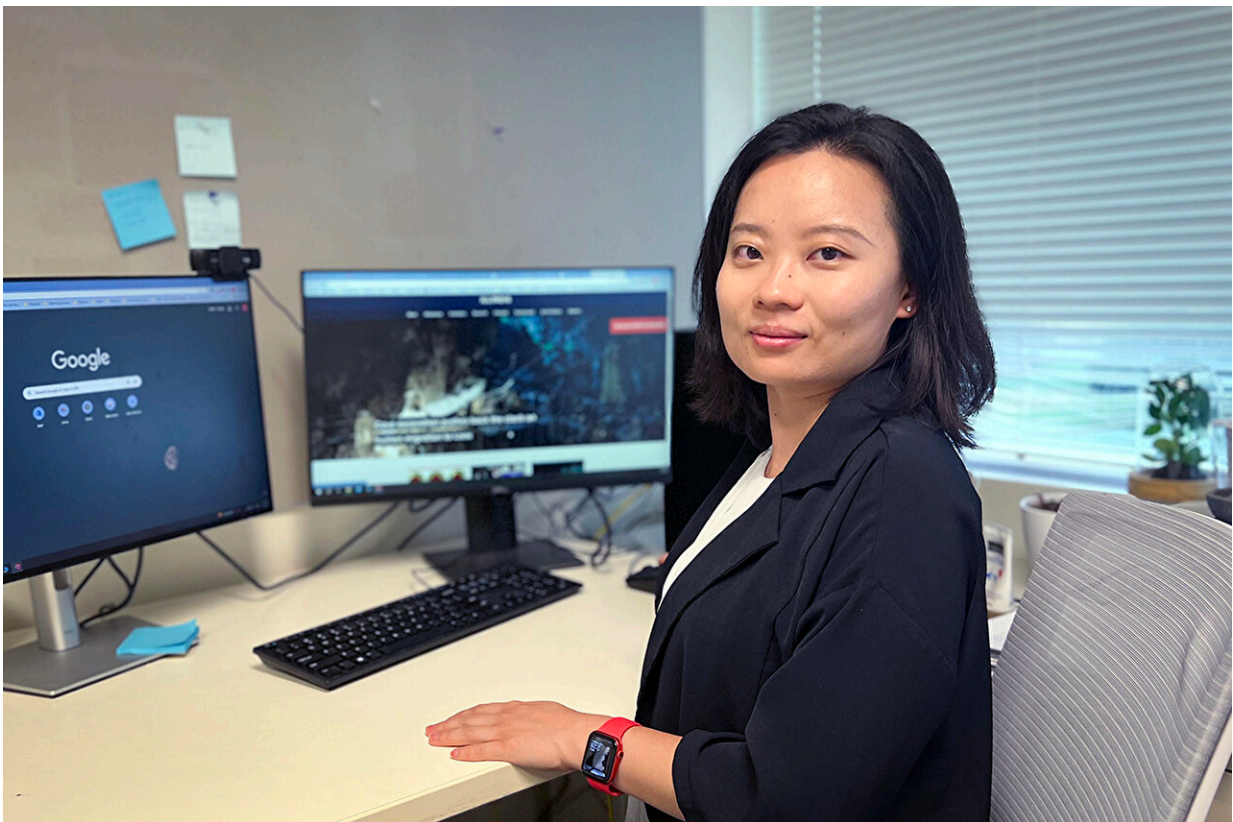


Q&A: Urban green spaces can help mitigate extreme heat in cities by reducing temperatures and providing shade

July 26 2023, by Jodi Heckel



Urban green spaces can help mitigate extreme heat in cities by reducing temperatures and providing shade, says University of Illinois Urbana-Champaign urban and regional planning professor Fang Fang. Credit: Fang Fang

Large parts of the country, particularly in the South, have been experiencing extreme heat waves recently, with the heat index well into triple digits.

