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Designing Futures From the Inside[1]

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Abstract

By looking at the design process of a narrative-based design fiction, this paper introduces new areas of exploration for futures practices concerned with human-scale futures — the internal worlds of daily lives. Called Trina, the design fiction imagines new practices through the simultaneous creation of storyworld, prototypes, characters, and plot, with an emphasis on relations as opposed to things. By theorizing the design fiction creators as participant-observers in a world that emerges from a field of forces (Ingold, 2013), the paper concludes with questions that arise from a method that may help explore the interconnectedness of futures "from the inside."

Introduction

This paper will look at how the making of a narrative-based design fiction in which storyworld, prototypes, characters, and plot were developed in tandem allowed its creators to experience a future "from the inside." Accessing futures through a subjective lens can be challenging given the speculative nature of futures and the impossibility of a firsthand future experience. But there are ways for futures practitioners and stakeholders to get close — and to gain insights and foresights through trying — which is an aspect of the research taken up by Integral (Slaughter, 2018), Experiential (Candy, 2010), and Everyday Futures ("Everyday Futures: About," n.d.).

Building upon Tim Ingold's account of "making," this paper argues for seeing the design fiction maker as a participant-observer who joins up with a world of forces in the creation of an emergent future (Ingold, 2013) that incorporates specific configurations of people and things. In particular, the paper studies the dynamic components that comprise a narrative-based design fiction, called *Trina*, which combines the tangible and visual dimension of design with the inner lives of literary figuring. *Trina* resulted from a collaboration between myself, a designer, and short story writer Janet Sarbanes *(Army of One, The Protestor Has Been Released)*.

Trina's plot follows the compromises, risks, and hacks that the titular character undertakes on a day-to-day basis as she negotiates with the infrastructural realities and next-generation technologies that shape her livelihood, from the sensors embedded in her body to the knowledge management system of her employer. The

mismatch between systemic forces and *Trina's* daily reality and personal biography is what powers the narrative. Thus, *Trina* enacts how individual agency intersects with histories, environmental conditions, technological capacities, and social, political, and economic networks. The author's experiential understanding of this entanglement resulted from an open-ended creative process, an "art of inquiry," (Ingold, 2013) that provided a firsthand experience of a first-person world.

By interrogating the process, this paper hopes to introduce new questions and areas of exploration for Futures practitioners, design researchers, and technology developers who aim to:

- explore the impact and viability of future technologies within particular future situations
- interact with forces that might affect agency for particular actors within particular future conditions
- test how specific individual motivations might give rise to new practices and social configurations within distinct future conditions
- adopt perspectives other than one's own
- enrich one's own 'futures literacy'

A Case Study, Part A: *Trina*

Trina is a narrative-based design fiction that was created to research the use of technologies in humanities scholarly production in a plausible near-term future in order to question the trajectories being built into today's Digital Humanities tools. Based upon research into relevant nascent technologies, the project brief required that the end result meet demands that are typically identified for [1] design fiction, [2] literary fiction, and [3] futures practices. Thus, the outcome had to: [1] show prototypes in use in a storyworld; [2] tell a compelling story; and [3] motivate an audience to consider the future effects of their present choices and conditions. While [3] seems like the most likely topic for an article in the *Journal of Futures Studies*, this paper concentrates on the surprising insights gained from the author's experience of simultaneously creating [1] and [2] — what we will call a narrative-based design fiction — and its relevance to futures practices.

Trina's format combines showing (design) and telling (literary fiction). Its primary medium is a live performance comprised of a slide show with spoken narration and live electronic sound, but it can also be experienced as a graphic novel or a short movie (Figure 1). The story's structure can be understood as a cross between a PechaKucha (20 slides, 20 seconds each) and *La Jetée* (Chris Marker's short science fiction film comprised of voiceover and stills). The format intermingles the visible and invisible forces that give shape to the protagonist's world and actions. A sequence of 60 composite images show what appears to be Trina's first-person perspective above a third-person panoramic image while an omniscient narrator with access to Trina's thoughts tells the story (Figure 2).
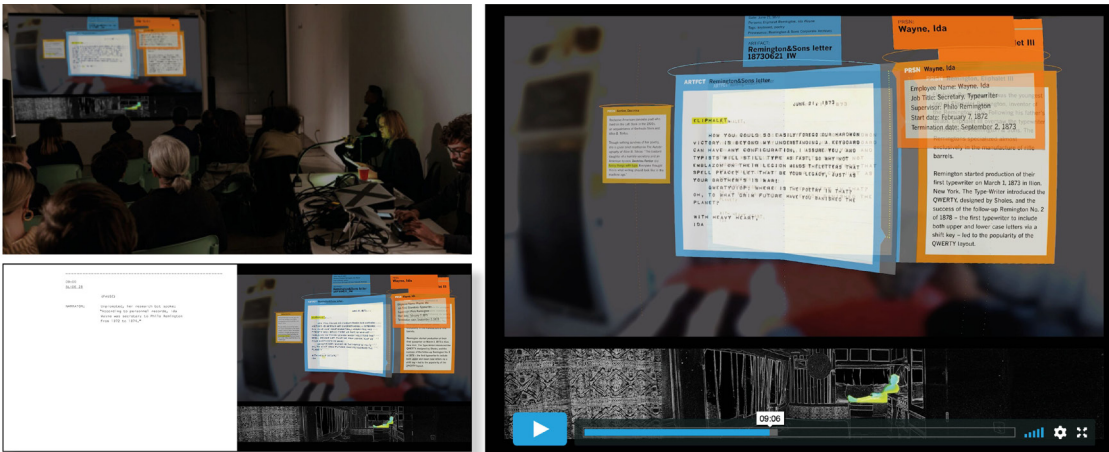
Figure 1. A moment in the *Trina* story in three different media, clockwise from top left: live performance with slide show, spoken narration, and live electronic sound; movie with voiceover narration and recorded electronic sound; graphic novel/script
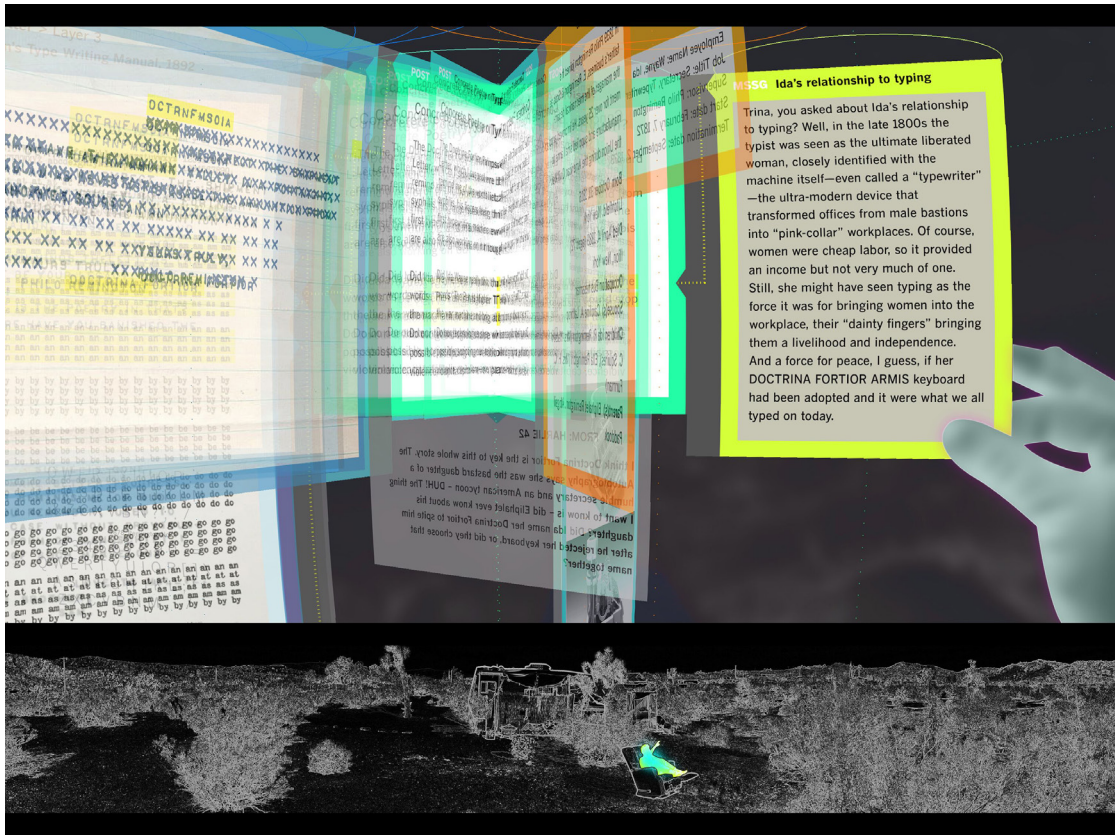

