

## Stellar Canvas: A Lucid Observatory

### Artist Statement

The night sky has always been humanity's original canvas, a chaotic scattering of light that our ancestors felt compelled to organize into shapes, stories, and gods. We all share that universal moment of looking up, overwhelmed by the vastness, tracing a vague pattern with our eyes and wondering, *"Is that something? Or is it just stars?"* My semester project, *Stellar Canvas*, was born from that exact moment of curiosity. It is an interactive web experience designed to bridge the gap between our idle doodles and the ancient geometry of the cosmos, transforming the cold abstraction of data into a playful, tactile discovery.

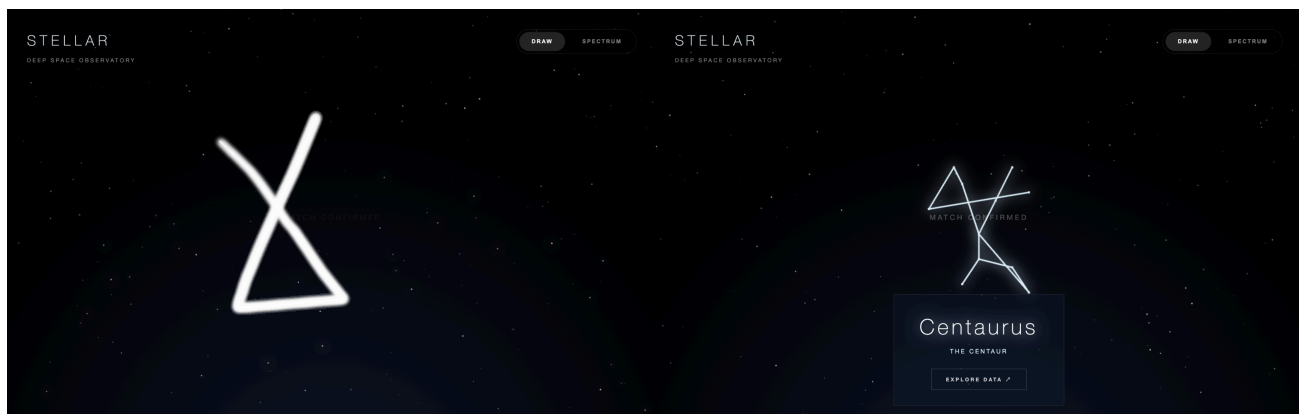
Github: <https://github.com/FredaPeng/Astro-canvas>

### The Vision and Inspiration

My primary inspiration for this piece was the Chrome Experiment "[Land Lines](#)," which matches user gestures to satellite imagery of rivers and roads. I found myself captivated by the idea of "data matching": the computer seeing a human squiggly line and finding a counterpart in the real world. However, while "Land Lines" looks down at the Earth, I wanted to look up.

I realized that learning astronomy often feels academic and rigid. Textbooks show us the constellations as static, perfect diagrams. But in reality, stargazing is messy; it relies on our imperfect perception. I wanted to create a digital space that embraces that imperfection. My vision was to build a "Lucid Observatory"—a user interface that feels transparent, ethereal, and glass-like, removing the heavy clutter of traditional educational sites and focusing purely on the interaction between the hand and the stars.

### The Creative Process: Drawing and Discovery

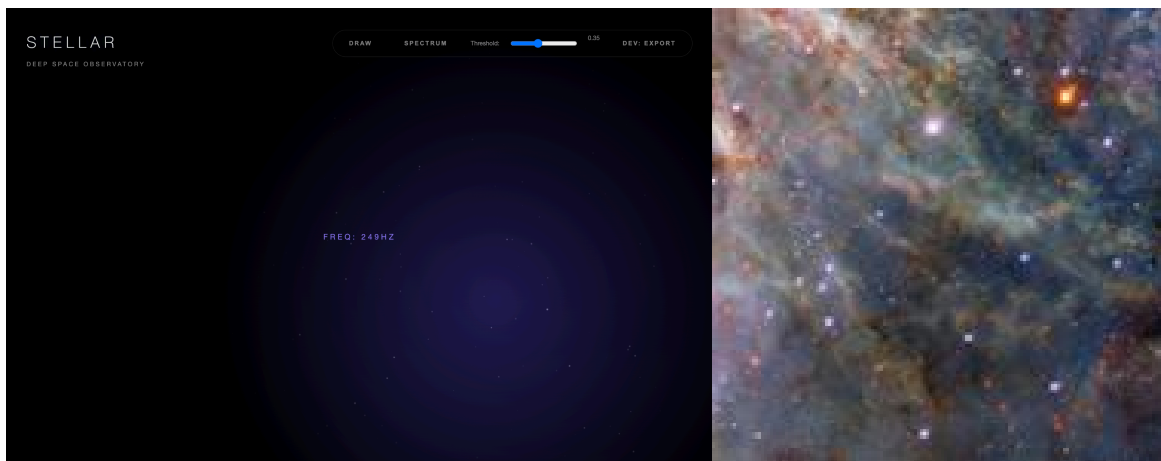


<https://noirlab.edu/public/education/constellations/centaurus/>

The core of Stellar Canvas is the "Draw Mode." The user is invited to draw a simple line or shape on the screen. It is an invitation to play, mimicking the way we absentmindedly trace patterns in the air. Through the use of a geometric resampling algorithm (specifically the \$1 Unistroke Recognizer), the system analyzes the user's imperfect gesture (angles, velocity, curvature) and instantly "snaps" it to the nearest matching constellation in the database.

This was a deliberate artistic choice: to validate the user's input. By turning a shaky mouse movement into the precise geometry of *Orion* or *Cassiopeia*, the project creates a sense of collaboration between the user and the universe. It serves as a digital metaphor for how humanity imposes order on chaos. To ensure accuracy and educational depth, the system pulls vector data from the 88 IAU constellations and links directly to the NOIRLab database, grounding the artistic play in rigorous scientific fact.

### The Science of Color: The Cosmic Palette



<https://www.flickr.com/photos/nasahubble/54707528101/>

While the drawing mode addresses geometry, the "Spectrum Mode" addresses light. Astronomy is not just about shapes; it is about the physics of light, color temperatures, and the chemical compositions revealed through spectroscopy. I was inspired by the concept of Redshift and Blueshift on how the stretching or compressing of light waves tells us about the movement of celestial objects as well as the way telescopes like Hubble and James Webb map invisible wavelengths into visible color.

In this mode, I turned the screen into a navigable gradient. As the user moves across the X-axis, they traverse the visible spectrum from deep infrared-reds to ultraviolet-blues/purples. This is not merely an aesthetic choice; it simulates the way astronomers "tune" their instruments to look for specific frequencies.

When the user hovers over a specific frequency (or hue), the system reveals deep-space photography corresponding to that color palette, revealing the *Carina Nebula* in deep reds or the *Veil Nebula* in ionized blues. By double-clicking, the user "locks" the telescope, bringing the image into full focus. This interaction is designed to mimic the excitement of discovery. We often see these images as static JPEGs, but by forcing the user to "find" them within the color spectrum, I hope to impart a sense of how varied and colorful our universe actually is, driven by the scientific properties of the gases and dust that compose it.

Stellar Canvas is my attempt to make the universe feel smaller, friendlier, and more accessible. It suggests that the macrocosm of the galaxy and the microcosm of a hand-drawn line are not so different as they both follow paths, curves, and laws of geometry. By combining the "Land Lines" algorithm with astronomical data, I intended to create a tool that is as much a toy as it is a teacher. I want my audience to leave the experience feeling that the stars are not just distant lights to be admired from afar, but patterns that they can reach out, touch, and redraw with their own hands.