Drew Day, Ph.D.

215-262-5175
dday612@gmail.com
LinkedIn: linkedin.com/in/drewbday
Website: drewdstat/github.io

EDUCATION

Ph.D. Duke University May 2017
Integrated Toxicology and Environmental Health
Thesis: "The Effects of Ozone Exposure on Cardiovascular Pathophysiology"
Thesis Advisors: Drs. Junfeng Zhang, Merlise Clyde, Daniel Costa, Heather Stapleton, and Joel Meyer

B.A., B.A., B.S. The Pennsylvania State University, Schreyer Honors College May 2011
B.A. in Comparative Literature, B.A. in Asian Studies,
B.S. in International Studies
Minors in Biology and Chinese Language

EMPLOYMENT

Epidemiologist Seattle Children's Research Institute September 2021 – December 2024
Center for Child Health, Behavior, and Development (CHBD)

Research Scientist III, Epidemiology Seattle Children's Research Institute September 2018 - August 2021
CHBD

Research Associate Duke University August 2012 - June 2017
Integrated Toxicology and Environmental Health Program

RESEARCH INTERESTS

- **Omics prediction of chronic disease**: Using machine learning analyses of omics data to predict patterns of chronic disease and discover pathophysiologic mechanisms.
- **Multi-outcome profiles**: Using phenotypes of disease outcome co-occurrence to identify subpopulations of individuals with shared mechanisms and risks of disease for epidemiologic and clinical applications.
- **Mixture exposures**: Advancing mixture exposure modelling to identify the combined impact of environmental factors on health outcomes.
- **Developmental origins of disease**: Exploring associations between early life chronic disease and pre- and postnatal chemical exposures.

GRANTS

5U2COD023375-07 NIH ECHO OIF 09/01/2021 - 08/31/2023
Role: Principal Investigator
Identifying Patterns of Child Health Outcomes in a Large Multi-Cohort Study

UG3 ES034412 (MEND) 09/01/2023 - 08/31/2030
Role: Co-Investigator
Mediators and Modifiers of Prenatal Environmental Exposures and Child Neurodevelopment: DNA Methylation, Prenatal Diet, and Cognitive Stimulation

R01 ES025169 (TIDES III) 09/01/2022 - 05/31/2027

Role: Epidemiologist
TIDES III: Endocrine Disruption, Hormones, and Sex Differences in Adolescent Airway Health

UH3 OD023271 (ECHO Pathways) 09/01/2018 - 08/31/2023
Role: Epidemiologist
Prenatal and Early Childhood Pathways to Health: An Integrated Model of Chemical and Social Exposures, Biological Mechanisms, and Sex-Specific Effects on Neurodevelopment and Respiratory Outcomes

AWARDS/HONORS

- National Institute of Environmental Health Sciences Extramural Paper of the Month Sept. 2017
- Duke Global Health Institute Doctoral Scholar 2014, 2015, & 2016
- Duke Global Health Institute Dissertation Grant 2015
- Duke University Chancellor's Scholarship and James B. Duke Fellowship
- Phi Beta Kappa academic honors society member

POST-DOCTORAL RESEARCH EXPERIENCE

Multi-Outcome Pediatric Chronic Health Outcome Profiles September 2021 – December 2024

- Serving as PI on an NIH Environmental Influences of Child Health Outcomes (ECHO) Opportunities and Infrastructure Fund (OIF) grant.
- Using simulations to test and validate distance-based and latent model methods for clustering mixed continuous and categorical health outcome in multi-cohort data while removing clustering by cohort. This included trying out an autoencoder-based method using Tensorflow.
- Applying the best performing method (residual k-means) to two separate multi-cohort samples of middle childhood-aged children to discover patterns of respiratory, neurodevelopmental, and obesity-related endpoints. Consistent phenotypes emerged that were stable across samples.
- Using mixture exposure regressions and LASSO to associate phthalates and demographic factors with multi-outcome phenotypes.
- Serving as data manager for the TIDES cohort study, organizing and disseminating data.

