

EmpathiCH: Scrutinizing Empathy-Centric Design Beyond the Individual

ALOK DEBNATH, Trinity College Dublin, Ireland

ALLISON LAHNALA, University of Bonn, Germany

UĞUR GENÇ, Delft University of Technology, Netherlands

EWAN SOUBUTTS, University College London, United Kingdom

MICHAL LAHAV, Google, United States

TIFFANIE HORNE, Google, United States

WO MEIJER, Delft University of Technology, Netherlands

YUN SUEN PAI, Keio University Graduate School of Media Design, Japan

YEN-CHIA HSU, University of Amsterdam, Netherlands

GIULIA BARBARESCHI, University College London, United Kingdom

HIMANSHU VERMA, Delft University of Technology, Netherlands

ANDREA MAURI, Université Claude Bernard Lyon 1, France

The EmpathiCH Workshop aims to blend a diverse set of expertise to expand upon the nascent field of Empathy-Centric Design. Building on the discussions in previous editions of the workshop, this iteration invites contributions which scrutinize the use of empathy as a design principle in digital interfaces. We encourage inquiry in a number of research dimensions: examining the multifaceted nature of empathy; establishing both the requirements and shortcomings of empathy in design research; discussing key post-human stakeholders in digital interfaces (social groups, causes, digital avatars, artificial agents etc.); and expanding the scope of empathy research beyond preliminary perspective-taking. The workshop, structured as a combination of author panels, expert discussion, and interactive activities, provides the ideal venue to foster a critical discussion on the nature of the suitability of empathy in digital design, especially in the rapidly approaching context of its role in post-humanist HCI.

CCS Concepts: • **Human-centered computing** → **HCI theory, concepts and models**; **HCI design and evaluation methods**.

Additional Key Words and Phrases: empathy, empathy-centric design, assessment of empathy, attributes of empathy, ethics of empathy, collaboration

ACM Reference Format:

Alok Debnath, Allison Lahnala, Uğur Genç, Ewan Soubutts, Michal Lahav, Tiffanie Horne, Wo Meijer, Yun Suen Pai, Yen-Chia Hsu, Giulia Barbareschi, Himanshu Verma, and Andrea Mauri. 2024. EmpathiCH: Scrutinizing Empathy-Centric Design Beyond the Individual. In *Extended Abstracts of the CHI Conference on Human Factors in Computing Systems (CHI EA '24)*, May 11–16, 2024, Honolulu, HI, USA. ACM, New York, NY, USA, 11 pages. <https://doi.org/10.1145/3613905.3636297>

1 BACKGROUND AND MOTIVATION

Within the Human-Computer Interaction (HCI) community, empathy is widely considered an important design principle in multi-stakeholder user-facing systems. *Empathy* is often defined as “the intuitive ability to identify with other people’s

Permission to make digital or hard copies of part or all of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for third-party components of this work must be honored. For all other uses, contact the owner/author(s).

© 2024 Copyright held by the owner/author(s).

Manuscript submitted to ACM

thoughts and feelings – their motivations, emotional and mental models, values, priorities, preferences, and inner conflicts” [32], which means going beyond “knowing the user” and understanding how “it feels like” to be that person [24, 53]. Design research considers this perspective of empathy as a crucial factor in better understanding people [41] and safeguarding the success of user-centred approaches [10, 53]. Empathy plays an essential role in the daily life of practitioners, e.g. client communication, leadership, agile teamwork, and also in the design process of human-centered technology (e.g., user research stage of “empathizing”). The importance of empathy has also been explored in adjacent fields, e.g. patients’ medic relation [33], education [2, 51, 52], racial bias reduction [36], gaming [2, 14], design [13, 41, 55]; and with different technologies such as virtual reality [2, 33, 47], mobile [35] and wearable devices [16, 38], and artificial intelligence [42].

Historically, as seen in workshops at ACM CHI 2022 [31] and 2023 [12], the discourse on empathy in HCI pivoted around human needs (e.g., control and safety) and values (e.g., inclusiveness and ethics). Recognizing empathy as “the intuitive ability to identify with other people’s thoughts and feelings” [54] has transformed our design approach, going beyond merely knowing the user to acknowledging their lived experiences and subjective context [5, 49]. This shift has fostered the growth of empathetic design frameworks, like cultural probes and storytelling, aiming to immerse designers in users’ perspectives [31]. As HCI expands towards a digital landscape where boundaries between humans and technology blur, our understanding of *empathy* has also evolved. It now encompasses not only human interactions but also abstract concepts, causes, and digital entities. For example, digital activism demonstrates technology’s ability to mobilize around environmental or historical issues [56].

For decades, scholars have studied how developing empathic relationships between designers and users results in better products or services [53], through design methods, conceptualization [7, 45], and the development of design frameworks [17, 25, 43]. However, the limitations of empathy in design and their effects on design solutions and outcomes are unclear and debatable [18, 19]. The only consensus on empathy is there is no consensus [7, 31]. Moreover, quantitative metrics of empathy in design to better explain and predict it are under-researched [7, 11, 45].

Combining these factors—emulating empathy for computational interfaces, the centrality of empathy as a design principle, and the changing emotional dynamics in human-non-human interactions through digital media—poses a complex research paradigm. Furthermore, collective empathy, where emotions and experiences are shared across networks, is often overlooked. Considering empathy as a concept beyond the individual necessitates reevaluating how we elicit, understand, and apply empathy in both physical and digital realms.

