

The Limits of Our Imagination: Design Fiction as a Strategy for Engaging with Dystopian Futures

Joshua Tanenbaum, Marcel Pufal and Karen Tanenbaum

UC Irvine

Department of Informatics

joshua.tanenbaum@uci.edu; mpufal@uci.edu; karen.tanenbaum@uci.edu

ABSTRACT

In this paper we explore how *design fiction* – an increasingly common and relevant strategy within HCI and the Digital Humanities – can be used to get *purchase* on the future. In particular, we address how design fictional methods allow researchers to construct arguments about feared or dystopian futures within the context of *collapse informatics*. 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; it allows us to articulate these consequences to a broader public in a format that is more readily consumed and understood than a research paper; and it allows us to insulate ourselves from the emotional consequences of perceived proximal dystopias by creating space to “play with” and explore alternative visions of the future. We argue that paying attention to how popular culture represents scenarios of collapse can provide insight into how to express and communicate the challenges and potential solutions framed by the LIMITS community to a broad public audience.

CCS Concepts

Human-centered computing~HCI theory, concepts and models

Keywords

Design Fiction; Sustainability; Envisioning; HCI Futures.

1. INTRODUCTION

WIDE EXT: The Wasteland.

*A leather clad figure stands beside the **Interceptor**, a beaten up muscle car, contemplating a bleak horizon that stretches unbroken ahead. It's unclear where the desert ends and the sky begins: dust storms and parched looking clouds bleed together in the distance. All is shades of deep orange, except for the edges of the sky which are a burned-in blue. The car's door hangs open to reveal a small pile of what is either provisions or trash. It has what looks like extra fuel tanks welded into its open trunk and deep patches of rust and damage in its matte blue-black paint. The camera pans down and low jagged rocks rise into view, flanked by some long-dead grass. A two headed gecko scuttles from the rocks and towards the figure*

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for components of this work owned by others than the author(s) must be honored. Abstracting with credit is permitted. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee. Request permissions from Permissions@acm.org.

LIMITS '16, June 08 - 10, 2016, Irvine, CA, USA

Copyright is held by the owner/author(s). Publication rights licensed to ACM.

ACM 978-1-4503-4260-5/16/06...\$15.00

DOI: <http://dx.doi.org/10.1145/2926676.2926687>

who stands in still silhouette. Cautiously it approaches him. We see some sort of tank on his back, that catches the light with a metallic glint. With a swift, sudden crack, the man snaps his left heel down on the lizard, then sweeps its body into his right hand with a practiced kick.

CLOSE EXT: Over Max's shoulder

Max has a tube of some sort running over one shoulder, and a black fabric headpiece to keep off the blistering sun. A lock of hair peeks out from under a pair of reflective goggles that he has pushed up onto his forehead beneath his hood. He turns in profile, revealing that he is chewing: the tail and hind legs of the lizard wriggle as he slowly masticates the poor creature.

These opening shots from *Mad Max: Fury Road* [23] cover only 43 seconds of screen time, but in under a minute they capture and communicate a future that feels frighteningly close. Although *Mad Max* is a work of fiction, it reflects very real anxieties about the imagined consequences of climate change, and about human nature when faced with extreme scarcity. There are rhetorics at work in *Mad Max* that reinforce a particular perspective on the future: that we are collectively headed for disaster; that democratic government will not survive this disaster; that in a post-collapse society the physically strong will dominate the weak. Conspicuously absent from this vision of the future is any digital communications infrastructure: there are no computers or smartphones in the “Dieselpunk” world.

Mad Max represents a vision of a future that is simultaneously wholly technologically mediated and technologically impoverished. It is a world of analog cybernetics, technological prostheses, and grotesque interpenetrations of flesh and steel. But it is also a world of waste: wasted water, wasted fuel, and wasted lives are all prominent features of the narrative, even though scarcity is a central theme. *Mad Max* is a dystopian vision of an apocalyptic world. As such, its causes are meaningfully different from the scenarios of slow collapse often discussed within the LIMITS community. It is a deeply flawed and unrealistic depiction of a dystopian future: the situation and society it depicts exist not as accurate portrayals of a post-collapse world, but as expressions of contemporary anxieties about human nature, resource scarcity, and the consequences of unsustainable behavior. In this sense, it may be considered to be a *design fiction*, by articulating a rhetoric of situated technology within an imagined future that addresses an issue of significant social importance.

In this paper we explore how such design fictions can play a role within both scholarly and popular discourses of collapse and sustainability. We discuss three different roles that design fiction can play when engaging with proximal dystopian futures. First, we

explore how design fiction can be employed to explore the consequences of different valued perspectives or intellectual commitments when conceptualizing proximal futures. Next we consider how design fiction can perform rhetorical work, serving as an interface between scholarly discourse and public understandings of possible futures. Third, we explore how design fiction can be employed as a strategy for regulating and mitigating the emotional consequences of engaging with likely futures that are frightening and seemingly hopeless.

2. WHAT IS DESIGN FICTION?

The last 10 years have seen the rise of design fiction as a mode of research within the HCI community. The term was coined by science fiction author and futurist Bruce Sterling in his 2005 book *Shaping Things* [34]. At the time, Sterling distinguished between science fiction, which, he argued, aimed to invoke a sense of the “grandeur and credibility of science for its own hand-waving hocus-pocus” [34:30] and design fiction, which “sacrifices some sense of the miraculous” [34:30] in order to make more sense on the page. Shortly thereafter, Julian Bleecker expanded upon the idea [10], drawing on inspiration from David Kirby’s notion of “diegetic prototypes” in film studies [20] and Paul Dourish and Genevieve Bell’s situated reading of science fiction alongside advances in Ubiquitous Computing [14]¹.

