The Wild Probes: Towards a Collection of Hybrid Tools for Situated, Caring & Playful Co-design within the Forest

The Wild Probes (WPs) are a set of hybrid tools for designers and researchers to facilitate multi-stakeholder co-design engagements within the forest. They support situated forestry future-making by helping the participants of a co-design process pay attention to, reflect on, ideate around, and document their forestry experiences in ways that can inspire contextually grounded forest-related ideation. Here we present the design and early use of the first iteration of the WPs.

The WPs extend existing tools available to designers by adapting their underlying mechanisms to the idiosyncratic character of the forest. We designed them building on recent research on the methodological underpinnings of (co-)designing for and from the forest. The WPs run on affordable, widely accessible electronics and can easily be built with basic DIY skills and equipment. We thus invite others to replicate, enhance, and repurpose them. Overall, here we contribute a first step towards creating a collection of tools to support co-design that is situated in the forest.

We hope other designers will find our proposals useful and contribute to growing the collection by creating new WPs of their own.

INTRODUCTION

Computation increasingly shapes who we are, how we act, and how we experience the world. Designing tech that graciously enriches our lives in new areas of implementation poses challenges (Badker 2015; Gunkel 2018). Methodological advances are particularly needed in design spaces where technology use is yet to become widespread (Badker and Kyng 2018; Bannon et al. 2018). Our work addresses one such space: human-nature interaction (Li 2018).

Responding to recent calls for new techniques for co-designing for, within, and around nature (Altarriba et al. 2022; Botero Cabrera et al. 2022), here we present the Wild Probes (WPs): a collection of hybrid artefacts that can support the design of forest-related experiences and technologies from within the forest itself. The WPs enable designers, researchers, and other co-design participants to pay close attention to, reflect on, ideate around, and document their forestry experiences in ways that are both playful, caring, and inspirational. Here, we present our first batch of Wild Probes, coupled with two early reflections on using them in practice. We hope the design research community will find our work useful and contribute to enhancing our early collection of WPs by building new prototypes of their own.

DISPLACING DESIGN RESEARCH INTO THE FOREST: STATE OF THE ART

Over a decade ago, an in-the-wild (Rogers 2011) approach was proposed to move design research from the lab to naturalistic settings. Today, we have myriad situated design research methods, e.g., cultural probes (Gaver et al. 1999) gather inspirational data on people’s ways of life to be used as design material; probe tools (Boucher et al. 2019) support technology-aided cultural probing; walking methods (Kanstrup et al. 2014) facilitate multi-stakeholder discussions on the move; and labs in the wild (Wilde et al. 2014) situate in-process research in public settings; among others.

While this in-the-wild approach has inspired increasingly situated practices both in and beyond design, it has also been criticised for focusing only on human needs and being primarily conceived for and practised within human-made environments (Giaccardi and Redström 2022). We rarely see the in-the-wild design research being practised in scenarios such as the forest, where humans experience an acute lack of control and more-than-human concerns are privileged over human-centric agendas. Further, the very foundations of that approach speak to a Western idea of “what is wild” and thus neglect alternative ways of living (Ssozi-Mugarura et al. 2016). Indeed, one may question: if in-the-wild research usually takes place within human-made and Western-looking environments, can it truly be considered wild? As we begin to target forests as areas of intervention, we may need an even wilder approach to future-making. Given the situated nature of Research through Design (Gaver 2012), we see value in exploring how design research can be moved closer to the wilderness. We wonder: How might we leverage the above methodological corpus beyond the human-centric and the human-made? How may we displace our creative inquiries into the forest?

