Tangible Interaction for Supporting Well-being

CAROLINE CLAISSE, MUHAMMAD UMAIR, ABIGAIL DURRANT, Newcastle University, U.K
CHARLES WINDLIN, PAVEL KARPASHEVICH, KRISTINA HÖÖK, KTH Royal Institute of Technology, Sweden
VASILIKI TSAKNAKI, IT University of Copenhagen, Denmark
PEDRO SANCHES, Umeå University, Sweden
CORINA SAS, Lancaster University, U.K

Our workshop aims to bring together researchers and practitioners across disciplines in HCI who share an interest in promoting well-being through tangible interaction. The workshop forms an impassioned response to the worldwide push towards more digital and remote interaction in nearly all domains of our lives in the context of the COVID-19 pandemic. One question we raise is: to what extent will measures like remote interaction remain in place post-pandemic, and to what extent these changes may influence future agendas for the design of interactive products and services to support living well? We aim to ensure that the workshop serves as a space for diverse participants to share ideas and engage in cooperative discussions through hands-on activities resulting in the co-creation of a Manifesto to demonstrate the importance of embodied and sensory interaction for supporting well-being in a post-pandemic context. All the workshop materials will be published online on the workshop website and disseminated through ongoing collaboration.

Additional Key Words and Phrases: Well-being, COVID-19, Tangible Interfaces, Design Manifesto

ACM Reference Format:
Caroline Claisse, Muhammad Umair, Abigail Durrant, Charles Windlin, Pavel Karpashevich, Kristina Höök, Vasiliki Tsaknaki, Pedro Sanches, and Corina Sas. 2022. Tangible Interaction for Supporting Well-being. In *CHI '22: ACM CHI Conference on Human Factors in Computing Systems, April 30 - May 6, 2022, New Orleans, LA.* ACM, New York, NY, USA, 7 pages. https://doi.org/10.1145/nnnnnnn.nnnnnnn

1 BACKGROUND

Well-being has gained traction in HCI research in the past decade [4]. The HCI community has engaged in health and well-being research in contexts of monitoring physiological parameters to support affective health [15], designing technology to promote physical activity in workplaces and care homes [10, 16], social inclusion for people with disabilities [2] and less privileged backgrounds [14] and technologies to support spiritual well-being [12] with diverse population in both clinical and non-clinical settings. With the latest advances around big data analytics and personal health technologies, the majority of work has engaged with data-driven approaches and screen-based interaction [4]. Conversely, there has been growing research that investigates the potential of tangible interaction for supporting well-being. Examples include material exploration with shape-changing, haptics and e-textiles technologies to support bodily awareness [13, 17], wearable artefacts for remote engagement [3], mindfulness [8, 9], and affect regulation

Manuscript submitted to ACM

[18, 19]. Practitioners who are exploring embodied interaction and somaesthetic design have argued for the importance of contact and sensory interaction for well-being [1, 6, 11]. These design exemplars have become more significant to think about our post-pandemic futures in terms of supporting us live well. The COVID-19 pandemic has affected our overall health and well-being and pushed us to rely more on screen-based technology in nearly all domains of our life. In the context of care provision, virtual and remote solutions were rapidly adopted in response to government measures both in the UK [5] and worldwide [20]. Such unprecedented measures have ethical and societal implications [5]. Although data-driven systems and screen-based technologies have the potential to empower people to self-manage their health and well-being [4], one question we want to raise is: to what extent will these unprecedented measures remain in place after the pandemic, and to what extent these changes may influence future agendas for the design of interactive products and services to support living well?

We feel it is timely to bring HCI researchers and practitioners together who are interested or already engaged with designing tangible interfaces to support well-being. With growing ethical and societal implications, it is critical to identify an agenda for future research. With this workshop, we aspire to address current challenges, share lessons learned, and co-define opportunities for design in this space. We aim to invite researchers and practitioners across disciplines in HCI (i.e. designers, makers, developers) who share an interest in promoting well-being through tangible interaction. We are specifically interested in bringing people who are passionate and have already been engaging with designing tangible interfaces to support well-being.

