OMB No. 0925-0001 and 0925-0002 (Rev. 10/15 Approved Through 10/31/2018)

BIOGRAPHICAL SKETCH

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NAME: Anderson, Georgiana Brooke

eRA COMMONS USER NAME (credential, e.g., agency login): gander32

POSITION TITLE: Assistant Professor in Department of Environmental & Radiological Health Sciences, Colorado State University

EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)

| INSTITUTION AND LOCATION | DEGREE  (if applicable) | Completion Date  MM/YYYY | FIELD OF STUDY |
| --- | --- | --- | --- |
| North Carolina State University, Raleigh, NC | B.A. | 12/2002 | French Language and Literature |
| North Carolina State University, Raleigh, NC | B.S. | 05/2004 | Chemical Engineering |
| Yale University, New Haven, CT | M.Phil. | 12/2006 | Environmental Engineering |
| Yale University, New Haven, CT | Ph.D. | 12/2010 | Environmental Engineering |
| Johns Hopkins Bloomberg School of Public Health, Baltimore, MD | Postdoctoral | 10/2014 | Biostatistics |
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1. **Personal Statement**

As an Assistant Professor at Colorado State University, I have developed deep expertise in R statistical programming, including methods for working with large datasets and for developing and customizing statistical software packages for health-related research. This research has focused on the health risks associated with climate-related exposures, using statistical software to integrate and analyze large, multi-level datasets of national-scale health and environmental data. As part of this research, I have published a number of open source software packages to facilitate environmental epidemiologic research (e.g., Anderson et al. 2017a; Anderson et al. 2017b; Lammars and Anderson 2017; Severson and Anderson 2016), several of which allow access to environmental exposure data directly from the R environment, using the open data application interfaces (APIs) of the United States Geological Survey (USGS) (Lammars and Anderson 2017) and the National Oceanic and Atmospheric Administration (NOAA) (Severson and Anderson 2016). As further evidence of my expertise in statistical programming for scientific research, I have been a reviewer for ROpenSci software packages, and am a two-time participant in the invitation-only ROpenSci Unconference, which brings together top international R programmers to develop R software for scientific research. I am a member of the editorial boards of *Epidemiology* and *Environmental Health Perspectives* and have a strong history of interdisciplinary research, including as a member of my university’s Partnership of Air Quality, Climate, and Health.

I am passionate about training other researchers to use open-source software tools to improve the efficiency, rigor, and reproducibility of research. With Dr. Roger Peng, I co-developed and am the co-instructor of *Mastering Software Development in R* (a five-course Coursera Specialization), which has been used by over 50,000 participants since it opened in the fall of 2016. I regularly teach a course in *R Programming for Research* at Colorado State University, which has drawn students from a variety of disciplines, including environmental health, mechanical engineering, microbiology, radiological health sciences, occupational health, and veterinary sciences. By the end of this course, the students—who mostly begin the course with little or no programming expertise—are competent in many principles of reproducible research, including use of literate programming to create reproducible reports and version control using *git* and *GitHub*. In fact, several of my previous students have brought the use of *git* and *GitHub* back to their research laboratories, encouraging their supervising faculty to implement version control within their research programs. I have the expertise and passion to lead the proposed development of globally-available training modules to improve reproducibility in data recording and pre-processing.

1. **Anderson GB**, Yan M, Ferreri J, Crosson W, Al-Hamdan M, Schumacher A, Eddelbuettel D. (2017a) `hurricaneexposure`: Explore and Map County-Level Hurricane Exposure in the United States. Version 0.0.1 [Software]. Available from: https://cran.r-project.org/web/packages/hurricaneexposure/index.html
2. **Anderson GB**, Schumacher A, Guikema S, Quiring S, Ferreri F, Staid A, Guo M, Ming L, Zhu L. (2017b) `stormwindmodel`: Model tropical cyclone wind speeds. Version 0.1.0 [Software]. Available from: https://cran.r-project.org/web/packages/stormwindmodel/index.html
3. Severson R, **Anderson GB.** (2016) `countyweather`: Compiles meteorological data for U.S. counties. Version 0.1.0 [Software]. Available from: https://cran.r-project.org/web/packages/countyweather/index.html
4. Lammars R, **Anderson GB.** (2017) `countyfloods`: Quantify United States county-level flood measurements. Version 0.0.1 [Software]. Available from: https://cran.r-project.org/web/packages/countyfloods/index.html

