**F5-05-04** ECOLOGICALLY VALID ASSESSMENT OF LIFE ACTIVITIES: UNOBTRUSIVE CONTINUOUS MONITORING WITH SENSORS

Jeff A. Kaye[1,2,3], Johanna Austin[1,2,3], Hiroko H. Dodge[1,2,3,4], Nora Mattek[1,2,3], Thomas Riley[1,2,3], **Adriana Seelye**[1,2,3], Nicole Sharma[1,2,3], Katherine Wild[1,2,3], *[1]Oregon Health & Science University, Portland, OR, USA; [2]NIA-Layton Aging & Alzheimer's Disease Center, Portland, OR, USA; [3]Oregon Center for Aging & Technology (ORCATECH), Portland, OR, USA; [4]University of Michigan, Ann Arbor, MI, USA. Contact e-mail: seelyea@ohsu.edu*

**Background:** Detecting clinically meaningful, functional change in dementia research is challenging. Self-report by patients or informants is limited by inaccurate memories or perceptions of events. Direct testing of function through performance-based ADL testing provides a more objective view of function, but is only a brief snapshot of a person's capacity and may be interpreted as a more complex cognitive test using a device. An alternative that may provide more objective and ecologically valid functional assessment is to employ pervasive computing and sensing technologies in the home to detect meaningful change. **Methods:** Continuous data from community dwelling older adults followed in ORCATECH's Intelligent Systems for Assessing Aging Changes and the Ambient Independence Measures for Assessing Care Transitions (AIMS) Studies was generated using simple embedded sensors and monitored devices (passive IR motion activity sensors, contact sensors, instrumented pill boxes, telephone and computer use monitors) to provide continuous metrics of functional ability. A weekly on-line questionnaire provided frequent assessment of relevant information that is difficult to obtain with sensors or infrequent clinic visits (e.g. falls, mood, medication changes). **Results:** Data from 354 participants followed for up to 9 years was used to develop summary metrics of daily function: total daily activity, number of room transitions, time out of home, sleep and nighttime behavior (e.g. time in bed, trips to the bathroom), social interaction (telephone use, visitors), medication adherence and cognitive function (computer use). Using these measures in the AIMS dataset, a mixed effects model combining data (63,745,978 observations) from conventional clinical sources, as well as novel sources (home-based sensing platform, weekly on-line reports, and public data-bases such as daily weather) tested the ability of this kind of data in aggregate, as well as in individual domains to determine functional outcomes and care needs. The prediction of transition to higher care levels from independence within 6 months achieved an area under the ROC curve of 0.97. **Conclusions:** Home-based pervasive computing and sensing technologies can provide a more objective and ecologically valid functional assessment that can be applied to longitudinal studies and clinical trials, improving the ability to detect meaningful change.

**THURSDAY, JULY 28, 2016
PLENARY SESSIONS
PL-05**

**PL-05-01** THE CHALLENGES AHEAD FOR PET IMAGING OF PROGRESSIVE PROTEINOPATHIES

**Victor L. Villemagne**, *The Florey Institute of Neuroscience and Mental Health, Melbourne, Australia; Department of Molecular Imaging and Therapy, Centre for PET, Austin Health, Heidelberg, Australia. Contact e-mail: victorlv@unimelb.edu.au*

Abstract not available.

**PL-05-02** NEXUS OF ALZHEIMER'S AND CANCER

**Jane Ann Driver**, *Brigham and Women's Hospital, Boston, MA, USA; Harvard Medical School, Boston, MA, USA. Contact e-mail: JDRIVER@partners.org*

Abstract not available.

**THURSDAY, JULY 28, 2016
ORAL SESSIONS
O5-01
NEUROIMAGING: NEUROIMAGING CHANGES ASSOCIATED WITH APOE4 AND OTHER GENETIC LOCI**

**O5-01-01** APOE E4 ALLELE EFFECT ON VASCULAR REACTIVITY MEASURED BY BREATH-HOLD ARTERIAL SPIN LABELING IN NORMAL AND MEMORY-IMPAIRED ADULTS

**Megan E. Johnston**[1], Laura D. Baker[1], Suzanne Craft[2], Christopher T. Whitlow[1], Youngkyoo Jung[1], *[1]Wake Forest University Health Sciences, Winston Salem, NC, USA; [2]Wake Forest School of Medicine, Winston-Salem, NC, USA. Contact e-mail: megjohns@wakehealth.edu*
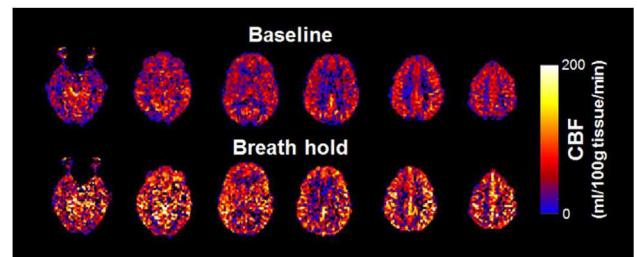


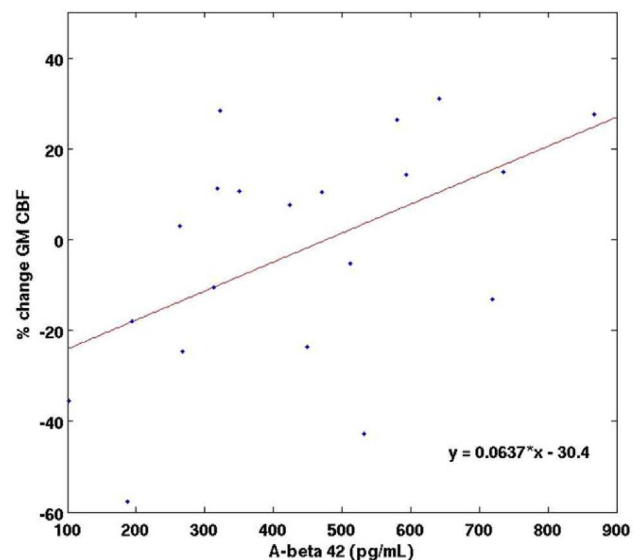Figure 1. Selection of slices from representative baseline and breath hold CBF maps



Figure 2. Plot of Aβ42 vs percent change in averaged GM CBF with breath-hold paradigm in APOE ε4 carriers adjusted for sex; adjusted $R^2 = 0.224$, $P = 0.025$