Given these challenges, this EmpathiCH workshop aims to solicit contributions that enhance theories, assessment methods, and empirical studies to advance our understanding of empathy and foster human-centered technology and service design. Mainly, we aim to: (1) **examine** the use of empathy in human-computer interaction, digital design, and computational social sciences, (2) **highlight** research that critically challenges and/or purports to shift the paradigm of empathy-centric design, and (3) **scrutinize** the role of empathy as a design principle. Building on last year’s discussions, this edition also seeks research and case studies providing insight into empathy between individuals and non-human entities such as news and social causes (e.g., activism), groups (and digital representations thereof), avatars and online personas, and artificial agents, among others.

1.1 Extending Upon Previous Editions

Through two consecutive workshops at CHI’22 [31] and CHI’23 [12], we have consolidated various notions, paradigms, and constructs in the continually evolving discourse on Empathy-Centric Design. Meanwhile, we have grown an

engaged and dedicated research community, with a steady influx of new members¹. This growth is reflected in our recent CHI workshops on Empathy-Centric Design, where new members have contributed to evolving themes that foster the diversity, inclusivity, multidisciplinary, and pluralism necessary to advance the Empathy-Centric Design research agenda. Building on past discussions, our current proposal demonstrates these facets through changes in the organizing team and thematic emphasis.

In the CHI'22 workshop on **Empathy-Centric Design At Scale** [31], 25 participants collectively scrutinized the role and vision of empathy in human-centred design practices in a day-long virtual workshop. This cooperation captured rich, nuanced, and fine-grained insights about context and target population. The discussions also delved into empathy's increasing role in interactive user experiences and in how it is evoked and spread through technology-mediated channels, and finally, the need to unify diverse conceptions of empathy across disciplinary, cultural, linguistic, and societal boundaries under the umbrella of Empathy-Centric Design and HCI.

The subsequent CHI'23 workshop—**Unraveling Empathy-Centric Design** [12]—expanded the discourse on pluralistic and divergent conceptions of empathy and Empathy-Centric Design, and sought to disentangle them from within established paradigms and methodologies, and their manifestations in existing scales, measures, and instruments for capturing empathy. Furthermore, over 50 participants in a hybrid workshop in Hamburg, Germany, collectively scrutinized and debated the seams of Empathy-Centric Design and the unconsidered role of empathy as a potential instrument of manipulation and influence. We further inquired into the overarching attributes and affordances of Empathy-Centric Design, including its materiality and temporality, followed by a review of its positioning in HCI.

In the current proposal, we aim to bring together diverse scholars—including computer scientists, social and political scientists, designers, psychologists, philosophers, linguists, and practitioners from different disciplines—to share their knowledge, experiences, and ideas about working with empathy at different levels and in a variety of contexts for large-scale societal impact. Participants will be encouraged to venture beyond existing constructs, conceptions, and paradigms of empathy and Empathy-Centric Design, and to collectively critique their vision and mission in HCI and beyond. In this way, we are also interested in fostering multidisciplinary collaborations among academics and practitioners, which can further guide and shape the future research agenda on Empathy-Centric Design.

1.2 Themes in Scrutinizing Empathy Beyond the Individual

Previous editions of this workshop have fostered a platform for diverse research on "Empathy-Centric Design". Empathy-centric design has gained traction in fields such as natural language processing (e.g., [6, 15, 50]), computational social science (e.g., [23, 28, 57]), and affective computing (e.g., [29, 37, 39]). We have also previously explored critical discussions on its definitional, ethical, and overlapping paradigms. In this workshop iteration, our goal is to refine and expand the empathy-centric design paradigm, inviting papers that delve into its principles and processes.

1.2.1 Empathy in Post-Humanist HCI. With the rapid evolution of HCI, our understanding of the human within the loop is expanding beyond traditional boundaries. The modern technological ecosystem presents opportunities to empathize not just with other humans, but also with externalized representations of self (digital avatars), sociopolitical causes via a digital landscape, collective groups identified with (or in solidarity) with an identity or cause, as well as digital and artificial interactive agents.

Empathy towards externalized representations of self and other: Digital interfaces contrast with in-person conversations, especially with the projection of personas and self-projections [4]. Empathy fundamentally recognizes

¹As assessed through increasing registrations on our Slack platform.

similarities between self and other [34]. How does the medium influence empathic expression? How does depersonalization affect empathy digitally? How do users interact differently with human and non-human actors on different mediums?

Empathy towards a collective experience: Beyond individual experiences, empathy can manifest collectively, especially in a world interconnected with human and non-human entities. Collective empathy shapes digital platforms, from online mourning to movements. With emotional contagion and mimicry in mind [22, 26], how can we use collective empathy in HCI for positive impact? How do group empathic experiences contrast with individual ones, and how should HCI adapt?

Empathy towards a sociological or geopolitical cause: Co-creating socio-technical solutions involves various stakeholders with potential value misalignments [8]. Instead of "parachuting" technology, aligning to local contexts is essential [20]. Yet, finding common ground among diverse stakeholders is challenging [40]. How can empathy-centric design help? With HCI intertwining with activism, how can we design and evaluate empathy for non-human or abstract subjects? How can we leverage design to evoke empathy for abstract entities, considering the immersive potential of digital experiences?

