Mediating Animacy: Designing Interfaces from Ongoing Change

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1 INTRODUCTION

A sense of being alive arises when the world exceeds what we already know or intend. Something happens that we did not initiate, and our attention and action shift in response. Ingold describes an animic world as one continually taking form through the relations of its inhabitants, rather than a finished world across which self-contained beings move [12, pp. 9–14]. Treating the world only as an object to be represented or controlled closes down this encounter: what surrounds us becomes a resource for a prior purpose rather than something that can redirect us.

One influential tradition in HCI modeled interaction through goals and task performance, exemplified by GOMS [6, pp. 139–192]. The field's third wave widened this account toward experience, participation, and everyday life [3]. Neither orientation, however, begins from events that unfold outside a user's intention and precede their input.

Mediating Animacy translates this orientation into interface design. It begins from a world already alive and changing, including changes beyond the reach of human perception. An interface always selects which changes its actors can sense and how they can respond. What if interfaces created connections through which people could notice the animacy of others? Across two existing works and future research directions, this article outlines how I will develop this vision through my master's research and establish it as a long-term research direction in HCI.

2 RELATED WORK: ANIMACY, MEDIATION, AND AGENCY

Animacy takes shape over time in the relation between a person and another being or process. Bird-David describes animist personhood through relational ways of knowing, rather than as a belief projected onto inert things [2, pp. S77–S82]. Ingold likewise locates animacy in a world continually taking form through movement and relations [12, pp. 9–14]. In this account, animacy is temporary: it intensifies, recedes, or disappears as attention and response change. I therefore treat it as a situated relation, not a stable classification of something as living or nonliving.

Because animacy takes shape through attention and response, the medium through which an encounter occurs forms part of that experience. Ihde describes technological mediation as a transformation of perception in which some aspects of the world are amplified and others reduced [11, pp. 72–80]. Verbeek carries this account into action by examining how artifacts mediate programs of action and the relations from which actors emerge [20, pp. 154–161]. An interface mediates animacy through the duration, scale, and form in which another's changes become perceptible, as well as through the responses it permits. Interface designers must acknowledge this role, because what becomes perceptible as living is also political.

Butler argues that frames condition which lives can be apprehended as lives in the first place [5, pp. 1–32]. Chen shows how animacy hierarchies order human life, disabled life, animal life, plant life, and nonliving matter into different positions of value and different zones of possible agency [7, pp. 3–4, 13–14]. Nussbaum's feminist account of objectification identifies treating a person as inert, denying their autonomy and agency, and disregarding their subjective experience as distinct ways of treating that person as an object [18, p. 257]. An interface participates in these distinctions when it determines whose changes become perceptible, whose responses affect what follows, and who remains available primarily for another's use.

HCI has approached this political problem from several directions. Feminist HCI places agency, identity, equity, and embodiment within the work of interaction design and uses feminist criticism to expose values embedded in dominant design paradigms [1]. Animal–Computer Interaction begins from animals' activities and welfare [17], while posthuman and entanglement approaches distribute agency across people, technologies, and other entities [8, 9]. A review of post-anthropocentric artifacts nevertheless found that most still offered humans more scope for action than the entities of nature they represented [16]. Mediating Animacy builds on these approaches without restricting its scope to nonhuman relations; interfaces also shape how one person encounters the animacy of another.

3 MEDIATING ANIMACY

Mediating Animacy is an HCI vision that places the mediation of animacy at the center of interface design. Ishii describes vision-driven design as an approach that complements needs-driven and technology-driven design by orienting research beyond current limitations [13]. As a vision, Mediating Animacy does not prescribe a single interface. It directs attention to how interfaces connect people with the lives and processes around them.

Those lives and processes are already unfolding, and this changes where interaction begins. Its initiating event is a change in the world, not an input produced by the present user. An interface selects from that change and translates it into a form that can enter human perception; interaction continues when a person notices what is happening and responds. Their response joins something already underway, whose changes remain beyond their intentions and can redirect what they notice and do next.

This sequence makes sensing, transformation, and response parts of the same design relation. What an interface captures or leaves out shapes how an event appears, while the response it permits shapes how a person can join it. These decisions determine what becomes perceptible and who can affect what follows. The politics described above therefore lies in the operation of the interface itself.

Acknowledging this politics defines an affirmative task for design: to create relations in which another may be felt as animate without claiming to reveal it as it truly is. Mediating Animacy begins from the animist possibility that anything may be alive, while treating animacy as a relation that takes form through attention and response [2, 12]. It carries that openness into HCI by asking how computation can connect human perception and response to another's ongoing changes. This vision emerged through the two existing works discussed next, which explore how an interface can join a person to changes unfolding in the present or persisting as traces across time.

4 EXISTING WORKS AND RESEARCH DIRECTIONS

4.1 Contact Membrane

Contact Membrane, accepted as a long paper in SIGGRAPH Asia 2026 Art Papers, is an interface for listening with a mealworm beetle [14]. The beetle walks on tensioned paper; piezoelectric elements detect the vibration of its footsteps while an inertial measurement unit tracks the paper's orientation. Spatializing the amplified vibration lets a performer follow the beetle through sound. When the performer tilts the paper to prevent a fall, that intervention changes the surface through which the beetle moves, and the resulting footsteps redirect the performer again.

