

Introduction

My name is Karlie Bailer, and I worked as a research assistant at Rhenium Alloys, Inc. in North Ridgeville from May to August in the summer of 2022. I contacted the company directly and asked if they had any open internship positions for chemical engineers, although they weren't advertising for anything. It was clear after interviewing that the position was outside the scope of my study of chemical engineering, but the company was willing to train me in the list of responsibilities. The company's focus is adding rhenium particles to pure metal powder, such as tungsten or molybdenum, to increase strength or ductility that would not otherwise have been present in a pure metal.

Learning Objectives

- Gain real-world experience in a work setting and apply concepts learned in the classroom
- Experience different departments of the company to see several aspects of manufacturing
- Understand and perform metallurgical analysis of W25Re and W25Re0.7ZrO₂

Application of Courses

Since this internship was outside of the realm of chemical engineering, the most useful things that I took with me from class were learning how to work efficiently and properly meet deadlines. My schooling has taught me to ask meaningful questions when I don't understand something

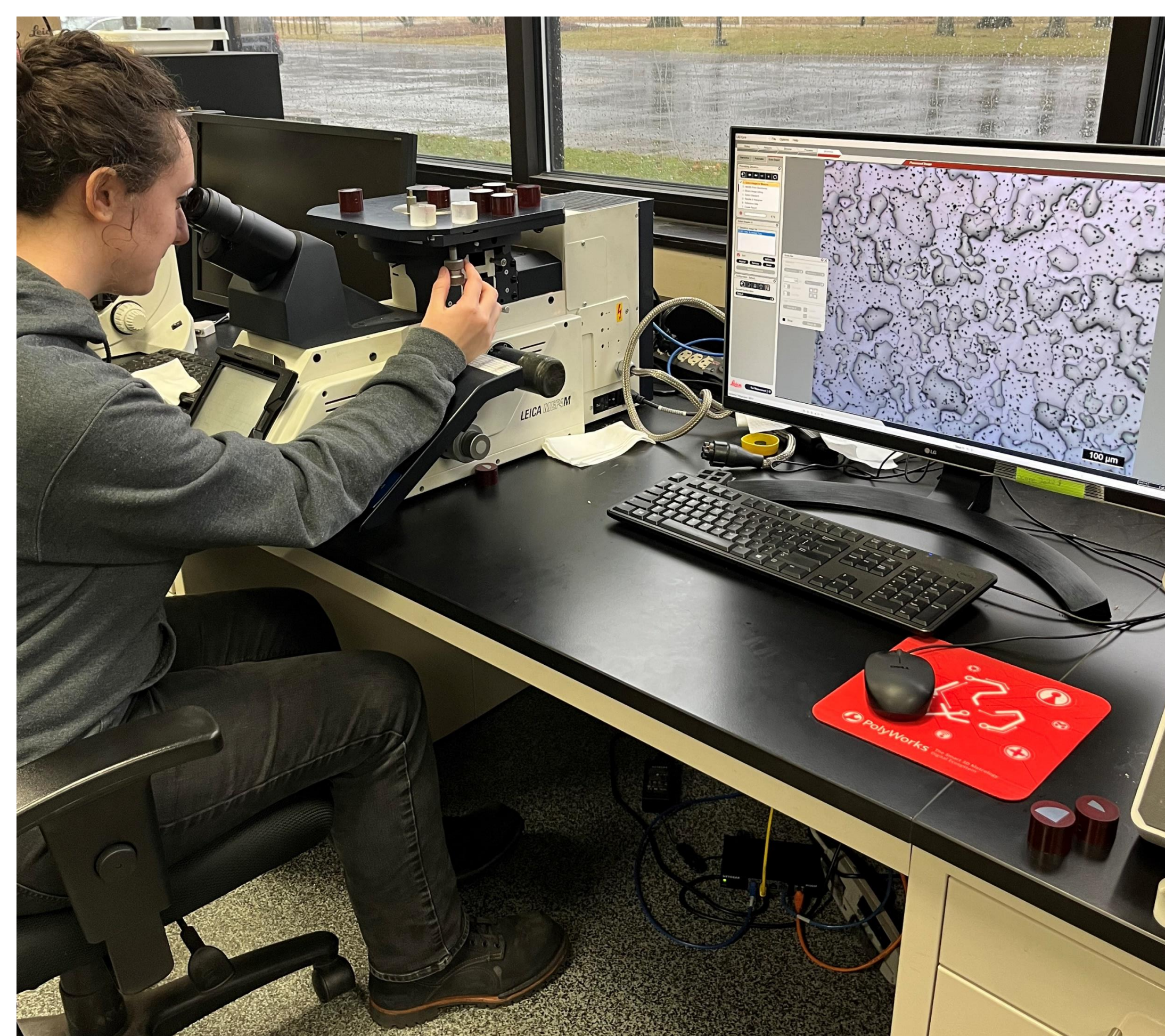


Figure 1: I am using a polarizing microscope to take images of the microstructure of a sample



