



# 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?



UNIVERSITY OF MIAMI  
**MILLER SCHOOL**  
**of MEDICINE**

# Erin Iturriaga / NIH



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



National Institutes  
of Health



## Oregon Health and Science University

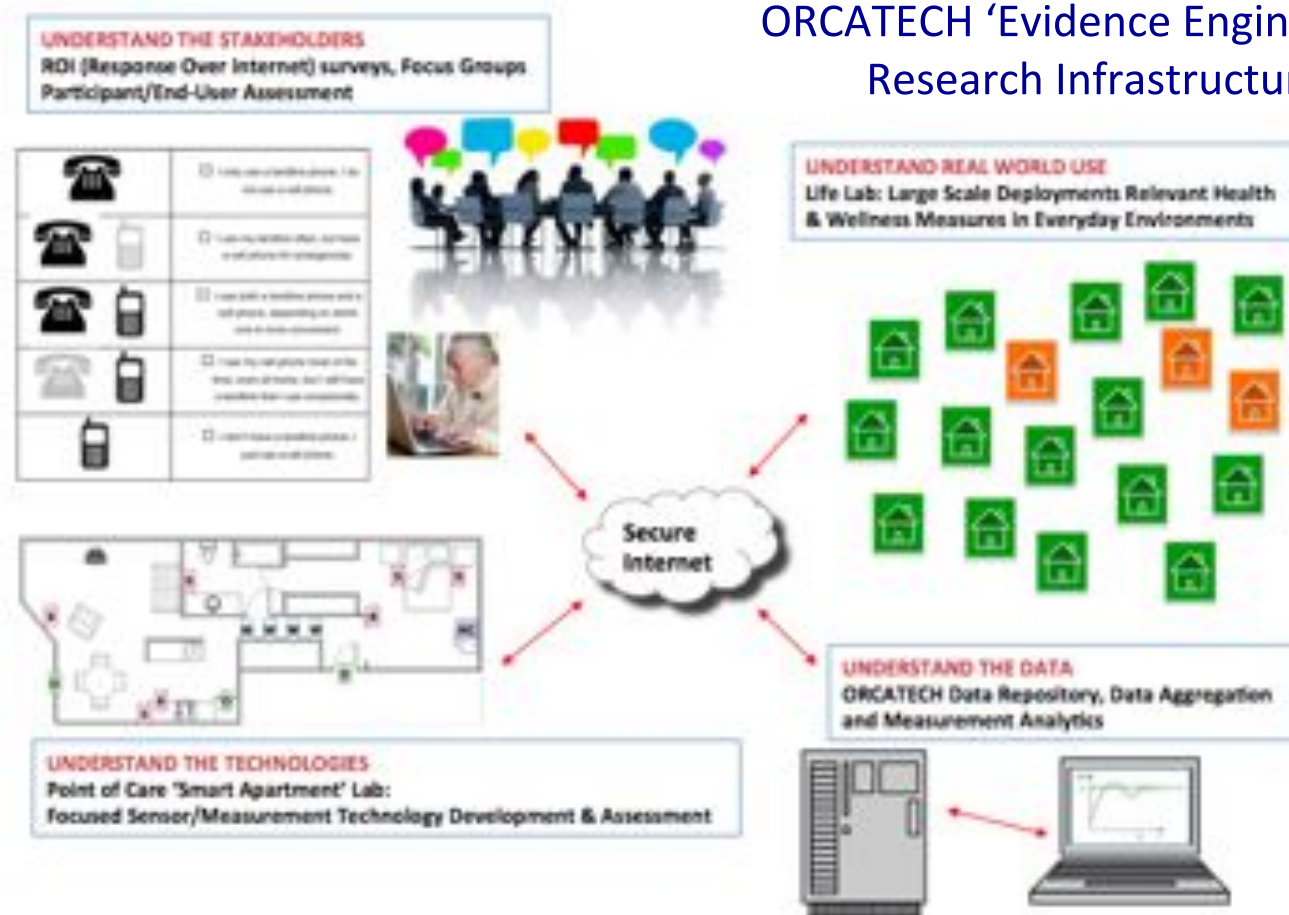


Layton Professor of  
Neurology & Biomedical  
Engineering

Director, ORCATECH

Director, Layton Aging &  
Alzheimer's Disease Center

### ORCATECH 'Evidence Engine' Research Infrastructure



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?

# Wendy Nilsen / NIH & NSF



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



National Institutes  
of Health



# Daniel Siewiorek/ Carnegie Mellon University



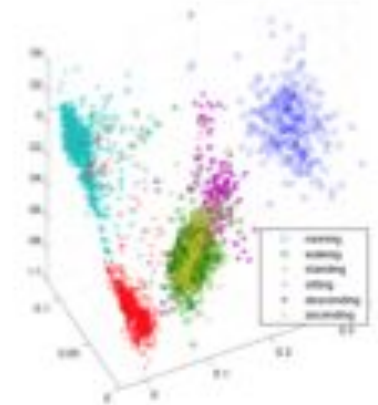
Buhl University Professor  
Computer Science and  
Electrical & Computer Engineering