**B. Positions and Honors**

**Positions and Employment**

Summer 2001 Science Intern for United States Embassy, Bern, Switzerland

Summer 2002 Research intern with Dr. Pierre Pichat (photocatalysis), L’Ecole Centrale, Ecully, France

Summer 2003 Undergraduate researcher with Dr. David Ollis (photocatalysis) through National Science Foundation Research Experiences for Undergraduates, North Carolina State University, Raleigh, NC

Fall 2003 Undergraduate researcher with Dr. George Roberts (solid state polymerization of poly(bisphenol A)), North Carolina State University, Raleigh, NC

Spring 2004 Undergraduate researcher with Dr. Jean-Marie Herrmann (photocatalysis), Laboratoire d’Application de la Chimie a l”Environnement, Villeurbanne, France

2004­–2005 Graduate researcher with Dr. William Mitch (nitrogenous disinfection by-products), Yale University, New Haven, CT

2005–2010 Graduate researcher with Dr. Michelle Bell (environmental epidemiology of air pollution and climate), Yale University, New Haven, CT

2010–2011 Postdoctoral researcher with Dr. Michelle Bell (environmental epidemiology of air pollution and climate), Yale University, New Haven, CT (part-time position)

2011–2014 Postdoctoral researcher with Dr. Roger Peng (environmental epidemiology of air pollution and climate), Johns Hopkins School of Public Health, Baltimore, MD

2014–present Assistant Professor, Department of Environmental & Radiological Health Sciences, Colorado State University

2015–present Member of the Editorial Board, *Epidemiology*

2016–present Faculty Associate, Department of Statistics, Colorado State University

2016–present Associate Editor, *Environmental Health Perspectives*

2016–present Co-instructor for five-course specialization on *Mastering Software Development in R* on Coursera

**Honors and Awards**

1999–2003 North Carolina State University Park Scholar

2004 Senior Award for Humanities, North Carolina State University College of Engineering

2004–2007 National Science Foundation Graduate Research Fellowship

2007 Second Place, Student Poster and Paper Competition, 100thAnnual Air & Waste Management Association Conference

2007 Finalist, Switzer Foundation Fellowship

2007–2010 United States EPA STAR Graduate Fellowship

2009 Lead author, National Institute of Environmental Health Sciences Extramural Paper of the Month, April 2009

2010 Winner, Student Poster Competition for the International Society for Environmental Epidemiology Conference

2010 Runner-up, Kenneth Rothman Epidemiology Prize (given for the best paper of the previous year in *Epidemiology*)

2010 Lead author, National Institute of Environmental Health Sciences Extramural Paper of the Month, December 2010

2011 Finalist, Reuel A. Stallones Student Prize Paper (given for outstanding contributions to epidemiologic methods by a student of epidemiology)

2013 Runner-up, Kenneth Rothman Epidemiology Prize (given for the best paper of the previous year in *Epidemiology*)

2016 Participant in invitational ROpenSci Unconference

2017 Participant in invitational ROpenSci Unconference

2017 One of Collaborative on Health and the Environment’ s 20 Pioneers Under 40 in Environmental Public Health

**C. Contributions to Science**

**1. Research software development. As part of my environmental health research, I have developed open-source software (e.g., Anderson et al. 2017a; Anderson et al. 2017b; Anderson et al. 2017c), including tools to leverage open data APIs with large collections of environmental exposure data (e.g., Severson and Anderson 2016; Lammars and Anderson 2017). Through this work, I have become involved in providing education materials to train others in software development in the R statistical language (e.g., Peng et al. 2017) as well as research on general solutions to research software development challenges, including how to share large repositories of research-related data through the R package infrastructure (Anderson and Eddelbuettel 2017).**

1. **Anderson GB**, Chen Z. (2017) `noaastormevents`: Explore NOAA Storm Events Database. Version 0.1.0 [Software]. Available from: https://cran.r-project.org/web/packages/noaastormevents/index.html
2. **Anderson GB**, Eason C, Barnes EA. (2017c) Working with daily climate model output data in R and the `futureheatwaves` package. *The R Journal* 9(1):124–137.
3. Peng RD, Kross S, **Anderson GB.** (2017) Mastering software development in R [Internet]. Available from: https://bookdown.org/rdpeng/RProgDA/
4. **Anderson GB, Eddelbuettel D. (2017)** Hosting data packages via ‘drat ‘: A case study with hurricane exposure data. *The R Journal* 9(1):486–497.

