology  2014-2016
Quantifying proximal contacts between school children during school, outside of school and during school closures

Yanjie Huang  MS in Epidemiology  2013-2014
Thesis title: Quantifying Human Mobility Using The Longest Disease Traveled

Rome Buathong  MS in Tropical Medicine  2010-2014
Royal Tropical Institute, Amsterdam, Netherlands
Thesis title: Risk and protective factors for primary and secondary dengue infections among school-aged children in Meuang district, Rayong province, Thailand

Madhura Rane  MS in Epidemiology  2012-2013
Socioeconomic determinants of mortality and disease transmission at census tract level during the 1918 H1N1 Influenza pandemic in Chicago

Katrina Mott  MS in Epidemiology  2010-2012
The Effect Of Age And Syndrome On Serotype Prevalence In Invasive Pneumococcal Disease: A Sub-Analysis Of The Pneumococcal Global Serotype Project

Paul Maurizio  MS in Molecular Microbiology and Immunology  2009-2011
Thesis Title: Detection And Vertical Transmission Of Culex Flavivirus In Culex Quinquefasciatus (Diptera: Culicidae) Mosquitoes From Zambia, Africa

Ben Althouse  MS in Biostatistics  2009-2010
Thesis Title: A Multi-Host Multi-Vector SIR Model of Dengue Fever in Senegal

Ripa Chakravorty  MS in Epidemiology  2009-2010
Thesis Title: Modeling the incubation period of Escherichia coli

Jon Benenson  MS in Biostatistics  2008-2010
Thesis Title: Susceptible reconstruction and serotype specific estimates of seasonality of transmission of dengue viruses in Thailand using a Time-Series-Susceptible-Infected-Recovered model

Jodi Udd  MPH  2009-2010

Eileen Obe  MPH  2009-2010

Yih Yng Ng  MPH  2008-2009
Thesis title: Prediction of Influenza-Like Illness trends in Singapore using Internet search data

Hannah Lee  MPH  2008-2009

Katherine Lin  MHS in Epidemiology  2007-2008
Thesis Title: A Method to Geocode Rural Addresses and Post Office Boxes: Application to a Study of Drinking Water Nitrate Exposure and Cancer Incidence

