



# Communicating High Frequency Water Monitoring Data Through Art

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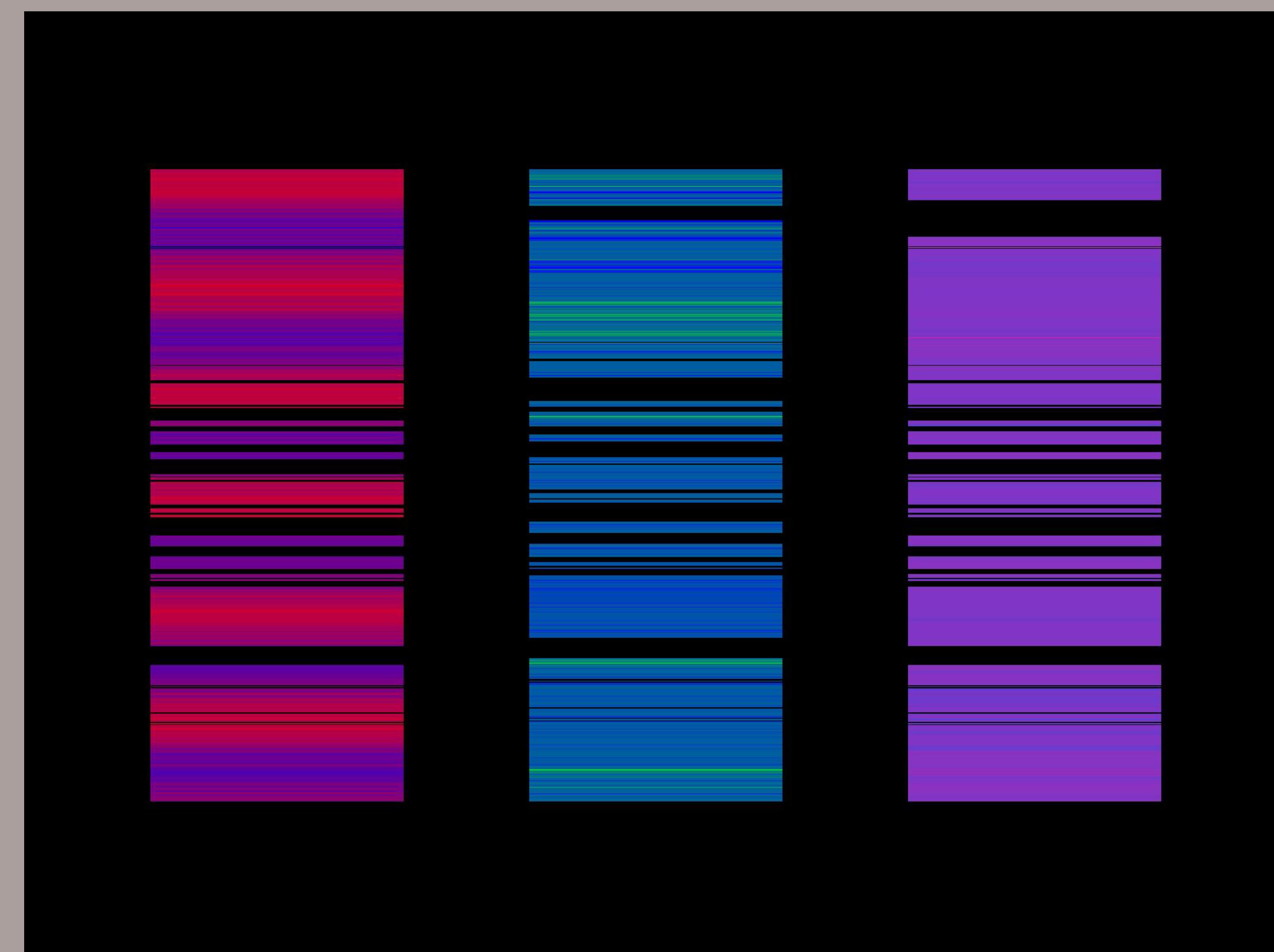
## Title: "Data Bars"

**Data Represented:** An artistic yet direct comparison between up to three different values. This example utilizes hourly averages from 2016-2022.

