

1. Student Name: Patrick Foley

2. Faculty Mentor: Dr. Alan Seabaugh

3. Project Title: Auto-prober I-V Measurements of Semiconductor Devices

4. New Skills Acquired:

- Ability to setup and understand measurements on a semiconductor device.
- Automation of these measurements using a Cascade autoprober.
- Writing of an instruction manual.
- Presentation and poster creation skills.

5. Practical Uses:

- May continue similar research as a final year project for my senior year of electrical engineering
- Insight into graduate work.
- Better understanding of semiconductor devices and the characterization of the devices.
- Experience in a laboratory environment.
- Graduate students can now use the autoprober to measure their fabricated samples.

Traditional probe stations require the manual movement and placement of probes on a device in order to measure the device characteristics. The Cascade Summit 12000B-M is installed with Nucleus, a software used for automated movements. Nucleus can be used with DC characterization applications, such as Wavevue, to automate the testing of hundreds of devices.

Wavevue is an integrated measurement solution that unifies RF/microwave and DC measurements in one software application. The Wavevue software can do many useful measurements, and automatically builds reports for the user once the measurements have finished.

This autoprober station is the first of its kind in Notre Dame. The goal of the project was to utilize the software to test many devices, accumulating results quickly and

efficiently for samples fabricated by graduate students. The process of using the two software programs in unison was detailed and used to measure current-voltage characteristics and breakdown voltage of metal oxide silicon heterostructures.

The project was a success as the station is now capable of automated testing, a detailed instruction manual was created for future users of the station, and a poster of the project was presented at the undergraduate research symposium.