

# CARINA J. GRONLUND

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## EDUCATION

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- 2013** PhD University of Michigan School of Public Health  
Department of Environmental Health Sciences
- 2008** MPH University of Michigan School of Public Health  
Department of Environmental Health Sciences, Occupational and Environmental Epidemiology Sub-Plan
- 1999** BA University of Chicago  
Biological Sciences, Honors and Specialization in Ecology and Evolution

## EXPERIENCE

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- 2022-present** Research Assistant Professor  
Department of Epidemiology (dry appointment)  
University of Michigan School of Public Health, Ann Arbor, MI
- 2019-present** Research Assistant Professor  
Social Environment and Health Program  
University of Michigan Institute for Social Research, Survey Research Center, Ann Arbor, MI
- 2018-2019** Research Investigator  
Social Environment and Health Program  
University of Michigan Institute for Social Research, Survey Research Center, Ann Arbor, MI
- 2013-2018** Postdoctoral Research Fellow  
Center for Social Epidemiology and Population Health  
University of Michigan Department of Epidemiology, Ann Arbor, MI
- 2007-2013** Research Assistant/Associate  
University of Michigan Department of Environmental Health Sciences, Ann Arbor, MI
- 2007** Summer Intern  
Michigan Department of Community Health, Healthy Homes Section, Lansing, MI
- 2000-2006** Research Assistant  
Karmanos Cancer Institute Clinical Trials Office, Detroit, MI
- 1997-1999** Research Assistant  
University of Chicago Department of Ecology and Evolution, Chicago, IL
- 1997** Research Assistant  
University of Chicago Hospitals Department of Planning and Evaluation, Chicago, IL

## GRANTS, FELLOWSHIPS, AND SCHOLARSHIPS

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### Current

- 2021-2027** Principal Investigator | Assessing the Neuropsychological Benefits of Weatherization Programs | R01ES032157  
National Institute of Environmental Health Sciences  
\$2,995,169  
Goal: To characterize and monetize the health impacts of low-cost and high-cost weatherization measures, which may improve the health of older adults through improvements in sleep, cognitive function, and financial worry as well as community-wide reductions in air pollution exposure.
- 2022-2027** Co-Investigator | Michigan Center on Lifestage Environmental Exposures and Disease (M-LEEAD) | P30 ES017885  
National Institute of Environmental Health Sciences  
\$7,352,027

Goal: The M-LEEaD mission is to accelerate research that defines impacts of environmental exposures during vulnerable life stages and to promote translation of findings to improve clinical and public health interventions for the mitigation of disease.

- 2022–2027** Co-Investigator | A National Neighborhood Data Resource to Understand Inequities in the Health and Socioeconomic Impacts of COVID-19 in the United States | U01 NR020556  
National Institute of Nursing Research  
\$3,574,675  
Goal: This national neighborhood data resource will support the scientific community in understanding the mechanisms that may convey risk and resilience, particularly in underserved and vulnerable populations, and will allow us to more effectively prepare for the next public health emergency.
- 2023–2025** Principal Investigator | Estimating and Monetizing the Health Benefits of Improving Household Energy Efficiency in Michigan | Internal Award  
University of Michigan Graham Sustainability Institute  
\$299,000  
Goal: To link housing, weatherization interventions, and measures of home energy use inefficiency (EUI, energy use per home area) to Medicaid emergency department (ED) records, to understand how emergency department visit risk changes following implementation of specific home weatherization.
- 2023-2025** Co-Investigator | Extreme Temperatures and the Aging Brain in Three Nationally Representative Surveys | R01 AG030153  
National Institute on Aging  
\$335,457  
Goal: To understand the impact of extreme temperatures and the aging brain in three nationally representative surveys.
- 2022–2024** Co-Investigator | Expanding the Gateway Research Infrastructure on Exposome Studies for the Health and Retirement Study and the Harmonized Cognitive Assessment Protocol International Network of Studies | R01 AG030153-17S1  
National Institute on Aging  
\$212,898  
Goal: Our team of researchers will prepare, validate, and help assign environmental contributors to the exposome (e.g., new air pollutants, extreme weather, light pollution, greenspace) for respondents of the HRS, ELSA, TILDA, CHARLS, LASI, Chile-Cog, and Mex-Cog.
- 2021–2024** Co-Investigator | Heating with Justice: How Can We Make Electrified Space Heating Equitable (Carbon Neutrality Acceleration Program ) | Internal Pilot  
University of Michigan Graham Sustainability Institute  
\$299,974  
Goal: As home heating moves toward full electrification and utilities require customers to adopt pricing plans designed to reduce peak demand, low-income customers could face a particularly stark tradeoff between cost and comfort. This project will test the hypothesis that dynamic pricing, when applied to electrified heating, will affect vulnerable households differently than it does other households.
- 2020–2024** Co-Principal Investigator | Reducing Barriers to Residential Energy Security through an Integrated Case-management, Data-driven, Community-based approach | NSF1952038  
National Science Foundation  
\$2,100,000  
Goal: To explore the efficacy of new social and technology paradigms to reduce residential energy insecurity for at least 180 households in three low and middle income neighborhoods in Detroit, Michigan.
- 2019–2023** Co-Investigator | Evidence to improve heat warming effectiveness in reducing morbidity and mortality | R01ES029950  
National Institute of Environmental Health Sciences

\$68,247 (Subcontract)

Goal: To identify the optimal health-based and location-specific metrics for issuing heat alerts, to estimate the causal benefits of heat alerts, and to identify characteristics of individuals or communities associated with the greatest reductions in morbidity or mortality following heat alerts.