Duza Baba,  MHS in International Health  2006
<table>
<thead>
<tr>
<th>Name</th>
<th>Degree</th>
<th>Department</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heidi Hallman</td>
<td>MHS</td>
<td>International Health</td>
<td>2006</td>
</tr>
<tr>
<td>Kristin Kelling</td>
<td>MHS</td>
<td>International Health</td>
<td>2005</td>
</tr>
<tr>
<td>Alex Ruan</td>
<td>Undergraduate</td>
<td>Public Health</td>
<td>2012</td>
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<tr>
<td><strong>Preliminary Oral Participation (alternate)</strong></td>
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<tr>
<td>Talia Quandelacy</td>
<td>PhD</td>
<td>Epidemiology</td>
<td>2015</td>
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<tr>
<td>Rebecca Pierce*</td>
<td>PhD</td>
<td>Epidemiology</td>
<td>2014</td>
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<tr>
<td>Andrew Azman</td>
<td>PhD</td>
<td>Epidemiology</td>
<td>2012</td>
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<tr>
<td>Henrik Salje</td>
<td>PhD</td>
<td>Epidemiology</td>
<td>2011</td>
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<tr>
<td>Isabel Rodriguez-Barraquer</td>
<td>PhD</td>
<td>Epidemiology</td>
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<tr>
<td>Benjamin Althouse</td>
<td>PhD</td>
<td>Epidemiology</td>
<td>2010</td>
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<tr>
<td>Su-Hsun Liu</td>
<td>PhD</td>
<td>Epidemiology</td>
<td>2009</td>
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<tr>
<td>Amanda Latimore</td>
<td>PhD</td>
<td>Epidemiology</td>
<td>2007</td>
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<tr>
<td>Bridget Ambrose</td>
<td>PhD</td>
<td>Epidemiology</td>
<td>2006</td>
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<td><strong>Schoolwide</strong></td>
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<tr>
<td>Sheldon Waugh</td>
<td>PhD</td>
<td>Epidemiology</td>
<td>2017</td>
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<tr>
<td>Punam Amratia</td>
<td>PhD</td>
<td>Forest Resources and Conservation</td>
<td>2017</td>
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<tr>
<td>Stephanie Cinkovich</td>
<td>PhD</td>
<td>Biology</td>
<td>2017</td>
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<tr>
<td>Jacob Ball</td>
<td>PhD</td>
<td>Epidemiology</td>
<td>2016</td>
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<tr>
<td>Talia Quandelacy</td>
<td>PhD</td>
<td>Epidemiology</td>
<td>2015</td>
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<tr>
<td>Mariam Fofana</td>
<td>PhD</td>
<td>Epidemiology</td>
<td>2014</td>
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<tr>
<td>Holly Schuh</td>
<td>PhD</td>
<td>International Health</td>
<td>2014</td>
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<tr>
<td>Kristen Little</td>
<td>PhD</td>
<td>Epidemiology</td>
<td>2014</td>
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<tr>
<td>Huitong Qui</td>
<td>PhD</td>
<td>Biostatistics</td>
<td>2014</td>
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<tr>
<td>Mufaro Kanyangarara</td>
<td>PhD</td>
<td>International Health</td>
<td>2014</td>
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<tr>
<td>Ian Craig</td>
<td>PhD</td>
<td>International Health</td>
<td>2013</td>
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<tr>
<td>Jessica Atwell</td>
<td>PhD</td>
<td>International Health</td>
<td>2013</td>
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<tr>
<td>Ricardo Castillo</td>
<td>PhD</td>
<td>Epidemiology</td>
<td>2012</td>
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<tr>
<td>Andrew Azman</td>
<td>PhD</td>
<td>Epidemiology</td>
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<tr>
<td>Benjamin Althouse</td>
<td>PhD</td>
<td>Epidemiology</td>
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<tr>
<td>Genevieve Wojcik</td>
<td>PhD</td>
<td>Epidemiology</td>
<td>2011</td>
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<tr>
<td>Michelle Mergier*</td>
<td>PhD</td>
<td>International Health</td>
<td>2011</td>
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<tr>
<td>Alison Turnbull*</td>
<td>PhD</td>
<td>Epidemiology</td>
<td>2011</td>
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<tr>
<td>Emily Gurley</td>
<td>PhD</td>
<td>Epidemiology</td>
<td>2011</td>
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<tr>
<td>Henrik Salje</td>
<td>PhD</td>
<td>Epidemiology</td>
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<td>Su-Hsun Liu</td>
<td>PhD</td>
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<td>2011</td>
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<tr>
<td>Amanda Latimore</td>
<td>PhD</td>
<td>Epidemiology</td>
<td>2010</td>
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<tr>
<td>James Stark</td>
<td>PhD</td>
<td>Epidemiology, University of Pittsburgh</td>
<td>2010</td>
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<tr>
<td>Isabel Rodriguez-Barraquer</td>
<td>PhD</td>
<td>Epidemiology</td>
<td>2010</td>
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<tr>
<td>Nikolas Wada*</td>
<td>PhD</td>
<td>Epidemiology</td>
<td>2010</td>
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<tr>
<td>Adrienne Shapiro</td>
<td>PhD</td>
<td>Epidemiology</td>
<td>2009</td>
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<tr>
<td>Bridget Ambrose</td>
<td>PhD</td>
<td>Epidemiology</td>
<td>2008</td>
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<tr>
<td>Willem van Panhuis</td>
<td>PhD</td>
<td>International Health</td>
<td>2008</td>
</tr>
</tbody>
</table>
Nicholas Reich  PhD  Biostatistics  2008
Kathryn Anderson  PhD  Epidemiology, Emory University  2008
Tassanee Silawan  PhD  Epidemiology, Mahidol University  2007

