

# Eleanor Rightley

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## Personal Profile

**Key Research Interests:** Machine Learning, Computer Vision, Image Processing, Robotics, Mechatronic Systems Design and Analysis, Educational Outreach

**Association and Society Memberships:** American Society of Mechanical Engineers (ASME), American Society of Civil Engineers (ASCE), Themed Entertainment Association (TEA), Institute of Electrical and Electronics Engineers (IEEE), IEEE Women in Engineering Society (IEEE WIES), IEEE Robotics and Automation Society (IEEE RAS)

**Certifications:** PCEP-30-02 Certified Entry-Level Python Programmer [Python Institute]

## Education

### 2024 – 2026: MS in Mechanical Engineering

**Specialization in** Intelligent and Mechatronic Systems

*New Mexico Institute of Mining and Technology*

Socorro, New Mexico

**Thesis:** Optimizing a Vision-Based Machine Learning Model To Enhance Interactivity of an Educational Robotic Figure (In Progress)

**Expected Completion Date:** July 2026

**Supervised by** Dr. Curtis O'Malley

**Current GPA:** 3.43/4.00

**Relevant Coursework:** Control System Design, Digital Image Processing, Microcontrollers, AI in Engineering, Advanced Manufacturing of Multifunctional Materials

### 2019 – 2024: BS in Mechanical Engineering

*New Mexico Institute of Mining and Technology*

Socorro, New Mexico

**Graduating GPA:** 3.29/4.00 (Honors)

**Relevant Coursework:** Electrical Engineering, Engineering Mathematics (Applied Linear Algebra), Mechatronics, Dynamic Systems and Controls, Design of Machine Elements

## Relevant Experience

### May 2025 – Dec 2025: Coordinator, Image Processing and Machine Learning Program

*New Mexico Institute of Mining and Technology and Air Force Research Lab (AFRL) STEM Academy*

- Developed a training program with the goal of providing a group of college students with knowledge and skills related to image processing and machine learning applications in order to create a program/curriculum for learners of all ages to develop skills in image processing and machine learning.
- Interviewed and hired a team of undergraduate and graduate students to participate in the training program as content developers.
- Provided hands-on training to content developers building their skills and knowledge of building and applying image processing techniques along with machine learning models to real-world applications.
- Held and ran bi-weekly and weekly re-occurring meetings with content developers.
- Met weekly with supervisors at AFRL STEM Academy to provide progress updates and presentations and receive real-time feedback on program content.
- Created and organized a Google Site to house the content created by Content Developers and myself for learners of all ages to use.
- Assigned weekly tasks to content developers to ensure the program was kept on schedule.
- Built and continuously updated a schedule for the continuation of the program.
- Worked side-by-side with content developers in creating content for teaching fundamentals of image processing and machine learning.
- Set-up and planned a wrap-up event attended by industry professionals, including AFRL engineers and various STEM outreach organizations, for the development team to share the finished learning program.

## **May 2024 – Mar 2024: Lead Design Engineer, Internal Culvert Inspection System**

*New Mexico Institute of Mining and Technology and New Mexico Department of Transportation*

- Led a team of mechanical and civil engineering students in the development of a complete system for use in internal inspections of two-foot diameter and larger culverts around New Mexico.
- Improved wire management of previous designs of the inspection robot, leading to decreased down-time of the system.
- Collaborated with current and past inspectors to determine aspects of the system that needed improvements.
- Performed multiple internal inspections with the inspection system to evaluate the system's performance.
- Ensured that the system, as a whole, was light-weight and hands-free in transportation to allow inspectors to easily transport the system between culverts.
- Designed the system to have multiple save-points of important inspection data to ensure no data was lost.

## **Academic Publications**

### **Developing a Robust Robotic Inspection System for Internal Inspections of Small Culverts**

International Conference on Transportation and Development 2025.

**Eleanor Rightley**, Wesley Cook, Claudia Mara D. Wilson, Curtis O'Malley, Isabel Morris.

## **Highlighted Projects**

### **Designing an Interactive Animatronic Dragon Figure for STEM Outreach Events | 2025 - 2026**

*New Mexico Institute of Mining and Technology*

- Sole designer of a simplified animatronic dragon figure for use in displaying engineering concepts applied to artistic projects meant to inspire young students visiting the New Mexico Tech (NMT) campus.
- Designed actuation points within the dragon figure to be easily recreated/mock-up in demonstrations to younger students.
- Designed a portable base for the dragon figure to allow for transportability of the figure to various spots around NMT campus.
- Performed material testing to determine the optimal materials and attachment methods for use on the exterior of the figure (skin, scales, etc.).
- Developed a machine learning (ML) model to examine the environment in front of the figure, determine the locations of people within the room, and output this information to the dragon's controls.
- Trained and tested a machine learning model that drove the movements of the dragon figure to enhance the interactivity of the figure with people within the room.

### **Design and Fabrication of a Robotics and Engineering Education Platform | 2025**

*New Mexico Institute of Mining and Technology*

- Lead designer of a wheeled robot system meant to provide a platform for a variety of robotics and engineering projects and activities.
- Designed the wheeled robot system to require minimal maintenance.
- Designed the wheeled robot system to be modular and be easily reconfigured for various tasks.
- Created technical documentation for the wheeled robot system detailing maintenance steps, troubleshooting tips, assembly instructions, and project ideas.

### **Simulation of Autonomous Drone Flight Using an Optimal Control Algorithm | 2024**

*New Mexico Institute of Mining and Technology*

- Researched the environmental factors that influence drone flight to incorporate into the computer simulation.
- Developed a physically accurate farmland simulation environment using Gazebo simulator.
- Wrote middleware code in ROS2 Humble for communication between the drone, in simulation, and the decisions made according to the optimal controls algorithm being studied.
- Configured ArduPilot software parameters within the Gazebo simulation to adapt the functionality of the simulated drone.

**For detailed descriptions of my previous projects, visit [www.eleanorrightley.com](http://www.eleanorrightley.com)!**

## **Skills**

**Programming Languages:** Python (15yrs), C/C++ (1yr), MATLAB (6yrs), Arduino IDE (6yrs), Assembly (1yr)

**Operating Systems:** Linux (Ubuntu) (15yrs), Linux (NVIDIA Jetpack) (6months), Linux (Raspberry Pi OS) (15yrs), Windows 11 (5yrs)

**Softwares and Packages:** SolidWorks (8yrs), ROS/ROS2 (5yrs), OnShape (4yrs), LabVIEW (3yrs), COMSOL (1yr), OpenCV (4yrs), TensorFlow (1yr), PyTorch (6months)

**Engineering Subjects:** Image Processing (3 years), Machine Learning (2 years), Sensor Technology (1 year), Leadership (5 years), Design for Manufacturability (4 years)

**Instrumentation and Hardware:** Arduino Microcontroller, ATmega328PB Microcontroller, Raspberry Pi, LiDAR, Intel RealSense Cameras, NI C-DAQ Chassis and Modules, NVIDIA Jetson Orin Nano Super Developer Board, NVIDIA Jetson AGX Orin Developer Board, Variable Power Supply, Multimeter

**Manufacturing:** Industrial 3-axis Mill, Industrial Metal Lathe, Horizontal and Vertical Metal Bandsaw, FDM 3D Printers, SLA 3D Printers, 2.5-axis CNC Router

## References

### **Dr. Curtis O'Malley**

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New Mexico Institute of Mining and Technology  
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### **Dr. Laura Jacobs**

Principal Mechanical Engineer  
Thermal Battery Design and Development  
Sandia National Laboratories  
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