Technology Mediated Caregiving For Older Adults Aging in Place

Elizabeth D Mynatt
Khoury College of Computer Sciences
Northeastern University
Boston, Massachusetts, USA
e.mynatt@northeastern.edu

Masatomo Kobayashi
IBM Research
Tokyo, Japan
mstm@jp.ibm.com

Alisha Pradhan
Department of Informatics, Ying Wu
College of Computing
New Jersey Institute of Technology
Newark, New Jersey, USA
alisha.pradhan@njit.edu

Niharika Mathur
School of Interactive Computing
Georgia Institute of Technology
Atlanta, Georgia, USA
nmathur35@gatech.edu

John Vines
University of Edinburgh
Edinburgh, United Kingdom
john.vines@ed.ac.uk

Katie Seaborn
Institute of Science
Tokyo, Japan
seaborn.k.aa@m.titech.ac.jp

Erin Buehler
Google
Mountain View, California, USA
buehler.erin@gmail.com

Jenny Waycott
School of Computing and Information
Systems
The University of Melbourne
Melbourne, Australia
jwaycott@unimelb.edu.au

John Rudnik
School of Information
University of Michigan
Ann Arbor, Michigan, USA
jrudnik@umich.edu

Tamara Zubatiy
Northeastern University
Boston, Massachusetts, USA
t.zubatiy@northeastern.edu

Agata Rozga
School of Interactive Computing
Georgia Institute of Technology
Atlanta, Georgia, USA
agata@gatech.edu

Abstract

The caregiving environment for an older adult aging in place includes a network of caregivers working with the older adult to support their needs and maintain independence. As older adults experience cognitive and functional changes, their caregiving network expands to include spouses or siblings (who are often older adults themselves), children, friends, neighbors and community members—each bringing unique values, expectations, and goals. In this network of care, technology-enabled support offers the potential to mediate care responsibilities, such as coordinating activities and assisting with everyday tasks. However, designing these systems requires addressing value tensions among caregivers, cultural norms around aging, participatory research practices and balancing autonomy with safety concerns for older adults in later life. This workshop brings together researchers and practitioners to discuss (1) opportunities and challenges for designing technological systems for caregiving for older adults; (2) longitudinal interactions with these systems as older adults progress through stages of functional and cognitive changes; (3) potential for such systems to support caregivers while centering older adults' privacy and autonomy needs; and (4) the influence of cultural norms on caregiving and technology use.

CCS Concepts

• **Human-centered computing → Human computer interaction (HCI)**.

Keywords

Older Adults, Caregiving, Assistive Technology

1 Motivation and Objectives

Aging in place, defined as *home-based care* that includes health, personal, and other support services to help older adults stay at home and in communities as they grow older has traditionally been viewed as an effective approach to support healthy aging due to the practical benefits of security and familiarity [38], a need bolstered by the COVID-19 pandemic [11, 34]. As older adults age

in place, they often rely on caregivers—family, friends, and neighbors—for help with daily activities and maintaining independence. Over time, as their abilities change, this caregiving environment also adapts to their changing lifestyles and needs for support. As family structures evolve and adult children increasingly live apart, remote caregiving also presents a complex challenge, requiring provision of caregiving from a distance [8]. The demanding nature of caregiving, exacerbated by the requirement for coordination and compromises among caregivers, creates potential for assistive technological systems to be designed to mediate caregiving between caregivers and older adults requiring care. Such systems ideally serve an intermediary role, necessitating interactions with both caregivers and older adults. Thus, it is crucial that their design includes a sociotechnical understanding of how older adults interact with them and cultural factors influencing technology adoption and caregiving practices. HCI researchers have examined various technology-enabled interventions that adapt to the diverse needs of older adults across the spectrum of aging needs, from daily task management for those with early-stage cognitive impairments to assistive tools for those in later stages of decline. The design of assistive technology in supporting caregiving is a growing area of focus of various studies within HCI, including those that have looked at technology-mediated care, remote caregiving [14], and caregiving challenges [27, 32]. Within the landscape of technology-mediated care, research has highlighted offloading of caregiving tasks on assistive devices, particularly in the case of humanoid care robots performing tasks like cooking [33] or providing social support [29]. In parallel, there is also a focus on collaboration between technologies and caregivers by exploring how caregivers scaffold the use of technology for older adults [18, 25, 42]. In these studies, the technological system works together with caregivers to mediate care and provides compensatory support for limitations in their time, energy, and resources, instead of replacing their caregiving tasks entirely. For remote caregiving, researchers have described innovative custom technologies, such as the check-in tree [2], digital family portrait [21], and the messaging kettle [1]. The use of anthropomorphic voice AI assistants in this context has also been studied [7, 12, 23], along with breakdowns in communication when older adults engage with such assistants [19, 20, 41]. Recent investigations include emerging technologies, such as VR assistants [3] and Generative AI chatbots [16], highlighting both their potential for engagement with older adults and potential challenges, such as trust calibration [26, 37].