Figure 2. Slide 52. A single moment captured from two different points of view: above, Trina's first-person perspective and the spindle interface of the Commons as seen through her embedded eyewear; below, a third-person panorama shows Trina in her environs — a La-Z-Boy recliner in the desert

Trina is an underemployed literary scholar who lives alone in the desert sometime in the near future. She is connected to others through an always-on virtual world that she accesses through eye, ear, and finger implants with which she performs human intelligence tasks (H.I.T.s) for a security research firm called Humanitas, Inc. In the story we see Trina working with a variety of speculative software applications (Fuller, 2003) in between dealing with daily life in an off-the-grid RV that is powered and connected through solar and satellite. The assignment that sets the story in motion is a historical document of ambiguous provenance that is thought to have been created on a code-generating typewriter in the early 1900s. Although it is a low-stakes assignment compared to Trina's work in the War on Terror, the human-technology relationships it exposes stirs something within her and she chooses to abandon the systems that define her work and worth. It is meant to be a plausible, if complicated, future — rather than a preferable one — and Trina is a complicated woman.

Though Trina is physically alone, the story is populated with other figures who she encounters while doing research in her online environment; she communicates with amateur historians, academic scholars, and an "outdated" AI therapist called NANCY. She deduces that there may be two possible authors of the document she is researching as she pieces together parts of their lost histories: Ida Wayne was a secretary at the rifle manufacturer Remington & Sons in the late 1800s during the time that one of the first typewriters was being prototyped; Doctrina Fortior was a concrete poet who was part of the American expat literary community in Paris in the early 1900s and may be Ida's bastard daughter. Like Trina, each historical character's relationship with her writing technology is conflicted, shaped by gender, class, education, occupation, historical context, and personal biography. The tensions give rise to new practices and acts of resistance, driven by individual personalities and motivations, in response to the pressures of each character's unique situation.

Human-Scaled Futures

Images of the future, such as scenarios, are used in foresight practices to explore what might happen in possible, probable, and preferable futures, stretching the thinking of practitioners and stakeholders alike (Candy, 2010). But Futures work focuses predominantly on the observable exterior world and large-scale and complex issues, over long-range time spans, especially in forecasting and planning (Slaughter, 2018). Approaches to accessing the human-scale of futures — internal worlds and the details of daily life — are less common.

Critical Futures Studies, along with Causal Layered Analysis and Social Constructionism, addressed the symbolic aspect of social futures, by accounting for worldviews, paradigms, and values. Nonetheless, Critical Futures work "lacked something essential – deeper insight into the nature and dynamics of individual agency" (Slaughter, 2018). To balance out the range of perspectives addressed by Futures practices, Integral Futures (IF) brought Integral Theory's holistic approach to the construction of reality through a modification of its four-quadrant map, which Slaughter advocates using to analyse Futures work. The quadrants include: the individual interior, or subjective dimension; the collective interior, or the intersubjective; the individual exterior, or objective; and the collective exterior, or interobjective (Slaughter, 2018). Yet in his assessment of the impact of IF, Slaughter (2008) concluded that none of the Futures approaches that were prominent at that time — 'maps of the future,' scenarios, T-cycles, CLA exercises, and environmental scanning — engaged the interior individual. The challenge has since been taken up through theories of the everyday and the experiential.

"Everyday Futures," part of Social Futures at Lancaster University, brings together "futures research, studies of everyday life, and social practice" ("Everyday Futures: About," n.d.). The interdisciplinary network is dedicated to developing methods to make, perform, and study the

granular details and daily practices of future everyday lives proposed or implied through both imaginative and analytic means. Like IF, they see a need to bring a human-scaled perspective to broad future visions with the aim of revealing assumptions and addressing gaps that social theory can help identify (Kuijer & Spurling, 2017). "Everyday lives vary across generations and across the life-course, across time and space, across the seasons, and across cultures and countries of the world. We think that finding methods and processes of future-making that are capable of capturing these differences, and forms of analysis that explore how they are made in the first place, is an area ripe for development" ("Everyday Futures: About," n.d.).

Indeed, "The Futures of Everyday Life" is the title of Stuart Candy's doctoral study of an approach he calls Experiential Futures (Candy, 2010). He and his frequent collaborator, Jake Dunagan, are similarly concerned with the subjective experience of everyday futures and to that end have done in-depth work developing methods they concisely define as "the design of situations and stuff from the future to catalyse insight and change" (Candy, 2015). "Situations" and "stuff" come from the "Experiential Futures Ladder" which was created to guide their work. The Ladder is topped by *Setting*, a kind of future, within which are *Scenarios*, specific narrative sequences, that contain *Situations*, particular places and times, that are populated by the tangible artefacts of *Stuff* (Candy, 2015). Integrating design methods, including design fiction, they ground their work on the lower end of the ladder, putting people in touch — sometimes literally — with everyday future things.