As the concept of design fiction has evolved, it has been pressed into service alongside other modes of future oriented design, and so it is important to consider the ways in which it is different from the *speculative design* of Anthony Dunne and Fiona Raby [16], which is itself an outgrowth of Dunne’s earlier concept of *critical design* [15]. The thing that sets design fiction apart from these allied practices is that it *explicitly* concerns itself with *diegesis*. This is perhaps most apparent in Sterling’s recent reformulation of his definition of design fiction as “the deliberate use of diegetic prototypes to suspend disbelief about change” [13]. In this definition, Sterling invokes Kirby’s concept of diegetic prototypes, while also attending to their importance in communicating scientific agendas to the broad public.

To understand what Kirby, Bleecker, and Sterling mean by diegetic prototypes, one must first become acquainted with the notion of *diegesis* as used in contemporary film studies². In cinema, diegetic material exists within the world of the film; it is accessible to the characters within the storyworld. Non-diegetic material, in contrast, is available to the viewer but is not a part of the fictional world on the screen. Title sequences, for example, are often non-diegetic. Orchestral scoring is generally non-diegetic, as opposed to diegetic sound such as a song playing on a car radio that the film’s characters are also listening to. Thus, when Kirby describes diegetic prototypes, the key point is that they are situated inside an imagined narrative world.

Positioning an imagined technology within a narrative world requires a designer to think beyond the immediate implications of that technology and consider it within a broader social and cultural ecosystem. Successful narratives have coherent internal logics that designers must account for and engage with when envisioning a

particular technology. For instance, if one were to imagine a world with accessible nanoscale manufacturing, it would be important to think about the possible futures and societies that such a technology might produce. This provides a set of constraints that affect how the fictional world that is envisioned, but it still allows for a wide range of possible futures. In previous work we have explored how different values and assumptions about human nature lead to radically different futures for imagined matter replication technology [39].

Design fiction fits at least partially within existing frameworks of futures studies [7], along with what Stuart Reeves has described as *envisioning* research within HCI [32]. Wangel et al. describe six aspects of futures studies that are relevant to sustainable development research. [48] Broadly paraphrased, these are:

1. Futures studies is an “elaboration of one or more representations of a future state”.
2. Futures studies addresses “ontological uncertainty” around possible futures by positing multiple scenarios.
3. Futures studies aims to increase the “perceived scope of possible solutions” by expanding the design spaces of an inherently uncertain future.
4. Futures studies is issue-driven, allowing the issues at hand to drive the search for solutions across disciplines.
5. Futures studies contextualizes scenarios through “informed imagination” that coherently and consistently integrate fact and fiction.
6. Futures studies creates scenarios that allow for both holistically testing existing models and also provoking discussion of new perspectives. [48]

The authors close with a consideration of how these scenario-driven techniques must be carefully deployed within sustainable design education in order to avoid producing anxiety among students who become uncomfortable when provided with an open-ended learning domain that does not have an existing solution. Futures studies, in this instance, can be seen primarily as a tool for thinking: it is especially well suited to expanding the possibility space that we address when engaging with imagined futures. Design fiction, as a particular case of futures studies, is ideally suited to several specific modes of imagining that can play important roles within the study of sustainable development in general, and the study of collapse in particular.

3. DESIGN FICTION AND COLLAPSE

Many of the touchstone works within the LIMITS community employ forms of design fiction and other futures studies methods as central to their engagement with collapse informatics. The field of collapse informatics is, at some level, fundamentally grounded in narratives about the future. The field frequently invokes Tainter’s grand narratives of sociotechnical collapse (based upon the second law of thermodynamics governing the increasing costs of solving problems through increasing specialization and complexity) [35,36] or some other narrative of global change, peak resources, or global catastrophe resulting in breakdown of civil and infrastructural order [27,30,44–47]. A succinct example is Friedman and Nathan introducing multi-lifespan design as

between designers, science fiction writers, and technology researchers.

² Diegesis was initially contrasted against *mimesis* by Plato to differentiate between narrative forms that were *recounted* and narrative forms that were *enacted*, respectively. [29]

¹ The timeline on this is a bit tangled. Bleecker notes that many of his ideas were constructed in conversations with Sterling, Kirby, Dourish and Bell (among others) in 2008. The “Resistance is Futile” paper had been circulating informally for years, collecting citations, and generating conversations before the final version was officially published in 2014. One could argue that the concept of design fiction was born in these conversations

motivated through narratives evoked by “Genocide. HIV/AIDS. Famine. Deforestation. Habitat destruction. Species extinction. Forced exodus” [17]. Fictional abstracts explore what research projects and agendas would look like if they were situated within carefully constructed design fictions [5,28].

Other researchers in this space have called for similar shifts away from technical complexity towards understanding the social implications of future-oriented work. In a discussion of self-driving vehicles (SDVs), e.g., Blyth et al. suggest:

“Instead of focusing on SDVs as primarily technical objects, and designing by a focused observation of the object of the design (SDV), an improved approach would require engineers and others to look into the future they are creating through the object of their design. This view into the future should involve imagining a range of possible and desired futures while considering a range of values.” [12].

Nardi further challenges us to “adjust design practice so that it more expansively encounters the future, lifting its gaze from the designed object to the complex realities of the world in which the object will be used” [25]. We see design fiction as an essential tool for accomplishing such future oriented designs. Working with Xinning Gui, Nardi discusses how studies of the Transition Town movement can be seen as visits or excursions to the future embodied by “a global network of towns with residents who believe that peak oil and climate change pose dangers for which we must prepare now” [18].

Given the prevalence of design fictional strategies within the LIMITS community, we contend that there is value in more explicitly engaging with this mode of inquiry as a fundamental component of our emerging field, rather than simply viewing it as a fun but inconsequential curiosity at the margins of the community. In particular, design fiction provides us traction on a set of interrelated issues that the field is actively grappling with. A typical exchange we frequently have with our colleagues around these issues often takes this form:

P1: “We know that *X* is a significant problem, but we can’t solve it because it requires massive interventions at the level of policy and society.”

P2: “So what do we do about it?”

P1: “Well, we’ve focused on a small intervention that doesn’t really solve the problem, but it at least helps some people feel like they aren’t completely powerless in the face of an impending disaster.”