The paper describes this orientation toward the animal's perceptual and effector capacities as Umwelt-centric design [14]. Audience discussions following three university performances raised the question of whether the processed sound's beauty masked the beetle's physical experience. In the paper, this question

Fig. 1. Contact Membrane. A performer responds to a mealworm beetle's amplified footsteps by tilting its paper membrane.

leads to an argument that Umwelt-centric design should make the politics of translation perceptible rather than leaving the transformation in the background.

4.2 Tele-Bio

Tele-Bio, accepted for the UIST 2026 Adjunct Proceedings, begins from the heat and moisture left on a public telephone receiver [15]. Lifting the modified receiver starts both the recording of the present user's physiological signals and the playback of traces left by previous users. Replacing it adds the new recording to an anonymous archive. The rotary dial selects how far into that archive to reach, and signals from the chosen period return through haptic pulses, changes in the receiver's temperature, and mist near the mouth.

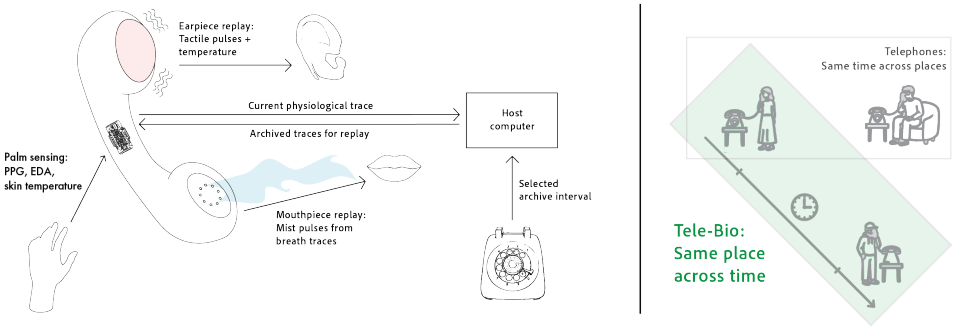

Fig. 2. Tele-Bio records present physiological traces and replays its archive through tactile pulses, temperature, and mist.

For a caller, a public telephone connects different places at the same time through voice. Its receiver also brings different bodies into contact with the same place across time, as each person presses a hand and face against the same object and leaves behind heat and moisture. Tele-Bio extends this second relation through biosensing. Physiological data becomes the material of an encounter between people who never hold the telephone at the same time.

4.3 From Existing Works to Future Research

Contact Membrane showed how an animal's ongoing movement can initiate interaction and draw a person into a reciprocal relation. Tele-Bio showed how bodily traces held by a shared object can connect people across time. Together, the works established a way to investigate Mediating Animacy through interfaces that begin from changes already underway in the world.

During the master's program, I will extend Mediating Animacy through encounters with a wider range of lives and processes, including organisms, weather, and changes in everyday materials. Each interface

will begin from the particular ways its subject moves and changes, leading to different forms of sensing, transformation, and human response. Developing several works in parallel will expand the vision while revealing the design principles that recur across these encounters.

5 RESEARCH APPROACH AND METHODS

Developing principles across these works requires a method that keeps concepts and artifacts in motion together. The project will therefore use Research through Design: questions emerge through making, and reflection on each artifact redirects the next prototype [10, 21]. Mediating Animacy will guide each prototype, while discoveries made through the prototype will revise the vision in return. Concept-driven interaction design provides a complementary account of artifacts as carriers through which theoretical constructs can be developed and examined [19].

Each project will begin with observation and material experiments. I will test sensors, substrates, and mappings to learn which changes become perceptible and how a person can respond to them. Each trial will extend this observation to the subject's response. When its behavior exposes an assumption built into the design, I will revise the sensing, structure, or interaction rather than filter the mismatch out as noise. Listening thus serves as one method within the broader development of each interface. I will record what each configuration senses, transforms, discards, and leaves outside human control, connecting the developing principles of Mediating Animacy to the decisions through which each interface takes form.

The prototypes will then enter exhibitions and fieldwork, where I will study how participants act, speak, and redirect their attention during an encounter. Drawing on my training in cultural anthropology and cognitive science, I will use observation and semi-structured interviews to examine these changes over time. When a project produces a question that can be examined under controlled conditions, I will extend the qualitative findings through an experiment or user study. The findings will return to the next iteration of sensing, mapping, and interaction.

Because the works will develop in parallel, comparison can begin before any one of them is complete. Annotated portfolios will bring the projects together while preserving the differences among their subjects and settings [4]. Each annotation will follow a change from its source through sensing and transformation to the responses it makes possible. Reading these paths across the works will reveal recurring design decisions and develop them into shared principles.

In the first year, I will refine and exhibit Contact Membrane and Tele-Bio while beginning new projects through short cycles of observation, material experimentation, and public presentation. In the second year, I will develop the new works further, compare the principles emerging across them, and synthesize the results through the master's thesis and international publications. Material experimentation and critique at the Critical Matter Group will accelerate this movement between making and reflection.

6 EXPECTED CONTRIBUTIONS

The research will develop Mediating Animacy as an HCI vision grounded in comparisons across multiple interfaces. It will articulate how sensing, transformation, and response determine which ongoing changes enter human perception, which are discarded, and how action is distributed after an encounter begins. Expressed as design principles, these decisions will make the politics of mediation available for examination across different organisms, materials, and environments.

These principles shift the point of departure for interaction from a user acting on a system to a person entering a relation already in progress. The annotated portfolio will show how discoveries from one work

revise the next and how a long-term vision develops through parallel Research through Design projects. By making both the principles and their derivation available to others, the thesis will position Mediating Animacy as a research direction for designing how humans join a world already in motion.

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