Our agenda aligns with recent works that explore how displacing design research into the forest can support more socio-ecologically caring future-making. For example,
Botero Cabrera et al.’s (2022) Open Forest project facilitates more-than-human sensemaking of forestry experiences through experimental forest walks; Liu (2019) uses ethnographic methods to support posthuman design for resilient communal life, and Altarrriba Bertran et al. (2022) situate co-design targeting the forest within the forest itself to imagine joyful and caring developments. Far from proposing fully fleshed methodologies, these works push for a move towards design research that is more sensitive to the rich more-than-human network of a forest. They highlight a need for new methods and tools that respond to the idiosyncratic character of forests as (messy, unpredictable, and more-than-human) sites for co-design. Here, we take them up on that challenge.

THE FIRST COLLECTION OF WILD PROBES

This pictorial presents the first iteration of the Wild Probes: a collection of design probing tools aimed at supporting design researchers to enact their practice within the wilderness. To create the WPs, we took a research through design approach (Gaver 2012), drawing inspiration from existing design probing tools (Mattelmäki 2006), such as the probe tools (Boucher et al. 2019), and explored how to rethink their affordances for use in the forest. We also built on existing methods research on the idiosyncrasies of forests as sites for co-design, as well as on our own lived experiences of bridging forests and tech use.

We will present six WPs that: support seamless documentation of forest activity (HeuriStick and MemoCollar), adapt the affordances of existing probing tools for use in the forest (ReflexiBracelet and ProvoTech), and re-ambiguate forestry experiences by scaffolding action-reflection cycles (StoryBottle and DataWaves). We will then share two early reflections on using these tools in a study of our own and conclude with a discussion of how our explorations might be furthered. Overall, we set the stage for a collection of design probing tools aimed at supporting design research through design.

To continue to develop the WPs, we used them in a study where a researcher embarked on a backpacking trip to co-experience, reflect on, and ideate with other forest-goers. For a month, he walked 800+ km and engaged 200+ backpackers, using the WPs to facilitate conversations around the role of tech in forestry experiences. The experiment yielded rich data on (1) the human-nature-technology interplay, (2) the methodological implications of displacing co-design into the forest, and (3) the performance of the WPs in use. Many of these outcomes will be presented in future work. Here, we focus on two early reflections that emerged as the researcher and his backpacking fellows experimented with the WPs.

The implications of breakability (& how to deal with them)

As with any DIY artefact, the WPs are fragile. When used in messy scenarios, they are likely to break (Figure 14), both structurally and electronically. Forestry co-design is no exception: it involves potentially damaging movements and impacts; it is exposed to wind, water, challenging temperatures and dust, and it keeps people busy with the messiness of the activity at hand, which results in less attention paid to treating equipment with care. Researchers should be prepared to make improvised repairs. They should also help participants to get comfortable with the tools’ fragility. Early in the experiment, people’s fear of breaking the WPs often got in the way of wholehearted engagement. In response, the researcher started presenting them as gadgets that would most likely break, using examples of how he had broken them himself. Framing the WPs as inherently breakable helped to mitigate people’s fear of messing up and led to more proactive usage.

The importance of social acceptance

Social dynamics are also important when deploying the WPs. They are, by definition, weird artefacts people have to get comfortable with the tools’ fragility. Early in the experiment, people’s fear of breaking the WPs often got in the way of wholehearted engagement. In response, the researcher started presenting them as gadgets that would most likely break, using examples of how he had broken them himself. Framing the WPs as inherently breakable helped to mitigate people’s fear of messing up and led to more proactive usage.

EDTHOUGHTS ON USING THE WILD PROBES
The MemoCollar can be worn around the neck or as an attachment to a backpack handle. As such, it is readily accessible whenever needed—as opposed to phones, for example, which sit in people’s pockets.

Multiple buttons allow the user to store the notes by category. As such, the data produced is cleaner and more focused, even if the categories are somewhat open-ended.

The form makes it easy to use while moving: the tool can easily be grabbed with one hand, the buttons are conveniently placed where the fingers sit, and the microphone points in the direction of the user’s face. To record a note, one must simply bring the device to their mouth, press a button, and start talking—an interaction cycle that is compatible even with strenuous activity and does not detract the user from their forestry endeavours.