P2: “But what is preventing us from implementing some larger scale solutions?”

P1: “We lack the collective political will to overcome the profoundly shortsighted incentive structures that dictate how our institutions make decisions, and can’t enforce the few decisions we’ve been able to agree upon.”

P2: “Why aren’t more people upset about this? Don’t they know that we’re talking about the end of the human race?”

P1: “It’s not real to them: and when it starts to get real it’s too frightening and overwhelming to really deal with, and people just tune it out.”

P2: “So, what do we do? How do we get people’s attention, or build a consensus for global action?”

P1: “I have no idea.”

-Every conversation we participated in at LIMITS 2015.

The above exchange is a fictionalized recounting of many conversations we’ve been having amongst ourselves as a community. It’s not quite a design fiction, but it uses a narrative form to drive home a central concern that we perceive within the community, but which is hard to cite because it is happening in the *context* of our work rather than the *content*. In the following sections we hope to show how design fiction is a useful strategy for positioning our research within broad public conversations about the future.

4. WHY DESIGN FICTION?

As discussed above, there are three features of design fiction that we believe are of interest to the study of sustainable futures. First, design fiction foregrounds questions of values and ethics. Second, design fiction serves a rhetorical purpose within public discourses around the future. Finally, design fiction creates a safe space for engaging with frightening or depressing futures.

4.1 Design Fiction and Values

One important function of design fiction is in highlighting the values and intellectual commitments associated with a new technology. Blythe provides a fascinating and playful example of this when he takes the infamous “Sal” story from Wieser’s seminal ubiquitous computing paper *The Computer for the 21st Century* and rewrites it in the voice of several different science fiction writers including Douglas Adams and Philip K. Dick [11]. In rewriting a canonical scenario from ubicomp, Blythe is able to reveal a number of rhetorics and values that were hidden within the initial “neutral” voice that Weiser used to portray the story of Sal living inside her computationally saturated world. Through this act of literary ventriloquism, the presence of pervasive marketing systems and oppressive surveillance apparatus is brought into view. Blythe uses techniques from literary theory and science fiction to force readers to grapple with the ethical issues hiding inside of a future vision that has dominated HCI discourse around ubiquitous computing.

Similarly, Kirman et al. use narrative techniques to critique implicit assumptions of benevolence around emerging technologies in HCI [21]. In a paper entitled *CHI and the Future Robot Enslavement of Humankind: A Retrospective* they assume the perspective of “robots from the future” writing about how 21st century research within the CHI community “facilitated and hastened the enslavement of mankind by robots”. As with Blythe’s literary techniques, Kirman et al.’s use of a diegetic frame allows them to explore and critique questions around values and ethics that fall outside the scope of much HCI research.

In our own prior work we have used design fiction as a lens for considering practices of technological reappropriation and making within the Steampunk community. [38,41] We have argued that the imagined neo-Victorian techno-future-pasts of Steampunk work as both design fictions and as acts of political and ideological expression. The fanciful creations of Steampunk makers are a form of diegetic prototype, to borrow Kirby’s terminology. They are often connected to imagined characters, situations, and narrative worlds. Of particular relevance here is the ways in which Steampunk makers articulate their practice in response to two aspects of post-industrial society: the proliferation of hackable e-waste and the preponderance of mass produced, homogenous consumer technologies. The values espoused by Steampunks are a concentration of broader ideologies of DIY, repair, and handcraft that are enjoying a revival within the Maker community [40]. Here we find an interesting paradox: the *sustainable ethos* of Steampunk and Maker practice is often in conflict with a lived reality of

technological appropriation that is wholly reliant upon the economies of scale driving mass industrial manufacturing.

Design fiction is uniquely suited to engaging with *consequences*. 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.

4.2 Design Fiction as Rhetoric

The diegetic prototypes described by Kirby served a very specific role as ambassadors of scientific agendas to a broader public [20]. The first example he provides of this is from the 1981 film *Threshold*, in which a woman successfully receives an artificial human heart transplant, a year before this technology was actually deployed in real life. *Threshold* was produced with input from a team of medical doctors, (including Robert Jarvik - the inventor of the artificial heart) and played a significant role in addressing public anxieties about new medical technologies. *Threshold* was entertainment, but it also made a successful *argument* about the benevolence of this new technology. It thus played a significant role in both imagining and *realizing* a new technological future.

Bleecker and Kirby both discuss the importance of a dialogue between scientific research and mass market entertainment in producing new possible futures. The best known example of this is probably the integration of John Underkoffler's work on gestural interface into Steven Spielberg's 2001 film *Minority Report*. Underkoffler, working with production designer Alex McDowell and prop master Jerry Moss, treated the cinematic depiction of this technology as an opportunity to do research and development on a possible prototype for this technology [20]. Kirby coins the term "technological sincerity" to describe the depiction of a piece of technology in film as *everyday* rather than extraordinary: this is to say that the prototypes fit into the natural landscape of the diegetic world. The resulting fictional world is *persuasive* because it has taken the time to take user experience and technology seriously, and is showing a future where the new technological elements are more than just flashy set-dressing. While many of the components of gestural interface had existed since the 1960s, it wasn't until its appearance in a major motion picture that a *public desire* for the technology emerged.

Design fictions can also serve as cautions against the dangers of technologies left unchecked. In a talk given at UX Week 2012 in San Francisco, Genevieve Bell traces the genealogy of the American narrative of self-aware, intelligent machines bringing about the end of humanity, as exemplified by Skynet in the *Terminator* films [6]. She connects a series of historical dots, starting with the craze for mechanical automata in the 18th century, the emergence of mechanized labor in the 19th century, and the parallel narrative of mankind creating new life gone wrong embodied within Mary Shelley's 1816 science fiction story *Frankenstein*. *Frankenstein* becomes the template for a whole subgenre of fiction that operates on the premise that "if things get smart they'll kill us." This speaks to an anxiety about the permeability of the boundary between "human" and "other" that Bell situates specifically within Western culture. The prevalence of narratives of robot uprisings, machine overlords, and AI run amok has played a significant role in the public consciousness around these technologies.

