Designing and Using the Wild Probes Toolkit (v1) to Co-Design From-the-Wild

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ABSTRACT

Recent research calls for new design methods and tools that respond to the idiosyncrasies of emergent design spaces. Here we address one of them: the design of nature-related technology. To facilitate increasingly situated practices in this space, we created the Wild Probes: a set of probing tools for displacing co-design into the wilderness. Our toolkit enables forestry future-making by helping forest goers to pay attention to, reflect on, ideate around, and document their forestry experiences. Here we present the design and early use of the toolkit. We hope other designers will find it useful and extend it with new Wild Probes of their own.

Authors Keywords

Co-design; Nature; Human-nature interactions; Design probes; From-the-wild; More-than-human; Outdoors

CSS Concepts

•Human-centered computing~Interaction design ~Systems and tools for interaction design

INTRODUCTION

Computation increasingly shapes who we are, how we act in, and how we experience the world. From smart urban spaces [15], to digital human-food interactions [3] or hybrid nature experiences [17], the digital keeps blending into the tangible. Designing tech that graciously enriches our lives in those new areas of implementation poses challenges [4, 13]. To address them, researchers are creating new methods and tools for participatory [19] and situated [12] design. Such methodological advances are particularly needed in emergent design spaces where tech use is yet to become widespread [5].

Here we address one such emergent area of innovation: the design space of human-nature interactions [16, 17]. Building on recent calls for new ways of co-designing for, within, and around nature [1, 7, 28], we aim to support situating design in the idiosyncratic space of the forest. We build on a rich body of co-design methods research and extend it by adapting it for use in the forest.

This pictorial presents one of our recent developments, the first iteration of the Wild Probes toolkit, as a step towards empowering designers to displace their practice into the (real) wild. The Wild Probes are a stereoscopic set of hybrid artifacts that can help to envision nature-related tech and experiences from within the forest itself. They enable forest goers to pay attention to, reflect on, ideate around, and document their forestry experiences in ways that are both playful, caring, and inspirational.

Here we present the design and early use of the toolkit, including an annotated portfolio of our initial set of Wild Probes (p. 3-6) and the takeaways from a study where we experimented with said tools in use (p. 7-11). Overall, our work will set the stage for the (hopefully collective) development of a rich resource for supporting human-forest interaction design & research. We hope the HCI community will find our work useful and contribute to enhancing it by building new Wild Probes of their own.

BACKGROUND

Over a decade ago, an *in-the-wild* [23] turn was proposed to displace design research from the lab to naturalistic settings. Today, we have myriad situated design research methods and tools, e.g.: *cultural probes* [9] allow collecting inspirational data about people's ways of living so it can be used as design material; *probe tools* [6] support technology-aided cultural probing; *walking methods* [14] facilitate multi-stakeholder discussions on the move, anchored in physical spaces; *bodystorming* [24] supports embodied thinking by placing the body at the center of ideation and reflection; or *labs in the wild* [29] situate in-progress research into public settings through participatory exhibits; among others.

Though it inspired increasingly situated practices in and beyond design, said in-the-wild turn has been criticised for being too focused on the human: like other human-centered practices, is mostly thought for and practiced within human-made environments, and mainly caters

to human needs [11]. Researchers also note its socio-cultural narrowness: its very foundations speak to a clearly Western idea of "what is wild" and thus neglect other ways of living and being [27].

Indeed, one may question: if in-the-wild research usually takes place within the human-made and the Western-looking, can it truly be considered *wild*? As we begin to target forests as areas of intervention, we may need an even wilder turn to future making. Given the situated nature of Research through Design [10], we see value in exploring how design research targeting nature can be moved closer to it. We wonder: How might we leverage today's rich corpus of co-design methods beyond the human-centric and the human-made? How may we support designers and researchers to truly displace their creative practice into the wilderness?

Our agenda aligns with recent works that explore how displacing design research into the forest might support increasingly socially, emotionally, and ecologically caring future making. For example, the *Open Forest* project [7] facilitates more-than-human sensemaking of nature-related experiences and infrastructures through experimental forest walks; McCrickard et al. [18] explore how forest-related tech might support positive connections among people in ways that are also environmentally sensitive; Liu [16] uses ethnographic methods to support posthuman design for resilient communal life; Tomico et al. explore how cohabitating with plants can facilitate posthuman forms of thinking and designing [28]; or Altarriba Bertran et al. [1] investigate how to design *from-the-wild*, that is, how to radically situate design targeting the forest into the forest itself to support joyful and caring innovations. Far from proposing fully fleshed methodologies, these works contribute to an ongoing move towards design research that is more sensible to nature. They highlight a need for new methods and tools that make those practices actionable and respond to the idiosyncratic character of forests as (messy and unpredictable) sites for co-design. Here we take up on that challenge: we present a toolkit of hybrid design probing tools aimed at supporting (co-)designing and researching from the wilderness.

THE WILD PROBES TOOLKIT V1

This pictorial presents the first iteration of the Wild Probes toolkit: a set of hybrid tools for forestry co-design. These tools can help forest goers to pay attention to, reflect on, ideate around, and document their forestry experiences in ways that can inspire contextually-grounded and socio-ecologically caring forest-related future making. To create the Wild Probes, we took a Research through Design approach [10]. Our work was inspired by existing design research tools, e.g. the *probe tools* [6], and explored how to rethink their affordances for use within the forest. We also built on recent methods research on the idiosyncrasies of forests as a sites for co-design [1, 7]. Finally, we looked at our own lived experiences as forest goers, to embrace the frictions and opportunities from bridging nature-related activity and technology use.

