Configurative Design: Reshaping Dystopian Fiction as Preferred, Future States

Keith Evan Green and Eric Gendreau

ABSTRACT
We introduce Configurative Design, a new framework for designing interactive systems intended to help cultivate a “preferred state” of affairs for futures, unknown. Building upon previous work from Future Studies, our framework seeks to overcome the constraints of user-centered design methods by fostering speculation of possible futures through making interactive systems, facilitated in part by rapid, digital fabrication. Utilizing the rich complex of people, processes, and places found within dystopian fiction, Configurative Design enables designers to give form to capacious, socio-material artifacts envisioned for use today and, by design, anticipating their use in circumstances yet known to us. In particular, Configurative Design highlights interactions across numerous and diverse human and non-human actors over extended periods of time, across cyber-physical space. The case study presented here, drawing from a J. G. Ballard story, offers early validation of this framework.

Author Keywords
Design methods; design fiction; interactive environments; prototyping; dystopia.

CCS Concepts
•Human-centered computing → Interaction design process and methods;

INTRODUCTION
Design researchers and practitioners strive to transform the world “from its current state to a preferred state” [39]. In so doing, designers, especially designers from within the HCI community, rely routinely on user-centered design methods to develop informed solutions responsive to societal problems. Endemic to the act of designing is, however, a time-lag mostly overlooked by designers. This time lag is the duration that begins with identifying societal needs and ends with its impact on society (subject to change due to circumstances), with the processes of design, manufacturing, marketing, and distribution in the middle. Digital manufacturing reduces this lag-time for minuscule production runs, but the impact of small numbers of artifacts is nominal on a larger population, and there is still the lag-time of awaiting their impact. In short, as artifacts we design today are fabricated and used later, designing remains a prophetic act of designing for circumstances yet known. Recognizing the widespread unawareness of this basic fact by designers, Otto Wagner, the Viennese architect of the late 19th century, proclaimed (in upper-case) the work of design “a FUTURE work” [37].

If designing is indeed a prophetic act, then many user-centered design methods that designers routinely use fall short, given that the requirements that such methods help identify today, for a limited number of participants, may not prove relevant to the inhabitants of a rapidly changing world in its many aspects - political, environmental, financial, technological, social, and psychological. In the familiar words of Kierkegaard [24], “Life can only be understood backwards; but it must be lived forwards.” The HCI community has expressed much the same. For instance, Bannon, Bardzell, and Bodker [6] characterize user-centered design methods as “banal, . . . concentrating on more local issues of usability and user satisfaction.” Similarly, Harrison, Back, and Tatar recognize the unfortunate practice of “dressing up design methods as more systematic and predictive than they are” [12]. Kolko [25] creates an inventory of such overwrought user-centered design techniques

Figure 1. The four working prototypes of our case study used to validate the Configurative Design approach.
as “two-hour ‘subject matter expert’ interviews,” “‘canvasses’,” “‘playbacks’,” “‘design sprints’,” and “lots and lots of Post-it notes.” And for Toyama, “potential users” - the finite number of participants participating in design studies - “don’t necessarily do or want things that make” for compelling interaction design [36], limiting prospects for innovative design outcomes. Or, as Steve Jobs succinctly put it, “People don’t know what they want until you show it to them” [10]. Moreover, conducting user-centric design studies can be costly, and most organizations channel their resources into design projects that, above all, promise to produce large financial returns.

In this paper, we propose a design framework that strives to overcome the limitations of user-centered design methods by shifting attention from user studies and product viability in favor of a more expansive design process that fosters speculation of possible futures - multiple and heterogeneous [35], “across time and stakeholders” [17] - through making interactive systems. This “giving form to possible futures” benefits from the readily available means of digital fabrication that makes for rapid, facile, high-resolution output. Given the numerous actors and relations we are considering, the artifact designed may be manifested as anything from object-scale to building-scale, and is quite frequently manifested as a capacious, interactive, cyber-physical environment (see Figure 1) to accommodate such complexity. This attention to physical scale - tending towards an interactive environment (filled with actors and objects) more than only to a singular, interactive object - is a key characteristic (and, we offer, a strength) of our design framework. To be clear, we see this framework useful to developing single interactive devices at object-scale, but always in the context of designing capacious cyber-physical environments envisioned filled with other such devices, people using them, and the processes that unfold between them.