This evident growth in research on the assistive role of technology in caregiving for older adults marks a promising trajectory and highlights the importance of fostering interdisciplinary collaborations to bridge insights and establish groundwork for future research in this space. This workshop brings together researchers working at the intersection of **technology and aging** and/or having investigated **caregiving perspectives for older adults**. We particularly center the role that technological interventions, including, but not limited to, assistive AI applications, can play to support, empower, amplify, and scaffold caregiving for older adults. At CHI 2024, the workshop *HCI and Aging: New Directions, New Principles* aimed to critically address the longstanding deficit-based narrative around older adults in HCI research and to chart the

trajectory of this discourse going forward [13]. With our workshop, we aim to broaden this conversation to encompass the older adult-centered caregiving environment while also including perspectives of caregivers involved, who also warrant care to maintain their independence and manage the onset of cognitive and physical challenges in their loved one's later life. *The Future of Hybrid Care and Wellbeing in HCI* workshop at CHI 2023 focused on provisions of remote caregiving and the merging aspects of political, sociocultural, and environmental sustainability dynamics into caring at large, not limited to older adults [5]. Inspired by the success of these workshops, our workshop focuses specifically on older adults aging in place and their caregivers, seeking to address these objectives:

- Identification of key challenges and barriers to the design and implementation of technological interventions for caregiving networks centered on older adults, focusing on longitudinal and adaptive interactions with such systems as older adults progress through stages of functional and cognitive change.
- Discussion of insights gleaned from studying how older adults engage with technological systems and participatory methods to collaborate with older adults in the design of assistive systems, including, but not limited to, emerging AI applications.
- Fostering plurality in discussions around cultural norms associated with aging and its influence on technological adoption by bringing together practitioners and researchers from across cultures with expertise in HCI, designing for older adults, healthcare, and beyond.
- Facilitation of discussions around concrete metrics and frameworks for designing and evaluating technical assistive systems intended to mediate a care ecosystem that includes an older adult as well as roadmaps for interdisciplinary research in this space.

1.1 Workshop Themes

We invite a wide range of submissions aligned with our workshop objectives, encouraging participants to share research ideas and engage in discussions including, but not limited to, the following themes and the interactions between these themes. This list is **not** an exhaustive one, but is provided as inspiration for participants to orient their position papers and to help organizers in structuring workshop discussions. We encourage participants to refer to these themes as they capture the scope of our envisioned workshop.

Identifying challenges and barriers to caregiving for older adults. Caregiving often poses challenges to caregivers' physical, mental, emotional, social, and financial well-being, including lack of social support, exhaustion, and limited financial resources, which can also affect their access to and use of technological interventions [27]. We invite discussions on the evolving challenges caregivers face in supporting and coordinating care for their loved ones.

Supporting caregivers and care recipients as cognitive changes occur. As older adults experience cognitive changes like dementia, their daily routines and activities are significantly impacted. Spousal and sibling caregivers, often older adults themselves, manage their own aging concerns while supporting loved ones, creating a complex care network where cognitive changes occur on a spectrum for both the older adult receiving care and the caregiver. We

invite discussions on longitudinal technological interventions that adapt to and learn from their changing cognitive abilities over time, such as AI-driven group conversation assistance [29, 35].