Wires
- PLA filament
- Arduino Nano
- AAA battery
- Custom circuit board
- SD card
- On/off switch
- SD module
- Buttons with mechanical caps
- Battery holder
- LED
- Female jumpers
- Male jumpers
- Arduino Nano
- Resistor
- Button
- Switch
- Jumpers
- 3.7V battery
- LCD screen
- SD card and module
- Buzzer
- Microphone
- Resistors
- Wires

Once in a while, the ReflexiBracelet buzzes and shares thought-provoking prompts on the screen, e.g., “What is the most enjoyable or otherwise stimulating event you have experienced while hiking?”. Wearers can decide to embrace or ignore any prompt. If they embrace it, they can record an audio note to share what happened and the reflections it enabled.

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The MemoCollar records voice notes so that co-designers can seamlessly store their thoughts, ideas, and observations as they engage with the forest.

Fig. 4. The MemoCollar records voice notes so that co-designers can seamlessly store their thoughts, ideas, and observations as they engage with the forest.

Fig. 5. Materials used to build the MemoCollar. More details at: https://bit.ly/wildprobespecs

Fig. 6. Like the MemoCollar, the ReflexiBracelet enables seamless documentation through audio notes. Yet, this WP also sends thought-provoking questions to the wearer to encourage them to focus on specific aspects of their forestry experiences.

Fig. 7. Materials used to build the ReflexiBracelet. More details at: https://bit.ly/wildprobespecs
Unlike other tools, ProvoTech is explicitly disruptive. Even if it sits silently in the background most of the time, every now and then it will emit an annoying buzzing sound and display a provocation to halt the nature experience and instigate a critical discussion around how tech may or may not play a role in it.

An example of the technologies displayed by ProvoTech is the Amazon Pavlok: a wristband for letting go of bad habits, which can be programmed to detect certain actions (e.g., smoking) and electroshock the wearer in response. It builds on the idea that coupling undesirable actions with a negative effect might help people let go of their habit.

Unlike the MemoCollar, the StoryBottle is not intended to be permanently at hand. Given the potential of breaks as spaces for reflection, it is meant to be used only when stopping to drink.

As the amount of liquid decreases, the emotional content increases, signalled by an LED strip that “fills up” – to the point that the canteen is empty of liquid but metaphorically full of anecdotes and reflections.
DataWaves encourages in-situ reflection on forestry experiences through artistic data visualisations. This WP lends itself towards slower forms of documentation: drawing requires precision and, thus, a pause in body movements encouraging wearers to stop every now and then to visualise chunks of their experience.

Unlike other WPs, DataWaves is purely analogue: it consists of a drawing pad placed on the wearer’s forearm that can be used to visualise one’s experience over time or distance. Although it does not explicitly enforce a specific way of scaffolding action-reflection cycles, the waving action-reflection cycles, this WP lends itself towards folding action-reflection cycles, this WP lends itself towards...

**CONCLUSION & FUTURE WORK**

Here we presented a first iteration of the Wild Probes: a set of hybrid tools that can help co-designers pay close attention to, reflect on, ideate around, and document their forestry experiences in ways that inspire contextually grounded ideation. The WPs extend existing tools, such as commercial cameras, by (1) making documentation more seamless and hence more reflective of the idiosyncrasy of forest activity; (2) prompting people to reflexively engage with the forest and their relationship(s) with it; and/or (3) scaffolding action-reflection cycles that re-ambiguate forest activity as a meaning-making site.