Pages 3-8 describe the six components of our v1 toolkit, including: *HeuriStick* (p. 3) and *MemoCollar* (p. 4), which support seamless recollection of forestry activity; *ReflexiBracelet* and *ProvoTech* (p. 5), which adapt the affordances of existing design probing and prompting tools for use in the forest; and *StoryBottle* and *DataWaves* (p. 6), which disrupt forest-related activity by scaffolding cycles of action and reflection that reambiguate said activity as a meaning making site. Following the presentation of these tools, we share our takeaways from a research project where we used the toolkit to co-imagine joyful and caring nature technology futures over the course of a one-month backpacking trip (p. 7-11). We conclude with a discussion of the relevance and limitations of our early explorations, and how they might be brought further (p. 12). Overall, our work sets the stage for a collective toolkit that empowers design researchers to displace their practice into the forest and work in increasingly situated ways. Detailed information on how to produce the Wild Probe prototypes (v1) can be found at: **https://bit.ly/wildprobespecs**

1 We began by designing and developing the 6 Wild Probes in our toolkit. We were inspired by existing research tools, by recent research on how to co-design from the forest, and by our own experiences as nature goers.

2 Then, a researcher experimented with the toolkit during a one-month backpacking trip/study where he co-imagined nature tech futures with other forest goers. He stored his reflections as photos, Instagram stories, and diary notes.
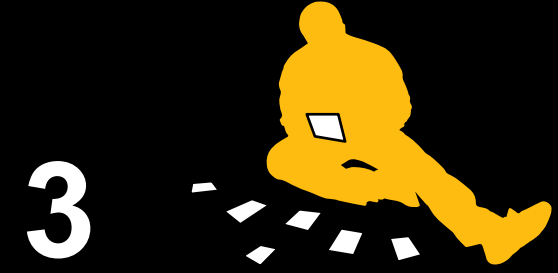
3 Finally, we used reflexive thematic analysis to examine the researcher's reflections. We foregrounded 4 take-aways that may help designers and researchers to use and extend the Wild Probes toolkit in their own work.

METHOD

THE HEURISTICK: A TREKKING POLE FOR SEAMLESS PHOTO TAKING

The *HeuriStick* is an extension to a walking stick that allows the beholder to easily make photos and videos while walking. It is meant to facilitate rapid and unobtrusive documentation of spontaneous events that take place during a hike. By pressing a button located at the back of the device, users can take photos and make videos.

The *HeuriStick* sits at the upper end of a trekking pole. It is attached to the top part of the handle, as close as possible to the user's hand. By being integrated into an object that people naturally bring to the nature, it facilitates unobtrusive documentation of forestry activity. Additionally, the button's placement makes it easily reachable with the thumb (without changing the hand's position) and thus enables seamless documentation that does not interfere with walking or sightseeing.

THE MEMOCOLLAR: A PLACEHOLDER FOR AUDIO-BASED MEMORY TOKENS

The *MemoCollar* is an audio recording device that can be worn as a collar, hanging from a cord around the neck, or as an attachment to a backpack handle. It allows recording voice notes by pressing a button and whispering to it. As such, it enables nature goers to seamlessly store their spontaneous thoughts, ideas, and observations as they engage the forest – an information that can later be retrieved and used as design material.

By hanging on an accessible part of the body, this Wild Probe is readily available whenever needed – unlike e.g. a phone, which sits on one's pocket when not in use. Its form factors enable easy use while moving: it can easily be grabbed with one hand; the buttons are conveniently placed where fingers sit; and the microphone points in the direction of the wearer's face. To record a note, one must simply bring the device close to the mouth, press a button, and start talking – an interaction cycle that is compatible even with strenuous activity and does not detract users from their forestry endeavors.

Multiple buttons allow storing the notes by category, keeping data collection open ended yet operationally manageable. As such, the data produced is cleaner and more focused than with other tools, e.g. sports cameras.
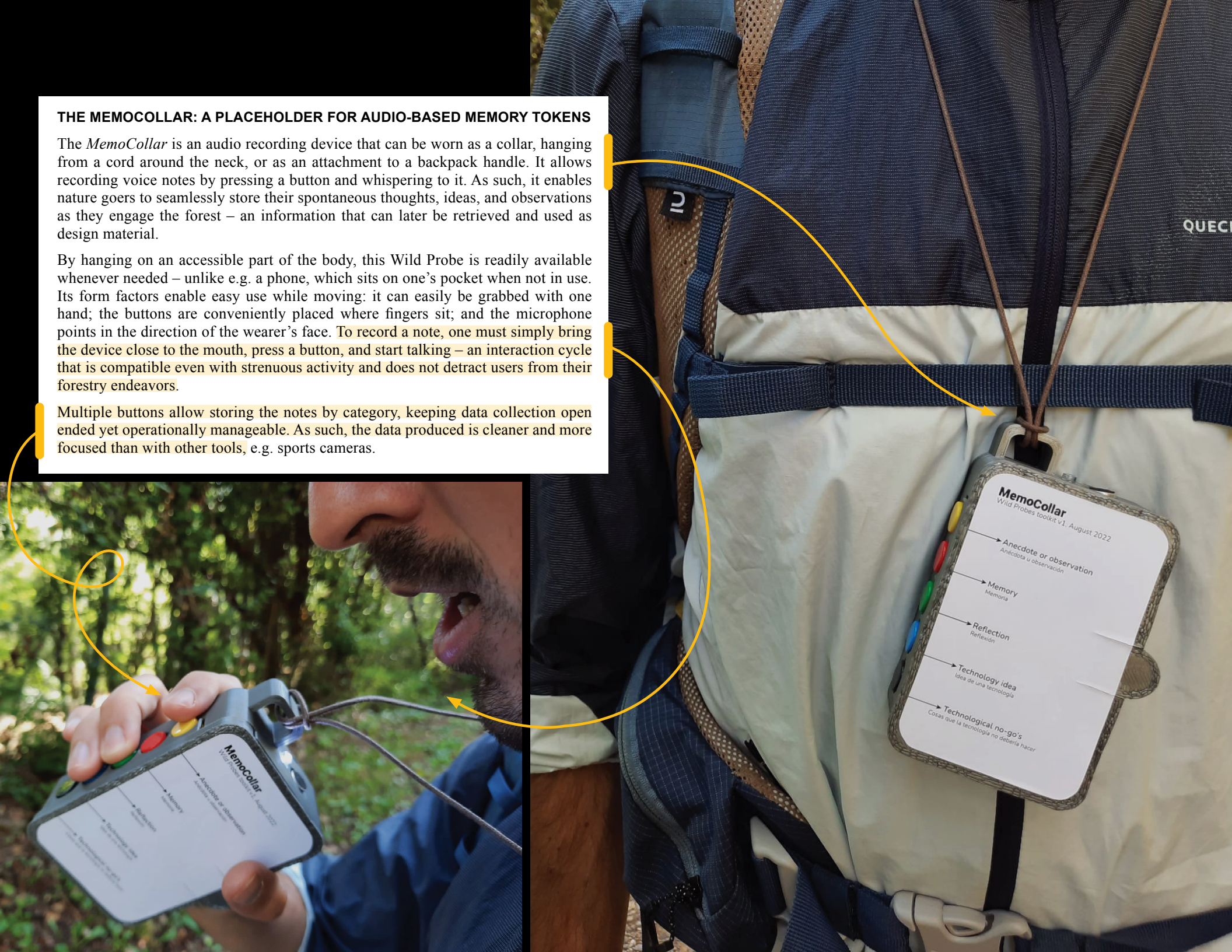
THE REFLEXIBRACELET: A WEARABLE REMINDER TO REFLECT WITHIN THE FOREST