Fang Fang is a University of Illinois Urbana-Champaign urban and regional planning professor who studies trees in [urban environments](#) and issues of landscape design and [environmental justice](#). Her most recent research—with co-author Andrew Greenlee, also a U. of I. urban and regional planning professor—examines how the quality of street trees in Washington, D.C., is related to environmental and socioeconomic factors. Their findings have been published in the journal *Urban Forestry & Urban Greening*.

Fang spoke with News Bureau arts and humanities editor Jodi Heckel about the use of [green spaces](#) to mitigate the effects of extreme heat.

How do urban green spaces help mitigate the effects of extreme heat?

As climate change brings [warmer temperatures](#) in summer, the health risks of extreme urban heat—such as asthma, heat stroke and heart attack—also increase. Urban green space is a natural-based solution in [urban planning](#) to address the challenges of mitigating the impact of [climate change](#) and extreme summer heat. It reduces the risk of heat-related illness and improves health. Urban green space reduces the overall temperature during [summer months](#) through the process of evapotranspiration, which is water evaporation into the atmosphere, including water vapor released through plant leaves.

In addition, the presence of trees and tall vegetation in cities also helps mitigate the extreme heat by providing ample shading. In [urban areas](#), shaded surfaces may be 20°F or more cooler than unshaded surfaces.

What populations are the most vulnerable to extreme heat, and what does your research show about the availability of green spaces for those residents?

Low-income communities are usually more vulnerable to extreme summer heat. These communities usually have limited access to air conditioning; thus, they are at a higher risk of heat-related illnesses.

We also found that residents with relatively low incomes and educational levels are more vulnerable to extreme summer heat due to the shortage of high-quality and well-maintained urban green space. They may have limited capacity to manage the green spaces and further improve the living environment. Thus, these [low-income communities](#) are suffering most from low-quality urban green space, especially street trees that might have dieback, disease and/or other physiological abnormalities. As a result, these low-quality street trees cannot provide the proper amount of environmental benefit—namely, a cooling effect to the local residents.

What are some challenges to providing green spaces to city residents?

For planners, it's hard to accurately quantify the need and demand for urban green space for residents. Increasing urban green space coverage is challenging due to various factors such as land use policy or budget concerns. Residents, planners and [decision makers](#) need to understand the long-term benefit of ample urban green space and make plans strategically.

Additionally, the quality of urban green space is more important than its quantity in mitigating extreme heat. We found that the quality and health status of urban green space is highly impacted by environmental factors

such as air temperature and the height of surrounding buildings. Such compound impacts make it more challenging and costly to maintain a healthy urban green space.

What are examples of innovative strategies to provide more green space in cities?

Some cities are incorporating urban greenery systems on rooftops and walls instead of overwhelming the city's spatial footprint. Extending the green space vertically can help mitigate extreme summer heat and create attractive spaces for residents to enjoy.

Is there a city that you believe is a good example for providing ample green space to its residents?

The Urban Forestry Division of the District Department of Transportation is the primary institute that provides comprehensive urban forestry management services across Washington, D.C., with the mission of keeping the urban forestry healthy, safe and growing. The division is responsible for street tree pruning, new tree planting and removals each year. Instead of simply providing services where requested, they consider environmental justice factors.

Wards 7 and 8 in the southeast quadrant in Washington, D.C., are dominated by low-income populations. From 2009 to 2020, the UFD focused on these places, which had the largest increase in new street trees and more than 25% of all tree pruning in 2022. Ward 8 experienced the fewest tree removals in the city. UFD provides guidance to planners and urban foresters in other mega cities to promote similar investments and strategies to reduce environmental inequity, especially for mitigating extreme heat, and maintain healthy green spaces for their residents.

More information: Fang Fang et al, Evaluating the quality of street trees in Washington, D.C.: Implications for environmental justice, *Urban Forestry & Urban Greening* (2023). [DOI: 10.1016/j.ufug.2023.127947](https://doi.org/10.1016/j.ufug.2023.127947)

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