

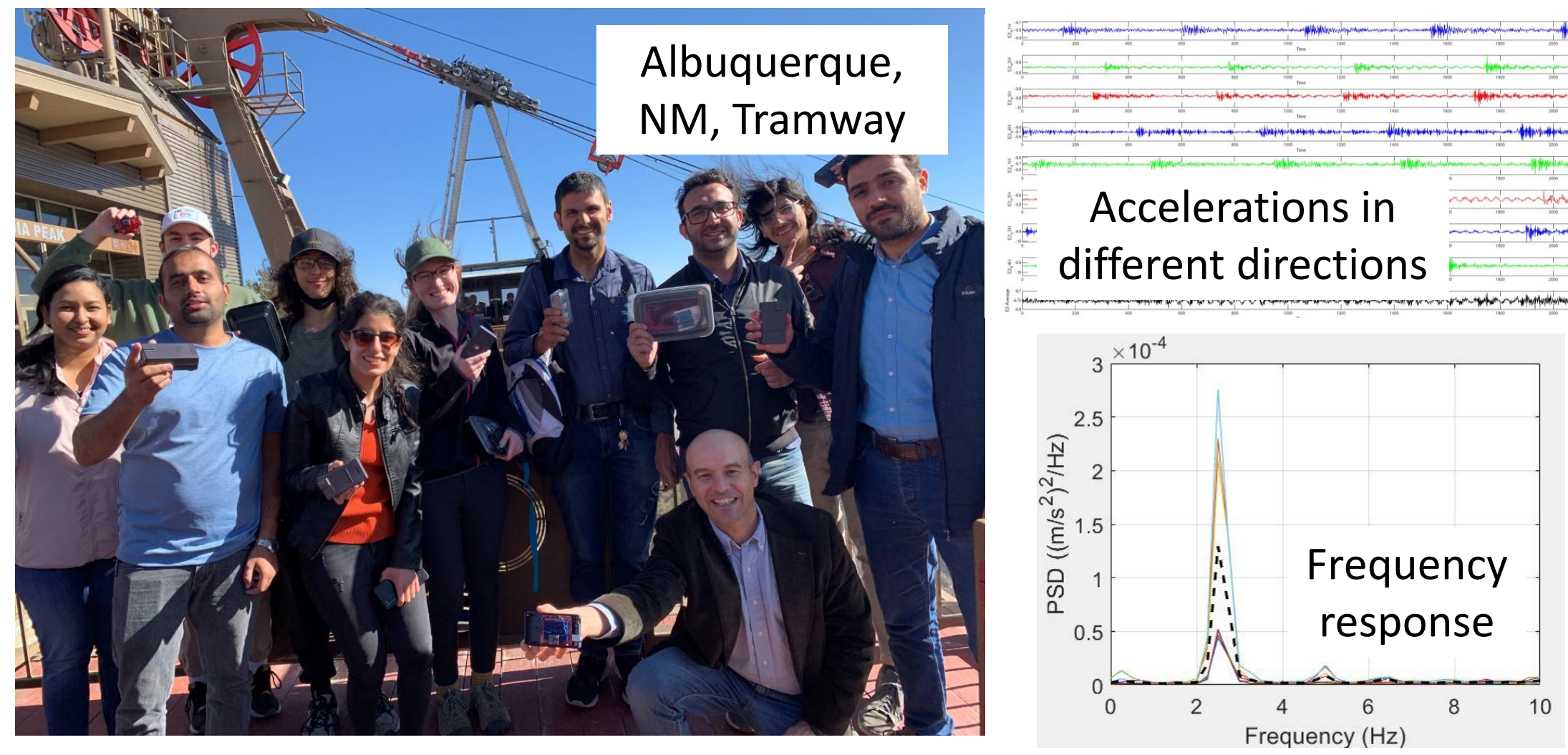
# Low-cost Efficient Wireless Intelligent Sensors (LEWIS) for Engineering Education: Native American Knowledge for Data Science Education

