GeoDat

Society for Geography Data Science

ABOUT US

We aim to explore and raise awareness about issues of inequity that impact our communities.

Our goal is to create an inclusive & interdisciplinary space where undergrad students can come together to share our knowledge and use our skills for good.

EXECUTIVE BOARD

2020-2021

Arghya Kannadaguli

Director

Geography Data Science

Claire Luo

Chief Data Officer

Statistics

Sonali Chandra

Informatics Chair

Bioinformatics

Aditi Teriar

GIS Chair

Geographic Information Systems

Nanditha Shivakumar

Public Health Chair

Biochemistry

WHAT WE DO

01 Collaborative Equity Research

Currently studying environmental health disparity through various lenses, based on our majors and interests.

Focusing especially on NHPI communities because they are underrepresented in EJ literature and studies.

Understanding the various impacts of global colonization and displacement of Indigenous peoples on their environmental health in the present day.

Ongoing

02 Interdisciplinary Hackathon

Inviting students from all disciplines and all three UW campuses to bring their unique skills to work on equity-related projects of their choosing.

Spring 2022

RECENT RECAP

01

Virtual Talks

Check out our recorded research presentations on our youtube channel!

02

Fundraising

Husky Seed Fund Grant Recipient 2021-2022

03

Outreach

Connecting with younger students through Bellevue School District & the Young Data Scientists League

Our Research

A quick summary of what we've been up to in the last few months!

RESEARCH TIMELINE

01

Background

Examining racial disparities in environmental issues.

02

Context

Understanding geographic, historical, and social context.

03

Narrowing Focus

Zoning in on issues specifically impacting NHPI peoples.

04

Potential Solutions

Assessing different ways of working toward more equity.

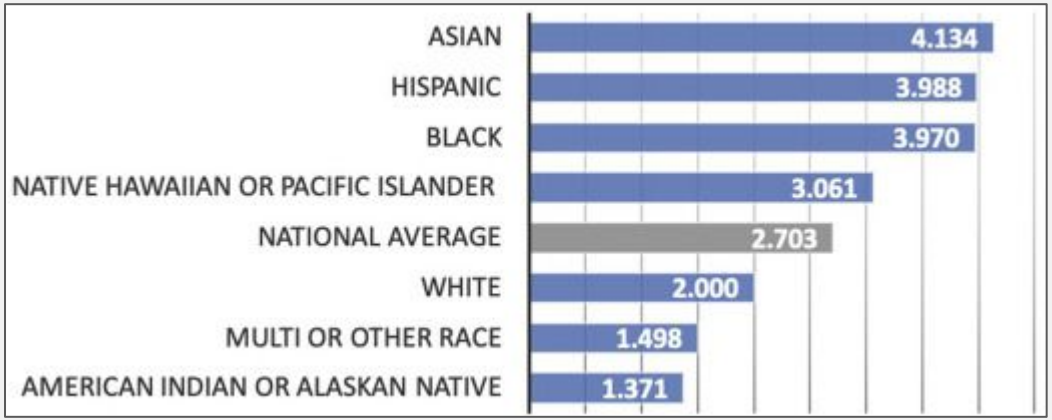
05

Future Study

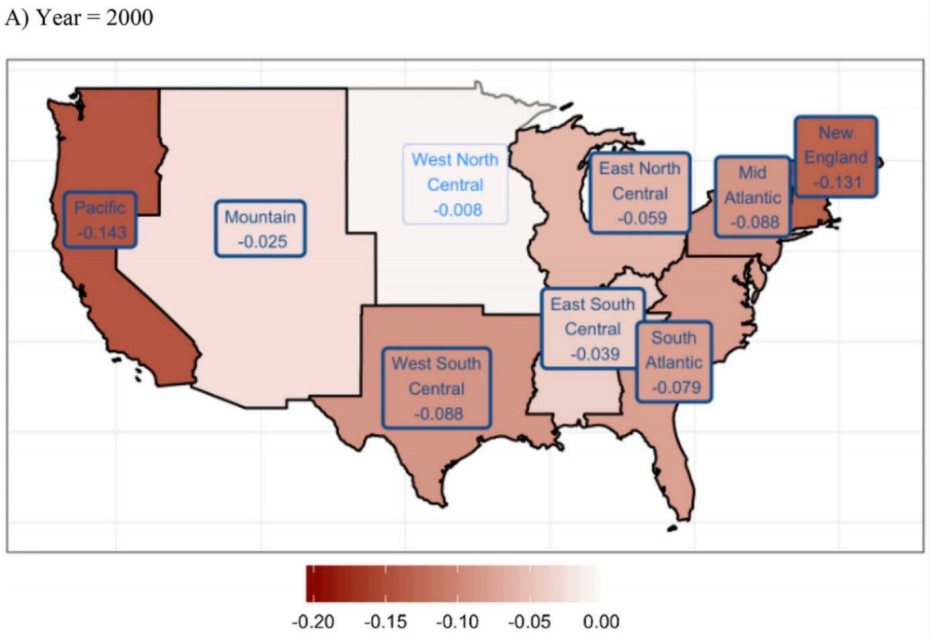
Including real stories and perspectives. Incorporating more GIS and Data Science!

