A Meat-Summer Night's Dream: A Tangible Design Fiction Exploration of Eating Biohybrid Flying Robots

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Fig. 1. Participants were eating "biohybrid flying robots" in the traditional French manner.

What if future dining involved eating robots? We explore this question through a playful and poetic experiential dinner theater: a tangible design fiction staged as a 2052 Paris restaurant where diners consume a biohybrid flying robot in place of the banned

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delicacy of ortolan bunting. Moving beyond textual or visual speculation, our "dinner-in-the-drama" combined performance, ritual, and multisensory immersion to provoke reflection on sustainability, ethics, and cultural identity. Six participants from creative industries engaged as diners and role-players, responding with curiosity, discomfort, and philosophical debate. They imagined biohybrids as both plausible and unsettling—raising questions of sentience, symbolism, and technology adoption that exceed conventional sustainability framings of synthetic meat. Our contributions to HCI are threefold: (i) a speculative artifact that stages robots as food, (ii) empirical insights into how publics negotiate cultural and ethical boundaries in post-natural eating, and (iii) a methodological advance in embodied, multisensory design fiction.

CCS Concepts: • **Human-centered computing → Empirical studies in HCI**.

Additional Key Words and Phrases: Speculative design, food futures, culinary culture, artificial intelligence, synthetic bioengineering, sustainability, ethics

1 Introduction

> *"Meat! We are going to eat some meat; and what meat!"*
>
> — Jules Verne, French writer, "father of science fiction".

> *"The brain is merely a meat machine."*
>
> — Marvin Minsky, American cognitive and computer scientist, AI pioneer.

Since time immemorial, humans have eaten animals. This act—mundane yet deeply cultural—has shaped our ethics, our rituals, and our relationship to the living world. Today, however, climate change, industrial farming, and shifting cultural values press us to imagine new food futures. Increasingly, researchers are exploring radically alternative possibilities. For example, the *RoboFood* project [82] exemplifies a broader movement where robotics and food science converge around the idea of edible robotics to reimagine what counts as food. Set against such innovations and imaginaries we ask: *what if we could eat biohybrid robots—robots that are (partly) made from cultured tissues—instead of cows, chickens, or fish?* In this paper, we take this speculative question constructively, not to propose a technological roadmap, but to use it as a lens: a way to probe how emerging technologies might reshape human ethics, cultural identity, and the boundaries of human–robot interaction.

Although eating animals has been a constant throughout evolutionary epochs, successive sociotechnical revolutions have transformed this relationship. Technologies have taken us from hunting "wild" animals to domestication, selective breeding [68], and eventually mass production. More recently, an emergent technology of cultivated or lab-grown meat has reached commercial approval. At present, Singapore and the USA are the only two countries that have legalized the sale of lab-grown meat for human consumption, with others likely to follow. For instance, the UK has approved lab-grown meat for pet food [88], and the Netherlands permits it for tasting purposes [93]. These developments mark the beginning of a food revolution [11], one that seeks to address the environmental and ethical costs of industrial meat production.

Yet the state of the art remains at an early stage, with technical, socio-political, and regulatory challenges ahead [90]. A key difficulty lies in replicating the form, texture, and appearance of conventional animal meat [78], given the complexity of biological structures [31]. This leads us to ask: *Why not consider creating a biohybrid robot that leverages natural processes to grow authentic animal components, while being managed and controlled by computers?* Here, Minsky's metaphor of the brain as a "meat machine" offers a useful conceptual pivot. By framing the brain—the seat of consciousness—as mechanistically reproducible, Minsky underscored a materialist view that, in principle, no natural phenomenon is beyond technological replication. Extending this reasoning, one might imagine not only replicating neural systems but also reconstituting organic tissues, organs, and even entire animal forms within artificial substrates. This conceptual foundation supports the possibility of assembling animal–robot hybrids: entities that merge biological growth with computational control. From this perspective,

biohybrid robots are not merely a technical workaround for the shortcomings of lab-grown meat. They represent a deeper continuity with cultural traditions of animals-as-food, while simultaneously reframing the act of eating within the context of human–robot interaction.

To bring this vision to life, we designed an experiential dinner theater titled *A Meat-Summer Night's Dream*. Inspired by Shakespeare's *A Midsummer Night's Dream*, the event blended performance, fine dining, and speculative narrative to critically explore future food rituals and revive a fading culinary tradition through speculative robotics and bioengineering. Specifically, we imagined a future where synthetic meat, grown as part of biohybrid flying robots, replaces the controversial French delicacy, *Ortolan Bunting*. This multisensory performance was not intended to propose a product or policy, but to provoke critical reflection and open dialogue around food ethics, technological futures, and cultural preservation.

Situated in Paris in 2052, the "dinner-in-the-drama" invited six participants who were not technical experts, but from the creative industries to embody roles within a futuristic gastronomic ritual in an art gallery setting. This tangible design fiction provided an embodied context to examine how people engage with speculative technologies when immersed in rich cultural and sensory environments. To guide our inquiry, we posed two research questions: **RQ1**: How do people contemplate the idea of eating biohybrid robots when exploring alternative food futures? **RQ2**: How does a tangible multisensory dining experience provoke critical reflection around sustainable food futures?

This paper contributes to HCI: (i) by presenting a speculative artifact—an envisionment and partial enactment of consuming biohybrid robots in future food rituals—that provokes critical reflection and discussion around alternative food futures and their ethical and sustainability implications; (ii) by offering empirical insights from participants' responses to a multisensory, performative experience, which surfaced reflections on sentience, sustainability, and cultural meaning; and (iii) through methodological development, by adapting design fiction into a tangible, embodied format that fosters critical, experiential engagement with speculative technologies.

2 Background and Related Work

2.1 New Frontiers for Food and Technology

2.1.1 ***Human–Food Interaction in HCI.*** Food is not only essential for survival, it is often a deeply social and cultural experience that can be enjoyable, unusual or repulsive [50]. Technology has crucially supported and enriched food-related practices [50]. Grimes and Harper [32] opened a discussion on the role of food-tech in HCI by introducing speculative design concepts for edible interfaces. As the intersection of food and technology has been explored, there has been a growing trend in exploring Human–Food Interaction (HFI) to create, transform, and elevate food-related experiences with technology [45, 89]. This research has taken two directions: "around food" and "with food" [30]. While design "around food" focuses more on the social experience of consuming food, design "with food" is oriented to crafting edible user experiences. A number of recent projects have involved the growth, preparation, and consumption of new types of foods [44, 95, 110] and has delved into speculative food-tech applications, imagining how technological innovations could transform the sensory experience of eating [48, 87]. In another technological innovation, Chen et al. examined ways to foster people's affective emotion toward fermentative microbes [14], proposing Nukabot—a conversational artifact supporting interaction between microbes and humans through maintenance, affection, and obligation. Relatedly, edible robotic systems have been envisioned as food that not only serves nutritional purposes but also embodies sensing, actuation, and computational functions, enabling applications from targeted drug delivery to ecological intervention [26].

However, the space of design "with food" has been less explored compared to design "around food" due to its challenging nature of going beyond traditional screen-based products [71] and underutilization of taste- and smell-based interfaces within the field of HCI [69, 70, 79]. Furthermore, existing studies have emphasized social and cultural aspects of technology in dining [32, 39], rather than aiming to improve the individual eating

experience [2]. To bridge these perspectives, Deng et al. proposed nine HFI building blocks [20], along with tangible "Dancing Delicacies" artifacts [23], contributing new methods and material vocabularies for HFI. Their concept of "computational food" [22] emphasized the choreographic potential of interactive foods and systematic study of "complex interactions among creators, computational food, and consumers." Other projects oriented toward fundamental dining experiences include Logic Bonbon [21], Chewing Jockey [91], and LoLLio [66].

