



Undergraduate student at **Rensselaer Polytechnic Institute** majoring in Applied Physics

Research · Computational Physics · UI/UX Design · Web & Software Development · DEI advocate

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## Research Experience

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2022 ***On the machine learning-assisted generation of Alcubierre-like spacetime metrics with consideration for use in interstellar travel***

Received Computer Science Award, Connecticut Science & Engineering Fair

I conducted theoretical analysis on the characteristics of the Alcubierre metric in General Relativity, which is of interest for advanced spacecraft propulsion, and examined its properties via computational visualizations. I then investigated the issues with high energy densities associated with the standard metric, and proposed a machine-learning based strategy to mitigate this issue.

## Current Research

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2024 ***Ultra-long-distance power transmission and space-based energy capture***

Space-based power collector swarms are a technology that may one day become a source of unlimited energy. However, their realization is dependent on the ability to conduct high-gain, high-power wireless energy transmission, which requires sophisticated modelling and engineering advances. With my team, I work on modelling electromagnetic power transmission by conducting finite-element simulations to solve computational electromagnetics problems.

## Past and Current Work

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Current **Head of Project Elara nonprofit**

I run Project Elara, a nonprofit organization whose mission is to work on research projects dedicated to the world. I am involved both with the research of Project Elara and its organization and planning, and coordinate a team of 6 other members.

Current **Member of the RPI Physics DEI Taskforce**

At Rensselaer, I am actively involved in the RPI Physics DEI Taskforce, through which I want to make sure equal recognition and treatment is given to all physicists and physics students, regardless of their identity or background. I work on planning events to make other students and faculty more aware of the DEI Taskforce, as well as creating designs and managing its website.

## Past and Current Work continued

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Current    **Community administrator and designer to the Natron project**

I am a community contributor and designer for [Natron](#), an open-source compositing software for digital artists. As part of my work, I have been participating in a 3-year development effort for the upcoming launch of the completely redesigned Natron website. In association with my co-designer, I am also working towards a visual interface redesign for the software.

Past    **Designer and contributor to Mewa**

I was previously a contributor to [Mewa](#), a motion graphics and animation software, for which I worked on the design of its visual components, set up an infrastructure for UI/UX design improvements, and redesigned the interface of its online plugin store.

## Software Development Portfolio

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**Elara GFX** |

A general-purpose library for GPU programming and GPU-accelerated rendering using OpenGL

**Elara Math** |

A math library for automatic differentiation, N-dimensional arrays, and neural networks, written in Rust

**Light of Hope** |

An open-source web player for comforting music pieces, all originally-composed and freely-available

## Skills

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**Python**    I am fluent in Python programming, including Python for scripting, server-side web applications, scientific computing, data visualization, and general-purpose programming.

**HTML/CSS/JS**    I have designed and developed websites and web applications, and can write client-side JavaScript, work with static site generators, style elements with CSS or Sass, and prepare modern, responsive, accessible websites.

**Rust**    I am familiar with the Rust language, and have written several scientific computing libraries in Rust. In addition, I can develop utility tools, scientific tools, and command-line applications in Rust.

**Digital design**    I use Figma frequently and am proficient in working on UI/UX design in Figma. I can also do icon designs, poster designs, and vector art in Figma or Inkscape, as well as cinematic renderings and short animations using Blender.