Light Pollution Inequities in the U.S.

- Race vs exposure to light pollution
- Minority groups are more exposed than white populations
  - Except Native American and Alaskan Natives
  - They have been marginalized within geographically isolated areas
- Key Takeaways
  - There is more to EJ than just numbers
  - Importance of considering historical and social context



Disparities in Access to Green Spaces for Immigrants



- **Greenness**, in this study, refers to the amount of nature in an area on earth.
- **GOAL**: Measure the association between immigrant proportions and greenness
- **METHOD:** Surrounding greenness was assessed through the Normalized Difference Vegetation Index (**NDVI**)
- **RESULTS:** Census tracts with **higher overall immigrant percentage** had significantly **lower greenness**
  - All **9** census regions
  - In **2000** and **2010**

Residential Segregation & Environmental Hazard

- Recognizing the impact of residential segregation on minority communities
  - Shoehorns them into areas with poor economic opportunity, healthcare availability and quality, environmental safety, etc.
  - Poor housing safety and environmental regulations → more toxic pollution exposure
- Classifying psychosocial community stress as an environmental hazard
- **Result:** Minority neighborhoods have much higher rates of illness than white neighborhoods
  - Increased rates of both infant and adult mortality, respiratory illness, teenage pregnancy, exposure to air pollution, etc.
  - Community stress can also manifest as physical symptoms (e.g. high blood pressure, mental illness, substance abuse, etc.)

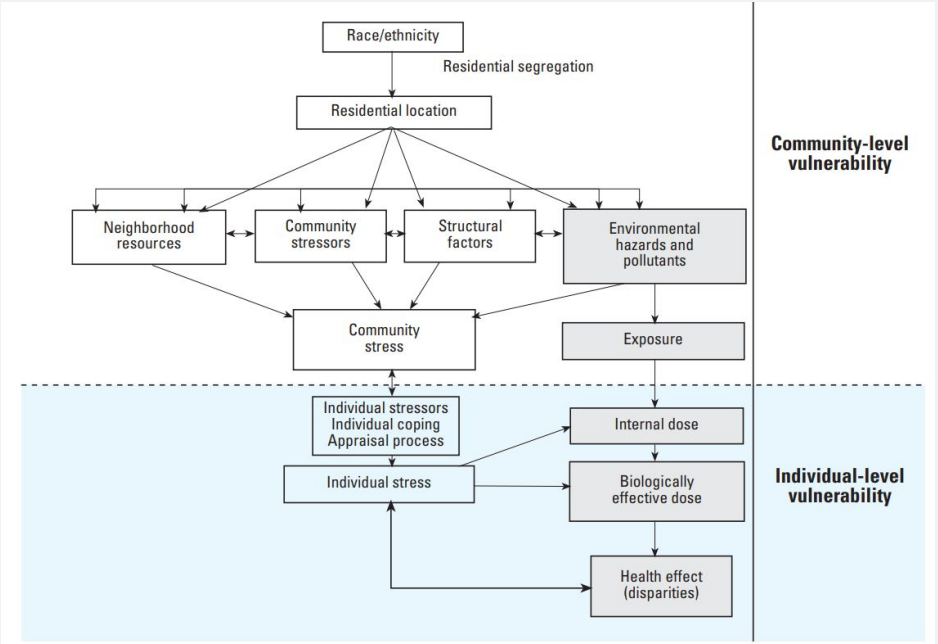
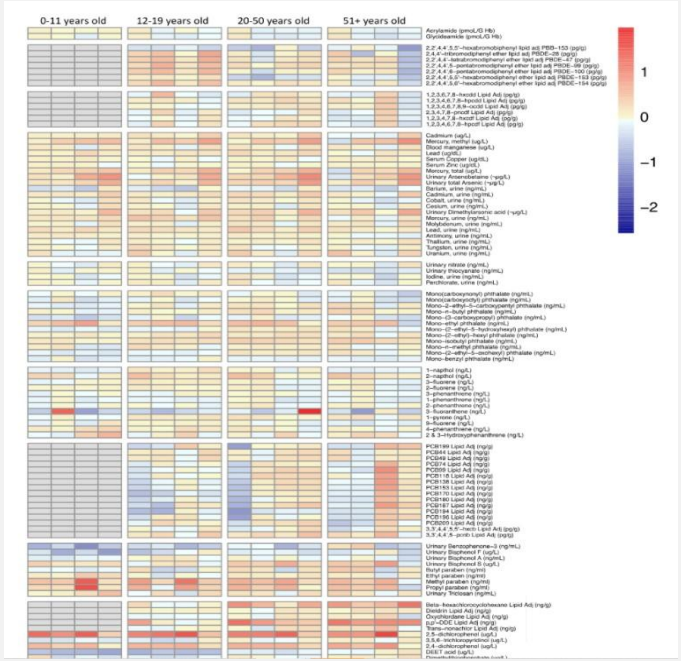