Director  
Quality of Life Technology Center



*How to make technology adapt to my needs as my abilities*

## Machine Learning



## Virtual Coaches



Physical Therapy Coach



Seating Coach



Stroke Therapy Coach



HeadCoach



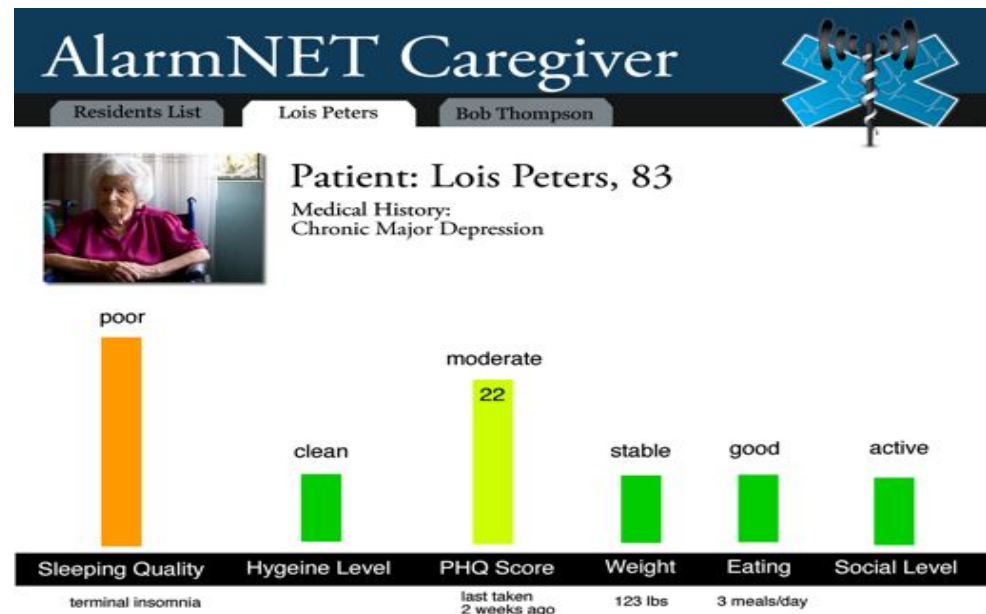
# John Stankovic / University of Virginia



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



# Timothy Bickmore

## Northeastern University



Challenge:

Consider the  
disadvantaged.

<http://relationalagents.com>

# Melinda Buntin/Vanderbilt Health Policy



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 can we combine infrequent user feedback and continuous sensor measurements to improve assessment methods?

# Anind K. Dey, Carnegie Mellon University



Associate Professor  
Director, Human-Computer Interaction Institute  
Carnegie Mellon University



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?



CCC

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Computing Community Consortium  
Catalyst

# Kenneth Gabriel / Prognosis

# Gwendolyn Graddy-Dansby, M.D., F.A.C.P.

## Center for Senior Independence



**Medical Director,  
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?

# Dave Gustafson/ University of Wisconsin-Madison



**No One Should Have to Suffer Twice!**

How do we help elderly people feel like they have a reason to live?



# Greg Hager

## Johns Hopkins University



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



Distinguished Professor  
Human-Computer Interaction,  
Accessibility



*“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?



Bill Hanson/ University of Pennsylvania



# Zack Ives

**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?*

# Robert Jarrin/ Qualcomm

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?



Senior Director, Government Affairs  
Qualcomm Incorporated

# 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



Physical Exercise: Tailored Assessment/Intervention

Cognitive Ex  
Physical Ex  
Sleep  
Mood  
Socialization  
Novelty  
Medications



Cognitive Exercise: Computational Models of Cognitive Function

# Brian Jones

## Georgia Institute of Technology



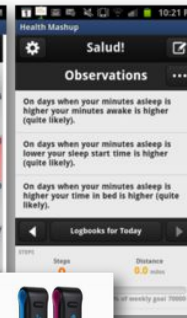
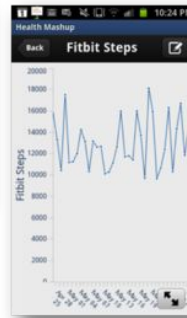
Director, Aware Home Research Initiative  
Senior Research Engineer, Interactive Media Technology  
Center (IMTC)



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



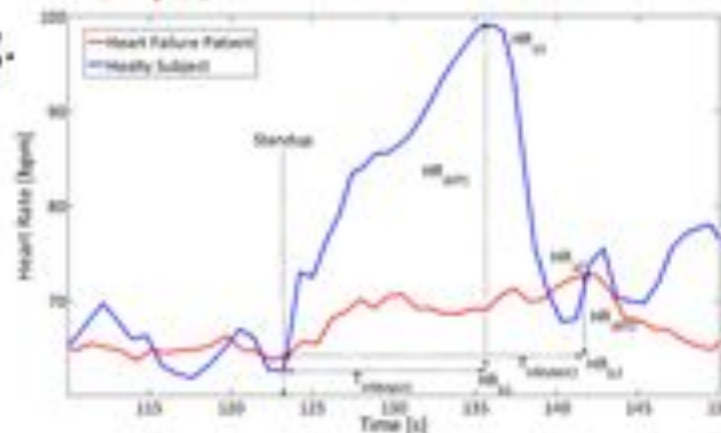
Associate Professor  
Electrical and Computer Eng.