Thus we see how technology situated inside of fiction can play a role in how the general public comes to understand new technologies, in both positive and negative ways.

4.3 Design Fiction as Play

In their paper for LIMITS 2015, Knowles and Eriksson raised an important point about the social and psychological burdens of researching the "end of the world as we know it" [22]. They consider how the moral implications of unchecked climate change (such as the extinction of the human race) are so daunting as to lead to feelings of helplessness, fear, and denial at a massive scale. These psychological limits lead to coping mechanisms that in turn limit our ability to act as a species to address the very real problems of climate change. They propose that researchers "retire" several ideas that exacerbate these unhelpful coping mechanisms. Knowles and Eriksson argue that we cannot live in denial about climate change, but also that acknowledging our own responsibility for the situation and for taking necessary action can be "guilt ridden and fraught with emotions" [22].

At least partially in response to this, we propose the use of design fiction as a tool for grappling with possible futures that are emotionally fraught. Design fictions allow us to "play" with possible dystopias, locating them within a fictional diegesis and providing us with a critical distance. We are tempted here to invoke canonical games scholar Huizinga's notion of the "Magic Circle" here, except that the magic circle in which a game is played (as initially conceptualized) exists in order to isolate the world of the game from any real world consequences [19]. The "diegetic buffer" we perceive surrounding a dystopian design fiction is more permeable, allowing for questions of values, ethics, and actions to cross back and forth between our present world and the simulated future. Thus, we use the term Play as articulated by contemporary games scholar Sicart in the sense of "a mode of being in the world" [33]. Sicart argues that while play is pleasurable, that it can also hurt, offend, challenge, and tease us [33].

Kirman et al.'s robot enslavement paper is a great example of how design fictions have been playfully pressed into service within the HCI community. The issues raised by the paper – that many ongoing themes in HCI placed human cognition in service to automated systems – are very real concerns for scholars of socio-technical systems, but it can be extremely difficult to confront the dystopian possibilities of this work while remaining an engaged researcher. Positioning this critique of current research trends within a tongue-and-cheek work of design fiction allowed Kirman et al. to engage with a difficult topic in a productive way.

Each of these three functions of design fiction – ethical, rhetorical, and playful – provides us with some insight into how these techniques may be used in communicating possible sustainable futures (or producing compelling warnings about future consequences of unsustainable actions). To see a real world example of how this works we turn to dystopian and apocalyptic narratives in popular culture by examining how the film *Mad Max: Fury Road* operates as a form of design fiction.

5. A CASE STUDY OF APOCALYPTIC DESIGN FICTION

5.1 A brief methodological interlude

To further explore connections between discourses of collapse and design fiction, we undertook a form of analysis that isn't frequently utilized within technology research. We performed a *close reading* of a relevant work of popular culture. Close reading is a form of scholarship with its origins in literary theory. It moves in and out of fashion every few decades, and has been used to analyze books, poems, films, and – most recently – video games [9]. It is a form of "hermeneutic inquiry" – a mode of scholarship that grounds its knowledge claims within the "expert interpretation and judgment"

of a “text” [37]. One of the central aspects of this kind of scholarship is that it is performed with as full a disclosure of the perspectives and biases of the research as is possible, and a discussion of the *analytical lenses* is used to focalize the reading.

For the purposes of this work, we approached the text – Mad Max: Fury Road – from the perspective of scholars with a more-than-passing interest in issues of design fiction, collapse, and dystopian futures. Two of us had watched the film in the theater when it was released, and one of us was watching for the first time. Prior to conducting our viewing, we identified three particular analytical lenses that we felt overlapped the issues raised by the film and the domain of computing within limits: scarcity, waste, and consequences.

Data collection in close reading can range from highly formalized practices of documentation to more loose and opportunistic modes of note-taking. We favored the latter, pausing the film periodically to discuss our reactions and observations, and then writing up notes on the experience from the perspective of our three lenses. We then supplemented this data collection process with a investigation of the digital representation of a related phenomenon: a Mad Max themed role-playing event called Wasteland Weekend. For the remainder of this paper we will discuss the results of this analysis and then close by connecting it back to issues of design fiction and computing within limits.

5.2 Mad Max: Fury Road

In prior work, we analyzed the practices of Steampunk makers as a form of design fiction from the perspective of HCI [41]. It is only fitting that we turn our attention to the dystopian subgenre of *Dieselpunk* when discussing post-apocalyptic futures. *Dieselpunk* draws on the design aesthetics of the early 20th century, usually inspired by the Art Deco movement and the technologies of the first and second world wars, as opposed to Steampunk that finds its aesthetic touchstone within the Edwardian and Victorian eras. Unlike Steampunk, which is often optimistic about the future, *Dieselpunk* takes a more apocalyptic perspective, as seen in touchstone *Dieselpunk* media such as the *Bioshock* and *Fallout* videogame series and the *Mad Max* film series. It is the most recent Mad Max film, *Fury Road*, that we are going to look at closely here.

The first three films of the Mad Max series were produced and released in the late 1970s and early 1980s. They were at least partially inspired by the 1973 oil crisis, and were an early rumination on the concept of *peak oil*. It took almost 30 years for the latest installment, *Fury Road*, to make it into production and distribution, and the new film reflects the changes in climate science that have happened in that time.