"In traditional futures practice, abstraction is clearly favoured, and high-level scenarios often lack a sense of the human, 1:1 scale. Yet there are urgent and decisive reasons for bringing futures out of the realm of cognitive abstraction and into experience; into the body…" (Candy & Dunagan, 2017, p. 2). Their work aims to "bridge the 'experiential gulf' between life as it is apprehended, felt, embedded and embodied in the present and on the ground and the inherently abstract notions of possible futures" (Candy & Dunagan, 2017, p. 15). One of their techniques, called Experiential Scenarios, involves co-creation of visceral firsthand futures for/with stakeholder-participants. By interacting with a human-scaled world, participants consider potential futures through their own subjective experience (Candy & Dunagan, 2017).

From Firsthand To First-Person

Firsthand experience is a potent mode of engagement — one whose strength lies in situated and embodied action (Dourish, 2004), a key concept from science and technology studies, that demands attentiveness to "specific configurations of people and things" (Suchman, 2006, p. 284), a concept we will return to. But the strength of hands-on engagement is also a built-in limitation. The benefits of activities such as Experiential Scenarios are restricted to those who can participate in person which means that the range of perspectives brought to the scenarios may be restricted. We are left with the question of how to access the individual interior of people other than futures practitioners and workshop attendees, a concern shared with the Everyday Futures initiative.

From the standpoint of narrative, Experiential Futures could be said to provide a first-person perspective, putting an individual inside their own fictitious world to directly engage with its unfolding. Literary fiction's first-person narration simulates this experience through language that allows a reader to "see the world through a character's eyes," to provide a kind of secondhand access to a character's inner thoughts and motivations. Similarly, third-person narration, particularly that of an omniscient narrator, can disclose the inner dimensions of multiple characters, making it a promising surrogate for accessing the individual interiors and agency of people other than one's self who are imagined to occupy potential futures.[2]

While the definition of "design fiction" continues to be the source of rich debate (Auger, 2013; Bleecker, 2009; Blythe & Encinas, 2016; Hales, 2013; Lindley & Coulton, 2015; Sterling, 2009,

2017), this paper asserts that it is the marriage of design's focus on human-made settings and stuff combined with literary fiction's focus on inner lives, actions, and consequences that can make design fiction relevant to Futures inquiry concerned with the human dimension. "Simulating a coherent narrative world inhabited by characters engaged in the resolution of some conflict forces us to think about the interplay between technological futures and sociological futures" (Tanenbaum, Pufal, & Tanenbaum, 2016, p. 4). Characters bring agency, values, and motivations that can shape — and be shaped by — imaginary worlds. Tapping into the entanglement of interior and exterior lives could enrich the kinds of futures we bring into being.

Narrative, especially science fiction and scenarios, has been used to investigate futures for years (Mcdowell & von Stackelberg, 2015). But Futures Studies has a shorter history with design fiction (Candy, 2010). Tanenbaum et al. (2016) argue that design fiction fits within Futures Studies, for it can open a space for public discussion of difficult potentialities. While the design aspect can make future possibilities tangible, "fiction, as a research tool, allows us to do several important things with proximal futures: it allows us to adopt a range of different intellectual commitments and values about the future and explore the consequences of those commitments" (Tanenbaum et al., 2016, p. 1). Furthermore, while design practices, such as speculative design (Dunne & Raby, 2013) and human-computer interaction (Dourish & Bell, 2014) may also be concerned with futures, particularly in relation to new technologies, design fiction explicitly involves *diegesis*, a distinction used in film studies to refer to the materials that are part of a film's on-screen narrative world. The terminology is a reference to what is widely considered to be the founding definition of design fiction asserted by science fiction author Bruce Sterling (2017): "the use of diegetic prototypes to suspend disbelief about change."

Diegetic prototypes were named as such by film scholar David Kirby "to account for the ways in which cinematic depictions of future technologies demonstrate to large public audiences a technology's need, viability and benevolence" (Kirby, 2010, p. 41). Kirby studied how filmmakers and science consultants use cinematic means to generate funding and interest in technologies that might be difficult to build in the here-and-now. To be effective, he maintains, diegetic prototypes must be plausible extrapolations of emerging technologies — not fantastical flights of fancy — that enter the social sphere when their use and consequences are demonstrated within a story and its world. Sterling and Kirby both celebrate what design can achieve that literature cannot (Sterling, 2009), which as Kirby puts it, is a "combination of a visual rhetoric along with narrative integration" (Kirby, 2010, p. 41).

Integration is the key word here, a defining aspect of what this paper proposes as narrative-based design fiction. Next, we will look at how bringing together literary figuring with a designed future world positioned *Trina's* co-creators (myself and Janet Sarbanes) as observer-participants in someone else's world, that of the lead character. Similar to Experiential Futures, the activity gave us a firsthand experience of bringing a first-person future into being.

A Case Study, Part B: Making Trina

In his account of making, Tim Ingold describes designers and other makers as "participants in amongst a world of active materials … bringing them together or splitting them apart, synthesising and distilling in anticipation of what might emerge" (Ingold, 2013, p. 21). In this sense, Janet and I might be seen as 'joining forces' in a process that was not entirely under our control. Ingold brings the intractions of making to life in a vivid description of students learning to weave baskets with willow reeds on a beach in Aberdeen. Beginning with tall lengths of willow stuck in a circular pattern in the sand and tied together at the top, the students wove horizontal pieces while kneeling in a cold wind. The baskets that resulted were shaped through a combination of the flexibility of the willow, the length, strength, and dexterity of the students' hands and arms, their tolerance for

the weather, and the direction of the wind, *in correspondence with* — not determined by — the students' own intentions (Ingold, 2013, pp. 22–23).

Trina similarly emerged from our designerly and authorly negotiations with a "field of forces," resulting in a holistic assemblage of biographies, infrastructures, economic and social configurations, environmental conditions, technology concepts, and nascent practices that would be difficult to divide discretely into the prototypes, storyworld, characters, and plot that comprise (design) fictions. We were performing what Ingold calls the "art of inquiry," in which:

> *"the conduct of thought goes along with, and continually answers to, the fluxes and flows of the materials with which we work. These materials think in us, as we think through them. Here, every work is an experiment: not in the natural scientific sense of testing a preconceived hypothesis, or of engineering a confrontation between ideas 'in the head' and facts 'on the ground', but in the sense of prising an opening and following where it leads. You try things out and see what happens. Thus the art of inquiry moves forward in real time, along with the lives of those who are touched by it, and with the world to which both it and they belong"* (Ingold, 2013, pp. 6–7).