Navigating social roles and ethical and value differences among caregivers and care recipients. Caregiving for older adults involves diverse perspectives to technological implementation, requiring systems to consider the social roles between caregivers and build strategies to adapt to those [4]. We invite discussions around incorporating these differences in social roles into technological design for consensus building, while centering the autonomy, safety, and privacy needs of older adults.

Bridging caregiving and healthcare in the home. Advancements in telehealth practices have brought healthcare outside the clinic, enabling remote clinical interactions [17]. Technologies/services for caregiving and healthcare have been studied independently; however, now both happen concurrently at home, requiring emotional, privacy, safety, and regulatory considerations. We invite research focused on facilitating an integrated view of technology-mediated caregiving and healthcare in the context of aging in place.

Understanding the role of community care resources in caregiving for older adults. Aging in place for older adults also includes provision of social and community interactions, requiring access to community resources such as public libraries, parks, community centers, and places of worship [9]. However, mobility, transportation, and infrastructural challenges can limit access to these resources for older adults. We invite discussions on technological interventions that can support access to these resources, such as offering virtual alternatives [39], facilitating remote engagement [22], or digital platforms that help older adults stay connected to their communities [40].

Cultural norms and perspectives around aging and caregiving and its influence on use of technology. Caregiving practices for older adults, especially involving family, are shaped by societal and cultural views on aging, influencing approaches to conflict resolution, autonomy, and attitudes toward privacy [30]. As a result, an older adult's surrounding sociocultural context has the potential to shape their expectations and means for technology-enabled support. We will start discussions on the intersection of culture and aging, exploring how diverse cultural perspectives influence interactions with technology and ways of supporting those interactions effectively.

Participatory research practices involving older adults and caregivers. Traditional research methods often overlook unique age-related nuances, preferences, and communication styles, leading to outcomes that may not address the actual needs of older adults. Studies have shown that older adults face challenges in unconstrained brainstorming (blue sky ideation) for future technologies [15], and benefit from using design prototypes, or scenarios to provide context during co-design sessions [24, 36]. We invite discussions on research practices and tools that promote responsible participation with older adults and prioritize meaningful collaboration, such as community-embedded practices [10, 28].

2 Workshop Organizers

Our organizing team, consisting of *organizers* and *subject matter experts*, is well-equipped to operationalize the vision of this workshop.

We are an established and interdisciplinary group of researchers situated across the world who have actively engaged with older adults and caregivers in our work across different sociocultural contexts, stages of cognition, and affinity to technology.

Elizabeth Mynatt is the Dean and Professor at Khoury College of Computer Sciences at Northeastern University. Her work has made leading contributions to the design of assistive technologies and ubiquitous computing, focusing on older adults dealing with the onset of cognitive impairments. She has also been a key researcher in the Aware Home Research Initiative that investigated future home technology designs that enable aging adults to live independently and is co-PI of the US NSF funded AI Institute, AI CARING, focused on use-inspired AI research in longitudinal and collaborative technologies to support older adults and their carepartners. Beth is an ACM Fellow and a member of the SIGCHI academy, and was elected as a member of the American Academy of Arts and Sciences in 2024.

Masatomo Kobayashi is a Senior Research Scientist at IBM Research, Tokyo. His research work has primarily focused on accessible computing for older adults and people with disabilities, technology use of older adults, as well as daily behavior analysis for early identification of cognitive and motor conditions. He served as a co-lead of the Senior Cloud project, a decade-long collaborative initiative between industry and academia funded by Japan Science and Technology Agency, which aimed to promote technology-mediated social involvement of older populations.

Alisha Pradhan is an Assistant Professor in the Department of Informatics at New Jersey Institute of Technology. Her research examines older adults' use of emerging technologies in everyday lives, and by adopting participatory approaches, includes older adults and their carepartners in designing their own personalized technologies to support aging-in-place, with interest in methodological considerations for meaningfully including older individuals in design activities. Alisha has co-organized workshops and panels at conferences such as ACM CHI and UbiComp [6, 31].

John Vines is Chair of Design Informatics at the University of Edinburgh. His interests are broadly at the intersection of research through design, participatory design, and data-driven technologies. He has specific expertise on the design of systems to support care and health in later life, and bringing together the sociology and critical study of ageing and health with the field of human-computer interaction. John has co-organized two workshops at ACM CHI on aging and caregiving [5, 13].