The main workshop output will be the co-creation of a Manifesto for expressing, documenting, and disseminating our ideas within the broader HCI community and beyond. We will draw from both participants' and organizers' works and use the Manifesto as a medium for defining a research agenda and demonstrating the importance of contact, sensory and actuation interaction for well-being in a post-pandemic context. Historically, manifestos have played a critical role in some of the most important, creative, and conceptual endeavors [7]. Manifestos have been used to document an ideology, with the aim to inspire and provoke change. They have been used as political tools at times where people felt desperate for change, to achieve revolutionary ideas. The following research questions will guide the co-creation of the Manifesto:

(1) How is well-being defined in HCI and what are the different types of well-being?
(2) What should be the role of technology for supporting well-being in post-pandemic contexts and futures?
(3) How is well-being assessed, facilitated and shaped by tangible interfaces? What are the different qualities of tangible interfaces and how do they support well-being?
(4) What are the motivations behind choosing a particular modality, materials, its form factor, and context of use (i.e., body, work, or clinical settings)?
(5) What are the challenges and opportunities for designing and evaluating tangible well-being technologies in contemporary life (i.e., technical, social)?

The workshop is intended to serve as an opportunity to connect to fellow researchers and practitioners working in this domain and, starting from the co-development of the Manifesto during the workshop, foster future collaborations.

2 ORGANIZERS

- **Caroline (Caro) Claisse** is an Innovation Fellow at Open Lab, Newcastle University working in Centre for Digital Citizens on Well Citizen Challenge Area. Caro is a designer by background working on participatory research and experience-centered design projects that focus on digital health and well-being. She has experience

in running co-creation workshops for various research projects and also for public engagement in museum and gallery settings.

- **Muhammad Umair** is Innovation Fellow at Open Lab, Newcastle University. He is working in Centre for Digital Citizens on Well-Citizen challenge area. He is interested in co-creation, tangible interfaces, data-driven systems to support health and well-being. He has previous experience of organizing a workshop with collaborators on the topic of health and well-being.
- **Abigail Durrant** is Professor of Interaction Design at Open Lab, Newcastle University. Adopting co-creative methods, Abi explores how digital technologies may enable expressions of self and relationships with others, for living well. Abi is an experienced CHI workshop organizer and facilitator, working in participatory health research areas.
- **Charles Windlin** is a doctoral researcher at the Soma Design research group, at KTH Royal Institute of Technology in Stockholm. His research explores how to co-design interactive technologies within mental health with soma design methodology.
- **Pavel Karpashevich** is a doctoral researcher at the Soma Design research group, at KTH Royal Institute of Technology in Stockholm. He is interested in using restriction, pressure and shape-changing materials to design interactive wearables altering the body perception and discovering new ways of being in the world. These novel designs are used in performance arts, to support well-being, as well as to study the emerging relationships between the wearer and the artefact.
- **Kristina (Kia) Höök** is Professor in Interaction Design at the Royal Institute of Technology and a part-time researcher at the Research Institutes of Sweden (RISE). Kia is recognized for her work on social navigation, seamfulness, mobile services, affective interaction and somaesthetic design. Kia's competence lies mainly in interaction design and user studies, striving to make life with technology more meaningful, enjoyable, creative and appreciative through all our senses.
- **Vasiliki Tsaknaki** is an Assistant Professor in Interaction Design at the IT University of Copenhagen, in the Digital Design department. Her research combines materials experiences, computational crafts and soma design methods. Through practice-based studies she investigates and reflects on intersections of these areas probing the space of designing for well-being and for engaging user experiences, more broadly.
- **Pedro Sanches** is an Assistant professor in Human-Centered Artificial Intelligence with a focus on health, autonomy and well-being at the Department of Informatics, Umeå University. His research aims at developing considerate data-driven smart materials through participatory methods aimed at including a plurality of bodies, and ways of moving and being in the world.
- **Corina Sas** is Professor in Human-Computer Interaction and Digital Health at School of Computing and Communications, Lancaster University, UK. Corina has expertise in co-design of technologies for well-being and affective health and in particular tangible interaction for regulation of affect.

3 WEBSITE

Through traditional channels for the ACM, CHI, and CSCW communities, organizers' networks (i.e., Open Lab, newsletters, social media) and the workshop website: www.tangibleinteraction4wellbeing.com, our call will invite interested individuals and communities to submit relevant contributions. The website will also provide a visual provocation to inspire workshop contributions and discussions, and will also be used to disseminate workshop outputs including accepted contributions, documentation of the activities and the Manifesto. The design of the website will adhere

to accessibility criteria and we will also coordinate with AccessSIGCHI to ensure social and situational accessibility during the workshop. Given the possibilities for co-located workshop activities, the website will be as interactive and supportive as possible.

