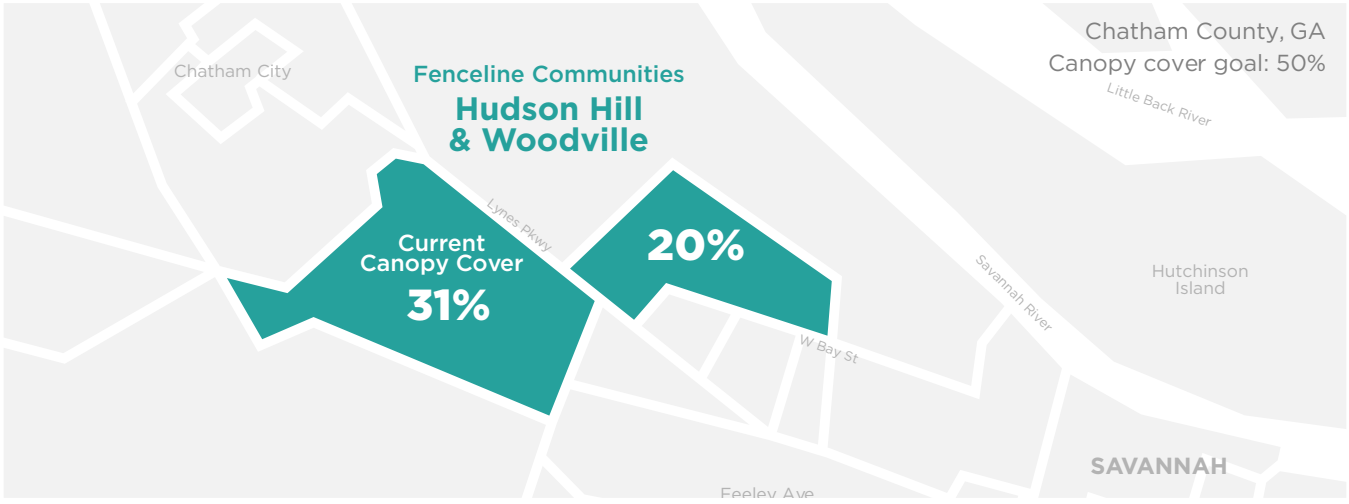
# From Big Data to Big Design:

## Solutions to Create an Equitable Environment for All

### INTRODUCTION

As climate change-driven events proliferate and intensify, the need for relief escalates in places like fenceline communities — marginalized neighborhoods located near commercial and industrial centers. In Savannah, Georgia, SCAD design for sustainability alumnus Seth Holland performed data-driven research with local agencies to promote tree canopy equity for neighborhoods around the city, which brought him to fenceline communities on the west side — Hudson Hill and Woodville. Throughout the project, he interviewed residents, noting frequent mentions of toxic air quality and its effects on health and lifestyles.

Afterward, Holland returned to Hudson Hill and Woodville with a desire to invoke positive change toward a more equitable environment. His research centered on how data equity could be linked to the capabilities approach espoused by philosopher Martha Nussbaum, and how it could be exemplified through collaboration among these Savannah fenceline communities and local organizations to monitor air quality. Holland's work demonstrates how concerted efforts to collect data can better inform policy creation and encourage collective action to improve quality of life.




*The Percentage of Tree Canopy in Hudson Hill and Woodville: Tree Equity Score National Explorer. (2021). https://www.treeequityscore.org/.*

## RESEARCH METHODOLOGY

Beginning with technological developments and the rapid rise of big data, Holland observed how such tools could be harnessed for profit or for equity, noting how for-profit pursuits have contributed to human well-being. To understand how to use big data for equity, he studied the capabilities approach through the work of Martha Nussbaum, who eschews development economics in favor of "human capabilities" like "education and political participation … health and bodily integrity, and on the importance of meaningful freedom to fashion one's life." With that theoretical lens, Holland asks, "How are humans able to meet their individual, nuanced needs by the use of technology?" and lays the groundwork for thoughtfully employing big data to the areas of his specific concern: Savannah's fenceline communities and their air quality.

Through his work with local nonprofit organizations and community leaders, Holland had existing relationships with the communities, governmental agencies, and nonprofits that helped him understand prior and ongoing air quality data collection in the area. Combined with a case study detailing how citizen scientists can impact environmental regulation, Holland identified how hyperlocal air sensors installed on resident properties could supplement ongoing air quality studies by putting the data and results in the hands of local residents.

Holland conducted a series of expert and contextual interviews with data equity experts from Data4Change, Ketch, Greenlink Hub, Georgia Ports Authority, and other research organizations; community engagement experts from City of Savannah Office of Sustainability, Public Lab, and Eagle Solar and Light; and with local residents. He also performed field visits within the Woodville and Hudson Hill communities and made visits to local community meetings featuring topics that aligned with his scope of interest. Holland's research and subsequent analysis led to six insights that can guide researchers and organizations in creating and implementing climate data acquisition initiatives, particularly in marginalized communities.

