

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

Opening Remarks

Marie A. Bernard, M.D.

Marie A. Bernard, M.D. is Deputy Director of the National Institute on Aging (NIA). She serves as the principal advisor to the NIA director, and working closely with the director oversees over \$1 billion in aging research conducted and supported annually by the Institute. As NIA's senior geriatrician, she is particularly interested in the translation of NIA research from the very basic laboratory to the bedside and community, and in the pipeline of future scientists. She co-chairs the Department of Health and Human Services Older Adults Workgroup and the Dementias, Including Alzheimer's Disease Workgroup for Healthy People 2020. Within NIH she serves on the Extramural Activities Working Group, the Diversity Working Group, and co-chairs the Women of Color Committee of the Women in Biomedical Careers Working Group. Until October 2008 she was the endowed professor and founding chairman of the Donald W. Reynolds Department of Geriatric Medicine at the University of Oklahoma College of Medicine, and Associate Chief of Staff for Geriatrics and Extended Care at the Oklahoma City Veterans Affairs Medical Center. She has held numerous national leadership roles, including chair of the Clinical Medicine Section of the Gerontological Society of America, chair of the Department of Veterans Affairs National Research Advisory Committee, board member of the American Geriatrics Society, president of the Association for Gerontology in Higher Education. Dr. Bernard's research interests include nutrition and function in aging populations, with particular emphasis upon ethnic minorities. She has had a long-standing interest in comparative effectiveness research, having served as a reviewer for the Agency for Healthcare Policy and Research (now Agency for Health Research Quality) and a reviewer for the Department of Veterans Affairs (VA) Scientific Review Committee, Health Services Research and Development Service. Dr. Bernard has also served on the Health Services Research & Development Steering Committee on Racial Variations in VA Health Care, and the VA Advisory Committee for Multicultural Studies in Health Care. Dr. Bernard received her undergraduate training at Bryn Mawr College, where she graduated cum laude with Honors in Chemistry. She earned her M.D. from University of Pennsylvania. She trained in internal medicine at Temple University Hospital in Philadelphia, PA, where she also served as chief resident. She has received additional training through the AAMC Health Services Research Institute, the Geriatric Education Center of Pennsylvania, and the Wharton School Executive Development program.

William Heetderks, M.D., Ph.D.

As a child, William Heetderks was fascinated with gadgets, especially radios. He says, "In those days, they had these little crystal radios. They had an antenna and a little diode that could take enough power out of the air to drive your earphone without a battery. It really amazed me that there was this energy all around us that you could actually hear if you had the proper instrumentation." Growing up in a time when children's lives were much less structured than today, instead of spending all his time on the soccer field or processing ever-growing mounds of homework, Heetderks was very content to spend much of his free time tinkering in the basement of his parents' home. His father, who was an accountant by trade, frequently reminded his family how much he regretted not choosing a profession in the field of engineering. It's obvious those lamentations had a strong impact on the family when Heetderks reports that his strongest role models during his formative years were two older brothers who became engineers. True to the family plan, Heetderks steered toward an undergraduate degree in electrical engineering in a program that was almost devoid of biological studies. He recalls, "I hadn't taken biology since tenth grade, but during my senior year at college, I took a course in bioelectricity that looked at electricity of the nervous system." That single course pushed Heetderks out of the engineering nest and into the bigger multidisciplinary world, stirring an unforeseen new interest that motivated his application to graduate school in bioengineering. One of the pioneers in what was then a newborn field, Heetderks received a Ph.D. in bioengineering in 1976 from the University of Michigan and stayed one additional year for postdoctoral research in microfabrication of solid state