Janet and I collaborated on the story one section at a time, entirely over email. I would send her notes, she would return bits of backstory and a narrative outline. From these I would develop sequential imagery, flesh out the prototypes and how they worked, add more historical research, and put all the pieces together, modifying according to the demands of the story as it grew. I would send a composed draft back to Janet, she would modify it, return it, and the cycle would continue.
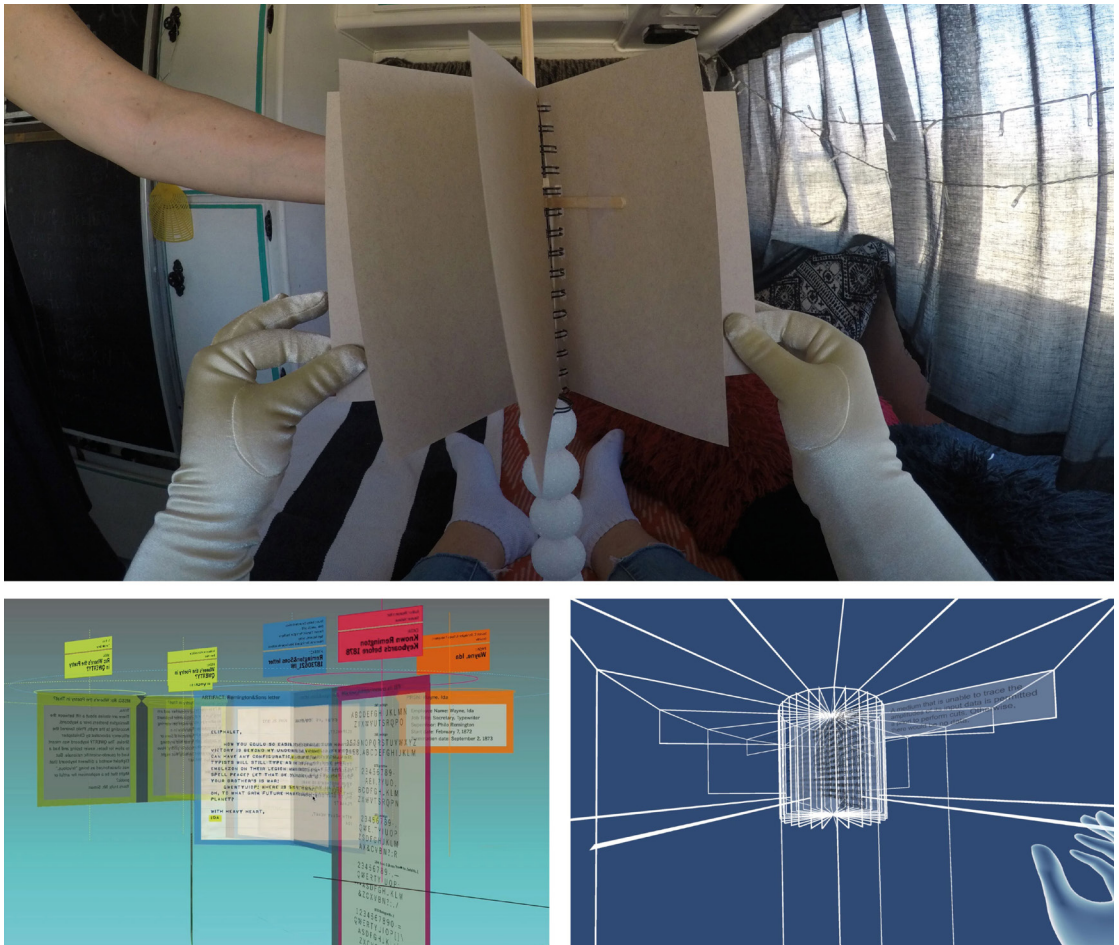
Figure 3. Prototypes created during the story's development, clockwise from top: a paper prototype; A VR prototype made in Unity; and a 3-D model made in Rhino

Two years passed between the creation of Part 1 and Parts 2-3. In the interim, the technologies I was imagining were becoming accessible and I had the opportunity to create actual working prototypes to test my ideas for Trina's tech (Figure 3). This allowed me to craft Trina's first-person perspective, to see what she would see when looking with and through the software, because I was able to do so myself. The open-endedness of the collaborative process allowed us to follow new trajectories as they came into view. The openings could come from anywhere in the project: a technological affordance, an animal, a business letter, an artificial intelligence, a newly discovered snippet of history, or from Trina herself.

Through an art of inquiry, in which designing and storytelling were conceived in a dynamic, emergent interplay, an insider's understanding of Trina's future started to emerge. I was weaving together storyworld, prototypes, characters, and plot, and it was getting harder to determine which was which. It is nearly impossible now for me to consider that one could attempt to address any one without implicating each of the others.

So, my next move here will seem counterintuitive, but we will attempt to do just that: temporarily disentangle the components from one another in order to better understand what each contributed to the whole and to explore what kind of access each gives to the human experience of futures.

Disentangled Storyworlds And Prototypes

Figure 4. Trina's storyworld, from left to right: a neoliberal knowledge economy; a desolate landscape; daily subsistence supported by virtual human intelligence tasks

In their 2015 review of the first ten years of design fiction practice, Lindley and Coulton derive what they claim are the most prevalent components of design fiction in the form of a "definitive definition":

"Design fiction is (1) something that creates a story world, (2) has something being prototyped within that story world, (3) does so in order to create a discursive space" [3] *(Lindley & Coulton, 2015, p. 210).*

The first component — "something that creates a story world" — gives designers wide berth in regards to narrative: a *storyworld* is not necessarily a story. A storyworld defines the spatial and temporal situation of a narrative, including environmental, social, cultural, political, economic, and other systemic attributes, and should have a degree of internal coherence. In film studies and narrative theory, it is the plot of a story that gives rise to a storyworld in an audience's mind as they attempt to make sense of what they see and hear (Routledge, p. 569). Though in the case of design fiction, an artefact may be enough to evoke a narrative world of which the object is imagined to be a part (Malpass, 2013).

But storyworlds can also exist on their own. McDowell and von Stackelberg propose creating coherent storyworlds prior to the generation of specific stories in a practice they call worldbuilding in which a world's attributes — its systems, physical environments, and artefacts — are built by collaborative and interdisciplinary teams. This is not dissimilar to the creation of setting and scenario for Experiential Scenarios, for once created, the worlds can be used as a space for thought experiments and stories to be tried and tested in order to communicate and explore futures. The worldbuilding process allows for the creation of rich narrative worlds as well as insight and foresight in regards to near-future technologies (Mcdowell & von Stackelberg, 2015).

