

# MU Engineering News

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## **MU College of Engineering, School of Nursing, School of Medicine receive \$1.2 million NSF ITR grant**

*Start work in December on “intelligent software” aimed at helping seniors*

For an 80-year-old, a fall can be not only frightening but life-changing.

Mobility may be limited, and bones made brittle by age may break. If living alone, an elderly person can lie injured for hours before help arrives. Such falls—or the fear of them—have swelled the ranks of nursing and assisted living homes, where assistance can be available at the push of a button.

MU College of Engineering (CoE) researchers have received a \$1.2 million National Science Foundation grant to pursue technology they hope will not only help monitor but also prevent such accidents among the elderly. The research team started work in December 2004 on developing software that will integrate information provided by monitoring systems into a meaningful pattern and alert caregivers to a senior’s current and impending needs.

“We’re trying to develop new technologies that will go beyond what’s out there today,” said Marjorie Skubic, an associate professor in the university’s electrical and computer engineering and computer science departments who is heading the project.

MU has taken a leading role in caring for the elderly since the opening of TigerPlace, a 33-unit apartment complex for seniors that opened last summer on about seven acres at Bluff Creek Drive, near the intersection of Grindstone Avenue and Highway 63.

A joint venture between MU’s Sinclair School of Nursing and Americare Systems Inc., TigerPlace is one of four projects granted state approval to operate under the “aging in place” model of care giving. Under that model, residents who would otherwise be required by state law to live in nursing homes may have health services brought to them in their apartments instead.

Technology that could help seniors “age in place” has been spotlighted in recent years, spurred by America’s aging population. The number of Americans 65 years old and up is expected to increase from 12.4 percent of the U.S. population in 2000 to 20 percent of the U.S. population in 2030. In financial terms, experts predict there will be only two U.S. workers per Social Security beneficiary by 2030, down from 1996 when there were 3.3 U.S. workers per Social Security beneficiary.

The focus of Skubic’s research team is on “intelligent software” that uses sensors to uncover patterns of activity helpful to caregivers. While such sensors are currently available, software that can interpret and analyze their data are not, said Marilyn Rantz, an MU nursing professor and TigerPlace director. And current technology commonly requires some action on the part of a senior—pushing a button or pulling rope—to signal a need for help.

“We want to take it beyond just a motion sensor,” Rantz said. “We want to be able to interpret, analyze and predict.”

That means developing software that can detect patterns of activity in the information collected by motion detectors, mat and stove sensors and sensors that measure a resident’s gait, Skubic said. Once that pattern is established, differences may signal an accident or impending change to which health care professionals can be alerted.

For example, kitchen and living area sensors showing uncharacteristic nighttime activity could alert care givers to cognitive problems such as dementia, Skubic said. Eventually, such technology could help predict as well as detect problems common among the elderly, she said.

The research team’s system will undergo testing by volunteer seniors. Part of the four-year federal grant is earmarked to pay for these tests of the usefulness of the technology being developed, Skubic said.

“We’ve tried to let this be driven by the needs that the nurses have identified,” she said.

The needs targeted by Skubic’s research team frequently are shared by seniors living independently, Rantz said. Success ultimately could allow elderly people to live more safely and independently longer, she said.

“This can revolutionize home care and help people stay at home,” Rantz said.