**INTRODUCTION**

- Wastewater biosolids applied as fertilizers for soils
- Wastewater effluent as a source of irrigation water
- Impact on antibiotic resistance in soil bacteria remains unclear
- BioCycle Farm in Eugene, Oregon
- Organic chemical "fingerprints"
- Relationship between antibiotics, groundwater, and soils
- Inform the future of the BioCycle facility management

**METHODS**

- **Sampling**: quarterly sampling, shallow groundwater wells on-site
- **Lab processing**: stripping organic chemicals from samples
- **Mass spectrometry**: chemical signature data
- **Computation**: machine learning to categorize and identify contaminants

**MY ROLE IN THE PROJECT**

- Introduced to the world of environmental chemistry!
- Gained technical lab analysis skills
- "A day in the life" of an environmental sampling technician
- Collected samples during field work
- Increased coding and computation skills
- Formed collaborations with professors and read their work
- Completed final project with professors
- Received formalized lab and research skills
- Coauthored a technical lab and research skills
- Introduced to the world of environmental chemistry

**CONCLUSIONS**

- Samples processed in the OSU Mass Spectrometry Center on October 29th and 30th
- Revealing antibiotics or neighboring groundwater contamination sources
- Improving safety and health practices of land-applied biosolids
- Wastewater byproduct use benefits agricultural and wastewater sectors

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**FILTERING SAMPLES**

We can answer how the BioCycle farm is impacting local groundwater and soils by matching sample chemical fingerprints to sources. Machine learning techniques:

- Support Vector Classification (SVC)
- Confusion matrix

**THE POINT**

Above: Code for generating a confusion matrix; next steps will include training and testing the support vector machine algorithm.

Right: Predicted vs. actual classifications confusion matrix.

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**INTRODUCTION**

Applying ecotoxicology and chemical fingerprinting with groundwater and biosolids to document antibiotic resistance at the BioCycle Farm.

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