McDowell shares how he came to the practice through his experience of working in a non-linear process with Stephen Spielberg and others on the film *Minority Report*. In filmmaking, a script is typically written first, then a production designer works with a director to develop the look and feel of the sets and props. But with *Minority Report*, the production design had to begin before the script was ready, resulting in what McDowell describes as a back-and-forth creation of storyworld and

script. The process involved in-depth research into the design of a future world through work with experts from science, technology, urban planning, and other fields, creating a "valuable creative tension" between traditional futurist approaches and storytelling demands. "At three broad scales – the world scale …, the community scale…, and the individual scale … – the world begins to fill in with connective rules that develop a holistic logic-driven world space" (Mcdowell & von Stackelberg, 2015, p. 39). As a form of futures practice, the result was not "an individual series of foresights from futurists," rather it was "an organic evolutionary process centered in storytelling that allowed the emergence of a holistic fictional world that was genuinely precognitive'" (Mcdowell & von Stackelberg, 2015, p. 41), a description that resonates with the integrated process that led to *Trina*.
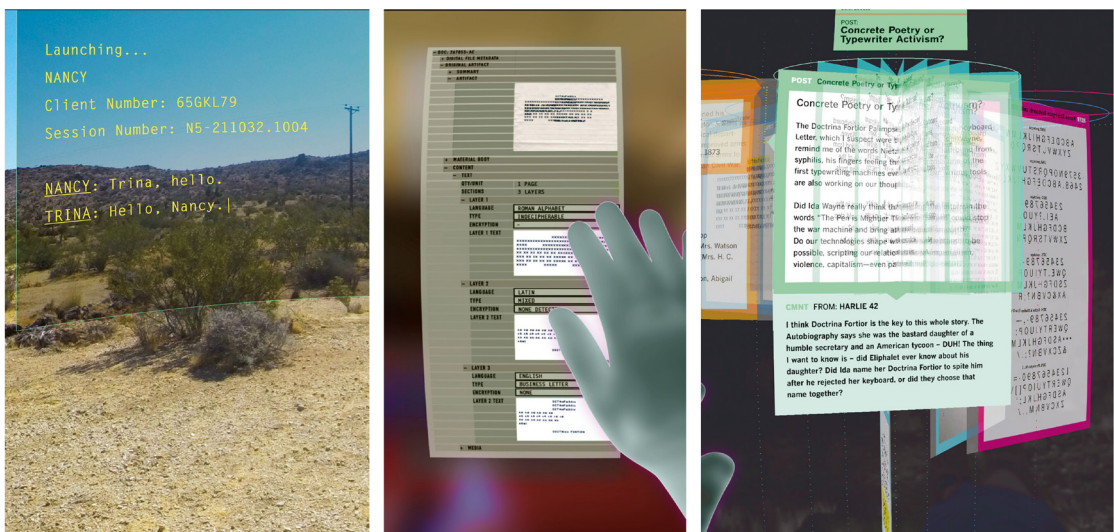

Figure 5. Trina's diegetic prototypes, from left to right: NANCY, a voice- and text-based AI therapist; Analyssist, Humanitas Inc.'s information management app; The Commons, a spatialized text display for networked reading and writing

The second design fiction component — "something being prototyped within that story world" — could be read as a diegetic prototype, arguably the best developed and most unique aspect of design fiction practice. As Kirby reminds us, it is the "visual element that is at the heart of a diegetic prototype" (Kirby, 2010, p. 45). The imagined future technologies of *Minority Report*, particularly Jonathan Underkoffler's gestural computer interface, serve as one of Kirby's primary examples of the rhetorical power of a diegetic prototype in which an extraordinary technology is made plausible and even benevolent through its use in ordinary circumstances. But to be convincing, Underkoffler recounts, the prototype needed to be designed as a "self-consistent technological entity" that "adhered not only to the rules of the diegetic world but also to its own internal logic and the constraints of real-world computer technologies" (Kirby, 2010, p. 51).

But not all prototypes are set in filmic contexts. Design fictions are realised in diverse media and many take the form of imaginary artefacts or promotions for future products and services. The narratives can be understood as an effect of the design fiction itself, and are seen as either embedded or external (Malpass, 2013). An embedded narrative is one that is extrapolated from specific attributes of an artefact whose design subverts expectations in a manner that is legible to a viewing audience (the story/world is deduced from clues communicated by the artefact). When an artefact is strange and unfamiliar, an external narrative may need to be conjured through additional media, such as writing or photography, to situate it in a specific use context in order to be understood (the

story/world is derived from an artefact *in situ*) (Malpass, 2013). As enunciative objects, artefacts could also be seen to create subject positions, implicit users who are a kind of human complement to the artefact. In either case, the narrative is conjured in the mind of an interpreter.

Kirby's concept of diegetic prototypes was informed by the "performative prototypes" identified by Suchman, Trigg, and Blomberg (2002) in the context of Science and Technology Studies. In their ethnomethodological account of information technology development practices in a large corporation — admittedly different conditions for futuring than science fiction filmmaking — they identify how a prototype's meaning evolves through interactions amongst an assemblage of actors that can include people, a physical environment, management systems, the prototype itself, and more. Placed in a use context, the prototype is a working tool, a mock-up of a proposed future technology produced as part of a design process. The prototype acts as a "tangible, but also provisional, apparatus," and a "reflexive probe" (Suchman et al., 2002, p. 175). The prototypes of *Trina* operated similarly. Through the design fiction's holistic creation, I experienced what Suchman et al. observed in their study: "like any technology, the prototype does not work on its own, but as part of a dynamic assemblage of interests, fantasies and practical actions, out of which new socio-material arrangements arise" (Suchman et al., 2002, p. 175).