## Completed (within prior 10 years)

- 2023** Principal Investigator | NIH Climate and Health Scholars Program  
National Heart, Lung, and Blood Institute (Host Institution)  
\$24,704  
Goal: This inaugural class of NIH Climate and Health Scholars will become part of the cross-cutting NIH effort to reduce health threats from climate change across the lifespan and build health resilience in individuals, communities, and nations around the world, especially among those at highest risk.
- 2019–2023** Principal Investigator | Causal mechanisms for sustainable adaptation to adverse heat and precipitation health effects | K99/R00ES026198  
National Institute of Environmental Health Sciences  
\$965,002  
Goal: To use novel data linkages while working with local officials and community leaders to understand the housing and health characteristics that increase vulnerability to heat- and precipitation-associated health effects to identify optimal and sustainable strategies for adapting to increasing extreme weather events.
- 2021–2022** Co-Investigator | Using Geospatial Data Science to Identify Vulnerable Communities to Climate Change | Internal Project  
University of Michigan Institute for Data Science  
\$70,000  
Goal: Communities face unprecedented risks due to climate change. These include coastal and inland flooding due to rising sea level and increased precipitation and heat stress due to rising temperature. Studies demonstrate that some communities are especially vulnerable due to socio-economic and demographic status. Finally, there is another crucial but understudied risk: Climate change denialism. This leaves one unprepared to take the necessary steps to adapt to these community risks and threats. The objective of this project is to use state-of-art spatial data science and AI to integrate these risks by creating a Climate Change Vulnerability Hotspot Index for the United States (US).
- 2019–2022** Principal Investigator | Characterizing the magnitude, time course, and risk factors of pollen-associated health effects in the Industrial Midwest in a changing climate  
University of Michigan Institute for Global Change Biology (IGCB)  
\$170,340  
Goal: Our present objectives are to understand the utility of new and existing pollen models which will then be linked to existing health outcome, housing, and air pollution data to understand the within-season patterns of and vulnerabilities to pollen-induced asthma and allergy exacerbations in the Industrial Midwest.
- 2021** Co-Investigator | Anti-oxidant vitamin intake, air pollution and preterm birth in a Mexican pregnancy cohort  
Michigan Lifestage Environmental Exposures and Disease (M-LEEd) Center (Supplement)  
\$55,984  
Goal: To conduct epidemiological research to evaluate whether prenatal intake of anti-oxidant vitamins (from supplements and food) and prenatal air pollution exposure, both singly and jointly, are associated with preterm birth and reproductive tract inflammation in a cohort of 935 pregnant women based in Mexico City.
- 2019–2021** Co-Investigator | Energy justice, housing and health in a changing climate  
MCUBED Classic Cube | University of Michigan MCUBED Program  
\$60,000  
Goal: Our ultimate goals are reduced energy insecurity for disadvantaged urban populations, increased low and moderate income household participation in energy efficiency and renewable energy programs and advancement of meaningful academic-community engagement.
- 2019–2020** Principal Investigator | Detroit flooding and health: A pilot study

Wayne State University Center for Healthy Urban Waters

\$30,000

Goal: To characterize the type and scale of recurrent household flooding in Detroit using existing data sources and new survey items within the Wayne State University Center for Urban Studies current survey efforts.

**2019–2020**

Principal Investigator | The cumulative health burdens of air pollution and heat in a changing climate under different local energy mix scenarios

Michigan Lifestage Environmental Exposures and Disease (M-LEEd) Center

\$35,000

Goal: To conduct health impact assessments to quantify the health effects of 1) DTE Energy's proposed Integrated Resource Plan and more rapid coal power plant decommissioning schedules, 2) the health impacts of present and future extreme heat under varying scenarios, and 3) the cumulative impacts of emissions from electricity generation and extreme heat in the Detroit area under varying scenarios.

**2019–2020**

Principal Investigator | The cumulative economic burden of air pollution health impacts and fuel poverty under different energy mix and utility rate scenarios

Graham Sustainability Institute

\$10,000

Goal: To inform the Michigan Public Service Commission's decision on DTE Energy's Integrated Resource Plan and proposed rates within an energy justice framework by quantifying the separate and combined economic burdens of air pollution health effects and fuel poverty

**2015–2020**

Postdoctoral Research Fellow | Hazards SEES: Enhancing Emergency Preparedness for Critical Infrastructure Failure During Extreme Heat Events | NSF 1520803 (PI Stone/O'Neill)

National Science Foundation (NSF)

\$2,350,000

Goal: To assess the effectiveness of specific environmental, technological, and behavioral adaptations in mitigating a growing heat hazard in Atlanta, Detroit and Phoenix, and to estimate mortality and morbidity associated with simulated grid failure events during heat wave conditions in the three cities in response to current and future climate conditions.

**2018–2019**

Principal Investigator and M-LEEd Center Scientist | Community-engaged research to understand the co-vulnerabilities of cold- and heat-associated health effects and inform sustainable interventions

Michigan Lifestage Environmental Exposures and Disease (M-LEEd) Center

\$25,000

Goal: Improve knowledge on how 1) housing conditions increase vulnerability to cold temperatures and 2) housing- and health-related vulnerabilities to cold correlate with heat vulnerabilities similar to those I am studying in my K99/R00 research.

**2017–2018**

Collaborator | Community-Based Research on Heat Waves, Housing and Health in Detroit

Michigan Institute for Clinical and Health Research

\$40,000

Goal: To compare analyses of existing survey data done without community partner engagement to an analysis done with community partner engagement, and to identify actions to mitigate the adverse health effects of extreme heat in vulnerable Detroit communities.

**2017–2018**

Collaborator | Increasing Climate Resiliency in Detroit through the Co-Analysis of Survey Data

Michigan Center on Lifestage Environmental Exposures and Disease (M-LEEd)

\$47,000

Goal: With guidance from the M-LEEd Community Outreach and Engagement Core, to analyze existing data obtained through funding from the National Science Foundation (NSF) and the Detroit Urban Research Center (Detroit URC) to address new research questions on how housing features and access/use of energy efficiency and weatherization services may be linked with reported heat-related health outcomes among 100 Detroit residents.

- 2015–2017** Principal Investigator | Understanding disparities in extreme-heat health effects for sustainable solutions  
Postdoctoral Translational Scholars Program, Michigan Institute for Clinical and Health Research, University of Michigan  
\$100,000  
Goal: To learn how housing, pre-existing health conditions and green space modify associations between heat and severe health events, with engagement with community and governmental stakeholders involved in climate change adaptation planning.
- 2013–2015** Principal Investigator | Identifying and communicating sustainable strategies for reducing heat vulnerability in a changing climate  
Dow Sustainability Fellowship, Graham Sustainability Institute at the University of Michigan  
\$70,000  
Goal: To identify and then map social factors and characteristics of the urban environment, such as proximity to parks, walkability and air pollution levels, that potentially affect susceptibility to summer heat using data from multi-ethnic cohort studies of cardiovascular health, namely, the Multi-Ethnic Study of Atherosclerosis and the Jackson Heart Study.
- 2011–2013** Pre-Doctoral Trainee | An examination of the health effects of heat on the elderly: Heat waves, heat interactions with air pollution, urban heat island effects and heat mitigation strategies  
T32 Interdisciplinary Training Program Traineeship on Public Health and Aging (PI Mendes de Leon), National Institute on Aging, NIH  
\$54,000  
Goal: To study the added effects of heat waves and characteristics of vulnerability to heat waves in a study of the association between temperature and hospital admissions, for multiple causes, among the elderly in 135 U.S. cities and using a life cycle assessment framework, to compare the use of central air conditioners in private residences to other heat mitigation strategies in the United States.