Despite growing activity in advancing both HFI directions, there has been limited exploration of food sources and food production technology. Although Wang et al. [96] proposed a speculative idea around consuming animal-robot hybrids, empirical HCI studies that test such concepts are scarce in this area of research and development. This study addresses this gap by introducing *tangible speculative food artifacts* to explore new imaginaries of sourcing and consuming food, and to provoke reflection on the ethical and affective entanglements involved in post-natural eating.

2.1.2 ***Synthetic Food: Cultivated Meat and Its Limitations.*** Frontier developments in bioscience and bioengineering, such as cellular agriculture and tissue engineering, have enabled the in-vitro cultivation of animal cells to produce edible meat products. Cultured or lab-grown meat is often promoted as a "slaughter-free", environmentally sustainable alternative to conventional animal agriculture [78]. Its purported benefits include reduced ecological impact, elimination of animal suffering, and improved control over foodborne diseases.

Despite this promise, cultivated meat faces significant scientific and socio-political barriers. Key technical limitations include replicating the complex, hierarchical structures of natural tissues—integrating microscale functional units into macroscale edible forms remains an ongoing challenge [31]. Furthermore, regulatory, cultural, and consumer acceptance issues persist [90].

These limitations open space for alternative visions. We suggest that integrating robotics into tissue-based food systems—i.e., constructing animal-robot hybrids (see subsubsection 3.1.1), offers speculative, yet provocative pathways to address structural, sensory, and ontological challenges in synthetic food futures. In parallel, advances in edible robotics, such as edible drones [54] and biodegradable aquatic robots [108], illustrate how food and robotic systems might merge to provide both functional performance and nutritional value in extreme or resource-limited environments, suggesting provocative future scenarios for post-natural eating.

2.2 The Idea of Living Machines, Biohybrid Robots, and the Animal-Robot Analogy

Over the last decade, the term Living Machines has been employed to signal a growing convergence between biology and technology (see [75, 76]). In both scientific and artistic domains, researchers have developed machines inspired by biological forms and processes [46, 97–99], and increasingly, machines built from living tissue itself [49, 51, 63]. For instance, Takeuchi and colleagues created a biohybrid bipedal robot powered by skeletal muscle tissue [51] and a humanoid robot covered with living skin capable of smiling [49]. Other works employ fungi as computational substrates for robotic control [62], blurring the boundaries between machine and organism. At the same time, ethical challenges and responsibilities in biohybrid robotics research have been raised [52, 60], as these efforts increasingly collapse distinctions between the biological and the mechanical. These efforts are part of a broader movement to develop biohybrid systems, where biological and synthetic components form new composite entities [43, 102]. Within this movement, edible robotic concepts [26] also extend the scope of "living" or "nutritive" machines, challenging the division between machine, organism, and food.

As a significant cultural metaphor, Living Machines build upon an idea that humans will continue to radically control and re-engineer the living world, including animals, to bend to our will [92]. Some advocate such systems as ecologically viable alternatives to resource-intensive AI and robotics [35]. Relatedly, animal-robot analogies have been explored in Human–Robot Interaction (HRI), suggesting that robots may be treated "like animals" to supplement social, cognitive, and emotional roles in human life [16, 18, 67, 103]. Previous research also suggests that people perceive machines as possessing consciousness to some extent [84, 105, 107], which further

complicates how living qualities are projected onto artificial systems. Complementing these techno-scientific efforts, artistic works such as *Lapillus Bug*[53] similarly explore the animacy of inorganic materials, blurring boundaries between life and non-life through speculative, sensory-driven design.

Against this backdrop of humans' propensity to exploit animals, two main topics emerge: harvesting animal products for food, and demanding services from animals. While many investigations have explored animals and robots through the lens of service provision, the possibility of cultivating animal products through robotic means remains largely unexamined in HRI and robotics research. This absence may stem from earlier technical and conceptual constraints—when animals were strictly biological and robots merely mechanical. Yet the emergence of Living Machines collapses these boundaries, expanding the sociotechnical horizon to include speculative systems where food, life, and machinery converge. It also prompts a deeper question: *What implications might such hybrids have for other human–robot and human–animal relations?*

2.3 Speculative Design and Design Fictions in HCI

Speculative design is a cover term for various forms of design fiction and critical design [1], we consider they are interchangeable. Design fiction has become an increasingly influential approach in HCI—particularly within research through design [65, 109]. As Dunne and Raby [25] described, speculative design serves as "a catalyst for social dreaming", enabling the creation of sociotechnical imaginaries [41] that challenge existing paradigms. Rather than solving problems, design fiction invites reflection and provokes debate [5, 28, 29], often using wit or satire to spark critical engagement [58].

Recent work has demonstrated speculative design's potential across a variety of domains. In robotics and AI, design fiction has been used to anticipate ethical challenges [81] and foreground public accountability in surveillance systems [1]. Within participatory and justice-oriented frameworks, speculative methods have empowered marginalized communities to envision alternative futures [10, 37, 38]. In food-tech, speculative design has supported community engagement in sustainable food futures [15], while others have explored ecological imaginaries and sustainable design through fictional scenarios [94]. Futures studies have further expanded the temporal scope of HCI research, promoting long-term thinking and creative radicalism in design [19, 59].

While inspiring, many of these projects rely primarily on textual, visual, or virtual formats for speculation (e.g., [1, 72, 85]), where participants interact passively as viewers or readers. Outside HCI, works like *The Anthropocene Cookbook* [13] similarly speculate on future food systems through artistic provocations. However, they too often remain abstract or conceptually distant. Yet human culture [101], politics, and ethics are fundamentally embodied and multisensory. To support deeper experiential engagement, we argue for the inclusion of tangible, multisensory elements in speculative design. In this work, we adopt an approach we call **tangible design fiction**, integrating material and sensory experience into speculative world-building to enable richer, more situated encounters with imagined futures.

3 Methodology

3.1 Ideation and Concept

3.1.1 ***General Speculative Concept of Eating Animal-Robot Hybrid.*** As a speculation on future food systems beyond lab-grown meat, we conceptualize a biohybrid robot composed of two major parts: (i) an artificial, computer-based "brain", and (ii) a semi-biological body embedded with living tissue, grown from real animal stem cells. The aim is to imagine a provocative but plausible progression of current tissue engineering and robotics research, bypassing existing constraints in replicating the texture and structure of conventional meat products [31].

The artificial "brain" consists of AI-based electronics capable of regulating the body's internal biological systems, much like a rudimentary autonomic nervous system. The "body", in turn, acts as a mobile incubator for stem-cell

growth, allowing differentiated biological tissues—such as muscle and skin—to grow in vivo. These hybrids, while mobile and organism-like, would remain non-conscious by design (i.e., lacking a cerebrum), enabling their assembly, harvesting, and disassembly without invoking traditional ethical concerns about slaughter.

Importantly, this concept is not intended as a direct technological proposal, but as a design fiction to stimulate reflection on how future food technologies might intersect with ethics, sentience, and biological complexity. The speculative system allows for diverse configurations—where the species, morphology, and AI complexity of each hybrid can vary based on culinary or cultural interest (e.g., bird-like versus insect-like forms). In developing this concept, we drew on parallels with speculative robotics and biohybrids in research [49, 51], as well as engaging with philosophical perspectives on consciousness, sentience, and embodied intelligence [33]. The biohybrid robot, in this context, acts as a vessel through which to explore boundaries between the animate and inanimate, edible and ethical, animal and machine.

