Michele Buzon, assistant professor of anthropology, and Gabriel Bowen, assistant professor of earth and atmospheric sciences, freeze-dry tooth enamel samples in preparation for oxygen isotope analysis on mass spectrometers in the Purdue Stable Isotope laboratory. Buzon collected the samples during excavations in Tombos, a site in the Nile Valley region.

United in Discovery

In trying to make a humanoid robot behave like a human, Purdue robotics researcher George Lee could view those as some of the best ways collaborations develop.” Lee and Zelaznik’s project is just one of the many collaborations that are part of United in Discovery, a new $60 million grant awarded to Purdue to support research and education in the field of robotics.

Humans are able to combine a series of basic movements, such as pushing, lifting or reaching, to perform a task.
of the most “primitive” skills to perform more complex movements.

The work is funded with a grant from the National Science Foundation’s Information Technology Research program. The project also involves collaboration with researchers from the Advanced Institute of Science and Technology in Japan, which is a leader in humanoid-robot research.

Teaching robots to learn new skills quickly increases their ability to help people. Lee and Zelaznik see applications in the health care industry, elder care and home care.

“By inserting the right amount of variability, you can have an assistive robot in elder care that would then adapt to the specific variabilities and idiosyncrasies of the person they’re assisting,” Zelaznik says.

Delving into the past

Piecing together an ancient story brought together Michele Buzon, assistant professor of anthropology, and Gabriel Bowen, assistant professor of earth and atmospheric sciences.

Buzon’s work focuses on answering 3,000-year-old questions about the origins and relations between the Egyptians and Nubians in the Nile Valley of Northern Sudan.

“In the Egyptian New Kingdom period around 1500 B.C., Egypt has colonized Nubia, but we do not really know how this has happened,” Buzon says. “The textual records do not give us a lot of information about whether many Egyptian colonists were going to the area or if they were just sending a few people. Part of this project is understanding the population movement in the past.”

Finding evidence of migration lies in the chemical analysis of human remains excavated by Buzon and her team from Tombos, a site north of the capital of Khartoum. Tombos was a colonial outpost for the Egyptians, who ruled the Nubians from 1460 to 1070 B.C.

Bowen has been developing geochemical methods for reconstructing the movements of modern humans and animals, and a collaboration involving the Tombos samples looks like a natural match.

Bowen’s lab at Purdue has analyzed oxygen isotopes in tooth enamel samples from the site.

“This type of analysis can tell us a lot of things, one of those being provenance,” Bowen says. “We can potentially tell where something came from, and this applies to humans in looking at travel, cultural exchange or migration.”

The ratio of isotopes will reveal whether water consumed by an individual is from local sources, which identifies where a person was living when the tooth enamel was forming. Differences in isotopes can indicate people are from different places.

“We can track if people were local, if they were born and raised there or if they came from somewhere else,” Buzon says.

Buzon expects the collaboration with Bowen to continue after her next trip to Sudan in 2010. Funded by a National Geographic grant, the trip will focus on excavating burials that date to the Napatan period, 750-660 B.C.

“During this period, Nubia succeeds in ruling Egypt,” Buzon says. “Nubians are moving up to Egypt and ruling the whole Nile Valley, and we do not really know how this Nubian polity came about, if they were a people from further in the south, if they were a combination of Egyptians and Nubians. Again, we are looking at population composition to understand what has been happening during these important sociopolitical developments in the past.”

Cancer prevention

A collaboration of faculty across colleges is striving to bring an equally diverse group of students to the field of cancer prevention.

A core team of seven Purdue faculty has received a five-year, $1.5 million grant from the National Institutes of Health to fund a new Cancer Prevention Interdisciplinary Education Program (CPID).

The program is designed to increase students’ interest in pursuing studies and careers in cancer research as well as to prepare successful in the field.

The program also provides all aspects of cancer prevention students to better approach problems.

“Our goal is to provide students information about the spectrum of research which will help to inform efforts in the future,” says Victor Hsiao, professor of nutrition and program director, who directs other disciplines, those in those disciplines in their work.

The grant provides students with graduate fellowships and graduate internships. Students who apply to participate in those selected will begin their work.

Team members will share responsibilities throughout the year.

In addition to attending classes, course, the students will complete community service learning to address issues in cancer and complete mentored research in a cancer prevention focus.

“We’re trying to inspire a generation of cancer prevention — inspire them to think about being open to the idea of being an cancer researchers in other disciplines,” says Steve Jensen, assistant professor of biology. The undergraduate students become cancer prevention scientists. The opportunity to learn.