

Joel Samuel Rhine Senior Software Engineer

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Work Experience:

Senior Software Engineer | The World Bank, Washington, DC

May 2024 – Present

- Developed end-end automated pipeline to fetch Sentinel-1 data, integrated with **GCS** Drive API and Desktop API with **Python** improving processing time by 90%.
- Developed detailed docs with **reStructuredText** and **Sphinx** on **ReadTheDocs** - mosaicbuilder.rtfid.io
- Implemented batching algorithm and error handling ensuring efficient processing.

Applied Python, Jupyter, Spark, Sphinx, GCS, ReadTheDocs, GitHub CI/CD, Data Analysis.

Senior Software Engineer | Development Monitors, Arlington, VA

May 2019 – Apr 2024

- Architected and led development of ARTEMIS Desktop – end-end Geo. Asset Management **system design**; deployed in two pilot cities, introducing city-wide monitoring and reducing manual time by ~90% with **QT**, **Python**, **PostgreSQL** and **KoBoToolbox** for data collection/validation.
- Developed scalable **PostgreSQL (PostGIS)** schema based on **EPANET** (US EPA) allowing cross-platform compatibility.
- Created GIS data formats (geojson, shapefile) from **PostgreSQL**. Visualized water network and interacted using **PyQGIS**.
- Integrated **Claude LLM** to create ARTEMIS AI, improving user engagement by 30% via function prompts.
- Architected end-end **system design** and led development of ARTEMIS 3D Hazard Mapping Application, visualizing areas of interest in 3D and overlaid with flooding data using **ReactJS**, **ThreeJS**, **NodeJS**, **Flask**, **Python**, **PostgreSQL**, **Docker** and **AWS (RDS, ECS, EC2, S3, CI/CD with AWS Code Pipeline)**.
- Developed backend pipeline to fetch satellite imagery, building footprints, elevation data in **Python** and render in 3D with **ThreeJS**, improving stakeholder engagement by 20% and reducing manual time by 75%.
- Architected **system design** and developed ARTEMIS 2D to automate flooding infrastructure identification with **ReactJS**, **NodeJS**, **Flask**, **Python**, **Docker** and **AWS (RDS, ECS, EC2, S3, CI/CD with AWS Code Pipeline)**. Successfully tested in Blacksburg, VA estimating 5 million in losses due to 2019 flooding.
- Managed and trained **machine learning models** to enhance satellite imagery resolution by 55% and digitize building footprints achieving 80% IOU resulting in 76% increase in speed in **Python**.
- Led and managed cross-functional teams and internship programs. Developed technical documentation, reports and proposals leading to 6 project awards.

Applied React, ThreeJS, Python, PostgreSQL, Flask, Spark, AWS, Docker, AI Agents, ML, MS Teams, Draw IO.

Full-Stack Projects:

Tresses Salon DC, tresses.us | **ReactJS**, **NodeJS**, **Typescript**, **MongoDB**, **Square**, **Figma**, **Asana**.

- Led development of responsive E-Commerce Website to view and schedule hair salon services and purchase products, resulting in 20% increase in customer bookings and revenue increase by 30%.
- Architected **system design** with **Figma** boards to create responsive UI mockups and **Asana** for task management.

YouTube Clone, github.com/rhinejoel/youtube-clone | **NextJS**, **Docker**, **TS**, **Express**, **GCS**, **Vercel**.

- Youtube clone built with **NextJS**, **Typescript**, **Express**, **Docker** and **Vercel**.
- Developed REST API interacting with **GCS Cloud Run**, **Storage Buckets**, **Pub-Sub** and **Firebase**.

Skills:

Backend: Python, JavaScript, Node, AWS, GCS **Frontend:** ReactJS, ThreeJS, HTML, CSS, JavaScript

Tech: ReadTheDocs, Git, CI/CD, Docker, Jupyter, PostgreSQL, Spark, Pandas

Certifications: Part 107 Remote Pilot (Drone Pilot), AWS CCP-Ongoing **Languages:** English (fluent)

Education:

George Washington University, Washington, DC. May 2019. (**GPA 3.52**) M.S. in Mechanical Engineering

Don Bosco Institute of Tech., Mumbai University, Mumbai, India. April 2016. B.S. in Mechanical Engineering