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## Background

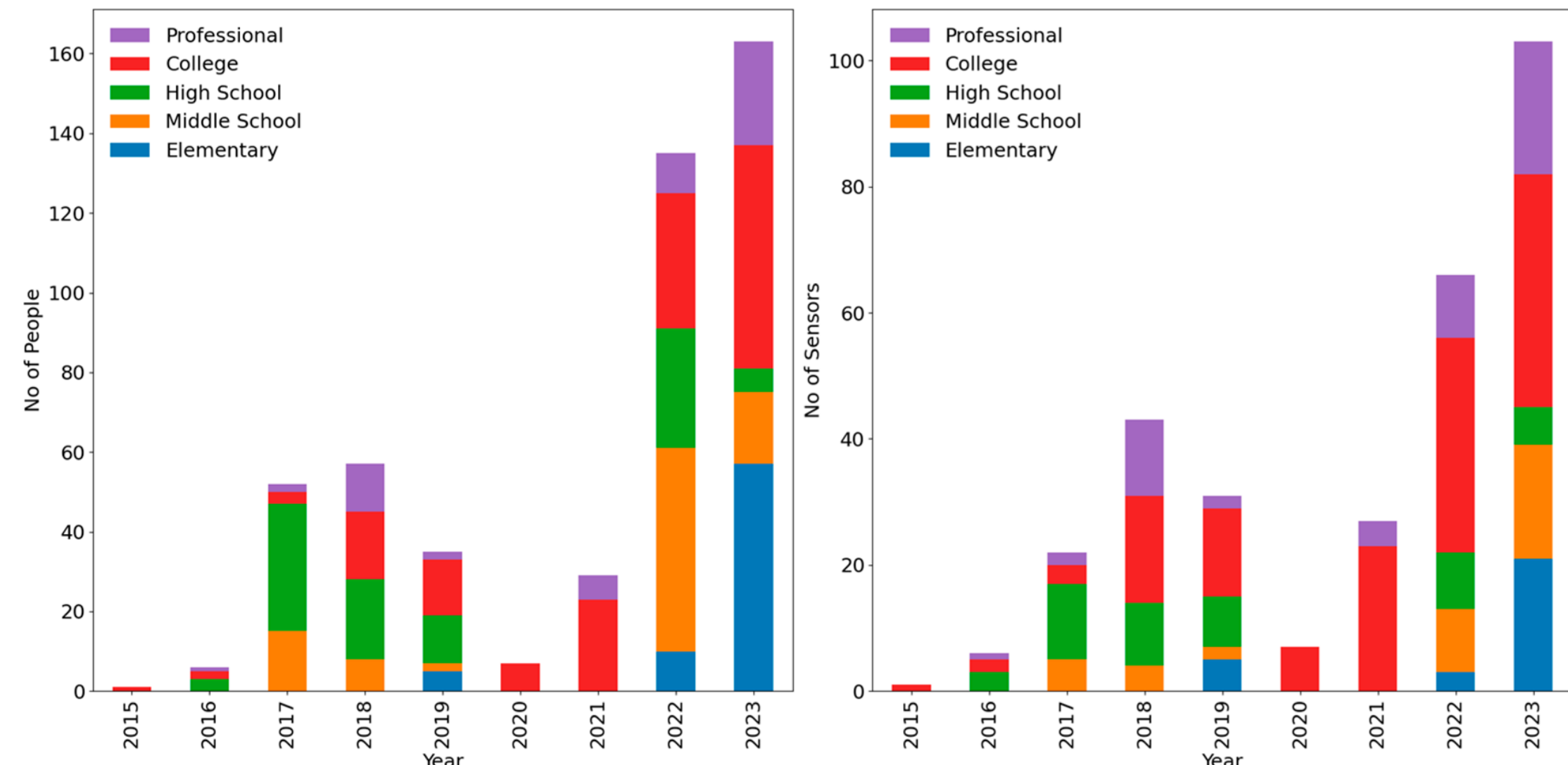
The SMILab group had experience in sensor manufacturing and outreach test by designing and building an accelerometer called LEWIS 1.