3.1.2 ***Biohybrid Flying Robots as Synthetic Ortolan for Eating.*** To provoke discussion on the tensions between tradition, ethics, and technology, we designed a speculative scenario in which diners consume a biohybrid flying robot inspired by the controversial French delicacy—the Ortolan Bunting. This choice is not intended as an endorsement of the original practice, but rather as a culturally loaded and emotionally charged case that allows us to explore the potential of synthetic organisms to preserve, transform, or challenge endangered culinary rituals.

The Ortolan Bunting is a small songbird historically consumed in French haute cuisine, where it was captured, force-fed, and drowned in Armagnac before roasting—a process widely regarded as cruel [56, 80]. The dining ritual, involving covering one's head with a napkin, was said to preserve aroma and also to hide the act from divine judgement. Its consumption was banned due to ethical and ecological concerns [86]. Yet, its symbolic cultural resonance persists.

In our speculative future, we reimagine this delicacy through a biohybrid robot whose meat—cultured from ortolan stem cells—is attached to a flying drone body. This hybrid allows us to explore how advanced biotechnology might intersect with ritual, ethics, and sensory experience. The traditional napkin ritual is retained, not as endorsement, but as a way to question how cultural practices may persist, evolve, or become recontextualized when paired with future technologies (see Figure 1). This design fiction serves as a provocation to examine broader (e.g., ethical, cultural, political) questions raised by prospects of alternative and radical technological food futures—providing a stage on which we could explore the study's two research questions (see section 1).

3.2 Dinner-in-the-Drama as Tangible Design Fiction

Design fiction is a widely used method in speculative and critical design to explore possible futures. However, most design fiction implementations in HCI have traditionally relied on visual or textual materials, such as videos, images, or written scenarios—often limiting participant engagement to a cognitive or imaginative level. In contrast, we propose a novel methodological extension we term **tangible design fiction**, which intentionally incorporates multisensory, physically embodied elements into the fictional scenario to foster immersive, situated reflection.

Our approach is motivated by the observation that human experience, especial culinary practices, is inherently multisensory: touch, smell, sound, and taste shape how we perceive and emotionally respond to the world. By engaging these sensory modalities, tangible design fiction narrows the distance between speculative imagination and physical experience, enabling participants to feel, not just imagine, a possible futures.

In this study we translated this method into what we call **"dinner-in-the-drama"**, a format that transforms traditional "dinner theater" into a participatory, performative research setting. Unlike dinner theater, where guests are passive observers of a staged narrative—*dinner-in-the-drama* immerses participants as actors within the fiction. They not only consume the food but perform roles, navigate rituals, and interact with speculative artifacts, becoming part of a live, co-created scenario. This format draws inspiration from methods such as speculative

enactments and live-action roleplay (LARP) in design research, but is distinct in its grounding in sensory food interaction and co-performance of situated cultural scripts.

By synthesizing speculative world-building, role play, and multisensory and cross-media design, *dinner-in-the-drama* offers a novel contribution to both HCI and Human-Food Interaction. It expands the repertoire of design fiction methods and supports the embodied evaluation of speculative technologies and their sociocultural implications.

3.3 Drama Design and Prototyping

The immersive environment of the dinner-in-the-drama was carefully curated to serve both narrative and methodological purposes, offering a multisensory anchor for the speculative scenario. Our goal was to embed participants in a future where cultural, ethical, and sensory boundaries around food are reimagined. Accordingly, props, atmosphere, and culinary design worked in tandem to construct a tangible speculative world grounded in the future consumption of biohybrid flying robots.

The visual identity of the event was themed around the color blue, symbolizing sky, freedom, and artificiality. This motif extended from the lighting and interior setup to drinks and desserts, invoking a sense of alien futurity. Table settings included napkins (for the Ortolan ritual), feathers, bird dolls, and glassware shaped like birds. These theatrical elements were chosen for their symbolic and sensory resonance, blending natural motifs with synthetic speculation. All guests were instructed to place napkins over their heads during the main course, reviving the traditional Ortolan ritual in a new technological context.

The atmosphere was further enriched through sonic design. At different narrative moments, we used the nostalgic French song "L'amour est bleu," authentic Ortolan birdsong, and artificially generated digital bird melodies to mark the emotional and ontological shifts across the experience—from nature to machine, from real to speculative.

We created and deployed three primary props (See Figure 2), each representing the biohybrid robot in a different stage of its imagined lifecycle:

- **Prop A – Flying Drone:** A feather-adorned quadcopter was flown through the dining space via Wizard-of-Oz techniques [17]. The drone's dynamic flight conveyed a lifelike presence and introduced movement into the sensory landscape.
- **Prop B – 3D-Printed Prototype:** Created from translucent resin, this prototype abstractly depicted the internal anatomy of the hybrid: colorful bones (bright blue), visible yellow fat, semi-transparent skin, and a geometric head unit to suggest a camera-driven AI controller. The prop was designed to bridge biological and mechanical aesthetics, making the hybrid's fictional anatomy visible and plausible.
- **Prop C – Plated Main Course:** A roasted quail represented the edible, final form of the hybrid, directly referencing the Ortolan in size and taste. It served to ground the speculative fiction in culinary realism and highlight ethical substitution.

Design Rationale and Iteration: The design process for the 3D-printed prototype (Prop B) evolved through several iterations. Inspired by anatomical diagrams, speculative fiction aesthetics, and edible robotics research, we gradually refined the head from a naturalistic form to a trapezoidal shape suggesting both abstraction and embedded intelligence. The translucent resin allowed participants to "see inside" the body, metaphorically suggesting transparency in future food production. While we did not involve bioengineering experts in prototyping due to resource constraints, we drew from interdisciplinary inspirations to ensure aesthetic coherence and thematic provocation.

Culinary Design and Symbolism: The three-course menu (see Appendix A) reflected the narrative arc of the drama and incorporated speculative and symbolic ingredients. The starter mimicked the natural diet of Ortolans, placing participants in the imagined perspective of the bird. The main course substituted Ortolan with quail for

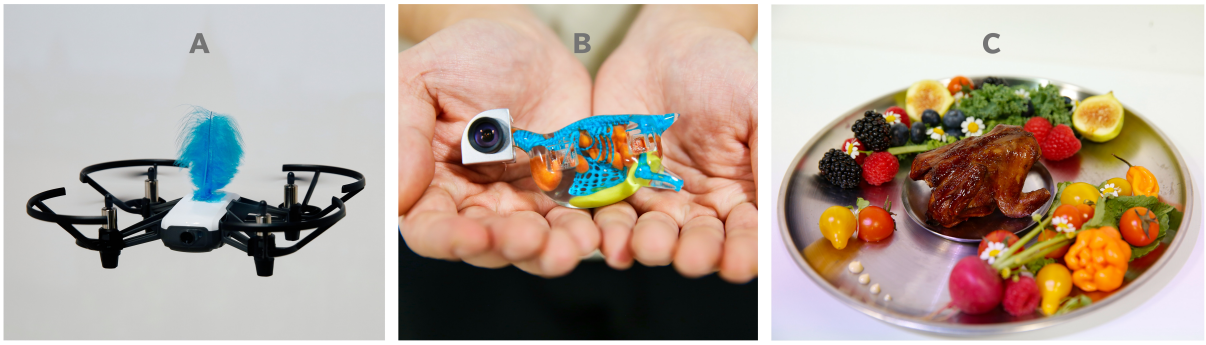

Fig. 2. Theatrical props showcasing the biohybrid flying robot in three different stages: (a) Flying drone (in motion); (b) 3D-printed prototype; (c) Roasted bird (edible).

ethical, legal, and sensory alignment, allowing diners to experience a taste analogous to the original dish [74]. The final dessert—a futuristic blue concoction—reinforced the speculative setting and closed the meal with a sense of surrealism. Real ingredients were disclosed in advance to respect dietary needs and ethical transparency. **Research Role of Prototypes:** While these were performative props, they functioned as epistemic artifacts—helping to make the speculative scenario legible, thinkable, and emotionally engaging. Their design was not solely aesthetic but methodological: each embodied a phase in the ontological ambiguity of life, machine, and food, triggering participant reflections central to our research questions.