**Interpretation Instructions:** To view this piece chronologically, look at the bar from bottom to top. The gaps in the bar represent times in which data was not available. This usually was due to sensors being damaged or the system going temporarily offline.

**Art Generator Option:** "--DataBars"

**More Information:** In this image, the three bars represent water temperature, salinity, and dissolved oxygen, respectively. Users can choose up to three different values to display. For each of these bars, they may select a cool and a warm color to represent when the data points are close to the minimum and close to the maximum. The ColorGenerator will automatically calculate the gradient of colors that makes up the bar.



## Introduction

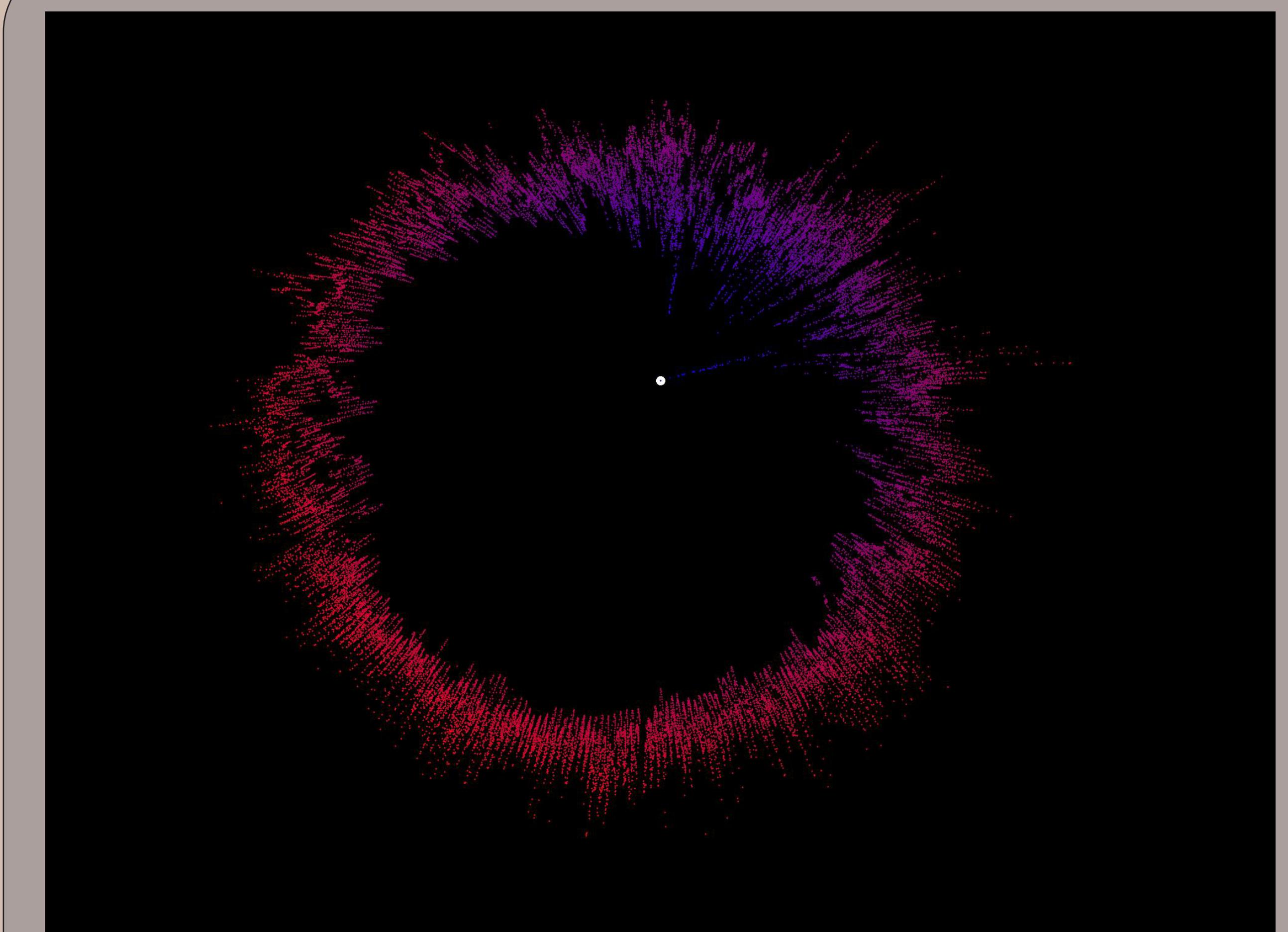
New, smart in situ sensor technologies have become widely used for monitoring and assessment of water systems that are affected by human activities. However, the large, high frequency monitoring data sets collected are often static, stored in data portals that are only of interest to scientists, and intended to be published in highly technical journals. These environmental data sets are rarely used to communicate in relatable format, resulting in emotional disconnections between the science and the general public. For this project, we built an art generator tool that uses the LEWAS lab data to create digital art pieces that communicate the collected high frequency water quality monitoring data to the general public.