1.2.2 The Role of the Researcher in Empathy-Centric Design: Empathy-centric design places empathy at the forefront of the design process. However, as the HCI community places increased emphasis on empathy-centric design, the role of the researcher in facilitating and studying these designs becomes pivotal, multifaceted and deserves scrutiny.

How can research be approached in an empathetic way? To incorporate empathy in research, one must grasp user emotions and societal context [30]. Using insights from design empathy [27, 48], how can research be authentic and user-focused?

Who guides the empathy exercise? Who should lead the empathy process: users, designers, or a collaborative effort? Traditional empathic designs sometimes sideline the empathy target, but emphasizing individual agency can balance power dynamics, especially in marginalized communities [46].

Can empathy become a burden or even a distortion? While empathy is celebrated in HCI, it has pitfalls [3]. There's a risk of sidelining actual user experiences for designer interpretations. How can empathy evolve from mere observation to a shared understanding considering societal contexts? How can it promote genuine connections without overshadowing user experiences?

How can we examine the benefits and shortcomings of empathy-centric design? The effectiveness and potential biases of empathy in design need examination [44]. Empathy's role shouldn't be discarded but rather assessed for its true value in design. How do we determine the appropriateness of empathy-centric design and understand the underlying stakeholder needs?

1.2.3 Going beyond "empathy as perspective taking". In HCI, empathy is often linked to perspective-taking, but it's vital to move beyond this limited view. Empathy is a complex concept with various layers. Ethical issues arise, such as whose needs are considered and whether it's fair. These concerns become more significant in complex situations influenced by biases. By addressing these ethical intricacies, HCI can progress towards a more inclusive and just design approach.

Emotional resonance and contagion: Empathy doesn't merely involve understanding another's perspective but resonating with their emotions. Emotional contagion and mimicry play pivotal roles in fostering empathy in HCI. How can we use this knowledge to design experiences that genuinely resonate?

Empathic Accuracy: Moving beyond understanding another’s perspective, empathic accuracy delves into accurately interpreting and responding to another’s emotions and thoughts [9, 21]. This accuracy is paramount in ensuring meaningful human-technology interactions.

Reactive Empathy: Empathy isn’t always passive. Reactive empathy seeks to alleviate distress and modulate emotional states. It poses pertinent questions: How can technology and design adopt a proactive stance? How can systems become more supportive and emotionally intelligent?

While these themes are diverse to allow academic interest and representation across a variety of fields from artificial general intelligence to human-centred design, the specificity of the theme of going beyond the individual represents a common goal for empathy-centred design.

2 ORGANIZERS

Below is an illustration of the disciplinary backgrounds of the organizing team, which includes researchers and practitioners from both academia and industry, and the rich and complementary perspectives they bring to the workshop theme.

Alok Debnath (*main contact*) is a Ph.D. candidate at the ADAPT Centre, Trinity College Dublin. His current research focuses on analyzing empathetic tendencies in conversational agents. (**Website:** <https://alokdebnath.github.io>)

Allison Lahkala (*main contact*) is a Ph.D. candidate at University of Bonn, researching NLP-based conversation modeling and computational social science, focusing on empathic communication. (**Website:** <https://allielahkala.com>)

Uğur Genç is a postdoctoral researcher at TU Delft (Netherlands). His work explores integrating empathy into technology, aiming to produce solutions that genuinely understand and respond to human needs for an elevated user experience. (**Website:** <https://ugenc.com/>)

Ewan Soubutts is a Research Fellow at University College London, UK. His research looks at the shared use of technology amongst older adults, and the emotional impact of the acceptance of different types of smart technologies for health and wellbeing. (**Website:** https://x.com/ewan_researches)

Michal Lahav is a Staff User Experience Researcher at Google Research. She focuses on uncovering challenges within the generative AI and natural language understanding space, primarily improvements for underserved and marginalized communities. (**Website:** <https://research.google/people/MichalLahav/>)

Tiffanie Horne is a User Experience Researcher at Google. With an interdisciplinary background in Special Education and Human-Computer Interaction - and passionate about creating socially responsible technological experiences - she helps launch more inclusive products through diversifying external users’ voices early and often in the product life cycle. (**Website:** <https://www.tiffaniehorne.com/>)

Wo Meijer is an industrial designer and Ph.D. candidate at TU Delft (Netherlands). His current research is focused on enhancing video as a user research method in order to help designers develop empathy for their users quickly and deeply. (**Website:** <http://womeijer.com>)

Yen-Chia Hsu is an Assistant Professor at the Informatics Institute, University of Amsterdam (Netherlands). He studies methods to co-design, implement, deploy, and evaluate interactive AI systems that empower local communities in addressing public health issues, such as air pollution. (**Website:** <http://yenchiah.me>)

Yun Suen Pai is a Senior Assistant Professor at Keio University, directing the Physionetic Interactions Group in the Embodied Media Laboratory. He explores extended reality to heighten empathy and foster pro-social behavior change. (**Website:** <https://yunsuenpai.com/>)

Giulia Barbareschi is a Senior Assistant professor at Keio University researching how accessible technologies can foster a more inclusive society. (**Website**: <https://giulia-barbareschi.com>)

Himanshu Verma is an Assistant Professor at TU Delft (Netherlands). He studies the role of empathy in facilitating human-AI collaborations, including AI-mediated interpersonal collaboration. (**Website**: <https://vermahimanshu.com/>)

Andrea Mauri is a Junior Professor at UCBL, affiliated with the LIRIS Lab. At the intersection of HCI and Data Management, he investigates how to integrate human factors in computational methods to design, develop and deploy data-intensive applications. (**Website**: <https://andreamauri.me>)

3 WEBSITE

The workshop website², hosted on GitHub Pages³, will feature essential workshop information, including background, participation details, important dates, organizer and committee profiles, a tentative program, and accepted contributions. It will also archive past workshop content. Before the workshop, we will upload the accepted papers and the video presentation, then, after the workshop we will add a summary of the discussion.

