

Suhas Cristy Mathey

I completed my master's in electrical & computer engineering with a strong focus on Data Science, Signal Processing, and Machine Learning. My MS research involved developing Machine Learning algorithms for artwork analysis

[✉ Email](#) [🌐 website](#) [in ms-cristy](#) [🔄 Cristy210](#) [🎓 Google Scholar](#)

Education

Master of Science in Electrical & Computer Engineering | GPA: 3.67/4.0 Feb 2025
University of Delaware | Newark, DE
Thesis: [Hyperspectral Image Analysis via Subspace Clustering](#) [🔗](#)
Bachelor of Technology in Electronics & Communication Engineering | GPA: 7.21/10.0 May 2021
Indian Institute of Information Technology, Tiruchirappalli | India

Experience

Graduate Research Assistant Feb 2024 – May 2025
University of Delaware - Electrical & Computer Engineering Newark, DE, US

- Worked on an inter-disciplinary project in Hyperspectral Image Analysis using **Unsupervised Learning** techniques.
- Utilized matrix decomposition techniques from linear algebra to handle high-dimensional image data, transforming it into lower-dimensional subspaces for efficient **Image analysis & Processing**.
- Developed and implemented **machine learning algorithms** in Julia to cluster and analyze hyperspectral image datasets using unsupervised learning methods.
- **Presented** research findings through weekly lab meetings using data visualizations created using **CairoMakie**, focusing on clear and actionable insights from hyperspectral data analysis.
- Utilized **GitHub** for version control and continuous integration, managing branching strategies, and ensuring efficient collaboration with the research team for end-to-end development workflow management.
- Co-developed a Julia **Software Package**, [SubspaceClustering.jl](#) [🔗](#), which implements various subspace-based clustering algorithms for efficient analysis of high-dimensional data.
- Designed and implemented **unit tests** to verify algorithm robustness across different data types and dataset structures.

Computational Researcher Jan 2024 – Feb 2024
University of Delaware - Chemical Engineering Newark, DE, US

- Implemented algorithms in **Python** for advanced numerical computations and used CuPy to leverage GPU acceleration.
- **Developed** synthetic datasets using **Pandas**, enhancing ML models for accurate prediction of atomic scattering patterns.
- Engineered parallel processing solutions via **Thread Pool Executors** for computational efficiency.

Senior Multimedia Student Assistant Sept 2023 – Jan 2024
University of Delaware - Library, Museum & Press Newark, DE, US

- Led a team of 8 student assistants, helping faculty and students address their multimedia needs.
- Awarded the [2024 Library Student Assistant Scholarship award](#) [🔗](#) in recognition of my work and demonstrated leadership potential.

IT Field Support Technician Jan 2023 - Sep 2023
University of Delaware - IT Client Support & Services Newark, DE, US

- Provided IT support to the University's facilities department, comprising about 500-600 employees, and managed an average of 1300 client devices including iPhones, iPads, and Laptops.
- Configured local system network and installed security certificates to route client's devices to the university Wi-Fi.
- Imaged laptops and desktops to the client's needs through MDT and deployed them in their workspace.
- Maintained up-to-date customer records on TeamDynamix and interacted with customers through email, phone, and in person.

- Addressed domain problems on the university-owned laptops and managed the devices through Active Directory.
- Used TeamViewer to remote into clients' computers for troubleshooting purposes.

Assistant System Engineer
TATA Consultancy Services

Mar 2022 – Dec 2022
Chennai, IN

- Dealt with vulnerability assessment checks for the Citi Corp's networks and applications.
- Collaborated with a **global** team of 50 in consolidating client's applications security.
- Developed data sheets using advanced **Excel** tools to present data and communicate insights to the **clients**.

Projects

MS Research: Pigment Mapping in RIS Datasets via Subspace Clustering

in

Language: Julia

- **Developed and optimized** clustering algorithms in Julia and Python for pigment mapping, to enhance clustering performance and accuracy in hyperspectral **Reflectance Imaging Spectroscopy (RIS)** datasets.
- Achieved over **95% accuracy** in clustering results through the development and optimization of machine learning algorithms for spectral signature-based pigment identification in hyperspectral imaging datasets.
- Results from this project have been accepted for a keynote talk at **Techno Heritage 2024** and for poster presentation at **2024 IEEE Baltimore Technical Colloquium**, underlining the contribution to technical innovation in the field of Machine Learning and Signal Processing.