At its core, our design methodology expands upon previous work [7],[11],[17],[20],[29],[31] on design futures that highlight the benefits of using fiction to open-up the design space for future studies. By “opening up,” we mean opening up the design space to the dimensions of a complex world yet known. But what fiction? [31], and for which future? [29]. Through literary history, works of fiction have portrayed the future as bright (as in fairy tales and visions of utopia). But darker futures are more popular in today’s fiction - so much so that Jill Lepore pronounced this “a golden age of dystopian fiction” [27]. Since its first usage in 1868 [21], the “dystopia” of dystopian fiction is characteristically “an unhappy country” [27]. Not surprisingly, dystopian fiction became popular in the time of the Industrial Revolution, and deeply rooted in dystopian fiction is a pessimism about technology and its impact on society [21],[27].

While Lepore’s consideration of dystopian fiction is enlightened, she makes a declaration that no designer could (or should) leave unchallenged. That is: “Dystopia cannot imagine a better future, and it doesn’t ask anyone to bother to make one.” Doesn’t Lepore’s declaration lie in direct opposition to the aim of design, to transform the world “from its current state to a preferred state”? As a challenge to Lepore, the design framework presented here aims to remedy, rectify, or in some way debug technology encountered in the dystopian tale to achieve a preferred state of affairs.

DESIGNING THE FUTURE

Our framework is inspired by the branch of Speculative Design [4],[16],[28], Future Studies and its associated design methodologies. Kozubaev summarizes the field of Future Studies [26], presenting the two (often conflicting) goals and duties of futurists: 1) “a futurist’s goal is to question dominant narratives about the future within and outside an organization, both by making these narratives more transparent and by helping create alternative ones”; and 2) “futurists are tasked with producing insights that are actionable today” [26]. Our framework seeks to reconcile these two contradicting goals in the next section. Due to the increasingly complex challenges affecting our world, this nascent “field of the future” is ripe for innovation. Future Studies breaks free from the constraints of human-centered design to apply new methods for design exploration.

Our framework is especially informed by the subfield of Future Studies, Design Futures, familiar to many in the HCI community. Design Futures opens up the design space by using narrative to envision the people, problems, and environments of future worlds. This enables “designers to undertake a kind of ‘user’ research in a world that does not (yet) exist” [11]. Designers can then leverage these rich narratives to design novel artifacts that would otherwise be unattainable when situated in a future limited by the context and knowledge of today. Christopher Le Dantec, a proponent of Design Futures, summarizes why the HCI community should embrace this method [11]. Le Dantec emphasizes with designers who are “tethered to the daily constraints” encountered when using conventional human-centered design methods. Describing the task of Design Futures, Le Dantec advocates “departing from these familiar contours . . . , an intentional move that lets us interpret the world anew or interpret a world full of experiences to which we might not have personal access.” Design Futures, writes Le Dantec [11], enables designers to “make a radical break, exploring experiences beyond what we find comfortable or easy to represent . . . .”

Design Futures has since spawned into myriad forms. Of these, we focus on Design Fictions. (Guidelines for creating Design Fictions is found in [31], and a history of Design Fictions is found in [9].) Design Fictions leverages narratives similar to science fiction to envision novel design solutions grounded within a future world, yet escapes the traps of infeasibility often found within the genre [9],[31],[34]. Framing Design Fictions as a diegetic process is critical, as it “places the emphasis on working out not only how something appears and operates, but also how it fits into the larger technology and social landscape” [31]. Blythe illustrates this by highlighting Bleeker’s work, showing how “Bleeker’s fictions present not just imaginary products but worlds for them to exist in” [9]. However, designers must be mindful that science fiction is an “extension of the ideas of the time when it was written and as embedded within the cultural expectations of that time” [31]. As a result, when using science fiction as a source of inspiration for these narratives, the design space may be inher-
Design Futures and its subareas, such as Design Fictions and Afrofuturism, open up the design space by using narrative to frame the designer’s work within new worlds unconstrained by the limitations and biases of today. However, the aim of this work typically focuses on envisioning new design solutions for these future worlds, while overlooking the learning that comes about through the process of making, a process that has been argued to be paramount for fruitful Research through Design [19],[8]. We envision our framework, elaborated in the next section, to capitalize on this process. Our framework is about thinking and making through the complexities that comprise/make our world. It’s about anticipating in an artifact today what it might need to be tomorrow. It’s also very much focused on the primacy of making and on the artifact as much as it recognizes the importance of thinking that goes in tandem with this making. It’s about an artifact that is complete in itself, and yet, by design, unfinished and open to some kind of nimble transmutation that makes it still relevant for yet seen futures. Our design framework works within the frame of dystopian fiction, presenting the designer with a complex use case “in the negative” with which to grapple and invent.