devices for biological sensing. In 1977, Cornell University came knocking with an offer of an electrical engineering faculty position, but the tenure track wasn't as appealing as he had anticipated. Heetderks explains, "As time passed, I felt I was doing more and more engineering, and less and less biology. I was very much interested in digital signal processing and microfabrication of devices, so I went to medical school to get more immersed in biology." In the late 1970s, it was difficult to find educational programs that crossed interdisciplinary lines. Heetderks provides perspective, "People criticize the stovepipe educational systems of today, but things are now radically better than in the 1970s. There was interdisciplinary work going on back then, but it took so much effort and patience. It was difficult to find physicians who thought of engineers as true collaborators; engineers were just people who solved problems for doctors. That perspective is fading, and there is a much more cooperative spirit now, but the golden key in today's interdisciplinary research is communication. Engineers need to learn the language of medicine, and medical professionals need to know the engineering language so they can communicate effectively about technical issues of their projects." Heetderks came to NIH in 1986, initially serving as Program Director of the Repair and Plasticity Cluster at the National Institute of Neurological Disorders and Stroke. In 2002, he accepted the position of Director of Extramural Programs at NIBIB where it is now his responsibility to make sure that about 80 percent of NIBIB funds are channeled outward to support research. He comments, "We have a very heavy emphasis on investigator-initiated research, but we also want to fund Bridging the Sciences initiatives and certain new kinds of imaging and bioengineering areas, such as point of care and tissue engineering technology. We are very plugged in to the broader scientific community, so we have a strong sense of where there are needs and opportunity." Heetderks sums up his philosophy of research and vision for health care saying, "The key thing to realize is that when it comes to chemistry, biology, physics, math, or engineering, there are no lines; they all interface seamlessly. I truly believe that this philosophy of the nature of matter and the life that springs from it will be the foundation for the next explosion of interventions that heal and cure. The public trust is well founded in NIBIB because our map points the way across an interdisciplinary bridge that will take us to amazing new clinical applications and implementation."

Panel I- Insights and Realities of Designing for Older Adults and Their Caregivers

Sara Czaja, Ph.D., University of Miami

Dr. Sara J. Czaja is Professor in the Departments of Psychiatry & Behavioral Sciences, and Industrial Engineering at the University of Miami and Scientific Director of the Center on Aging at the University of Miami. She has an extensive background in scientific investigation related to functional performance of older adults, innovative use of technology in intervention research, supervision of both laboratory and field research, and administration of large scale research programs. She is also the Director of the Center on Research and Education for Aging and Technology Enhancement (CREATE). CREATE is funded by the National Institute on Aging and involves collaboration with the Georgia Institute of Technology and Florida State University. The focus of CREATE is on making technology more accessible, useful, and usable for older adults. Dr. Czaja has extensive experience in aging research and a long commitment to developing strategies to improve the quality of life for older adults. Her research interests include: aging and cognition, caregiving, human-computer interaction, training, and functional assessment. Dr. Czaja is very well published in the field of aging and has written numerous book chapters and scientific articles. She recently co-authored a book with other members of the CREATE team concerning the design of technology for older adult populations. In addition, she is Fellow of the American Psychological Association, the Human Factors and Ergonomics Society, and the Gerontological Society of America. She is the past chair of the Risk Prevention and Behavior Scientific Review Panel of the National Institutes of Health. She is a member of the Committee on Human-Systems Integration, National Academy of Sciences and Member, National Research Council/National Academy of Sciences, Committee on Human Factors and Home Health Care.

Vicki Hanson, Ph.D, Rochester Institute of Technology

Dr. Vicki Hanson is Distinguished Professor in the B. Thomas Golisano College of Computing and Information Sciences at Rochester Institute of Technology (RIT) and Research Staff Member Emeritus from IBM Research. She has been working on issues of inclusion for older adults and disabled people throughout her career, first as a Postdoctoral Fellow at the Salk Institute for Biological Studies. She joined the IBM Research Division in 1986 where she founded and managed the Accessibility Research group. She currently receives research funding as PI for the Research Councils UK (RCUK) BeSiDE project which investigates issues of care home design and technology in support of resident mobility and wellness, as well as creation of Accessible Technologies as Co-PI of the SiDE Research Hub. She is a Fellow of ACM, the Royal Society of Edinburgh, and a Chartered Fellow of the British Computer Society. In 2013 she received the Anita Borg 'Woman of Vision Award for Social Impact.' She currently serves as the elected Vice President of ACM and on the Executive Committee of ACM Women in Europe.