3.4 Participants and Their Role Play

We recruited six guest participants using snowball sampling, all professionals working in creative, design, and cultural sectors. This selection was intentional: individuals with imaginative capacities and critical reflection skills were likely to engage productively with the speculative scenario. The participants were: P1, a design lecturer at a world-renowned institution; P2, an award-winning poet; P3, an artist and gallery owner; P4, a foresight expert from a global tech innovation hub; P5, a professional UX designer; and P6, a filmmaker. The group was gender-balanced, with five aged 30s and one aged 70s. Participants were verified as meat eaters, and food allergies were checked in advance. One participant with dietary restrictions participated as a non-eater, taking on the role of the restaurant service manager.

The event was framed as a "dinner-in-the-drama" taking place in a fictional 2052 Paris restaurant. Participants were invited to inhabit customized personas inspired by their real-world occupations, allowing for semi-structured but naturalistic role-play. Each persona was paired with discussion prompts thematically aligned with their real-life expertise (e.g., environmental, ethical, political). This mapping sought to support ecological validity, encouraging authentic engagement within a speculative fiction setting while reducing performance pressure or role incongruence.

While role-playing introduced fictional framing, participants were encouraged to speak from their own perspectives, enabling a hybrid mode between improvisational acting and real-world reflection. This method allowed us to observe how participants explored, negotiated, and responded to speculative concepts, while remaining anchored in their lived knowledge and values. Furthermore, assigning a range of perspectives ensured balanced discussion and mitigated dominant voices. Table 1 demonstrates the participants' roles, assigned personas, and discussion topics.

All participants provided informed consent to be audio- and video-recorded, photographed, and analyzed. They were told the session was part of a research project and were free to withdraw at any time. As compensation, food and event-related costs were covered, and participants enjoyed the dinner as a unique speculative experience.

Table 1. Roles, personas, and suggested contributions for each participant in the drama.

Person	Role	Persona	Suggested Contribution
Lead Researcher	Chef	A knowledgeable chef, sometimes has crazy ideas.	
Lead Artist	Host	A hospitable and rich host.	
Project Assistant	Lensman	A quiet person, but a hardworking man.	
P1: Design Lecturer (30s, F)	Manager	A restaurant manager, also a researcher and designer passionate about developing creative strategies in regions affected by environmental and technological shifts.	Discuss ethical considerations of the future scenario and technology.
P2: Poet (30s, M)	Diner	A poet with a background in literature, blending technology, food, and philosophy in his works. He plans to publish a collection exploring the intersection of these themes.	Raise philosophical questions about the scenario and technology.
P3: Artist (30s, F)	Diner	An artist and curator in Paris, thriving on creativity and innovation at the intersection of art and technology. She is also a food enthusiast.	Guide the group on socio-cultural impacts of the future scenario.
P4: Foresight Expert (70s, M)	Diner	A professional futurist with expertise in global technological trends. He enjoys exploring food markets and visiting innovative restaurants around the world.	Lead a discussion on economic impacts of the future technology.
P5: UX Designer (30s, F)	Diner	A Paris-based designer who has lived in France for a decade. She is knowledgeable about French food culture.	Discuss environmental impacts of the future technology.
P6: Filmmaker (30s, M)	Diner	A Paris-born film director passionate about cinema and culinary traditions. His work is deeply influenced by the cultural essence of Paris.	Facilitate conversation on political impacts of the technology.

3.5 Event Procedure

To explore how people might engage with the idea of consuming biohybrid animal-robot hybrids in the future, we designed a dinner-in-the-drama event that unfolded across multiple scripted and improvised stages (Figure 3). The flow and content of the event were deliberately crafted to elicit both emotional and reflective responses around the speculative scenario.

Upon arrival, participants attended a reception with drinks and snacks to foster rapport and comfort. They were then ushered into the dining room, where a staged environment evoked the future 2052 Paris restaurant. Cultural cues—such as the projection of the Eiffel Tower and the soundtrack "L'amour est bleu"—anchored the experience in both a futuristic and distinctly French atmosphere.

The lead artist (host) welcomed guests and introduced the speculative narrative. The chef (researcher) then explained the fictional menu and contextualized the key concept of edible animal-robot hybrids. Dramatic beats followed: a feathered drone representing the "synthetic ortolan" was flown across the room (Figure 4d), after which it was replaced by a 3D prototype passed among the guests (Figure 4e). The final edible course—a roasted quail representing the hybrid—was served under napkins, referencing the historic Ortolan tradition (Figure 4f). The experience concluded with a dessert and a moderated post-dinner discussion.

3.6 Post-Event Interviews and Data Analysis

After the immersive dining event, semi-structured individual interviews were conducted with each participants. The interview questions aimed to gather participants' reflections on their overall experience of the drama and

