

Research Experience for Undergraduates (REU): Smart Cities – Advancing Mobility

Project Objective

Supplement UNLV's existing NSF Research Experience for Undergraduates (REU) Site with three students during the Spring 2026 semester to work on advanced data and machine learning research under the guidance of faculty mentors.

Problem Statement

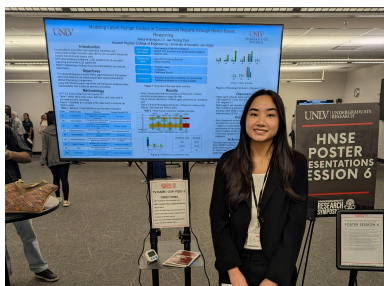
Three projects were designed to address:

- How to extract meaningful structured information from unstructured OSHA narratives using a large language model (LLM)?
- How to use computer vision techniques to preemptively detect abnormal track conditions that might lead to rail defects?
- How can computer vision and machine learning be used to better characterize body kinematics in X-ray images?

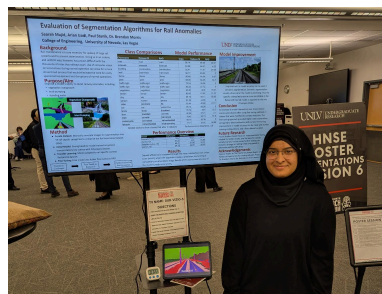
Research Methodology

Each undergraduate research project was led by a UNLV faculty mentor. The mentor guided the student in literature review, data collection/cleaning/preparation, in machine learning techniques, and how to design and conduct meaningful experiments.

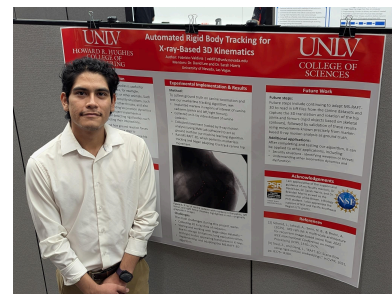
Results



(a) Alexa Alisangco



(b) Saarah Majid

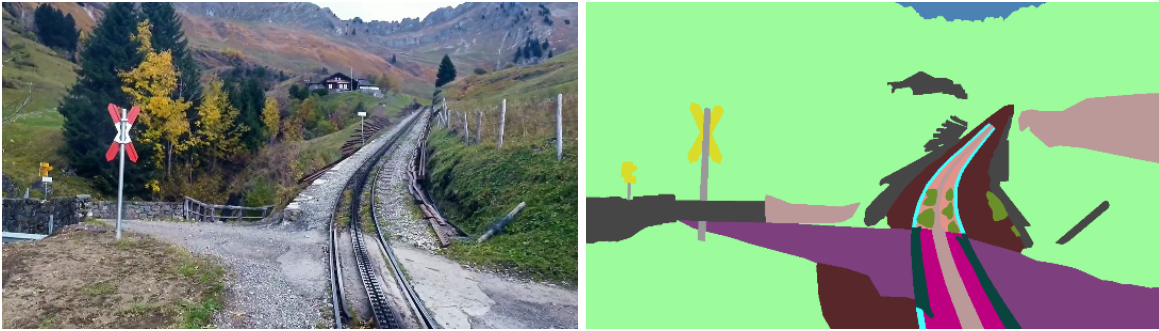


(c) Fabrizio Valdivia

Figure 1: REU Participants in Undergraduate Research Poster Session

Alexa Alisangco was a sophomore in Civil Engineering and mentored by Prof. Jay Park from Civil Engineering. Alexa's research explored the use of large language models (LLMs) to extract important accident factors from OSHA construction accident narratives to develop a new structured dataset from the unstructured narratives. Saarah Majid was a junior in Computer Science and mentored by Prof. Brendan Morris from Electrical Engineering. Saarah collected railway images online and manually segmented all objects of interest, including the target anomalies which could lead to track degradation. The new Rail Anomalies Dataset (RAD) is expected to support a new benchmark for visual rail inspection for the computer vision community. Finally, Fabrizio Valdivia was a senior in computer science mentored

jointly by Prof. Sarah Harris from Electrical and Computer Engineering and David Lee in Life Sciences. Fabrizio's research examined the computer vision approach of scene flow to develop a markerless X-ray-based part tracking pipeline for studying body kinematics during movement. All three REU projects supported larger ongoing research agendas that included other graduate students.



(a) Vegetation Overgrowth between the rails marked dark green



(b) Mud Pumping marked in yellow

Figure 2: Rail Anomalies Dataset (RAD) Examples