Wendy A. Rogers, Ph.D, Georgia Institute of Technology

Wendy A. Rogers is Professor in the School of Psychology at the Georgia Institute of technology. Her research interests include design for aging; human-automation interaction; human-robot interaction; cognitive aging; skill acquisition; and training. She is Director of the Human Factors and Aging Laboratory funded by:

- the National Institutes of Health through the Center for Research and Education on Aging and Technology Enhancement (CREATE)
- the Department of Education through a Rehabilitation Engineering Research Center on Technologies to Support Successful Aging with Disability (TechSAGE)

Dr. Rogers is a Certified Human Factors Professional and a fellow of the Human Factors and Ergonomics Society and the American Psychological Association.

Panel 2- Innovation Needed: Sensing, actuation and system integration technology

Anind K. Dey Ph.D., Carnegie Mellon University

Anind K. Dey is the Charles M. Geschke Director of the Human-Computer Interaction Institute in the School of Computer Science at Carnegie Mellon University. He conducts research at the intersection of human-computer interaction, ubiquitous computing and machine learning, focusing in the domains of healthcare, sustainability, automotive and education.

Mani Srivastava, Ph.D., University of California Los Angeles

Mani Srivastava is on the faculty at UCLA where he is associated with the EE and CS Departments. His research is broadly in the area of networked human-cyber-physical systems, and spans problems across the entire spectrum of applications, architectures, algorithms, and technologies. His current interests include issues of sensing, privacy, security, data quality, and variability in the context of applications in mHealth and sustainable buildings.

Jack Stankovic, Ph.D., University of Virginia

Jack Stankovic is the BP America Professor in the Computer Science Department at the University of Virginia. He is a Fellow of both the IEEE and the ACM. He is Co-Director of the Center for Wireless Health at UVA. Stankovic has an h-index of 100 and over 36,000 citations. His research interests are in real-time systems, wireless sensor networks, wireless and mobile health, and cyber physical systems. He has built a home health care monitoring system for the elderly which has been deployed for various studies.

Panel 3- Health transitions trajectories: Data to action

Jeff Kaye, Ph.D., Oregon Health & Science University

Dr. Kaye is Professor of Neurology and Biomedical Engineering at Oregon Health and Science University (OHSU). He directs the NIA - Layton Aging and Alzheimer's Disease Center at OHSU and the Portland Veterans Affairs Medical Center. He also directs ORCATECH - the Oregon Center for Aging and Technology. Dr. Kaye's research program has focused over the past two decades on the question of why some individuals remain protected from dementia at advanced ages while others succumb at much earlier times. In order to answer this question he has emphasized the high-risk population of people age 85 years or older (the "oldest old"). The centerpiece of his studies has been the ongoing Oregon Brain Aging Study, established in 1989. He currently leads a large NIH study using ubiquitous, unobtrusive technologies for assessment of elders in their homes to detect changes signaling cognitive decline is imminent. Dr. Kaye received his medical degree from New York Medical College and trained in neurology at Boston University. He completed a fellowship in brain aging at the National Institute on Aging. He moved to Oregon in 1989 to develop the Layton Aging and Alzheimer's Disease Program. Dr. Kaye has received the Charles Dolan Hatfield Research Award for his work. He is listed in Best Doctors in America. He serves on many national and international panels and review boards in the field of geriatrics and neurology, neurology including as a commissioner for the Center for Aging Services and Technology (CAST) and chair of the Working Group on Technology for the National Alzheimer's Association. He is an author on over 200 scientific publications and holds several grant awards from federal agencies, national foundations and industrial sponsors.