## PAID CONSULTANCIES

- 2023** National Institutes of Health Climate and Health Scholar  
Bethesda, Maryland
- 2015–2017** Building Resilience Against Climate Change  
Michigan Department of Health and Human Services, Lansing, Michigan
- 2015** Evaluation of Turbidity of Public Water Supplies and Risk of Acute Gastrointestinal Illness  
Drexel University, Philadelphia, Pennsylvania

## SERVICE

- 2023-present** Member  
City of Detroit Home Repair Task Force
- 2023-present** Editorial Board Member  
Environmental Health Perspectives
- 2021–present** Committee Member  
Michigan Public Service Commission Energy Waste Reduction Workgroup, Health and Safety Subgroup
- 2019-present** Grant Reviewer  
National Institutes of Health Time Sensitive R21 Review Panel (2022)  
National Science Foundation Smart and Connected Communities Track 1 and 2 Health Review Panel (2021)  
Michigan Institute for Clinical and Health Research Career Development Awards (2019)
- 2014-present** Conference Abstract Reviewer  
International Society for Environmental Epidemiology (2022-2023)  
American Public Health Association Annual Meeting (2017)  
Great Lakes Adaptation Assessment for Cities Conference on Adaptation in the Great Lakes Region (2014)
- 2009–present** Journal Manuscript Reviewer  
Am J Epidemiol, Arch Gerontol Geriatr, BMJ Open, Build Environ, Curr Opin Environ Sustainability, Epidemiology, Environ Health, Environ Health Perspect, Environ Int, Environ Monit Assess, Environ Pollut, Environ Res, Int J Biometeor, Int J Environ Res Public Health, Int J Health Geogr, JAMA, JAMA Peds, J Expo Sci Environ Epidemiol, Lancet Planetary Health, Nat Hazards, Nature Clim Change, PLoS One, Sci Tot Environ, Weather Clim Soc

<b>2008–present</b>	<b>Volunteer</b> Jefferson East, Inc., Detroit, MI
<b>2020–2023</b>	<b>Consultant</b> Michigan Climate and Health Adaptation Program, Michigan Department of Health and Human Services
<b>2019–2022</b>	<b>Committee Member</b> Eastside Community Network Climate Equity Advisory Committee
<b>2018–2020</b>	<b>Committee Member</b> Detroit City Council Green Task Force Climate Action Subcommittee
<b>2015–2018</b>	<b>Committee Member</b> Detroit Climate Action Collaborative, an initiative of Detroiters Working for Environmental Justice

## PROFESSIONAL ORGANIZATIONS

American Public Health Association (APHA)  
 International Society for Environmental Epidemiology (ISEE)  
 Society for Epidemiological Research (SER)  
 Institute for Healthcare Policy and Innovation (IHPI)  
 Interdisciplinary Association for Population Health Sciences (IAPHS)  
 Michigan Institute for Data Science (MIDAS)  
 University of Michigan Injury Prevention Center

## STUDENTS MENTORED

Jonathan Ta MPH Student   2022-2024	Anam Khan PhD Student   2018–2021	Amanda Schooner MPH Student   2018
Zenzele Osundu Morgan State University Senior Summer Leader in Environment and Diversity   2023	Erica Bennion MPH Student   2019–2020	Jacqueline Cardoza MPH Student   2017–2018
Rebecca Beilinson MPH Student   2023-2024	Rachel Bergmans, PhD Postdoctoral Trainee   2018–2020	Miatta Buxton PhD student   2014–2016
Ronnie Sharangpani MPH Student   2023-2024	Krista Latta MPH Student   2018–2019	Trish Koman PhD student   2013–2016
Claire McKenna PhD Student   2021–present	Dylan Kirby MPH Student   2018–2019	Adesuwa Ogbomo MPH Student   2014
Peter Larson, PhD Postdoctoral Trainee   2019–present	Zoey Laskaris PhD Student   2017–2019	Yi Wang MPH Student   2014
Madeline Somers MPH Student   2019–2021	Nathan Carpenter Oberlin College Senior	Alyssa Yang MPH Student   2013
Kaan Cem Ketenci MS Student   2019–2021	Doris Duke Conservation Scholar   2018	Rachel Burkhart MPH Student   2013
	Cherrel Manley BS Student MICH Summer Immersion Program   2018	Tess Gallagher MPH Student   2012

## IN PROGRESS & SUBMITTED PAPERS

1. McKenna C\*, Vaishnav P, **Gronlund CJ**. *The Energy Efficiency Disconnect for Homeowners in Michigan*. In progress.
2. **Gronlund CJ**, Vaishnav P, Washington G, Tonn B, Schulz AJ, O'Neill MS. *Chapter 5: Energy and Health Inequities*. In Environmental Health: Foundations for Public Health. Natalie Sampson ed. In progress.
3. Rollins K, **Gronlund CJ** (co-first author), Larson PS, O'Neill MS, Wellenius G. *Using individual-level health and exposure data to develop a heat vulnerability risk score for a temperate U.S. climate*. In progress.
4. Beilinson R, **Gronlund CJ**, Larson PS, O'Neill MS, Wellenius G. *Vulnerability to extreme precipitation by housing features and flooding propensity*. In progress.
5. Ta J, **Gronlund CJ**, Larson P, O'Neill MS, Newell J. *Using emergency department visits to identify spatial variability in heat vulnerability*. In progress.
6. Larson PS, Clarke PJ, Khan A,\* Melendez R, **Gronlund CJ**.\*\* *Long term exposure to extreme heat and cold days is associated with cognitive decline in older adults from the Reasons for Geographic and Racial Differences in Stroke (REGARDS) cohort*. Submitted.