Mad Max: *Fury Road* is the fourth film in the Mad Max franchise, a series of post-apocalyptic *Dieselpunk* narratives set in a desert wasteland, and centering upon the unlikely (and often unwilling) heroics of Max Rockatansky, the Road Warrior. *Fury Road* follows Max as he is captured by raiders (War Boys) from the Citadel of Warlord Immortan Joe, and ends up caught up in the escape plans of Imperator Furiosa, who is smuggling Joe’s five wives away from him to safety. Joe is a despotic overlord who maintains power over a desperate population through control of an aquifer of fresh water in the midst of an otherwise desolate and toxic desert. He selects women for breeding, and also keeps a stable of lactating women around to produce “mother’s milk” for the use of himself and his select soldiers. The world of *Fury Road* is set an unknown amount of time in a future where a global oil crisis has culminated in nuclear warfare and both social and ecological collapse. People end up organizing into tribal groups, seeking protection from powerful

warlords or adopting nomadic lifestyles that allow them to either escape danger or prey upon less well defended travelers.

As a design fiction, *Mad Max: Fury Road* reflects a deep seated set of anxieties about the future. The actions of the characters in the film do not fit with any rational model of human behavior, but when considered within the film’s context, a set of rhetorics emerges that all advance the film’s core arguments about collapse and human nature. It is an uncomfortable mirror to look into at times, and there are moments in the film that are extremely difficult to watch, but it is also difficult to look away from. We orient our reading of the film around themes of scarcity, waste, and consequences.

5.2.1 Scarcity and Waste

In the future, fuel, water, and food are scarce resources, and are unevenly distributed across the remaining population. Power derives from the ability to seize and control access to these resources, so by maintaining a monopoly on safe water and food, Immortan Joe is able to exert power over his immediate population and surrounding settlements with less essential monopolies (Gas Town, where fuel is produced and Bullet Farm, where ammunition is manufactured). In spite of this monopoly, Joe’s dynasty remains tenuous due to his inability to produce a suitable heir: healthy genetic material is an extremely precious resource in a world where nuclear fallout has resulted in rapid cellular mutation. Thus, the 5 wives that Furiosa helps to escape are among the most precious resources Joe possesses, in particular because two are pregnant.

We only see two living creatures that are not human in the film: the first is the mutated gecko that Max eats at the beginning of the film. The second is an insect that is swiftly consumed by Nux, the conflicted war boy who ends up joining Max and Furiosa in the back half of the film.

Most of the film plays out as an extended chase sequence with Max, Furiosa, and their various companions being pursued by war parties from all three locales. This is a costly pursuit, such that at one point the “Bullet Farmer” breaks out a ledger (itself printed on paper, which must be exceedingly rare in a world with no trees) and tallies up the costs of the pursuit in vehicles, fuel, ammunition, and lives. It is an immense amount of waste to reckon in a world of such profound scarcity.

Waste is ubiquitous in the movie, and is far more pronounced within the context of scarcity. The most startling moment of waste happens at the very beginning of the movie, as we are introduced to Immortan Joe. He stands in front of a large switch, on a stone mesa high above a ragged and deformed crowd, releasing torrents of water for a few brief moments before closing the valve. Below him, the crowd scrambles to catch life-giving water in makeshift vessels, clawing over each other to get to the downpour before it ends. More water ends up soaking into the ground than in the mouths of the people who need it.

Wasteful behavior is not just confined to the “evil” characters: there is a scene during the chase when Furiosa’s war rig and the pursuit vehicle driven by Nux are caught in an immense sandstorm (itself a striking representation of the extreme weather of the future). When the storm passes, both vehicles are damaged, and both groups are exhausted and injured. At this point in the narrative Max has been bound, muzzled, and chained to the front of Nux’s car, and connected to the war boy via an intravenous transfusion to provide blood (and presumably strength) to his captor. Freed from his captivity by the storm, Max comes upon the five wives of Immortan Joe, bathing and removing their chastity belts.

In the ensuing confrontation, the hose connected to the war rig’s tank is used repeatedly as a weapon, spraying precious water all

over the desert. The film is saturated with similar images of waste: at one point the war rig is hitched to a dead tree in order to pull the vehicle free from a bog – the tree is pulled out by its roots during this maneuver, and dialogue from Nux indicates that he has never seen a tree before.



Figure 1 - The scale of waste here is mind boggling [23]

The recurring images of waste in *Fury Road* can make it hard to accept as a possible future at first. It's hard to imagine humans living in a post-collapse, post-peak-oil, post-nuclear toxic desert playing fast and loose with their water and fuel reserves, however we believe that there is a rhetoric at work here that goes deeper than the initial implausibility of the characters' actions. The wasteland and the tattered remnants of human civilization that cling to life in it are the product of our inability to control our impulse to waste limited resources, and that wastefulness continues unabated. Even the apocalypse is not enough to bring about significant behavioral change. The world of *Mad Max* can be seen as an ongoing indictment of our failure to reign in our wasteful human natures, even after the end of the world. Waste also plays into an economy of power within the world: when Immortan Joe opens the floodgates for a brief moment, it is an oppressive act: a demonstration of his power over others.

5.2.2 Consequences

Closely connected to the rhetorics of waste in the film is an ongoing meditation over the value of life, and the nature of consequences. This is most pronounced within the story arc of the war boy, Nux. The war boys, as a group, seem to exist in order to die gloriously in battle: Immortan Joe maintains demi-god status among them as the arbiter of their entrance to an afterlife on the highways of Valhalla. The dominance of this cultic mythology, oriented primarily towards a promised afterlife, is important because it allows human life to be viewed as essentially disposable. If the point of life is to be "witnessed" in glorious death, then all other choices are inconsequential. The automobile takes on a central role within this mythos: altars are made of steering wheels, and chrome paint is sprayed into the mouth of warriors facing death and demanding others to witness their devotion. The ubiquity of tumors and life threatening mutations only reifies this sense of human disposability: the war boys are all already dead, and so what does it matter when death comes, so long as it is heroic?

It's hard to conceive of human action as consequential when the end of the world has come and gone. The characters in *Mad Max* struggle to survive, but many of them cannot articulate a purpose for living. The apocalypse that has devastated the environment and

the population has also robbed the survivors of any sense of a possible future. Surviving the apocalypse does not mean living a life in any conventional sense: it means wallowing in misery, cruelty, and pain until released by death. The only characters with real agency in the film are also characters who have lost something or have something to lose: Immortan Joe stands to lose his progeny, Furiosa stands to lose her reunion with her original clan, the wives have their first taste of freedom, and even Nux discovers that there is the possibility of love for him, which he then is forced to sacrifice. Throughout the film Max is haunted by the ghosts of the people he failed to save in the previous installments of the franchise, but he has very little left to lose, and very little agency for most of the film.