Maureen Schmitter-Edgecombe, Ph.D., Washington State University

Maureen Schmitter-Edgecombe is a professor in the Department of Psychology at Washington State University. She received her Ph.D. in clinical psychology with specialized training in neuropsychology from the University of Memphis in 1994. She completed a pre-doctoral internship at the University of Arizona Health Sciences Center. Dr. Schmitter-Edgecombe has been conducting research and supervising and training students in the area of clinical neuropsychology for the past 14 years. She is a licensed clinical psychologist and the primary supervisor for students conducting adult learning disability, ADHD, and other neuropsychological evaluations (e.g., traumatic brain injury, dementia, multiple sclerosis, cerebrovascular accidents) in the Psychology Clinic. Under Dr. Schmitter-Edgecombe's careful supervision, students use a flexible battery approach to answer a variety of referral questions, including questions related to diagnosis, the consequences of cognitive impairment, management and treatment planning, and treatment effectiveness. Dr. Schmitter-Edgecombe's clinical work is influenced by her strong research programs in the area of clinical neuropsychology and rehabilitation. Her research with traumatic brain injury and dementia populations has been funded by the National Institute of Neurological and Strokes Disorders, the National Institutes of Health, and the Life Sciences Discovery Fund.

Daniel P. Siewiorek, Ph.D., Carnegie Mellon University

Professor Daniel P. Siewiorek is the Buhl University Professor of Electrical and Computer Engineering and Computer Science at Carnegie Mellon University. He has designed or been involved with the design of nine multiprocessor systems and has been a key contributor to the dependability design of over two dozen commercial computing systems. Dr. Siewiorek leads an interdisciplinary team that has designed and constructed over 20 generations of mobile computing systems. Dr. Siewiorek has written nine textbooks in the areas of parallel processing, computer architecture, reliable computing, and design automation in addition to over 475 papers. Dr. Siewiorek has served as Associate Editor of the Computer System Department of the Communications of the Association for Computing Machinery, as Chairman of the IEEE Technical Committee on Fault-Tolerant Computing and as founding Chairman of the IEEE Technical Committee on Wearable Information Systems. He is a thrust director for the Quality of Life Technology NSF Engineering Research Center. He is also a thrust leader in the Future of Work Center and the Smart Grid Center. His previous positions included Director of the Human Computer Interaction Institute, Director of the Engineering Design Research Center and co-founder of its successor organization, the Institute for Complex Engineered Systems, where he served as Associate Director. He has been the recipient of the American Association of Engineering Education Frederick Emmons Terman Award, the IEEE/ACM Eckert-Mauchly Award, and the ACM SIGMOBILE Outstanding Contributions Award. He is a Fellow of IEEE, ACM, and AAAS and is a member of the National Academy of Engineering. Professor Siewiorek received the B.S. degree in Electrical Engineering from the University of Michigan,

Ann Arbor, in 1968, and the M.S. and Ph.D. degrees in Electrical Engineering (minor in Computer Science) from Stanford University, in 1969 and 1972, respectively.

Panel 4- How to integrate Aging in Place in a Learning Healthcare System

Thomas Edes, M.D., M.S., U.S. Department of Veterans Affairs

Thomas E. Edes, MD, MS, is director of Geriatrics and Extended Care for Clinical Operations for the Department of Veterans Affairs (VA). He has national responsibility for operations and management of VA's spectrum of services, providing care to our nation's veterans with complex, chronic disabling diseases in all settings, including geriatric clinics, adult day health care, home-based primary care, purchased skilled home care, veteran-directed home care, homemaker/home health aide, respite care, dementia care, and various residential care settings, among others. Under his leadership since 2000, the number of veterans receiving home-based primary care has tripled, palliative care has become an established program in every VA medical center, and medical foster home care has grown from a pilot to a national program in 33 states. Prior to taking this position at VA Headquarters, he was chief of geriatrics and extended care at the Harry S. Truman Memorial VA Medical Center and associate professor of medicine at the University of Missouri in Columbia. There he was instrumental in developing geriatric evaluation and management inpatient and outpatient programs, subacute care and hospice units, a geriatric fellowship program, and the advanced disease planning initiative. He was medical director of the VA Nursing Home Care Unit and the Home-Based Primary Care program. Dr. Edes served as associate director of the 1995 White House Conference on Aging Office, and served for the secretary on the Policy Committee for the 2005 White House Conference on Aging. He was instrumental in the VA End of Life Care initiative, and was a project manager for the Institute for Healthcare Improvement MediCaring collaborative on improving care for persons with advanced chronic disease.