7. Larson PS, Steiner AL, Bennion E, Baptist AP, O'Neill MS, **Gronlund CJ**.\*\* *Model-based ragweed pollen counts predict sleepiness but not allergy symptoms in immunotherapy patients of a Southeastern Michigan allergy clinic*. Submitted.
8. Larson PS, O'Neill MS, Steiner AL, Baptist AP, **Gronlund CJ**.\*\* *"Race and sex disparities in chronic and infectious respiratory mortality from exposures to speiated pollen in Michigan, 2006-2017*. Submitted.
9. McKenna C\*, Vaishnav P, **Gronlund CJ**. *Energy cost burdens of air source heat pumps across income groups in Southeast Michigan*. Submitted.
10. **Gronlund CJ**, Somers M,\* Larson PS, Latta K, Melendez R, O'Neill MS. *Present and Future Burden of Emergency Department Visits Associated with Moderate Precipitation, Downpours, and Dry Spells among Older Adults in Michigan, Ohio, and Pennsylvania, USA*. Submitted.
11. **Gronlund CJ**, Hondula D, Mallen E, O'Neill MS, Stone B. *Deriving the missing exposure-outcome link: "equivalent" outdoor airport temperatures for assigning heat-health effects to individually-experienced temperatures in three U.S. cities*. Submitted.

## PEER-REVIEWED PUBLICATIONS

- |             |   |
|-------------|---|
| <b>2023</b> | <ol style="list-style-type: none"> <li>1. Buxton MA, Heydarzadeh BS, <b>Gronlund CJ</b>, Castillo-Castrejon M, Godines-Enriquez M, O'Neill MS, Vadillo-Ortega F. <i>Associations Between Air Pollution Exposure and Blood Pressure During Pregnancy Among PRINCESA Cohort Participants</i>. <i>Toxics</i>. 2023. doi: 10.3390/toxics11050424.</li> <li>2. Stone Jr. BJ, <b>Gronlund CJ</b>, Mallen E, Hondula D, O'Neill MS, Rajput M, Grijalva S, Lanza K, Harlan S, Larsen L, Augenbroe G, Krayenhoff ES, Broadbent A, Georgescu M. <i>How blackouts during heat waves amplify mortality and morbidity risk</i>. <i>Environ Sci Tech</i>. 2023. 10.1021/acs.est.2c09588.</li> </ol>   |
| <b>2022</b> | <ol style="list-style-type: none"> <li>3. Larsen LS, <b>Gronlund CJ</b>, Ketenci KC, Harlan SL, Hondula DH, Stone B, Lanza K, Mallen E, Wright MK, O'Neill MS. <i>Safe at Home? A Comparison of Factors Influencing Indoor Residential Temperatures during Warm Weather Among 3 Cities</i>. <i>J Am Plann Assoc</i>. 2022. 1-13. doi: 10.1080/01944363.2022.2087724.</li> <li>4. <b>Gronlund CJ</b>, Ketenci KC,* Reames TG, Larson PS, Schott J, Rowe Z, Jenkins QS, Gjisbers E, Sanca MO, Tournat T, Sol K, Williams D, Gjisbers E, O'Neill MS. <i>Indoor apparent temperature, cognition, and daytime sleepiness among low-income adults in a temperate climate</i>. <i>Indoor Air</i>. 2022. doi: 10.1111/ina.12972.</li> </ol>   |
| <b>2021</b> | <ol style="list-style-type: none"> <li>5. Bergmans RS,* Larson P, Bennion E,* Mezuk B, Wozniak MC, Steiner AL, <b>Gronlund CJ</b>.** <i>Short-term exposures to atmospheric evergreen, deciduous, grass, and ragweed aeroallergens and the risk of suicide in Ohio, 2007-2015: Exploring disparities by age, gender, and education level</i>. <i>Environ Res</i>. 2021. doi: 10.1016/j.envres.2021.111450.</li> <li>6. Khan AM*, Finlay JM, Clarke P, Sol K, Melendez R, Judd S, <b>Gronlund CJ</b>** . <i>Regional Analysis of Acute Exposure to Extreme Temperatures and Cognitive Function in Older Adults: An Analysis from the REGARDS Cohort</i>. 2021. <i>BMC Public H</i>. 2021. doi: 10.1186/s12889-021-11533-x.</li> <li>7. Lanza K, Stone B, Chakalian PM, <b>Gronlund CJ</b>, Hondula DM, Larsen L, Mallen E, Haardörfer R. <i>Physical Activity in the Summer Heat: How Hot Weather Moderates the relationship Between Built Environment Features and Outdoor Physical Activity of Adults</i>. <i>J Phys Act H</i> 2021. doi: 10.1123/jpah.2019-0399.</li> <li>8. Larson PS, <b>Gronlund CJ</b>, Thompson L, Sampson N, Washington R, Steis Thorsby J, Lyon N, Miller C. <i>Recurrent home flooding in Detroit, MI 2012-2020: Results of a household survey</i>. <i>Int J Environ Res Public H</i>. 2021. doi: 10.3390/ijerph18147659.</li> <li>9. Stone B, Mallen E, Rajput M, <b>Gronlund CJ</b>, Broadbent A, Krayenhoff E, Augenbroe G, O'Neill MS, Georgescu M. <i>Compound Climate and Infrastructure Events: How Electrical Grid Failure Alters Heatwave Risk</i>. <i>Environ Sci Technol</i>. 2021. doi: 10.1021/acs.est.1c00024.</li> </ol> |
| <b>2020</b> | <ol style="list-style-type: none"> <li>10. Buxton MA,* Perng W, Tellez-Rojo MM, Rodríguez-Carmona Y, Cantoral A, Sánchez BN, Rivera-González LO, <b>Gronlund CJ</b>, Shivappa N, Hébert JR, O'Neill MS, Peterson KE. <i>Particulate Matter Exposure, Dietary Inflammatory Index and Preterm Birth in Mexico City, Mexico</i>. <i>Environ Res</i>. 2020. doi: 10.1016/j.envres.2020.109852.</li> <li>11. Cardoza J,* <b>Gronlund CJ</b>, Rowe Z, Schott J, Lee M, Clark S, Williams G, Harlan S, Ziegler T, O'Neill M. <i>Heat-related illness is associated with lack of air conditioning and pre-existing health problems in Detroit, Michigan, USA: A community-based participatory co-analysis of survey data</i>. <i>Int J Environ Res Public H</i>. 2020. doi: 10.3390/ijerph17165704.</li> <li>12. Conlon KC, Mallen E, <b>Gronlund CJ</b>, Berrocal VJ, Larsen L, O'Neill MS. <i>Mapping human vulnerability to extreme heat events: A critical assessment of heat vulnerability indices created using principal components analysis</i>. <i>Environ Health Perspect</i>. 2020. doi: 10.1289/EHP4030.</li> <li>13. Finlay J, Khan AM*, <b>Gronlund CJ</b>, Jang J, Sol K, Melendez R, Judd S, Clarke P. <i>Weather Woes? Exploring Potential Links Between Precipitation and Cognitive Decline</i>. <i>Int J Environ Res Public H</i>. 2020. doi: 10.3390/ijerph17239011.</li> </ol>   |