**Final Oral Participation**

Henrik Salje  PhD  Epidemiology  2014
Andrew Azman  PhD  Epidemiology  2014
Kara Randolph*  PhD  Epidemiology  2014
Ben Althouse  PhD  Epidemiology  2013
Hannah Clapham  PhD  Infectious Disease Epidemiology  2013
Imperial College
Melinda Munos*  PhD  International Health  2012
Alison Liu  PhD  Epidemiology  2012
Isabel Rodriguez-Barraquer  PhD  Epidemiology  2012
Kaitlin Rainwater Lovett  PhD  Epidemiology  2012
Johns Ayers*  PhD  Health, Behavior and Society  2011
Kathryn Anderson  PhD  Epidemiology, Emory University  2010
James Stark  PhD  Epidemiology, University of Pittsburgh  2010
Nicholas Reich  PhD  Biostatistics  2010
Emily Henkle*  PhD  Epidemiology  2010
Willem van Panhuis  PhD  International Health  2009
Justin Lessler  PhD  Epidemiology  2008
Michael Johansson  PhD  Molecular Microbiology & Immunology 2008
Christina Schumaker  PhD  Epidemiology  2008
David Dowdy  PhD  Epidemiology  2008
Tassanee Silawan  PhD  Epidemiology, Mahidol University  2008

**Thesis Committee Participation**

Mark Kartzinel (UF)  The impact of the larval environment on post-emergence fitness of aedes aegypti
Punam Amratia (UF)  Fine-scale mapping of malaria in Ghana: use of Bayesian models
Jacob Ball (UF)  The ecology and epidemiology of respiratory diseases in high-risk populations
Stephanie Cinkovich (UF)  The Role of Host Composition and Asymptomatic Infection on the Transmission Dynamics of Zoonotic Diseases
Andrew Azman (JHU)  Heterogeneities in Cholera Transmission
Mary Grabowski (JHU)  Patterns and predictors of the epidemiological and evolutionary dynamics of HIV-1 infection in Rakai, Uganda
Ben Althouse (JHU)  Studies of Sylvatic Dengue in Senegal
Henrik Salje (JHU)  Combining surveillance data with genetic analysis in the characterization of spatiotemporal clustering of dengue cases in Bangkok
Isabel Rodriguez-Barraquer  Towards a better estimation of the force of infection and basic reproductive number of dengue virus
Su-Hsun Liu (JHU)  Mathematical modeling to inform likelihood of second peak HPV prevalence in older women
Kaitlin Lovett (JHU)  The Impact of Immune Reconstitution and Revaccination on Measles Immunity in HIV-infected Zambian Children initiating Antiretroviral Therapy
Genevieve Wojcik (JHU)  
A Genome-Wide Association Study of Oral Polio Vaccine Failure in Infants from Bangladesh (MAL-ED Study): Gene-, and Pathway-Level Analyses

Emily Gurley (JHU)  
Exposure to Indoor Air Pollution and Pneumonia in Dhaka, Bangladesh

Justin Lessler (JHU)  
The Detection and Characterization of Respiratory Virus Transmission in Institutions

Willem van Panhuis (JHU)  
Dynamics of Dengue Antibodies: Transplacental Transfer, Decline after Birth and the Serotype Specific Response to Infection among Infants and Children in Thailand

Christina Schumacher (JHU)  
Identifying, Characterizing and Predicting the Role of Core Groups in Syphilis Epidemics

Nicholas Reich (JHU)  
Statistical Methods for Incomplete Data from Infectious Disease Outbreaks

Michael Johansson (JHU)  
The Influence of Climate on Dengue Transmission in Puerto Rico

David Dowdy (JHU)  
Impact and Cost-Effectiveness of Improved Diagnostics for Tuberculosis in Developing Countries

Classroom Instruction

2017
Principal Instructor (and course developer)
Department of Biology
University of Florida
Outbreaks
Enrollment: 25
I developed a course called “Outbreaks” ZOO4926 which is an undergraduate course that teaches quantitative concepts in characterizing epidemics and dynamics of emerging infectious diseases in multiple hosts including humans, animals and plants. Development included creation of lectures, 5 labs (in class quantitative assignments), final projects and final exam.