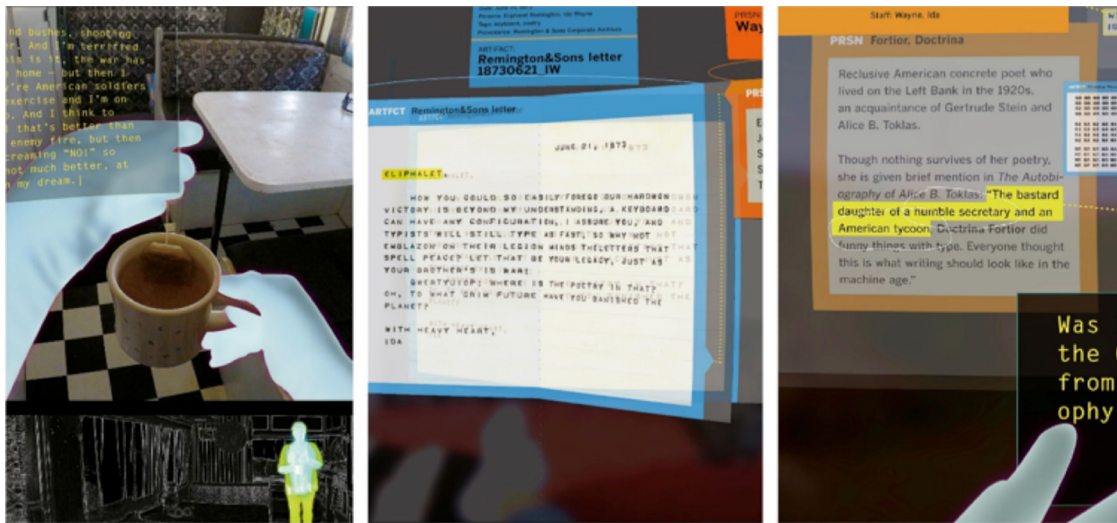## Disentangled Characters And Plots

Figure 6. *Trina*'s main characters. from left to right: Trina, an underemployed literary scholar who performs human intelligence tasks (H.I.T.s) to make ends meet; Ida Wayne, a secretary at Remington & Sons in the late 1800s; Doctrina Fortior, a concrete poet who may or may not be Ida's bastard daughter

The new socio-material arrangements of *Trina* took the form of new practices, shifting our attention away from "discrete, intrinsically meaningful objects" and onto relations and actions (Suchman, 2003). While consideration of the interior individual brings to the scene "the specific ways that stakeholders construct meaning and significance" (Slaughter, 2018), Suchman's assertion is less centered on the human subject as an autonomous actor and is more concerned with how "relations of human practice and technical artifact become ever more layered and intertwined" (Suchman, 2003, p. 2). This calls for specificity, temporally and spatially: "understanding a given arrangement of humans and artefacts requires locating that configuration within social histories and individual biographies for both persons and things" (Suchman, 2006, p. 284).

Narrative voice is one way to get a distinct inside-out perspective on how relationships are

made meaningful — for both humans and non-humans. In order to project identity, present a point of view by proxy, and articulate subjective and contextualized perspectives, Andrew Morrison has developed a distinct notion of "persona" used to investigate proximal futures (Morrison & Chisin, 2017). In Wi-Fly, we meet a rogue female drone, called Adrona, who writes first-person blog entries and poetry that are combined with images and other media to create a multi-modal composite design fiction. Adrona's misgivings and concerns about her legacy and association with militarized technologies in an urban context are used to interrogate the role of prospective technologies for surveillance in future cities (Morrison, 2014). Morrison was also involved in a set of participatory design fictions about a tiger fish named Fiscilla, embodied in a sculptural skeleton that travelled across southern Africa, and a nuclear-powered narwhal named Narratta who authored online posts about life in the Anthropocenic arctic. The projects were designed to build 'futures literacies' in relation to climate change and the team found that immersing participants in perspectives connected to emotion, cultural identity, the biological, and the conceptual, altered their perceptions and opened them up to new shared meanings (Morrison & Chisin, 2017).

But, as Mark Blythe (2014) points out, "creating a vivid and non-stereotypical character each time a scenario becomes necessary in the design process is a bit of a tall order" (Blythe, 2014, p. 52). Therefore, Blythe and his collaborators created "Pastiche Scenarios" that use personas with the "depth, personality, history and cultural context" of expertly drawn characters from literature and popular fiction, such as Ebenezer Scrooge, Bridget Jones, or Bart Simpson. These characters bring distinctive voices and personal foibles to the imagined "felt-life" experience (McCarthy & Wright, 2005) of a fictitious user. The team's goal is not to create generic users or use scenarios, rather it is to use idiosyncratic characters for the reflexive engagement they require as established characters that already have "a mind of their own," one that may be misaligned with a designer's goals. Pastiche Scenarios exploits the ambiguity that results to explore the emotional, social, and political values related to prospective technologies in imagined futures (Blythe, 2014; Blythe & Wright, 2006).

Social histories and individual biographies exert force on a story. Author Ursula Le Guin (2004) describes composition as "a special condition. While writing, I may yield to my characters, trust them wholly to do and say what is right for the story" (Le Guin, 2004, p. 235). Blythe notes similar comments from Tolstoy and Pushkin who have expressed being surprised by the choices and actions their characters have taken (Blythe & Wright, 2006). "When you construct or reconstruct a world that never existed, a wholly fictional history, the research is of a somewhat different order, but the basic impulse and techniques are the same. You look at what happens and try to see why it happens, you listen to what the people there tell you and watch what they do, you think about it seriously, and you try to tell it honestly, so that the story will have weight and make sense" (Le Guin, 2001, p. X). The story is one amongst the field of forces. And it is these exchanges and transformations, amongst storyworld, prototypes, and characters, that constitute the events of a plot.
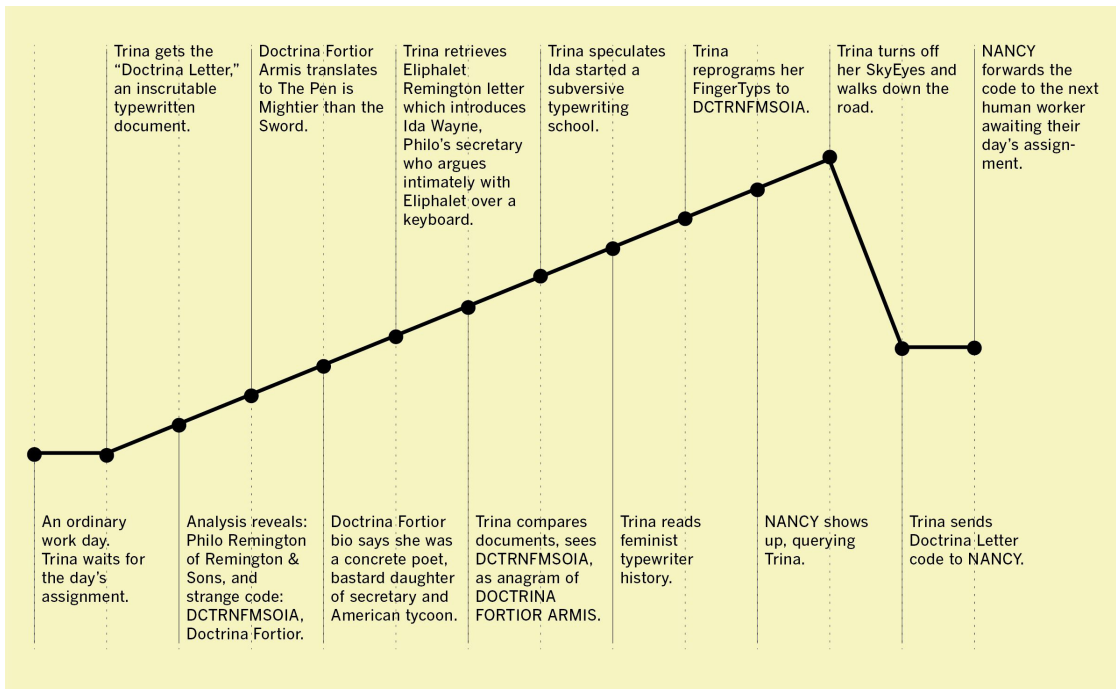
Figure 7 offers the following timeline annotations, above and below the plotted line:

Above the line (left to right):
- Trina gets the "Doctrina Letter," an inscrutable typewritten document.
- Doctrina Fortior Armis translates to The Pen is Mightier than the Sword.
- Trina retrieves Eliphalet Remington letter which introduces Ida Wayne, Philo's secretary who argues intimately with Eliphalet over a keyboard.
- Trina speculates Ida started a subversive typewriting school.
- Trina reprograms her FingerTyps to DCTRNFMSOIA.
- Trina turns off her SkyEyes and walks down the road.
- NANCY forwards the code to the next human worker awaiting their day's assign-ment.

Below the line (left to right):
- An ordinary work day. Trina waits for the day's assignment.
- Analysis reveals: Philo Remington of Remington & Sons, and strange code: DCTRNFMSOIA, Doctrina Fortior.
- Doctrina Fortior bio says she was a concrete poet, bastard daughter of secretary and American tycoon.
- Trina compares documents, sees DCTRNFMSOIA, as anagram of DOCTRINA FORTIOR ARMIS.
- Trina reads feminist typewriter history.
- NANCY shows up, querying Trina.
- Trina sends Doctrina Letter code to NANCY.

Figure 7. The plot of *Trina* as the arrangement of people, things, and events as they unfold in the telling

Design practitioners who rely upon Sterling's 2012 assertion that design fiction "tells worlds rather than stories" (Bosch, 2012)[4], (RTD Conference, Coulton, Lindley, Sturdee, & Stead, 2017) risk missing an important dimension of sociological and technological futures: the new practices that concern Suchman and the consequences that Kirby champions. To get at the messy subjectivity and embodied specificity of people in action, especially when they are meant to be someone other than one's self, we can return to the literary figuring of narrative fiction which brings the diegetic prototype into use by specific people. Imagining what happens when individuals make moves helps us to contemplate more than just a set of objects and conditions and asks us to consider: in such a world and with such prototypes, *what will happen? What will people do and what new conditions will their choices give rise to?* The answer, of course, depends on the particular people in their particular conditions, or as Le Guin says, "you listen to what the people there tell you."

It may be helpful here to return to the notion of *diegesis*, which is similar to literary theory's definition of *plot* — the arrangement of people, things, and events as they unfold in a narrative's telling. As we learned earlier, it is the plot that gives rise to a *storyworld* in a reader's mind. Narrative theory also asserts that the plot shapes the story, which in theoretical terms takes place in the space and time of a storyworld and functions according to a coherent chronology and logic (Eagleton, 2008). To illustrate the distinction between story and plot, we can look at a typical detective fiction: the *plot* begins with the discovery of a body then jumps back in time to the events that led to the murder then jumps forward to the trial. Along the way we glimpse clues, fragments from a crime scene or eyewitness accounts that create a partial, composite version (or versions) of the events. The *story*, on the other hand, takes place chronologically: first, a murder happened, then it was discovered and investigated, then the criminal was caught, and then he was taken to court. But a simple chronological accounting may be uninteresting and plot plays with time to craft a narrative experience. If the story that emerges for the reader is a function of the plot, the story could be said to be "in the telling." Thus, *who tells it and how they tell it* has a significant effect on the "world" that emerges.

While it is possible to map the plot of *Trina* to a simple plot diagram (Figure 7), its telling hinges upon moments of conflict, ethical dilemmas, risk-taking, inspiration, curiosity, discovery, and sacrifice. These moments happen as *Trina* takes action, bumping up against systems of power, revealing very human reactions to a designed future, but also reshaping that future through the moves she makes. Thus we could say, that for Futures inquiry, characters and plot can have as much impact, if not more, than storyworlds and prototypes, on the kinds of futures that get imagined.

The Holistic Assemblage of *Trina*

Attempting to find the edges or autonomous attributes of a narrative-based design fiction's storyworld, prototypes, characters, and plots confirmed what I learned through *Trina*'s making:

- Individual components cannot work on their own. Tension between components can be productive. Boundaries between components can be fugitive.
- A story is shaped by who tells it and how.
- Specific biographies for people and things necessitate seeing a future world through distinct perspectives.
- The meaning of settings and stuff is constructed through actions, practices, and consequences.

To demonstrate, we will quickly revisit *Trina*, only this time within the holistic assemblage of the narrative-based design fiction.

NANCY: prototype, character, or plot device?
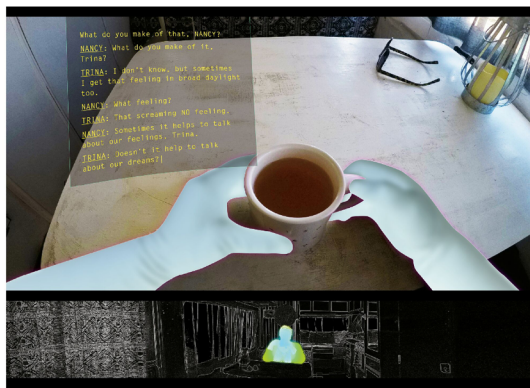
TRINA: ... so maybe it's not that much better, at least not in my dream. What do you make of that, NANCY?

NANCY: What do you make of it, Trina?

TRINA: I don't know, but sometimes I get that feeling in broad daylight too.

NANCY: What feeling?

TRINA: That screaming NO feeling.

NANCY: Sometimes it helps to talk about our feelings, Trina.

TRINA: Doesn't it help to talk about our dreams?

NARRATOR: Suddenly the characters disappeared, replaced by the slow-blinking insistence of NANCY'S cursor. This was an odd hour for NANCY.

NANCY: Good morning Trina.

NARRATOR: Trina typed a response.

Figure 8. Two views of NANCY, from left to right: a typical therapy session; checking in on Trina when she begins to behave unpredictably

In the first draft of *Trina*, NANCY was a human therapist named Marjorie. As the design fiction developed, Marjorie came to feel inconsistent and we determined that an AI therapist would be a better fit. With a different history and biography than Marjorie, NANCY became multiple things as soon as we put her in the story: a technological prototype, a character, and a catalyst for the narrative's final act. When she first appears to the reader, she is a clumsy liability management tool from corporate HR. But through the plot, it becomes apparent that NANCY is yet another surveillance technique employed by Humanitas, Inc. and by the end of the story, her pleasant queries take on an ominous tone. (Figure 8) Trina interacts with NANCY as only Trina would. At first, she tolerates and ignores, then she toys with, and finally, she actively defies. Along the way, Trina's experience of NANCY's "curtain of text that hangs just beyond the brim of her hat," a "live transcript" that records Trina and NANCY's inane exchanges, also infects Trina's dreams: "'NO!' Trina shouted, but no sound came out — only text. A transcript dangled in the air between the soldier, the woman and the girl, but it made no difference, nobody saw it but her." Trina could sense NANCY's threat to her agency.