The *ReflexiBracelet* is a wristband that prompts the wearer to focus on specific aspects of their nature experiences and store audio notes reflecting on them. Like the *MemoCollar*, it enables seamless documentation of forestry lived experiences; yet, rather than taking a passive stance, it actively provokes the wearer with questions every now and then.

Once in a while, the *ReflexiBracelet* buzzes and uses a screen to share provocative prompts such as "have you laughed today?", "why don't you go ahead and find a forestry element you've never seen before?", or "is there anything about what you're doing that brings you joy?". Wearers can then decide to embrace or ignore any prompt. If they embrace it, they can record an audio note about it, to share what happened and the reflections it enabled.

PROVOTECH: A TECHNOLOGICAL PROVOCATEUR

ProvoTech is a smartphone-sized digital encyclopedia of controversial technology. Just like the *ReflexiBracelet*, it is meant to take an active role in supporting reflection during nature activity. Every now and then, the device makes an obnoxious noise to alert that a new piece of information is ready to be shown; then, it uses its screen to bring up a problematic, silly, surprising, or otherwise controversial tech (e.g. the *Amazon Pavlok Shock Clock* [22]) as a provocative starting point to discuss how nature tech could do better in the situation at hand.

Unlike other Wild Probes, *ProvoTech* is explicitly disruptive. It is meant to periodically interrupt people's forestry activity, even if it sits silently on the background most of the time. By occasionally (and obnoxiously) halting the flow of events with some sort of technological provocation, it momentarily disrupts the ongoing activity and triggers a critical discussion around how tech may or may not play a role in it.

THE STORYBOTTLE: A HIKING CANTEEN THAT REMEMBERS CONVERSATIONS

The *StoryBottle* is an attachment to a hiking canteen that allows nature goers store their reflections as audio messages for the future self anytime they stop to drink some water. It can be used individually, as a tool for personal reflection, or in group, as a repository of the conversations had during a break. Unlike the *MemoCollar*, the *StoryBottle* is not meant to always be ready-at-hand. Given the potential of breaks as spaces for collective reflection, this tool is meant to be used only when stopping to drink. It thus allows hikers to share and store their thoughts at a time when reflexive discussion among them often takes place [1].

Using a microphone at the front of the bottle, people are invited to record the outcomes of their conversations while stopping for a moment to have a rest or drink. As the liquid contents of the bottle keep decreasing, the emotional ones increase, signaled through an LED strip that "fills up" – to a point that as the canteen runs out of water it grows (metaphorically) full of thoughts, anecdotes, and reflections.
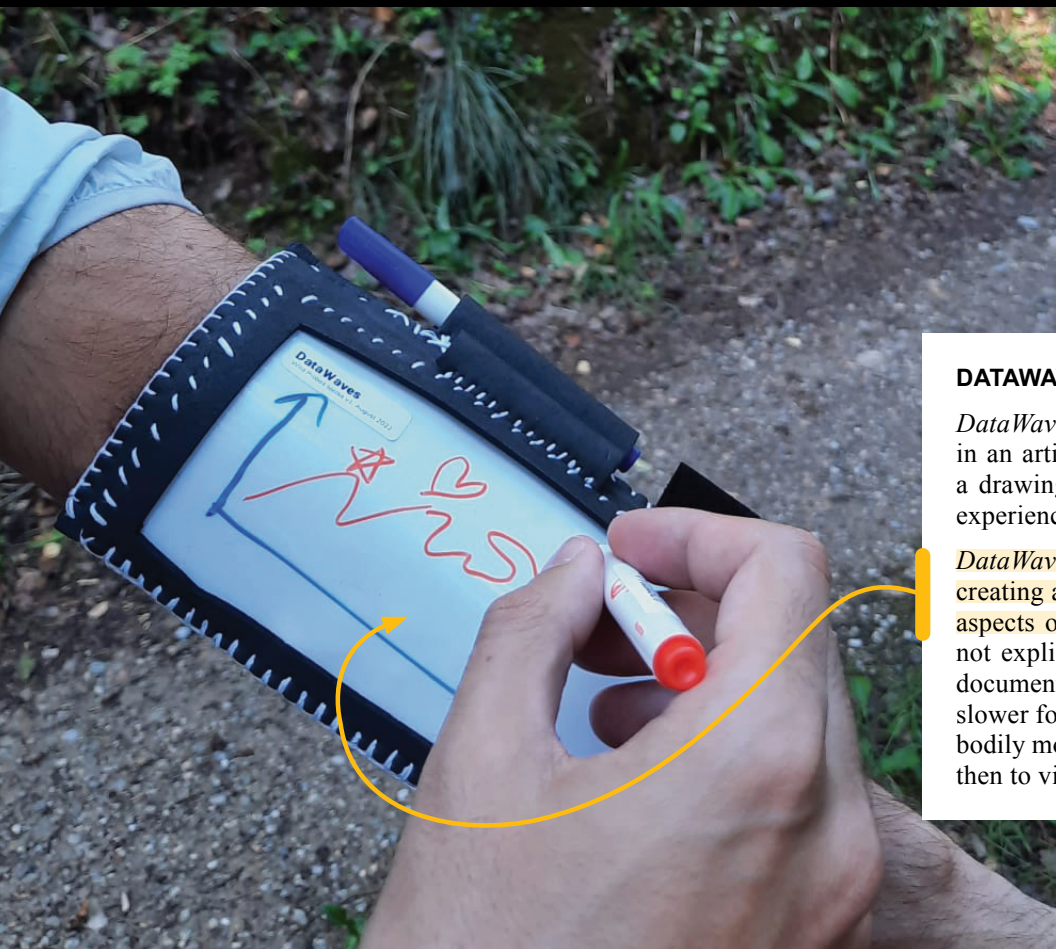
DATAWAVES: A CANVAS FOR ARTISTIC ACCOUNTS OF NATURE EXPERIENCES