Co-Director:

- mHealth Lab
- Real-time Physiological Monitoring Lab

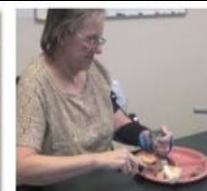


How can we use wearable monitoring  
and ambient intelligence for  
early detection of health deterioration?





# Steve Kelly



Founder/COO

Smart Orthotics

Kendall Square

Restoring Independence

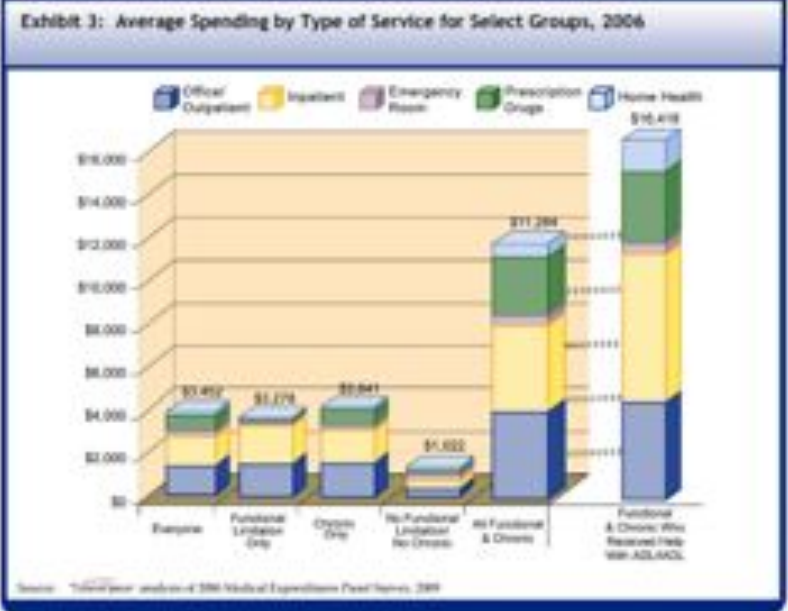
## Question:

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:



People with Functional Limitations and Chronic Conditions Spend More on All Types of Health Care Services



## Solution Elements:

Smart Phones, Homes,  
Cars, & Orthotics

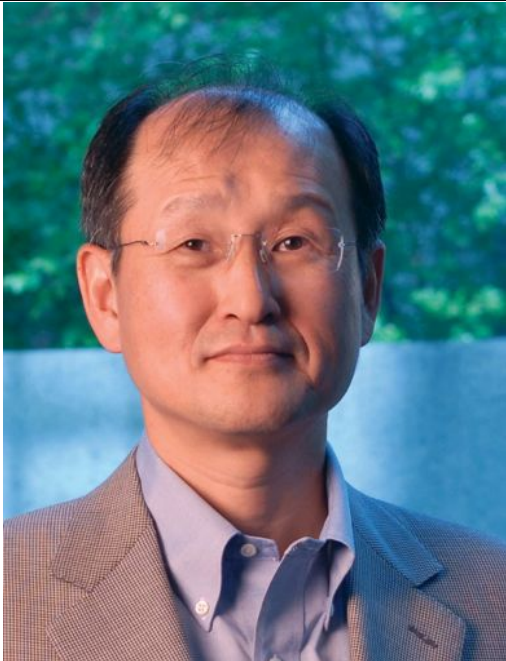
Internet of things

Big Data

Quantitative Self

Man-Machine Interface

Crowd Sourcing



Cecilia Fitler Moore Professor  
Computer and Information  
Science

Director  
PRECISE Center

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

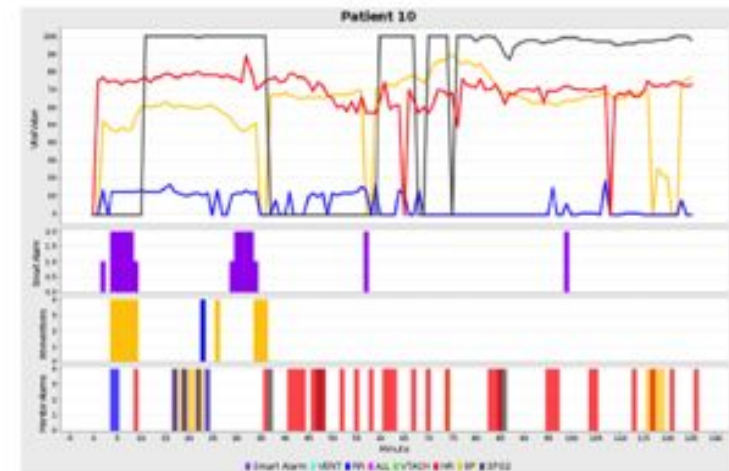


Fig. 3. Vitals signs and alarms; The top row is a trace of vital signs, smart alarm response is the second row, alarms resulting in an intervention are third from top and spurious alarms are in the bottom row. The smart alarm response tracks with the occurrence of intervention alarms.