2009-2015
Principal Instructor (and course developer) (with Dr. William Moss and Dr. Justin Lessler)
Department of Epidemiology
Bloomberg School of Public Health
Johns Hopkins University
Concepts and Methods in Infectious Disease Epidemiology
Enrollment: 10, 35, 35, 32, 27

Principal Instructor (course developer)
Department of Epidemiology
Bloomberg School of Public Health
Johns Hopkins University
Infectious Disease Dynamics: Theoretical and Computational Approaches
Enrollment: 18, 25, 20, 30, 20, 22, 24, 20

2014
Principal Instructor (with Dr. Kenrad Nelson, Dr. Shruti Mehta, and Dr. Isabel Rodriguez-Barraquer)
Department of Epidemiology
Bloomberg School of Public Health
Johns Hopkins University
Epidemiology of Infectious Diseases
Enrollment: 42

2011
Guest Lecturer “Modeling and prediction of DHF”, “Models of dengue transmission and dengue vaccines”
PAHO/Instituto Pedro Kouri Dengue Institute
Havana, Cuba
Enrollment: 210

2010
Principal Instructor (and course developer)
Infectious Disease Dynamics: Theoretic and Computational Approaches
Johns Hopkins Bloomberg School of Public Health Fall Institute
Barcelona, Spain
Enrollment: 20

2007-2013
Instructor
Department of Epidemiology
Bloomberg School of Public Health
Johns Hopkins University
Epidemiologic Methods 3
Enrollment: 220 on average in class total each year, 60 in lab section each year.

2007-2013
Faculty Advisor
Department of Epidemiology
Bloomberg School of Public Health
Johns Hopkins University
Modeling of Spatial and Temporal Disease Epidemiology Forum-Student Group

2005-2006
Principal Instructor (and course developer)
Department of International Health
Bloomberg School of Public Health
Johns Hopkins University
Infectious Disease Dynamics: Theoretical and Computational Approaches
Enrollment: 19, 15

2005-2013 (12 separate lectures)
Guest Lecturer “Introduction to mathematical modeling of infectious diseases”, “Influenza"
Department of Epidemiology
Bloomberg School of Public Health
Johns Hopkins University
Infectious Disease Epidemiology

2012-2014 (5 separate lectures)
Guest Lecturer “MERS Coronavirus”, “Dengue”, “SARS Coronavirus”
Department of Epidemiology
Bloomberg School of Public Health
Johns Hopkins University
Emerging Infectious Disease

2008-2010
Guest Lecturer “Host demographics and infectious disease dynamics”
Department of Molecular Microbiology and Immunology
Bloomberg School of Public Health
Johns Hopkins University
Ecology of Infectious Disease

2007-2008
Co-organizer
Departments of Epidemiology and Biostatistics
Bloomberg School of Public Health
Johns Hopkins University
Epi/Biostats Working Group on Infectious Disease

2014, 2015
Guest Lecturer “Infectious Disease Epidemiology”
Global Institute of Public Health
New York University

2006-2008
Guest Lecturer
University of Pittsburgh Graduate School of Public Health
Department of Epidemiology
Infectious Disease Epidemiology

2012
Guest Lecturer “A Practical Short Course in Infectious Disease Modeling”
Harvard University/Mahidol University
Bangkok

2006-2014
Guest Lecturer “Models of infectious disease dynamics”
United States Uniformed Services University
Bethesda, MD
Infectious Disease Epidemiology

2006-2011
Instructor
Field Epidemiology Training Program
Thailand Ministry of Public Health
Bangkok, Thailand
Infectious Disease Dynamics

2003-2004
Guest Lecturer
Department of Earth and Planetary Sciences
Zanvyl Krieger School of Arts and Sciences
Johns Hopkins University
Climate Change and Global Health

