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Students

Summer interns work with laser engineering research

August 7, 2012

This summer the Electrical and Computer Engineering department at CSU has been delighted to welcome three summer interns, Christian Carrico, Alysia Dong and Hannah Yehudah, to help conduct particle accelerator and laser engineering research.

Summer interns in Electrical and Computer Engineering department

Carrico recently graduated from Prairie View High School in Henderson, Colo., class of 2012 and will be attending CSU in the fall. He will be pursuing his bachelor's in [electrical engineering](#) and will continue to work with the group in the laboratory throughout the school year.

Dong, also a Colorado native, will be a senior at the University of Illinois in Champaign-Urbana. She will be getting her bachelor's in electrical engineering in the spring of 2013.

Hannah will be a senior in High School at Morgan Park Academy in Chicago, Illinois, and also will be graduating spring of 2013.

Hands-on research

Carrico, Dong and Yehudah eagerly joined the ECE team and have had the opportunity to learn about the history and applications of particle accelerators and do hands-on work designing optics, measuring magnetic fields and setting up labs.

Carrico performed research with the installation and automation of the radio-frequency (RF) test laboratory. First the group will measure an X-band (11.4 GHz) accelerating structure on loan from the SLAC National Accelerator Laboratory. This RF lab will be used for instruction and for measuring the novel RF accelerator devices developed by the CSU team.

Dong is working on the installation of the magnetic measurement laboratory for the group. She is learning to use Labview to automate the laboratory. An example would be the electromagnet measurement process, where she can control the power supply current for the magnets and measure the induced magnetic fields. This laboratory will be used to measure components of a linear accelerator being constructed at CSU as well as research of magnetic devices.

Yehudah is designing the optics for the laser transport line from a laser room to the linear accelerator vault, where the laser will strike a photocathode to generate electrons. She performed the design of the entire layout of the line, including the performance-critical final optic table adjacent to the linear accelerator that does the final "staging" of the laser beam. Part of the design involved determining the type, quality and all associated specifications of the optics – lenses, mirrors, beamsplitters, irises – as well as the peripherals – including energy meters and mechanical mounts.



Front Row: Auralee Morin, Karen Horovitz, Hannah Yehudah, Alysia Dong, Sandra Biedron; Second Row: Jon Edelen, Christian Carrico, Stephen Milton; Back Row: Chris Hall, Ted Burleson

She learned how to maintain the correct beam size, determine the number of photons and energy needed from the quantum efficiency of copper, as well as research the photoelectric effect to better understand the process.

Summarizing work in a report

The three summer interns are not only learning, but making positive contributions to the infrastructure of the accelerator engineering laboratories. They each will summarize their work this summer in a report for their senior team members and also will provide a copy to the sponsor - the Office of Naval Research. They each have had a chance to explore the field of accelerator and laser engineering research, and have had the opportunity to work hands-on with a real research team to motivate them to pursue a future in the ECE and hopefully with our team at CSU.

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