Mixture Exposures Analysis and Methods Development October 2018 – December 2024

- Developing a method called Weighted Quantile Sum regression with a permutation test (WQSPT) for improving the balance of statistical power and false positive rate for the Weighted Quantile Sum (WQS) regression method by generating permutation test methods for this single index mixture exposure model.
- Validating this approach against other existing forms of single index exposure models using extensive simulations performed with supercomputing resources and publishing the method in an accompanying R package *wqspt*.
- Applying this method to several first and middle author papers to analyze the associations between mixtures of phthalate or polycyclic aromatic hydrocarbon (PAH) exposures and pediatric chronic health outcomes like measures of behavior, cognition, and asthma.
- Helping to develop an SOP for the preparation, collection, and storage of silicone wristbands for exposomic analysis for the GAPPS cohort study in collaboration with Duke University.

Endocrine Determinants of Pediatric Health Outcomes September 2018 – December 2024

- Performing analyses associating maternal sex hormone concentrations during early pregnancy first with childhood neurobehavioral assessment measures and later with asthma-related outcomes.

- Examining interactions between melamine and derivative triazine nephrotoxicant compounds in association with cross-sectional childhood kidney injury biomarkers.
- Using the WQSPT method to analyze associations between childhood neurobehavioral outcomes and mixtures of phthalates, a type of plastic-associated endocrine-disrupting chemical.
- Performing a pilot weighted gene co-expression network analysis (WGCNA) and differentially expressed gene (DEG) analysis when associating the placenta transcriptome with childhood neurobehavioral outcomes.

DOCTORAL RESEARCH EXPERIENCE

Indoor Air Filtration Strategies and Occupant Health Indicators November 2014 - July 2017

- Helping to design and implement a study evaluating the cardiopulmonary health benefits of different indoor air filtration technologies among office workers in Changsha, China.
- Playing a role in all steps of the study including composing part of the grant, selecting and developing SOPs for biomarker collection, composing ethics committee applications, acquiring and setting up equipment, composing questionnaires, collecting data in the field, performing laboratory analyses, and finally analyzing that data and presenting the results.
- Overseeing and implementing the collection and processing of urine, blood, and exhaled breath condensate; performing cardiopulmonary tests; and using HPLC and ELISAs to analyze inflammation, oxidative stress, and thrombotic biomarkers.
- Performing frequentist and Bayesian analyses using R, JAGS, and Python. This included calculating time-adjusted air pollutant exposures and associating them with biomarker outcomes using linear mixed effects models and a hierarchical Bayesian mixed effects ridge regression.

Air Pollution-Associated Disease Biomarker Analysis October 2013 - November 2014

- Using linear mixed effects models with linear and spline predictors and covariates to associate pollutant level changes during the 2008 Beijing Olympics with lung function measures and oxidative stress.
- Performing HPLC analysis on exhaled breath condensate and cell supernatant samples to analyze nitrogen dioxide and the oxidative stress marker malondialdehyde.

Prenatal Air Pollutant Toxicology in Rodents September 2012 - November 2013

- Staci Bilbo's lab: Breeding and instilling pregnant dam mice intratracheally with diesel exhaust particulate matter, extracting and inflating lungs for histologic and multiplex analysis, and performing immunohistochemistry and stereology to quantify innate immune cell populations.
- Richard Auten's lab: Refining immunohistochemistry methods for analyzing mouse lung tissue and using those methods to evaluate airway epithelia for cell types and chemokine signaling following neonatal ozone exposure.

MENTORSHIP/TEACHING

University of Delaware Winter 2022 - Present

- Serving on the dissertation committee for a doctoral student at the University of Delaware Department of Health, Behavior, and Nutrition Sciences. This has involved mentoring the student in designing research studies, toxicology, statistics, and coding.

Seattle Children's Research Institute Summer 2022

- Mentored a biostatistics PhD student in performing a mixture exposure analysis associating phthalate mixtures with behavior as mediated by prenatal stressful life events.
- Mentored an undergraduate student in learning basic R and performing summary statistics on wristband-derived exposure data as part of the Summer Scholars Program.

Stanford China Scholars Program November 2018, May & November 2019

- Taught an hour-long high school lecture on 3 separate occasions for the Stanford China Scholars Program covering the major environmental challenges in China as well as basics of toxicology.