14. **Gronlund CJ**, Berrocal V. *Modeling and comparing central air conditioning ownership and cold-season in-home thermal comfort using the American Housing Survey*. J Expo Sci Environ Epidemiol. 2020. doi: 10.1038/s41370-020-0220-8.
15. **Gronlund CJ**, Yang AJ,\* Conlon KC, Burkhart RS,\* O'Neill MS, Le HQ, Batterman SA, Wahl RL, Cameron L. *A time series analysis of total and direct associations between high temperatures and preterm births in Detroit, Michigan*. BMJ Open. 2020. doi: 10.1136/bmjopen-2019-032476.
16. Wright MK, Hondula DM, Chakalian PM, Kurtz LC, Watkins L, **Gronlund CJ**, Larsen L, Mallen E, Harlan SL. *Social and behavioral determinants of indoor temperatures in air conditioned homes*. Build Environ. 2020. doi: 10.1016/j.buildenv.2020.107187.
- 2019 17. Buxton MA, Meraz-Cruz N, Sanchez BN, Foxman B, **Gronlund CJ**, Beltran-Montoya J, Castillo-Castrejon M, O'Neill MS, Vadillo-Ortega F. *Repeated measures of cervicovaginal cytokines during healthy pregnancy: understanding "normal" inflammation to inform future screening*. Am J Perinatol. 2019. doi: 10.1055/s-0039-1685491.
18. Buxton MA, Meraz-Cruz N, Sanchez BN, **Gronlund CJ**, Foxman B, Vadillo-Ortega F, O'Neill MS. *Air pollution and inflammation: Findings from concurrent repeated measures of systemic and reproductive tract cytokines during term pregnancy in Mexico City*. Sci Total Environ. 2019. doi: 10.1016/j.scitotenv.2019.05.041.
19. Chakalian PM, Kurtz L, Harlan SL, White D, **Gronlund CJ**, Hondula DM. *Exploring the Social, Psychological, and Behavioral Mechanisms of Heat Vulnerability in the City of Phoenix, AZ*. J Extreme Events. 2019. doi: 10.1142/S2345737620500062.
20. **Gronlund CJ**, Cameron L, Shea C, O'Neill MS. *Assessing the magnitude and uncertainties of the burden of selected diseases attributable to extreme heat and extreme precipitation under a climate change scenario in Michigan for the period 2041-2070*. Environ Health. 2019. doi: 10.1186/s12940-019-0483-5.
21. Lanza K, Stone B, Chakalian P, **Gronlund CJ**, Hondula D, Larsen L, Mallen E. *Physical activity in the summer heat: How hot weather moderates the relationship between built environment features and outdoor physical activity of adults*. 2019. J Phys Act Health. doi: 10.1123/jpah.2019-0399.
22. Ziegler T, Coomb C, Rowe Z, Clark SJ, **Gronlund CJ**, Lee M, Palacios A, Larsen LS, Reames TG, Schott J, Williams GO, O'Neill MS. *Shifting from "community-placed" to "community-based" research to advance health equity: Lessons learned from the Heatwaves, Housing, and Health: Increasing Climate Resiliency in Detroit (HHH) partnership*. Int J Environ Res Public H. 2019. doi: 10.3390/ijerph16183310.
- 2018 23. **Gronlund CJ**, Sheppard L, O'Neill MS, Adar S, Auchincloss A, Kaufman J, Lima JA, Madrigano J, Diez Roux AV. *Vulnerability to the cardiovascular effects of summer heat in six U.S. cities: Results from the Multi-Ethnic Study of Atherosclerosis (MESA)*. Epidemiology. 2018. doi: 10.1097/EDE.0000000000000910.
24. **Gronlund CJ**, Sullivan K, Kefelgn Y, Cameron L, O'Neill MS. *Climate change and temperature extremes: a review of heat- and cold-related morbidity and mortality concerns of municipalities*. Maturitas. 2018. doi: 10.1016/j.maturitas.2018.06.002.
- 2017 25. Ogbomo A\*, **Gronlund CJ**, O'Neill MS, Konen T, Cameron L, Wahl R. *Vulnerability to extreme-heat-associated hospitalization in three counties in Michigan, USA, 2000-2009*. Int J Biometeor. 2017. doi: 10.1007/s00484-016-1261-5.
- 2016 26. **Gronlund CJ**, Zanobetti A, Wellenius GA, Schwartz JD, O'Neill MS. *Vulnerability to renal, heat and respiratory hospitalizations during extreme heat among U.S. elderly*. Climatic Change. 2016. doi: 10.1007/s10584-016-1638-9.
27. Guentchev G, Rood RB, Ammann CM, Barsugli JJ, Berrocal V, O'Neill MS, **Gronlund CJ**, Ebi K, Vigh J, Koziol B, Cinquini L. *Evaluating the appropriateness of downscaled climate information for projecting risks of Salmonella*. Int J Environ Res Public Health. 2016. doi: 10.3390/ijerph13030267.
- 2014 28. Bush KF, Fossani C, Li S, Mukherjee B, **Gronlund CJ**, O'Neill MS. *Extreme precipitation and beach closures in the Great Lakes region: evaluating risk among the elderly*. Int J Environ Res Public Health. 2014. doi: 10.3390/ijerph110202014.
29. **Gronlund CJ**. *Racial and socioeconomic disparities in heat-related health effects and their mechanisms: a review*. Curr Epidemiol Rep. 2014. doi: 10.1007/s40471-014-0014-4.
30. **Gronlund CJ**, Berrocal VJ, White-Newsome JL, Conlon KC, O'Neill MS. *Vulnerability to extreme heat by individual characteristics and area green space and socio-demographic characteristics among the elderly in Michigan, 1990-2007*. Environ Res. 2014. doi: 10.1016/j.envres.2014.08.042.
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- 2002**
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- 2001**
46. Price CS, Kim CH, **Gronlund CJ**, Coyne JA. *Cryptic reproductive isolation in the Drosophila simulans species complex*. Evolution. 2001. doi: 10.1111/j.0014-3820.2001.tb01274.x.

\*Mentored student.

\*\*Senior author.

