

# Nursing, engineering professors developing device to get seniors moving

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For those of us living the frenetic modern lifestyle, sitting in one place for a long period might seem like a vacation. But for those who are retired, it can lead to health complications.

Patricia Burbank, professor of nursing at the University of Rhode Island, realized that there is a need to get [older adults](#) moving.

The actual idea was inspired by Burbank's own aunt, a 97-year-old woman living on her own.

"She loves hearing from her family and personal messages really resonate with her. How much better would it be to develop a device that could send a loving message and a suggestion to exercise?" said Burbank who is concerned about her aunt's decreased activity levels.

She brought the idea to Dayle Joseph, dean of URI's College of Nursing, who suggested Burbank get in touch with Ying Sun, director of URI's biomedical engineering program. Sun and Kyle Rafferty, a senior from Amherst, N.H., who is double majoring in biomedical engineering and electrical engineering, have been working to transform Burbank's ideas into a tangible product. In November, the device was patented through URI's Office of Research and Development.

Working with Sun during the summer in the initial stages of the project, Rafferty is now involved as part of an independent study. Using a breadboard, a construction base for electrical circuits, Rafferty has been

responsible for getting the components of what is being called, the Activity Analyzer fully functional.

"It is a unique product because instead of counting steps like a [pedometer](#) or measuring distance walked, it uses an [accelerometer](#), a three-axis motion detector, to analyze activity in three dimensions. It also has a recording device and a clock so you can record messages to go off at a particular time or messages to go off after periods of inactivity," Burbank said.

"I have been working to enable the processor to regulate time and the audio playback as well as program several messages to go off during different times during the day," Rafferty said. "It is my goal to have a working prototype, or close to it, by May."

Rather than a long guided workout, the audio messages would be intended for short prompts and reminders. Messages would be customized for each user's mobility issue and lifestyles. The messages would be recorded by loved ones or primary care physicians.

At the end of each day, the device scores the individuals based on their activity levels, which can be tracked using a computer.

Although the main application of the device is to increase activity levels in older adults, it also has numerous other helpful functions. Alicia Curtin, URI associate nursing professor, is working to use the device to help individuals with mild to moderate dementia.

"Family members or care providers can record step-by-step instructions to prepare meals and other daily activities," said Burbank of North Kingstown. "This would increase independence and allow individuals to live on their own when they otherwise couldn't."

Other important uses for the device would be to remind individuals to take medication and for people of all ages to increase their daily levels of low-impact activity, especially those in sedentary work place such as offices.

"The device will also help with fall prevention by working on balance and quadriceps strengthening exercises," said Burbank. "Simple exercises, such as leg lifts and standing on one leg with support as needed, can help reduce the risk of falling."

Burbank and Sun are currently reworking a proposal to be submitted for grant funding that would allow the team to construct six Activity Analyzers and conduct a research study. The study would involve testing the device with a sample of 18 older adults to measure activity levels and collect feedback in order to improve the product.

Overall, the devices will help to improve the lifestyles of older adults.

"Sedentary older adults, as a group, benefit the most from even the smallest amount of exercise. When you are stationary, your blood doesn't circulate as well, your lungs don't work as well and it has an impact on your mental health. Exercise has cardiovascular, respiratory, digestive, neurological and skeletal muscular system benefits among many others," said Burbank. "By getting individuals moving just a little, they will hopefully move toward a more structured, regular exercise routine."

Provided by University of Rhode Island

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