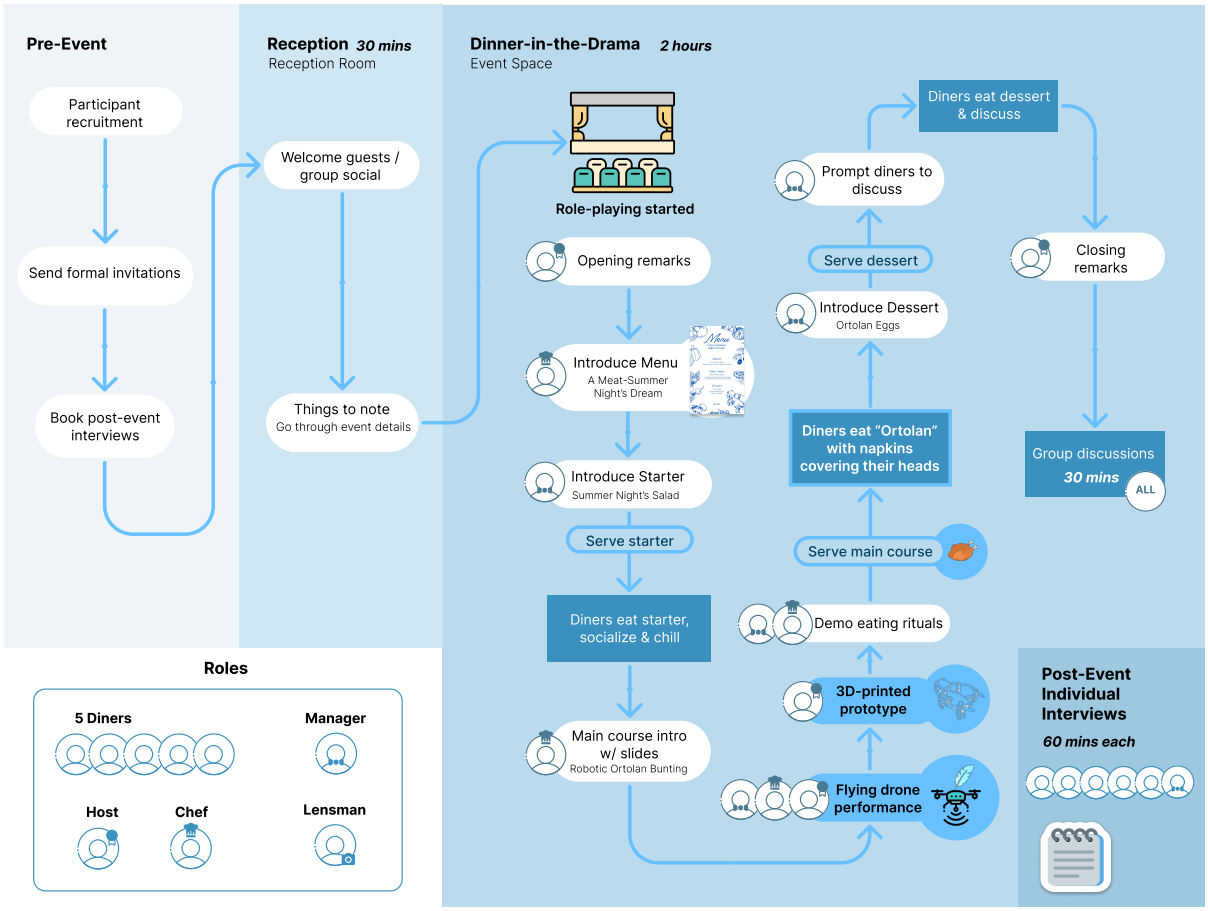

Fig. 3. Procedure diagram.

dinner event, with a focus on both the sensory and ethical dimensions of the staged future. Participants were asked to share their thoughts on the drama itself and provide opinions on key topics, including philosophical, ethical, environmental, economic, and socio-cultural issues from PESTEL Framework [106], which is a framework or tool used by marketers to analyze and monitor the macro-environmental impacts on an organization, company, or industry [106]. It examines the Political, Economic, Social, Technological, Environmental, and Legal factors in the external environment. Additionally, we explored their perceptions of the identity of the animal-robot hybrid and their views on AI-infused food systems.

A thematic analysis was conducted to identify and interpret key patterns [9]. First, the transcripts were reviewed to familiarize with the data, and initial codes were created based on recurring topics. These codes were then grouped into broader themes that were were used to develop and organize the result section below, responding to our overarching research questions.

Although the participant group was small, the goal of this study was not to generate generalizable claims, but to probe diverse reactions and reflections using a depth-over-breadth approach common in design research and speculative methods.

Fig. 4. Highlights from the dinner-in-the-drama: (a) Opening remarks; (b) Introducing key concepts; (c) Enjoying the show; (d) Biohybrid robot in flight; (e) Observing the biohybrid robot; (f) Serving biohybrid robots; (g) Eating biohybrid robots.

4 Results and Discussion

In this section we present results alongside discussion, situating findings within HCI, HRI, and food futures research. Participants expressed curiosity, caution, and concern about the role of biohybrid robotics in reimagining food. Our analysis identified three themes: *Technological Feasibility and Pathways, Cultural and Ritual Transformation, and Ethics and Moral Boundaries.* Each integrates multiple perspectives, capturing points of convergence and divergence. We also consider how participants engaged with the research method itself, reflecting on the sensory cross-media design and the productive role of serendipity.

These reflections are not predictions or prescriptive ethical claims. Rather, they represent situated perspectives that illuminate a contested terrain where hopes, anxieties, and imaginaries of possible food futures—biohybrid or otherwise—circulate and collide.

4.1 Critical Explorations of Alternative Food Futures

4.1.1 ***Technological Feasibility and Pathways.***

As non-experts, participants offered varied yet complementary perspectives on the maturity, timelines, and scalability of biohybrid food technologies. Several viewed lab-grown meat and partial integrations—such as meat grown on robotic substrates—as plausible in the near term, while fully integrated biohybrid robots producing edible tissue were imagined as a more distant possibility. P6 suggested that building an autonomous biohybrid animal with an AI "brain" would be prohibitively costly but not inconceivable, estimating a 40-year horizon before such systems might emerge. In the meanwhile, partial implementations will more likely emerge and serve as marketing tools hoping to drive early adoption. By contrast, P3 drew on science fiction imaginaries, envisioning similar futures within a decade but stressing that adoption should be slowed to allow society to grapple with social and ethical complexities. P4 identified a more immediate and sensorial roadblock—improving the taste of lab-grown meat—arguing that if taste improves, adoption would accelerate and the technology upscaled. They speculated that market pressures might drive innovation toward experimenting with novel taste and nutrient profiles or even with cross-fertilisations of ideas and materialities—e.g., bringing together different species, body parts, and biological processes into a new hybrid formation—such as producing "tiger eggs". While speculative, these anticipations highlight deep uncertainties about the societal, ethical, and disruptive potential of biohybrid robotics, echoing debates within the field itself [60].

Several participants also questioned whether synthetic food production is as environmentally sustainable as often claimed, particularly compared to plant-based alternatives. Concerns included the resource intensity of engineering food at scale (P1), the energy demands of biohybrid and AI-driven processes (P2, P5), and the broader ecological footprint relative to traditional farming (P5). P4 expanded the debate by suggesting sustainability might also be measured in terms of disease reduction, such as lowering zoonotic risks from wild animal consumption. These exchanges underscore the difficulty of defining "sustainability" for emerging food paradigms, especially when both technologies and practices remain unsettled. Crucially, these tensions also speak to a wide set of risks that must be navigated moving forward. Importantly many of the associated risks (i.e., human health, AI domination, and environmental risks) have been key features of bioethical inquiry in tangent and more established fields—such as synthetic biology (see [52]).

Market adoption was another recurrent theme. P4 framed diffusion through psychographic segmentation and technical customization. Initially imagining biohybrid products as *"a blob… a hamburger patty"* he revised expectations toward modularity and tuning, *"You might have a bunch of these [biohybrid robots] and they might be customized… affect the flavor or umami… with the nutrients that go into the robot-grown part… so it would make sense to use artificial intelligence as part of the formula."* He envisioned a staged diffusion despite high costs, *"Early adopters will… try it anyway… then the fast follower markets like experiencers who would do it for the thrill… whereas the more information-seeking market… will be more interested in sustainability, environmental*

impacts…[and] whether it fits into their lifestyle." He also added a status-oriented tier (*"achievers"*) who *"watch the other markets"* and adopt once it *"makes them look good."* These psychographic distinctions, he argued, would vary across cultural contexts.

Beyond consumer markets, participants speculated on system-level effects. P4 pointed to food supply chains and the political stakes for governments choosing between promoting innovation or protecting traditional farming. P6 extended customization to the individuality of biohybrid animals, envisioning ranchers as curators who fine-tune traits such as personality and taste for differentiated offerings. P5 imagined personalization at the consumer end, where families could assemble or breed unique variations, creating heirloom-like recipes passed down across generations and producing affective attachments that transcend efficiency or sustainability.