4 PRE-WORKSHOP PLANS

Interested individuals or groups will be invited to make submissions to address the following research question: What should be the role of tangible technology for supporting well-being in post-pandemic contexts and futures? We will invite multi-disciplinary submissions of novel designs in the forms of demos, position papers, pictorials, and design fictions of tangible interfaces for supporting well-being. The organizers will publish on the website further guidance including a visual provocation to inspire people's responses. Participants' submissions will be formatted in ACM Extended Abstract outlining original contributions to the workshop themes. Accepted contributions will be made available on the website ahead of time and will serve as a starting point for making the Manifesto during the workshop.

To provide a comfortable space for discussion and collaboration, the workshop will take place over one day and we will aim to accept between 10 - 15 submissions with a maximum of 15 participants in attendance. Submissions will be collaboratively reviewed by the organizers' team plus invited reviewers' input to a juried process, and assessed on originality and relevance. Accepted contributions will be published on the website and in a shared drive folder ahead of the workshop. With the permission of workshop participants, we will create a Slack channel for organizers and participants to introduce themselves and communicate ahead of the workshop with the aim to keep the thread of conversation going for further collaboration and dissemination plans after the workshop.

5 PLANS FOR ENGAGEMENT

We expect that the workshop will take place face-to-face at the CHI 2022 Conference in New Orleans. The organizers will show examples of existing manifestos for inspiration and guidance on how to contribute to the Manifesto. Participants will be invited to work with visuals and text to create their contributions and there will also be an option to work in 3D. We will provide participants with everything they need to make their contributions. Printed and craft materials will include paper-based materials for participants who want to respond by creating collage compositions: photocopies of participants' works, well-being and technology-related images (printed), different types of paper (various textures, colors) and magazines will be provided. 3D materials such as card boards, textiles and various found (small) objects will also be provided for participants who want to create 3D contributions to the Manifesto. The organizers will also sourced additional materials for making and assembling the contributions: scissors, glue sticks, large scroll of paper, glue gun and Polaroids. The Manifesto will be photographed at the workshop and later, it will be assembled into a digital 'Zine' for dissemination (see Post-Workshop Plans section).

We will plan to have a hybrid format for those who are unable to join us on site. Participants will still be able to present their work and take part in discussion via the use of teleconference software (i.e. Zoom). We will also ensure that participants who attend the workshop remotely can still contribute to the workshop activities meaningfully. For example, photographs of their contributions will be incorporated into the Manifesto. The organizers will communicate with participants ahead of the session to address any accessibility concerns.

The organizers will also plan for the workshop to be conducted entirely remotely if needed, in the case of having to comply with government measures. We will use Zoom (https://zoom.us) to convene participants online and Miro (https://miro.com) for the more collaborative and creative activities. The organizers will call for volunteers to attend the session for facilitating engagement with online tools like Miro. In case of conducting the workshop remotely,

the timings of the session will be decided depending on participants' time zone and what feels most appropriate for everyone. Information will be collated by the organizers via a survey ahead of to the workshop.

6 WORKSHOP STRUCTURE

Participants will be invited to engage with everyone's contributions prior to the workshop as they will be given access to a shared folder where the accepted position papers will be gathered. They will also be invited to read through the workshop information provided through the website. Each participant will have the opportunity to present their submitted contribution at the workshop. Participants will be asked to prepare three slides introducing: (i) who they are, (ii) their work in connection to the workshop theme; and (iii) a visual provocation in response to the question prepared by the organizers (e.g. What should be the role of technology for supporting well-being in post-pandemic futures?). For the Introduction part of the workshop, we will ask participants to think of an artifact that they see connected to well-being and bring it with them to the workshop. If conducted remotely, workshop participants will be able to introduce their artifact via Zoom. The one-day workshop will be structured as shown in Table 1.

Time	Activity	Task Description
9:30 - 10:00	Introduction	Welcome, participants and organizers introduce themselves. Participants introduce their 'well-being artifact'. Organizers introduce the workshop activities.
10:00 - 11:00	Participant Provocations	Participants present their workshop contributions: demos, position papers, pictorials and case studies followed by a brief questions and answers session.
11:00 - 11:15	Coffee break	
11:15 - 12:00	Mapping out the Design Space	Participants work in small groups to discuss the questions posed in the introduction.
12:00 - 13:00	Lunch	Networking
13:00 - 15:00	Manifesto Co-Creation	Organizers will provide materials and guidance for co-creating the Manifesto. Participants will work in small groups, with different research questions to inspire their creative response for the Manifesto.
15:00 - 15:15	Coffee break	
15:15 - 17:00	Presentation and Discussion	Each group presents their contribution to the Manifesto. Everyone engages in discussion for mapping out future directions and plans