## Objectives

- Raise public awareness of environmental impacts of urban activities on local surface water quality.
- Inspire public, active participation in protecting the environment.



Two of these options, a Salinity Circle and Temperature Circle, appear superimposed on the new art board installed on-site at Stroubles Creek. This, with an accompanying explanatory paragraph and QR code, is intended to draw public attention and thus increase awareness about water quality.



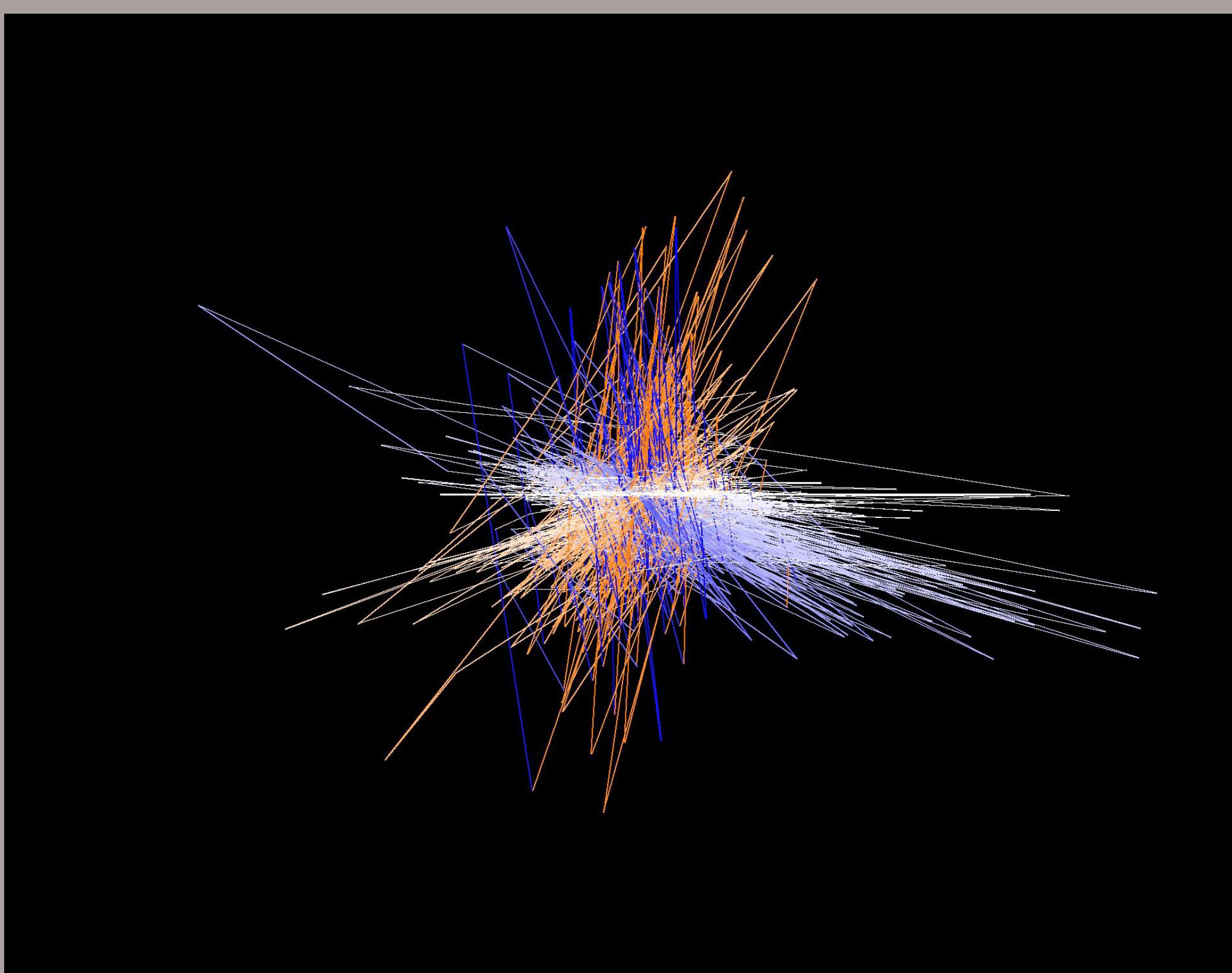
## Title: "Temperature Circle"