Niharika Mathur is a Human-Centered Computing doctoral student at Georgia Tech. Her work has investigated the design of conversational AI technologies for older adults for routines such as medication management, grounded in participatory engagement in co-design workshops with older adults with Mild Cognitive Impairment (MCI). Niharika has been a George Family Foundation Health Innovation Fellow and works with the US NSF funded AI Institute, AI CARING, focusing on user-centered approaches to designing AI systems to support older adults.

John Rudnik is a doctoral student at the University of Michigan School of Information, where he is advised by Dr. Robin Brewer. His research explores the intersection of technology and society, focusing on the design and implementation of automated decision-making technologies and data infrastructures to support care and

old age. John's work emphasizes the moral and ethical considerations of user-centered design, particularly in the context of the longevity economy. He has held positions at the AARP Foundation and MIT AgeLab, focusing on pragmatic elements of technology adoption to support care practices and relationships.

Jenny Waycott is an Associate Professor in the School of Computing and Information Systems, The University of Melbourne, Australia. Jenny's recent research has examined how emerging technologies, such as VR and social robots, are used to provide social and emotional enrichment in later life, especially for people living in aged care. In this work, she has examined ethical issues associated with designing and evaluating new technologies for use in sensitive settings such as elder care, where a respectful and empathetic approach is critical to ensure new technologies provide benefit without causing harm. Jenny has previously co-organized a workshop at ACM CHI [13].

Tamara Zubatiy is a Postdoctoral Research Fellow at Northeastern University. Her research focuses on studying longitudinal usage of conversational voice assistants by older adults. Her work has contributed to the understanding of limitations in current conversational systems for older adults, and exploring how privacy-conscious approaches can improve the design of future embodied systems. Tamara has been a National Science Foundation Graduate Research Fellow and has also led industry-focused discussions and panels on designing AI systems for aging populations.

In addition to the primary workshop organizers, we have the following confirmed **subject matter experts** to assist the organizing team as well as lead discussion panels and moderate breakout groups during the workshop:

Katie Seaborn is an Associate Professor at Institute of Science, Tokyo. Katie has worked with a diversity of older adults in Canada and Japan, focusing on serious games for psychological well-being, intergenerational engagement with playful embodied prototypes, conversational agents and social robots for group conversation facilitation, and "older adult" peer voice assistants for longitudinal engagement in the home and reduction of implicit ageism.

Agata Rozga is a Principal Research Scientist at Georgia Tech with an extensive background in measurement and analysis of health-related behaviors, situated at the intersection of computing and psychology. Her current research focuses on the development of AI-based systems to monitor cognitive and functional changes in older adults and to support their care networks. She also serves as the Director of Translational Research for the US NSF funded AI Institute for Collaborative Assistance and Responsive Interaction for Networked Groups (AI-CARING).

Erin Buehler is a Senior User Experience Researcher at Google leading the cognitive accessibility team to design assistive technologies. She currently leads the research and design capabilities, focused on developing technologies to support equitable access to digital experiences, taking an abilities-based approach, and striving to center the voices of users with cognitive disabilities in the creation of accessible tools and features.

In addition to remarks and contributions from organizers and subject matter experts during discussions, we plan to invite distinguished researchers as **keynote speakers** for the workshop. Potential speakers at this stage are:

Wendy Rogers: Dr. Rogers is a Professor of Applied Health Sciences at the University of Illinois Urbana-Champaign. She is an internationally recognized expert in healthy aging and human factors, and has made significant contributions to the design of technologies that support functional independence of older adults.

Anne Marie Piper: Dr. Piper is a Professor in the Department of Informatics at University of California, Irvine. She has several years of experience in understanding technology and online life among older adults, including issues of ageism in technology design and what it means to age online in the context of disability. Her work has significantly informed participatory design methods involving people with complex communication needs and in making co-design more equitable and just.

3 Workshop Plans

Our workshop will be a **one-day event** (9am to 6pm local time) in a **hybrid** format to ensure participation for all attendees, allowing in-person participation in Yokohama and online participation from across the world. To facilitate a smooth hybrid experience, we will have 2-3 of the organizers dedicated solely to managing virtual participation.

