

Ross J. Lee

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SUMMARY

Research Engineer/Scientist with 3+ years building intelligent systems across nuclear security and startup environments. Proven record designing AI systems for anomaly detection, sensor fusion, and pipelines in edge robotics and automated systems. Former Los Alamos National Laboratory engineer; founder of Limonata, an AI/Automation company. U.S. Citizen; eligible for Top Secret or Q clearance. Open to relocation to San Francisco/New York City/Boston. Strong builder mindset and “figure-it-out” attitude.

CORE COMPETENCIES

Programming: Python, Rust, C++, OpenCV, PyTorch, scikit-learn, PyVista, Burn, Kornia, Linux, GitLab CI/CD

Nuclear Security & Analysis: Nuclear Proliferation Detection, Threat Assessment (red-teaming), Capability-based Investment Planning, Multi-source Intelligence Data Integration, Nuclear Detection Technologies, Nuclear Materials Surveillance, NNSA Programs, Multi-modal Detection

ML/AI for Security Applications: Anomaly Detection, Computer Vision (YOLO, Detectron2, Mask R-CNN), Sensor Fusion (LiDAR), Embedded Systems, Advanced Pattern Recognition, Image Classifier (SVM, AlexNet)

PROFESSIONAL EXPERIENCE

Los Alamos National Laboratory

Los Alamos, NM

Research Engineer

June 2022 – July 2023

- **NNSA-Sponsored Nuclear Security R&D:** Contributed to the development of automated surveillance systems for plutonium container monitoring, participating in capability-based investment planning to enhance surveillance and pit manufacturing missions across LANL, LLNL, and Savannah National Laboratory
- **Advanced Nuclear Threat Detection:** Designed and deployed ML pipelines for SAVY-4000 plutonium container proliferation detection supporting DOE Manual 441.1-1 compliance:
 - Performed **Anomaly Detection** by implementing PaDiM and PatchCore algorithms, uplifting capability for detectron2/Mask R-CNN IoU scores by 17% in downstream segmentation
 - **Nuclear Dataset Development:** Red-teamed detection pipeline by simulating adversarial failure conditions on surrogate slip lid vessels to overcome inherent data sparsity, augmenting the dataset by 300%
 - Developed “EasyML” annotation tool for labeling defects, corrosion, and damage on nuclear storage containers, reducing annotation time by 200%+
 - **Multimodal Nuclear Detection:** Developed preprocessing pipelines for LiDAR point clouds, thermal imagery, and visual data using PyVista, enabling faster automated computation of indentation curvature radii by 15x
- **Nuclear Materials Analysis:** Architected and implemented a 1D U-Net in collaboration with UC Berkeley for automated segmentation of nuclear-grade steel stress-strain curves, supporting materials integrity assessment and evaluations

Limonata

Lehi, UT

Founder | Research Engineer/Scientist

August 2023 – Present

- **Midas Vision Platform:** Building perception/agentic LLM asynchronous selling and listing automation tool for eBay-style marketplaces using Rust
- **Reactor Control:** Integrated real-time feedback from pressure sensors, load cells, and thermocouples using MPC and PID control algorithms
- **Embedded Systems:** Programmed STM32 and Arduino-based microcontrollers to run low-latency control loops for pumps, valves, and heating elements. Designed systems for robustness in fluidic and thermal process environments and flight environments

PROJECTS

- **Limonata:** Python-Rust implemented open-source chemical reactor
- **Hermes:** Ridiculously fast asynchronous Rust SDK for eBay APIs (available on request)
- **ShieldingOptimizer:** Nuclear reactor shielding optimization in Python (see publication 2)

- **QCodonOptimizer:** NP-Hard codon optimization in Python on the D-Wave Chimera, benchmarked against genetic algorithm.

EDUCATION

Georgia Institute of Technology

Remote

M.S. Computer Science

2026

Key coursework: Artificial Intelligence Techniques for Robotics, Artificial Intelligence, Machine Learning, Deep Learning

Brigham Young University

Provo, UT

B.S. Chemical Engineering

2022

Key coursework: Nuclear Engineering Intro, Nuclear Reactor Transient Analysis, Fluid Dynamics, Heat and Mass Transfer, Thermodynamics, Safety Analysis, Statistics for Engineers, Machine Learning for Engineers, Process Control & Dynamics, Electrical Engineering

CERTIFICATIONS

Carnegie Mellon University

Pittsburgh, PA

School of Computer Science

2023

Machine Learning: Fundamentals and Algorithms
Deep Learning

RESEARCH EXPERIENCE

Brigham Young University

Provo, UT

Reactor Design Researcher | Reactor Design Group

2021 – 2022, 2023, 2024

Improved 3 regression approaches to predict temperature profiles of novel molten salt reactors by an average of 66%. Led a reactor design project to increase metric performance by 32% and reduce overfitting by 17%. Modeled Loss of Heat Sink (LOHS) for Sodium Fast Reactor.

University of Illinois

Champaign, IL

Quantum Computation Researcher

2021

Computed 20 statistically significant Hamiltonian scores to demonstrate the practicality of the annealing approach to quantum computing for the NP-hard codon degeneracy problem on SaRs-COV-19.

SELECTED PUBLICATIONS & AWARDS

- **Best Overall Paper (1/500+):** “Leveraging machine learning and imaging technology for autonomous container inspection” – WM Symposia Waste Management Symposia, 2023
- [1] T. Niu et al., “A Novel Machine Learning-Driven Approach to High Throughput Mechanical Testing,” JOM, vol. 77, no. 4, pp. 2121–2133, Jan. 2025, doi: 10.1007/s11837-024-07063-7.
 - [2] A. Larsen, R. Lee, C. Wilson, J. Hedengren, J. Benson, and M. Memmott, “Multi-objective optimization of molten salt microreactor shielding perturbations employing machine learning,” Nuclear Engineering and Design, vol. 426, p. 113372, Sep. 2024, doi: 10.1016/j.nucengdes.2024.113372.
 - [3] A. Larsen et al., “Optimization of passive modular molten salt microreactor geometric perturbations using machine learning,” Nuclear Engineering and Design, vol. 424, p. 113307, Aug. 2024, doi: 10.1016/j.nucengdes.2024.113307.
 - [4] R. Lee, R. Lee, S. Lukow, J. Hafen, D. Grow, and J. Gigax, “Enhancing Nuclear Material Storage Container Surveillance with Automation and Machine Learning Toolkits,” 2023.
 - [5] S. Lukow, R. Lee, J. Hafen, D. Grow, J. Gigax, and WM Symposia, Leveraging Machine Learning and Imaging Technologies for Autonomous Container Inspection - 23408. 2025.
 - [6] S. Lukow, R. Lee, D. Grow, and J. Gigax, Advancing Vision-based Feedback and Convolutional Neural Networks for Visual Outlier Detection. Office of Scientific, 2022. doi: 10.2172/1889960.
 - [7] S. Lukow, R. Lee, J. Gigax, and D. Grow, Improving Non-Destructive Detection Technology Through SAVY Feature Detection. Office of Scientific, 2022. doi: 10.2172/1884728.
 - [8] S. Lukow, R. Lee, D. Grow, and J. Gigax, A Demonstration of Intelligent Container Surveillance Using Stationary and Mobile Camera Platforms. Office of Scientific, 2022. doi: 10.2172/1889956.
- **TA of the Year**, 2019