**Data Represented:** Changes in water temperature throughout a year. This image is an overlay of hourly averages from 2016-2022.

**Interpretation Instructions:** The top of the circle, or the 12:00 position on a clock, represents January 1st. As we view the piece in a clockwise manner, the year progresses. Thus, 6:00 is June, and 11:59 is December 31st.

**Art Generator Option:** "--TemperatureCircle"

**More Information:** Radial position and color are both determined by the temperature value. The radius is calculated by determining how a given value relates to the minimum and maximum values of the dataset. If the given value is close to the maximum, it will be displayed far from the origin and will be colored close to the 'warm' color. If the given value is close to the minimum, it will be displayed close to the origin and will be close to the 'cool' color.



## Title: "Line Graph"

**Data Represented:** An abstract relation between two arbitrary values taken over a given timespan. In this example, the x-axis value is water temperature and the y-axis value is salinity. This represents hourly averages from 2016-2022.

**Interpretation Instructions:** Points in the top left of the canvas saw a decrease in water temperature but an increase in salinity from the last reading. Points in the bottom left saw a decrease in both. Points in the bottom right of the canvas saw an increase in water temperature but a decrease in salinity. Points in the top right of the canvas saw an increase in both metrics. Points close to the origin saw very little change from the previous reading, and points far away saw significant changes.

**Art Generator Option:** "--LineGraph"

**More Information:** This piece of art is unique because it is not generated based on the values, but the differences in values. If a given point has a higher water temperature reading than the previous value, the point will be plotted somewhere on the right of the canvas. If the salinity is higher than previously, the point will be plotted somewhere on the top half of the canvas.

## Title: "Salinity Circle"

**Data Represented:** Changes in salinity throughout the year. This image is also an overlay of hourly averages from 2016-2022.

**Interpretation Instructions:** Similar to "Temperature Circle," the top of the piece represents January 1st, and the piece can be read clockwise such that June 30th is the bottom of the piece.

**Art Generator Option:** "--SalinityCircle"

**More Information:** This piece is generated with the same algorithms as "Temperature Circle," but it deserves its own piece because of its uniqueness. "Salinity Circle" reveals an important aspect about unnatural salinity spikes in the creek. They appear to be concentrated around the top of the piece, which represents the December-February months. This is due to a high usage of road salt during the winter months. This salt washes off the roads and into the watershed, creating the toxic salinity spikes at the top of the art piece. To learn more about these spikes and how to reduce them, see the on-site art board.