4 PRE-WORKSHOP PLANS

As outlined in Section 1.1, our goal is to bring together multidisciplinary researchers and practitioners from ACM SIGCHI and beyond. Our organizing team embodies this disciplinary diversity and plans on inviting interested participants. We will announce the call for participation via ACM SIGCHI's mailing list, our website, organizers' social and professional networks, and the EmpathiCH Slack⁴. We aspire to involve over 50 attendees to foster community-building and meaningful discussions.

To curate an engaging program, the organizers will form a Technical Program Committee (TPC) consisting of authors from previous workshops and invited experts in relevant fields. The TPC will ensure a balance of diverse perspectives and topics related to the workshop themes, and will review and select relevant submissions. Each submission will undergo a rigorous double-blind peer review, by at least 3 TPC members, focusing on novelty, provocativeness, and thematic relevance. We will publish accepted papers and the schedule on the website prior to the workshop. Accepted authors will be requested to provide a 4-6 minute video pitch about their work, which will be showcased during the workshop and enable interactive discussions during author panels (see Table 1). Authors will also be invited to join a dedicated Slack channel for communication and organization purposes.

5 SYNCHRONOUS AND ASYNCHRONOUS HYBRID PLAN

To engage a wide range of participants and foster community building, we will conduct the workshop in a *synchronized hybrid* manner utilizing Zoom⁵ which is widely available. For collaborative activities between remote and in-person participants, we will utilize Miro⁶. We will coordinate with workshop and local chairs to ensure a seamless interactive experience, for example by having 360° cameras and microphones available in the physical setting. Some of our organizers attending remotely will act as hybrid chairs to coordinate the remote activities with the onsite organizers. This arrangement (as tested at the CHIWORK'22 symposium⁷) has been shown to enhance the experience and participation

²We will continue using the URL from the previous workshop, i.e., <https://www.empathich.com/>.

³GitHub Pages: <https://pages.github.com>

⁴EmpathiCH Slack: https://join.slack.com/t/empathich/shared_invite/zt-1hqfe9ugx-RyIf2ixEVmdkGkTI3JGYOQ

⁵Zoom: <https://zoom.us/>

⁶Miro: <https://miro.com/>

⁷Url to the CHIWORK'22 Symposium <https://chiwork.org/22/>

Table 1. Proposed workshop schedule.

Duration	Activity
15 minutes	Set Up: Welcome in-person participants, set the Zoom call and general introduction.
60 minutes	Opening keynote A 45-minute keynote presentation followed by 15 minutes Q&A. The talk will be held onsite or remotely depending on the speakers' availability.
30 minutes	Interactive Discussion: Discussion around the topic <i>Empathy in Post-Human HCI</i>
10 minutes	Short coffee break
60 minutes	Author Panel: The first set of authors spend 3 minutes each presenting their work. organizers moderate an engaging and dynamic discussion.
60 minutes	Lunch break and social gathering
30 minutes	Expert Panel Discussion: Organizers will then moderate a brief expert panel, encouraging experts and participants to reflect on how the previous sessions influenced their understanding of the keynote.
60 minutes	Author Panel: The second set of authors spend 3 minutes each presenting their work. organizers moderate an engaging and dynamic discussion.
30 minutes	Interactive Discussion: Discussion around the topic <i>The Role of the Researcher in Empathy-Centric Design and the suitability of Empathy</i>
10 minutes	Short coffee break
60 minutes	Closing Keynote: A 45-minute keynote presentation followed by 15 minutes Q&A. The talk will be held onsite or remotely depending on the speakers' availability.
30 minutes	Interactive Discussion: discussion around the topic <i>Going beyond empathy as perspective taking</i>
10 minutes	Wrap up: This will be followed by a dinner and social event.

and reduce the isolation of remote participants. We will also use our Slack environment to engage participants and plan interactive sessions both before and after the workshop. After the workshop, we will publish a summary of key discussions and highlights on the website to encourage further engagement.

6 WORKSHOP ACTIVITIES

We propose a full-day hybrid workshop (see Section 5 for details on the hybrid setup), inviting submissions that include position papers, work-in-progress, demos, or posters. Authors are also asked to prepare a 4-6 minute pitch summarizing their work, promoting more discussion rather than presentation during panels. Based on past workshops, we estimate the event to last 8 hours. We provide the schedule in Table 1. Following the feedback collected during last year's workshop, we will prioritize author panels for interactive discussions over paper presentations. Participants will engage in activities centred on the workshop's three main themes throughout the day. All activities will be recorded on Zoom for analysis to understand empathy's role in such contexts. This could lead to joint publications by the organizers and new interdisciplinary collaborations. Follow-up studies will further our understanding of empathy and contribute to empathy-centric design guidelines. Beyond papers and videos, expected outcomes include actionable research directions about empathy in design, which we will publish on our workshop website.

