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## Mural Urban Heat Island Effect

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# Mural Urban Heat Island Effect

Creative

By Sirena Pearl  
Virginia Commonwealth University

## ABSTRACT

According to NASA, July 2023 was the hottest month in global history since 1880. With increasing temperatures influenced by anthropogenic climate change, the urban heat island effect is becoming more prominent of an issue than ever. In response, the researcher created a mural on campus property to educate VCU and local communities about the urban heat island effect and provide actionable information on reducing this effect. The artistic application of the researcher's paint investigates the qualitative contrasts of three methods of thermal painting. First, the researcher measured the thermal appearance of different tonal gradations. The researcher painted the specified areas with either light or dark shades. Second, the researcher found the difference in heat retention between solar reflective paints and regular mural paints. The third area the researcher measured is how various mark-making techniques with light and dark tones impact the surrounding temperature of the mural. The research showed that the solar reflective sealant contributes to a cooler surface temperature difference. Another significant finding was the change in image clarity of the mural throughout the day during the winter. The image clarity depended on the sun as its peak clarity ranged in the afternoon from 2:00 PM to 4:00 PM. During the Summer of 2024, additional research will investigate how heat retention changes during the season. This is critical for evaluating the impact of the urban heat island. Finally, the researcher found that the mural's tonal values significantly affect heat absorption. Darker shades absorb considerably more heat than lighter ones, confirming the researcher's hypothesis. The researcher created this mural to make temperature data visual and accessible to a broad audience. If one looked only at the quantitative data, one would significantly limit the population to spread this message.

**Dimensions:** 91 x 25 feet

**Medium:** Spray Paint, Exterior Paint, Cool Coat Sealant, Infrared Thermal Camera

## Artist Statement

I create artwork with environmental risk communication in mind. My mural is large-scale to be accessible to the city of Richmond and VCU. It explores the relationship between urban planning, the risks associated with anthropogenic climate change, and the urban heat island effect. When viewed from a drone, the mural's site specificity is striking, dividing Richmond's vegetated suburbs and urban infrastructure. I personified two contrasting cities to exemplify the difference between a sustainable city and a city affected by the urban heat island effect. Two figures contrast by color. Their limbs interlock in a pulsing configuration, representing complex and chaotic ecological systems. The red figure personifies an urban heat island, visibly sweating and in pain from absorbed heat. The surrounding environment of the urban heat island figure displays concrete infrastructure, asphalted roads, and sparse vegetation. The blue figure, in contrast, represents a city modeled on sustainability. It is surrounded by forest coverage, wildlife, and infrastructure rooted in garden roofs. The blue figures' temperature is cooled, symbolizing sustainable urban planning, and their posture is mostly at rest, indicating a harmonious relationship with the environment. The thermal effects of the two cities are shown using a thermal infrared camera and designed thermal painting techniques that alter the temperature of the cities. I investigated what thermal infrared images might look like if I intentionally manipulated the

mural's surface temperature. The thermal painting techniques involve artistic experimentation with tonal shades, materiality, and various mark-making techniques such as gradients, stippling, blending, and clean-cut color blocking. Focusing on the paint's materiality, I experimented with solar reflective paint to control the temperature of the mural and its binary cities. I applied a special sealant that cools and reflects solar light on the sustainable figure and the surrounding landscape. This application was used to emphasize the importance of sustainability. In contrast, I used non-solar reflective paint to cover the heat island figure and its environment. The non-solar reflective paint's contrasting heat absorption signifies unsustainable infrastructure. The thermal infrared camera plays a critical role in this artwork by displaying temperature differences visually. It allows viewers to observe cool temperatures on objects, which can help reduce the heat island effect. Areas that absorb heat and contribute to urban heat appear as warm colors on the thermal infrared capture, while regions that reflect heat and mitigate heat retention appear as cooler colors. The mural's surface reflects these temperature variations, making it a valuable tool for comprehending the factors that heat or cool urban spaces. I urge viewers to learn from the painting and assist communities with limited access to temperature-cooling infrastructure that are most impacted by the urban heat island effect.

## Mural Images

(All High-Resolution Images Below are in the Shared Folder)

[https://drive.google.com/drive/folders/1TuBQ9Zz\\_cPShJ3Sl34qNEqwiHRBiZPK0?usp=drive link](https://drive.google.com/drive/folders/1TuBQ9Zz_cPShJ3Sl34qNEqwiHRBiZPK0?usp=drive link)