Figure 1. Exposure–disease–stress model for environmental health disparities.

Racial Disparities in Chemical Biomarkers

- **A Comprehensive Analysis of Racial Disparities in Chemical Biomarker Concentrations in US Women, 1999-2014**
- Racial disparities in disease incidence is an ongoing public health issue
- Disparities are a result of interactions between genetic, social, lifestyle and environmental risk factors: 70%-90% of risk is due to environmental exposure

- Objective: Quantitative evaluation of chemical exposure disparities by race/ethnicity, life stage and time in the US using the NHANES's biomarker data for 143 chemicals
- Methodology: Application of survey weighted, generalized linear models using NHANES data + cycle and age group stratified subpopulations
- Outcome & Results: Chemical biomarker concentrations, main predictors was race/ethnicity with adjustments for age, socioeconomic status and smoking habits. Highest disparities in non Hispanic Black, Mexican American, other Hispanic and other race/multi racial women with increased levels of pesticides and their metabolites, personal care and consumer product compounds, and metals
- Discussion & Takeaway: Encourage chemical prioritization in studies on toxicology and epidemiology. This can guide public health interventions→ environmental/health disparities across populations



Generational Health Impacts of Air Pollution Exposure

American Journal of Epidemiology
Published by Oxford University Press on behalf of the Johns Hopkins Bloomberg School of Public Health 2018.
This work is written by (a) US Government employee(s) and is in the public domain in the US.

Vol. 188, No. 2
DOI: 10.1093/aje/kwy256
Advance Access publication:
November 19, 2018

Original Contribution

Ambient Volatile Organic Compounds and Racial/Ethnic Disparities in Gestational Diabetes Mellitus: Are Asian/Pacific Islander Women at Greater Risk?

Table 3. Association Between First-Trimester Exposure to High Volatile Organic Compounds (≥75th Percentile) and Gestational Diabetes in the Consortium on Safe Labor, United States, 2002–2008[a]

VOC	White (n = 109,396)		Black (n = 49,093)		Hispanic (n = 38,241)		Asian/Pacific Islander (n = 9,068)	
	OR	99% CI	OR	99% CI	OR	99% CI	OR	99% CI
Benzene	1.13	0.99, 1.29	0.98	0.81, 1.17	0.95	0.79, 1.15	1.29	1.04, 1.59[b,c]
1,3 Butadiene	0.97	0.88, 1.07	0.87	0.76, 1.00[c]	0.88	0.77, 1.01[c]	0.91	0.71, 1.16[c]
Ethylbenzene	1.13	0.95, 1.33[b]	0.96	0.77, 1.18	0.95	0.76, 1.17	1.28	1.00, 1.64[b,c]
Cyclohexane	1.03	0.93, 1.14	0.97	0.83, 1.13	0.95	0.82, 1.10	1.13	0.92, 1.39[c]
MTB ether	1.10	1.01, 1.19[b]	1.00	0.88, 1.15	0.90	0.79, 1.01	1.28	1.06, 1.54[b,c]
N-hexane	1.15	1.03, 1.29[b]	0.99	0.84, 1.18	0.97	0.82, 1.14	1.34	1.10, 1.65[b,c]
Ethyl methyl ketone	1.13	1.03, 1.24[b]	1.01	0.87, 1.17	0.93	0.81, 1.08	1.21	1.01, 1.46[b]
m-Xylene	1.07	0.89, 1.27	0.90	0.72, 1.13	0.89	0.71, 1.11	1.21	0.94, 1.56[c]
o-Xylene	1.02	0.86, 1.21	0.86	0.69, 1.07	0.86	0.69, 1.07	1.17	0.91, 1.51[c]
p-Xylene	1.08	0.93, 1.25	0.93	0.76, 1.14	0.90	0.74, 1.10	1.23	0.97, 1.55[c]
Propene	1.10	1.02, 1.19[b]	0.97	0.85, 1.11	0.95	0.82, 1.09	1.28	1.06, 1.54[b,c]
Sesquiterpene	1.13	1.03, 1.23[b]	1.06	0.92, 1.22	0.91	0.79, 1.02	1.36	1.12, 1.65[b,c]
Styrene	1.00	0.91, 1.10	0.93	0.81, 1.06	0.90	0.75, 1.20[c]	0.95	0.75, 1.20
Toluene	1.08	0.92, 1.28	0.91	0.73, 1.13	0.92	0.74, 1.14	1.23	0.96, 1.50[c]