Scaling pathways were also explored. P2 invoked a "Tesla model" in which early, costly applications give way to affordability as supply chains mature, *"There were early adopters with very specialized expensive tasks, and then gradually a supply chain was built up to make it more affordable to produce."* He also referenced MAYA (*Most Advanced Yet Acceptable*) to stress that designs balancing familiarity and novelty can smooth transitions from niche enthusiasm to mainstream uptake. While Rogers' diffusion framework emphasizes categories like innovators and laggards [83], our findings show how lay participants developed imaginaries from such categories to articulate culturally grounded adoption models, informed as much by sensory and ethical reflection as by perceptions of technical readiness.

These reflections suggest that speculative dining can surface adoption dynamics often overlooked by surveys or foresight methods. Prior HFI work has highlighted how food technologies augment sensory and social experiences [23, 50, 70], but our study extends this by showing how embodied encounters provoke deeper reasoning about systemic issues—supply chains, market drivers, scaling transitions and regulation. This resonates with speculative design research [4, 25], which emphasizes provocation, yet here participants did more than imagine possibilities: they actively modeled barriers and accelerators of adoption. They did so with an acute sensitivity to a range of cultural and political themes, that we turn to now.

4.1.2 ***Cultural and Ritual Transformation.***

Participants imagined divergent futures for biohybrid food technologies, reflecting both optimism and deep concern. P4 sketched a dystopian scenario in which only the wealthy gain access, while climate change and resource scarcity exacerbate inequities, forcing migration and conflict. In contrast, their optimistic vision imagined widespread access, efficient production, and support for small farms and local communities. Such visions exemplify the splintering of sociotechnical imaginaries "towards utopic and dystopic extremes" [6], highlighting that possible futures for these technologies already operate within contested political and cultural spaces. Below we trace these opposing politics through the forces and metaphors outlined in Table 2.

Table 2. Conservative vs. Progressive Politics

Conservative Politics	**Progressive Politics**
Lag – Cultural, political, or ethical frameworks trail behind technological developments, slowing acceptance and integration.	**Spark** – Technology or cultural shifts ignite enthusiasm to embrace and accelerate adoption.
Drag – Institutions or communities that resists or slows innovation, creating structural friction or inertia.	**Rupture** – Political, cultural and artistic movements that anticipate future transformations, preparing the ground for change.
Preservation – Efforts to use new technologies to maintain existing traditions, values, or rituals. Adapting only superficially.	**Transformation** – Making new social, ethical, and cultural practices with emerging technologies and possibilities that depart from the old.

Even if the field of biohybrid robotics rapidly accelerates, participants emphasized that cultural acceptance may *lag* behind technological development. This tension became especially apparent when participants explored how future populations might respond to autonomous animal-like behaviors and forms in synthetic food—features intentionally introduced through the Flying Drone Performance. Discussions around creating "lifelike" robotic food from quasi-living materials often turned to the influence of political, religious, and cultural dynamics on adoption or rejection. For example, P5 explained: *"Beef is such a politically charged topic in India because cows are sacred to Hindus."* She speculated that lab-grown beef could, in principle, enable those who wish to eat beef to do so while respecting religious doctrine. Yet she doubted whether technological innovation alone could bypass such deeply rooted sensitivities, asking *"If [the cow is] lab-grown… does it solve all our problems?"* This rhetorical question signals a hesitation where ingrained cultural attitudes are perceived as anchors that *drag*, slowing and resisting the adoption of biohybrid food technologies.

Other participants suggested biohybrids might be mobilized to *preserve* rituals and traditions. The research design itself staged this through the dinner-in-the-drama, where a flying robot evoked the banned French culinary practice of eating Ortolan Bunting—a practice now legally and ethically untenable. P2 extended this preservation logic by noting that religious and ceremonial diets have historically adapted to new conditions while retaining symbolic resonance.

In contrast, some framed biohybrids as carrying *progressive inertia*. Understood as part of a "food revolution" [11], they were positioned as capable of reshaping culinary practices, rituals, and aesthetics. Participants described two progressive dynamics: gradual cultural shifts and sparks of transformation.

P1 emphasized familiarity as a bridge. She argued that biohybrids would initially join existing rituals, adopting the "trappings of traditional food" before evolving into distinct forms: *"Someone invented 'the hamburger'… Someone will invent the hamburger of synthetic meats [and biohybrid robots]. It's going to be different."* Drawing parallels to early design strategies—trolley cars made to resemble trains, or push-button elevators with attendants—P1 suggested that cultural adjustment would first be eased through mimicry, before giving way to new aesthetics, flavors, and rituals.

Others stressed rupture and spark. P6 speculated that individuality in biohybrid animals could become a site of cultural experimentation, where advertised "personalities" provoke new attachments and ethical dilemmas. Conversely, if mass-produced and indistinguishable, biohybrids might *"feel more like robots"*, evoking less moral concern. Such reflections illustrate how the characteristics of the technology itself can catalyze ethical and symbolic negotiation. Speculative dining thus served as a stage not only for debating sustainability but also for surfacing affective and political economies of eating. Participants' reflections resonate with broader debates in food ethics and cultural studies [3, 77]. They also point to HCI challenges: designing technologies that help publics navigate the trade-offs of both conservative and progressive forces. Cultural experimentation around synthetic meat is already visible in art and design—such as Catts and Zurr's Disembodied Cuisine and Semi-Living Steak projects [12], which used semi-living tissue to provoke visceral responses. Participant engagement in this study likewise suggests that speculative food artifacts prompts critical explorations that can help craft new sociotechnical imaginaries. Deployed iteratively, through co-design processes, it is possible that novel technologies and practices could be developed, embraced, or resisted.

Across these accounts, participants revealed how biohybrid food technologies occupy an ambivalent cultural and political terrain, oscillating between drag and spark, preservation and transformation. From an HCI perspective, these findings extend Human–Food Interaction (HFI) research that has emphasized edible interfaces, playful augmentations, and choreographic food interactions [23, 50, 66, 71, 91]. Much less attention, however, has been given to the creative future of designing "with food" (see 2.1.1). As this section and Bourdieu [7] reminds us, taste functions as political and cultural distinction. Our study shows how speculative food artifacts—such as biohybrid drones—can provoke reflection not only on how food tastes, but on what taste means culturally, while exploring alternative and speculative drone functions as food that extend the notions of possible human–drone interaction

[100]. Indeed edible robots [82] and "computational" foods [22] may be set to remake the palate, introducing new flavors and textures. However doing so will inevitably reshape categories of rarity, luxury, and cultural/political distinction. Whether easing continuity or sparking rupture, biohybrids appear as catalysts for reimagining the rituals, aesthetics, and politics of food. These insights prepare the ground for the next section, which turns to participants' ethical deliberations on life, death, and consumption.

4.1.3 ***Ethics.***

Ethical considerations emerged as a central axis of reflection, with participants repeatedly returning to three interconnected debates: (i) sentience and suffering, (ii) individuality and symbolism, and (iii) replicability and losing control. They posed ethical tests, recalled personal anecdotes, and drew on imaginaries from adjacent fields such as synthetic biology, robotics, and AI. Across these debates, participants wrestled with how biohybrids may provoke new dilemmas as they continue the transition from "science fiction into real science and engineering" [102]. These discussions situated edible (biohybrid) robotics within wider debates about technological agency, taboos, and moral boundaries.

