

Jesse Anderson

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Education

University of Illinois at Urbana Champaign

Chicago, IL

Master of Computer Science

August 2025

- **GPA:** 4.00
- **Relevant Coursework:** Applied Machine Learning, Practical Statistical Learning, Distributed Systems, Methods of Applied Statistics, Cloud Computing Applications, Database Systems, Scientific Visualization, Data Cleaning

University of Illinois at Chicago

Chicago, IL

Bachelor of Science in Chemical Engineering

May 2023

Minor in Mathematics and Computer Science

- **GPA:** Major 3.82 | Minor 3.78 | Cumulative 3.77
- **Concentrations:** Process Automation and Biochemical Engineering
- **Relevant Mathematics and Computer Science Coursework:** Data Structures, Discrete Math, Linear Algebra, Industrial Math & Computation
- **Relevant Chemical Engineering Coursework:** Calculus I/II/III, Differential Equations, Computational Methods in ChE, Chemical Reaction Engineering, Programming for Engineers with MATLAB

College of DuPage

Glen Ellyn, IL

Associate's in Science

August 2019

- GPA: 3.64

Work Experience

Independent

July 2024-Present

Independent Software Consultant

- Architect, code, and deliver scalable IoT, data, and machine-learning systems for startups, research teams, and small businesses(~8-20 hrs/wk billable).
- Engineer low-power IoT networks with ESP32(C++/ESP-IDF, MicroPython), MQTT, and multi sensor arrays(climate monitoring), achieving 99.9% data uptime on mesh + local-first edge deployments.
- Design and deploy cloud-native pipelines on AWS(EKS, S3, Lambda) and self-hosted Kubernetes, cutting release cycle time 43% via Docker based CI/CD(Github Actions, Terraform).
- Build real time analytics dashboards ingesting sensor data, municipal data, and customer data.
- Deliver ML workflows(feature engineering, XGBoost, Random Forest, SHAP explainability..) boosting forecasting accuracy +/- 8 RMSE -> +/- 2 RMSE for environmental KPIs.
- Optimize multi-model data stores(Neo4j, MongoDB, MySQL); implemented schema versioning & backup automation, reducing recovery RTO from 120 min to 15 min.
- Write maintainable code across Python, C++, Javascript, Bash; enforce ~80%+ test coverage(pytest, Google Test) and automated static analysis(SonarQube, clang-tidy).

UL Solutions

June 2023-April 2024

Engineer

- Design automation software in Python and VBA to eliminate 500+ hours of tedious workflows annually.
- Develop Python software with OpenCV/PyMuPDF to automatically detect and alert engineers of changes in CAD files.
- Establish ETL pipeline to reduce redundant analytical tasks by 240-555 hours per year dependent on incoming work.
- Determine project scope, preliminary plan of investigation, and project specifications to initiate technical projects in testing and verification of products to UL's standards.

United Conveyor Corporation

May 2022- August 2022

Summer Engineering Intern

- Pioneered software to automate 150 hours/yr of data entry, comparison and analysis tasks.
- Developed software to improve analysis workflow bottleneck by 540,000% by eliminating manual data entry.
- Developed a software library for analyzing thermoplastic and thermoset properties to ASME/AWWA/PPI standards.

University of Illinois at Chicago

August 2020-December 2021

Peer Leader, Calculus Based Physics

- Ensured student success in Calculus-Based Physics (Mechanics) via one-on-one and group tutoring through online platforms (Blackboard, Zoom) with a focus on problem solving methodology.
- Developed an automated attendance analytics program to measure student attrition in Physics I.

G5 Environmental

June 2016 - August 2019

Safety/Project Manager

- Served as project lead at job sites by ensuring completion of contract requirements by CDL team members.
- Ensured safe execution of any mechanical repairs by mechanics.
- Acquired parts on an as needed basis to ensure that contracts serviced did not experience time offline

Technical Skills

Computational Skills:

- **Programming Languages:** MATLAB, Python, R, C++, Julia, VBA, VB.NET, FORTRAN, CUDA, JavaScript, HTML, CSS, Shell Scripting, Bash
- **Software & Tools:** SuperPro, Aspen Plus, SnapGene, Power BI, Tableau, Git, Markdown, SQL (MongoDB/PostgreSQL/MySQL), OpenCV, PyMuPDF, PyTorch, Flask, BeautifulSoup, Jupyter Notebook, Anaconda, Docker, Kubernetes
- **Machine Learning & AI:** Classification, Regression, Clustering, CNN, RNN, NLP, LLM (local/API), Denoising Autoencoder, Variational Autoencoder, Generative Adversarial Network (GAN), TensorFlow, Keras, PyTorch
- **Data Science & Analysis:** Pandas, sklearn, numpy, ETL Pipelines, Data Visualization, Matplotlib, Seaborn, Plotly, Scipy, Grafana

- **Cloud & APIs:** Google Cloud Platform (GCP), Amazon Web Services (AWS), pyMongo, PostgreSQL, SQLite3, RESTful APIs
- **IoT & Hardware:** Raspberry Pi, Arduino, ESP32, Circuit Design, Blueprint Interpretation, Parts Diagram Reading, Sensors (DHT11, DHT22, BMP180,...)
- **DevOps & CI/CD:** GitHub Actions, Cronjobs

Additional Skills:

- Strong problem-solving and analytical skills
- Translating business requirements into actionable deliverables
- Developing automation workflows from engineering input

Projects

[Oak Park Crime Tracking](#)**[December 2024]**

Developed an ETL pipeline to parse Oak Park crimes and place into a Folium static web application to track crimes over time. Updated daily using a raspberry pi, pushed to a weekly mailing list, and NLP enabled to determine commonalities across incidents.

