

# Opportunities and Challenges of Designing for Mindful Eating: Integrating HCI Research on Mindfulness, Human-Food Interaction and Somaesthetics

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Given its sensory and emotional qualities, food as a rich resource for design has been much explored in Human-Food Interaction research. Besides such positive aspects of food and food experiences, other scholars have focused on problematic and disordered eating, as well as technologies' negative impact on the growing number of people living with these conditions. Drawing from mindfulness-based interventions, health research has explored effective interventions for mindful eating, which, however, have been limitedly harnessed in interaction design, despite the growing body of HCI research on mindfulness technologies, emphasising also the role of the human body in mindfulness practices. This half-day workshop aims to address this gap, by bringing together designers, practitioners, and HCI researchers from human-food interaction, mindfulness, and somaesthetics to explore the design space of technologies for mindful eating interventions, with a focus on five goals targeting (i) support for the role of the body in mindful eating, (ii) design exploration of technologies supporting mindful eating interventions, (iii) develop theoretical and methodological foundations for designing for mindful eating, (iv) explore ethical aspects of designing for mindful eating interventions, and (v) position mindful eating technology-based interventions within a broader, more sustainable food cycle.

*Mindful eating. Human-food interaction. Mindfulness. Food. Somaesthetics*

## 1. INTRODUCTION AND MOTIVATION

Food is an excellent resource for design with rich sensory (Velasco et al., 2018) and emotional qualities (Gayler et al., 2017), and a significant impact on wellbeing and health. Thus, it has attracted increased research interest in the Human-Food Interaction (HFI) area (Altarriba et al., 2020; Altarriba et al., 2019; Velasco et al., 2023), where the main focus has been on augmenting taste (Ranasinghe et al., 2016; Gayler et al., 2019), or smell (Brooks et al., 2023; Brooks et al., 2023) and their hedonic qualities (Gayler et al., 2022), or supporting commensality (Grevet et al., 2012; Mitchell et al., 2015). Within HFI, scholars have also explored the design of technologies to support healthy eating (Kim et al., 2016; Epstein et al., 2016), particularly for children (Kadomura et al., 2013; Kim et al., 2010; Joi et al., 2016; Lo et al., 2007). Such research has focused on a range of technologies from mobile apps (Gayler et al., 2022), social media (Lu et al., 2021) or 3D-food printing (Gayler et al., 2018; Gayler et al., 2023; Lin et al., 2020; Khot et al.,

2015), to wearables (Kim et al., 2016) smart tableware (Kadomura et al., 2013; Kim et al., 2016), ingestible sensors (Brandmueller et al.,; Li et al., 2018) or AR/VR interfaces (Narumi et al., 2012; Narumi et al., 2011).

While much such research has predominantly explored the positive aspects of food and eating experiences (Epstein et al., 2016; Bomfim et al., 2020; Lukoff et al., 2018; Vylegzhanina et al., 2014; Guluzade et al., 2023), other body of work has focused on problematic eating (Guluzade et al., 2024; Chung et al., 2017; Devakumar et al., 2021) and the arguably negative impact of technologies such as mobile apps focused on calorie tracking (O'neill et al., 2024), particularly for people living with eating disorders (Guluzade et al., 2024; Devakumar et al., 2021). Problematic and disordered eating is; however, an important societal challenge reflected in the growing number of people, especially young ones, living with eating disorders (Dane et al., 2023; Patel et al., 2016) or the prevalence of obesity worldwide (James et al., 2001). Such patterns of

eating have been associated with poor food intake regulation, diminished self-control, reduced interoceptive awareness (Merwin et al., 2010; Jenkinson et al., 2018), as well as challenges in emotional regulation (Harrison et al., 2010; Gilboa et al., 2006).

