

# Campus Flow

A functional installation for a better, more interactive way to navigate campus.

*Installation: 2023 - 2024*

*DXARTS 200 Spring 2023*

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# Campus Flow

2023 - 2024

A functional, kinetic, and interactive maps installation for helping visitors and students navigate UW campus.

**Dimensions:** 3 x 1.5 x 8 feet installations. Multiple installations placed around campus.

**Materials:** 360 2" transfective color displays, 400 servo motors, 1 compute unit (Raspberry Pi 4 or equivalent), 7 microcontrollers (Arduino Due), short range proximity sensors, 360° camera, multiple RGB LED light strips, reflectors, extruded aluminum, frosted glass, weatherproof sealing, various 3D printed and custom manufactured components.

**Location:** Installed as replacements to the current campus maps/directories located across UW Seattle campus.

## Project Description

Delivering navigation information is both an art and a science. Complicated and intricate location information needs to be delivered in a simple and pleasant manner. And to be useful, there needs to be many directories placed around in strategic locations around an area. However, directories often look like immense monoliths that are often an eye-sore to the architecture of the space. Campus Flow, an improved take on the traditional directory map, introduces an interactive 3D interface that enhances the mapping experience and provides a

friendlier interface. The display is a mosaic of smaller screen tiles that come together to form 1 larger display. With servos, the tiles can dynamically be pushed above the image plane to provide depth information and highlight landmarks for navigation. This moving display provides a new dimension for information, as it can show traffic conditions in the speed of the tile's movement and act as tactile input for users. Since all the map information is displayed on a screen, the map can be dynamic and show various location as well as zoom in and out. It can also provide walking directions.

To improve upon the metal monolith design often used, Campus Flow installations are instead constructed with frosted glass panels on servo motors and colored light strips. In conjunction with proximity sensors, the installation comes alive with movement and color, reacting to its surroundings and blending/adapting its movement to match its natural surroundings when not in use. At night or in poor lighting, the lights in the installation can act as waypoints to help guide visitors and students alike. This design approach aims to overcome the visual monotony of traditional directories, providing an aesthetically pleasing and harmonious addition to the campus environment.

Campus Flow draws inspiration from various works by artists in the space of robotics, machine art, and data-driven art. Similar to Jean Tinguely's art, which emphasizes kinetic movement and differentiates itself from static and "silent" artwork in a sterile gallery, Campus Flow is designed to be constantly moving and flowing with both its surroundings and its interactivity. The reactive and flow-y behavior of Campus Flow installations is reminiscent of Edward Ihnatowicz's *Senster* and Ricardo O'Nascimento & Ebru Kurbak's *Feather Tales*. Since installations are placed in real environments instead of galleries, Campus Flow installations'

movements must be in tune with its surroundings to behave naturally and blend in. Traffic flow on campus is also visualized through encoded data from livestream cameras and the built-in 360° camera. This fusion of information algorithmically generates a traffic map and directional flow of people moving about on campus, displayed both visually and in the movement of the display tiles.

Campus Flow is a multi-featured kinetic installation that serves as an informative campus directory for visitors, a quick way for students to understand crowded locations on campus, and a safety system for navigating campus at night or in low visibility. It accomplishes all of this while blending its appearance with its surroundings and reacting to interactions, avoiding the metallic monoliths commonly seen as directories on campuses today. By combining innovative technology, interactive design, and artistic inspiration, Campus Flow revolutionizes the way navigation information is presented, creating a seamless and engaging experience for users while enhancing the aesthetics of the space.

## About the Artist

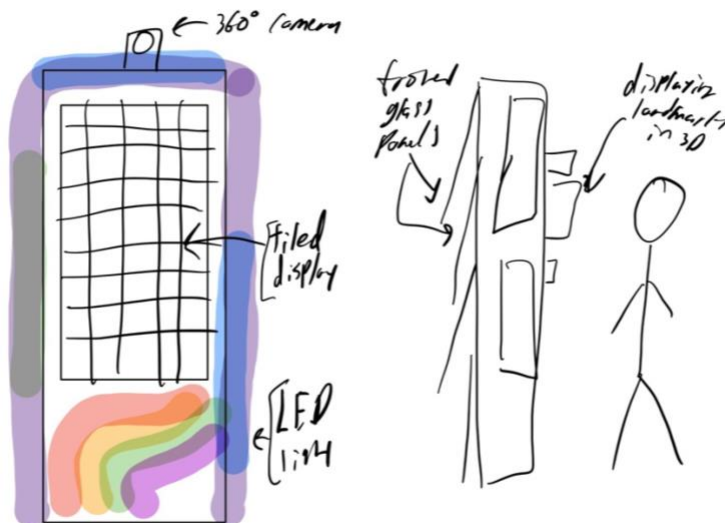
**Kenneth Yang** (b. 2002) is a Taiwanese American born in California and currently resides in Washington State. He is a computer science student at the University of Washington Seattle, specializing in computer graphics and human-computer interactions. He also works in a neuroscience lab, building interactive brain visualizations and robotic tools for surgeries and experiments. As an artist, Kenneth combines visual aesthetics from digital art with a focus on functional purpose. Constantly seeking problems to solve and ways to improve existing solutions, he pushes the boundaries of art and technology. Bridging the gap between science and art, Kenneth's work is both visually captivating and practical. With a relentless drive for innovation, he challenges conventions and explores new possibilities at the intersection of art and technology, constantly striving to create impactful and harmonious pieces.

## Design Visualizations



The goal of Campus flow is to replace these stands that display a static map of the campus. They are located around campus.

Instead, there will be a system like this:



With a dynamic 3D display, an interactive map can be displayed with building popping out of the display and fluttering movement on the tiles to show the flow of pedestrian traffic. The side panels will also move and flutter along with the lights that

will move and “breathe” making the display be more natural and less a static metal monolith. The sensor array, hidden within the glass will be used to detect the surroundings and interact with it such as awake when a visitor comes up to the display and match the colors of the surroundings when people are simply passing by. The lights can also be used as location beacons.

## Materials

Item	Count
<b>2" Transflective Color Display</b>	360
<b>Servo motors</b>	400
<b>Compute Unit (for display and sensor fusion)</b>	1
<b>Microcontroller (for servos and LEDs)</b>	7
<b>Short range proximity sensors</b>	4
<b>360° camera</b>	1
<b>RGB LED light strips</b>	8
<b>Frosted glass panes (various sizes)</b>	40 varied plates combined
<b>Extruded aluminum</b>	Used as needed for frame
<b>Weatherproof sealing</b>	As needed
<b>3D printed components</b>	As needed to support 3D display



## References and Bibliography

Graham, Dan, *Present Continuous past(s)*, 1974

Ihnatowicz, Edward, *Senster*, 1970

O’Nascimento, Ricardo and Kurbak Ebru, *Feather Tales*, 2012

The last two pieces were great influences on this project. They were examples of using sensors to drive interactivity and make kinetic/robotic pieces flow naturally with their environment. This was the general backbone to the artistic design of Campus Flow. The functional aspects and sensor fusion via computer vision and monitoring traffic was inspired by Graham’s *Present Continuous past(s)*

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