## REPORTS

Sampson N, White-Newsome J, **Gronlund C**, Leaphart E, Miller C, Steis Thorsby J, Larson P, Jackson M, Ackerman R, Washington R, Thompson L. 2021. *Household flooding in Detroit: A snapshot of citywide experiences, implications for public health, & potential solutions*. <http://bit.ly/detroitfloodreport>.

## DATA SETS

- Gronlund CJ**, Melendez R, Gypin L, and Clarke PJ. 2023. National Neighborhood Data Archive (NaNDA): *Weather by County, United States, 2003-2016*. Inter-university Consortium for Political and Social Research [distributor], 2023-09-14. <https://doi.org/10.3886/ICPSR38858.v1>.
- Gronlund CJ**, Melendez R, Papaethymiou, K. 2023. *Daily, Address-Level Medicare Emergency Department Visits and Deaths Linked to Housing, Land Cover, Sunlight, Weather, and Pollen Exposures in Michigan and Ohio, 2006-2016*. Available from Dr. Gronlund with permission from the Centers for Medicare and Medicaid Services.

3. **Gronlund CJ**, Melendez R, Papaethymiou K. 2023. *Daily, ZIP Code-Level Medicare Emergency Department Visits and Deaths Linked to Housing, Land Cover, Sunlight, Weather, and Pollen Exposures in Michigan, Ohio, and Pennsylvania, 2006-2016*. Available from Dr. Gronlund with permission from the Centers for Medicare and Medicaid Services.
4. **Gronlund CJ**, de Majo RF, O'Neill MS. 2019. *Air Pollution Exposures in the Pregnancy Research on Inflammation, Nutrition, & City Environment: Systematic Analyses (PRINCESA) cohort in Mexico City, 2009-2014*. Available with appropriate human subjects permissions from Dr. O'Neill.

## PRESENTATIONS

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|-------------|---|
| <b>2023</b> | <ol style="list-style-type: none"> <li>1. <i>Housing Weatherization and Energy Efficiency Upgrades: A Triple Win</i>. Oral presentation for the National Institute of Health Housing Workgroup, December 2023.</li> <li>2. <i>Considering climate adaptation strategies to slow age-related cognitive decline</i>. Oral presentation at the National Institute for Aging Workshop   The Future of Population-Based Studies in Alzheimer's Disease and Related Dementia Research: Setting Future Scientific Priorities. Bethesda, MD, October 2023.</li> <li>3. <i>Ambient and built environments and environmental justice</i>. Chair of session at the Interdisciplinary Association for Population Health Science. Baltimore, MD, October 2023.</li> <li>4. <i>"Inside"-er tips for adapting to and mitigating climate change</i>. Oral presentation at the Climate, Environment and Health Legislative Forum, Lansing, MI, September 2023.</li> <li>5. <i>The inner workings of climate change and health: housing interventions to adapt to and mitigate climate change</i>. Oral symposium presentation at the American College of Epidemiology Annual Conference, Virtual, September 2023.</li> <li>6. <i>Health, housing, and energy justice in a changing climate</i>. Presentation to the National Institute of Environmental Health Sciences Chronic Disease Climate Group, Virtual, July 2023.</li> <li>7. <i>Present and Future Risk and Burden of Gastrointestinal and Respiratory Emergency Department Visits Associated with Extreme Precipitation and Dry Spells Among Older Adults in Michigan, Ohio, and Pennsylvania</i>. Oral presentation at the International Society for Environmental Epidemiology North America Chapter Annual Conference, Corvallis, OR, June 2023.</li> <li>8. <i>Preventing "weathering": increasing housing weatherization and indoor thermal comfort to reduce disparities in climate impacts</i>. Oral presentation at the Society for Epidemiologic Research Annual Conference, Portland, OR, June 2023.</li> <li>9. <i>Climate change and health issues relevant to tribal communities</i>. Presentation to the NHLBI Strong Heart Study of American Indians Steering Committee, Virtual, June 2023.</li> <li>10. <i>NIH Climate and Health Scholars</i>. Co-presentation to the NIH Climate Change and Health Initiative Executive Committee, Virtual, April 2023.</li> <li>11. <i>Resilience to climate change: climate change, housing, and health</i>. Presentation to the National Heart, Lung, and Blood Institute, Resilience Working Group. Virtual, April 2023.</li> <li>12. <i>Everything under the roof: climate change, housing, and health</i>. Presentation to the National Heart, Lung, and Blood Institute, Social Determinants of Health Working Group. Virtual, April 2023.</li> <li>13. <i>Weatherization and health effects studies at UM</i>. Presentation to the Michigan Public Service Commission Energy Waste Reduction Group, Detroit, MI, April 2023.</li> <li>14. <i>Cardiovascular health and climate change</i>. Presentation to the National Heart, Lung, and Blood Institute (NHLBI) Division of Blood Diseases and Resources, Bethesda, MD, April 2023.</li> <li>15. <i>Identifying housing interventions to adapt to and mitigate climate change</i>. Presentation to the NIH Climate Change and Health Interagency Working Group, Bethesda, MD, April 2023.</li> <li>16. <i>From the Inside Out: Climate Change, Housing and Health</i>. Presentation to the Michigan State University Department of Family Medicine, Research Subcommittee, Virtual, March 2023.</li> <li>17. <i>Research needs to support climate change adaptation and mitigation in the U.S.</i> Presentation to the National Heart, Lung, and Blood Institute, Epidemiology Branch, Virtual, February 2023.</li> </ol> |
| <b>2022</b> | <ol style="list-style-type: none"> <li>18. <i>Associations of Extreme Precipitation with Emergency Department Visits Among Older Adults in Michigan, Ohio, and Pennsylvania, USA, 2006-2013</i>. Poster presentation at the Thirty-fourth Conference of the International Society for Environmental Epidemiology, Athens, Greece, August 2022.</li> <li>19. <i>Identifying interventions for climate change mitigation and health adaptation in the Upper Midwest</i>. Presentation at the National Institute for Environmental Health Sciences Core Centers Meeting, New York, New York, July 2022.</li> <li>20. <i>Coping With Weather and Climate Change: Vulnerability and Adaptation for Healthy Aging</i>. Seminar in U-M Healthy Aging Seminar Series: The Art and Science of Successful Aging, Institute for Healthcare Policy and Innovation, Virtual, May 2022.</li> </ol>  |