Table 1. Workshop Schedule

7 POST-WORKSHOP PLANS

We plan to publish the Manifesto online to the workshop website. The organizers will also design a 'Zine' that will be shared online to disseminate both the Manifesto and conversation from the workshop. Beyond that, our post-workshop plans will include the following steps for disseminating participants' contributions and workshop outcomes: We will prepare an Interactions Magazine article that all participants have the opportunity to contribute to. We will prepare a proposal to a premier ACM journal for a Special Issue whose themes will be informed by the workshop outputs. The focus will be on promoting well-being through tangible interaction with a particular interest on exploring the space for post-pandemic futures. Examples of potential submissions could include research that explores how

embodied interaction focused on shape-changing materials, haptic technologies or e-textiles can be scaffolded through somaesthetic design methods and material explorations.

8 CALL FOR PARTICIPATION

This workshop forms an impassioned response to the COVID-19 pandemic context and the pressures for switching to online and remote interaction in all domains of our lives. One question we want to raise is: to what extent will these measures remain in place post-pandemic, and to what extent these changes may influence future agendas for the design of interactive products and services to support living well? We invite interested individuals or groups to submit a provocation in response to the following prompt: What should be the role of technology for supporting well-being in post-pandemic futures? We are interested in multi-disciplinary submissions of novel designs or material exploration in the forms of demos, position papers, pictorials and case studies of tangible interfaces for supporting well-being. Relevant work may include, but are not limited to, exploration of shape-changing, or haptics and e-textiles technologies. Submission should be made to [email address] in the ACM SIGCHI Extended Abstract Format (maximum 4 pages) by [deadline date]. Accepted contributions will be published on the workshop website, and will serve as materials for supporting the workshop activities aiming for the co-creation of a Manifesto for expressing, documenting, and disseminating our ideas within the broader HCI community and beyond. Upon acceptance, at least one of the authors must register for both the workshop and for at least one day of the main conference. To read the full call and access further information, please have a look at www.tangibleinteraction4wellbeing.com.

REFERENCES

[1] Miquel Alfaras, Vasiliki Tsaknaki, Pedro Sanches, Charles Windlin, Muhammad Umair, Corina Sas, and Kristina Höök. 2020. From Biodata to Somadata. In *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems* (Honolulu, HI, USA) *(CHI '20)*. Association for Computing Machinery, New York, NY, USA, 1–14. https://doi.org/10.1145/3313831.3376684

[2] Theja K. Arachchi, Laurianne Sitbon, Jinglan Zhang, Ruwan Gamage, and Priyantha Hewagamage. 2021. Enhancing Internet Search Abilities for People with Intellectual Disabilities in Sri Lanka. *ACM Trans. Access. Comput.* 14, 2, Article 10 (July 2021), 36 pages. https://doi.org/10.1145/3460202

[3] Janne Mascha Beuthel, Philippe Bentegeac, Verena Fuchsberger, Bernhard Maurer, and Manfred Tscheligi. 2021. Experiencing Distance: Wearable Engagements with Remote Relationships. In *Proceedings of the Fifteenth International Conference on Tangible, Embedded, and Embodied Interaction* (Salzburg, Austria) *(TEI '21)*. Association for Computing Machinery, New York, NY, USA, Article 95, 13 pages. https://doi.org/10.1145/3430524.3446071

[4] Ann Blandford. 2019. HCI for health and wellbeing: Challenges and opportunities. *International Journal of Human-Computer Studies* 131 (2019), 41–51. https://doi.org/10.1016/j.ijhcs.2019.06.007 50 years of the International Journal of Human-Computer Studies. Reflections on the past, present and future of human-centred technologies.

[5] Ann Blandford, Janet Wesson, René Amalberti, Raed AlHazme, and Ragad Allwihan. 2020. Opportunities and challenges for telehealth within, and beyond, a pandemic. *The Lancet Global Health* 8, 11 (Nov. 2020), e1364–e1365. https://doi.org/10.1016/s2214-109x(20)30362-4

[6] Nadia Campo Woytuk, Marie Louise Juul Søndergaard, Marianela Ciolfi Felice, and Madeline Balaam. 2020. Touching and Being in Touch with the Menstruating Body. In *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems* (Honolulu, HI, USA) *(CHI '20)*. Association for Computing Machinery, New York, NY, USA, 1–14. https://doi.org/10.1145/3313831.3376471

[7] Mary Ann Caws. 2001. *Manifesto: A Century of isms.* U of Nebraska Press.