CONFIGURATIVE DESIGN
A departure point for our design framework is Jennifer Golbeck’s approach to teaching an introductory course in HCI [20], in which students are asked to design interactive artifacts for, in her case study, the Ghostbusters from the popular film of the same name. At the start of the process, Golbeck and her students watch scenes from the movie in which the Ghostbusters benefit from (or are imagined to benefit from) interactive technology. Once students, inspired by a scene, have identified a technology for design development, students physically prototype that technology following an iterative design and evaluation process that includes low and high-fidelity production as well as user-centered methods such as generating personas, heuristic evaluations, and cognitive walkthroughs. In Golbeck’s pedagogical approach, evaluation activities benefit from having the movie readily available to students for their further review and analysis; students test their technology against the targeted users (Ghostbusters) and their interactions with that technology in various contexts (i.e. the movie’s scenes). To gain further insights, a student might also user-enact [Odom] the role of a Ghostbuster, tracing the script of a specific movie scene while directly interacting with the developing artifact.

Golbeck’s pedagogy is a compelling introduction to HCI aimed at cultivating a student’s creativity, technical skill, and an understanding of users and their environments. Drawing on scenes from a movie opens up - even for the least experienced designer - a world of complexity not offered in more traditional HCI assignments defined by prescribed problems targeting user populations and specific use cases. Our design framework, however, departs from Golbeck’s pedagogical approach foremost in its foregrounding that world of complexity.

To tackle the chaotic, wicked problems of the future, our design framework exploits, specifically, works of dystopian fiction, as just considered in this paper, to essentially debug their suboptimal states. Forging intensive user research, our process leverages the entanglement of problems, environments, and protagonists found in such fiction to enable us, as designers, to begin thinking and making better worlds. Rather than identifying a technology from within a movie scene as design inspiration, our design framework explores fiction as an extended field of interactions across multiple artifacts [33] and the intimate lives of people encountered in the fiction, with all the negotiations between protagonists and their surroundings playing-out over an extended duration of time and space.

Our design framework involves the following:

I. Mapping the Work of Fiction
Mapping the work of fiction aims to identify that work’s protagonists, places, and processes (social, psychological, cultural, political, economic, …) with particular emphasis on human-machine relations. The designer works through still and moving images (see Figure 2), text, and found artifacts - anything from material culture that will help ponder and delineate the network of associations across people, things, and places.

II. Generating Plausible Backstories: The Augmented Persona
Plausible backstories for the protagonists are generated with the aid of that method used by method actors following Stanislavski’s acting technique [1]. To build a rich backstory, Stanislavski’s method asks actors to “ask their characters” seven questions: Who am I?, Where am I?, What time is it?,...
What do I want?, Why do I want it?, How will I get what I want?, and What must I overcome? Going beyond the superficialities of the persona (e.g., a name, an age, a profession, interests), a backstory aims to construct the complex of attributes that make a person, including that person’s intent, motivation, desire, level of self-awareness, relationships, attitudes, shortcomings, and beliefs. The benefits of such a backstory for a designer designing interactive systems is not dissimilar for an actor acting a role: to inform choices made, to bring the work to life, to avoid cliches, to fully realize a multi-dimensional figure [18].

III. Scenario-in-the-Text
In our design framework, scenarios are written (i.e. inserted) directly into the written dystopian text, very selectively, as a corrective measure, a turn in the tale, a possible preferred state that the designer strives to achieve by way of the artifact(s) designed. The scenario becomes a rewriting of the fiction at precisely that instant or instances when the misfortunes of the protagonists can possibly be overturned, catalyzed by interactive technology.

IV. Configuring the Artifact
Similar to design fiction’s need for system feasibility, and consonant with Golbeck’s pedagogy, our framework remains grounded in making functioning prototypes. Prototypes themselves, along with the process of making them, are tools for design thinking, interrogating, and socio-technological implementation. As a means of capturing early design intentions to potentially prototype, a designer might earl-on prepare a collage of precedents as in Figure 3.

In our design framework, the primacy of making functional prototypes represents a conscious aim to escape the easy trap of generating altogether unfeasible imaginings. At the same time, low-cost, rapid prototyping techniques provides designers a nimble vehicle for quickly and iteratively creating myriad visions of futures yet known. As a consequence, our attitude towards making has an outcome that is less defined by prototyping (as in, producing an “early example of something” [15] and more by configuration (the shaping or organizing of things [14] subject not only to the designs whim but also to wide-ranging, visible, anticipated, and altogether unknown influences).

In her paper entitled “Configuration” [35], Lucy Suchman ponders how human beings and the things they make (machines are her focus) are not distinct entities but instead figured together - or configured and then reconfigured - in the sense that they are shaped by each other and their surroundings over time. Suchman’s sense of the word figure is surely indebted to the theory of social semiotics (e.g. Hodge and Kress [23] and Danto [12]), and reawakens the etymological meaning of the figura used by the Church Fathers of the first centuries A.D.: figure in the sense of something “both real and . . . something other, future, true [which] lies concealed” within the thing [3].