21. *University Research Corridor Roundtable Discussion on Flooding and Infrastructure*. Presentation at Wayne State University, Detroit, Michigan, April 2022.
- 2021**
22. *Deriving the missing exposure-outcome link: “equivalent” citywide ambient temperatures for assigning heat-health effects to individual-level temperature exposures*. Lighting talk at the Thirty-third Conference of the International Society for Environmental Epidemiology, Virtual, August 2021.
23. *Advancing Health & Environmental Justice in Utility Integrated Resource Plans (IRPs)*. Oral co-presentation to the Michigan Advisory Council on Environmental Justice, Virtual, April 2021.
24. *A community-based approach to energy, housing, & health justice*. Oral co-presentation to Jefferson East, Inc., Virtual, April 2021.
- 2020**
25. *Translating climate and health knowledge into testable interventions in the Industrial Midwest*, Oral symposium presentation at the 2020 Conference of the Society of Epidemiologic Research, Virtual, December 2020.
26. *Indoor temperature impacts on cognition and daytime sleepiness in Detroit, Michigan, USA*. Poster presentation at the Thirty-second Conference of the International Society for Environmental Epidemiology, Virtual, August 2020.
27. *A health impact assessment of lack of air conditioning during extreme heat in a temperate climate*. Poster presentation at the Thirty-second Conference of the International Society for Environmental Epidemiology, Virtual, August 2020.
28. *Assessing health impacts of DTE’s 15-year energy plan and how a public health approach can advance environmental justice in the COVID context*. Webinar co-presentation hosted by the Michigan Environmental Justice Coalition, Detroit, Michigan, May, 2020.
- 2019**
29. *Heat-mortality vulnerability by individual air conditioning and comorbidities among older adults in ten Ohio and Michigan counties, USA, 2006-2013*. Poster discussion presentation at the Thirty-first Conference of the International Society for Environmental Epidemiology, Utrecht, Netherlands, August 2019.
- 2018**
30. *Total and direction associations between high temperatures and preterm births in Detroit, MI*. Poster presentation, Thirtieth Conference of the International Society for Environmental Epidemiology, Ottawa, Canada, August 2018.
31. *Vulnerability to the cardiovascular effects of ambient heat in six U.S. cities: results from the Multi-Ethnic Study of Atherosclerosis (MESA)*. Poster presentation, Thirtieth Conference of the International Society for Environmental Epidemiology, Ottawa, Canada, August 2018.
32. *Preterm birth and heat in Detroit*. Oral presentation to the Michigan Department of Health and Human Services, April 2018.
- 2017**
33. *Association between high temperature and pre-term birth in a high-risk city*. Poster presentation, American Public Health Association’s 2017 Annual Meeting and Expo, Atlanta, GA, November 2017.
34. *Housing disparities in extreme-heat mortality in the Industrial Midwest*. Oral presentation, Climate Changes Health: Ensuring Environmental Justice Underlies Public Health’s Climate Change Work, a Summit of the American Public Health Association Environment Section, Spelman College, Atlanta, GA, November 2017.
35. *Assessing the burden of disease due to climate change in Michigan*. Epidemiology/Biostatistics Seminar Series, Michigan State University, Lansing, MI, April 2017.
- 2016**
36. *Pragmatic projections of climate-associated health effects in Michigan, USA*. Poster presentation, Twenty-Eighth Conference of the International Society for Environmental Epidemiology, Rome, Italy, September 2016.
37. *Vulnerability to extreme-heat-associated hospitalization in three counties in Michigan, USA, 2000-2009*. Poster presentation, 2016 Epidemiology Congress of the Americas, Miami, FL, June 2016.
38. *Climate change and health in Detroit*. Climate and Health Science Café, Detroit Hispanic Development Corporation, Detroit, MI, March 2016.
- 2015**
39. *Climate change and health, the researcher’s perspective*. Panelist, Health Equity Speaker Series, University of Michigan School of Public Health, Ann Arbor, MI, November 2015.
40. *Heat vulnerability in Michigan*. Oral presentation, Michigan’s Premier Public Health Conference, by the Michigan Association for Local Public Health, Thompsonville, MI, October 2015.
41. *Vulnerability to the cardiovascular effects of summer heat in six U.S. cities: Results from the Multi-Ethnic Study of Atherosclerosis (MESA)*. Poster presentation, Reimagining Health in Cities: New Directions in Urban Health Research, Philadelphia, PA, September 2015.
42. *Climate change and public health in Detroit*. Oral presentation, Public Health Forum on Climate Change in Detroit, Detroit Climate Action Collaborative, Detroit, MI, August 2015.
- 2014**
43. *Vulnerability among the elderly to extreme heat-associated cardiovascular mortality in Michigan, 2000-2009*. Oral presentation, Twentieth International Congress of Biometeorology, Cleveland, OH, October 2014.

44. *Vulnerability to heat-associated hospital admissions among the elderly in the United States by individual and area-level characteristics, 1992-2006*. Oral presentation, Twenty-Sixth Conference of the International Society for Environmental Epidemiology, Seattle, WA, August 2014.
45. *Individual and neighborhood-level vulnerability to extreme-heat-related mortality among the elderly in Michigan, 1990-2007*. Oral presentation, Great Lakes Adaptation Assessment for Cities Conference on Adaptation in the Great Lakes Region, June 2014.
- 2013** 46. *Individual and neighborhood-level vulnerability to extreme-heat-related mortality among the elderly in Michigan, 1990-2007*. Poster presentation, University of Michigan Geriatrics Center Research Symposium, April, 2013, University of Michigan School of Public Health Eighteenth Annual Environmental Health Sciences Research Symposium, February, 2013, and the Twenty-Fourth Conference of the International Society for Environmental Epidemiology, Columbia, SC, August 2012.
47. *Individual-level and area-level vulnerability to heat among the elderly in Michigan, 1990-2007*. Speaker, University of Michigan Center for Social Epidemiology and Public Health Seminar Series, February 2013.
- 2011** 48. *The added heat wave effect in the association between temperature and hospital admissions among the elderly in 129 U.S. cities*. Poster presentation, Twenty-Third Conference of the International Society for Environmental Epidemiology, Barcelona, Spain, September 2011.
49. *Dose-response, severity, characterization factors and burden of disease of particulate matter for life cycle assessment*. Platform presentation (on my behalf by Shanna Shaked) at the Society of Environmental Toxicology and Chemistry North America Thirty-First Annual Conference in Portland, OR, November 2010 and poster presentation at the University of Michigan School of Public Health Sixteenth Annual Toxicology Symposium, February 2011.
- 2010** 50. *Identifying heat-related vulnerabilities, programs, and public perception of risk in Detroit*. Co-speaker with Natalie Sampson, Preparing for the Health Impacts of Increased Heat: A Workshop for Community Decision-Makers, Detroit, MI, December 2010.
- 2009** 51. *Heat waves, impervious surfaces, and hospital admissions among the elderly in U.S. cities*. Poster presentation, Twenty-First Conference of the International Society for Environmental Epidemiology, Dublin, Ireland, August 2009.
- 2008** 52. *Hospital admissions of the elderly during heat waves in five U.S. cities, 1985-2003*. Oral presentation, Twentieth Conference of the International Society for Environmental Epidemiology, Pasadena, CA, October 2008.
- 2007** 53. *Healthy Homes University: A program to reduce children's asthma symptoms in Michigan*. Poster presentation, Environmental Health Sciences MPH Poster Presentations, University of Michigan, Ann Arbor, MI, October 2007.
- 1999** 54. *Mate grasping in *Drosophila pegasa**. Oral presentation, Annual Meeting of the Society for the Study of Evolution, Madison, WI, June 1999.