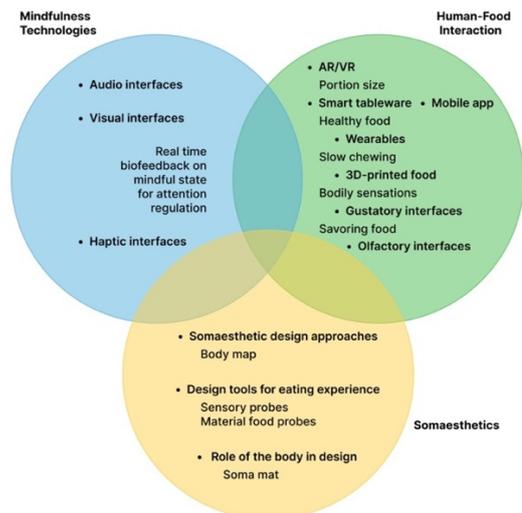
Drawing from mindfulness interventions, several interventions have been developed for mindful eating, which focuses on slowly savouring food, with small bites and portion sizes, and chewing thoroughly (Monroe 2015; Framson et al., 2009; Kristeller et al., 2014). Among such interventions, the Mindfulness-Based Eating Awareness Training Program (MB-EAT) has been shown to be particularly effective (Kristeller et al., 2014) in supportive mindful eating for both clinical (Kumar et al., 2018) and non-clinical populations (Keyte et al., 2020). Framson et al. (Framson et al., 2009) defined mindful eating as “*nonjudgmental awareness of physical and emotional sensations while eating or in a food-related environment*”. It encourages cultivating present-moment awareness during meals by tuning into the body's internal cues and eating with small bites and portions to avoid overeating. It involves eating attentively, reducing distractions, and fully savouring the sensory qualities of food (Monroe 2015).

Despite its benefits, interaction design on mindful eating has been limitedly explored. There has been however a growing body of HCI research on mindfulness technologies that we could draw from, which has highlighted the value of audio/visual (Antle et al., 2022; Cochrane et al., 2021; Dauden et al., 2023) or thermal interfaces for regulating attention (Dauden et al., 2021), the potential and limitations of mobile apps (Lukoff et al., 2020; Dauden et al., 2018) as well as the role of the human body in meditation (Dauden et al., 2020). The somatic turn from social sciences has also impacted HCI research (Loke et al., 2018) from somaesthetics design approach (Hook et al., 2018) or tools (Anne et al., 2022) to design tools for eating experiences (Gayler et al., 2021; Gayler et al., 2020).

Our in-person, half-day workshop extends previous DIS and CHI workshops on HFI (Davis et al., 2020; Dolejvsova et al., 2020; Choi et al., 2012; Dolejvsova et al., 2019) and wellbeing-related aspects (Sas et al., 2020; Thieme et al., 2012; Claisse et al., 2022; Ahmadpour et al., 2025). Thus, it aims to by bringing together these two separate areas of research on HFI, and mindfulness technologies to investigate the less explored design space of systems for mindful eating, while also drawing from somaesthetics approaches and tools (Fig. 1). Research on HFI has touched upon aspects of mindful eating, such as slow eating through smart tableware (Kadomura et al., 2013; Zhang et al., 2016), wearables (Kim et al., 2016; Bi et al., 2014; Lotfi et al., 2020; Morshed et al., 2022) or 3D-printed food (Lin et al., 2020),

AR/VR for altering small portion sizes (Narumi et al., 2012) or taste by superimposing different scents (Narumi et al., 2011), colours (Nishizawa et al., 2016), or augmenting sounds to enhance hedonic experience (e.g., crunchy) (Chen et al., 2024; Koizumi et al., 2011; Kleinberger et al., 2023; Mathiesen et al., 2019).

**Figure 1:** Diagram reflecting the two main areas of research on human-food interaction and mindfulness technologies, as well as somaesthetics approaches and tools that this workshop aims to bridge and integrate



## 2. AIMS AND OBJECTIVES

The workshop aims to build a rich community of researchers, designers, and practitioners interested in the underexplored design space of technologies for mindful eating interventions. The workshop's aim can be broken down in two objectives: (i) to reflect on the challenges and opportunities of designing mindful eating technologies, and (ii) to explore key future directions for designing such technologies. For the former objective, we will focus on the role of the body in mindful eating and the importance of developing theoretical and methodological foundations for designing for mindful eating. For the second objective, we will focus on design exploration of technologies supporting mindful eating interventions, the ethical aspects of designing for mindful eating interventions, and the importance of positioning mindful eating technology-based interventions within a broader, more sustainable food cycle, i.e., food-related activities such as production, consumption or management of food waste (Khot et al., 2019).

