Cool as ICE

U STUDENTS CHILL OUT IN THE ARCTIC *for* Science

PHOTO COURTESY KENNETH GOLDEN

Amy Heaton, right, and Hajo Eicken measure recent ice growth in February near Barrow, Alaska, the northernmost point in the United States.

Rita Sharshiner
Chronicle Staff Writer

It's not in the course catalog. U students will not find it wedged somewhere between intermediate algebra and calculus. The excursion which took U physics and math students to the frigid Arctic is not on any course syllabus, but it exists at the U, in the fine print, nevertheless.

For nearly 40 years, sea ice research had come to a virtual standstill. It was not until the breakthrough research of some motivated undergraduate students, which began about a year and a half ago, that interest again began to rise regarding this remarkable phenomenon in the Arctic and Antarctic regions of the world.

Sea ice is a complex, composite material consisting of pure ice with brine and air inclusions covering oceans and seas on Earth. This ice serves as a barrier between the water and the air around us, and without this barrier, huge amounts of heat would come out from the polar oceans into the atmosphere, likely advancing the widely-feared global warming phenomenon.

Ken Golden, director of undergraduate studies for the U's math department, explains that the huge impact sea ice has on our environment is only one of the many reasons it is important to study.

In June 2002, under Golden's leadership, Troy Finlayson, a U senior majoring in physics, was given the opportunity to participate in the latest research conducted on the frozen waters of the Arctic Ocean in northern Alaska.

For nearly a year, Finlayson had been studying previous results from sea ice research, and he considered this trip to Alaska an opportunity to gain exposure to the subject he had been reading so much about.

Specifically, Finlayson focused on the thermo-conductivity of sea ice, or the speed at which heat travels through the ice. He spent five days drilling through the hard ice and taking core samples, all the while analyzing the intricate details of the brine trapped inside and the flow of fluid through the ice.

Finlayson owes his experiences in the Arctic to the Research Experiences for Undergraduates Program offered through the math department at the U. The program, as Golden points out, is mostly funded by the National Science Foundation.

Last year, the math department received a $1 million VIGRE grant, which is to be distributed over a five-year period to fund many different projects. In addition, a Collaborations Between Mathematics and the Geosciences grant, totaling roughly $670,000 to be distributed over a three-year period, was given specifically to the sea ice research program at the U. The combination of these various grants pay the salaries of students like Finlayson who are working to advance knowledge on sea ice.

Finlayson explains that "money, infrastructure, and having expectations put on by a mentor" are all reasons why he chose to work within the program versus conducting independent research.

He had initially joined the program to improve his paper writing and presentation skills, and feels like he owes much of his success to his mentor, Golden.

"Golden was key in everything I had learned," Finlayson said.

Amy Heaton, a U sophomore majoring in chemistry, says she feels like she has learned a great deal as well. When Heaton finished her freshman year at the U, she approached Golden, her calculus teacher, with a request to help him with his sea ice research. In February 2003, she was on her way to Alaska where she worked for a week studying the sea ice covering the Arctic Ocean.

Heaton compliments the program, saying, "You get paid to think. That's what I like about it." The aspect of the program that drew her in was the realization of how important publishing a paper is to her future career plans.

According to Golden, published she will be. On the week of June 9, 2003, Finlayson, Heaton and Golden took a trip to Washington D.C. where they presented their research to United States Congress. Golden also expects that Heaton and Finlayson will be the main authors of an article published in an elite science magazine.

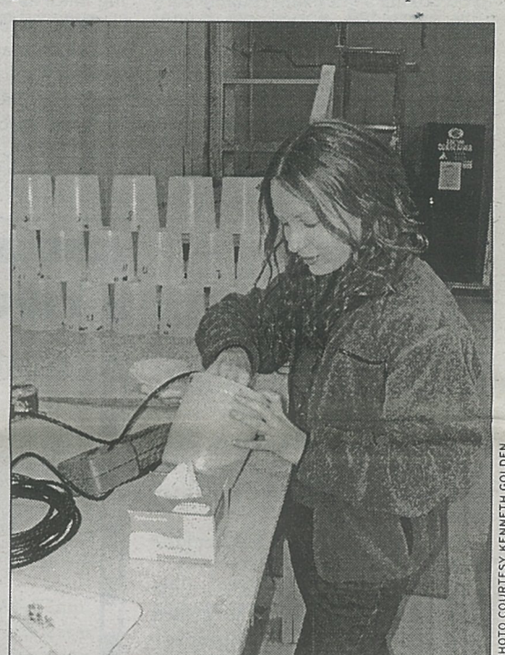

PHOTO COURTESY KENNETH GOLDEN

Amy Heaton measures salinity of melted sea-ice.

Golden says the research program is a wonderful way to attract more students to the math program. His main goal for next year is to do exact-

see ICE, page 5

ICE

continued from page 4

ly that. Golden says, "Math, and calculus in particular, is the operating system of science," further stressing that many hard-core science majors would greatly benefit from a math major or minor by gaining a deeper understanding of their field.

According to Golden, the aspect making this research program unique is that "it's not short sighted. These research projects are not a single-semester type of deal...it is something that takes time. "

Golden attributes much of his success to undergraduates like Finlayson and Heaton, whom he considers "true colleagues," and he hopes to attract more high-caliber students like them to participate in his future endeavors.

rsharshiner@chronicle.utah.edu