Tony Lee / Philips

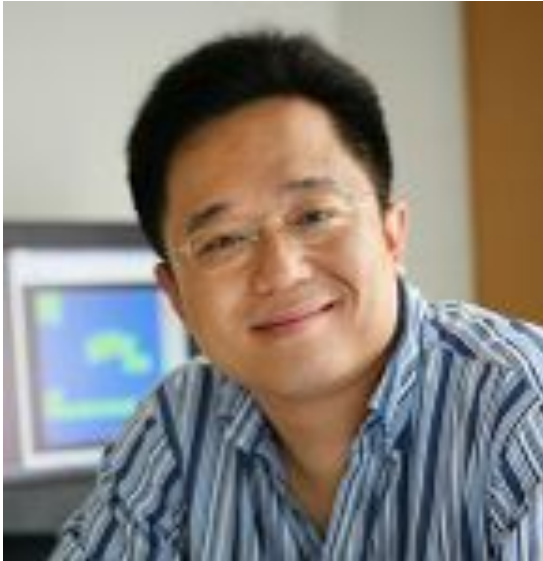
# Clayton Lewis/ University of Colorado



Global Public Inclusive Infrastructure ([gpII.net](http://gpII.net))

How can we shape standards-based, public information infrastructure to meet the needs of people as they age?

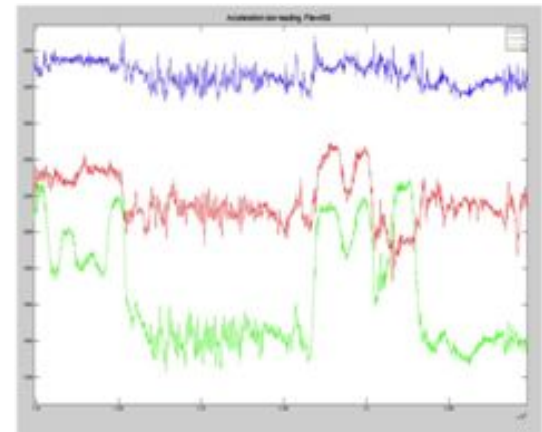
# Chenyang Lu / Washington University



Professor of Computer  
Science and Engineering



*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)

# Misha Pavel / Northeastern University

Consortium on Technology for Proactive Care

Behavioral Model  
ModelMe



*Research Focus:*  
*Behavioral Informatics*

Using computational modeling of behaviors to infer cognitive and physical functionality and to optimize interventions

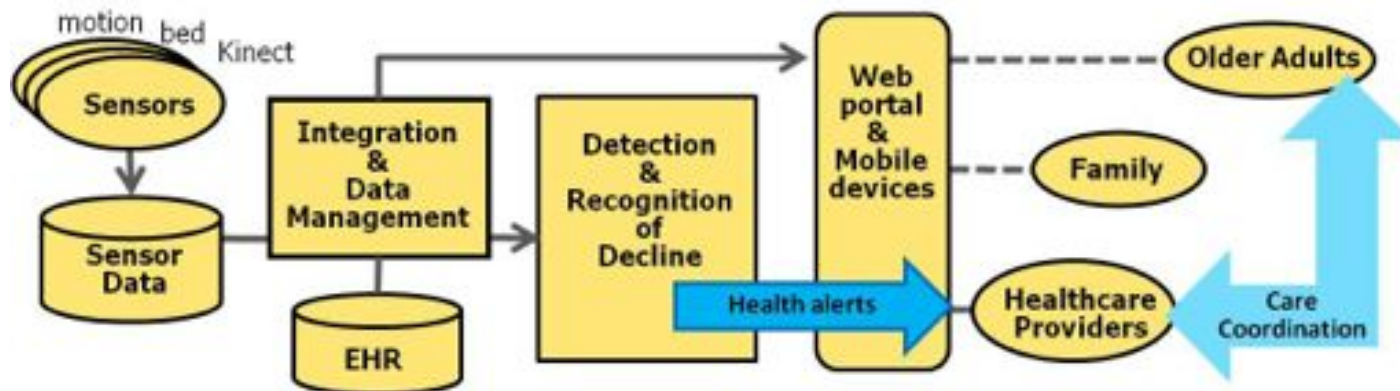
What are the scientific principles that would enable us to:

- 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

# Marilyn Rantz / University of Missouri

*Curators' Professor, MU Sinclair School of Nursing  
Executive Director, Aging In Place, TigerPlace*

**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?**





# Wendy Rogers

## Georgia Institute of Technology



Director: Human Factors and Aging Laboratory

CREATE: Center for Research and Education on Aging and Technology Enhancement (NIH/NIA)

TechSAGE: RERC on Technologies to Support Successful Aging with Disability (NIDRR)