## 3. BENEFITS AND SIGNIFICANCE

We welcome submissions relevant but not limited to our five goals, with the aim of laying a stronger

interdisciplinary foundation for the design of mindful eating. This will advance the state-of-the-art in this space and nurture the community of interested researchers, designers, and practitioners. Following the workshop, we aim to organise a call for a special issue in the ACM Transactions in Human-Computer Interaction journal on designing for mindful eating.

#### 4. SCHEDULED ACTIVITIES

The workshop will be in person and will run for half a day, with a minimum of 8 attendees and structured according to the following tentative schedule:

Time	Activity	Description
9.00 – 9.15	Introduction	Welcome and introduction
9.15 – 9.30	Activity 1	Mindful eating introduction and guided meditation
9.30 – 10.30	Activity 2	Group activity on challenges and opportunities of designing mindful eating technologies
10.30 – 10.45	Coffee break	
10.45 – 11.45	Activity 3	Group activity on key future directions for mindful eating technologies
11.45 – 12.00	Wrap-up	Final reflections and closing remarks

**Introduction** session ensures that participants are welcome, get to briefly know each other through icebreaking exercises, and are introduced to the main activities and intended outcomes.

**Activity 1** extends the Introduction with a guided mindful eating session supporting an experiential understanding of this practice.

**Activity 2** focuses on the challenges and opportunities of designing mindful eating technologies. Here we will explore the role of the body in mindful eating and the theoretical and methodological foundations for designing mindful eating interventions. For this, we will explore current design approaches and technologies from both HFI and HCI research on mindfulness that capture bodily aspects. The aim is to discuss and reflect on how current approaches and technologies could be extended to support awareness of sensory aspects of food, and of internal sensations of hunger and fullness. Here we could draw from wearable sensors capturing mindful states such as EEG, together with audio, visual, or haptic neurofeedback interfaces, or ingestible sensors capturing metabolism, for

instance, with AR interfaces for representing internal metabolism processes.

Activity 2 also acknowledges the theoretical gap (Hekler et al., 2013) of HCI research and the value of developing a stronger theoretical foundation. To design for mindful eating interventions, we can draw from health research on conceptualising mindful eating (Hulbert et al., 2014; Carriere et al., 2022; Mantzios et al., 2023) and mindful eating interventions (Kristeller et al., 2014; Burton et al., 2020). We can also explore and develop new design methods inspired by the somaesthetics approach (Hook et al., 2018) or tools (Anne et al., 2022) such as sensory probes (Gayler et al., 2021) or material food probes (Gayler et al., 2020)

**Activity 3** focuses on key future directions for designing mindful eating technologies. For, we will focus on three areas, such as mindful eating interventions, ethics of such technologies, and their sustainability. Here, the goal is to explore key mindful eating aspects such as slow chewing (Kim et al., 2016s), reduced portion size (Narumi et al., 2012; Narumi et al., 2015; Kim et al., 2016), non-judgmental attitude towards food and eating (Eat Right Now), healthy food (Kadomura et al., 2013), or gratitude for food (Donga et al., 2022). The aim is to explore novel design concepts that could address several such aspects, as well as potential tensions among them, such as increased awareness of chewing speed while limiting a non-judgmental attitude. These efforts could help us articulate the affordances and constraints of key technologies such as smart tableware, wearables, 3D food printing, AR/VR, or mobile apps, and how they can be best leveraged for supporting mindful eating interventions such as those informed by the MB-EAT program.

Concerning ethics, eating behaviours can also be problematic, which over time may present the risk of developing into eating disorders such as bulimia or anorexia, or disordered eating such as diabetes. Previous work has shown the negative impact of technologies on vulnerable users at risk of such conditions or living with these conditions, in particular, food tracking technologies (Chung et al., 2017; Devakumar et al., 2021; O'Neill 2024 et al.; Guluzade et al., 2024). While ethical aspects of designing for mindful eating have been less explored, we can draw from the growing HCI interest in the ethics of affective health technologies (Bowie et al., 2022; Sanches et al., 2019) drawing for instance from the four biomedical ethics principles (Beauchamp et al., 1994) of autonomy, non-maleficence, beneficence, and justice.