Trina's final act: prototypes in use or dramatic event?
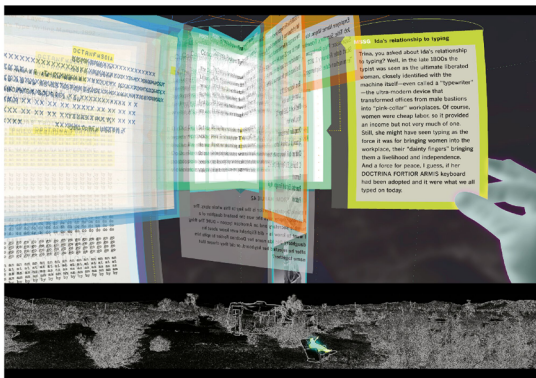
From a private note, Trina learned that in the late 1800s the typist was seen as the ultimate liberated woman. Even though women were cheap labor, their "dainty fingers" gave them independence.

This last comment struck a chord and Trina paused, remembering the day she got her finger implants. ...
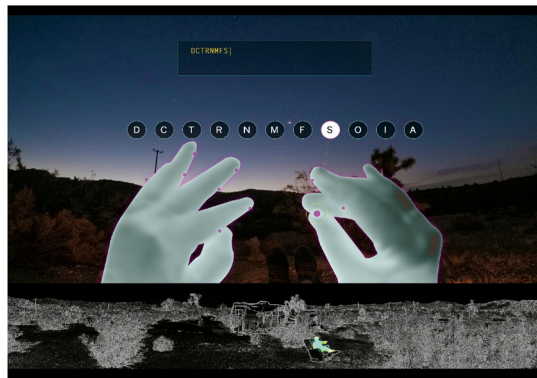
Then she got an idea.

Rubbing her thumb up and down each finger methodically, she reprogrammed her FingerTyps, using only Ida's sequence and nothing else. She tapped out a test to see if it made her feel anything.

Peace? Pacifism? Might?

Figure 9. Two scenes that demonstrate prototypes "as part of a dynamic assemblage of interests, fantasies and practical actions, out of which new socio-material arrangements arise" (Suchman et al., 2002, p. 175)

To demonstrate the affordances of The Commons protoype, *Trina* needed to show a reader's view of multiple simultaneous textual interpretations of a single document (Figure 9). Thus, the plot's action happens through the prototype's use: we see Trina manipulating the spindle to read responses to her writing. The responses provide additional clues to the story-within-a-story of Ida Wayne and the gendered history of the typewriter, which Trina interprets through her own subjective lens. Inspired by what she has now pieced together about Ida Wayne — that she tried and failed to encode her pacifist ideals in the keyboard of the first-ever typewriter so she launched a women's typing school with a subversive teaching method instead — Trina reprograms her own FingerTyps, (another opportunity to demonstrate a future technological affordance). In her final act of resistance, Trina uses NANCY (prototype and character) to send an encoded message that launches a feedback loop with the other human readers of Humanitas, Inc., before unplugging and walking away. The reader of *Trina* is left to imagine what this small army of human readers might do next — as am I.

Conclusion

This paper has asked how might creating a narrative-based design fiction offer a way for Futures practitioners, design researchers, and technology developers to get a feel for the interior lives and everyday texture of human-scaled futures. We saw how the firsthand experience of creating a first-person future combines the tangibility of design with the interior access of literary fiction, a situation that provides a palpable engagement that can enrich one's futures literacy, particularly when approached as an art of inquiry. But how else might it be used and who is it best used by?

The point of working with an idiosyncratic individual with a specific biography in a specific place and time is not to create generalizable conclusions about functions and uses of technology or to predict human reactions to future conditions. Rather it is to better understand the forces at play that give shape to the action of any world or any story. It is a process best used to explore imagined actions, practices, and consequences that arise in relation to distinct conditions, for example: how technologies might be made meaningful, how agency might be negotiated, how individual motivations might give rise to new practices and social configurations, how people with different biographies and histories might react, and so forth.

But questions remain. How in-depth does the process need to be to achieve its effects? Is it best practiced in groups or alone? Are professional authors and designers necessary? What other forms of disciplinary expertise would be helpful? How open do the process and parameters need to be and where are the limits?

Ingold's art of inquiry helps address issues of agency and emergence through the making of first-person futures. Becoming intimately entangled in a web of materials and forces, human and nonhuman, each pushing and pulling on the action as it advances a story, is the way to achieve surprising and insightful results. As we saw in Ingold's example of weaving a basket, the outcome will be only partially in the creator's control, and the final shape will tell you something about the forces of the world of which it is a part. In practical terms, this means that prototypes, storyworld, characters, and plot should be created in concert with one another and in correspondence with their creators.

As participant-observers, Janet and I did not sit on the outside of our design fiction as it was coming into being; we were an integral part of it. Designing *Trina* was my own experiential future, one in which I could feel the effects of the forces of an imaginary future through the process of making. Working with the specificity of a unique individual and her life at a particular time and in a particular place allowed me to see that while I could have designed a near-perfect technology (the Commons) for Trina, her ability to make use of it was not defined by the (visible) affordances of the designed prototype but by the (invisible) economic, social, political, and ecological forces at play. Seeing a world through Trina's eyes, developing a world in tandem with Trina and Janet and Ida and the RV and the Commons, gave me a first-hand experience of the interdependencies, the fields and forces of a particular future, Trina's complicated everyday. I was a participant-observer, investigating a world from the inside.

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Notes

1. This paper has been created with support from University of Technology Sydney and ArtCenter College of Design, with guidance from Stuart Candy, Molly Wright Steenson, Johanna Drucker, and Daniel Cardoso-Llach, who are on my supervisory committee in the PhD in Design at CMU.
2. The politics of whose lives get imagined, and how, is beyond the scope of this paper but is a key factor that should be explicitly considered by those engaged in this work.
3. As this paper is concerned with the creation of a narrative-based design fiction rather than its outcomes, we will set aside the much-debated notion of opening debate and discursive space, a topic covered elsewhere. (Auger, 2013; Tonkinwise, 2015)
4. In the same interview Sterling responds to the question of what makes design fictions work well: "Talking about a future gadget" which he implies is intrinsically fascinating, in contrast to "talking about a future government or women's rights in the future or other hot-button problems."

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