7 ACCESSIBILITY

To enhance workshop accessibility, we will implement several measures. Before the workshop, authors are required to follow SIGCHI's Accessible Submission Guide⁸ when crafting their articles and to pre-record their video pitches with closed captions. The organizers will rigorously audit these materials to ensure they meet accessibility standards. Additionally, a pre-event survey will be conducted to assess attendee accessibility needs for both in-person and online participation. During the workshop, in collaboration with CHI Accessibility Chairs, we will cater to online and on-site participants' special needs. After the workshop, all content will undergo a thorough review by our team and will be supplemented with features such as subtitles and alt-text to guarantee broader accessibility of the proceedings.

8 POST-WORKSHOP AND PROCEEDINGS PLAN

After the workshop, a social event will be held for informal discussions. Accepted workshop materials, such as papers, videos, and slides, will be available on the workshop website. As with our last edition [1], accepted papers will be part of ACM's International Conference Proceedings Series⁹. After the workshop, we aim to propose a special issue or book series that brings together contributions to the workshop themes. We will also consolidate and disseminate the research agenda through the workshop discussions in a position paper co-authored by interested participants. In this way, we also encourage future collaboration among participants on the consolidated research agenda. Finally, to actively engage the community built during the workshop, we will invite authors to reflect on their work in a bi-weekly follow-up podcast or seminar series where organizers and authors engage in ongoing discussion and reflection on the workshop. The community engagement that manifested itself at the previous edition of the workshop and around its themes shows the potential to form a SIG on Empathy-Centric Design to further advance the community.

9 CALL FOR PARTICIPATION

Empathy in HCI research is gaining attention, yet the research primarily focuses on "perspective-taking" in technology design for users' subjective experiences and contexts. However, the depth of empathy extends to collective experiences influenced by digital environments and non-human interactions. In our third EmpathiCH workshop, we will reassess HCI's focus on empathy in design and explore diverse empathy dimensions. We welcome 4-6 page submissions (excluding references) via the ACM Master Article Submission Template (single column) [Submission Template link], touching on themes such as: **(1) Empathy-centered design:** Its applicability, constraints, and implications for various stakeholders; **(2) Collective Empathy:** The nurturing or disruption of empathy in digital communities and design implications; **(3) Empathy for a Cause:** Its role in digital activism, potential for misuse, and the risk of indoctrination; and **(4) Post-humanist Empathy:** Exploring empathy beyond human perspectives in interactions with non-human entities and abstract constructs.

Our aim is to gather diverse professionals from HCI, AI, social science, design, and more, for a dialogue on these subjects. The workshop will culminate in the "Empathy Beyond the Individual" research direction.

Submissions need to be submitted on EasyChair¹⁰ by **February 22, 2024**. Selection is based on originality, quality, relevance, and potential for stimulating discussion, using a double-blind review (three reviewers per paper). Accepted papers will feature in ACM's International Conference Proceedings Series. At least one author per paper must attend,

⁸Guide To An Accessible Submission: <https://sigchi.org/conferences/author-resources/accessibility-guide/>.

⁹ACM ICPS: <https://www.acm.org/publications/icps>

¹⁰<https://easychair.org/>

with registration for one conference day. For inquiries, contact **Alok Debnath** (debnatha@tcd.ie) and **Allison Lahkala** (alahkala@uni-bonn.de). Further details on our website <https://empathich.com>.

ACKNOWLEDGMENTS

The authors would like to thank the anonymous reviewers for their insightful comments on the proposal. This research was supported by Science Foundation Ireland under Grant Agreement No. 13/RC/2106_P2 at the ADAPT SFI Research Center, the German Federal Ministry of Education and Research (BMBF) as a part of the Junior AI Scientists program under the reference 01-S20060, the Lamarr Institute for Machine Learning and Artificial Intelligence, the Google Research Scholar Program - *Human-Guided Annotation for High-Quality Health Data Collection* and the Data4Health ANR project.

