

# Allegra Allgeier

Website | [LinkedIn](#) | [allegra.aallgeier@gmail.com](mailto:allegra.aallgeier@gmail.com) | (470) 452-5131 | Dallas, TX

Aspiring data scientist (US citizen) temporarily abroad combining professional growth with relocation for family reasons.

## SKILLS

Programming Languages:	Python, SQL, MATLAB, R, Java
Tools:	PyTorch, pandas, scikit-learn, matplotlib, OpenCV, ONNX Runtime, git, bash, Docker
Concepts:	Data Science, Computer Vision, Deep Learning
Languages:	English, Japanese

## EXPERIENCE

**Researcher**, Brain Co., Ltd. | Nishiwaki, Japan

*Jan 2023 – present*

*Assisted the development of commercial computer vision systems by Brain Co.*

- Developed an instance segmentation data augmentation pipeline using OpenCV and a rectangle packing algorithm, improving the generation of an image and its masks from a manual rate of 7 to an automated 11300 images/hour.
- Increased the accuracy of a meal identification system from 85% to over 95% through identifying issues in the code.
- Implemented anomaly detection methods such as PatchCore, PaDim, and SPADE for potential use in food quality control.

*Assisted a major Japanese construction firm in automating tunnel drilling.*

- Visualized spatiotemporal data to show drill patterns, allowing the client to isolate select data for further analysis.
- Found a positive correlation between soil hardness and blast count, offering optimization insights for drilling strategy.
- Conducted a segmented data analysis by dividing the tunnel into six regions and calculating blast densities, revealing varying demands for, and informing the distribution of, blasts across regions.

**Graduate Teaching Assistant**, Georgia Institute of Technology | Atlanta, GA

*Aug 2020 – Dec 2022*

- Assisted undergraduate students with Integral Calculus and Linear Algebra through recitations and office hours.
- Awarded Outstanding Student Evaluations by the School of Mathematics in April 2022.

**Undergraduate Researcher**, University of California, Berkeley | Berkeley, CA

*Jun 2018 – Aug 2018*

- Researched and visualized hyperbolic polyhedra in Python during an REU in geometry and topology.
- Presented at the 2019 Nebraska Conference for Undergraduate Women in Mathematics and Kalamazoo College.

## SELECTED PROJECTS

### Convolutional Neural Networks

- Found that ResNet recognizes local patterns, instead of global object shapes, and exploit spurious correlations.
- Trained ResNet with transfer learning for object detection and performed data collection, cleaning, and annotation.
- Published the [main article](#) and a [follow-up article](#) through IEEE conferences in 2022.

### Credit Card Fraud Detection

- Balanced data with SMOTE and reduced dimensionality by filtering through variance/correlation and by PCA/MCA.
- Applied logistic regression, KNN, naïve Bayes, SVM, and decision tree and compared them by recall and F1 scores.

### Image Deblurring and Denoising

- Deblurred and denoised images through total variation minimization using FFT and conjugate gradient descent.

### Computer Vision

- Matched features by implementing the Harris corner detector and a simplified SIFT; estimated the homography matrix for panorama stitching using RANSAC; and trained the PSPNet for semantic segmentation.

## EDUCATION

**Georgia Institute of Technology** | Atlanta, GA

*Dec 2022*

Master of Science in Electrical and Computer Engineering

Major GPA 4.00/4.00 – President's Fellowship

**Kalamazoo College** | Kalamazoo, MI

*Jun 2019*

Bachelor of Arts in Mathematics

GPA 3.97/4.00 – Summa Cum Laude with Honors