My name is Osei Amponsah and this is Norfolk State's Center for Materials Research lab and this lab is actually our electron spin resonance lab and today we are going to run some materials in the electron spin resonance spectroscopy. ESR is actually a spectroscopic technique whereby a materiel is immersed in a strong magnetic field and it absorbs electromagnetic radiation. These materials are paramagnetic that is they have just one electron spin and that means your spin is greater than zero. The ESR machine actually automatically calculates the derivatives of our sample.

The first step here is to turn our water on. The second step is to turn our heat exchanger on. I turn my EMX on, and finally we turn on our current controller.

What we have here is our sample cavity. Here we have two powerful magnets and this is the cavity that our sample actually goes in. This sample you can see at the bottom of the tube is a sample that was manufactured specifically for our ESR test. It's a nickel nanorod sample that we are going to run in our ESR sample. The sample is going to go in our sample cavity which we can see in between the two magnets.

The goal here is try to get our sample to go exactly where the yellow spot is. The yellow spot is where our magnetic radiation goes through our sample. What we do is to try to get a visualization as to how far down our tube needs to go to that spot with the yellow. What we do is measure how far the sample needs to go down and once we get the visualization done we can go ahead and put the sample in the cavity. And then the sample should be at the spot.

The ESR can run liquid and solid samples. What we have here is this a liquid sample which we can run in our ESR machine.

Now that we have our sample in our sample cavity we can open our software. We go to our file and open up an old file. Now that we have on an old file open we can go ahead and go to our parameter and go to bridge control. So from here we can actually tune our signal.

Now how do that is –this is in Standby- we go to Tune and we see our signal in his box. What we are trying to do here it is to get this signal to be in the center of box so we can do that by moving our frequency around a little.

Once you get a good idea that it is in this middle of the box you can go to operate.

The goal here is try to get our AFC, our Diode, and operating levels and "calibrated" and all to being green. How we do that is to move our frequency. So we can move our frequency which will control our AFC. And now that we have our AFC, our diode, and our "calibrated" all in green we can click the Run button and that will start recording the signal from our sample.

And what we have here is our actual signal. What we can notice is that our signal intensity here is very low. We can actually zoom in on our signal by drawing a box by using our mouse and we get a better picture of our signal. Now that we have a signal we can actually go here click our file and save.

We can change our filename to "test" and click the OK button and we will save our file.

What we have here is our nickel sample and what we can conclude from here is our signal tells that our sample is a uniaxial anisotropic sample, meaning it has just one axis. So here we have two samples oriented at different orientations in our sample cavity. What we can learn from here is if you have a sample that is perpendicular to the applied field our magnetic response shifts to a lower field. But when we have our sample oriented parallel to our applied field our signal shifts to a higher field. And that tells us about the magnetic properties of our sample.