Sentience and Suffering. P6 observed that humans routinely anthropomorphise machines and animals, projecting sentience and emotion onto them—a phenomenon well documented in robotics [24] and animal studies [64]. For him, this raised a central objection: *"We would be building a sentient being to kill it… there would be more public resistance."* P1 extended this, shifting responsibility to designers, *"If we are making these things more similar to living organisms… at what point do they just approach the same organisms we are trying to replace and prevent suffering?"*

The group's focus mirrors ongoing controversies in synthetic biology, where frameworks such as the 14-day embryo rule hinge conceptually on the onset of nociception and neurological development [27, 40]. P3 broadened the debate by invoking religious worldviews in which all living things possess a soul. Prompted by the robotic bird's unpredictable movements, she extended this to AI-driven or biohybrid systems: *"Could they embody a form of soul?"* P2 noted that resolving such questions requires *"a philosophical position on the soul and materialism"* to judge whether biohybrids might possess sentience and thus the capacity to suffer.

Perhaps recognizing the intractability of such ontological debates, P2 offered an ethical test: if a biohybrid *"looks like an animal"* but *"does not have feelings"* harming it would be *"ethically neutral"*. He extended this provocatively, *"Is it unethical to grow a human and eat the human? It's not a feeling person… there's no ethical harm."* While framed hypothetically, participants reacted with visible discomfort. P2 himself acknowledged the idea as *"powerful and gross"* illustrating how disgust functions as a moral boundary. These responses echo Kass's notion of the "wisdom of repugnance" [47] developed through a bioethical investigation of (human) cloning: visceral reactions that mark limits where rational justification falters.

Individuality and Symbolism. Participants also reflected on how individuality might reshape the ethics of consumption. P6 speculated that if biohybrids displayed distinct personalities, acceptance and regulation would be far more complex: *"If all of these biohybrids had their own… personalities, then people seem to be more wary politically."* P5 added that even subtle cues shift moral perception: *"When the tissue is dependent on a scaffold, it feels more like a robot… but when it flies, it feels more like a bird, as if it will have free will."*

Here, debates on sentience became entangled with symbolism. P5 argued that meaning often outweighs materiality: *"Sometimes it doesn't matter whether it's real or synthetic… it's just the fact that this is a symbol of my faith or my religion or whatever, like my beliefs."* P6 illustrated this through a personal anecdote: his grandmother once killed a cat that ate rare cheese in rural Alaska—an act framed not by abstract principle but by survival. These exchanges highlight the need for relativist ethics that attend to context, symbolism, and cultural values. For future systems to be perceived as ethical, designers must account for how perceptions of individuality and symbolism shape moral status.

Replicability and Losing Control. P1 warned that creating self-replicating biohybrids could introduce runaway effects. While some Xenobots have already demonstrated replication [34], achieving this in robotics would require AI-led integration of synthetic and biological structures. For P1, the risks were profound: *"Life is a machine for self-perpetuation, so the odds of unintended consequences are so much higher for creating a living agent."* If capable of replication, biohybrids would enter *"the category of any living being with an intrinsic drive to reproduce"*, potentially acting like a virus against other systems. These anxieties connected to wider fears about AI, where distributed agency and emergent behavior defy governance. As P1 put it, *"It connects to AI… fears about general artificial intelligence having runaway impacts."* Such reflections were framed as calls for humility, guardrails, and continuous evaluation. P5 echoed this, questioning *"How much control humans should exert: should biohybrids have feelings, agency, or senses? How much autonomy should they be allowed to develop?"*

The questions and reflections foregrounded in this section show how technological agency operates across ontological (sentience, free will), perceptual (individuality, symbolism), and sociological (replication, runaway risks) levels. Participants attributed surprising degrees of agency and semi-sentience to the drones. Some described malfunctions as drones *"having a mind of their own"*; others referred to an *"AI-brain"* or *"soul of the machine"*. Such statements challenge the anthropocentric orientation of much AI and robot ethics, which typically centers on humanoid robots or conversational agents. Instead, participants engaged with animal–machine hybrids as ethically significant others. This aligns with posthumanist theory [8, 104] and animal studies [36], which decenter the human as the sole locus of moral value and open space for considering responsibility, care, and cohabitation with more-than-human actors. Further, these perceptions resonate with work on machine consciousness [84, 105, 107], suggesting that moral reasoning emerges when technologies are seen as partially autonomous. From a Science and Technology Studies perspective [55], these responses illustrate how publics are already negotiating moral boundaries in spaces where "animal" and "machine" overlap.

4.2 Tangible Multisensory Dining Experience as a Valuable Provocation

Our multisensory method surfaced a rich range of perspectives and tensions. Participants connected technological speculation with reflections on politics, religion, nationality, popular culture, symbolism, and ontological beliefs about life, consciousness, and suffering. Speculative dining thus functioned as more than entertainment: it operated as an epistemic tool for engaging publics in complex biotechnological debates. In the reflections that follow, we identify three mechanisms through which these deep speculative exchanges emerged.

4.2.1 ***The Value of Sensory Immersion and Emotive Response.***

Participants felt that the immersive dining format—particularly the use of napkin hoods and live/mechanical elements—provoked strong sensory engagement and elicited intense emotional responses. Several highlighted the hooded moment as especially impactful, though their interpretations diverged. P2 described how covering heads with napkins transformed the room: conversation ceased and a collective silence emerged, *"like putting a cover over a birdcage."* Rather than diminishing sociality, this paradoxically heightened his awareness of others: he became *"hyper-aware of the other people eating around me,"* sensing a subtle connection through shared quietude. By contrast, P4 found the same setup isolating and unsettling, likening the stillness to lockdown loneliness and wishing for *"more aromas or something"* to enrich the experience.

Others found the hood sharpened perception of detail. P5 noted, *"It does help you focus on that, like this is what you're eating."* P6 appreciated the privacy, *"I didn't really like… watching you eat bones… so it was nice to eat freely and not feel like people were watching me… it made the experience more intimate."* P3 described the most ambivalent reaction: feelings of *"shame and guilt"* as if engaging in something forbidden, mixed with curiosity and excitement. Crucially, she stressed that these tensions stemmed less from the food itself than from the performative act of concealment. For her, hiding under a napkin generated novelty, surprise, and playfulness alongside discomfort.

These divergent responses show how ritualized interventions can shift social dynamics, provoking new avenues for reflection. The napkin ritual was not simply an immersive act: it reshaped sensory perception, interpersonal awareness, and ethical imagination.

By immersing participants in unfamiliar sensory worlds, the dinner-in-the-drama offered an embodied glimpse of futures that lies between plausible and preposterous [96]—where biohybrid robots might be consumed to preserve or revive a dying tradition such as eating Ortolan Bunting. These experiences opened participants to explore other radical potentials: futures not only technologically novel but culturally and sensorially alien to current norms.

The combination of bodily intimacy and collective ritual created conditions for curiosity, discomfort, and shared reflection. These findings extend work in speculative design and experiential prototyping [4, 25, 42, 61], showing how eating as a medium uniquely foregrounds questions of ethics and materiality. Whereas many speculative methods rely on images, videos, or texts (e.g., [1, 72, 85]), speculative dining demonstrates how tangibility and embodiment illuminate the politics of sensory experience in ways representational formats cannot.

Building on post-COVID design [57] and sensory futures scholarship [73], we argue that both speculative and sensory methods can be combined (see also [42]) to illuminate wider social, technical, and political entanglements. Futures are not imagined in abstraction but experienced through bodies, memories, and collective rituals.