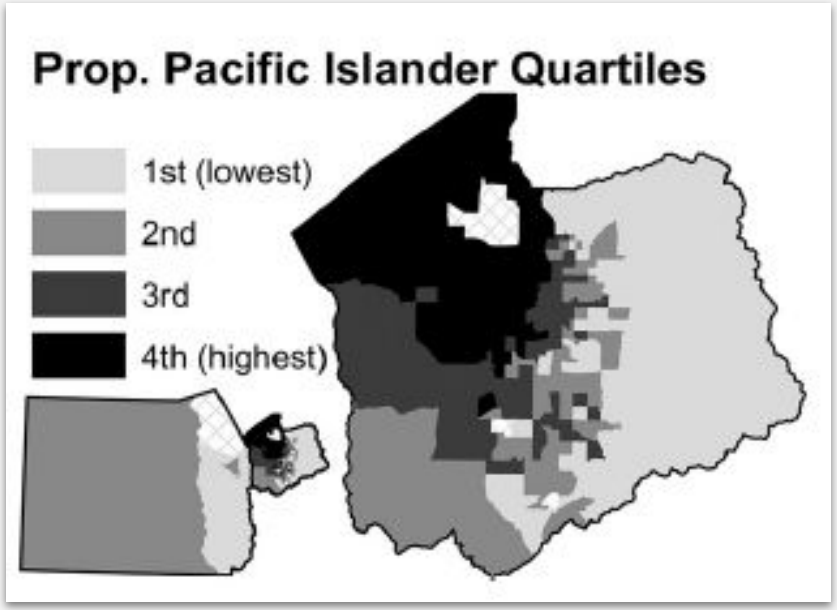
Abbreviations: CI, confidence interval; MTB, methyl tert-butyl; OR, odds ratio.
[a] Model was adjusted for maternal race, maternal age, insurance status, marital status, season of conception, parity, site, hospital type, and pre-pregnancy body mass index. Other race/ethnicity groups were included in the overall analysis, but stratum-specific results are not reported here, due to heterogeneity of the population.
[b] Statistically significant estimate ($P < 0.01$).
[c] Significant interaction term ($P < 0.01$), suggesting the association is different from data on white women.

- 2018 US Government study linking air pollution exposure and gestational diabetes in API women
- High rates of exposure to Volatile Organic Compounds can cause insulin resistance
- **Result:** Pregnant API women were found to be exposed to VOCs at twice the rate as all other race groups studied
  - Gestational diabetes can increase risk of complications during pregnancy
  - Increased risk of diabetes and obesity in the mother and her children
- Underrepresentation of API in EJ literature and studies due to the model minority myth

Environmental Justice and Religion

- Systemic white privilege oppresses minority groups → air pollution disparities
- Pacific Islander, Hispanic/Latino, and Black racial status strongly correlate with higher levels of air pollution
  - Areas with most concentration for minorities are in the center of the valley floor
- The Mormon Church and religion
  - Political and economic power
- Key Takeaways
  - Colonization of the Pacific continues to contribute to the oppression of Pacific Islanders

Pacific Islander Population Distribution
In Salt Lake City, UT



Importance of Inclusivity and Indigenous Knowledge

Background:

- As climate change is progressing, effects are exacerbating in the Islands
- Has imperial and capitalist roots driven by white supremacy
- Aim: Use Pacific Islander perspectives to approach environmental injustice in those regions