DataWaves is a lower arm wearable strap for visualizing one's nature experiences in an artistic way. Unlike other Wild Probe tools, it is purely analog: it consists of a drawing pad placed on the wearer's forearm that can be used to visualize one's experience over time or distance using whiteboard markers.

DataWaves encourages in-situ reflection on experiences lived within nature. By creating a free-form, emergent, and artistic data visualization, the wearer can surface aspects of their forestry activity that are potentially inspirational. Although it does not explicitly enforce a specific way of scaffolding the cycles of experiencing and documenting, the nature of its input mechanism leans towards periodical stops and slower forms of documentation. Since drawing requires precision (and, thus, pause in bodily movements), wearers are likely to take stops from their walking every now and then to visualize chunks of their experience on the drawing pad.

EXPERIMENTING WITH THE TOOLKIT: A ONE-MONTH BACKPACKING ADVENTURE

To experiment with, better understand, and continue to develop our toolkit of Wild Probes, we began using it in a research project of our own. The project took the form of a design-oriented study where the first author immersed himself into a backpacking trip to co-experience, -reflect on, and -ideate within the forest with other nature goers. Over the course of one month, he walked 800+ km and engaged 200+ backpackers from 35+ nationalities. He used those radically situated encounters as a platform for facilitating conversations around the role of technology in human-nature interactions, with the ultimate goal of co-imagining forest technology futures grounded in values of joy and care. Throughout the adventure, the Wild Probes (along with other materials and tools) helped the researcher and his backpacking peers to stimulate, scaffold, and document their conversations and ideation around the human-nature-technology interplay.

To document his experiences with and reflections around the use of the Wild Probes, the researcher used a variety of mechanisms, including: making photos and videos to reflect his and his companions' lived experiences;

producing a daily collection of Instagram stories[1] to share the daily occurrences with a broader audience; or articulating his reflections as notes on a handwritten diary. Adhering to guidelines from the national board of research integrity of the country where the study took place, people with whom the researcher interacted were told we might document, analyze, and write about those engagements. We also introduced the Wild Probes and their functionality so people were aware of their documentation capabilities. All involved backpackers gave verbal consent, and only those who also consented to being photographed and videotaped were included in the visual documentation. Participants were informed they could revoke their consent anytime during or after the trips, and were invited to express their concerns anytime they felt uncomfortable with the research.

The experiment yielded rich data on several fronts: First, on the interplay between humans, tech, and nature (and how it could be designed for); Then, on the methodological implications of displacing co-design into the forest; Finally, on the challenges and opportunities

of using the Wild Probes to co-design. An analysis of the first two data types will be shared in future publications. Here, we focus on the third type: the reflections from our use of the Wild Probes during the backpacking study.

To analyze the researcher's accounts from experimenting with the Wild Probes, we used reflexive thematic analysis [8]. Meaning making started during the backpacking trip itself, where the researcher began to identify salient themes from his reflexive engagement with his own (and his companions') use of the toolkit. Upon return from the trip, the researcher digitized all his notes, photos, videos, and Instagram stories, and compiled them into a Miro Board[2] for analysis. He then used an inductive approach to more systematically identify the key insights derived from the data, and involved two other researchers to contrast and challenge his analysis. That process yielded four themes, which we articulate as takeaways for designers interested in using the toolkit. In future work, we will continue to develop the toolkit building on those findings. We hope other designers and researchers will join us in that iterative process as well.
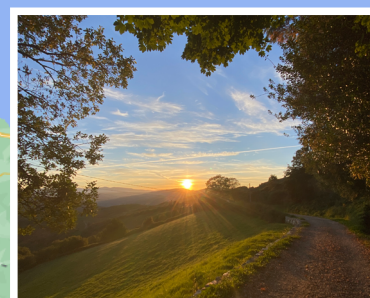
Hiked 800+ km over 30 days

Reflected through a notebook diary

Engaged 200+ backpackers from 35+ nationalities

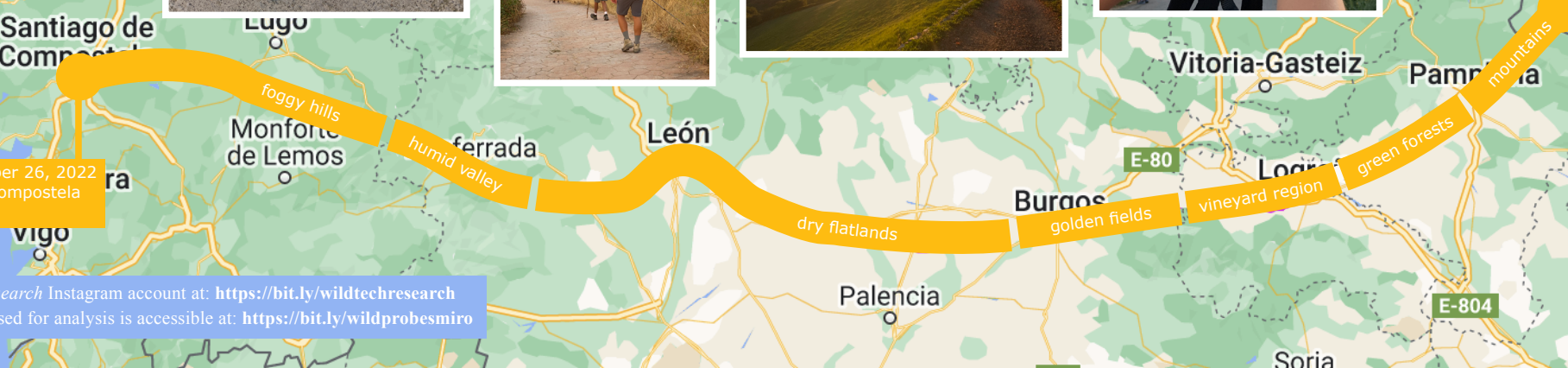**Experienced a broad range of landscapes**