4.2.2 ***The Value of Cross-Media Theatricality.***

Participants reflected on how cross-media representations—including 3D-printed models, slideshow drawings, decorative birds, and live drones—shaped their perceptions of the boundary between "animal" and "machine". Design cues strongly mediated engagement: P5 noted that the absence of eyes in the 3D prints *"helped it remain an object"*, while P4 preferred the hybrids *"stay machine-like"*. These choices reveal how the curation of the design fiction influenced participants' speculations and critical reflections.

The hands-on, participatory character of the theatrical method was also generative. P6 described handling the models and watching the drone as a form of imaginative play: *"I'm totally game for that… I can pretend this is a bird and not a drone… it led to a good moment where the drone kind of had a mind of its own."* P4 and P5 similarly emphasized that physically interacting with the models and drones stimulated richer speculation than written reports or static visuals, while group discussion further expanded perspectives. P2 extended this idea, framing food itself as a medium of speculation: *"We were literally putting the meat from the presentation inside our bodies"*—making imagined futures both tangible and memorable. As P4 summarized, such interactive experiences are *"much more effective than one person sitting down with a laptop and typing out a scenario"*.

Beyond embodied engagements with cross-media representations including material objects, participants highlighted how the theatrical setup deepened reflection. P1 likened the interplay of physical objects and live performance to theater, arguing that even malfunctions should be *"embraced in character… never apologizing… everything is within the theater"*. The staging, assigned roles, and curated narrative demanded role-play—and this was methodologically productive. P1 described inhabiting a dual position as "restaurant manager" and critical observer, performing enthusiasm while also questioning the technology. This was a blend of positionalities that stretched their thinking and imagination. P6 similarly slipped between his assigned persona—a 2050s Parisian filmmaker—and his own identity, an unsettling doubling that prompted deeper ethical reflection on biohybrid meat.

4.2.3 ***The Value of the Unexpected.***

Participants highlighted how unexpected moments and exchanges within the dinner-in-the-drama shaped their experiences and provoked deeper reflections. P2 observed that the drone's unplanned error during the demonstration *"reminded us that machines don't always do what we want them to do"* evoking science fiction tropes where machines seem to possess minds and wills of their own. This moment underscored the limits of human control and illustrated how malfunction was not a limitation of the method but a catalyst, sparking

reflection. Similarly, P5 described the drone's erratic behaviour as a *"quiet reminder that speculative technologies will inevitably go wrong"*, emphasizing the importance of anticipating risks and strategies for response. For P3, however, the same incident was striking, describing the crash as *"really beautiful"*, suggesting that the machine's uncontrolled movements imbued it with a sense of "soul". Such unexpected moments can be seen to directly inform the generation of substantive themes unpacked in subsubsection 4.1.3.

If drone malfunctions marked unexpected moments from the drama itself, equally significant were the unplanned contributions from participants as they role-played characters and interacted with one another. Group discussion was encouraged throughout and after the curated experience. P2 reflected that the act of eating together also provided a conducive social environment for exchanging viewpoints and speculation, creating imaginative setting that a written report or static interview could not achieve. This social environment, full of fast-paced lively exchanges, encroached on territories that would unlikely be given thought through individual contemplation.

Crucially, participants were invited to improvise with the narrative, props, and environment of the design fiction. This opened space for idiosyncratic references to literature, philosophy, and popular culture to surface. For example, P2 argued that biohybrid technologies push ethics into uncharted territory, where distinctions between complex machines and sentience begin to unravel (see subsubsection 4.1.3). To illustrate, he invoked *Westworld* and *Ex Machina*, noting how popular debates about machine ethics focus on humanoid robots while largely overlooking animal-like entities and biohybrids. Similarly, P4 referenced *the Bicentennial Man* to highlight how incremental human-like features shift perceptions of agency and moral worth.

Together, these accounts frame unpredictability of the method not as disruption but as a speculative resource. While such moments cannot be fully designed or foreseen, the open, immersive, and performative nature of the dinner-in-the-drama created conditions where this productive serendipity could unfold—revealing how surprise, malfunction, and improvisation can deepen reflection on technological ethics and imagined futures.

The methodological reflections offered across this section position speculative dining as a site where *future imagination and collective memory intersect*. By staging encounters that are playful, unsettling, unpredictable, and socially charged, such practices push speculative design beyond abstract futuring: they invite publics to grapple with the ethical, affective, and cultural entanglements of technologies-in-the-making. Doing so the method activated cultural repertoires that bridged experiential design, philosophical inquiry, and everyday discourse. Rather than illustrating possible futures, speculative dining demonstrates how experiential prototyping can materially intervene in collective understanding, generating embodied memories and ethical awareness rarely achieved in conventional engagements. Our work advances design fiction from representation to embodiment, where multisensory encounters provoke unique reflections.

5 Conclusion and Future Work

This paper staged a tangible design fiction—a dinner-in-the-drama—where participants consumed "biohybrid flying robots" inspired by (but not in support of) the banned French delicacy of Ortolan Bunting. By moving speculation off the page and into embodied, multisensory experience, we invited publics to grapple with futures that are both provocative and unsettling.

Our findings highlight three interconnected terrains. First, technological feasibility and pathways (subsubsection 4.1.1) were imagined in ways that extended and brought together debates in AI, robotics and other areas of technological innovation. Participants drew on their embodied experiences of the tangible design fiction and wider knowledge to speculate about how this technology might be developed, adopted or rejected. They connected sensory qualities—such as taste and texture—with broader questions of production, distribution, and marketing. The nuanced accounts that surfaced reflect a set of opportunities and barriers often overlooked in conventional foresight. Second, cultural and ritual transformation (subsubsection 4.1.2) revealed how biohybrid food futures

are never purely technical. Participants framed them through cultural politics, positioning biohybrids as means of preserving heritage practices, igniting new rituals, or provoking contestation. Their reflections revealed tensions between conservative impulses to adapt technologies to preserve existing traditions and progressive desires to craft novel culinary forms. Third, ethics and moral boundaries (subsubsection 4.1.3). Participants raised ethical questions at multiple levels: ontological (sentience, soul, suffering), perceptual (individuality, symbolism), and sociological (replicability, runaway risks). Resonating with posthumanist critiques, these reflections suggest that biohybrids may need to be understood as ethically significant others, especially as edible robotics move from lab to plate. Together, these terrains show how technological, cultural, and ethical reasoning intertwined when speculation was grounded in multisensory experience.

Beyond these thematic insights, our work demonstrates the methodological value of tangible, multisensory speculation. By integrating food, props, performance, and ritual, the dinner-in-the-drama fostered affective intensity, playful improvisation, and productive serendipity. These qualities encouraged participants to navigate uncomfortable questions—ones unlikely to emerge from textual scenarios alone. We argue that such methods enrich HCI's repertoire for engaging publics with technologies-in-the-making, particularly when futures are materially intimate, culturally charged, and ethically fraught.

For HCI and HRI, our contributions are threefold: (i) a speculative artifact that stages robots as food, expanding imaginaries of human–robot interaction into culinary domains; (ii) empirical insights showing how non-technical experts negotiate feasibility, culture, and ethics when immersed in embodied speculation; and (iii) a methodological advance in tangible design fiction, extending speculative design toward experiential and multisensory provocation.

Looking forward, we encourage future work to explore speculative dining and related methods not only as entertainment but as critical tools for public engagement, ethical deliberation, and cross-disciplinary dialogue. As edible robotics and biohybrid systems move from fiction toward feasibility, the challenge for HCI is not simply to assess usability or efficiency but to grapple with how such technologies reconfigure cultural meaning, social relations, and ethical boundaries.

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A Menu

Fig. 5. The menu.