## WORKSHOPS

### \*Community-Based Participatory Research in Practice

University of Michigan Network for Innovative Methods in Longitudinal Aging Studies, Virtual, April 2023.

### \*Detroit Flooding Study Stakeholder Meeting

University of Michigan and Wayne State University. Virtual, February 2021.

### \*University of Michigan M-LEEd/Wayne State University CURES Annual Symposium: Making Your First Research Team a Success

Ann Arbor, MI, May 2019.

City of Detroit Office of Sustainability, Sustainability Action Agenda Health and Environment Workshops Detroit, MI, June, August, and November 2018.

Climate Changes Health: Ensuring Environmental Justice Underlies Public Health's Climate Change Work, a Summit of the American Public Health Association Environment Section

Spelman College, Atlanta, GA, November 4 2017.

Evaluation of Turbidity of Public Water Supplies and Risk of Acute Gastrointestinal Illness

Drexel University, Philadelphia, PA, October 15 2015.

2014 Georgia Institute of Technology Urban Climate Institute Meeting on Urban Warming and Public Health Atlanta, GA, July 9-10 2014.

### \*Preparing for Impacts of Increased Heat: A Workshop for Community Decision-Makers

Detroit, MI, December 15 2010.

Centers for Disease Control and Prevention Indo-U.S. Program on Environmental and Occupational Health  
Workshop on Climate Change and Health

Goa, India, August 30-September 2 2009.

Third Biannual Workshop on Climate and Health, Summer Colloquium on Climate and Health, National Center  
for Atmospheric Research

Boulder, CO, July 13-17 2009.

\*Co-organizer

## POST-GRADUATE PROFESSIONAL TRAINING

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Michigan Institute for Clinical and Health Research Mentorship Academy

University of Michigan, Ann Arbor, MI, May-June 2019.

CLIMATE 588: Regional Climate: Downscaling Techniques and Applications

University of Michigan, Ann Arbor, MI, January-April 2018.

Spatial Statistics for Epidemiologic Data, Epidemiology Summer Session

University of Michigan, Ann Arbor, MI, July 2017.

Introduction to Bayesian Statistics, Inter-university Consortium for Political and Social Research

University of Michigan, Ann Arbor, MI, July 2017.

High Impact Principles and Practices for STEM Education

eight-week online course, Center for Research on Learning and Teaching, University of Michigan, Ann Arbor, MI, June-August 2016.

Causal Mediation Analysis, Half-Day Workshop by Tyler VanderWeele

Epidemiology Congress of the Americas, Miami, FL, June 2016.

Reach the Decision Makers Program

online and in-person training for scientists and community members in promoting science and health-based policies at the U.S.

Environmental Protection Agency, Washington, DC, September 2015-April 2016.

Methods in Community-Based Participatory Research

University of Michigan Graduate Summer Session in Epidemiology, July 6-10 2015.

## AWARDS

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Environmental Health Sciences Chair's Award

University of Michigan School of Public Health, April 2013.

Best Poster Presentation

University of Michigan School of Public Health Eighteenth Annual Environmental Health Sciences Research Symposium, February 2013.

Best Student Abstract

University of Michigan School of Public Health Symposium on Global Aging, October 2008.

Environmental Health Sciences Academic Achievement Award

University of Michigan School of Public Health, November 2007.

First Place, Environmental Health Sciences MPH Poster Session

University of Michigan School of Public Health, October 2007.

Sigma Xi Science Prize (awarded to the top three original undergraduate research papers)

University of Chicago, May 1999.

## LECTURES AND TEACHING EXPERIENCE

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Energy and Health

Lecture in the Environmental Health and Research Action Summer Course for Undergraduates, Virtual, July 2023.

A primer on climate science, health and climate change, and environmental justice

Lecture in HMP 681: Special Topics in Health Management and Policy, Ann Arbor, MI, January 2023.

Intersections of Social and Environmental Epidemiology in a Changing Climate

Lecture in EPI 621: Social Epidemiology, Drexel University, October 2021.

Time series and case-crossover analyses in air pollution and temperature epidemiology

Lecture in course EHS/EPID 675: Data Analysis for Environmental Epidemiology, University of Michigan, April 2013-2023.

**Climate change, environment and aging**

Lecture in course Epid 677: Epidemiology of Aging, University of Michigan, October 2017, October 2019.

**Mapping heat vulnerability**

Lecture in course Epid 684: Theory and Applications of Spatial Epidemiology, University of Michigan, February 2019.

**Environmental exposures and aging**

Lecture in course Epid 677: Epidemiology of Aging, University of Michigan, September 2016, October 2018.

**Climate change and health in Michigan**

Lecture in UM Dearborn course ENST/ESCI 395: Seminar on Environmental Issues, University of Michigan, February 2017.

**Climate change, health and the elderly**

Lecture in course EPID 813: Advanced Seminar on Public Health and Aging. University of Michigan, January 2016.

**Vulnerability among the elderly to heat and heat waves in the U.S.**

Lecture in course EPID 813: Advanced Seminar on Public Health and Aging. University of Michigan, January 2015.

**Teaching Assistant, University of Chicago Department of Ecology and Evolution.**

Taught a lab section, graded quizzes and lab reports, and held office hours for the course "Environmental Ecology." University of Chicago, January-March 1999.