Duke University September 2012 - June 2017

- Assistant: ENV 581: Environmental Health Problems: Principles and Case Studies taught by Junfeng Zhang (January - May 2017) - helped to set up prerecorded lectures, write scripts and perform the videorecording, and ensure online access to course materials.
- Teaching assistant: ENV 604: Air Quality: Human Exposure and Health Effects taught by Junfeng Zhang (October - November 2016) - helped with organizing the lectures, grading, and lecturing on air pollution health effects.
- Teaching assistant: ENV 603: Air Quality: Management taught by John Vandenberg (September - October 2016) - helped with the organization of lectures and grading.
- Mentored fellow students in Junfeng Zhang's lab in R coding, statistics, and paper writing.
- Mentored two undergraduate students in cryosectioning and preparing mouse brain tissue for immunohistochemistry analysis in Staci Bilbo's lab (Summer 2013)

PUBLICATIONS

Riederer AM, Sherris AR, Szpiro AA, Melough MM, Simpson CD, Loftus CT, **Day DB**, Wallace ER, Trasande L, Barrett ES, Nguyen RH. Environmental and dietary factors associated with urinary OH-PAHs in mid-pregnancy in a large multi-site study. Environmental Research. 2025 Feb 1;266:120516.

Sherris AR, Hazlehurst MF, Dearborn LC, Loftus CT, Szpiro AA, Adgent MA, Carroll KN, **Day DB**, LeWinn KZ, Ni Y, Sathyanarayana S. Prenatal exposure to ambient fine particulate matter and child lung function in the CANDLE cohort. *Ann Med*. 2024 Dec 31;56(1):2422051.

Webb MD, Park JW, **Day DB**, Trabulsi JC, Sathyanarayana S, Melough MM. Associations of Phthalate Exposure With Adiposity and Metabolic Syndrome in US Adolescents and Adults, NHANES 2013 to 2018. *J Endocr Soc*. 2024 Dec;8(12):bvae189.

Baker BH, **Day DB**, Hazlehurst MF, Herkert NJ, Stapleton HM, Sathyanarayana S. Associations of environmental chemical exposures measured in personal silicone wristbands with sociodemographic factors, COVID-19 restrictions, and child respiratory health. *Environ Res*. 2024 Aug 13:119776.

Day DB, Melough MM, Flynn JT, Zhu H, Kannan K, Ruzinski J, De Boer IH, Sathyanarayana S. Environmental Exposure to Melamine and its Derivatives and Kidney Outcomes in Children. *Environ Res*. 2024 Jul 1; 252:118789.

Zhang Y, Gong J, Hu X, He L, Lin Y, Zhang J, Meng X, Zhang Y, Mo J, **Day DB**, Xiang J. Glycerophospholipid Metabolism Changes Association with Ozone Exposure. *J Hazard Mater*. 2024 Jun 9:134870.

Sherris AR, Loftus CT, Szpiro AA, Dearborn L, Hazlehurst MF, Carroll KN, Moore PE, Adgent MA, Barrett ES, Bush NR, **Day DB**, Kannan K, LeWinn KZ, Nguyen RHN, Ni Y, Riederer AM, Robinson M, Sathyanarayana S, Zhao Q, Karr CJ. Prenatal polycyclic aromatic hydrocarbon exposure and asthma at age 8-9 years in a multi-site longitudinal study. *Environ Health*. 2024 Mar 8;23(1):26.

Day DB, LeWinn KZ, Karr CJ, Loftus C, Carroll KN, Bush NR, Zhao Q, Barrett ES, Swan SH, Nguyen RHN, Trasande L, Moore PE, Ako A, Ji N, Liu C, Szpiro AA, Sathyanarayana S. Subpopulations of Children with Multiple Chronic Health Outcomes in Relation to Chemical Exposures in the ECHO-PATHWAYS Consortium. *Environ Int*. 2024 Feb 8:108486.

Hazlehurst MF, Dearborn LC, Sherris AR, Loftus CT, Adgent MA, Szpiro AA, Ni Y, **Day DB**, Kaufman JD, Thakur N, Wright RJ, Sathyanarayana S, Carroll KN, Moore PE, Karr CJ. Long-term ozone exposure and lung function in middle childhood. *Environ Res*. 2024 Jan 15;241:117632.

Baker BH, Melough MM, Paquette AG, Barrett ES, **Day DB**, Kannan K, Nguyen RH, Bush NR, LeWinn KZ, Carroll KN, Swan SH. Ultra-processed and fast food consumption, exposure to phthalates during pregnancy, and socioeconomic disparities in phthalate exposures. *Environ Int.* 2024 Jan 6:108427.

