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BME People

Tamara Hayes

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Current Appointments

Assistant Professor, Department of Biomedical Engineering

Office

Primary Office at Center for Health and Healing

3303 SW Bond Avenue

Mail code: CH13B

Portland, OR 97239

Rm #13043

Education

BASc [Engineering Science](#) University of Toronto, 1981

MASc [Electrical Engineering](#), University of Toronto, 1990

MS Behavioral Neuroscience, University of Pittsburgh, 1990

PhD [Neuroscience](#), University of Pittsburgh, 1994

Department(s)

Biomedical Engineering

Biography

Dr. Hayes received her M.A.Sc. in Electrical Engineering from the University of Toronto in 1990, and her Ph.D. in Neuroscience from the University of Pittsburgh in 1994. After receiving her doctorate she worked at OHSU doing telemedicine research, developing a teledermatology system and doing outcomes research evaluating the use of the system to deliver tertiary dermatology care to rural Oregon. She then worked in industrial software development at Informix and IBM, both as an engineer and a senior manager. She returned to OHSU in 2002 as an Assistant Professor in the newly formed Department of Biomedical Engineering.

Research Interests

Dr. Hayes' research interests include the use of ubiquitous computing to deliver health care in the home, with the goal of changing the current paradigm of clinic-centered healthcare to a model that is less costly, more effective, and allows an individual to participate more fully in their own health care. This work is done collaboratively with other researchers in the Point of Care laboratory, with clinicians and scientists at the Layton Center for Alzheimer's and Aging Research, and with industry partners.

Current projects include a 225-person longitudinal study of motor and cognitive change in the elderly, using unobtrusive in-home technology to assess early changes in motor and cognitive function; a 600-person randomized trial examining the use of technology to do more frequent cognitive assessments, with the goal of detecting incident cognitive decline earlier; a study of the use of load cells under the bed to assess sleep apnea and periodic leg movements (Zach Beattie's dissertation project); and a number of smaller projects examining the use of technology for intervention and support of Instrumental Activities of Daily Living

A great deal of work remains to develop appropriate algorithms for analyzing the data collected from

these systems. The data collected form a non-periodic time series that requires sophisticated multi-resolution approaches to separate acute and chronic changes from normal daily or weekly variability for a given individual. In addition, there are interesting technical challenges to be resolved, including extending the system to work in multi-person homes and ultimately providing real-time analysis, which would allow us to embed intelligent "aids" into the system.

Research Group(s)

Neuroengineering

Point of Care Laboratory

Selected Publications

- Hayes TL, Larimer N, Adami A, Kaye J. *Medication adherence in healthy elders: small cognitive changes make a big difference. Aging and Health*. In press.
- Hayes TL, Abendroth F, Adami, A, Pavel, M, Zitzelberger TA, Kaye JA. *Unobtrusive assessment of activity patterns associated with mild cognitive impairment. Alzheimer's and Dementia*, In press.
- Kaye JA, Hayes TL, Zitzelberger TA, et al. *Deploying wide-scale in-home assessment technology. Technology and Aging*, A. Mihailidis, J. Boger, H. Kautz, and L. Normie, Eds., IOS Press, 2008, 21:19-26.
- Hayes TL, Pavel M, Kaye JA. *An approach for deriving continuous health assessment indicators from in-home sensors. Technology and Aging*, A. Mihailidis, J. Boger, H. Kautz, and L. Normie, Eds., IOS Press, 2008, 21:130-137.
- Lundell J, Hayes TL, Vurgun S, Ozertem U, Kimel J, Kaye J, Guilak F, Pavel M. *Continuous Activity Monitoring and Intelligent Contextual Prompting to Improve Medication Adherence. 29th Annual International Conference of the IEEE Engineering In Medicine and Biology Society, 23-26 August, 2007, Lyon, France.*
- Leen, T, Hayes TL, Zhengdong, L, Kaye JA. *Detection of Early Cognitive Loss from Medication. 2nd International Conference on Technology and Aging (ICTA), Proceedings of FICCDAT 2007, 16-19 June, 2007; Toronto, CA.*
- Hayes TL, Pavel M, Kaye JA. *Continuous health assessment using in-home sensors. IOS Press, 2007. 2nd International Conference on Technology and Aging (ICTA), Proceedings of FICCDAT 2007, 16-19 June, 2007; Toronto, CA.*
- Pavel M, Hayes TL, Tsay A, Erdogmus W, Paul AS, Larimer N, Jimison H, Nutt J. *Continuous Assessment of Gait Velocity in Parkinsons Disease from Unobtrusive Measurements. 3rd International IEEE EMBS Conference on Neural Engineering, 2 5 May 2007, Hawaii, USA.*
- Hayes TL, Pavel M, Adami A, Larimer N, Tsay IA, Nutt J *Pervasive Technology in Distributed Healthcare: Simultaneous Assessment of Multiple Individuals. IEEE Pervasive Computing, 2007, 6 (1):36-43.*
- Kaye JA , Hayes, TL,. *Home Health Monitoring. Generations. 2007*
- Hayes TL, Hunt JM, Adami AG, Kaye J. *An electronic pillbox for continuous monitoring of medication adherence. Presented at 28th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, Sep 2006, New York, NY.*
- Pavel M, Hayes TL, Adami AG, Jimison HB, Kaye J. *Unobtrusive assessment of mobility. Presented at 28th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, Sep 2006, New York, NY*
- Pavel M, Adami A, M. Morris M, Lundell J, Hayes TL, Jimison H, Kaye JA. *Mobility Assessment Using Event-Related Responses. 2006 Transdisciplinary Conference on Distributed Diagnosis and Home Healthcare, 2-4 April, 2006; Arlington, VA.*
- Adami AM, Hayes TL, Pavel M, Singer CM. *Detection and Classification of Movements in Bed using Load Cells. 27th Annual International Conference of the IEEE Engineering In Medicine And Biology Society, 1-4 September, 2005; Shanghai, China.*
- Hayes TL, Pavel M, Kaye JA. *An Unobtrusive In-home Monitoring System for Detection of Key Motor Changes Preceding Cognitive Decline. 26th Annual International Conference of the IEEE Engineering In Medicine And Biology Society, 1-5 September, 2004; San Francisco, CA.*
- Hayes TL, Pavel M., Schallau PK, Adami AM. *Unobtrusive Monitoring of Health Status in an Aging Population. 5th International Conference on Ubiquitous Computing, October 12-15, 2003; Seattle, WA.*

Adami AM, Hayes TL, Pavel M. *Unobtrusive Monitoring of Sleep Patterns*. 25th Annual International Conference of the IEEE Engineering In Medicine And Biology Society, 17-21 September, 2003; Cancun, Mexico.

Staff

Austin, Daniel
Earl, Eric
Kearns, Peter
Larimer, Nicole
Riley, Thomas
Saperstein, Sara
Yeagers, Jon

PhD Student(s)

Beattie, Zach

Related Courses

BME 565 /BME 665 - Introduction to Computational Neurophysiology

Related Links

ORCATECH: Oregon Roybal Center for Aging and Technology

This center includes clinicians, technologists, and scientists focused on the study of how unobtrusive technology can be used to assess health changes and to deliver healthcare to elders in the community. It incorporates the concept of a "living laboratory" in which continuous health assessment becomes an integral part of a person's daily activity.

Current and Upcoming Classes (through Spring 2009)

Class Number	CRN	Title	Term
BME 565	20577	<i>Introduction to Computational Neurophysiology</i>	Winter 2007



OREGON
HEALTH & SCIENCE
UNIVERSITY

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