Fury Road is making a very explicit argument about the end of the world. The future it imagines draws less on pessimistic statistics about climate change and more on a cynical view of human nature. In spite of (or perhaps, *because* of) this fairly dire worldview, *Mad Max* was extremely successful, both commercially and critically. Of particular interest to us however, is that it has spawned a community of role-play and praxis that seeks to recreate a version of this future in the Mojave Desert. This weekend event represents a fascinating blend of design fiction, survivalist practice, and social commentary.

5.3 Wasteland Weekend

Connected to the *Mad Max* film franchise is the annual event Wasteland Weekend, a 4-day long gathering of costumed fans and custom vehicles in the Mojave Desert. A version of the event began in 2004, when *Mad Max* fans who had constructed replica vehicles from the original film trilogy gathered to cruise down California 101 for an event dubbed "Roadwar USA" [2]. This event was repeated several times, but there was a desire for a more immersive, desert-based fan event. In 2009, "Road Warrior Weekend" was held as a one-time event, and participants immediately started making plans for an annual gathering. In 2010, Wasteland Weekend was born as a "post-apocalyptic festival" in the Mojave Desert. Starting with 400 participants in 2010, the festival expects to sell out of the 2500 tickets available for the 2016 event in September.

The event draws heavily and explicitly on the *Mad Max* films, but also incorporates "other iconic pieces of post-apocalyptic pop culture", such as the weekend's "official sport" of Juggler, an armed football/rugby hybrid inspired by the 1989 film *Blood of Heroes* (also called *The Salute of the Juggler*) [1]. *Mad Max*-themed custom vehicles, decorated campsites and elaborate costumes fill the desert with a small town of apocalyptic survivors. DJs, bands, fire-spinners, dancers, stunt performers and circus acts entertain the adults-only crowds. The official theme of the event is: "No one is sure how many years have passed since the world experienced a nuclear apocalypse. Every year, the survivors gather in the wastelands and put on a festival to celebrate another year of beating the odds. It is a time of revelry, trading, music and ceremony. It is Wasteland Weekend." The General Rules explicitly discourage what they term "futuristic/science fiction-based apocalyptic scenarios" such as alien invasions and robot uprisings [3]. Participant's costume technology should reflect what is available at this moment in time, with laser guns, exoskeletons, cyborgs and robots not being welcome. An exception is made for the wearable PIP boy computers from the *Fallout* series. Costume guidelines mandate that nothing should appear "clean or new" and that "repurposing is key", e.g. using sports equipment as armor. The stated purpose of the weekend is to create "a cohesive, immersive illusion that we can all build together and live in for a few days.

Yes, it's a slightly Hollywood-ized "fun" version of the apocalypse, but it is also meant to be reality-based" [3].



Figure 2. Left, a costumed participant rides his war horse through the gates of Wasteland [42]. Right, a participant climbs the Thunderdome [43].

There are a couple elements of Wasteland Weekend that we find interesting. One is the timing of when the event started, with preliminary gatherings in 2004 and the start of the weekend itself in 2010. This was 25 years after the original film trilogy ended, and 5 years before the new film debuted. It seems clear that while the films were the seed for this phenomenon, some other, external element caused it to crystallize at this particular moment in time. It seems likely that generalized cultural anxieties about global climate change and environmental catastrophe found a release valve of expression via this fan community.

One of the key practices of the community is making things. The official website puts it thus: "Wasteland Weekend takes place in the broken world of tomorrow. Wasteland Weekend is all about the innovation and mind-blowing creativity involved in re-purposing junk and found items, and the DIY attitude. It's re-purposed tires, and found object art. It's the art of distressing and weathering, and the beauty we see in rust, dust, and decay" [3].



Figure 3. "The Fixer" highlights the making practices central to Wasteland Weekend [31]

The aspects of Wasteland Weekend that are concerned with *praxis* are especially interesting within the context of survivalism. Richard Mitchell characterizes survivalists as being primarily concerned with "fantasy role-playing, creative if not concrete problem-solving in imaginary worlds, where troubled times can be adequately met with a few simple principles, the tools and resources at hand, and a will to work" [24]. Conceptualizing survivalism in terms of imaginary play provides some framework for understanding the pleasure of roleplaying within a fundamentally hostile dystopian world. Watching how this community envisions and simulates a

possible post-collapse future is a rich source of material about how cultures engage with collapse that we don't have time to fully explore in this paper.

6. CONCLUSIONS

Collapse informatics and the LIMITS community have a problem of intelligibility: the harder we work at communicating insights into dire futures, the more difficult it becomes to overcome the visceral resistance to engaging with the harsh realities our civilization faces. Without an understanding of how public anxiety and imagination around these futures works we cannot hope to build the broad based support needed to meaningfully address these impending futures.

Our analysis has primarily focused on the dystopian apocalyptic future on display in *Mad Max*. While it represents a very common – and extreme – narrative of environmental collapse, it does not have a monopoly on envisioning the future. Other recent works of science fiction provide alternate visions that warrant attention. The 2014 film *Interstellar* [26], for example, is set in a world where agriculture is in decline, leading to dustbowl conditions and population collapse. The most recent installment in the *Fallout* [8] series of video games simulates scavenging, homesteading, and a number of other survivalist practices within a post-apocalyptic future. Paolo Bacigalupi's 2009 novel *The Windup Girl* [4] imagines a post-sea-level-rise, post-peak-oil, post-crop-failure world where power is distributed across a number of biotechnology companies who control monopolies on safe GMO food crops, and communities have become isolated due to the unavailability of any reliable transport infrastructure. These visions of possible futures grapple with a number of concerns that are actively being investigated by the LIMITS community. While these works may not have been created as intentional design fictions, they serve as both reflections of public anxieties around the future, and as examples of how to engage people in issues around sustainability and environmentalism.