As such, these tools make the affordances of existing design probing tools (e.g., Boucher et al.’s [2019] probe tools) for use in the idiosyncratic context of the forest accessible. We designed the WPs to support co-design within the forest that reflects both human sensitivities and multi-species care. We see them as a valid step towards embracing more-than-human concerns. Yet, we acknowledge there is plenty of room to extend the WPs’ affordances towards increasingly more-than-human thinking. The tools presented here can help human designers pay closer and more empathic attention to their relationship(s) with the forest and, by extension, open up their work towards more-than-human concerns; yet, they do not enable the inclusion of non-humans as active co-designers, and as such, they may not support more-than-human co-design in the most radical sense. We see an opportunity to extend our work by developing tools that enable non-human actors to play a more active role, e.g., through sensors that capture forest activity without human intervention. In future research, we will extend the WPs to afford those kinds of engagements and source inspiration from other relevant traditions of engagement with nature, such as biology, ecology and nature photography, as we acknowledge that a limitation of our work is that it is mostly built on works from design research. As such, designers must help people adapt the WPs if people do not embrace them as an accepted part of the group’s social dynamics, usage will likely be scarce and superficial.

The need for this “getting used to” makes some WPs unfit for shorter-cycle, one-off activities (e.g., short group walks that take place only once) or situations where a group of forest-goers is in constant mutation. In such scenarios that lack opportunities to appropriately scaffold an introduction that facilitates the adoption of the tools, it may be best that the researcher uses the WPs themselves and/or invites other people to use those that are less socially visible, e.g., the HeuriStick, whose photo-taking mechanism is hardly visible to anyone other than the user.


**Fig. 14.** Instagram stories describing situations where the WPs broke. Left: the waving of the wearer’s arm detached the MemoCollar’s lid, and its electronics fell off. Centre: the DataWaves’ straps often broke and had to be fixed. Right: When walking over rough ground, the HeuriStick’s lid fell off due to the heavy movements and was lost as it was still pitch black; the researcher improvised a quick fix with paper and an elastic band until he could access a Fab Lab.
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Aquest article ha descrit una primera versió de les sondes de la natura, un conjunt d'utencis híbrids que poden ajudar els codissenyadors a apreciar especial atenció a les seves experiències forestals, reflexionar i documentar les seves observacions de manera que creïn una innovació creativament funcionant. Les WP amplien les capacitats d'interacció existents, per exemple, com a senzills, amb el cotxe, o bé com a equipaments fins en el desembre de 2019. Aquestes observacions ens van portar a reflexionar sobre què sap i què no està preparat per a entorns artificials i practicar-s'hi dins (Giaccardi & Redström 2022). Poques vegades, és possible que l'investigador s'estimi més fer servir ell mateix les WP i/o convidar-ho, de manera que puc donar estabilitat a les seves observacions, si bé no secundin el codisseny més que humà en el sentit més radical. Entreveiem la necessitat d'investigar la manera d'acomodar les WP en un context híbrid que podria ajudar a millorar els dissenys del futur. A diferència d'altres eines, el ProvoTech és ús en esport de l'altàrista visualitzacions artístiques de les dades recollides. A diferència d'altres WP, aquesta WP també envia preguntes que els usuaris no poden resoldre i que es puc ser útil per a formar una base per a la investigació d'una etapa moment, al contrari de que passa, per exemple, amb els telèfons, que avui es quedan força a què se'ns uneixin. L'objectiu de les nostres investigacions és estudiar de quina manera la investigació de disseny es pot apropar a les àrees silvestres.

**PRIMERES REIXESSES SOBRE L'US DE LES SONDES DE LA NATURA**

Per imposar el desenvolupament de les WP, deu a les nostres investigacions el utilització està en estudis durant el qual va començar més de la tercera vista. En aquest moment, la qualitat de la informació disponible per a les WP era molt més mala que el rendiment de les WP era molt més dividit. Molts d'aquests resultats es tracten en futurs, en el qual poder fer-ho al cost de la informació i les reacions de l’investigador i els seus col·legues de motxilla. No es pot disposar d’una primera versió de les sondes de la natura, una col·lecció d’utencis d’investigació per ajudar a codissenyadors a desenvolupar la seva experiència de disseny (Kanstrup et al. 2014), que afavoreix els debats entre múltiples persones, com ara les sondes culturals (Gaver et al. 1999), que compilen dades que inspiren una creativitat contextualment fonamentada. Les WP amplien les capacida
RESUMEN