Figure 2: top – rhenium powder; bottom – 16.5mm sintered rod and final 0.5mm drawn wire

Responsibilities

- Complete metallographic process: Cutting, mounting, grinding, and polishing metal samples at various sizes
- Examining samples under polarizing microscope and SEM
- Perform Vickers hardness tests and mechanical testing of each sample



Figures 3 and 4: 500x mag; 0.5mm diameter drawn wire longitudinal microstructure after 60 min exposure at 1650°C

Lessons Learned

- The thing that surprised me the most was the willingness of everyone I worked with to explain anything I had questions about; everyone was excited to share about their work of expertise
- I learned how to think critically about what I was doing and ask specific questions if needed

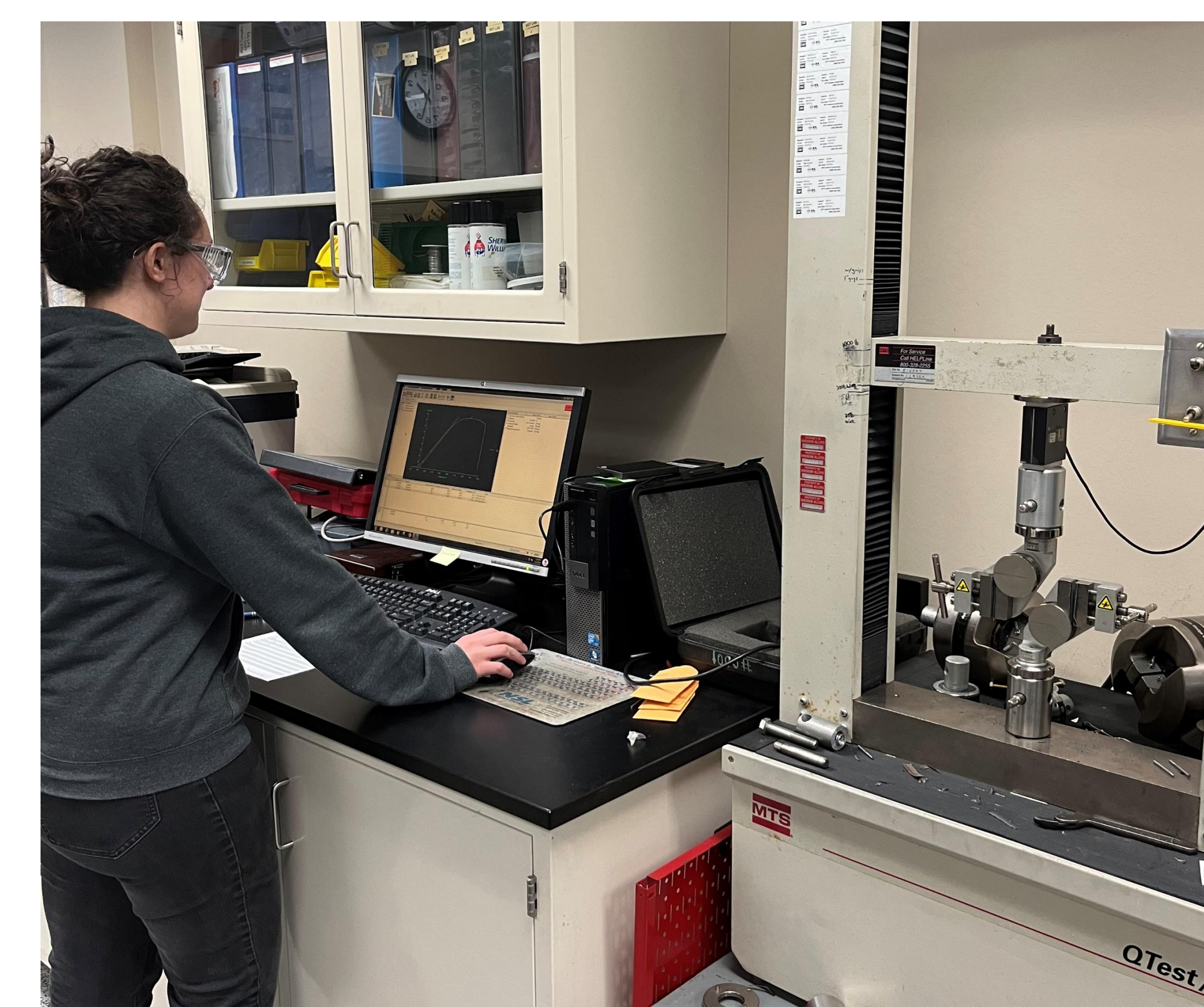


Figure 5: This is the setup for a tensile test for wire; the computer shows the quantified data

Future Work

During the last three weeks of my internship, I shadowed a coworker in the engineering department, and I was offered a position in that department after this semester. I will be responsible for operating vacuum furnaces and working as a manufacturing engineer and engineering technician.

Acknowledgments

- Choose Ohio First and Cleveland State University
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 - Sam Belsito, Lab Technician