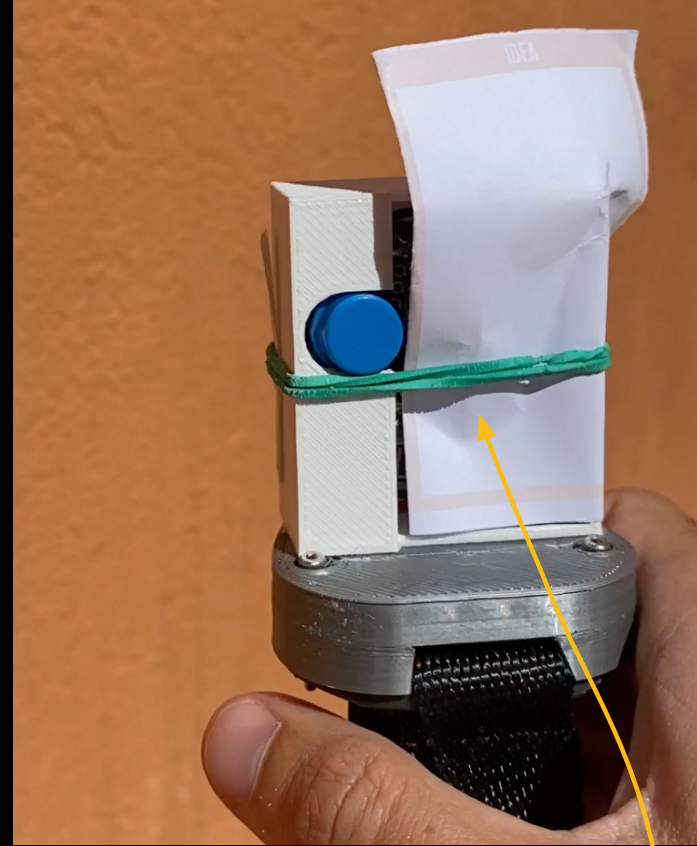**Experimented with the Wild Probes (and invited others to do so)**
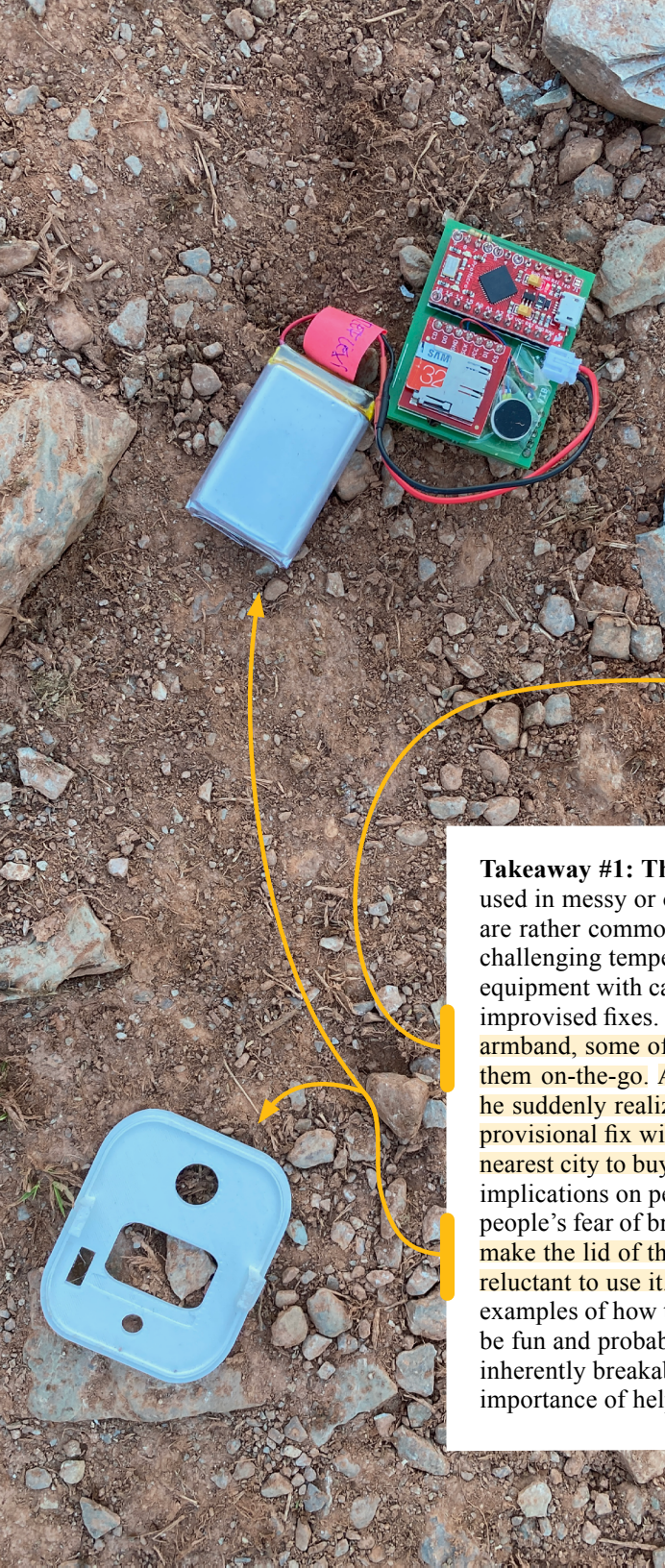
Start: August 28, 2022 Saint-Jean-Pied-de-Port (France)