3.1 Pre-workshop Plans

Our workshop website (https://sites.google.com/view/chi2025-aging-in-place) will be set up to provide details about workshop objectives, submission guidelines and organizer information. For this workshop, we would like to invite 25-35 participants, with at least 10 in-person participants interested in discussions around technological systems for caregiving for older adults. Our workshop will be conducted in a **hybrid** format and we invite participants to join us in one of the two ways: (1) by submitting a short (4-5 pages, excluding references) position paper describing ongoing research and relevance to workshop objectives/themes; or (2) by submitting a statement of interest (400-600 words) describing motivation to attend. Our intention to diversify ways for participation is to be inclusive for early career researchers and students who may have a strong motivation to attend but may not have ongoing work submissions just as yet. For participants wishing to present ongoing works, they will be encouraged to do so by submitting position papers discussing works-in-progress, case studies or reflective pieces. We will aim to have equal representation for both types of submissions, contingent on the number and type of submissions received. The submitted positions papers will receive reviews from 2-3 external reviewers, while the statements of interest will be lightly reviewed by 1-2 organizers. In alignment with our theme of understanding challenges to caregiving, we also welcome submissions that do not explicitly contain technological implementations but explore barriers to providing care for older adults. Submissions will be reviewed by at least two reviewers and accepted papers will be published on our website and as proceedings via arXiv, grouped on the basis of emerging themes and shared among attendees in advance. We plan to advertise our workshop through various channels such as university mailing lists, and organizers' social media. A subset of our organizers are also affiliated with the **US National Science Foundation-funded AI Institute for Collaborative Assistance**

and Responsive Interaction for Networked Groups (AI CAR-ING) and will provide significant value to promote our workshop to a wider audience across research institutes.

3.2 Hybrid and In-Person Setup

We plan to use several tools to manage collaboration among attendees before, during, and after the workshop for both in-person and remote participants:

Workshop Website: A dedicated website will provide key information, including the call for participation, submission guidelines, and details on accepted papers, invited speakers, and working groups. Accepted papers will be published on the website and made available before the workshop.

Slack Workspace: A Slack workspace will facilitate communication, with channels for each paper session, QnA, and participant introductions. Speaker details and papers will be shared in advance to encourage active engagement.

Zoom (conferencing software): Zoom will be used for online participation, presentations, breakout sessions, and live-streaming keynotes. Remote participants will engage in group activities through breakout rooms, with recordings made available via the workshop website.

Miro (virtual brainstorming tool): Miro will support virtual brainstorming and collaboration during breakout sessions, integrating both in-person and remote participants in idea exchange and group work archiving.

3.3 Asynchronous Engagement

If participants encounter technical or accessibility challenges, recordings of keynotes, panels, and group discussions will be made available in the workshop's password-protected archive on our website and we will keep the Miro board open for two weeks post-workshop. Additionally, for participants presenting a position paper, we will also provide the option to submit a pre-recorded video for the papers. This provision is intended specifically for virtual participants who are located in significantly different time zones and are unable to join us synchronously during the paper sessions, and will be determined on a case-by-case basis.

4 Workshop Structure and Activities

Our workshop is structured to facilitate engagement among participants in the first session, and encourage collaborative group work in the second. The morning will be focused on keynotes discussions, participant introductions, and paper sessions; the afternoon will constitute the subject matter expert panel and the breakout group activity.

9:00 am - 9:15 am: Workshop welcome and Introduction. Organizers will welcome participants and provide an overview of the agenda for the day, including details of planned activities, goals and hybrid setup.

9:15 am - 9:55 am: Keynote and discussion. Keynote discussion will operate as a moderated panel with two distinguished researchers in the field and one expert-organizer serving as the moderator (Elizabeth Mynatt), all three with extensive experience in aging research within HCI. Our organizers' past workshop experiences have indicated that an interactive panel format for keynotes

helped engagement spur engagement from participants more than longer keynote presentations. We will curate a semi-structured list of question topics for the speakers beforehand, and will also encourage participants to actively engage with the speakers during the discussion.

9:55 am - 10:30 am: Rapid workshop introductions. Participants will introduce themselves for collaborative research interests. We will encourage participants to prepare a "Give/Get" slide, detailing their individual experience and what they can offer (give) and what they hope to learn from others in the workshop (get), with 1-2 minutes for each participant.