Tramway sensor outreach event and results, Albuquerque, NM

## LEWIS 1 Approach

In this project we introduce the fabrication of LEWIS as a tool to trust data science by engineering and non-engineering students. We target all ages, backgrounds, and educations:



Evolution of uses and teaching of LEWIS1 over the years

## Wildfire and Flooding

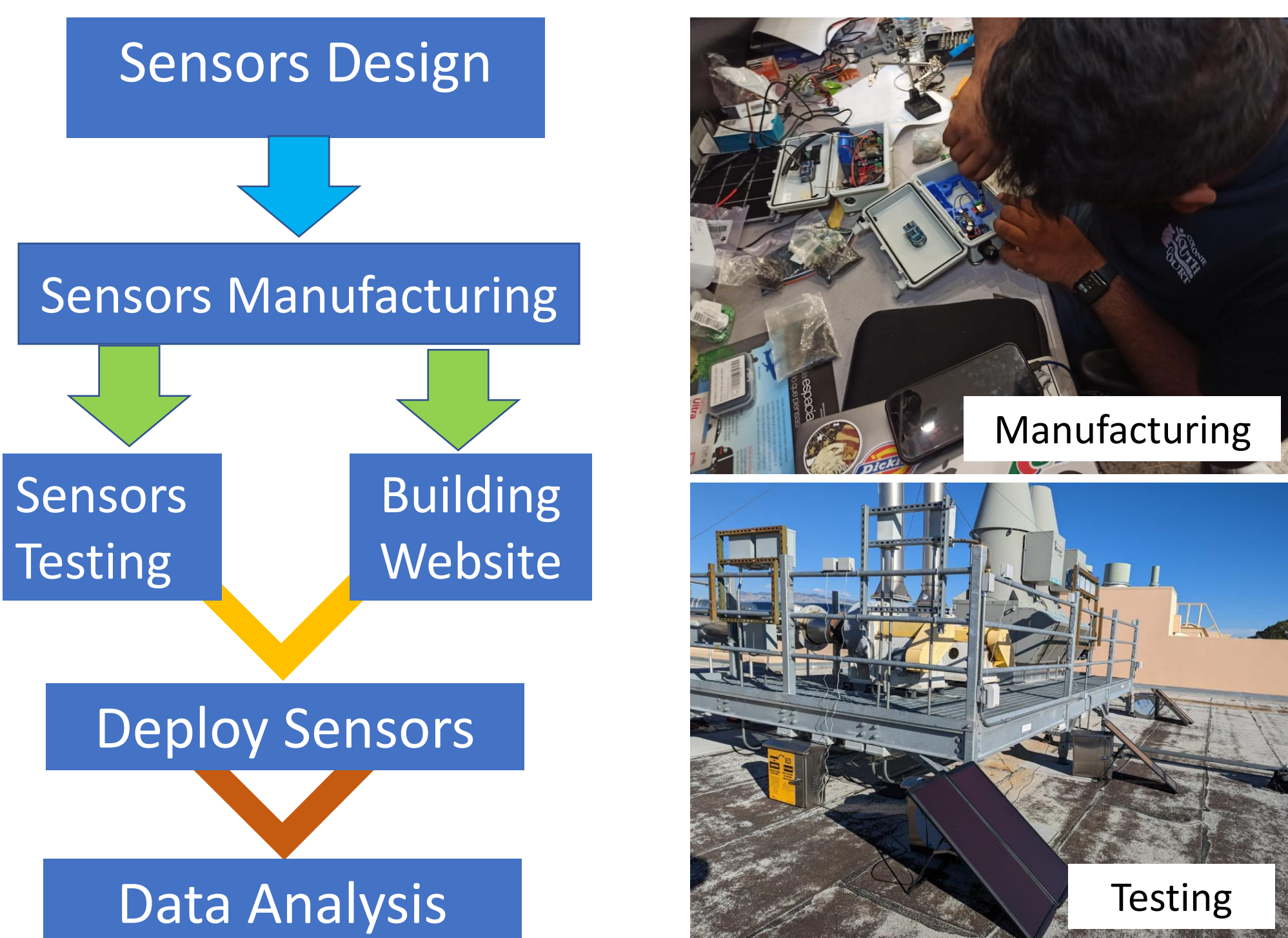
Ohkay Owingeh government decided to find a solution for the flooding and wildfire to save people's life and properties using LEWIS for long term deployment: LEWIS5