[8] Claudia Daudén Roquet and Corina Sas. 2021. *Interoceptive Interaction: An Embodied Metaphor Inspired Approach to Designing for Meditation.* Association for Computing Machinery, New York, NY, USA. https://doi.org/10.1145/3411764.3445137

[9] Claudia Dauden Roquet, Corina Sas, and Dominic Potts. 20201 (in press). Exploring Anima:A brain-computer interface for peripheral materialization of mindfulness states during mandala coloring. *Human-Computer Interaction* (20201 (in press)).

[10] Kathrin Gerling, Mo Ray, Vero Vanden Abeele, and Adam B. Evans. 2020. Critical Reflections on Technology to Support Physical Activity among Older Adults: An Exploration of Leading HCI Venues. *ACM Trans. Access. Comput.* 13, 1, Article 1 (April 2020), 23 pages. https://doi.org/10.1145/3374660

[11] Kristina Höök. 2018. *Designing with the body: Somaesthetic interaction design.* MIT Press.

[12] Tom Jenkins. 2013. Devotional Gardening Tools. In *CHI '13 Extended Abstracts on Human Factors in Computing Systems* (Paris, France) *(CHI EA '13)*. Association for Computing Machinery, New York, NY, USA, 2219–2226. https://doi.org/10.1145/2468356.2468743

[13] Annkatrin Jung, Miquel Alfaras, Pavel Karpashevich, William Primett, and Kristina Höök. 2021. *Exploring Awareness of Breathing through Deep Touch Pressure.* Association for Computing Machinery, New York, NY, USA. https://doi.org/10.1145/3411764.3445533

[14] Jahmeilah Roberson and Bonnie Nardi. 2010. Survival Needs and Social Inclusion: Technology Use among the Homeless. In *Proceedings of the 2010 ACM Conference on Computer Supported Cooperative Work* (Savannah, Georgia, USA) *(CSCW '10)*. Association for Computing Machinery, New York, NY, USA, 445–448. https://doi.org/10.1145/1718918.1718993

[15] Pedro Sanches, Axel Janson, Pavel Karpashevich, Camille Nadal, Chengcheng Qu, Claudia Daudén Roquet, Muhammad Umair, Charles Windlin, Gavin Doherty, Kristina Höök, and Corina Sas. 2019. HCI and Affective Health: Taking Stock of a Decade of Studies and Charting Future Research Directions. In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems* (Glasgow, Scotland Uk) *(CHI '19)*. Association for Computing Machinery, New York, NY, USA, 1–17. https://doi.org/10.1145/3290605.3300475

[16] Corina Sas, Nigel Davies, Sarah Clinch, Peter Shaw, Mateusz Mikusz, Madeleine Steeds, and Lukas Nohrer. 2020. Supporting Stimulation Needs in Dementia Care through Wall-Sized Displays. In *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems* (Honolulu, HI, USA) *(CHI '20)*. ACM, 1–16. https://doi.org/10.1145/3313831.3376361

[17] Vasiliki Tsaknaki, Kelsey Cotton, Pavel Karpashevich, and Pedro Sanches. 2021. *"Feeling the Sensor Feeling You": A Soma Design Exploration on Sensing Non-Habitual Breathing*. Association for Computing Machinery, New York, NY, USA. https://doi.org/10.1145/3411764.3445628

[18] Muhammad Umair, Muhammad Hamza Latif, and Corina Sas. 2018. Dynamic Displays at Wrist for Real Time Visualization of Affective Data. In *Proc. Conf. Companion Publication on Designing Interactive Systems*. ACM, 201–205. https://doi.org/10.1145/3197391.3205436

[19] Muhammad Umair, Corina Sas, Niaz Chalabianloo, and Cem Ersoy. 2021. Exploring Personalized Vibrotactile and Thermal Patterns for Affect Regulation. In *Designing Interactive Systems Conference 2021 (DIS '21)*. ACM, 891–906. https://doi.org/10.1145/3461778.3462042

[20] Paul Webster. 2020. Virtual health care in the era of COVID-19. *The Lancet* 395, 10231 (April 2020), 1180–1181. https://doi.org/10.1016/s0140-6736(20)30818-7