We believe in the importance of narrative frameworks to capture and communicate complexity, both within the sustainability research community and to the public at large. For every researcher who reads a paper about collapse informatics, there are thousands of people who instead watch a film like *Mad Max: Fury Road*. While we are not proposing that the entire community quit their research jobs and start new careers in Hollywood, we do believe that it is essential that we find ways to situate our research within a broader public discourse, and that design fiction is a strategy that holds significant promise for communicating possible futures. Likewise, we don't believe that cultural producers can be expected to capture the nuances of the problems under discussion within scholarly and scientific communities without our participation. We might be best served to look at the success of Robert Jarvik's team of scientists, who advised on the production of the film *Threshold*, or at John Underkoffler's diegetic prototypes in *Minority Report*. Both are examples of how scientific agendas enhanced film production and were subsequently advanced by the impact of film on public consciousness. In both instances, the films did not directly persuade viewers to adopt specific positions advocated by the science consultants, but rather provided audiences with resources for formulating opinions about topics that had been previously obscure, alien, or unknown.

By attending to how popular culture is conceptualizing these futures we gain a better understanding of the gaps in public knowledge and the misconceptions about sustainability. *Mad Max's* future isn't particularly realistic, but it represents deeply held beliefs about humanity and the environment that form the baseline assumptions for many people when thinking about

collapse. Until we understand the nature of the narrative around collapse from this perspective, we will not be able to impact it.

REFERENCES

1. Anonymous. 2015. *The Blood of Heroes*. Wikipedia, the free encyclopedia. Retrieved March 21, 2016 from https://en.wikipedia.org/w/index.php?title=The_Blood_of_Heroes&oldid=668694681
2. Anonymous. A Brief History of Wasteland Weekend. *Wasteland Weekend*. Retrieved March 21, 2016 from <http://wastelandweekend.com/history/>
3. Anonymous. Wasteland Weekend, Theme. *Wasteland Weekend*. Retrieved March 21, 2016 from <http://wastelandweekend.com/about/theme/>
4. Paolo Bacigalupi. 2015. *The Windup Girl*. Night Shade Books.
5. Eric P.S. Baumer, June Ahn, Mei Bie, et al. 2014. CHI 2039: Speculative Research Visions. *CHI '14 Extended Abstracts on Human Factors in Computing Systems*, ACM, 761–770. <http://doi.org/10.1145/2559206.2578864>
6. Genevieve Bell. 2012. *Ducks, Dolls, and Divine Robots: Designing our Futures with Computing*. San Francisco, CA, USA. Retrieved March 19, 2016 from <https://vimeo.com/52634332>
7. Wendell Bell. 2011. *Foundations of Futures Studies: Human Science for a New Era: Values, Objectivity, and the Good Society*. Transaction Publishers.
8. Bethesda Game Studios. 2015. *Fallout 4*. In (Microsoft Windows). Bethesda Softworks.
9. Jim Bizzocchi and Joshua Tanenbaum. 2011. Well Read: Applying Close Reading Techniques to Gameplay Experiences. In *Well Played 3.0: Video Games, Value, and Meaning*, Drew Davidson (ed.). ETC-Press, Pittsburgh, Pennsylvania, USA, 262 – 290.
10. Julian Bleecker. 2008. *Design Fiction: A short slideshow on design, science, fact and fiction*.
11. Mark Blythe. 2013. The hitchhiker’s guide to ubicomp: using techniques from literary and critical theory to reframe scientific agendas. *Pers. Ubiqu. Comput.*: 1–14.
12. Pascale-L. Blyth, Miloš N. Mladenović, Bonnie A. Nardi, Norman M. Su, and Hamid R. Ekbia. 2015. Driving the Self-Driving Vehicle. *IEEE International Symposium on Technology in Society*, IEEE Computer Society. Retrieved March 21, 2016 from <http://milosmladenovic.info/Professor%20Milos%20Mladenovic%20publications/Driving%20the%20Self-Driving%20Vehicle%20Expanding%20the%20Technological%20Design%20Horizon.pdf>
13. Torie Bosch and Bruce Sterling. 2012. *Sci-Fi Writer Bruce Sterling Explains the Intriguing New Concept of Design Fiction*. The Slate Group.
14. Paul Dourish and Genevieve Bell. 2014. “Resistance is futile”: reading science fiction alongside ubiquitous computing. *Personal and Ubiquitous Computing* 18, 4: 769–778. <http://doi.org/10.1007/s00779-013-0678-7>
15. Anthony Dunne. 2008. *Hertzian Tales: Electronic Products, Aesthetic Experience, and Critical Design*. The MIT Press. Retrieved March 8, 2016 from <http://www.amazon.ca/exec/obidos/redirect?tag=citeulike09-20&path=ASIN/0262541998>
16. Anthony Dunne and Fiona Raby. 2013. *Speculative everything: design, fiction, and social dreaming*. The MIT Press, Cambridge, Massachusetts ; London.
17. Batya Friedman and Lisa P. Nathan. 2010. Multi-lifespan Information System Design: A Research Initiative for the Hci Community. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, ACM, 2243–2246. <http://doi.org/10.1145/1753326.1753665>
18. Xinning Gui and Bonnie Nardi. 2015. Sustainability Begins in the Street: A Story of Transition Town Totnes. Atlantis Press. <http://doi.org/10.2991/ict4s-env-15.2015.41>
19. Johan Huizinga. 1949. *Homo Ludens*. Taylor & Francis.
20. David Kirby. 2009. The Future is Now: Diegetic Prototypes and the Role of Popular Films in Generating Real-world Technological Development. *Social Studies of Science* 40: 41–70.
21. Ben Kirman, Conor Linehan, Shaun Lawson, and Dan O’Hara. 2013. CHI and the Future Robot Enslavement of Humankind: A Retrospective. *CHI '13 Extended Abstracts on Human Factors in Computing Systems*, ACM, 2199–2208. <http://doi.org/10.1145/2468356.2468740>
22. Bran Knowles and Elina Eriksson. 2015. Deviant and guilt-ridden: Computing within psychological limits. *First Monday* 20, 8. Retrieved March 19, 2016 from <http://journals.uic.edu/ojs/index.php/fm/article/view/6127>
23. George Miller. 2015. *Mad Max: Fury Road*.
24. Richard Mitchell. 2001. An interview with Richard G. Mitchell Jr. author of *Dancing at Armageddon: Survivalism and Chaos in Modern Times*. Retrieved March 20, 2016 from <http://press.uchicago.edu/Misc/Chicago/532445in.html>
25. Bonnie Nardi. 2015. Designing for the Future: But Which One? *interactions* 23, 1: 26–33. <http://doi.org/10.1145/2843592>
26. Christopher Nolan. 2014. *Interstellar*.
27. Birgit Penzenstadler, Ankita Raturi, Debra J. Richardson, M. Six Silberman, and Bill Tomlinson. 2015. Collapse (and other futures) software engineering. *First Monday* 20, 8. <http://doi.org/10.5210/fm.v20i8.6123>
28. Birgit Penzenstadler, Bill Tomlinson, Eric Baumer, et al. 2014. ICT4S 2029: What will be the systems supporting sustainability in 15 years. Atlantis Press. <http://doi.org/10.2991/ict4s-14.2014.4>
29. Plato. 1972. *The Republic of Plato*. L: Oxford University Press, 1972. 366p.
30. Barath Raghavan and Justin Ma. 2011. Networking in the Long Emergency. *Proceedings of the 2Nd ACM SIGCOMM Workshop on Green Networking*, ACM, 37–42. <http://doi.org/10.1145/2018536.2018545>
31. rbeforee. WW2011 - 017. Flickr - Photo Sharing! Retrieved March 21, 2016 from <https://www.flickr.com/photos/rbeforee/6187349569/>
32. Stuart Reeves. 2012. *Envisioning Ubiquitous Computing*. ACM Press.
33. Miguel Sicart. 2014. *Play Matters*. The MIT Press, Cambridge, Massachusetts.
34. Bruce Sterling. 2005. *Shaping things*. MIT Press, Cambridge, Mass.
35. Joseph A. Tainter. 1988. *The Collapse of Complex Societies*. Cambridge University Press.
36. Joseph A Tainter and Tadeusz W Patzek. 2012. *Drilling down the Gulf Oil debacle and our energy dilemma*. Copernicus Books, New York, NY. Retrieved March 21, 2016 from <http://public.eblib.com/choice/publicfullrecord.aspx?p=883878>
37. Joshua Tanenbaum. 2015. Hermeneutic Inquiry for Digital Games Research. *The Computer Games Journal*: 1–22. <http://doi.org/10.1007/s40869-015-0005-9>
38. Joshua Tanenbaum, Audrey Desjardins, and Karen Tanenbaum. 2013. Steampunking Interaction Design: Principles for

