

BIOGRAPHICAL SKETCH

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NAME: Ferguson, Jacqueline M

eRA COMMONS USER NAME (credential, e.g., agency login): JFERGU18

POSITION TITLE: Postdoctoral Fellow

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
Johns Hopkins University, Baltimore, MD	B.A	08/2012	Public Health Studies
Johns Hopkins Bloomberg School of Public Health, Baltimore, MD	M.H.S	08/2013	Environmental Health Science
University of California, Berkeley, Berkeley, CA	PhD	08/2019	Environmental Health Science

A. Personal Statement

I am an epidemiologist with a versatile and broad foundation in occupational and environmental epidemiology, exposure assessment, and causal inference. While my research portfolio may involve seemingly disparate projects, they are connected by a common thread: assessing how complex exposures and time-varying confounders affected by prior exposure influence human health. Thanks to my intensive training at the Johns Hopkins Bloomberg School of Public Health and the University of California, Berkeley, I developed a strong quantitative skillset in study design, data management, and applied epidemiological analysis in large datasets. This skillset enables me to estimate exposure-response parameters in the presence of selection bias using complex secondary data.

My current research examines patterns of work and sleep disruption on human health, particularly among communities of color and US veterans. This research combines my interest and experience in utilizing secondary data sources to evaluate disproportionate impacts of occupational exposures on disadvantaged communities. Since receiving my doctorate, I have been a post-doctoral research fellow at the Center for Population Health Sciences at Stanford University. As a part of this post-doctoral fellowship, I am a fellow in the Big Data Scientist Training Enhancement Program at the VA Palo Alto Health Care System. As part of this program, I am supplementing my experience in the management of large datasets with training in health services and bioinformatics research.

I am committed to advancing our understanding of human health and disease by harvesting the wealth of information contained in biomedical big data. However, the lack of appropriate tools, poor data accessibility, and insufficient training are major impediments to the effect utilization of these data. My career goal is to overcome those hurdles by teaching, mentoring, and conducting research using biomedical and occupational big data. I strive to produce the best possible research by carefully executing proper statistical and epidemiological analysis in a transdisciplinary and collaborative environment. My ambition for research collaboration is reflect in the diverse and impactful research I conduct. I believe my passion for research in conjunction with the resources and mentors available at Stanford University and the Veterans Administration make me particularly well-suited to be a productive and thoughtful candidate for future independent academic research awards.

B. Positions and Honors

Positions and Employment

2009-2013	Research Assistant, Johns Hopkins School of Public Health
2012-2013	Summer Diversity Research Intern, Johns Hopkins School of Public Health
2013-2014	Laboratory Technician, Johns Hopkins School of Public Health
2014-2015	Senior Research Program Coordinator, Johns Hopkins School of Public Health
2015-2016	Student Research Assistant- Robert Wood Johnson Foundation Scholars in Health Policy Research Program- University of California, Berkeley
2016-2019	Senior Data Science Fellow, D-Lab, University of California, Berkeley
2019-	Postdoctoral Fellow, Center for Population Health Science, Stanford Medicine, Stanford University

Professional/Academic Memberships

2016-	Society for Epidemiologic Research (SER)
2019-	International Commission on Occupational Health (ICOH)

Honors

2009-2012	Johns Hopkins University Undergraduate Dean's List
2012	Johns Hopkins University Graduate Honors
2012	Johns Hopkins University Undergraduate Public Health Departmental Honors
2012	Johns Hopkins University Public Health Most Distinguished Senior Thesis
2019	Outstanding Graduate Student Instructor Award, University of California, Berkeley
2019	Best Student Paper, The 27 th International Symposium on Epidemiology in Occupational Health, 2019 <i>Joint Effects of Night Work and Shift Rotation on Treated Depression in a Cohort of Manufacturing Workers</i>

Scholarships/Fellowships

2011	Johns Hopkins University Center for Educational Resources Technology Fellowship Grant
2011	Johns Hopkins University Provost's Undergraduate Research Award
2015	The Dr. Edmond Preston III and Elizabeth J. Preston Scholarship Fund
2015	UC Berkeley Power Top Off Award (Merit Scholarship)
2015-2018	UC Berkeley Environmental Health Sciences Division Annual Fellowship (Merit Scholarship)
2018	UC Berkeley Graduate Division Conference Domestic Travel Grant
2019	UC Berkeley Graduate Division Conference International Travel Grant

Contributions to Science

The following contributions to science contain 11 published manuscripts and 6 selected first author presentations. This [link](#) provides access to all published work currently indexed by PubMed:

1. Health Effects of Shift Work

Shift work is a common occupational exposure that has been consistently associated with many adverse health outcomes, including cancer. However, little is known about the impact of specific working hour characteristics on health beyond the generic classification of 'shift work'. As part of my doctoral dissertation work, I pioneered a novel joint-characterization and description of selected working hour characteristics that may impact circadian rhythm disruption. I identified disparities in shift work exposures and found that older workers were more likely to work easier day schedules while racial minorities were more likely to perform night work and work with rotations. Furthermore, my published and presented research contributed evidence that both night and rotational work are associated with elevated risks of hypertension and treated depression. Some of this research is presented in a presentation titled "*Distribution of Working Hour Characteristics by Race, Age, Gender, and Shift Schedule in the American Manufacturing Cohort*" and in a co-first authored publication titled "*Joint Effects of Night Work and Shift Rotation on Treated Depression in a Cohort of Manufacturing Workers*". I continue to examine the health effects of shift work on other data

through my domestic and international collaborations with Dr. Jennifer Cavallari on the Connecticut WorkTime Study at the University of Connecticut and with Dr. Mikko Härmä on the Finnish Working Time Study at the Finnish Institute for Occupational Health.

- a. **Ferguson JM**, Costello S, Neophytou AM, Balmes JR, Bradshaw PT, Cullen MR, Eisen EA. [Night and rotational work exposure within the last 12 months and risk of incident hypertension](#). *Scand J Work Environ Health*. 2019 May 1;45(3):256-266. doi: 10.5271/sjweh.3788. Epub 2018 Nov 26. PubMed PMID: 30614503; PubMed Central PMCID: PMC6494694.
- b. *Presentation: Ferguson J*, Eisen E, Bradshaw T, Cullen M, Costello S: *Characterizing the Distribution of Shift Domains by Demographics and Shift Schedule in the American Manufacturing Cohort*, Twenty-fourth International Symposium on Shiftwork & Working Time, September 9-13, 2019, Coeur D'Alene, Idaho, USA
- c. *Presentation: Ferguson J*, Elser H, Costello S, Cullen M, Eisen E: *Joint Effects of Night Work and Shift Rotation on Treated Depression in a Longitudinal Cohort of Manufacturing Workers*, The 27th International Symposium on Epidemiology in Occupational Health (EPICOH), April 29th-May 2, 2019, Wellington, New Zealand ***Awarded Best Student Paper** by EPICOH 2019 Organizing Committee, May 2nd, 2019
- d. *Presentation: Ferguson J*, Costello S, Cullen M, Neophytou A, Eisen E: *How Does the American Manufacturing Cohort (AMC) Compare to the Danish Working Hour Database and the Finish Working time Data?*, Working Hours and Health, Nordic Institute for Advanced Training in Occupational Health, May 28th-29 2018 Copenhagen, Denmark

2. Methods to Address Bias in Occupational Epidemiology

Studies of longitudinal occupational cohorts are characterized by the healthy worker survivor bias, often resulting in downward biases that cannot always be addressed using conventional regression approaches. As a topic of interest in my doctoral work, I trained in advanced biostatistics methods that can appropriately handle bias caused by time-varying confounders affected by prior exposure, a hallmark of the healthy worker selection effect. I collaborated with several prominent and expert authors as we reviewed the literature to discuss G-methods and their appropriate applications. I have continued my training by employing marginal structural models to adjust for time-varying health status affected by prior night shift work in an analysis of night and long working hours and risk of incident diabetes and hypertension.

- a. Brown DM, Picciotto S, Costello S, Neophytou AM, Izano MA, **Ferguson JM**, Eisen EA. The Healthy Worker Survivor Effect: Target Parameters and Target Populations. *Curr Environ Health Rep*. 2017 Jul 15. doi: 10.1007/s40572-017-0156-x. PubMed PMID: 28712046.
- b. Poster: **Ferguson J**, Costello S, Neophytou A, Cullen M, Eisen E: *Hypertension and Night Work: A Need for G-Methods*. Society for Epidemiological Research (SER), June 19-22nd, 2018 Baltimore, Maryland

3. Airborne Occupational Exposures

During my undergraduate and masters program I worked on assessing secondhand smoke exposure. I primarily worked with Dr. Ana Navas-Acien and Dr. Patrick Breyse on their research characterizing environmental toxicants and tobacco biomarkers. As a part of this project, I trained field researchers in survey data collection and fine particulate monitoring. I also independently developed a relational database with branching logic to support data collection and entry. Data analyses I completed are presented in the co-authored publications below. I continued my research in airborne occupational exposures by collaborating with Dr. Ellen Eisen at UC Berkeley and Dr. Debra Silverman at the National Cancer Institute on an analysis examining the impact of long-term diesel exhaust exposure and the risk of chronic obstructive pulmonary disease mortality in the Diesel Exhaust and Miners cohort. This analysis resulted in a first-authored publication titled "*Chronic Obstructive Pulmonary Disease Mortality: The Diesel Exhaust in Miners Study (DEMS)*".

