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9th International Workshop on Mental Health and Well-being: New Research Directions

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Abstract

Mental health and well-being influence overall health: suffering from a mental illness can create severe impairment and reduce quality of life. Ubiquitous computing technologies are beginning to play a central role in collecting clinically relevant behavioral and physiological information on mental health that can be used to detect symptoms early-on, deliver preventative interventions, and manage symptoms throughout the course of illness. Despite this potential, designing and translating ubiquitous technologies into mental healthcare is a complex process, and existing technologies have faced numerous challenges towards effective implementation. The goal of this workshop is to bring together researchers,

practitioners, and industry professionals to identify, articulate, and address the challenges of designing and implementing ubiquitous computing technologies in mental healthcare. Given these challenges, we are adding a specific call for papers that inspire new research directions, with initial findings that are valuable to the community, but are not fully publishable or finished contributions. Following the success of this workshop for the last eight years, we aim to continue facilitating the UbiComp community in both the conceptualization, translation, and implementation of novel mental health sensing and intervention technologies.

CCS Concepts

• **Applied computing** → **Health care information systems**; • **Human-centered computing** → **Ubiquitous and mobile computing**.

Keywords

Mental Health; Mobile Sensing; mHealth; Predictive Modeling; Behavioral Intervention; HCI

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1 Introduction

Mental illness is on the rise globally. In 2021, more than 750 million individuals worldwide suffered from a mental illness [4]. The prevalence of individuals experiencing mental health disorders continues to grow, and have been exacerbated by the COVID-19 pandemic [13] and the ongoing effects of climate change [16]. Mental illness has a devastating impact on individuals experiencing symptoms, including an increased risk of disability and premature mortality from preventable, comorbid physical conditions and suicide [12]. In addition, mental illness has a large economic burden, with an estimated annual cost on the global economy of US \$1 trillion [5].

Despite these known challenges, symptoms of mental illness often remain undetected and untreated [11]. Lack of treatment is often more acute in developing countries due to a shortage of trained mental health providers [8]. As such, there has been an increased interest in improving our ability to detect and intervene on mental illness. For example, in May 2023, the White House announced a \$200 million dollar investment to “transform how mental health is understood, accessed, treated, and integrated in and out of healthcare settings” [6].

Ubiquitous technologies provide a unique opportunity to advance these priorities by capturing real-time behavioral and physiological data associated with mental health and well-being. This data can be used to uncover opportune moments for delivering intervention. This promise has resulted in over a decade of research by the UbiComp community to apply wearable, mobile, and other ubiquitous technologies towards both sensing symptoms of and intervening on a variety of mental health conditions [1–3, 7, 9, 10, 14, 15, 17]. While this research illustrates the motivation for sensing and intervention systems to positively impact mental healthcare, it is difficult to translate these ubiquitous technologies into care, and multiple challenges remain towards developing effective solutions that improve mental health and well-being.

These challenges invite both technical and sociotechnical research towards the effective implementation of these tools. From a technical lens, continued research should address how to capture contextual data from users’ lived environment to improve the accuracy of passive sensing-mental health AI tools, how to best leverage the outputs of these tools to identify opportune moments for just-in-time intervention, and potentially integrate insights from ubiquitous computing technologies into novel LLM-based mental health solutions. There are also opportunities to create privacy-preserving algorithms, and multimodal fusion techniques that combine sensing data with more traditional forms of clinical data (eg, electronic health record data). From a sociotechnical lens, researchers could think about how to best use Ubiquitous computing technologies to

provide meaningful and actionable feedback to both patients and care providers, ensure intervention engagement, that built tools are fair, and are designed for both majority and also historically underserved communities. Towards implementation, it is critical to understand how to best embed both novel measurement tools and interventions into clinical pathways, establish the validity and efficacy of such technologies, create regulatory frameworks to ensure appropriate use, payment models, and energy neutral solutions to ensure sustainable uptake. These challenges are multifaceted, requiring interdisciplinary approaches for effective development and adoption of ubiquitous technologies to support mental health and well-being.

2 Workshop Objective

The objective of this workshop is to bring together researchers, practitioners, and industry professionals with both technical and clinical backgrounds to address these challenges by exploring novel technologies, analysis methodologies, and design techniques. Past UbiComp Workshops on Mental Health and Well-being have successfully convened community members to engage with these topics (more information on previous workshops can be found at <https://ubicomp-mental-health.github.io/>). Building on insights gathered from that experience, the present workshop has refined and extended its focus and scope.

This year, we are adding a **special call for workshop papers that inspire new research directions**. These papers should include initial findings that are valuable to the community, but are not fully publishable or finished contributions. Based upon prior years’ work, these papers could include methods and/or topics such as:

- Ethical deployments of ubiquitous computing systems in historically underserved communities.
- Ethical frameworks for developing and implementing ubiquitous technologies for mental health.
- Experience reports from clinical studies in any phase, from early pilot studies to large-scale clinical trials.
- Experience reports of clinical implementation from any perspective in the healthcare system.
- Identification of opportunities for ubiquitous computing technologies to help solve global issues that impact mental health, like climate change.
- Integration of ubiquitous technologies into existing healthcare infrastructures (e.g., payment models, regulatory frameworks) and policy.
- Investigation of new methodologies for intervention (e.g., conversational agents, AR/VR applications).
- Proposals of novel frameworks to implement and sustain ubiquitous computing technologies in mental healthcare.
- Reflections on implementing ubiquitous computing-based technologies to improve mental health and well-being in both clinical and general populations.