REFERENCES

- [1] 2023. *EMPATHICH '23: Proceedings of the 2nd Empathy-Centric Design Workshop* (Hamburg, Germany). Association for Computing Machinery, New York, NY, USA.
- [2] Christine M. Bachen, Pedro Hernández-Ramos, Chad Raphael, and Amanda Waldron. 2016. How do presence, flow, and character identification affect players' empathy and interest in learning from a serious computer game? *Computers in Human Behavior* 64 (2016), 77–87. <https://doi.org/10.1016/j.chb.2016.06.043>
- [3] Cynthia L. Bennett and Daniela K. Rosner. 2019. The Promise of Empathy: Design, Disability, and Knowing the "Other". 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, 1–13. <https://doi.org/10.1145/3290605.3300528>
- [4] Grant Bollmer. 2017. Empathy machines. *Media International Australia* 165, 1 (2017), 63–76.
- [5] Lisa Carlgren, Ingo Rauth, and Maria Elmquist. 2016. Framing design thinking: The concept in idea and enactment. *Creativity and innovation management* 25, 1 (2016), 38–57.
- [6] Jacky Casas, Timo Spring, Karl Daher, Elena Mugellini, Omar Abou Khaled, and Philippe Cudré-Mauroux. 2021. Enhancing Conversational Agents with Empathic Abilities. In *Proceedings of the 21st ACM International Conference on Intelligent Virtual Agents* (Virtual Event, Japan) (IVA '21). Association for Computing Machinery, New York, NY, USA, 41–47. <https://doi.org/10.1145/3472306.3478344>
- [7] Álvaro M. Chang-Arana, Antti Surma-aho, Katja Hölttä-Otto, and Mikko Sams. 2022. Under the umbrella: components of empathy in psychology and design. *Design Science* 8 (2022), e20. <https://doi.org/10.1017/dsj.2022.13>
- [8] Matthew Cohen and Arnim Wiek. 2017. Identifying misalignments between public participation process and context in urban development. *Challenges in Sustainability* 5, 2 (2017), 11–22.
- [9] Max T. Curran, Jeremy Raboff Gordon, Lily Lin, Priyashri Kamlesh Sridhar, and John Chuang. 2019. Understanding Digitally-Mediated Empathy: An Exploration of Visual, Narrative, and Biosensory Informational Cues. 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, 1–13. <https://doi.org/10.1145/3290605.3300844>
- [10] Yumei Dong, Hua Dong, and Shu Yuan. 2017. Empathy in design: A historical and cross-disciplinary perspective. In *International Conference on Applied Human Factors and Ergonomics*. Springer, 295–304.
- [11] Luce Drouet, Kerstin Bongard-Blanchy, Vincent Koenig, and Carine Lallemand. 2022. Empathy in Design Scale: Development and Initial Insights. In *CHI '22 Extended Abstracts*. New Orleans, LA, USA, 7. <https://doi.org/10.1145/3491101.3519848>
- [12] Luce Drouet, Wo Meijer, Aisling Ann O'Kane, Aneesha Singh, Thimeo Wambsganss, Andrea Mauri, and Himanshu Verma. 2023. The EmpathiCH Workshop: Unraveling Empathy-Centric Design. In *Extended Abstracts of the 2023 CHI Conference on Human Factors in Computing Systems* (Hamburg, Germany) (CHI EA '23). Association for Computing Machinery, New York, NY, USA, Article 366, 7 pages. <https://doi.org/10.1145/3544549.3573796>
- [13] Andrea Gasparini. 2015. Perspective and use of empathy in design thinking. In *ACHI, the eight international conference on advances in computer-human interactions*. 49–54.
- [14] Lisa Gilbert. 2019. "Assassin's Creed reminds us that history is human experience": Students' senses of empathy while playing a narrative video game. *Theory & Research in Social Education* 47, 1 (2019), 108–137.
- [15] Jingya Guo, Jiajing Guo, Changyuan Yang, Yanjing Wu, and Lingyun Sun. 2021. Shing: A Conversational Agent to Alert Customers of Suspected Online-Payment Fraud with Empathetical Communication Skills. In *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems* (Yokohama, Japan) (CHI '21). Association for Computing Machinery, New York, NY, USA, Article 383, 11 pages. <https://doi.org/10.1145/3411764.3445129>
- [16] Mariam Hassib, Daniel Buschek, Pawel W. Wozniak, and Florian Alt. 2017. HeartChat: Heart Rate Augmented Mobile Chat to Support Empathy and Awareness. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems* (Denver, Colorado, USA) (CHI '17). Association for Computing Machinery, New York, NY, USA, 2239–2251. <https://doi.org/10.1145/3025453.3025758>