**2. Health impacts of climate-related disasters.** My current research includes interdisciplinary projects to explore the potential health impacts of increased heat under climate change (Anderson et al. 2016a; Oleson et al. 2015; Petkova et al. 2014), in particular in the context of potential adaptation to heat (Anderson et al. 2016a). As part of this work, I have led the development of open source software to identify, characterize, and explore heat waves from projections generated by multiple climate models, with multiple ensemble members for each model (Anderson et al. 2016b, Anderson et al. 2017c). This software is facilitating current work to project heat-related impacts using projections from all ensemble members of all CMIP5 models, to explore uncertainty in projections in heat-related impact assessments both across climate models and by adaptation scenario. Further, I have developed open source software to facilitate assessment of exposure to tropical storms for epidemiological studies (Anderson et al. 2017a; Anderson et al. 2017b; Anderson and Eddelbuettel 2017).

1. **Anderson GB**, Oleson KW, Jones B, Peng R. (2016a) Projected trends in high-mortality heatwaves under different scenarios of climate, population, and adaptation in 82 US communities. *Climatic Change*. NIHMSID: NIHMS813874.
2. **Anderson GB**, Eason C, Barnes EA. (2016b) `futureheatwaves`: Find, characterize, and explore extreme events in climate projections. Version 1.0.3 [Software]. Available from: https://cran.r-project.org/web/packages/futureheatwaves/index.html
3. Oleson KW, **Anderson GB**, Jones B, McGinnis SA, Sanderson B. (2015) Avoided climate impacts of urban and rural heat and cold waves over the US using large climate model ensembles for RCP8.5 and RCP4.5. *Climatic Change.* NIHMS ID: [NIHMS738532](http://www.nihms.nih.gov/db/sub.cgi?mid=738532).
4. Petkova EP, Bader DA, Anderson GB, Horton RM, Knowlton K, Kinney PL. (2014) Heat-related mortality in a warming climate: Projections for 12 US cities. *International Journal of Environmental Research and Public Health*. PMCID: PMC4245617.

**3. Exposure metrics for environmental health research.** I have conducted research to clarify the use of different exposure metrics, including the heat index (Anderson et al. 2013; Anderson et al. 2016c) and ozone exposure metrics (Anderson and Bell 2010), in the context of environmental epidemiologic research. As part of this worked, I have developed open source R packages to calculate heat index and convert weather metrics (Anderson et al. 2016c), as well as an R package to facilitate matching of exposure data time-stamped in Universal Time (UTC) and health outcomes aggregated based on local time (Anderson and Guo 2016).

1. **Anderson GB**, Bell ML, Peng RD. (2013) Methods to calculate the heat index as an exposure metric in environmental health research. *Environmental Health Perspectives.* PMCID: PMC3801457.
2. **Anderson GB**, Bell ML. (2010) Does one size fit all? The suitability of standard ozone exposure metric conversion ratios and implications for epidemiology. *Journal of Exposure Science and Environmental Epidemiology.* PMID: 18985076.
3. **Anderson GB,** Ferreri J, Peng RD. (2016c) `weathermetrics`: Functions to convert between weather metrics. Version 1.2.2 [Software]. Available from: https://cran.r-project.org/web/packages/weathermetrics/index.html
4. **Anderson GB**,Guo Z. (2016) `countytimezones`: Convert from UTC to local time for United States counties. Version 1.0.0 [Software]. Available from: https://cran.r-project.org/web/packages/countytimezones/index.html