End: September 26, 2022 Santiago de Compostela (Spain)

foggy hills

humid valley

dry flatlands

golden fields

vineyard region

green forests

mountains

Takeaway #1: The implications of breakability (and how to deal with them). As any DIY artefact, the Wild Probes are fragile. When used in messy or otherwise challenging scenarios, they are likely to end up breaking, both structurally and electronically. Those scenarios are rather common in forestry co-design: it involves potentially damaging movements and impacts; it is exposed to wind, water, dust, or challenging temperatures; or it often keeps people busy with the messiness of the activity at hand, which leads to less attention on treating equipment with care; among others. Given those potential sources of damage for the Wild Probes, designers should be prepared for making improvised fixes. Our researcher had to make many during his backpacking trip. For example, during the first days of using the *DataWaves* armband, some of the straps detached from the pad as a result of the ongoing strapping and unstrapping; he used instant glue to re-attach them on-the-go. Another example is the *HeuriStick*: one morning, a participant was using the device while it was still pitch dark, and he suddenly realized that the lid covering the battery compartment had fallen off. It got lost, so the researcher had to improvise a quick, provisional fix with the materials at hand (a folded piece of paper acting as a lid, attached with a rubber band) and wait until he got to the nearest city to buy, 3D print, or otherwise make a piece of plastic to properly replace the missing part. Critically, such breakable nature has implications on people's expectations from and experience with the Wild Probes. Early in the backpacking trip, the researcher noticed that people's fear of breaking the tools often got in the way of wholehearted engagement. For example, seeing how rough arm movements could make the lid of the *ReflexiBracelet* fall (with the subsequent scattering of its inner components all over the ground) initially made people reluctant to use it. In response, the researcher started presenting the Wild Probes explicitly as gadgets that would most likely break, using examples of how they had broken before. He reassured people they should not be worried about breaking them – that, in fact, it might even be fun and probably yield interesting reflections for our experimental and somewhat messy research study. Indeed, framing the devices as inherently breakable helped to mitigate people's fear of messing up and led to a more proactive uses. Learning from that, we highlight the importance of helping participants of a co-design process mediated by the Wild Probes to get comfortable with the tools' fragile nature.

Takeaway #2: The importance of social acceptance and group appropriation. Social dynamics are also important when deploying the Wild Probes. These tools are, by definition, weird artifacts people have not seen or engaged with before; some even involve ways of behaving that are socially awkward or uncommon in the activity at hand (e.g. recording audio messages when surrounded by people). If people do not embrace the Wild Probes as an accepted part of their nature experience, usage will likely be scarce and superficial. As such, some kind of onboarding is needed to help people adopt the tools and integrate them into the group's social dynamics. The need for such getting-used-to may make some of the tools unfit for shorter-cycle, one-off activities (e.g. a short group walk that takes place only once and presents little opportunities for scaffolding a proper introduction of the tools that leads to social adoption), or for situations where a group of nature goers is in constant mutation. The latter was the case of our researcher's experience during many days of his backpacking adventure: the group of people he hiked with fluctuated a lot and, in those conditions, some of the Wild Probes that involved more socially visible forms of documentation became socially disruptive (and hence, not adopted by the group). He ended up using those tools (e.g. the *MemoCollar*) more in situations where he was alone or had enough personal space not to interfere with other people's business. Differently, tools such as the *HeuriStick*, whose use is less socially visible, continued to be useful despite the lack of stability in the group members and culture. In such kinds of scenarios, we suggest it may be best that the researcher uses the Wild Probes themselves, and/or invites other people to use those tools that are less socially visible. Additionally, we highlight the potential for some of the tools to be reappropriated by the group to serve a different purpose than intended. During the backpacking trip, that happened on several occasions. For example, in realizing that *DataWaves* required the wearer to periodically stop to draw their own experience of nature (an inherently individualistic activity that added no value to their companions' experience), people spontaneously started to use it as a shared drawing pad. That made *DataWaves* much more meaningful and contextually appropriate and compensated the need for periodical stops by providing opportunities for creative activity that was meaningful and appealing for the whole group.

Takeaway #3: Different tools, different ways of thinking. Although we did not approach the backpacking trip as a systematic, in-depth evaluation of the toolkit, experimenting with the Wild Probes (and seeing others do so) allowed the researcher to begin to get an understanding of how each of them might support co-design activity. The affordances (physical, interactive, social...) of each device enabled different ways of documentation that, in turn, facilitated different ways of thinking. The researcher also had a chance to explore the affordances of the Wild Probes as opposed to (or in combination with) other equipment e.g. his smartphone. While based on previous research (e.g. [1]) he expected the phone to be too disruptive to support documentation of forestry activity, he soon realized that under certain conditions it might actually afford fruitful uses. At some point during the adventure, he captured those reflections as a sequence of Instagram stories, focusing on unpacking the complementary affordances of his smartphone and the *MemoCollar* Wild Probe when it came to document and reflect on his daily ideas, experiences, and thoughts.

Sequence of Instagram stories reflecting on the documentation affordances of *MemoCollar* vs. a smartphone.

Speaking of which, today I also got to reflect on the MemoCollar's uses and potential. In using it in combination with the phone to document the hikes, I've come to realize that they are actually not an either-or. In fact, their affordances make them quite complementary.

On the one hand, the phone is great when you're surrounded by strangers. It allows you to document your shit privately, without obnoxiously talking to a quirky artifact in front of strangers. Differently, the MemoCollar is super nice to use when you're alone, minding your own business. It also works very well in social situations when you're with people whom you trust; in those cases, it can even lead to collective (and often playful) forms of documentation.

On another note, both tools afford different ways of thinking and articulating ideas. The MemoCollar is great for immediate documentation, to keep ideas and stories fresh. Differently, the phone helps a lot to pull the thread of deeper reflections, helping you to make them unfold as your write (and walk).

better when surrounded by strangers

better for private or tight-knit group settings

The *ReflexiBracelet* facilitated occasional, short, and highly situated reflection around one's lived experiences within the forest. It operated as a reminder, rather than a disruptor: it was relatively easy to forget about it while not in use.

