Lightning Introductions

Trans-NIH/Interagency Workshop on the Use and Development of Assistive Technology for the Aging Population and People with Chronic Disabilities

September 10-11, 2014
Alice Borrelli / Intel

Director of Global Healthcare Policy
Sara J. Czaja
University of Miami Miller School of Medicine

Leonard M. Miller Professor, Department of Psychiatry and Behavioral Sciences
Scientific Director, Center on Aging
Director, Center for Research and Education on Aging and Technology Enhancement (CREATE)

How can we assure that vulnerable older adult populations have “meaningful access” to technologies and technology applications that meet their needs and enhance their well-being and quality of life?
What are the evidentiary requirement to move research on the topic of aging in place into practice?

Program Officer/Clinical Trials Specialist
National Heart, Lung, and Blood Institute
Anecdote is not the plural of data: what is the evidence needed to move technology assisted solutions into meaningful practice?
Elizabeth Mynatt
Georgia Institute of Technology

Worked in the “Aware Home” on Aging in Place Technologies including the Digital Family Portrait (caregiver awareness) and Memory Mirror (cognitive support)

Professor
Interactive Computing
Georgia Tech

Vice-Chair
Computing Community Consortium (CCC)

BIG QUESTION FOR THE WORKSHOP
How do we create technologies and services that evolve as a person ages and their health needs change?
How do we seamlessly build health into our digital world?

Health Science Administrator,
Office of Behavioral and Social Science Research, NIH
Program Director, Smart & Connected Health, CISE, NSF
How to make technology adapt to my needs as my abilities

Machine Learning

Virtual Coaches

Buhl University Professor
Computer Science and
Electrical & Computer Engineering

Director
Quality of Life Technology Center
How to make the in-home and on-body technology for wireless and mobile health robust, safe, accurate, and disappear!

BP America Professor
Dept. of Computer Science

Co-Director: Center for Wireless Health
Challenge:
Consider the disadvantaged.

http://relationalagents.com
How must our fiscal and social policies adapt to care for an aging population?
Neil Charness
Florida State University

William G. Chase Professor of Psychology
Interim Director, Institute for Successful Longevity

How can we develop technology that enables people to set, pursue, and (hopefully) achieve their goals across their lifespans?
Octav Chipara/ University of Iowa

Assistant Professor
Department of Computer Science
University of Iowa
Part of the Aging Mind and Brain Initiative

Context-Sensitive Evaluations of Hearing Aids In-situ

Measuring the auditory context
How important was it to hear well?
How noisy was it?

acoustic environment

Could you see the talker’s face?

Where were you?

activity

What were you listening to?

How can we combine infrequent user feedback and continuous sensor measurements to improve assessment methods?
How do we use the huge amount of passively and actively collected health data to improve assessment and diagnostic capabilities?
Ann Drobnis - CCC, Director

Working to bringing communities together around computing and technology.

How can we use the information already being collected to aid in the care of individuals?
Gwendolyn Graddy-Dansby, M.D., F.A.C.P.
Center for Senior Independence

The Program of All-Inclusive Care for the Elderly (PACE) program is an innovative model of care for aging individuals. Using an Interdisciplinary Team, our goal is to support healthy aging and aging in place. Our purpose is to promote quality of life for frail seniors living in their community by offering care for their medical, social, and physical needs.

How do we maximize and bridge high-touch using the concept of PACE and high-technology in the 21st Century?
No One Should Have to Suffer Twice!

How do we help elderly people feel like they have a reason to live?
How can we develop systems that adapt to a user as their mental and physical abilities decline?

Professor and Chair, Computer Science
Johns Hopkins

Chair, Computing Community Consortium
Vicki Hanson

“The corridors are so long and I get lost so I just wait for someone to push me instead of walking”

How do we take advantage of technology without overwhelming the its users?

Distinguished Professor
Human-Computer Interaction, Accessibility
IEEG.org:
Collaborative data sharing for the biomedical sciences

How do we build the capabilities for allowing clinicians, device manufacturers, and scientists to develop new capabilities for monitoring health and improving life?
Can some aspects of long-term care (LTC) be made available through affordable, smart, digital home-use medical and assistive wireless technologies?