Barrett ES, **Day DB**, Szpiro A, Peng J, Loftus CT, Ziausyte U, Kannan K, Trasande L, Zhao Q, Nguyen RH, Swan S. Prenatal exposures to phthalates and life events stressors in relation to child behavior at age 4-6: a combined cohort analysis. *Environ Int*. 2024 Jan 4:108425.

Sun B, Wallace ER, Ni Y, Loftus CT, Szpiro A, **Day D**, Barrett ES, Nguyen RHN, Kannan K, Robinson M, Bush NR, Sathyanarayana S, Mason A, Swan SH, Trasande L, Karr CJ, LeWinn KZ. Prenatal exposure to polycyclic aromatic hydrocarbons and cognition in early childhood. *Environ Int*. 2023 Aug;178:108009.

Gaylord A, Barrett ES, Sathyanarayana S, Swan SH, Nguyen RHN, Bush NR, Carroll K, **Day DB**, Kannan K, Trasande L. Prenatal bisphenol A and S exposure and atopic disease phenotypes at age 6. *Environ Res*. 2023 Jun 1;226:115630.

Paquette AG, Lapehn S, Freije S, MacDonald J, Bammler T, **Day DB**, Loftus CT, Kannan K, Alex Mason W, Bush NR, LeWinn KZ, Enquobahrie DA, Marsit C, Sathyanarayana S. Placental transcriptomic signatures of prenatal exposure to hydroxy-polycyclic aromatic hydrocarbons. *Environ Int.* 2023 Feb;172:107763.

Paquette AG, MacDonald J, Bammler T, **Day DB**, Loftus CT, Buth E, Mason WA, Bush NR, Lewinn KZ, Marsit C, Litch JA, Gravett M, Enquobahrie DA, Sathyanarayana S. Placental transcriptomic signatures of spontaneous preterm birth. *Am J Obstet Gynecol*. 2023 Jan;228(1):73.e1-73.e18.

Wallace ER, Buth E, Szpiro AA, Ni Y, Loftus CT, Masterson E, **Day DB**, Sun BZ, Sullivan A, Barrett E, Nguyen RH, Robinson M, Kannan K, Mason A, Sathyanarayana S, LeWinn KZ, Bush NR, Karr CJ. Prenatal exposure to polycyclic aromatic hydrocarbons is not associated with behavior problems in preschool and early school-aged children: A prospective multi-cohort study. *Environ Res*. 2023 Jan 1;216(Pt 4):114759.

Loftus CT, Szpiro AA, Workman T, Wallace ER, Hazlehurst MF, **Day DB**, Ni Y, Carroll KN, Adgent MA, Moore PE, Barrett ES, Nguyen RHN, Kannan K, Robinson M, Masterson EE, Tylavsky FA, Bush NR, LeWinn KZ, Sathyanarayana S, Karr CJ. Maternal exposure to urinary polycyclic aromatic hydrocarbons (PAH) in pregnancy and childhood asthma in a pooled multi-cohort study. *Environ Int.* 2022 Dec;170:107494.

Day DB, Sathyanarayana S, LeWinn KZ, Karr CJ, Mason WA, Szpiro AA. A Permutation Test-Based Approach to Strengthening Inference on the Effects of Environmental Mixtures: Comparison between Single-Index Analytic Methods. *Environ Health Perspect.* 2022 Aug;130(8):87010.

Freije SL, Enquobahrie DA, **Day DB**, Loftus C, Szpiro AA, Karr CJ, Trasande L, Kahn LG, Barrett E, Kannan K, Bush NR, LeWinn KZ, Swan S, Alex Mason W, Robinson M, Sathyanarayana S. Prenatal exposure to polycyclic aromatic hydrocarbons and gestational age at birth. *Environ Int*. 2022 Jun;164:107246.

Melough MM, **Day DB**, Fretts AM, Wang S, Flynn JT, de Boer IH, Zhu H, Kannan K, Sathyanarayana S. Associations of Dietary Intake with Urinary Melamine and Derivative Concentrations among Children in the GAPPS Cohort. *Int J Environ Res Public Health*. 2022 Apr 19;19(9).

Barrett ES, Corsetti M, **Day D**, Thurston SW, Loftus CT, Karr CJ, Kannan K, LeWinn KZ, Smith AK, Smith R, Tylavsky FA, Bush NR, Sathyanarayana S. Prenatal phthalate exposure in relation to placental corticotropin releasing hormone (pCRH) in the CANDLE cohort. *Environ Int*. 2022 Feb;160:107078.