The *HeuriStick* afforded the rather mindless documentation of interesting landscapes and events for later reflection. Yet, it did not facilitate any form of reflexive thinking in situ.

ProvoTech certainly created disruptions to the social situation, some of which led to interesting (and rather critical) discussions around the role of technology in human life; yet, those disruptions were hardly socially gracious. Most of the times, researcher found it more helpful to drop the provocations himself based on his nuanced interpretation of the social situation at hand.

The *StoryBottle* was the least useful item on the toolkit – or, at least, it was perceived as such by most backpackers. According to the researcher's notes, that was probably due to the highly structured activity it proposed. It is an example of a Wild Probe that might require a thorough scaffolded introduction to facilitate adoption; a process that was not possible during the backpacking adventure given the fluid and unstable nature of the hiking group.

DataWaves was seen as excessively demanding and socially disruptive for individual use. Yet, some groups reappropriated it for collective activity by spontaneously turning it into a shared canvas for drawing or annotating their thoughts around technology use in the nature.
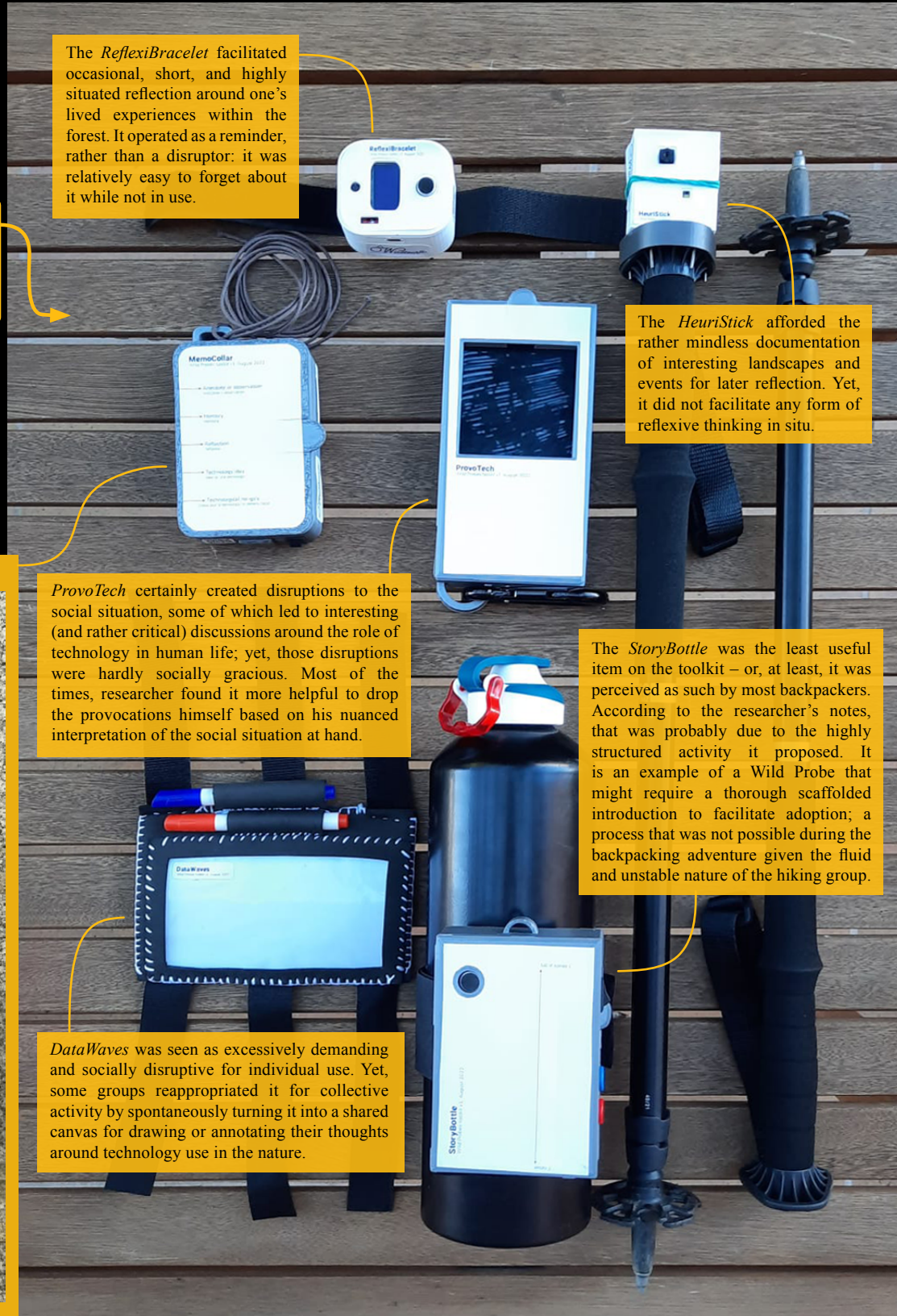
Takeaway #4: New avenues for extending the toolkit. The one-month adventure into the Spanish wilderness exposed the researcher to countless scenarios and contextual circumstances (social, physical, environmental...). He and his fellow backpackers experienced a number of situations where the Wild Probes in the v1 of our toolkit were not prepared to address the idiosyncrasies of the events at hand. That motivated ideas of additional tools that could become a part of the toolkit in the future. Here we unpack four of them.

During the backpacking trip, the researcher found the phone to be a useful documentation tool in certain occasions – even if not perfect. *FocusApp* is a smartphone app that enhances its potential for easy & smooth multimedia notetaking. It allows locking all other phone apps, notifications, functionalities, etc., so the user can leverage the multimedia documentation affordances of their smartphone while avoiding any potential disruptions. The app also geo-locates the notes, photos, videos, etc., on the trail's map, thereby pinning the insights produced during the research on the places where they were produced.