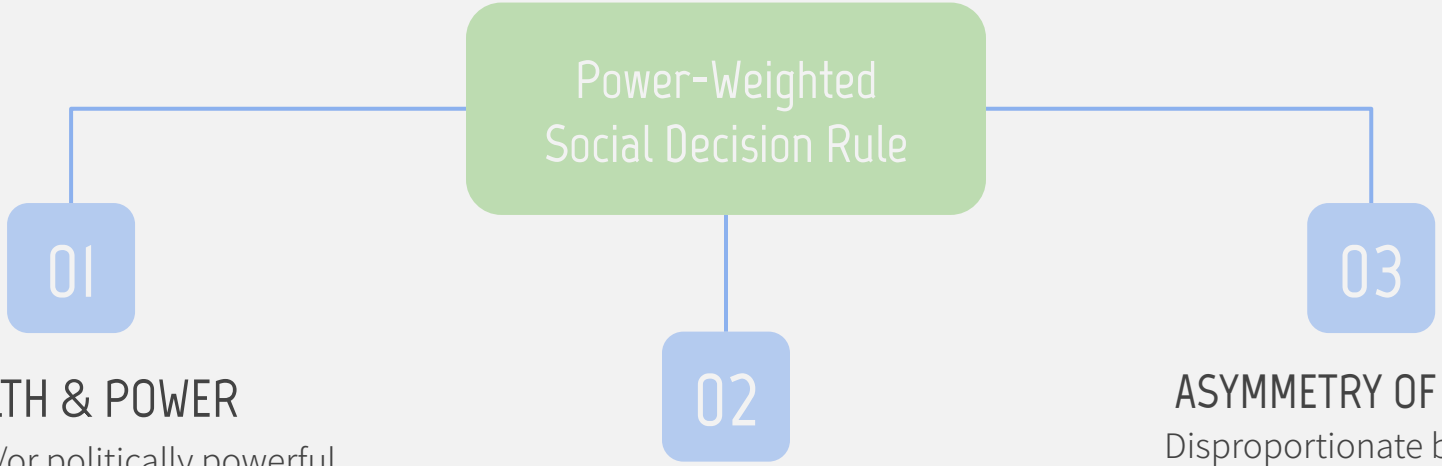
Environmental Justice, Indigenous Knowledge Systems, and Native Hawaiians and Other Pacific Islanders

Michael S. Spencer,[1,2] Taurmini Fentress,[1] Ammara Touch,[3,4] and Jessica Hernandez[5]*

What Needs to Change:

- Environmental Justice programs should move past judicial and procedural justice
- Understand the culture and importance of land and practices of the region
- Focus on specifically on physical, spiritual, genealogical, and sociopolitical relationships
- Islands don't have much (0.03%) carbon footprint but are the first to see the effects

Social Inequality & Environmental Quality



WEALTH & POWER

Wealthy and/or politically powerful groups can influence geographic placement of toxic pollution sources.

POLLUTION DISPLACEMENT

When pollution can be easily displaced onto disadvantaged communities because they have limited political power, industry may even be encouraged to pollute more.

ASYMMETRY OF POWER

Disproportionate burden of environmental pollution and toxin exposure on communities with less political power.

Conclusions

Beyond the Ability to Pay - Lack of Access to Healthcare

- **Native Hawaiian** and **Pacific Islander** populations suffer from a number of **poor** health outcomes. High rates of:
  - Obesity
  - Hypertension
  - Asthma and cancer mortality
- **GOAL:** Compare health status, healthcare access, and health outcomes for NHOPI to Asians
- **METHOD:** Survey Collection

- **RESULTS:** NHOPI in the US are **more likely** to experience a cost barrier to accessing healthcare, and even without that barrier, they still have alarming amounts of health issues
- **ANALYSIS:** Making health insurance more affordable is **NOT** the entire solution in eliminating health disparities

Importance of Community Inclusivity in Environmental Health Justice

RESEARCH Open Access

Metal air pollution partnership solutions: building an academic-government-community-industry collaboration to improve air quality and health in environmental justice communities in Houston

Elaine Symanski[1*], Heyreoun An Han[2], Loren Hopkins[3], Mary Ann Smith[2], Sheryl McCurdy[4], Inkyu Han[2], Maria Jimenez[2], Christine Markham[4], Donald Richner[5], Daisy James[5] and Juan Flores[6]

- Metal recycling is a big industry in Houston, Texas, with little laws about having industries near residential areas
- Community-based approach to promote accessibility of information and tackle environmental justice in socio-economically disadvantaged communities

Key Takeaways:

- Focused on recruiting community leaders and their input in boosting engagement
- Created activities and events to increase participation and awareness about issues
- Increased environmental health literacy
- Involving target community is important to understanding how environmental health issues can be solved in a long term manner

Next Steps

NEXT STEPS

01

Continuing Research

Interviewing NHPI community members, and incorporating GIS / data science!

02

Hackathon Planning

Husky Seed Fund Grant Recipient 2021-2022

03

Recruiting

Aiming to recruit members starting late-summer / fall, but people are welcome to join at any time!

Thank you!

Learn more at
https://linktr.ee/geodat