Justin Florence

919-698-4459 | jrfloren@ncsu.edu | https://www.linkedin.com/in/justin-florence | https://justinFlorence.github.io

Education

North Carolina State University — Raleigh, North Carolina
Bachelor of Science in Applied Math, Physics — *Aug. 2021 – May 2026*

- Relevant Courses: Numerical Methods, Mathematical Modelling, Fluid Dynamics

Technical Skills

Languages: Java, Python, C/C++, SQL, JavaScript, HTML/CSS, R, Fortran, Matlab, Julia
Commercial Software products: Ansys Electronics, COMSOL, MathWorks
Frameworks: React, Node.js, Flask, JUnit, WordPress
Operating Systems: Linux, Windows, MacOS, RedHat Enterprise Linux
Developer Tools: Git, Docker, LLMs, VS Code, Visual Studio, PyCharm, IntelliJ, Eclipse, AWS
Libraries: pandas, NumPy, Matplotlib, PyTorch,MPI,CUDA

Experience

Scientific Software Engineer Associate — May 2024 – Present
North Carolina Institute for Climate Studies — *Asheville, NC*

- Configured AWS EC2 instances and managed security groups, dynamically scaling computing power and storage to meet the demands of a large-scale weather model validation project.
- Developed and optimized Docker environments using Conda command-line arguments, selecting appropriate base images to accelerate data analysis workflows.
- Automated data retrieval from The National Space Science Technology Center and PRISM research group using NCARR, lftp, and private servers, handling large datasets in zip and netCDF formats.
- Streamlined data processing and statistical validation by storing real-world data in large text files and utilizing Python scripts for inferential statistical tests, enhancing the accuracy of model predictions.
- Enhanced a complex weather model by refining grid mesh points, integrating soil and precipitation data to improve the model's predictive capabilities.

Computational Physics Research Assistant — June. 2022 – August 2024
Laboratory for Laser Energetics — *Rochester, New York*

- Optimized CYGNUS hydrodynamic multiphysics simulations by implementing advanced numerical differentiation techniques and grid-specific adjustments, leading to more efficient computational resource allocation near pressure wavefronts.
- Created 3D and 2D visualizations of pressure gradients in fluid dynamics using Paraview, illustrating wavefront movements during laser ablations and enhancing the understanding of fluid behavior.
- Developed an iterative method to approximate the surface area of a target pellet using 180,000 data points, improving the accuracy of sphericity measurements in inertial confinement fusion simulations.
- Utilized custom Python and Matlab scripts to visualize solid target pellets, assess areal density uniformity, and calculate neutron yields, contributing to a 15% increase in neutron yield and an eventual 40% improvement in overall fusion reaction efficiency.
- Streamlined computational processes by adjusting grid zone densities, focusing computational efforts where needed most, and reducing unnecessary runtime in less critical areas.

Projects

NFL Statistics Automation | *Python, Selenium, NFL API, Pandas, NumPy* — May 2024 – Present

- Developed a web scraping program using Selenium and NumPy to automate data extraction from NFL stats pages, overcoming dynamic content and anti-scraping measures by scraping directly from JavaScript and implementing access delays.
- Ranked NFL players by position-specific metrics, such as yards per carry for running backs and sacks for defensive ends, providing tailored insights based on player performance data.
- Automated data cleaning processes to exclude inactive or injured players, streamlining the dataset for more accurate analysis.
- Implemented a simple high dimensional linear regression model to predict player output based on height, weight, and position, using Python, NumPy, Selenium, Pandas, and the NFL API.