2001
Tutorial Instructor
GEOMED 2001
Université Pierre et Marie Curie, Paris
Time-Series Analysis, Pre-conference Tutorial

1996
Teaching Assistant
Inorganic Chemistry, Brown University

RESEARCH GRANT PARTICIPATION

Active Support
Linking antigenic and genetic variation of dengue to individual and population risk
02/01/15-1/31/2020, NIH R01 Total award: $3,800,000
Principal Investigator: Derek Cummings
Primary Goal: Characterize the genetic and antigenic variability of dengue viruses circulating over the last twenty years using a large repository of viral samples and build population models of ecological interactions between dengue viruses and its impact on human health.

Southeast Regional Center of Excellence in Vector-Borne Diseases: the Gateway Program.
12/31/2016-12/30/2021, US Centers for Disease Control Total award: $9,999,628.
Principal Investigator: co-PI’s Derek Cummings, Greg Glass, John Beier (University of Miami), Tom Unnasch (University of South Florida), Rhoel Dinglasan, Program Director.
Primary Goal: Conduct research to enhance our understanding of the transmission dynamics of arthropod-borne disease transmission in order to effectively respond to detect and control outbreaks.

Monitoring cause-specific school absences to estimate influenza transmission in Western PA
09/01/13-08/31/16, CDC U01 Total award: $1,500,000
Principal Investigator: Derek Cummings
Role: Principal Investigator

Methods for Reducing Spatial Uncertainty and Bias in Disease Surveillance
02/01/2013-01/31/2018, NIH R01 NIAID Total award to UF subcontract: $226,469
Principal Investigator: Justin Lessler
The goal of this research is to develop methods that can improve forecasting and current estimates of the incidence of dengue and other infectious diseases. The project uses multiple approaches including mechanistic models and models that traverse multiple temporal and spatial scales to produce estimates of incidence.
Role: Investigator
Influenza Immunity and Survival in Aging Populations
09/01/15-08/31/2017, US NIH R56 Total award to UF subcontract: $26,395
Principal Investigator: Justin Lessler, Derek Cummings (local PI)
Primary Goal: This study aims to understand how and why this increase in antibody titers occurs, and what role survival effects, patterns of infection and the biology of the immune response over multiple infections play in its development.
Role: Investigator

University of Pittsburgh MIDAS Center of Excellence: Data and Statistical Inference Project
07/01/14-08/31/19, NIH U01 Total award to UF subcontract: $217,409
Principal Investigators: Derek Cummings (local PI), Donald Burke (overall PI)
Primary Goal: Computational modeling for science and policy is driven by availability of data to estimate model parameters. Insights for disease transmission dynamics are derived from statistical inference using these models. This project will capitalize on new opportunities provided by large scale genetic and epidemiological data created during MIDAS-II to study infectious disease transmission dynamics at the micro- and macro level using innovative statistical approaches and parameter estimation methods.
Role: Investigator

Modeling interactions between HIV interventions in key populations in India
7/1/2015-6/30/2017, US NIH R21 Total award: $448,573
Principal Investigators: Derek Cummings
Primary Goal: The proposed study will use a novel modeling approach to help to disentangle multiple dynamic effects of combination interventions in order to inform future large-scale implementation of such combination interventions.

Influenza Immunity and Survival in Aging Populations
09/01/15-08/31/2017, US NIH R56 Total award to UF subcontract: $26,395
Principal Investigator: Justin Lessler, Derek Cummings (local PI)
Primary Goal: This study aims to understand how and why this increase in antibody titers occurs, and what role survival effects, patterns of infection and the biology of the immune response over multiple infections play in its development.
Role: Investigator

University of Pittsburgh MIDAS Center of Excellence: Data and Statistical Inference Project
07/01/14-08/31/19, NIH U01 Total award to UF subcontract: $217,409
Principal Investigators: Derek Cummings (local PI), Donald Burke (overall PI)
Primary Goal: Computational modeling for science and policy is driven by availability of data to estimate model parameters. Insights for disease transmission dynamics are derived from statistical inference using these models. This project will capitalize on new opportunities provided by large scale genetic and epidemiological data created during MIDAS-II to study infectious disease transmission dynamics at the micro- and macro level using innovative statistical approaches and parameter estimation methods.
Role: Investigator