Dr. Edes received his MD degree and MS degree in nutrition from the University of Illinois in 1981. He holds board certification in internal medicine and in geriatric medicine, and is a fellow of the American College of Physicians and the American College of Nutrition. In 2010, Dr. Edes was elected as president of the American Academy of Home Care Physicians.

David Gustafson, Ph.D., University of Wisconsin-Madison

David Gustafson, PhD is the author of several books and over one hundred journal articles. He is a Fellow of the Association for Health Services Research, and of the American Medical Informatics Association. He is a Fellow and past Vice-Chair of the Board of the Institute for Healthcare Improvement, Board Chair of the eHealth Institute, and past Chair of the Federal Government's Science Panel on Interactive Communications in Health. Dave is National Program Director of NIATx, a Robert Wood Johnson Foundation initiative to improve quality of services in substance abuse treatment agencies. His research on organizational improvement focuses on making and sustaining organizational change. He developed a computer system (QISS - the Quality Improvement Support System) to help organizations implement quality improvement. He developed new techniques for facilitating groups and understanding customer needs. Evaluating the computer systems led to new models to measure: customer satisfaction, severity, medical under-service and quality of care. His behavior change research led to models to predict and explain initiation of and adherence to organizational change. The addiction treatment field is his primary test bed for these organizational change initiatives. Dave's interests in decision, change and information theory applied to health systems come together in the design and evaluation of systems and tools to help individuals and organizations cope with major changes. Regarding individual change, his research teams have created systems to detect suicidal propensity, help teenagers adopt healthy behaviors and help families facing major health crises cope more effectively. That work focuses on the Comprehensive Health Enhancement Support System (CHESS), a computer system to help people facing serious situations such as breast and prostate cancer, asthma, AIDS/HIV, heart disease, Alzheimer's disease, and sexual assault. CHESS has been tested in randomized trials and field tests involving several thousand people and provided insight into acceptance, use, and impact of computer-based support systems on health, health-related behavior, and health service use. Dave Gustafson is Research Professor of Industrial and

Systems Engineering, and Director of the Center for Health Enhancement Systems Studies, at the University of Wisconsin-Madison.

Howard Wactlar, Ph.D., Carnegie Mellon University

Howard Wactlar is presently serving as the Division Director for Information and Intelligent Systems in the Computer Information Science and Engineering Directorate of the National Science Foundation. Prof. Wactlar is on leave from his duties as Vice Provost for Research Computing, Associate Dean in the School of Computer Science, and Alumni Research Professor of Computer Science, Science at Carnegie Mellon University. He has served CMU in various research, technical and administrative capacities, including most recently, that of Scientific Director for the NSF Quality of Life Technology (QoLT) Engineering Research Center. He graduated in Physics from the University of Maryland and the Massachusetts Institute of Technology. He was primary architect and served as project director of the Informedia Digital Video Library, one of the original U.S. NSF Digital Library Initiative projects. He has been the principal investigator for a number of defense and intelligence agency research projects on automated video analysis and information integration, and multiple NSF and NIH-funded CareMedia-related projects in machine understanding of human health and behavior. He was a co-founder and Associate Director of the DoD-funded Software Engineering Institute (SEI) and Director of the joint CMU/IBM Information Technology Center that pioneered ubiquitous campus computing. He holds basic patents for processes related to automated video library creation and video search and summarization, and is co-inventor of a pending patent for automated video capture and analysis of human behavior. He co-founded MediaSite, organized to commercialize video information extraction and search technology. He has been active in establishing video information research programs in the U.S., Europe and China through joint initiatives with multiple foreign partners. His current research centers on multimedia information systems, machine learning and intelligent systems, and their application to improving health care.

Panel 5- Shaping the Future of Aging in Place

Susan Miller, M.D., Centers for Medicare and Medicaid Services

Susan Miller, MD is a Board Certified psychiatrist. She practiced for over 20 years before joining the Coverage and Analysis Group at the Centers for Medicare and Medicaid Services.