***How can technology **ENHANCE** the lives of older adults...***

***...by enabling, augmenting, empowering, advancing, energizing, engaging, etc.***

# Jon Sanford

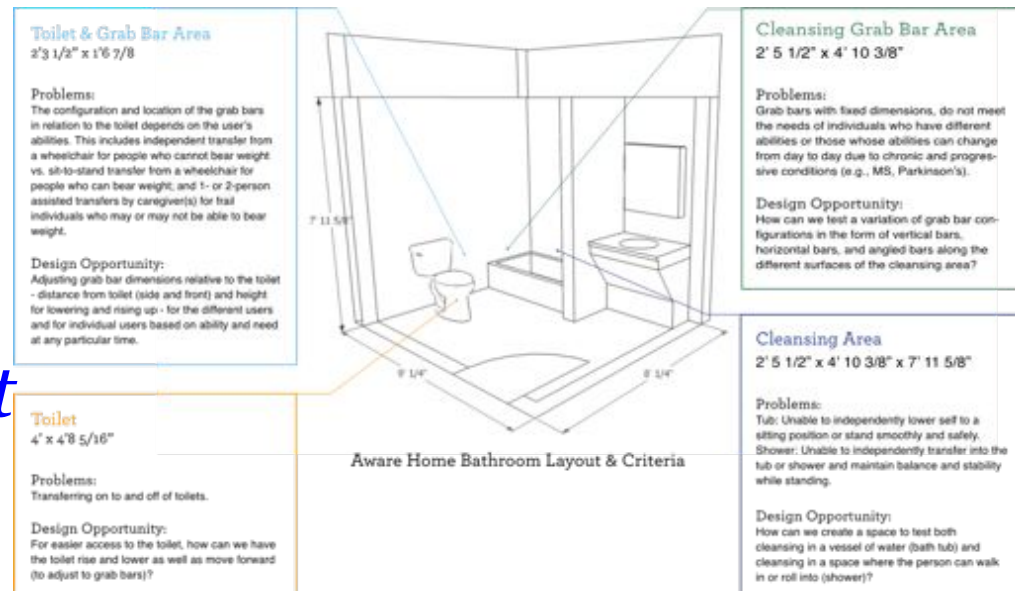
## Georgia Institute of Technology



Director: Center for Assistive Technology & Environmental Access - Enabling Environments (ee) Lab

PI: RERC on Technologies to Support Successful Aging with Disability (NIDRR)

*How do we seamlessly integrate the digital and physical worlds to support our needs and abilities at any point in time?*



Center for Assistive Technology  
and Environmental Access

College of Architecture

# Maureen Schmitter-Edgecombe Washington State University



Meyer Distinguished Professor  
Department of Psychology

How can we improve human health and support aging in place with smart technologies that aid with health monitoring, assessment and real-time intervention?



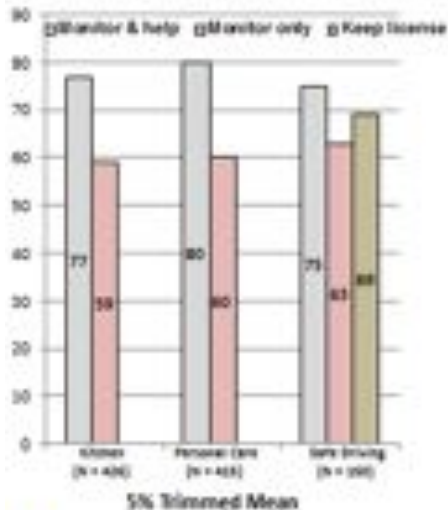


# Richard Schulz / U. of Pittsburgh

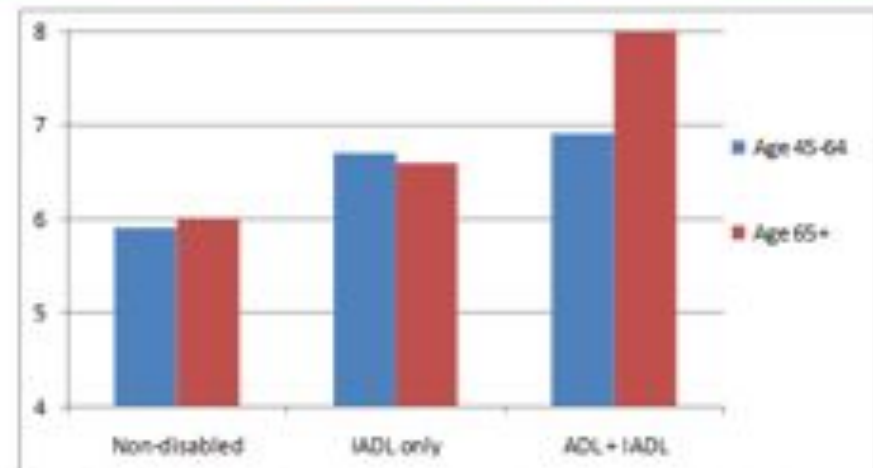


The role of privacy and willingness to pay on technology uptake among older individuals and family caregivers.

Amount (\$) Willing to Pay Monthly Out-of-Pocket for Kitchen, Personal Care, and Safe Driving Technologies, by Level of Assistance Provided (Among Those Willing to Pay > \$0)



Acceptability of Sharing /Recording Health Information by Disability Level and Age



Controlling for gender, education, race, general technology attitudes, and assistive device use.