- [17] Justin L. Hess and Nicholas D. Fila. 2016. The manifestation of empathy within design: findings from a service-learning course. *CoDesign* 12, 1-2 (April 2016), 93–111. <https://doi.org/10.1080/15710882.2015.1135243>
- [18] Ann Heylighen and Andy Dong. 2019. To empathise or not to empathise? Empathy and its limits in design. *Design Studies* 65 (2019), 107–124.
- [19] Matthew Holt. 2011. The limits of empathy: Utopianism, absorption and theatricality in design. *The Design Journal* 14, 2 (2011), 151–164.
- [20] Yen-Chia Hsu, Himanshu Verma, Andrea Mauri, Illah Nourbakhsh, Alessandro Bozzon, et al. 2022. Empowering local communities using artificial intelligence. *Patterns* 3, 3 (2022).
- [21] Ruolin Jian and Zhixiang Wang. 2021. Influence of Different Types of Experience on College Students' Empathy Ability. In *Proceedings of the 2021 6th International Conference on Distance Education and Learning* (Shanghai, China) (ICDEL '21). Association for Computing Machinery, New York, NY, USA, 189–194. <https://doi.org/10.1145/3474995.3475027>
- [22] Nora Elizabeth Joby and Hiroyuki Umemuro. 2022. Effect of Group Identity on Emotional Contagion in Dyadic Human Agent Interaction. In *Proceedings of the 10th International Conference on Human-Agent Interaction* (Christchurch, New Zealand) (HAI '22). Association for Computing Machinery, New York, NY, USA, 157–166. <https://doi.org/10.1145/3527188.3561939>
- [23] Hamed Khanpour, Cornelia Caragea, and Prakhar Biyani. 2017. Identifying Empathetic Messages in Online Health Communities. In *Proceedings of the Eighth International Joint Conference on Natural Language Processing (Volume 2: Short Papers)*. Asian Federation of Natural Language Processing, Taipei, Taiwan, 246–251. <https://aclanthology.org/I17-2042>
- [24] Merlijn Kouprie and Froukje Sleeswijk Visser. 2009. A framework for empathy in design: stepping into and out of the user's life. *Journal of Engineering Design* 20, 5 (2009), 437–448. <https://doi.org/10.1080/09544820902875033> arXiv:<https://doi.org/10.1080/09544820902875033>
- [25] Merlijn Kouprie and Froukje Sleeswijk Visser. 2009. A framework for empathy in design: stepping into and out of the user's life. *Journal of Engineering Design* 20, 5 (Oct. 2009), 437–448. <https://doi.org/10.1080/09544820902875033>
- [26] Iolanda Leite, Ginevra Castellano, André Pereira, Carlos Martinho, and Ana Paiva. 2012. Modelling Empathic Behaviour in a Robotic Game Companion for Children: An Ethnographic Study in Real-World Settings. In *Proceedings of the Seventh Annual ACM/IEEE International Conference on Human-Robot Interaction* (Boston, Massachusetts, USA) (HRI '12). Association for Computing Machinery, New York, NY, USA, 367–374. <https://doi.org/10.1145/2157689.2157811>
- [27] Stephen Lindsay, Katie Brittain, Daniel Jackson, Cassim Ladha, Karim Ladha, and Patrick Olivier. 2012. Empathy, Participatory Design and People with Dementia. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (Austin, Texas, USA) (CHI '12). Association for Computing Machinery, New York, NY, USA, 521–530. <https://doi.org/10.1145/2207676.2207749>
- [28] Marina Litvak, Jahna Otterbacher, Chee Siang Ang, and David Atkins. 2016. Social and linguistic behavior and its correlation to trait empathy. In *Proceedings of the Workshop on Computational Modeling of People's Opinions, Personality, and Emotions in Social Media (PEOPLES)*. The COLING 2016 Organizing Committee, Osaka, Japan, 128–137. <https://aclanthology.org/W16-4314>
- [29] Shu Liu, Kevin Koch, Zimu Zhou, Simon Föll, Xiaoxi He, Tina Menke, Elgar Fleisch, and Felix Wortmann. 2021. The empathetic car: Exploring emotion inference via driver behaviour and traffic context. *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies* 5, 3 (2021), 1–34.
- [30] Malin Lundström, Johan Åberg, and Johan Blomkvist. 2015. Perceptions of Software Developers' Empathy with Designers. In *Proceedings of the 2015 British HCI Conference* (Lincoln, Lincolnshire, United Kingdom) (British HCI '15). Association for Computing Machinery, New York, NY, USA, 239–246. <https://doi.org/10.1145/2783446.2783563>
- [31] Andrea Mauri, Yen-Chia Hsu, Marco Brambilla, Ting-Hao Kenneth Huang, Aisling Ann O'Kane, and Himanshu Verma. 2022. Empathy-Centric Design At Scale. In *Extended Abstracts of the 2022 CHI Conference on Human Factors in Computing Systems* (New Orleans, LA, USA) (CHI EA '22). Association for Computing Machinery, New York, NY, USA, Article 75, 6 pages. <https://doi.org/10.1145/3491101.3503744>
- [32] D McDonagh. 2006. Empathic research approaches to support the designer: a supra-qualitative research for designing model. *Design Issues* (2006).
- [33] Anne-Sophie Milcent, Abdelmajid Kadri, and Simon Richir. 2021. Using Facial Expressiveness of a Virtual Agent to Induce Empathy in Users. *International Journal of Human-Computer Interaction* (2021), 1–13.
- [34] Junya Morita and Yuna Kano. 2022. Effects of Self-Experience and Situational Awareness on Empathic Help to Virtual Agents. In *Proceedings of the 10th International Conference on Human-Agent Interaction* (Christchurch, New Zealand) (HAI '22). Association for Computing Machinery, New York, NY, USA, 132–139. <https://doi.org/10.1145/3527188.3561938>
- [35] Aisling Ann O'Kane, Yvonne Rogers, and Ann E Blandford. 2014. Gaining empathy for non-routine mobile device use through autoethnography. In *Proceedings of the SIGCHI Conference on Human factors in Computing Systems*. 987–990.
- [36] Ivan Patané, Anne Lelgouarch, Domna Banakou, Gregoire Verdelet, Clement Desoche, Eric Koun, Romeo Salemme, Mel Slater, and Alessandro Farnè. 2020. Exploring the effect of cooperation in reducing implicit racial bias and its relationship with dispositional empathy and political attitudes. *Frontiers in psychology* 11 (2020).
- [37] Rosalind W Picard. 2000. *Affective computing*. MIT press.
- [38] Camilo Rojas, Malena Corral, Niels Poulsen, and Pattie Maes. 2020. Project Us: A Wearable for Enhancing Empathy. In *Companion Publication of the 2020 ACM Designing Interactive Systems Conference* (Eindhoven, Netherlands) (DIS' 20 Companion). Association for Computing Machinery, New York, NY, USA, 139–144. <https://doi.org/10.1145/3393914.3395882>
- [39] Samiha Samrose, Kavya Anbarasu, Ajjen Joshi, and Taniya Mishra. 2020. Mitigating boredom using an empathetic conversational agent. In *Proceedings of the 20th ACM International Conference on Intelligent Virtual Agents*. 1–8.