Wallace ER, Ni Y, Loftus CT, Sullivan A, Masterson E, Szpiro AA, **Day DB**, Robinson M, Kannan K, Tylavsky FA, Sathyanarayana S, Bush NR, LeWinn KZ, Karr CJ. Prenatal urinary metabolites of polycyclic aromatic hydrocarbons and toddler cognition, language, and behavior. *Environ Int*. 2022 Jan 15;159:107039.

He L, Hu X, **Day DB**, Yan M, Teng Y, Liu XL, Yan E, Xiang J, Qiu X, Mo J, Zhang Y, Zhang JJ, Gong J. The associations of nitrated polycyclic aromatic hydrocarbon exposures with plasma glucose and amino acids. *Environ Pollut*. 2021 Nov 15;289:117945.

Hu X, Yan M, He L, Qiu X, Zhang J, Zhang Y, Mo J, **Day DB**, Xiang J, Gong J. Associations between time-weighted personal air pollution exposure and amino acid metabolism in healthy adults. *Environ Int*. 2021 Nov;156:106623.

Paquette AG, MacDonald J, Lapehn S, Bammler T, Kruger L, **Day DB**, Price ND, Loftus C, Kannan K, Marsit C, Mason WA, Bush NR, LeWinn KZ, Enquobahrie DA, Prasad B, Karr CJ, Sathyanarayana S. A Comprehensive Assessment of Associations between Prenatal Phthalate Exposure and the Placental Transcriptomic Landscape. *Environ Health Perspect*. 2021 Sep;129(9):97003.

Loftus CT, Bush NR, **Day DB**, Ni Y, Tylavsky FA, Karr CJ, Kannan K, Barrett ES, Szpiro AA, Sathyanarayana S, LeWinn KZ. Exposure to prenatal phthalate mixtures and neurodevelopment in the Conditions Affecting Neurocognitive Development and Learning in Early childhood (CANDLE) study. *Environ Int*. 2021 May;150:106409.

He L, Lin Y, **Day D**, Teng Y, Wang X, Liu XL, Yan E, Gong J, Qin J, Wang X, Xiang J, Mo J, Zhang Y, Zhang JJ. Nitrated Polycyclic Aromatic Hydrocarbons and Arachidonic Acid Metabolisms Relevant to Cardiovascular Pathophysiology: Findings from a Panel Study in Healthy Adults. *Environ Sci Technol*. 2021 Mar 16;55(6):3867-3875.

Day DB, Collett BR, Barrett ES, Bush NR, Swan SH, Nguyen RHN, Szpiro AA, Sathyanarayana S. Phthalate mixtures in pregnancy, autistic traits, and adverse childhood behavioral outcomes. *Environ Int*. 2021 Feb;147:106330.

He L, Hu X, Gong J, **Day D**, Xiang J, Mo J, Zhang Y, Zhang J. Endogenous melatonin mediation of systemic inflammatory responses to ozone exposure in healthy adults. *Sci Total Environ*. 2020 Dec 20;749:141301.

He L, Lin Y, Wang X, Liu XL, Wang Y, Qin J, Wang X, **Day D**, Xiang J, Mo J, Zhang Y, Zhang JJ. Associations of ozone exposure with urinary metabolites of arachidonic acid. *Environ Int*. 2020 Dec;145:106154.

Hu X, He L, Zhang J, Qiu X, Zhang Y, Mo J, **Day DB**, Xiang J, Gong J. Inflammatory and oxidative stress responses of healthy adults to changes in personal air pollutant exposure. *Environ Pollut.* 2020 Aug;263(Pt A):114503.

Cui X, Li Z, Teng Y, Barkjohn KK, Norris CL, Fang L, Daniel GN, He L, Lin L, Wang Q, **Day DB**, Zhou X, Hong J, Gong J, Li F, Mo J, Zhang Y, Schauer JJ, Black MS, Bergin MH, Zhang J. Association Between Bedroom Particulate Matter Filtration and Changes in Airway Pathophysiology in Children With Asthma. *JAMA Pediatr*. 2020 Jun 1;174(6):533-542.

Day DB, Collett BR, Barrett ES, Bush NR, Swan SH, Wang C, Sathyanarayana S. Prenatal sex hormones and behavioral outcomes in children. *Psychoneuroendocrinology*. 2020 Mar;113:104547.