**4. Health effects of extreme temperature. I have conducted national studies of the association between mortality risk and extreme temperatures (Anderson and Bell 2009) and heat waves (Anderson and Bell 2011), as well as a national study of heat-associated respiratory hospitalizations (Anderson et al. 2013). These studies include analysis of effect modification by community (Anderson and Bell 2009) and heat wave (Anderson and Bell 2011) characteristics. I have also researched trends in occupational heat-health risks, as well as heat preparedness and response in US cities (**White-Newsome **et al. 2014).**

1. **Anderson GB**, Dominici F, Wang Y, McCormack M, Bell, ML, Peng RD (2013) Heat-related emergency hospitalizations for respiratory diseases in the Medicare population. *American Journal of Respiratory and Critical Care Medicine.* PMCID: PMC3734617.
2. **Anderson GB,** Bell ML. (2011) Heat waves in the United States: Mortality risk during heat waves and effect modification by heat wave characteristics in 43 US communities. *Environmental Health Perspectives.* PMCID: PMC3040608.
3. **Anderson, G.B.**, & Bell, M.L. (2009) Weather-related mortality: How heat, cold, and heat waves affect mortality in the United States. *Epidemiology*. PMCID: 19194300.
4. White-Newsome JL, Ekwurzel B, Baer-Schultz M, Ebi KL, O’Neill MS, **Anderson GB.** (2014) Survey of county-level preparedness and response to the 2011 summer heat in 30 U.S. states. *Environmental Health Perspectives.* PMCID: PMC4048256

**5. Health effects of other ambient environmental exposures.** I have explored health-related risks associated with a number of other ambient exposures, including ozone pollution (Anderson et al. 2012), particulate matter pollution (Krall et al. 2013), a major power outage (Anderson and Bell 2010), and wildfire-related particulate air pollution (Liu et al. 2016).

1. **Anderson GB**, Krall JR, Peng RD, Bell ML. (2012) Is the relationship between ozone and mortality confounded by chemical components of particulate matter? Analysis of 7 components in 57 United States communities. *American Journal of Epidemiology*. PMCID: PMC3571246.
2. **Anderson GB**, Bell ML. (2012) Lights out: Impact of the August 2003 power outage on mortality in New York, NY. *Epidemiology*. PMCID: PMC3276729.
3. Krall JR, **Anderson GB**, Dominici F, Bell ML, Peng RD. (2013) Short-term Exposure to Particulate Matter Constituents and Mortality in a National Study of U.S. Urban Communities. *Environmental Health Perspectives*. PMCID: PMC3801200.
4. Liu JC, Wilson A, Mickley LJ, Ebisu K, Wang Y, Sulprizio MP, Peng RD, Yue X, Son JY, **Anderson GB**, Dominici F, Bell ML. (2016) Exposure to wildfire-specific fine particulate matter and risk of hospital admissions in 369 urban and rural counties in the Western US 2004-2009. *Epidemiology.* NIHMSID: NIHMS829780.

**Complete List of Published Work in MyBibliography:**

https://www.ncbi.nlm.nih.gov/sites/myncbi/1dE75vStfiZQB/bibliography/46332610/public/?sort=date&direction=ascending

**D. Research Support**

**Ongoing Research Support**

NIH/NIEHS, K99-R00 ES022631 Anderson (PI) 09/2013­–12/2018

**Investigating Health Effects of Climate-Related Disasters in the United States**

The proposed research will develop models to investigate effects of cyclonic storms on all-cause morbidity and mortality, and then apply these methods to investigate the effects of cyclonic storms on human health in the United States, including investigations of individual and city-level susceptibility and an analysis of the role of storm-related infrastructure damage on health risks.

NSF, 1331399 Guikema (PI) 10/2013–09/2018

**Hazard SEES Type 2: Modeling to Promote Regional Resilience to Repeated Heat Waves & Hurricanes**

In this project, an interdisciplinary team of researchers will develop an integrated model, the Integrated Hazard, Impact, and Resilience Model to better understand the impacts of repeated hurricanes and heat waves on regional vulnerability and resilience and use the model to develop approaches for improving resilience to these repeated hazards.

Role: Subcontractor (PI of Colorado State University subcontract)