[Pi Environmental Monitor Interactive Database](#)**[May 2024]**

Developed a web-based ETL pipeline to monitor and visualize environmental data using a Raspberry Pi and DHT11 sensor. Collected data was pushed to MongoDB, PostgreSQL, ThingSpeak, and Google Sheets. The web interface dynamically displayed real-time temperature and humidity data in tabular and graphical formats.

[VAE-GAN](#)**[University of Illinois at Urbana-Champaign][April 2024-May 2024]**

Train a Variational AutoEncoder Generative Adversarial Network to generate images from the MNIST dataset prior to training a Denoising Autoencoder, Variational Autoencoder, and Generative Adversarial Network.

Research Experience

University of Illinois at Chicago

December 2020 - June 2023

Undergraduate Research

Principal Investigator: [Dr. Ying Samuel Hu](#)

- Authored novel software in MATLAB, R, and Python for image and computational analysis of single molecule localization microscopy images.
- Utilized clustering algorithms (DBSCAN/OPTICS/Ripley's K) to determine spatiotemporal properties of single-molecule localizations.
- Published in a variety of journals including Scientific Reports, Bioconjugate Chemistry, and Biophysical Journal.
- Optimized existing numerical algorithms to decrease the time it takes for a bottlenecked lab operation by 267%.

[Senior Design Project](#)

August 2023-May 2023

Mentors: Dr. Betul Bilgin and Dennis O'Brien

Project Name: "From Waste to Wonder: Bacterial Synthesis of 1,3-Propanediol from Crude Glycerol"

- Researched the chemistry of an optimized bacterial strain, *Lactobacillus reuteri* CH53, that is capable of converting crude glycerol to 1,3-propanediol.
- Developed a quantitative model for reaction kinetics and total mass flow of reactants to achieve desired products.
- Simulated the batch and fed-batch portions(bioreactors, blending vessels) of the proposed process in SuperPro simulation software.
- Simulated the continuous portion(distillation) of the proposed process in Aspen Plus process simulation software.
- Won 1st prize at the University of Illinois at Chicago Engineering Senior Design Expo within the Chemical Engineering division.

Publications

- Ramseier, Neal T., Jing,H., **Anderson,J.**, et al. Superresolution Imaging Reveals the Spatial Organization of CD81 Microdomains in Regulating Membrane Signaling on Jurkat T Cell Microvilli, 8 Dec. 2024, <https://doi.org/10.1101/2024.12.07.627345>
- Gunasekara, Hirushi, et al. "Phalloidin-paint: Enhanced quantitative nanoscale imaging of F-Actin." Biophysical Journal, vol. 123, no. 18, Sept. 2024, pp. 3051–3064, <https://doi.org/10.1016/j.bpj.2024.07.003>
- Saed, B., Ramseyer, N., **Anderson, J.**, et al. "Increased vesicular dynamics and nanoscale clustering of IL-2 after T cell activation." Biophysical Journal, vol. 123, no. 15, Aug. 2024, pp. 2343–2353, <https://doi.org/10.1016/j.bpj.2024.03.029>
- Gunasekara, Hirushi, et al. Quantitative Superresolution Imaging of F-Actin in the Cell Body and Cytoskeletal Protrusions Using Phalloidin-Based Single-Molecule Labeling and Localization Microscopy, 6 Mar. 2024, <https://doi.org/10.1101/2024.03.04.583337>
- Gunasekara, H., Perera, T., **Anderson, J.**, Saed, B., Ramseyer, N., Keshta, N., Hu, Y. S. (2023). Superresolution imaging with single-antibody labeling. Bioconjugate Chemistry, 34(5), 825–833. <https://doi.org/10.1021/acs.bioconchem.3c00178>
- Gunasekara, H., Perera,T., **Anderson,J.**, et al. "Time-lapse single-molecule imaging revealed spatiotemporal antibody interaction dynamics in situ." Biophysical Journal, vol. 122, no. 3, Feb. 2023, <https://doi.org/10.1016/j.bpj.2022.11.856>
- Saed, B., Munaweera, R., **Anderson, J.** et al. Rapid statistical discrimination of fluorescence images of T cell receptors on immobilizing surfaces with different coating conditions. *Sci Rep* 11, 15488 (2021). <https://doi.org/10.1038/s41598-021-94730-3>

Certifications & Specializations

[Google Data Analytics Certificate](#)

Google

[Data Structures & Algorithms Specialization](#)

UC San Diego

[Google Project Management Certificate](#)

Google

[Fundamentals of Accelerated Computing with CUDA C/C++](#)

Nvidia

Lean Six Sigma - Yellow Belt

UL