A major challenge presented by an aging population is finding socially and financially responsible ways in which we can care for the elderly. In the year 2000, 35 million Americans were over the age of 65. By 2030 that number will double [1]. Worldwide over 35 million people will be diagnosed with dementia by 2050 [2]. To discover better ways to provide for the elderly, care facilities are currently being used as testing grounds for exciting new technologies that help to monitor the abilities and needs of residents. Systems such as motion-tracking radio frequency transceivers, medication-monitoring pill bottles, and gait-detecting floor mats help provide useful data of health and functionality. Such data may allow aging individuals to live at home longer, have comprehensive care in residential facilities, and lower the burden of repetitive and mundane tasks on caregivers. We believe that GATE (the Gestural Automated Testing Environment) will provide elderly patients and those who care for them an inexpensive, robust, and convenient source of information which can be used to improve their lives. With more information doctors can make better decisions; allowing patients to stay at home longer without the concern that they are being ignored or under-served.

GATE provides an inexpensive, non-invasive, and accessible way for elderly people to be monitored for cognitive and fine motor function decline. By performing tests at home we hope to generate statistics which are more strongly correlated to the health of the patient than those currently in use in doctor’s offices. To achieve these goals we have developed GATE based upon a popular gestural motion controller used primarily for computer gaming. We chose this device because of its low cost, ease of use, and robust API. Our initial trials on the device were designed to test cognitive abilities and motor function. We believe that in the future the device could also be used diminish cognitive decline in the elderly [3]. Integration with other systems developed at OHSU could allow our system to correlate the effects of proper medication on the tremor of a Parkinson’s sufferer, the metal acuity and motor function of a person with Alzheimer’s, or the memory of a person suffering from the early stages of dementia. In a finished product wellness statistics would be available to the patient’s healthcare professional over the internet.

Our team believes that by creating affordable solutions for monitoring the effects of degenerative diseases in patients we can substantively improve the lives of honored citizens by allowing them to stay at home for longer and ensuring that they are receiving treatment especially suited to their needs. An at-home monitoring system could be used in place of doctor-administered tests which would save the patient a potentially stressful trip to the hospital and give doctors and care givers instant access to pertinent information regarding each patient.

Today motor function and cognitive testing is inaccessible for many elderly patients due to cost, lack of transport, and a limited pool of healthcare professionals. Inaccessible testing leads to gaps in the knowledge of doctors. Patients who are already vulnerable to illness are subjected to stressful hospital environments and left without adequate care. GATE provides an inexpensive system for testing cognition and motor function in elderly patients, providing more data faster to healthcare professionals, and mitigating the effects of cognitive and motor function decline through fun activities.

GATE: Gestural Tracking for Neurodegenerative Disorders
Noah Zentzis¹, Erich Schafermeyer²
¹BS, Computer Science, ²MS, Electrical Engineering