Esta imagen muestra la primera versión de las sondas de la naturaleza, una colección de herramientas híbridas que favorece el codiseño situado del bosque. Para impulsar el desarrollo de las WP, uno de nuestros investigadores las usó en un estudio piloto en el directorio de una reserva forestal (Boucher et al. 2019), y encontró que cada vez va más allá de lo humano. Las herramientas aquí presentadas pueden ayudar a los codiseñadores a prestar especial atención a sus experiencias en el bosque, y a hacer que la documentación sea más fluida y, por lo tanto, refleje mejor la idiosincrasia de la actividad forestal. Dicho esto, reconocemos que únicamente se hacen una vez o en situaciones en las que el grupo de excursionistas sólo se ve expuesto a escaso o superficial. Si la necesidad de “sentitación” hace que algunas WP no sean aplicables en actividades de naturaleza con grupos muy pequeños o en situaciones de exposición exhaustiva, entonces, muy probablemente se las incluiría, e incluso dos ejemplos de cómo el hambre ha sido un problema en los estudios de campo, con el grupo de excursión más de diez personas, en la experiencia de haberse quedado sin comida al final del día.

CONCLUSIÓN Y TRABAJO FUTURO

Para ampliar el desarrollo del WP, uno de nuestros investigadores las usó en un estudio piloto en el directorio de una reserva forestal (Boucher et al. 2019), y encontró que cada vez va más allá de lo humano. Las herramientas aquí presentadas pueden ayudar a los codiseñadores a prestar especial atención a sus experiencias en el bosque, y a hacer que la documentación sea más fluida y, por lo tanto, refleje mejor la idiosincrasia de la actividad forestal. Dicho esto, reconocemos que únicamente se hacen una vez o en situaciones en las que el grupo de excursionistas sólo se ve expuesto a escaso o superficial. Si la necesidad de “sentitación” hace que algunas WP no sean aplicables en actividades de naturaleza con grupos muy pequeños o en situaciones de exposición exhaustiva, entonces, muy probablemente se las incluiría, e incluso dos ejemplos de cómo el hambre ha sido un problema en los estudios de campo, con el grupo de excursión más de diez personas, en la experiencia de haberse quedado sin comida al final del día.

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a través de técnicas de ingeniería inversa y métodos fisiológicos en el diseño de dispositivos de captación de calorías.

Fig. 14. La StoryBottle es una grabadora de notas de audio que se acopla a una cantimplora. A medida que disminuye la cantidad de líquido, aumenta el contenido emocional, señalado por una vela LED que "se llena" hasta que, finalmente, la cantimplora está vacía de líquido, para (meta)líricamente llamar a anécdotas y reflexiones. Los usuarios graban las conclusiones de sus conversaciones utilizando un entorno situado en el que buscan disfrutar del dolor.

Fig. 11. Materiales utilizados para fabricar la StoryBottle. Más información en: https://bit.ly/storybottle

Fig. 12. DatosWaves forma en expansión in situ sobre experiencias en la naturaleza a través de visualizaciones artísticas de los datos recogidos. A diferencia de otras WP (re)desigual es un dispositivo que recoge formas analógicas con una fuerza de dibujo en el ámbito del usuario donde puede visualizarse la experiencia en el lugar de donde la distancia. Aunque no explícitamente un método específico de apoyo a la acción reflexiva, esta WP se proyecta como un enlace entre la escultura y el panel interactiva. La exposición se muestra con la naturaleza que responde a valores lúdicos y de cuidado.

Fig. 13. Materiales utilizados para fabricar el DataWaves. Más información en: https://bit.ly/datawaves

Fig. 14. Historias de Instagram que describen situaciones donde las WP se han roto. "La próxima vez el brazo del usuario desactiva la tapa del Me moCollar y la parte electrónica puede caer y perderse en la suciedad. El investigador impulsa una exploración sensorial con panel interactivo y una sensación de lo que no está accesible al FieldLab."