Modeling interactions between HIV interventions in key populations in India
7/1/2015-6/30/2017, US NIH R21 Total award: $448,573
Principal Investigators: Derek Cummings
Primary Goal: The proposed study will use a novel modeling approach to help to disentangle multiple dynamic effects of combination interventions in order to inform future large-scale implementation of such combination interventions.

Completed Support
Staphylococcus aureus and Pseudomonas Hospital Acquired Infections
01/01/13-12/31/16, MedImmune
Principal Investigator: Derek Cummings (co) with Trish Perl
Funding Level: 0.6 months
Primary Goal: Identify risk factors for hospital acquired infections of staphylococcus aureus and pseudomonas in 7 hospital centers and assist in trial design for new intervention products.
Role: Principal Investigator

From Ebola Response to Sustainable Public Health Systems in Liberia
7/1/2015-6/30/2016, US CDC
Principal Investigator: David Peters, Derek Cummings (co-PI’s)
Funding Level: 2.4 calendar months
Primary Goal: The goal of this project is to support the Ministry of Health of Liberia in building an integrated disease surveillance system to conduct surveillance for a number of infectious diseases as well as build general capacity to analyze infectious disease surveillance data.
Role: co-Principal Investigator

Inference for interacting pathogens with mechanistic and phenomenological models
09/01/14-08/31/16, NIH
Principal Investigators: Derek Cummings (local PI), Nick Reich (overall PI)
Funding Level: 1.56 calendar months
Primary Goal: Develop inference framework to estimate interactions of multiple pathogens that co-circulate and induce immune responses that might create competitive and/or enhancing relationships.
Role: Investigator

Modeling of infectious disease; A study of repeat influenza vaccination, and how population based immunity impacts the genetic makeup of dengue viruses.
04/01/14-09/30/2016, WRAIR
Principal Investigator: Derek Cummings
Funding Level: 0.12 calendar months
Primary Goal: Two part project to determine the impact of successive influenza vaccine on immunity and risk and 2) dengue population immunity and how this shapes the dengue viral evolution.
Role: Principal Investigator

09/01/10-08/31/15, CDC/VA
Principal Investigators: Trish Perl, Lew Radonovich (co-PI’s)
Funding Level: 1.2 calendar months
Primary Goal: The goal of this research is to compare the efficacy of surgical masks to N95 respirators in protecting health care workers from respiratory viruses including influenza.
Role: Investigator

Analytic Support for the Ebola Outbreaks and Strengthening Primary Health Care in West Africa and Democratic Republic of Congo
10/15/14-01/31/15, Unicef
Principal Investigators: David Peters (PI)
Funding Level: 0.12 calendar months
Primary Goal: The goal of this project is to conduct analyses and simulations to support UNICEF’s response to the Ebola virus outbreak in West Africa.
Role: Investigator

VMI II: Application of Computational Models to Guide and Evaluate Global
07/01/13-06/30/15, University of Pittsburgh, Bill and Melinda Gates Foundation
Principal Investigator: Derek Cummings
Funding Level: 0.60 calendar months
Primary Goal: To use theoretical models to evaluate multiple vaccination strategies and vaccine candidates to control dengue and other vector-borne diseases
Role: Principal Investigator

Quantifying Contact Rates and Mixing Patterns in School Aged Children
08/31/11 - 08/30/14, CDC
Principal Investigator: Derek Cummings (co) with Shanta Zimmer
Funding Level: 1.2 calendar months
Primary Goal: The goal of this work is to use multiple methods to quantify the contacts that school children make that could potentially transmit influenza including survey,
proximity detectors and GPS devices in order to evaluate each of these methods.
We will also link measures of social contact to the risk of acquisition of
influenza.
Role: co-Principal Investigator