Quality of Life Technology Center

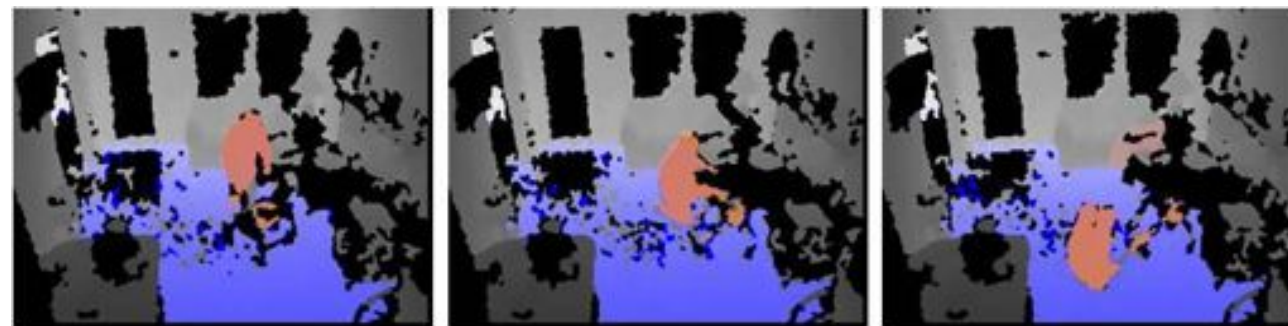
Informal caregivers may be a better target/market for technology development than older persons themselves. What technologies can we develop to facilitate their role in supporting family and friends with disability?

# Marjorie Skubic / University of Missouri



**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**



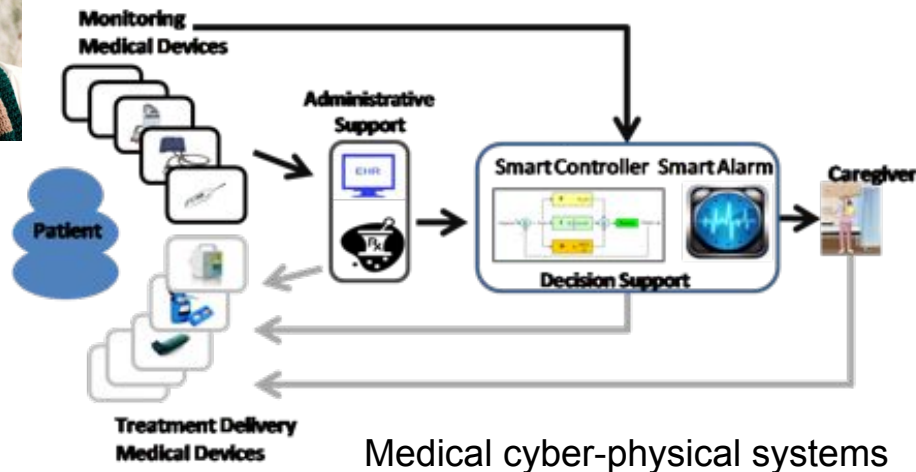
**Bed sensor captures pulse, breathing & restlessness**

# Oleg Sokolsky

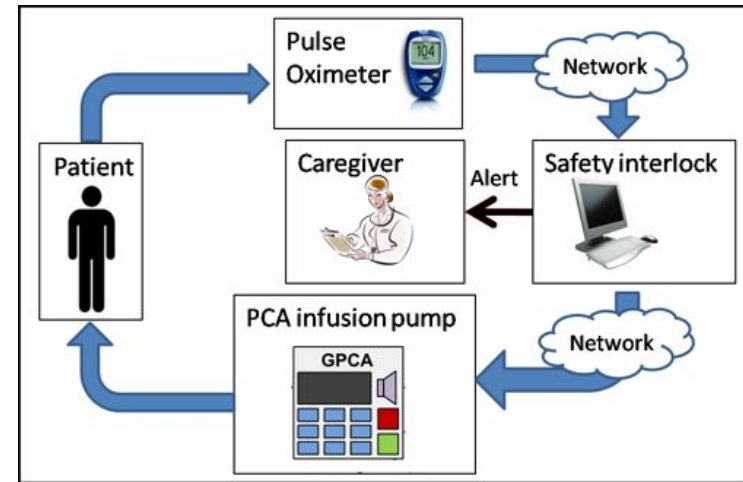
## University of Pennsylvania



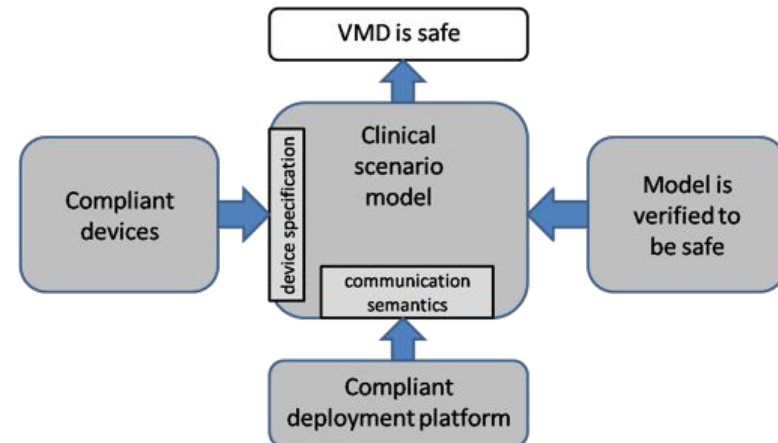
Research Associate Professor, PRECISE Center,  
School of Engineering and Applied Sciences



**How do we leverage the great promise of modern technology without compromising safety of the patient?**



Safety of physiological closed-loop systems



Assurance techniques for medical CPS

# Bob Sproull

## University of Massachusetts



former Vice President and Director, Oracle Labs

Chair, Computer Science Telecommunications  
Board, National Academy of Engineering