Day DB, Clyde MA, Xiang J, Li F, Cui X, Mo J, Gong J, Weschler CJ, Zhang Y, Zhang JJ. Age modification of ozone associations with cardiovascular disease risk in adults: a potential role for soluble P-selectin and blood pressure. *J Thorac Dis*. 2018 Jul;10(7):4643-4652. doi: 10.21037/jtd.2018.06.135.

Cui X, Li F, Xiang J, Fang L, Chung MK, **Day DB**, Mo J, Weschler CJ, Gong J, He L, Zhu D, Lu C, Han H, Zhang Y, Zhang JJ. Cardiopulmonary effects of overnight indoor air filtration in healthy non-smoking adults: A double-blind randomized crossover study. *Environ Int*. 2018 May;114:27-36.

Day DB, Xiang J, Mo J, Clyde MA, Weschler CJ, Li F, Gong J, Chung M, Zhang Y, Zhang J. Combined use of an electrostatic precipitator and a high-efficiency particulate air filter in building ventilation systems: Effects on cardiorespiratory health indicators in healthy adults. *Indoor Air*. 2018 May;28(3):360-372.

Day DB, Xiang J, Mo J, Li F, Chung M, Gong J, Weschler CJ, Ohman-Strickland PA, Sundell J, Weng W, Zhang Y, Zhang JJ. Association of Ozone Exposure with Cardiorespiratory Pathophysiologic Mechanisms in Healthy Adults. *JAMA Intern Med*. 2017 Sep 1;177(9):1344-1353.

Xiang J, Weschler CJ, Mo J, **Day D**, Zhang J, Zhang Y. Ozone, Electrostatic Precipitators, and Particle Number Concentrations: Correlations Observed in a Real Office during Working Hours. *Environ Sci Technol*. 2016 Sep 20;50(18):10236-44.

Zhang JJ, **Day D**. Urban air pollution and health in developing countries. In: Nadadur SS, Hollingsworth JW, editors. *Air Pollution and Health Effects.* London: Springer; 2015. Chapter 13; p.355-380.

ADDITIONAL MANUSCRIPTS

In preparation:

Day DB, LeWinn KZ, Karr CJ, Loftus C, Carroll KN, Bush NR, Barrett ES, Ako A, Ji N, Liu C, Szpiro AA, Sathyanarayana S. Patterns of Pediatric Chronic Health Outcomes in the United States: The Environmental Influences on Child Health Outcomes (ECHO) Program.

CONFERENCES

International Society for Environmental Epidemiology Conference

- 2024: Poster: "Patterns of Pediatric Chronic Health Outcomes in the United States: The Environmental Influences on Child Health Outcomes (ECHO) Program"
- 2023: Oral: "Determining Subpopulations of Children with Multiple Health Outcomes using Unsupervised Clustering and Examining Associations with Prenatal Phthalates"
- 2022: Poster: "Differences in Silicone Wristband Exposure Profiles by COVID School Restrictions in Washington State Children"
- 2021: Poster: "Environmental Exposure to Melamine-Related Compounds and Kidney Outcomes in Children"
- 2020: Poster discussion session: "Comparing Performance between Models Assessing the Additive Effects of Exposure Mixtures" & Poster abstract: "Placental Gene Transcription and Child Cognitive and Behavioral Outcomes"
- 2019: Posters: "Prenatal Sex Hormones and Behavioral Outcomes in Children" & "Phthalate Mixtures in Pregnancy and Childhood Behavioral Outcomes"
- 2016: Poster: "Ozone and $PM_{2.5}$ in pollution mixture differentially impact cardiopulmonary pathophysiologic mechanisms"

Pediatric Academic Societies Conference
- 2023: Poster: "Determining Subpopulations of Children with Multiple Health Outcomes using Unsupervised Clustering and Examining Associations with Prenatal Phthalates"
- 2022: Oral: "Early Pregnancy Maternal Sex Hormones and Childhood Allergy-Related Respiratory Outcomes"

NYC Exposome Symposium
- 2022: Poster discussion: "A Permutation Test-Based Approach to Strengthening Inference on the Effects of Environmental Mixtures for Weighted Quantile Sum Logistic Regression"
- 2020: Poster: "Comparing Performance between Models Assessing the Additive Effects of Exposure Mixtures"