We still encourage submissions from other topics, including but not limited to (in alphabetical order):

- Analyses of fairness and bias in mental health–ubiquitous computing technologies.

- Design and implementation of computational platforms (e.g., mobile phones, instrumented homes, skin-patch sensors) to collect health and well-being data.
- Design and implementation of feedback or decision-support (e.g., reports, visualizations, proactive behavioral interventions, subtle or subconscious interventions etc.) for both patients and caregivers towards improved mental health.
- Design of privacy-preserving strategies for data collection, analysis, and management.
- Development of methods for sustaining user adherence and engagement over the course of an intervention.
- Development of robust models that can handle data sparsity and mislabeling issues within mobile sensing and mental health data.
- Identification of opportunities for UbiComp approaches (e.g., digital phenotyping, predictive modeling, micro-randomized intervention trials, adaptive interventions) to better understand factors related to substance abuse.
- Integration of multimodal data (with potentially clinical data) from various sensor streams for predicting or measuring mental health and well-being.

2.1 Types of Submissions and Selection Criteria

We will accept submissions up to 6 pages, including figures and references. The 6 pages are not a requirement; shorter submissions (e.g., 3 pages) are welcome. Papers should be submitted using the UbiComp ISWC 2024 proceedings format, see the UbiComp website (linked) for more details. Specific types of papers include:

- Scientific papers describing novel technologies, approaches, and studies related to ubiquitous computing and mental health. We encourage these submissions to focus on learnings that are beneficial for the community, and not finished contributions.
- Challenge papers, in which authors describe a specific challenge to be pitched and discussed at the workshop. These papers often lead to a lively discussion during the workshop.
- Demonstrations, to facilitate authors demonstrating developed technologies and early systems at the workshop.
- Experience reports that can introduce novel perspectives on real-world implementation, such as in clinical settings, or historically underserved communities.
- Critical reflections of one's own research or existing research at the intersection of ubiquitous computing and mental healthcare. We expect critical reflection papers to contribute towards better research practices in the community.

All submitted papers will be reviewed and judged on originality, technical correctness, relevance, and quality of presentation. We explicitly invite submissions of papers that describe preliminary results or works in-progress, including early translational experiences. The accepted papers will appear in the UbiComp supplemental proceedings and in the ACM Digital Library. Authors of accepted papers will be invited to present their work in-person and receive feedback from attendees. We plan to have a fully in-person workshop in Melbourne.

2.2 Expected Attendance

The workshop attendees will include UbiComp attendees, authors of accepted papers, as well as keynote speakers. We expect to have 50 total workshop attendees, and do not plan to limit attendance.

2.3 Preparation and Planned Activities

Upon workshop acceptance, we plan to update the prior year's website (see <https://ubicomp-mental-health.github.io/>) with key information about the 2024 workshop, including the workshop overview, call for participation, important dates for workshop paper submission, and formatting instructions. The organizers will then advertise the workshop to recruit authors, speakers, panelists, and mentors for participation. In addition, we will coordinate with the UbiComp organizing committee on the physical infrastructure (e.g., room, food/drink, audiovisual setup) necessary for a successful workshop. Organizers will conduct all paper reviews, and send out notifications of paper acceptance as well as registration information to authors.

We are planning for a 1-day workshop. Table 1 shows the tentative workshop schedule. A summary of the planned workshop activities include:

- Networking: Opportunities for attendees to interact, share ideas, and build collaborations.
- Keynote speakers: We will invite keynote speakers from both academia and industry to talk about their work. This year, we plan to identify a keynote speaker local to Australia, as well as a speaker to highlight opportunities to use Ubiquitous computing technologies to improve mental healthcare in underserved communities.
- Paper feedback sessions: Opportunities for authors of accepted papers to present their work to attendees and receive feedback.
- Group discussions: Opportunities for workshop attendees to discuss challenges and potential future directions of mental health and well-being research.

2.4 Organizers' Backgrounds

Organizers include both leading academics (Mishra, Sano, Bardram, Abdullah, Murnane, Choudhury, Musolesi, Kwon, Rahman, Salekin, D'Alfonso), postdoctoral associates (Xu), PhD students (Adler, Zhao, King, Kalanadhabhatta, Zhang), and industry professionals (Krell) at the intersection of ubiquitous computing and mental health.

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Morning Session	
Time (AEST)	Activity
09:00–09:30	Opening remarks
09:30–10:30	Keynote speaker 1
10:30–11:00	Speed networking and coffee break
11:00–12:30	Workshop paper feedback sessions
12:30–14:00	Networking lunch with workshop attendees
14:00–16:00	Group discussion. Potential topics: LLMs in mental health and UbiComp UbiComp, mental health, and climate change Mental health tech for underserved communities Translating research into clinical care Funding and publishing strategies Interdisciplinary collaborations Ethics and privacy Entrepreneurship and commercialization
16:00–17:00	Keynote speaker 2
17:00–17:30	Closing remarks

Table 1: Tentative workshop schedule.

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