

Chamber: Large donations vital to project

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John Halliwill described the chamber as "officially fully functional and ready to go for our summer research projects." He and Chris Minson, recently promoted to the rank of associate professor of human physiology, are co-directors of the University's Exercise and Environmental Physiology Laboratories. They plan to use the chamber for research regarding the human body's response to different environmental conditions.

Chambers that control temperature, humidity or oxygen exist in various places around the country, but the University's chamber is rare in that it simultaneously controls all three variables, Minson said. Halliwill added that the chamber also has lamps to simulate the sun's radiant energy.

While a person exercises on the chamber's treadmill or stationary bicycle, his or her oxygen consumption, carbon dioxide production, core body temperature, cardiac output and respiration are measured. For specific experiments, instruments in the chamber can also measure a person's skin blood flow, skin temperature, cooling rate or blood flow to various organs.

The chamber cost \$300,000 to build. A Department of Defense grant funded \$250,000, and the rest came from private donations, Minson said.

"The army and Department of Defense have had a long-standing interest in environmental physiology as it relates to soldiers in the field," Halliwill said. He later added that the Department of Defense grant has no strings attached and is intended to get

students excited about science, regardless of whether it directly benefits the Department of Defense.

Halliwill said he and Minson had been planning the chamber since he was hired in 2002. They began searching for funding sources and found out about the Department of Defense grant two weeks before its application deadline in August 2003. Seven or eight months later, they received the funds, and began designing and building the chamber.

"Short of hiring the two faculty who are responsible, I would rank it right up there with one of the most significant events that have occurred over the past five to 10 years," human physiology department head Gary Klug said.

Minson said that while a person's usual activity level might not be apparent from initial observation, a workout in the chamber can quickly provide that information. For example, people who don't exercise can have coronary artery disease and not know it because they never stress their body to the point that the effects of the disease would be obvious.

"Trying to study the human body at rest doesn't give us a lot of information," Minson said. "When we place challenges on the body, then we can understand how physiology works."

Because the chamber just opened, it has not yet been used for anything other than basic research. However, future collaborations involving medicine, athletics and clothing companies are possible.

"There are certain situations where we can test certain things more specifically than physicians can," Minson said.

For instance, Minson said people faint for different reasons that can be related to oxygen levels or temperature conditions, and tests could be performed on a person in the chamber to determine the cause of his or her fainting.

Minson said the University athletic department once approached the researchers in search of a thermal chamber to prepare football players for a game at the University of Missouri.

"They called Nike and (Nike) said, 'You've got one right on your campus,'" Minson said.

Minson said some athletic clothing companies have expressed interest in using the chamber to test the function of their products under various conditions.

Despite these opportunities, Minson said, "We want to do our research and that's got to come first."

With a National Institutes of Health-funded grant, Halliwill plans to use the chamber to study the relationship between sleep apnea and hypertension. He will use the chamber's high altitude settings to simulate the oxygen deprivation of sleep apnea, when a person becomes temporarily unable to breathe while sleeping. Minson researches changes in the skin during environmental heat stress.

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