- Envisioning Through Imaginitive Practice. *interactions* 20, 3: 28–33.
39. Joshua G. Tanenbaum and Karen Tanenbaum. 2015. Fabricating Futures: Envisioning Scenarios for Home Fabrication Technology. In *Creativity in the Digital Age*, Nelson Zagalo and Pedro Branco (eds.). Springer London, 193–221. Retrieved from http://dx.doi.org/10.1007/978-1-4471-6681-8_11
40. Joshua G. Tanenbaum, Amanda M. Williams, Audrey Desjardins, and Karen Tanenbaum. 2013. Democratizing Technology: Pleasure, Utility and Expressiveness in DIY and Maker Practice. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, ACM, 2603–2612. <http://doi.org/10.1145/2470654.2481360>
41. Joshua Tanenbaum, Karen Tanenbaum, and Ron Wakkary. 2012. Steampunk As Design Fiction. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, ACM, 1583–1592. <http://doi.org/10.1145/2207676.2208279>
42. V Threepio. Wasteland Weekend 2015. *Flickr - Photo Sharing!* Retrieved March 21, 2016 from <https://www.flickr.com/photos/warriorpoet/21797443519/>
43. V Threepio. Wasteland Weekend 2015. *Flickr - Photo Sharing!* Retrieved March 21, 2016 from <https://www.flickr.com/photos/warriorpoet/21797404329/>
44. Bill Tomlinson, Eli Blevis, Bonnie Nardi, Donald J. Patterson, M. SIX Silberman, and Yue Pan. 2008. Collapse Informatics and Practice: Theory, Method, and Design. *ACM Trans. Comput.-Hum. Interact.* 20, 4: 24:1–24:26. <http://doi.org/10.1145/2493431>
45. Bill Tomlinson, Juliet Norton, Eric P. S. Baumer, Marcel Pufal, and Barath Raghavan. 2015. Self-Obviating Systems and their Application to Sustainability. Retrieved September 25, 2015 from <https://www.ideals.illinois.edu/handle/2142/73442>
46. Bill Tomlinson and M. Six Silberman. 2012. The cognitive surplus is made of fossil fuels. *First Monday* 17, 11. <http://doi.org/10.5210/fm.v17i11.4120>
47. Bill Tomlinson, M. Six Silberman, Donald Patterson, Yue Pan, and Eli Blevis. 2012. Collapse Informatics: Augmenting the Sustainability & ICT4D Discourse in HCI. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, ACM, 655–664. <http://doi.org/10.1145/2207676.2207770>
48. Josefin Wangel, Mattias Höjer, Daniel Pargman, and Örjan Svane. 2013. Engineers of the future : using scenarios methods in sustainable development education. Retrieved March 17, 2016 from <http://www.diva-portal.org/smash/record.jsf?pid=diva2%3A746565&dswid=3629>