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Project: Designing a Dew Point Monitoring System

My research project for summer 2016 was designing and building a dew point monitoring system for the Cornell High Energy Synchrotron Source (CHESS). There are several expensive and intricate systems in CHESS required for the X-ray experiments performed there. Many of these machines require air from a clean air system to be pumped through them in order to function and, unfortunately, even a small amount of moisture in this air can ruin a machine. My project, therefore, was to design a build a system that would monitor the dew point, and thereby the moisture, in the clean air system at CHESS as a guard against the damaging of the equipment there.

There were several steps involved in the design and manufacturing of the dew point monitoring system. The first step was writing the code for the system. The code was written in a form called ladder logic in order to run on a PLC (Programmable Logic Controller), which would be the "brain" of the system. Next, a touchscreen was programmed (via C-More Software) to allow a user to control the system. The third step was using a 3D design program (AutoDesk Inventor) to design the box, which would contain the system and then re-designing the panels of this box individually for manufacturing. The final step in the creation of this system was assembling it, which involved assembling and wiring the box, and debugging, which involved debugging the code, touchscreen program, and some wiring issues.

The final result of this project was a system, about 12.25in. x 17.75in. x 8.75in. in size, capable of monitoring moisture levels and air pressure, logging and storing this data, allowing a user to override the system if necessary, and many other less important tasks. It will be installed in CHESS in the near future.

Lastly, I am immensely grateful for this opportunity that I have received and believe that my project was very beneficial in teaching aspects of mechanical and electrical engineering.