Immune Landscapes of Human Influenza in Households, Towns and Cities in Southern China
10/01/08-8/31/14, NIH
Principal Investigator: Derek Cummings
Funding Level: 1.8 calendar months
Primary Goal: The goal of this work is to characterize immunological profiles to human
influenza in space and time among individuals living in Guangzhou province,
China, and to build computational models that capture the transmission dynamics
that could create the specific distributions observed.
Role: Principal Investigator

Career Award at the Scientific Interface
07/01/07 - 07/31/15, Burroughs Wellcome
Principal Investigator: Derek Cummings
Funding Level: 0.12 calendar months
Primary Goal: To study natural and vaccine-induced immunity and spatial-temporal
dynamics of epidemic dengue
Role: Principal Investigator

Using Viral Sequences to Characterize the Micro-scale Dispersal Dynamics of Dengue in Bangkok
2/1/2012-12/31/2014, Johns Hopkins Center for Global Health
Principal Investigator: Derek Cummings
Funding level: $50,000 research funds (0 months)
Primary Goal: Describe the micro-scale transmission of dengue in an urban environment using
genetic and geographic information on the occurrence of cases.
Role: Principal Investigator

Computational Models of Infectious Disease Threats Center for Excellence
04/01/09 – 04/01/14, NIH-NIGMS
Principal Investigator: Don Burke
Funding Level: 3.0 calendar months
Primary Goal: Integrate the most advanced and powerful techniques of epidemiological data
analysis with those of computer simulation to produce a unified computational
epidemiology.
Role: Investigator

Vaccine Modeling Initiative
04/1/08-04/31/13, Bill and Melinda Gates Foundation
Principal Investigator: Don Burke
Funding Level: 1.0 calendar months
Primary Goal: Evaluation of candidate vaccine technologies using computational models.
Role: Investigator

Temporal and Spatial Dynamics of Sylvatic Arbovirus Transmission and Emergence
Primary Goal: The goal of this project is to study the dynamics of transmission of dengue and chikungunya virus among non-human primate species in Senegal and determine which species support transmission of these viruses endemically and which ones appear to be only spillover species.

Role: Investigator

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Multi-Scale Modeling of Infectious Diseases in Fluctuating Environments
09/01/09 – 08/31/13, NIH

Principal Investigator: Derek Cummings, Lora Billings (co)
Funding Level: 0.6 calendar months
Primary Goal: The objective of this proposal is to develop new mathematical models of infectious disease transmission that effectively, capture the impact of stochasticity on dynamics and lead to more effective control. The group will study the dynamics of disease spread in fluctuating environments modeled at various population scales.

Role: Co-Principal Investigator

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Preparedness and Catastrophic Event Response (PACER)
06/01/09 – 05/31/12, US department of Homeland Security

Principal Investigator: Gabe Kelen
Funding Level: 0.12 calendar months
Primary Goal: PACER is a consortium of research institutions studying how the nation can best prepare for and respond to potential large-scale incidents and disasters. My work on this project is on model development for pandemic influenza models particularly, methods for parameter estimation for individual based simulations.

Role: Investigator

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Immune Reconstitution of HIV-1 Infected Zambian Children Initiating Antiretroviral Therapy 03/01/07 – 02/28/12, NIH

Principal Investigator: William Moss
Funding Level: 0.6 calendar months
Primary Goal: This project will study measles and measles vaccination in HIV-1-infected children in Lusaka, Zambia to characterize measles virus-specific immune reconstitution and immunologic memory in Zambian children initiating ART.

Role: Investigator

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Planning for Avian Influenza Outbreaks and Potential Pandemics
9/14/05 – 3/31/10, NIH-Fogarty International Center

Principal Investigator: Don Burke
Funding Level: 0.6 calendar months
Primary Goal: Develop capacity among epidemiologists at the Thai Ministry of Public Health to utilize new theoretical and computational tools in concert with traditional epidemiologic approaches to address issues surrounding avian influenza and potential influenza pandemics.