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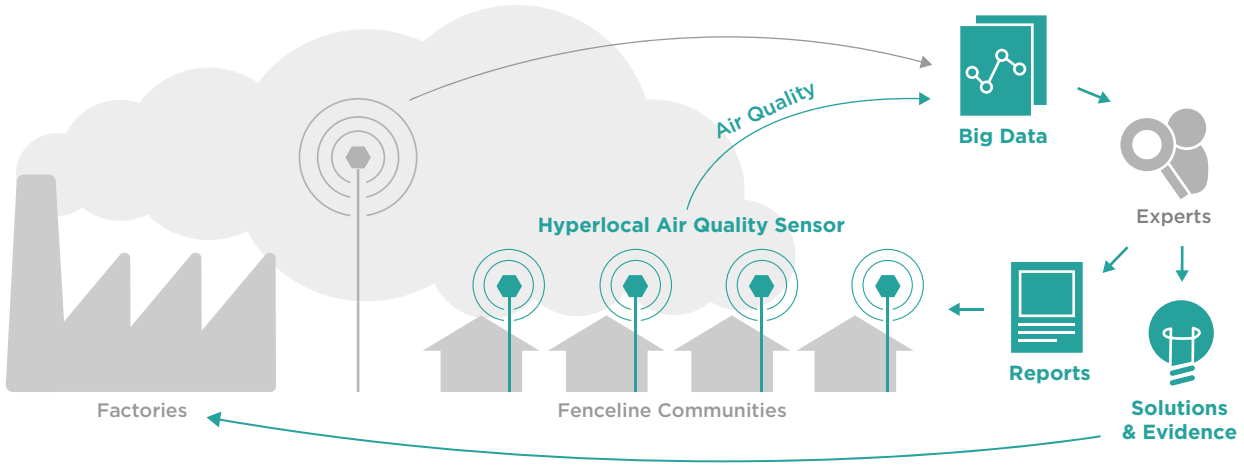
> **Data** is the most important commodity for the digital age and drives most capitalistic efforts, but it does not have to stop there. By properly framing a new data equity taxonomy, it is possible to construct a view of data for good, in which it enables humanity to meet their everyday needs via the capabilities approach.

## VALUE EXCHANGE MAP




*Sensor Data to Societal Change:*
*Collecting data can better inform policy creation and encourage collective action to improve quality of life.*

## INSIGHTS

**1. Know that technology has limitations and plan for it.** Hyperlocal air monitoring sensors contain strengths and drawbacks. They're inexpensive, effective — and useful for community and news awareness — but require a skilled analytics team to examine and interpret substantial data sets. Contingencies would need to be developed in the case of equipment breakdown, malfunction, or sensor cleaning along with tracking related data anomalies that result from such events.

**2. Empower citizens with clarity and education.** Professionals should state their intentions clearly, provide education, and include physical and digital touch points. Data-driven reports may be confusing and would likely need a design implementation to communicate findings to citizens with gaps in technology or technological knowledge.

**3. Expect challenges.** Experiential pollution data can reveal structural issues that face fenceline neighborhoods. Residents can have barriers to implementation like sufficient power, lack of Wi-Fi, or difficulty with associated apps. Other environmental observations like vehicle traffic and smell reports need to be quantified alongside air quality data to demonstrate their interrelatedness.

**4. Foster agency awareness.** Organizational efforts can be siloed. Several related, coexisting projects have the potential to take place among governmental, academic, and nonprofit settings, resulting in separate datasets. Without communication and cooperation, multiple inefficiencies can drain budgets and labor.

**5. Build bridges with industry partners.** Red tape often stymies efforts to form relationships with local industries. In addition, corporate structures can hinder communication as initiatives move among departments. In the face of negative enviornmental impacts, the burden of proof is often shifted to citizens. Data can help industries understand their impact on neighbors.

**6. Cultivate empathy and partnership.** Communities are over-surveyed and underserved. Vital initiatives require relationship building, empathy, and face-to-face communication to create productivity and trust. With a strong foundation, community awareness and empowerment thrive.

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> **When applying the insights** from primary and secondary research towards a design solution, **it is important to recognize the validity of these different viewpoints and connect their commonalities as effectively as possible.”**

## CONCLUSION

Holland’s research opens a multitude of design opportunities to build equity for marginalized populations. With education, resources, and empathy, big data can be harnessed to better understand environmental challenges born from climate change and evolving economic growth.

Designers must invest time in the communities they want to serve. The cultivation of holistic knowledge and citizen empowerment will form the bedrock for solutions that help communities live longer and healthier.

*These research insights were originally generated by Seth Holland (M.F.A., design for sustainability, 2023).*

*SCADask is an applied research unit of the Savannah College of Art and Design that generates timely research at the intersection of commerce, creativity, and culture. To learn more, or to partner with SCADask, contact research@scad.edu.*