

**Thesis Project Portfolio**

**Improving Functionality and User Experience in the Search for Housing**

(Technical Report)

**How Gentrification Affected the Health Outcomes of Low-Income Residents in**

**Washington, DC through 2013**

(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science

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In Fulfillment of the Requirements for the Degree

Bachelor of Science, School of Engineering

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## **Sociotechnical Synthesis**

(Executive Summary)

*Home Is Where the Heart Is*

“Housing is health care” – unofficial motto of the National Health Care for  
the Homeless Council

If redlining were an episode in the history of US housing, then gentrification would be the sequel. After years of being forgotten by the government, people are losing their homes due to rapid increases in the cost of living from the sudden influx of new people and businesses. Although I am not a student of the fields of housing or public health, I chose my STS topic because I see gentrification in my built environment everyday. I see it in the buildings I pass on my commute and the skeletons of new buildings to come and old buildings long forgotten. It perplexed me how society could allow communities to go decades without support and care and then suddenly start caring when new people start moving in. As someone who has struggled to find decent, affordable housing, I became more curious about gentrification, health, and how considering a sociotechnical approach to both might be productive. On the sociological side, I examined how gentrification affected the health of low-income DC residents through 2013 when gentrification was at its most intense. On the technical side, I designed an application that would help people find housing while assisting others in protecting their current housing. With any complex sociotechnical issue, including gentrification and health, both the socio- and the -technical must be considered; considering one without the other may leave behind unrealized benefits while potentially causing harm.

For the technical portion of my thesis, I designed a mobile- and offline-friendly housing web application that helps users find housing or protect their current housing situation. This is essentially a website that anyone with an Internet-connected device and browser can access. Because low-income people are less likely to have reliable Internet access, I chose to design the application to work on mobile devices and computers, even when the user is unable to access the Internet. This is made possible by storing and updating data and web pages on the device when it is connected. If connection is ever lost, the stored data and web pages provide the user with an experience that appears as if the device is still connected to the Internet. Data such as apartment listing information may be temporarily outdated, but the user can still use the application including offline-friendly features such as sharing via text messaging until they can connect to the Internet again. Another feature of the application is the use of machine learning to detect gentrification and assign a gentrification risk score to each housing listing to better inform users before they move. Credit for this idea must be given to Jayne Yoo, a data scientist at the US Census Bureau, who used machine learning and publicly available data to predict gentrification in DC with high accuracy.

In my STS research, I explore how gentrification affects the health outcomes of the low-income residents of Washington, DC. Although it may seem obvious that forcing people to leave their homes would harm their long-term health, the ways in which displacement due to gentrification affects health are varied and consequential in more ways than one might expect. For example, gentrification can cause people who are displaced from their homes to lose their social networks in the form of neighbors, local businesses, and community members which can lead to chronic stress, heart disease, and cancer. I also learned that gentrification is the continuation of a deep, racist and classist history, and I realized that housing is regarded in

practice as a luxury instead of a human right and a form of preventative healthcare. Even though multiple cities across the country face gentrification, DC being the nation's capital, previously having a majority-Black population, and being unable to govern itself due to its lack of statehood make the former "Chocolate City" a uniquely complex case study of gentrification.

Without being an expert in housing policy or urban planning, one can see how inaccessible affordable housing is to low-income families. Any engineer might be able to envision a technical solution to the displacement and affordable housing crises in DC, whether it is a software application, building technique or technical document. What may be less apparent are the history, laws, and social conditions that contributed to the current situation. Further, no real or complete discussion can occur without including the direct experiences of the residents who are being displaced. Any complex problem will likely be sociotechnical in nature. In order to better unravel the complexity of the problem, it is important to understand both the socio- and -technical aspects.

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