10:30 am - 11:00 am: Coffee break

11:00 am - 12:00 pm: Paper session(s) and follow up QnA panel with authors. Participants will share their papers with a 5-minute presentation. Papers will be pre-organized by emerging themes, with each session concluding in a panel where all the authors will collectively answer questions. Remote participants will be encouraged to ask questions via Discord channels.

12:00 pm - 1:30 pm: Lunch break

1:30 pm - 2:30 pm: Subject matter expert panel. Experts will join a common discussion panel moderated by two organizers (Alisha Pradhan and Jenny Waycott) with subject themes deeply tied to workshop goals and core interests. Participants will be encouraged to ask panelists questions for their individual expertise. We currently have confirmed experts for the following subjects engaging with the workshop themes – *Aging and cognitive accessibility* (Agata Rozga), *Social robotics and embodied technology design* (Katie Seaborn), and *Design of assistive technologies* (Erin Buehler).

2:30 pm - 2:45 pm: Introduction to breakout group activity. Organizers Tamara Zubatiy and John Rudnik will introduce participants to the breakout group activities and provide guiding slide templates for group presentations.

2:45 pm - 4:15 pm: Breakout Group activity. Focus areas for breakout groups will be drawn from emerging themes from paper submissions. Participants can choose their preferred breakout group, and remote attendees will have dedicated remote breakout groups, moderated by two organizers (Niharika Mathur and John Rudnik) to ensure effective collaboration.

4:15 pm - 4:45 pm: Coffee break

4:45 pm - 5:30 pm: Breakout group presentations. Each group will present their slides based on discussions and ideas formed through collective brainstorming.

5:30 pm - 6:00 pm: Closing. Organizers will wrap up the proceedings and will synthesize key takeaways from the day to facilitate building of a research community that can continue to collaborate and discuss ideas beyond the workshop. We will conclude the workshop by inviting participants to engage in the planned post-workshop activities.

5 Post-Workshop Plans

In addition to building a research sub-community, we plan to continue discussions by archiving presented works on our workshop website. Interested participants will be invited to join the organizers in drafting and submitting a report to *Interactions* from the workshop takeaways. Building on discussions from the workshop, we also plan to draft extended abstracts for evaluatory frameworks,

guidelines, and metrics for the design of technological systems supporting caregivers and older adults. Additionally, based on sufficient interest and demand by workshop participants, the organizers also plan to propose a special issue related to technology-mediated caregiving in the context of aging in the ACM Transactions on Computer-Human Interaction (TOCHI) or Transactions on Accessible Computing (TACCESS) journal, as this would provide us a valuable platform for disseminating in-depth research and fostering continued scholarly discourse in this area.

6   Call for Participation

A growing recognition of the potential of assistive technologies for supporting older adults requires understanding aging and caregiving perspectives, as well as the cultural factors that shape older adults' technological interactions. In this hybrid workshop, we invite researchers, students, and practitioners working at the intersection of technology and aging and/or having investigated caregiving perspectives for older adults to engage in discussions centered on the role that technological interventions—including, but not limited to AI systems—can play to support, empower, amplify, and scaffold caregiving for older adults. We invite interested participants to join us in one of the two ways: (1) by submitting a position paper describing ongoing research, case studies or provocations engaging with workshop goals/themes described on our website (4-5 pages, excluding references, reviewed by a program committee); or (2) by submitting a statement of interest describing motivation to attend (400-600 words, lightly reviewed by 1-2 organizers). Position papers should follow the ACM Extended Abstract format, submitted through the workshop website. For early career researchers and students not wishing to submit a position paper, we encourage you to join us by submitting a statement of interest describing your motivation to attend through our website. In alignment with our goal of understanding caregiving challenges, we also welcome submissions that do not explicitly contain technological implementations but do explore barriers to providing care for older adults. Submissions will be accepted based on quality of submission, relevance to workshop goals, and the diversity of arguments that may contribute to productive discussions. Accepted papers will be posted to arXiv and the workshop website. At least one author of each accepted submission must attend the workshop and all participants must register for the workshop.

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