

Acclimatizing to Heat in a Legacy City: Urban Heat Islands, Segregation and Social Connections in Toledo, Ohio

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In July 1995, over a five-day period in which the temperatures soared, 739 residents of Chicago died of heat-related causes in one of the deadliest climate disasters in U.S. history. The impacts of the heatwave were uneven, reflecting patterns of economic and racial segregation in the city (Klinenberg, 2015).

The proposed research-based studio will focus on the intersection between such heat events and the structure of the city, socio-economic and physical. The question we ask is: how can heat mitigation architecture and planning interventions further social equity? Our exploration aims to examine the emergent relationship between our daily experience and urban conditions, and to re-integrate the wellbeing of individuals with the design of healthy public spaces and neighborhood-wide environments.

Climate change has led to an increase in the length, severity and frequency of heat waves. One major contributor to these prolonged high temperatures is Urban Heat Islands (UHIs), urban areas that are significantly warmer than their surroundings chiefly because of concentrated heat emitted from the built environment, vehicles and industrial land uses. Impervious surfaces such as roads, sidewalks, parking lots, driveways and roofs create UHIs. Tree canopies can mitigate some of the effects, but nationwide, the number of trees in a neighborhood is related to the degree of segregation in a metropolitan area (Jesdale, et al., 2013; Westendorff, 2020). As a result, UHIs are far more likely to be located in poor and minority neighborhoods, than in affluent white neighborhoods (Harlan, et al., 2007).

Studies suggest that the UHI effect is expected to strengthen in the future as cities and metropolitan regions change in structure and expand while also growing denser at their center (US Global Change Research Program, n.d.). However, a number of cities, particularly in the industrial belt of the U.S. Midwest, have had a somewhat different experience with metropolitan change which include:

- deep and persistent population loss
- vacancy and abandonment, rather than densification of the core
- a change in the structure of the economy away from manufacturing
- racial and economic segregation

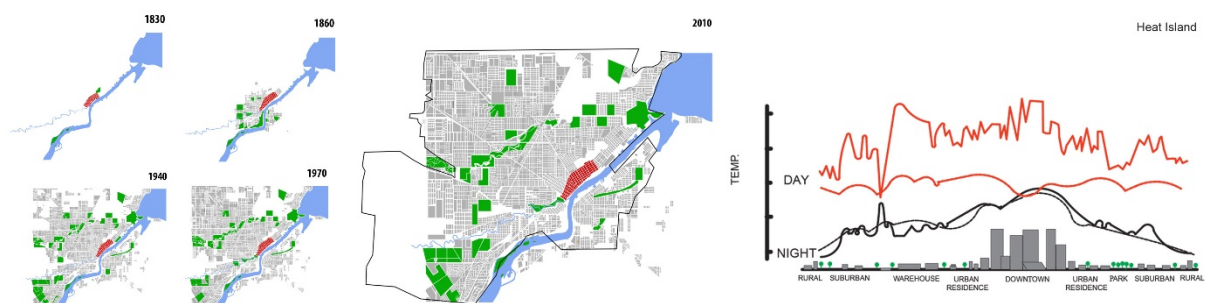


Figure 1: Historical Development of Green Spaces with Relation to UHIs, City of Toledo. Source: Department of Architecture, Bowling Green State University.

These are so-called legacy cities, of which Toledo, Ohio, an example. Cities like Toledo offer up a different set of challenges when addressing climate change and heat events. Intrinsic to the profound economic, socio-demographic and physical changes of the last several decades is a history of racially discriminatory design and planning practices. This is reflected, for example, in absence of green spaces in the central city (Figure 1).

This collaborative research-based studio will bring together students from two departments in two universities - architecture at Bowling Green State University, and geography and urban planning at the University of Toledo, both in Ohio. Using climate justice and environmental justice as organizing principles, this studio will provide a space for students from separate but related fields to understand the formation of UHIs and their connection to climate change, analyze the socio-economic and racial dimensions of segregation in the city, and offer design and planning ideas – including addressing social isolation - at the neighborhood, city and regional scale to mitigate the impacts of UHIs. The uneven social and racial impacts of historic planning interventions - such as the building of highways - on our city's urban fabric are well understood. The uneven impacts of climate change will be a new focus.

The course will be organized in five modules:

1. Understanding context: climate and environmental justice and UHIs at multiple scales
Place local climate responses in larger global and regional contexts. We will use as a starting point the award-winning plan by Skidmore, Owings and Merrill, “The Great Lakes Century – a 100-year Vision,” which highlights climate change as a major challenge for the region. Central to this section will be discussion of the racial and spatial inequities in UHIs.
2. Analysis of existing UHI mitigation strategies
Analyze the prevalence of, and mitigation responses to UHIs to develop a compendium of UHI mitigation strategies based on the experiences of cities that have already made efforts in this area and develop a book of case studies.
3. Focus on Toledo
Understand the particular challenges of legacy cities such as Toledo. Identify neighborhoods in the city that are dealing with intersecting challenges of racial and economic segregation, the spatial concentration of demographic groups such as the elderly, disinvestment, vacancy, etc., and therefore the most likely to be UHIs. Map the built and green spaces in the city and identify neighborhoods that would benefit most from UHI mitigation strategies.
4. Develop a catalog of design and planning strategies
Based on conversations with local experts, model scenarios of heat events. Using these and based on the case studies, develop a catalog of design and planning interventions to mitigate the impacts of UHIs with application to particular neighborhoods. In this module, we will also conduct a charrette with Toledo Public School high school students to engage with them and the public on the issues of design and planning for climate change, and to broaden the range of voices contributing to the catalog.
5. Symposium/Exhibition/Monograph
Conclude with a symposium designed to facilitate a community conversation, one reflects on climate change, the uneven distribution of UHIs across the city and mitigation strategies.

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