Activity 3 also focuses on positioning technology-based mindful eating interventions within the sustainable food cycle. While most research on HFI

has focused on eating experiences (Gayler et al., 2022), interest in the design of more sustainable food practices has also emerged (Comber et al., 2013; Velasco et al., 2023). We can extend such previous work to account for gratitude towards food and how it has been produced, as an important aspect of mindful eating. In turn, designing to support such gratitude could strengthen appreciation for more sustainable food practices across the entire food cycle, from food production to the prevention of food waste.

**Wrap-up** Finally, we will ask participants to share their insights with the other attendees. The workshop will wrap up by summarising the day's activities 1, 2, 3 and outlining the next steps forward.

## 5. ACCESSIBILITY CONSIDERATIONS

All submissions will be asked to comply with SIGCHI accessibility guidelines. The workshop website <https://sites.google.com/view/beschci25mindfuleating/home> complies with these guidelines.

## 6. REQUIRED FACILITIES AND EQUIPMENT

For this in-person, half-day workshop, we require a cabaret-style room with tables where people can work in small groups, a projector, and a lectern with a PC controlling the projector. Based on the size of the room, we may benefit from 1-2 microphones. To summarise the discussion, A0 flipchart paper and coloured markers, together with adhesive for hanging on walls, would be useful.

## 7. ORGANISERS

**Corina Sas** is Professor in HCI and Digital health in the School of Computing and Communications at Lancaster University, UK. Her expertise includes mindfulness technologies, HFI with a focus on 3D food printing for wellbeing, and design tools, as well as the role of the body in the design, to support emotional awareness and regulation for both wellbeing and mental health.

**Lala Gulzade** is PhD candidate in the School of Computing and Communications at Lancaster University, UK. She is a product designer with over eight years of experience whose HCI research focuses on exploring and designing interactive technologies for mindful eating. Her research interests include health, wellbeing, and designing for better user experience.

**Ferran Altarriba Bertan** is Associate Professor at Escola Universitària ERAM (Salt, Catalonia) and a researcher at the Gamification Group (Tampere, Finland). His work explores designing tech that supports ways of living that are both joyful and

caring, using situated and participatory design methods. As part of that research agenda, Ferran has explored different areas of food practice, looking into their capacity to give rise to rich lived experiences where play and playfulness (technology-mediated and otherwise) can have a meaningful role. Ferran has co-organised 30+ co-design workshops, in both academic (in conferences such as CHI, DIS, IDC, or CHI Play) and non-academic settings, partnering with both public and private institutions. [www.ferranaltarriba.com](http://www.ferranaltarriba.com)

**Kristina Höök** is Professor in Interaction Design at the KTH Royal Institute of Technology, Sweden. She is known for her work on affective interaction and designing for bodily, somatic, sensory engagement in interaction through *soma design*. Soma design is a holistic design approach offering aesthetic and ethical design ideals.

**Rohit Ashok Khot** is Senior Lecturer in the School of Design at RMIT University, Australia. He directs the HAFP Research Lab which contributes innovative ideas and designs to the rapidly evolving realm of Human-Food Interaction (HFI). His work challenges established norms and spearheads a paradigm shift in the traditional approach to designing technology for food and well-being, weaving in the worlds of play and multi-sensory experiences within the context of food.

**Naseem Ahmadpour** is Associate Professor in Interaction Design at the University of Sydney. She leads the Affective Interactions lab, where she conducts research on affective experiences and emotional harms of sociotechnical systems that increasingly shape the future of care and work. Her research interests also include mindfulness and tools for soma-based design, while her recent work questions the platformisation of care and raises ethical concerns about unregulated innovations in this space.

## 8. CALL FOR PARTICIPATION

We invite designers, practitioners, and researchers with an interest in mindful eating to participate in this workshop. Its aim is to bring together expertise from HCI research on Human-Food Interaction (HFI), mindfulness technologies, and somaesthetics to explore the opportunities and challenges of designing interactive systems for supporting mindful eating interventions for both clinical and non-clinical populations.

We welcome single-column SIGCHI submissions, up to 3 pages long (excluding references), describing theoretical perspectives, design approaches or tools, as well as conceptual designs or prototypes that could support mindful eating interventions. All PDF submissions must comply

with SIGCHI accessibility guidelines and should be sent to [l.s.guluzade@lancaster.ac.uk](mailto:l.s.guluzade@lancaster.ac.uk) with the subject line “BCS HCI25 Mindful Eating Workshop”.

## 9. ACKNOWLEDGMENTS

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