Past flooding and wildfire of Ohkay Owingeh, northern New Mexico

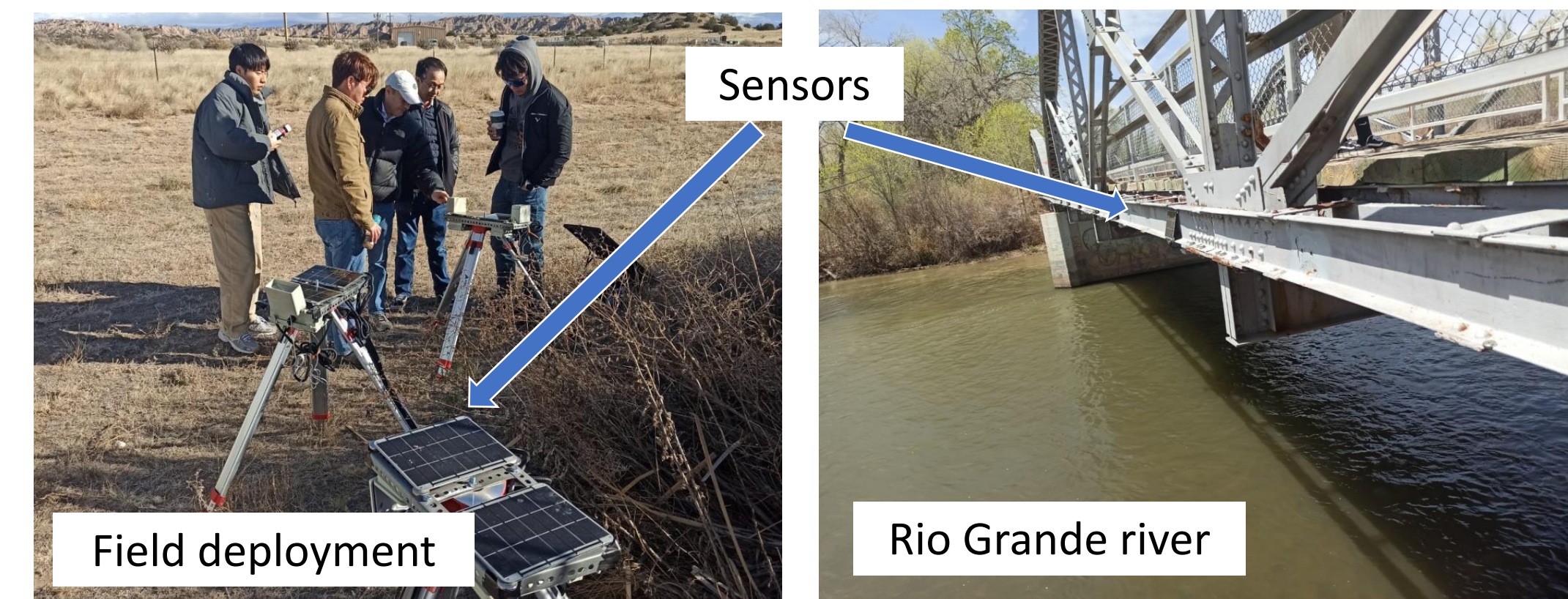
## LEWIS 5 Approach

- Building a flood monitoring system via manufacturing sonar and rain sensors.
- Build a website to show each sensors data in semi-real-time.
- Deploy the sensors in the locations identified by Ohkay Owingeh government based on flooding and wildfire maps.