- a. **Ferguson JM**, Costello S, Elser H, Neophytou AM, Picciotto S, Silverman DT, Eisen EA. Chronic obstructive pulmonary disease mortality: The Diesel Exhaust in Miners Study (DEMS). *Environ Res.* 2019 Nov 1;:108876. doi: 10.1016/j.envres.2019.108876. [Epub ahead of print] PubMed PMID: 31711661.
 - b. Moon KA, Magid H, Torrey C, Rule AM, **Ferguson J**, Susan J, Sun Z, Abubaker S, Levshin V, Çarkoğlu A, Radwan GN, El-Rabbat M, Cohen J, Strickland P, Navas-Acien A, Breyse PN. Secondhand smoke in waterpipe tobacco venues in Istanbul, Moscow, and Cairo. *Environ Res.* 2015 Oct;142:568-74. doi: 10.1016/j.envres.2015.08.012. PubMed PMID: 26298558; PubMed Central PMCID: PMC4609287.
 - c. Moon KA, Rule AM, Magid HS, **Ferguson J**, Susan J, Sun Z, Torrey C, Abubaker S, Levshin V, Çarkoğlu A, Radwan GN, El-Rabbat M, Cohen JE, Strickland P, Breyse PN, Navas-Acien A. Biomarkers of Secondhand Smoke Exposure in Waterpipe Tobacco Venue Employees in Istanbul, Moscow, and Cairo. *Nicotine Tob Res.* 2017 Jun 3. doi: 10.1093/ntr/ntx125. PubMed PMID: 28582531.
 - d. *Presentation: Ferguson J*, Stewart H, Costello S, Neophytou A, Silverman, Debra, Eisen E: *Chronic Obstructive Pulmonary Disease Mortality in the Diesel Exhaust in Miners Study (DEMS)*, International Society of Exposure Science-International Society for Environmental Epidemiology (ISES-ISEE) 2018 Joint Annual Meeting, August 26th-30th, 2018, Ottawa, Canada
 - e. *Presentation: Ferguson J*, Hepp L, Breysee P, and Avila-Tang E. *Secondhand Smoke Exposure on the Homewood Campus: An Analysis of Airborne Nicotine and Particulate Matter 2.5 in Academic and Dormitory Buildings*, CDC National Conference on Health Statistics, August 7, 2012, Washington, DC, Abstract #18, and The Johns Hopkins University Provost Undergraduate Awards Ceremony, May 2012
4. Interventions for household reservoirs of methicillin-resistant *Staph. aureus*
 Recent evidence suggests that home environmental Methicillin-resistant Staphylococcus aureus (MRSA) contamination and MRSA carriage in pets can contribute to MRSA colonization in people. As a research assistant with Dr. Meghan Davis, we evaluated longitudinal sampling and interventional designs to identify important roles for animal carriage and home environmental contamination in persistence or recurrence of MRSA colonization in people. My primary responsibilities included performing laboratory-based microbial culture, antimicrobial susceptibility testing, and genetic analysis of staphylococcal isolates. Additionally, I also conducted field sampling for environmental and bio-aerosol samples in participant homes. Dr. Davis and I continue to work together and have a first-authored literature review titled “A systematic review on the association between indoor home environmental exposure to staphylococci, particularly *Staphylococcus aureus*, and noninfectious upper and lower respiratory disease”.
- a. Davis MF, Hu B, Carroll KC, Bilker WB, Tolomeo P, Cluzet VC, Baron P, **Ferguson JM**, Morris DO, Rankin SC, Lautenbach E, Nachamkin I. Comparison of Culture-Based Methods for Identification of Colonization with Methicillin-Resistant and Methicillin-Susceptible Staphylococcus aureus in the Context of Cocolonization. *J Clin Microbiol.* 2016 Jul;54(7):1907-11. doi: 10.1128/JCM.00132-16. Epub 2016 Apr 27. PubMed PMID: 27122377; PubMed Central PMCID: PMC4922128.
 - b. Iverson SA, Brazil AM, **Ferguson JM**, Nelson K, Lautenbach E, Rankin SC, Morris DO, Davis MF. Anatomical patterns of colonization of pets with staphylococcal species in homes of people with methicillin-resistant Staphylococcus aureus (MRSA) skin or soft tissue infection (SSTI). *Vet Microbiol.* 2015 Mar 23;176(1-2):202-8. doi: 10.1016/j.vetmic.2015.01.003. Epub 2015 Jan 12. PubMed PMID: 25623014.
5. Tobacco Control:
 Following the completion of my Master’s degree, I served as a Senior Research Program Coordinator for the Tobacco Pack Surveillance Program with the Institute for Global Tobacco Control. I was independently responsible for data cleaning, management, and analysis for a large-scale 14 country dataset assessing tobacco pack health warning compliance and pack features and appeals.