- [40] Maximilian JL Schormair and Dirk Ulrich Gilbert. 2021. Creating value by sharing values: Managing stakeholder value conflict in the face of pluralism through discursive justification. *Business Ethics Quarterly* 31, 1 (2021), 1–36.
- [41] Leon D Segal and Jane Fulton Suri. 1997. The empathic practitioner: Measurement and interpretation of user experience. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, Vol. 41. SAGE Publications Sage CA: Los Angeles, CA, 451–454.
- [42] Ashish Sharma, Inna W. Lin, Adam S. Miner, David C. Atkins, and Tim Althoff. 2021. Towards Facilitating Empathic Conversations in Online Mental Health Support: A Reinforcement Learning Approach. In *Proceedings of the Web Conference 2021* (Ljubljana, Slovenia) (*WWW '21*). Association for Computing Machinery, New York, NY, USA, 194–205. <https://doi.org/10.1145/3442381.3450097>
- [43] Wina Smeenk, Janienke Sturm, and Berry Eggen. 2019. A Comparison of Existing Frameworks Leading to an Empathic Formation Compass for Co-design. 13, 3 (2019), 16.
- [44] Wina Smeenk, Oscar Tomico, and Koen van Turnhout. 2016. A systematic analysis of mixed perspectives in empathic design: Not one perspective encompasses all. *International Journal of Design* 10, 2 (2016), 31–48.
- [45] Antti Surma-aho and Katja Hölttä-Otto. 2022. Conceptualization and operationalization of empathy in design research. *Design Studies* 78 (Jan. 2022), 101075. <https://doi.org/10.1016/j.destud.2021.101075>
- [46] Reem Talhouk, Madeline Balaam, Austin L Toombs, Andrew Garbett, Chaza Akik, Hala Ghattas, Vera Araujo-Soares, Balsam Ahmad, and Kyle Montague. 2019. Involving Syrian refugees in design research: lessons learnt from the field. In *Proceedings of the 2019 on Designing Interactive Systems Conference*. 1583–1594.
- [47] Sara Ventura, Laura Badenes-Ribera, Rocio Herrero, Ausias Cebolla, Laura Galiana, and Rosa Baños. 2020. Virtual reality as a medium to elicit empathy: A meta-analysis. *Cyberpsychology, Behavior, and Social Networking* 23, 10 (2020), 667–676.
- [48] Froukje Sleswijk Visser and Pieter Jan Stappers. 2007. Mind the Face. In *Proceedings of the 2007 Conference on Designing Pleasurable Products and Interfaces* (Helsinki, Finland) (*DPPI '07*). Association for Computing Machinery, New York, NY, USA, 119–134. <https://doi.org/10.1145/1314161.1314172>
- [49] Froukje Sleswijk Visser, Pieter Jan Stappers, Remko van der Lugt, and Elizabeth B-N Sanders. 2005. Contextmapping: experiences from practice. *CoDesign* 1, 2 (2005), 119–149. <https://doi.org/10.1080/15710880500135987> arXiv:<https://doi.org/10.1080/15710880500135987>
- [50] Thiemo Wambsganss, Matthias Soellner, Kenneth R Koedinger, and Jan Marco Leimeister. 2022. Adaptive Empathy Learning Support in Peer Review Scenarios. In *Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems* (New Orleans, LA, USA) (*CHI '22*). Association for Computing Machinery, New York, NY, USA, Article 227, 17 pages. <https://doi.org/10.1145/3491102.3517740>
- [51] Thiemo Wambsganss, Matthias Soellner, Kenneth R Koedinger, and Jan Marco Leimeister. 2022. Adaptive Empathy Learning Support in Peer Review Scenarios. In *CHI Conference on Human Factors in Computing Systems*. 1–17.
- [52] Denise K Whitford and Andrea M Emerson. 2019. Empathy intervention to reduce implicit bias in pre-service teachers. *Psychological reports* 122, 2 (2019), 670–688.
- [53] Peter Wright and John McCarthy. 2008. Empathy and Experience in HCI (*CHI '08*). Association for Computing Machinery, New York, NY, USA. <https://doi.org/10.1145/1357054.1357156>
- [54] Peter Wright and John McCarthy. 2008. Empathy and experience in HCI. In *Proceedings of the SIGCHI conference on human factors in computing systems*. 637–646.
- [55] Shu Yuan and Hua Dong. 2014. Empathy building through co-design. In *International Conference on Universal Access in Human-Computer Interaction*. Springer, 85–91.
- [56] Ke Zhou, Luca Maria Aiello, Sanja Scepanovic, Daniele Quercia, and Sara Konrath. 2021. The language of situational empathy. *Proceedings of the ACM on Human-Computer Interaction* 5, CSCW1 (2021), 1–19.
- [57] Naitian Zhou and David Jurgens. 2020. Condolence and Empathy in Online Communities. In *Proceedings of the 2020 Conference on Empirical Methods in Natural Language Processing (EMNLP)*. Association for Computational Linguistics, Online, 609–626. <https://doi.org/10.18653/v1/2020.emnlp-main.45>