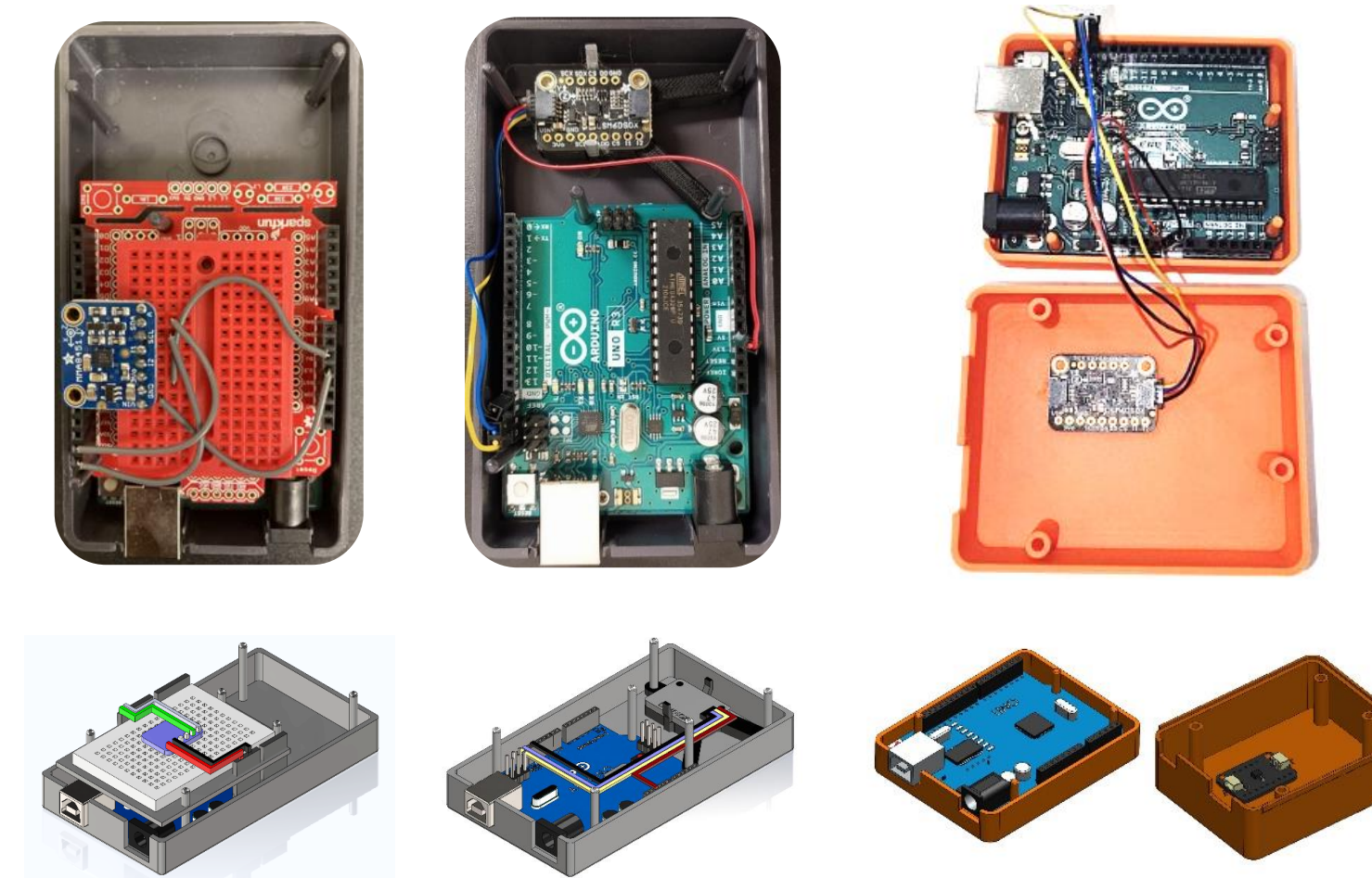


## LEWIS 5 Field Deployment

Deploy the sensors in the critical locations at Ohkay Owingeh to monitor the rain and water level.