With more and more Americans aging in place and becoming disabled, in the absence of Medicare, affordable supplemental insurance, disability insurance, or Social Security disability benefits, will there come a point when the federal government be forced to deal with America’s LTC affordability problem?
Holly Jimison / Northeastern University

Consortium on Technology for Proactive Care

**Question:** What technology innovations could help us incorporate what matters most to older adults (feeling needed, independence, self-actualization, socialization, …) into health interventions?

Remote Health Coaching of Older Adults in the Home

- Cognitive Ex
- Physical Ex
- Sleep
- Mood
- Socialization
- Novelty
- Medications

Physical Exercise: Tailored Assessment/Intervention

Cognitive Exercise: Computational Models of Cognitive Function
Brian Jones
Georgia Institute of Technology

Director, Aware Home Research Initiative
Senior Research Engineer, Interactive Media Technology Center (IMTC)

Onacom connected communication
Health coaching CHF, diabetes

Personal health mashups

The Aware Home - connected home monitoring

How can integration / analysis of information from innovative technologies interpret an individual’s needs and empower them to live healthier lives?
Emil Jovanov
University of Alabama in Huntsville

Associate Professor
Electrical and Computer Eng.

Co-Director:
• mHealth Lab
• Real-time Physiological Monitoring Lab

How can we use wearable monitoring and ambient intelligence for early detection of health deterioration?
**Question:**
With 10,000 Boomers turning 65 per day, how does the US keep them in a low cost setting (home) and flatten the cost of the most expensive (need daily help with ADL/IADLs)?

**Problem Elements:**

Mobility: Higher Quality of Life & Lower Cost

<table>
<thead>
<tr>
<th>Quality of Life</th>
<th>$1s</th>
<th>$1,000s</th>
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<tbody>
<tr>
<td>Home Care</td>
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<td>Residential Care</td>
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<td>Acute Care</td>
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Goal: Shift Left

Exhibit 3: Average Spending by Type of Service for Select Groups, 2006

**Solution Elements:**

- Smart Phones, Homes, Cars, & Orthotics
- Internet of things
- Big Data
- Quantitative Self
- Man-Machine Interface
- Crowd Sourcing
How to monitor vulnerable individuals and provide for “as needed in real-time” connection to the health care system and thereby to allow them to stay safely in the living environment of their choice longer?

- Medical CPS
- Medical Device Interoperability
- Mitigating Alarm Fatigue using Smart Alarms
- human-in-the-loop autonomous systems
Global Public Inclusive Infrastructure (gpii.net)

How can we shape standards-based, public information infrastructure to meet the needs of people as they age?
What are the fundamental computer science questions underlying practical aging in place systems?

Fall Study in Community-Dwelling Older Adults
- Six participants with mean age of 73 years
- Wore the device for an average of 10.33 days
- Had an average of 3.83 falls (range: 0-12)
What are the scientific principles that would enable us to:
- Augment human cognitive and physical capabilities
- Help people feel young, useful and managing their health
- Effortlessly improve health behaviors
- Use big data analytics to improve prediction and inference
How can we use technology to proactively keep people healthy and functionally active, engage them in self-management strategies AND improve their quality of life AND have better health outcomes AND save healthcare dollars?
How can technology ENHANCE the lives of older adults...
...by enabling, augmenting, empowering, advancing, energizing, engaging, etc.
How do we seamlessly integrate the digital and physical worlds to support our needs and abilities at any point in time?
How can we improve human health and support aging in place with smart technologies that aid with health monitoring, assessment and real-time intervention?
The role of privacy and willingness to pay on technology uptake among older individuals and family caregivers.

Informal caregivers may be a better target/market for technology development than older persons themselves. What technologies can we develop to facilitate their role in supporting family and friends with disability?
How can we capture each individual’s needs and create technology systems that automatically customize to fit their needs?

Professor, Electrical & Computer Engineering
Director, Center for Eldercare & Rehabilitation Technology

Using Kinect depth images to capture falls and in-home gait

Bed sensor captures pulse, breathing & restlessness
How do we leverage the great promise of modern technology without compromising safety of the patient?
Bob Sproull
University of Massachusetts

former Vice President and Director, Oracle Labs
Chair, Computer Science Telecommunications Board, National Academy of Engineering
Pervasive sensing, analytics, decision, and intervention technologies for various human concerns that are *unobtrusive* (easy to deploy, use, manage) and *trustworthy* (effective, reliable, resilient, privacy-sensitive).