# Mani Srivastava

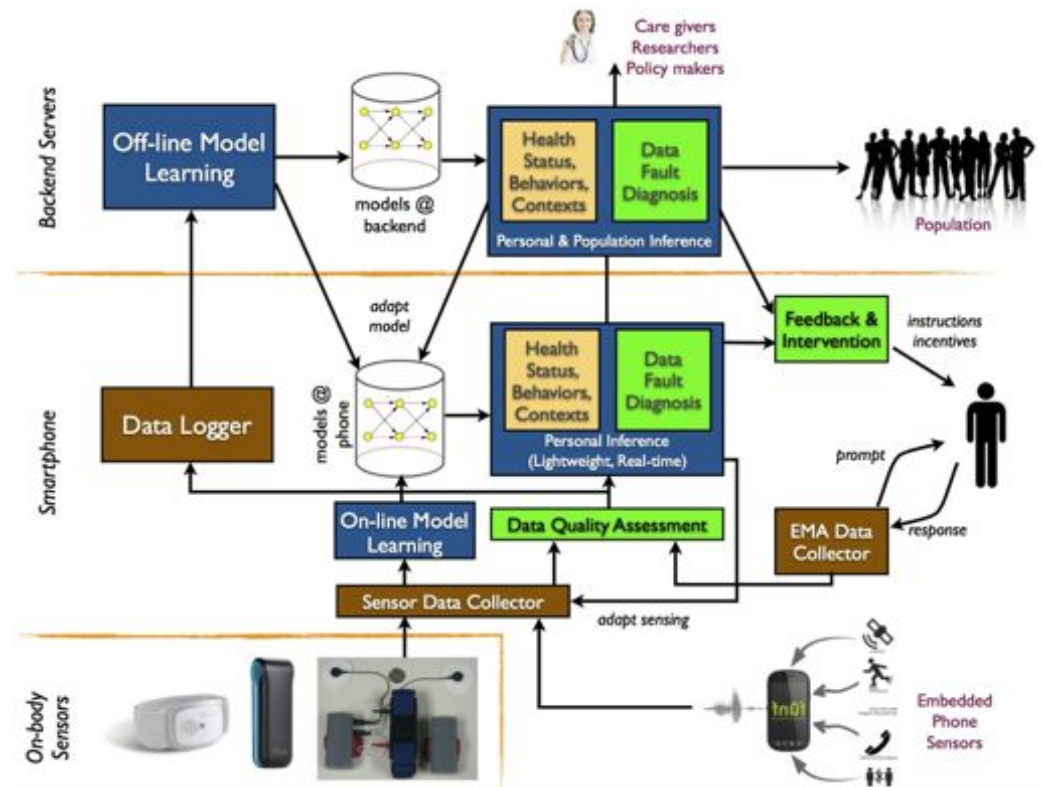
UCLA

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





# Ransom Towsley



How can technology  
best support the  
informal caregiver?

Corporate Senior  
Director of Community  
Services  
&  
Executive Director of  
Presbyterian SeniorCare  
at Home



# Howard Wactlar

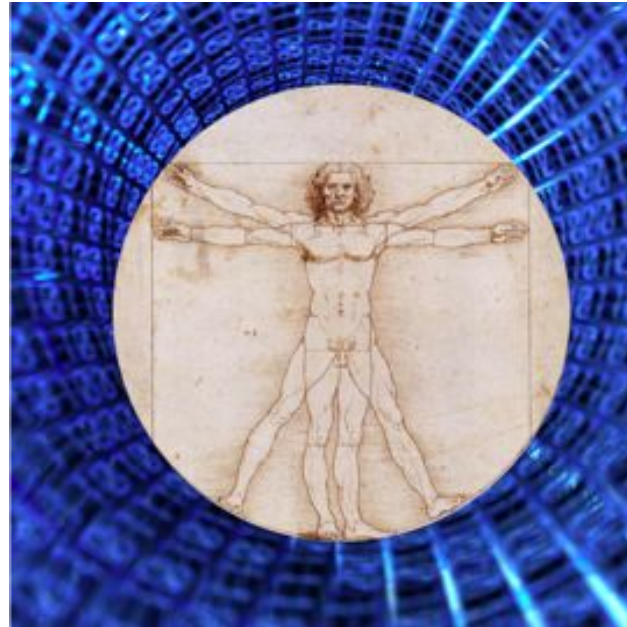
## Carnegie Mellon University



Alumni Research Professor  
of Computer Science

Scientific Director,  
Quality of Life Technology  
Center

Former Director, Information  
& Intelligent Systems  
Division, NSF



Augmenting Human  
Capability & Performance

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

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?



Neeraj Arora / NIH/NCI



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?

# Elizabeth Cocke / HUD

Lawton Cooper / NIH/NHLBI

# Theresa Cruz/ NIH/NICHHD



## **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?



National Institutes  
of Health



# Theresa Cullen / VA Informatics

# Sarah Domnitz/ IOM

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?