- a. Smith K, Washington C, Brown J, Vадnais A, Kroart L, **Ferguson J**, Cohen J. The Tobacco Pack Surveillance System: A Protocol for Assessing Health Warning Compliance, Design Features, and Appeals of Tobacco Packs Sold in Low- and Middle-Income Countries. *JMIR Public Health Surveill.* 2015 Aug 12;1(2):e8. doi: 10.2196/publichealth.4616. eCollection 2015 Jul-Dec. PubMed PMID: 27227142; PubMed Central PMCID: PMC4869212.
- b. Ross H, Vellios N, Clegg Smith K, **Ferguson J**, Cohen JE. A closer look at 'Cheap White' cigarettes. *Tob Control.* 2016 Sep;25(5):527-31. doi: 10.1136/tobaccocontrol-2015-052540. Epub 2015 Sep 28. PubMed PMID: 26418617; PubMed Central PMCID: PMC5036225.
- c. Cohen JE, Brown J, Washington C, Welding K, **Ferguson J**, Smith KC. Do cigarette health warning labels comply with requirements: A 14-country study. *Prev Med.* 2016 Dec;93:128-134. doi: 10.1016/j.ypmed.2016.10.006. Epub 2016 Oct 3. PubMed PMID: 27713100.
- d. Brown J, Welding K, Cohen JE, Cherukupalli R, Washington C, **Ferguson J**, Clegg Smith K. An analysis of purchase price of legal and illicit cigarettes in urban retail environments in 14 low- and middle-income countries. *Addiction.* 2017 Oct;112(10):1854-1860. doi: 10.1111/add.13881. Epub 2017 Jun 26. PubMed PMID: 28556313; PubMed Central PMCID: PMC5600117.

D. Additional Information: Research Support

Ongoing

R01 AG026291 Cullen (PI)

07/01/2016-06/30/2021

NIH/NIA

Disease, disability and death in the aging workforce

The goal is to describe the covariance of chronic disease health outcomes with industrial plant and region specific social and economic exposures, and more precisely assess the association of contextual variables with health outcomes. I lead aspects of the project related to measuring social and economic exposures over the life course in relation to chronic disease outcomes.

Role: Postdoctoral Researcher

3R01AG026291-13S1 Cullen (PI), Eisen (Co-PI)

09/01/2019-05/31/2022

NIA

Racial/Ethnic and Geographic Disparities in Work Life: An Occupational Cohort Study

For over a decade, research funded by the parent grant (R01AG026291) has made substantial contributions to our understanding of the influences of the workplace environment and other exposures accrued during work-life on health and economic trajectories in an aging population. This supplemental research project will allow us to extend a longstanding research program to leverage existing administrative data and new data sources to adopt a serious focus on racial/ethnic and rural/urban health disparities in the AMC population, which in turn may offer insights to disparities that occur throughout work life and contribute to later health.

Role: Postdoctoral Researcher

Completed

5T42OH008429-15 Balmes (PI)

07/01/2016-06/30/2019

NIOSH

Occupational Safety and Health Educational and Research Centers

The goal of the Northern California NC-ERC, a consortium of programs of the University of California, is to train professionals as practitioner and research leaders in occupational safety and health by offering graduate degrees, residency training, clinical experiences, and research mentorship to trainees. The aim of the NC-ERC training program is to produce graduates with strong problem-solving skills and the ability to synthesize diverse information in order to effectively address both typical and unusual problems that arise in the technically, institutionally, and culturally complex workplaces that characterize the current economy.

Role: Trainee