**Professor & Techno-Optimist**

**Research:** Embedded & Mobile Computing and Sensing, Privacy & Security, Human-Cyber-Physical Systems
How can technology best support the informal caregiver?

Corporate Senior Director of Community Services & Executive Director of Presbyterian SeniorCare at Home
Howard Wactlar
Carnegie Mellon University

What are the science and engineering obstacles to be overcome to enable technology to compensate for debilitating human physical and mental conditions?

Alumni Research Professor of Computer Science
Scientific Director, Quality of Life Technology Center
Former Director, Information & Intelligent Systems Division, NSF

Augmenting Human Capability & Performance
Victoria Zagaria /Intel Federal Healthcare
Alicia Anderson
Department of Housing and Urban Development (HUD)

Housing Program Manager
Section 202 Supportive Housing for the Elderly Program
Office of Housing Assistance and Grant Administration

How can technology be used to improve health outcomes, reduce health care utilization and postpone or delay institutionalization for poor elderly?
Stephen M. Bauer, Ph.D.
National Institute on Disability and Rehabilitation Research

Project Officer

Expertise: Assistive and Universally Designed Technologies; Assistive Technology Service Provision; ICF Applications.

How might (why should) ICF language and concepts be used to characterize human needs and associated technology (and other) solutions?
Margaret L. Campbell, Ph.D.
National Institute on Disability and Rehabilitation Research

Senior Scientist for Planning and Policy Support and
Lead NIDRR Subject Matter Expert for “Aging with Disability”

How can we better bridge knowledge across disciplines to coordinate the development and translation of promising practices and technology-based interventions that enhance the health and independence of adults who are both aging with long-term disabilities and those aging into disability and chronic disease in later life?
Theresa Cruz/ NIH/NICHD

Program Officer
National Center for Medical Rehabilitation Research at the
Eunice Kennedy Shriver National Institute of Child Health and Human Development

How can we use technology to empower people with disabilities?
Program Officer, Institute of Medicine
Forum on Aging, Disability and Independence

How can/will technology affect how we use the health care workforce? Will technology replace some of what health care workers do now?
Lyndon Joseph /NIA/ERP
Dr. Shari Ling
Deputy Chief Medical Officer
Centers for Medicare and Medicaid Services
Shari.ling@cms.hhs.gov

What are outcomes are meaningful to achieve despite aging?
Leah Lozier
U.S. Dept. of Housing & Urban Development

Presidential Management Fellow
Office of Policy Development & Research
U.S. Department of Housing & Urban Development

How can we accommodate the needs of the low income elderly?
Research Scientist and Program Director  
Outcomes Research Branch  
Applied Research Program  
Division of Cancer Control and Population Sciences  
National Cancer Institute

Areas of scientific interest:
- Measurement of symptoms and functional status using patient-reported outcomes, performance-based measures, and sensor data
- Oncology telehealth models of care
- As a board certified nurse practitioner, I am also interested in technology implementation to enhance care delivery processes and evidence-informed clinical decision-making

What technologies can be developed, adapted or deployed during and following cancer treatment to improve clinical outcomes and the patient experience for older, frail or vulnerable patients (including those with multimorbidity)?
How do we develop a suite of technologies that will match the abilities of a human caregiver?

**Populations**
- Island Health, B.C.
- WWNMMC – Military (?)

**Partnerships (evolving)**
- IBM – Analytics, Watson
- Telus – Innovation center
- ORCATECH (?)
Weisong Shi / NSF

- NSF: Managing the Computer Systems Research Program, SCH/CyberSEES
- WSU: Lead Wireless Health Initiative

How does computing technology advance aging problems? and what are the new computing challenges from aging applications?

Program Director @ NSF
Professor @ Wayne State University
How do we translate the research being done into a national platform model, that takes into account lessons learned from academia, government and the private sector?
How can we work with lay persons to assure their medical equipment is useful and usable to them on a regular basis?