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Thomas Edes / VA

Jerome Fleg / NHLBI

Robert Hornyak / ACL/CDAP



Lyndon Joseph /NIA/ERP

Jonathan King / NIH/NIA/ERP

Allison Kumar / FDA/CDRH

Catherine Levy /NHLBI

# Shari Ling / CMS



Dr. Shari Ling  
Deputy Chief Medical Officer



Centers for Medicare and Medicaid Services

[Shari.ling@cms.hhs.gov](mailto: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?**



PD&R



Keith Marzullo / NSF

# Mary Ellen Michel / NCMR

Susan Miller / CMS

# Sandra Mitchell / NIH/NCI



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

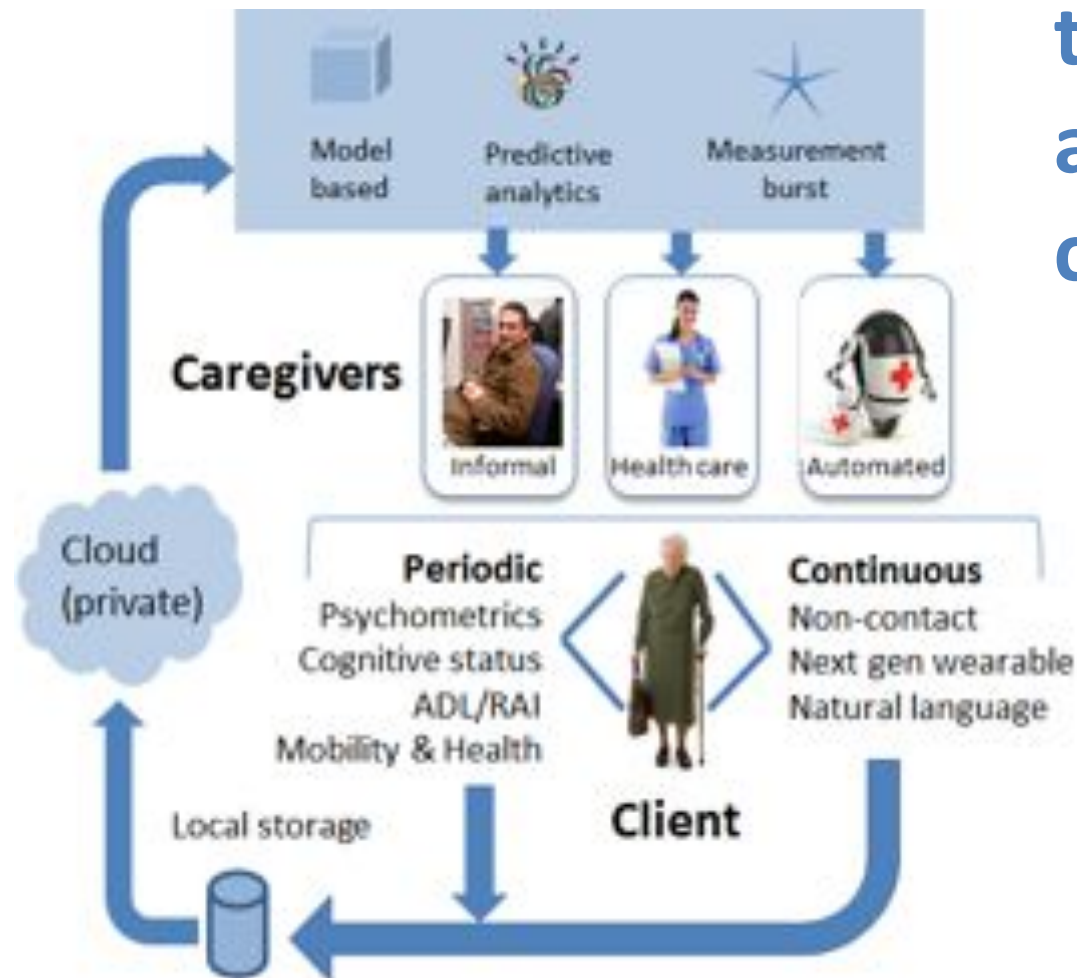
**What technologies can be developed, adapted or deployed during and following cancer treatment to improve clinical outcomes and the patient experience for older, frail or vulnerable patients (including those with multimorbidity)?**

Debra Sheets - UVIC gerontological nursing  
Sandra Hundza - UVIC rehab neuroscience  
Marc Klimstra - UVIC biomechanics  
Stuart MacDonald - UVIC neuropsychology

**Andrew R. Mitz**  
Laboratory of Systems  
Neuroscience  
NIH/NIMH/DIRP

Yvonne Coady - UVIC analytics  
Cheryl Beach - Island Health, B.C  
Ravi Chacko - Washington University  
biomedical engineering

# 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 (?)

# Andrew Pope / IoM



Louis Quatrano / NCMRR/NICHD/NIH

Matthew Quinn / FCC

Jamie Roberts / NIH/NINDS

# 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



Nina Silverberg / NIA

# Carol Star / HUD



# Erika Tarver/FNIH

Senior Project Officer  
Foundation for the National Institutes of Health



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?

# Mary Weick-Brady/ FDA-CDRH



Senior Policy Advisor  
Center for Devices and  
Radiological Health  
Food and Drug Administration

How can we work with lay persons to assure their medical equipment is useful and usable to them on a regular basis?