Role: Investigator

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Computational Models of Infectious Disease Threats
04/01/04 – 04/01/09, NIH-NIGMS
Principal Investigator: Don Burke
Funding Level: 4.2 calendar months
Primary Goal: Integrate the most advanced and powerful techniques of epidemiological data analysis with those of computer simulation to produce a unified computational epidemiology.
Role: Program Coordinator and Investigator

Pittsburgh Influenza Prevention Program
10/01/06 - 09/31/08, CDC
Principal Investigator: Don Burke
Funding Level: 0.6 calendar months
Primary Goal: Study the transmission dynamics of influenza in Pittsburgh elementary schools and conduct trials of non-pharmaceutical interventions targeting influenza transmission.
Role: Investigator

Harmonic Decomposition and Compartmental Models in the Analysis of Epidemiologic and Climatic Data: An Analysis of Dengue in Southeast Asia
07/01/04 - 06/31/07, NOAA
Principal Investigator: Don Burke
Funding Level: 2.4 calendar months
Primary Goal: Apply methods developed under previous funding cycle to data from Southeast Asia on dengue hemorrhagic fever.
Role: Investigator

Ethical Issues in Influenza Pandemic Preparedness and Response
04/01/06 - 10/01/06, Rockefeller Foundation
Principal Investigators: Ruth Faden and Ruth Karron (co-PI’s)
Funding Level: 0.12 calendar months
Primary Goal: Identify current and potential responses to the threat of pandemic influenza that profoundly affect the world’s disadvantaged and to undertake concrete action to prevent or at least to mitigate those responses that are the most unjust. Simulate the impact of pandemic mitigation responses in resource poor settings.
Role: Investigator

Computational Modeling of Vaccination Strategies against Smallpox
08/01/02 - 07/31/04, Alfred P. Sloan Foundation
Principal Investigator: Joshua Epstein
Funding Level: 2.4 calendar months
Primary Goal: Develop computer simulations of the introduction and spread of a bio-terrorist agent such as smallpox in human populations, and evaluate possible response strategies.
Role: Investigator

Research to Guide Allocation of Public Resources in the Event of an Intentional Introduction of Smallpox
12/01/02 – 05/31/04, FIC / NIH / DHHS
Principal Investigator: Don Burke
Funding Level: 2.4 calendar months
Primary Goal: Develop, evaluate, and utilize computational models of smallpox
introduction into the USA, and of public health strategies to contain smallpox epidemics.

Role: Investigator

Harmonic Deconstruction in the Analysis of Epidemiologic and Climatic Data.
08/01/02 – 07/31/03, NOAA
Principal Investigator: Don Burke
Funding Level: 2.4 calendar months
Primary Goal: Develop and evaluate new computational methods for correlating dengue epidemiologic data and weather data, such as wavelet transforms and Empiric Mode Decomposition.
Role: Investigator

ACADEMIC SERVICE

Department of Biology

Advisory Committee
Strategic Planning Committee
2015-present
2016-present

Department of Epidemiology

Lead, Department of Epidemiology Self-study
Chair of Faculty Executive Committee
Faculty Executive Committee
Infectious Disease Journal Club, Faculty Coordinator
Admissions and Credentialing Committee, Member
2013-present
2013-present
2012-present
2009-2012
2009-2012

Department of International Health

Steering Committee, Member
2005-2006

School-wide

Technology Transfer Committee, Member
2010-2015

ADDITIONAL INFORMATION

Personal statement of research and research objectives

I am interested in developing effective strategies for the control infectious diseases. My approach in doing this is to develop temporally or spatially targeted administration of vaccines or other interventions to produce the largest reduction in morbidity and mortality. I utilize a mix of field study and theoretical models of infectious disease in order to understand the transmission dynamics of dengue, influenza, measles, hepatitis C and chikungunya and to estimate the impact of specific interventions.

Keywords
Infectious disease, dynamics, influenza, dengue, measles, hepatitis C, ebola, social dynamics, vaccine-preventable, mathematical models, ecology