Mary Weick-Brady, MSN, RN, The Food and Drug Administration

Mary Brady is a senior policy advisor in the Office of the Center Director at the Center for Devices and Radiological Health at FDA. She has been with FDA for 24 years, starting as a nurse consultant monitoring adverse events. She became a supervisor for this group and then was a deputy director for the postmarket regulations division. She represented FDA on the Global Harmonization Task Force for postmarket issues, is a representative on the ISO home medical equipment standard, and also the symbols and nomenclature standards group. She co-chairs the AAMI committee on home care and was also a member of the National Research Council's working group on Human Factors in the home environment. Ms. Brady worked for 6 years part time as a home health care nurse; she also worked as a public health nurse in Washington DC and in the Peace Corps. She was an evening clinical supervisor at a long term care facility and hospice; she started her nursing career at the Mayo Clinic in Minnesota.

Shari Ling, M.D., Centers for Medicare and Medicaid Services

Dr. Shari M. Ling is currently the Centers for Medicare and Medicaid Services (CMS), Deputy Chief Medical Officer serving in the Center for Clinical Standards and Quality (CCSQ), responsible for assisting the CMS Chief Medical Officer in the Agency's pursuit of higher quality health care, healthier populations, and lower cost through quality improvement. Dr. Ling long-standing focus is on the achievement of meaningful health outcomes through delivery of high quality beneficiary-centered care across all care settings, with a special interest in the care of persons with multiple chronic conditions and functional limitations, and reducing health disparities. Dr. Ling has served as the lead coordinator and facilitator of the CCSQ Measures Forum. Dr. Ling represents CMS on the Health and Human Services

(HHS) Multiple Chronic Conditions workgroup, and the National Quality Forum Measures Application Partnership Post-acute Care/Long-term Care workgroup, and chairs the Measures and Data sources sub-workgroup for the HHS Action Plan for Healthcare Associated Infection (HAI) Prevention in Long-term Care facilities. Dr. Ling also serves as the clinical sub-group lead for the HHS National Alzheimer's Project Act. Dr. Ling is a Geriatrician and Rheumatologist who received her medical training at Georgetown University School of Medicine where she graduated as a member of the Alpha Omega Alpha Honor Society. Dr. Ling received her clinical training in Internal Medicine and Rheumatology at Georgetown University Medical Center, and completing Geriatric Medicine studies at Johns Hopkins University., remaining on faculty at Johns Hopkins for 5 years, after which she joined the Intramural Research Program of the National Institutes of Health at the National Institute on Aging as a Staff Clinician for 8 years studying human aging and age-associated chronic diseases with attention to musculoskeletal conditions and mobility function. Dr. Ling continues to serve as a part-time faculty member in the Division of Geriatric Medicine and Gerontology at Johns Hopkins University School of Medicine, and in the Division of Rheumatology, Allergy and Clinical Immunology at the University of Maryland. Dr. Ling volunteers at the Veterans Administration Medical Center in Baltimore. She is a Gerontologist who received her training in Direct Service from the Ethel Percy Andrus Gerontology Center, at the University of Southern California, and served as the co-director of the Andrus Older Adult Counseling Center.

Melinda Buntin, Ph.D., Vanderbilt University

Melinda Buntin joined Vanderbilt as the Chair of the new Department of Health Policy in August 2013. She was previously Deputy Assistant Director for Health at the Congressional Budget Office (CBO), where she was responsible for managing and directing studies of health care and health care financing issues in the Health, Retirement, and Long-term analysis Division. Prior to that Dr. Buntin was deputy director of RAND Health's Economics, Financing, and Organization Program, director of Public Sector Initiatives for RAND Health, and co-director of the Bing Center for Health Economics. Her research at RAND focused on insurance benefit design, health insurance markets, provider payment, and the care use and needs of the elderly. More recently, she was on detail from RAND to the Office of the National Coordinator for Health IT (ONC), where she established and directed the economic analysis, evaluation, and modeling group. She has an A.B. from the Woodrow Wilson School at Princeton and a Ph.D. in Health Policy with a concentration in economics from Harvard. Dr. Buntin is on the editorial board of HSR and Health Care: The Journal of Delivery Science and Innovation.