## LEWIS 1 Evolution

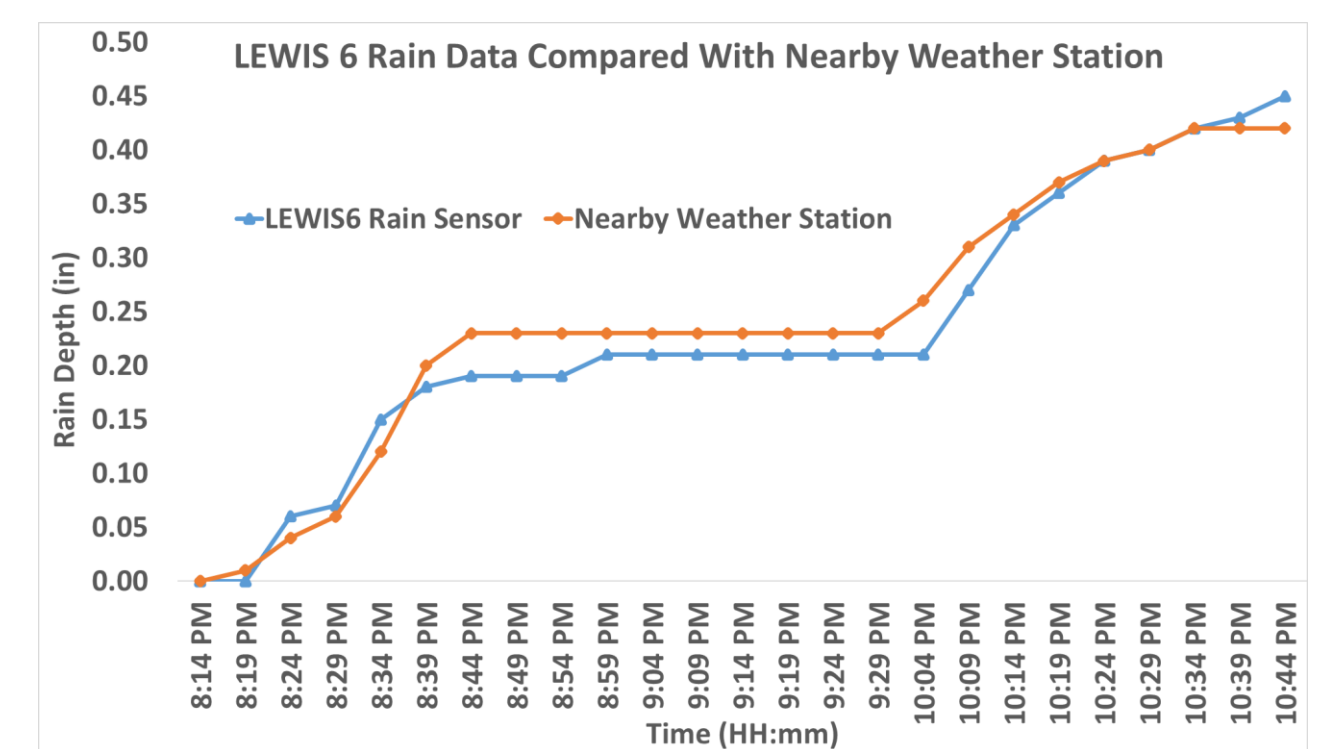


The interaction with users has provided inputs on the learning / educational value of LEWIS1 and their design, both hardware and software

## Results and Conclusion

- Manufactured more than 80 sonar and rain sensors for the wildfire and flooding monitoring system
- Successfully built a real time website to monitor and record sensor data, relative to their location
- Worked in collaboration with various industry experts, and the native land of Ohkay Owingeh
- Training youngsters and guests from both multi states and international

Rain data collected from Tinker Town river in New Mexico, showing high agreement between low-cost sensor data and local weather station data.



## Acknowledgment

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