Hyperspectral Image Analysis - Unsupervised Learning

in

Language: Python, Julia, MATLAB

- Implemented clustering algorithms, including K-Means, Spectral Clustering, and K-Subspaces Clustering, for hyperspectral image analysis.
- Analyzed and classified hyperspectral datasets such as **Pavia, Salinas, Indian Pines, and Onera Satellite**, focusing on **spectral** and **spatial** feature clustering.
- Optimized clustering techniques to enhance accuracy in segmenting **high-dimensional** hyperspectral data.
- Developed scalable workflows to process and visualize results, aiding in comprehensive analysis and actionable insights from **hyperspectral imagery**.
- Developed interactive pluto notebooks and hosted static web-pages demonstrating the implementation of **K-Subspaces Clustering (KSS)** and **Threshold Subspace Clustering (TSC)** algorithms on remote sensing datasets.

Feature Engineering with Analytical Data – Dow Chemical (Spring 24)

in

Language: Python

- Implemented **regression models** to analyze spectroscopy datasets of different materials provided by **Dow Chemical**.
- Employed **peak finding** function from the **SciPy library** to accurately detect and pre-process key **spectral features**, improving the precision of data analysis.
- Implemented pre-processing strategies like **normalization** and **dimensionality reduction** to enhance the integrity of the data by minimizing noise and variability amongst the features.
- Leveraged **NumPy** and **SQL** for efficient data manipulation, **querying**, and **analysis** of large spectroscopy datasets, enabling seamless data extraction, pre-processing, and feature selection for **regression analysis**.
- Utilized statistical models, specifically linear regression, to link analytical data with polymer performance, establishing quantitative feature-performance relationships.
- Applied **PCA** to reduce dimensionality and for **feature selection**, simplifying complex high-dimensional data and enabling clearer insights into material behavior.
- Leveraged **Matplotlib** for advanced data visualization techniques, utilized **scree plots** for dimensionality reduction analysis and **parity plots** to evaluate model accuracy.

Biomolecular Identification Algorithm for Mass Spectrometry

in

Language: Julia

- Investigated **bio-informatics** methods for identifying several biological targets with minimal spectrum pre-processing needed.
- Implemented and compared **clustering algorithms**, including **K-Means**, **Spectral Clustering**, and **K-Subspaces Models**, to enhance the identification and classification of biological targets.

- Designed a robust pipeline for data **pre-processing, dimensionality reduction**, and clustering, optimizing the algorithm's accuracy and performance on bio-informatics datasets.
- Validated the algorithm's effectiveness on diverse datasets, demonstrating its adaptability and reliability in identifying bio-molecular targets across varying experimental conditions.

Smart Irrigation system using Internet of Things (IoT)

Language: C++

- **Designed** and **simulated** an IoT-based irrigation system using Proteus 8 Professional, focusing on circuit design and sensor integration.
- **Programmed** sensors in Arduino IDE to collect and analyze soil moisture data, transmitting real-time updates via a Wi-Fi module to optimize irrigation based on environmental conditions.
- **Performed** data analysis on sensor feedback to fine-tune water usage, addressing efficiency in water management.
- Developed a scalable system architecture, ensuring reliability and energy efficiency for continuous field use.
- Drafted detailed documentation covering essential details regarding components, materials, and system assembly, supporting seamless implementation and user accessibility.

Presentations & Talks

Udel GECE Hour – Graduate Student Seminar (Talk) Mapping Pigments in Reflectance Imaging Spectroscopy (RIS) Datasets via Subspace Clustering	Nov 1, 2024
2024 IEEE Baltimore Technical Colloquium Conference (Poster Session & Lightning Talk) Mapping Pigments in Reflectance Imaging Spectroscopy (RIS) Datasets via Subspace Clustering	Nov 2, 2024
Delaware Data Science & Darwin Computing Symposium (Poster Session & Lightning Talk) Mapping Pigments in Reflectance Imaging Spectroscopy (RIS) Datasets via Subspace Clustering	Feb 13, 2025

Awards & Scholarships

2024 Library Student Assistant Scholarship award <i>Recognized for leadership and excellence in supporting multimedia and digital services at the University of Delaware Library.</i>	2024
Graduate Research Assistant Scholarship <i>Awarded full tuition support and stipend for MS research - University of Delaware</i>	2024 – 2025

Community Service

Hope Worldwide Ltd

- Active volunteer in Hope Worldwide since freshman year in college
- Organized a volunteer event to renovate Hope Worldwide orphanage in Tiruchirapalli, India with 200+ participants.
- Organized a clean-up with about 50 people from the locality at White Clay Creek Park in Newark, DE

Hen Hacks, University of Delaware

- Participated in a 24-hour hackathon conducted by the University of Delaware.
- Built a website in improving financial literacy in underserved communities in Delaware.
- Successfully launched a website to facilitate the community in providing the best resources when it comes to looking out for a loan.