360 Camera
taking videos/photos automatically when predefined events happen (e.g. a beautiful landscape, a surprising tree, a strange shape in the sky) and/or predefined time intervals

The *FootageCam* is a camera that autonomously makes photos and videos so you can have extra visual diegetic material to document and communicate the co-design process (e.g. on social media). It releases pressure from the facilitator, so they do not have to take up on all the documentation responsibility. It also enables emergence to play a bigger role in documentation, as the camera will inevitably document unexpected things and thus enable the noticing of the unseen or the unexpected.

360° cameras

Microphone

If it rains, none of the tools in the v1 of our toolkit will work. Even the phone, which is supposed to be robust and resilient, is hardly useful when it is raining, e.g. the water drops "write" on the screen by themselves. In light of this, we see the need for a *WaterProbe*, e.g. in the form of a device integrated inside a rain poncho that allows easy, water-less recording of audio memos.

The *StrenuousProbe* is a stretchy vest equipped with lightweight electronics such as cameras and a microphone. It allows automatic and smooth documentation of the wearer's surroundings and activity during strenuous tasks, e.g. running or climbing. It was motivated by the researcher's experience of having to stop running or speedwalking every time he wanted to take a picture of a decent quality.

Touching fingertips
to control the *StrenuousProbe* functions

Microphone

DISCUSSION

The design of the Wild Probes built on the premise that, the more (the closer, the slower) human co-designers engage the forest, the more their ideas will reflect, respect, and cherish more-than-human concerns. Our reflexive engagement with the probes in action began to provide evidence in that direction: we experienced, first-hand and in situ, their potential to support conversations grounded in a deep care for both the environment and people's lived experiences within it. Though, as noted above, not all tools were fit for all possible scenarios, they often allowed us to enact co-design in-situ and in-action, thus enabling tight cycles of action-reflection that are known to be desirable in design [25]. Arguably, such situated co-design activity – grounded in a skin-by-skin (sometimes, literally) engagement with the spaces, activities, and non-human actors targeted by a design process – can support innovations that transcend the bounds of human need and intent. While we see a need for future work that evaluates their impact in more depth, we can confidently suggest that the Wild Probes can help to sensitize human designers towards the wellbeing and idiosyncrasies of other stakeholders than them, human and non-.

We also acknowledge the many limitations of our work when it comes to supporting more-than-human co-design engagements. Clearly, the tools presented here do not intervene beyond sensitizing human designers to more-than-human concerns. For example, they hardly facilitate the inclusion of non-human stakeholders as active participants of the conversation. We thus explicitly frame this first batch of Wild Probes as an early and incomplete step towards supporting forestry co-design that fully embraces more-than-human sensitivities. We are excited to expand on the work presented here with additional Wild Probes that explore alternative forms of human-nature interactions and further displace control from humans, e.g. by capturing data from non-human activity in the forest and using it as a primary input for design. We hope that others within the HCI and design research communities will join us in that venture.

To that end, we openly make our first batch of Wild Probes accessible for other designers and researchers. Detailed instructions on how to build them can be accessed at: **https://bit.ly/wildprobespecs**. In doing so, we hope to invite others to replicate, use, disrupt, and reimagine the toolkit and its components. Just like we will continue to develop them, we would like see the contributions from others as well. We are excited by the prospect of pluralistic advancements in this methodological space – technological, conceptual, and beyond.

Our future efforts will advance the Wild Probes tookit in three directions: First, we will continue to sharpen the tools presented here and create additional ones that respond to specific needs we identified in our work (see p. 11). In doing so, we hope to broaden the spectrum of scenarios targeted by the toolkit, including additional kinds of forestry activity (e.g. biking, climbing...) as well as other forms of nature beyond forests (e.g. water-related environments).

Second, we will explore how to support more genuine forms of more-than-human participation. That will likely lead to the design of newer tools that extend the palette of Wild Probes at hand. We also see opportunities for extending some of the existing tools towards increasingly more-than-human thinking: For example, the affordances of *HeuriStick* could be enhanced with additional sensing capabilities that bring non-human accounts of more-than-human activity into the conversation, e.g. by including temperature sensing or using different camera placements (near the ground, up in the sky...). Similarly, by rethinking the bodily placement of tools like *DataWaves* (e.g. by relocating it around the ankle, of by reimagining it as a shoe), we may be able to capture non-human contacts with the human body in ways that are not mediated by our intent.

Third, we also aim to continue to experiment with the Wild Probes in use. As noted earlier, our reflections from the case study described in this pictorial only cover the surface of what could be learned by experimenting with the Wild Probes. As the toolkit keeps growing, we will conduct a more systematic study to fully evaluate the performance and affordances of the different tools, and in diverse settings. Building on that, we will work towards a framework for designing and using the Wild Probes. We hope to include other designers and researchers in that process so the resulting framework resonates with pluralistic understandings of nature-related co-design.

Importantly, it is because we see the Wild Probes toolkit as a community resource in formation that we share it now, at its early inception, when its foundations can still be expanded or even rethought. We see value in inviting others to contribute to shaping this novel methodological space from the onset, at a time when there is ample room for deep reconfiguration. We ultimately see the Wild Probes as tools for and by the HCI and design research communities, and as such we open the development of their foundations up to them. We hope that our in-depth descriptions of the first batch of Wild Probes helps others to get involved in ongoing advances of the toolkit (practical, theoretical, and otherwise). We are excited to see how others use the Wild Probes presented here – or disrupt them, or even extend them towards additional designs that respond to the many challenges and opportunities arising in nature-related co-design.

CONCLUSION

Here we presented the design of the first iteration of the Wild Probes toolkit, a set of hybrid co-design tools that can help forest goers to pay attention to, reflect on, ideate around, and document their nature experiences in ways that can inspire contextually-grounded and socio-ecologically caring forest-related future making. Through a case study of our own work, we reflected on the toolkit in use and derived four take-aways that can inspire other designers and researchers to use (and extend) the toolkit in their own practice. We see the Wild Probes as a community resource for increasingly situated nature-related co-design and research. In the future, we will continue to develop the toolkit. We hope that others in the HCI and design research communities will conribute to that process as well.

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