International Society for Children's Health and the Environment Conference
- 2022: Oral: "Differences in Silicone Wristband Exposure Profiles by COVID School Restrictions in Washington State Children"

National Institute of Environmental Health Sciences Environmental Health Science Fest
- 2016: Poster: "Pathophysiologic Mechanisms Underlying Cardiorespiratory Effects of Ozone in Healthy Adults"

Health Effects Institute Annual Conference
- 2016: Poster: "Ozone and $PM_{2.5}$ in pollution mixture differentially impact cardiopulmonary pathophysiologic mechanisms"

SOFTWARE

R packages:

Day DB. 2024. DrewDayRFunctions: R Functions for Epidemiologic Applications by Drew Day. R package version 1.0.1. https://www.github.com/drewdstat/DrewDayRFunctions.

Day DB, Szpiro AA. 2024. ResidualKMeans: Clustering Mixed-Type Data in Multi-Cohort Studies. R package version 1.0.1. https://www.github.com/drewdstat/ResidualKMeans.

Day DB, Szpiro AA. 2023. impgrplasso: LASSO Regression for Multiply Imputed Data with a Group Penalty. R package version 1.0.1. https://www.github.com/drewdstat/impgrplasso.

Day DB, Peng J, Szpiro AA. 2023. wqspt: Permutation Test for Weighted Quantile Sum Regression. R package version 1.0.1. https://cran.r-project.org/web/packages/wqspt/index.html.

OTHER PROFESSIONAL SERVICE

Manuscript Reviewer

The Journal of the American Medical Association (JAMA)
Environmental Health
Epidemiology
Journal of the Air & Waste Management Association
Ecotoxicology and Environmental Safety
Environment International
Environmental Research
Scientific Reports
Indoor Air

Professional Society Membership

International Society for Environmental Epidemiology: Member 2016 - Present

Advocacy

Washington Chapter of the American Academy of Pediatrics (WCAAP) - September 2018: Drafted a letter on behalf of the WCAAP advocating for the endorsement of Initiative 1631, which proposed a fee on fossil fuels and then investing those funds in environmental initiatives.

SKILLS

- **Coding**: R (12 years), Python (3 years), Unix (3 years), JAGS (2 years), STAN (2 years), Tensorflow/PyTorch (1 year)
- **Statistics**: Mixture exposure regressions (e.g., weighted quantile sum (WQS) regression), nonlinear regressions (e.g., GAMs), unsupervised learning (e.g., autoencoders), Bayesian regressions, penalized regressions (e.g., LASSO), transcriptomics (e.g., Limma), scRNA analysis (e.g., Seurat), causal inference (e.g., propensity scores), causal ML (e.g., TMLE), causal mediation, and cost-benefit analysis (e.g., state transition models).
- **Writing**: Experience composing grants, including 2 internal K grant applications and one training grant (OIF) as PI and several grants on which I served as a co-I or epidemiologist. Publishing first author papers in top-tier journals like *JAMA Intern Med* and *Environ Health Perspect*.
- **Toxicology**: Strong background in cardiopulmonary, endocrine, and immune toxicology.
- **Data Management**: Organizing and fulfilling data requests for a multi-site cohort study.
- **Field**: Organizing silicone wristband exposure sampling protocols for a cohort study and implementing biomarker measurement for an air pollution interventions study in China.
- **Lab**: Experience in HPLC chemical analysis, ELISAs, blood processing, immunohistochemistry, and rodent handling and dissection.

OTHER PROFESSIONAL EXPERIENCE

Duke University – Postdoctoral Research Associate May - July 2017

- Performing analyses and revising manuscripts proposing an ozone exposure-associated cardiovascular toxicity mechanism involving platelet activation amplified by increasing age.

Duke University – Research Associate June - September 2012

- Working on the Mountaintop Mining Project with the laboratory of Dr. Richard Di Giulio.
- Collecting well drinking water samples in areas located close to mountaintop mining activity, preparing those samples for analysis, and presenting the results to the participating communities

e8 Resources – Technical Advisor November 2011 - May 2012

- Conducting site audits for groundwater and soil contamination in Shanghai, China

- Providing water and waste management advising for sustainability projects
- Helping to translate the company website and presentations into Chinese

Humphries Industries Ltd. – Medical Writing Translator October 2011 - May 2012

- Providing high-level freelance medical writing translation from Chinese to English online for a pharmaceutical company based in Bethesda, MD