Configurative Design is the name we lend our design framework. The aim of Configurative Design is to design socio-material artifacts that both embody and shape what is external to them, now and in the future, in our striving to design preferred states. The primary distinction between Configurative Design and allied frameworks like Embodied Interaction and Speculative Design is that Configurative Design is particularly attentive to designing for futures “in the making” and their multitudes of interactions across wide-ranging human and non-human actors over extended periods of time and spaces. To accommodate the complexity of these envisioned futures, the material outcomes of Configurative Design are often capacious, cyber-physical environments rather than a singular device somewhat isolated from the richness of context. But no matter whether they be software, devices, furnishings, rooms, buildings, cities, or combinations of these things across physical scales, the artifacts of Configurative Design are responsive to “the now” and yet also anticipate, by design, happenstances, entanglements, and frictions [35] that inevitably occur at some instant, somewhere, in the life-cycle of human and non-human actors.

V. Evaluation Defined by Enactments in Social Settings
With respect to evaluation, our framework is in concert with Golbeck’s pedagogical approach, where the interactive system is tested with respect to the protagonists encountered in the work (of dystopian fiction, in our case) and their interactions with the designed artifact in designated instances of the text and the scenarios embedded within them. To extend the capacity of evaluation activities to possible futures, however, we envision evaluation following from Lofland’s “social setting framework” [32] whereby every social setting involves (human and non-human) actors engaging in activities with others in a certain space. In practical terms familiar to HCI, and again following from Golbeck, our framework promotes the use of “user enactments” (UES) [22],[30] whereby the designer assumes the role of a protagonist in the unfolding text and embedded scenario, constructed (to the fullest extent possible) as both “physical form and the social context of simulated futures” [22] within which the designer directly interacts with the developing artifact. Due to the cost and complications of constructing full-scale the tangible setting of the text and scenario, we advocate building to scale, so that the enactment occurs in a scale model with scaled figures representing the protagonists. The workings of this to-scale UE evaluation procedure has been elaborated in [2].
CASE STUDY: BALLARD’S “STELLAVISTA,” FORWARD

We envision Configurative Design used by designers as an apt framework for pondering and probing relationships across people and their surroundings found in dystopian fiction as a means to materialize interactive technologies for possible futures. As a convenient means to validate our framework, we report here on a case study conducted in Spring 2018 at [x] University where Configurative Design was used by graduate and senior undergraduate students to accomplish the core assignment for an interaction design studio course. (The class included students from systems and mechanical engineering, computer science, information science, and design.) Drawing from J. G. Ballard’s classic dystopian short story, “The Thousand Dreams of Stellavista,” [5] and equipped with 3D-printers, laser cutters, microcontrollers, and a woodshop, students fabricated functioning, artful, meticulous, cyber-physical artifacts and environments responsive to instances within the story when technology runs amok, threatening the sanctity of a husband-wife relationship.

In Ballard’s story, a young couple, Howard and Fay, purchase, and inhabit a robotic house among an enclave of other houses in a desert community somewhere in the southwestern part of the United States, perhaps at the far reaches of Los Angeles. The homes were designed to be “psychotropic” meaning that they sense the emotional disposition of the inhabitants and physically and, more broadly, atmospherically “morph” themselves to reflect this disposition. Since their construction, the homes have however suffered many malfunctions, so that some of them were taken off-line and some have been reprogrammed to have limited functionality. As Howard and Fay “brought home” their own marital complications, the robotic house they purchased (at an enticingly low price) quickly became threatening to their marriage and their wellbeing. This work of dystopian fiction was chosen for its brazen display of what happens when technology, sought to improve our future, goes horribly wrong. As designers, the class took Ballard’s story as a challenge to configure better futures for the protagonists and implicitly for us, working from the context of the story when technology runs amok, threatening the sanctity of a husband-wife relationship.

We also identified an imagined site for the home Howard and Fay purchased by using the internet to explore actual physical sites in the far periphery of Los Angeles that matched our sense of the place. We arrived at the address 125 Rose Court, Upland, CA 91784, and downloaded from the local building department the plot which defined the physical site for our design (Figure 4).

II. Generating Plausible Backstories

To “paint portraits” of the protagonists - what we characterize here as “augmented personas” - the students of the class, in small groups, created backstories for Howard and Fay using Stanislavski’s seven questions as a guide. In the process of doing so, each group also searched online for images of the two protagonists as they imagined them. The groups came together as a class to compare their backstories and their found images to construct a collective understanding of Howard and Fay that each student could return to in the iterative process of design and evaluation. Figure 5 shows sixteen faces drawn from a Google image search that represent the finalists, with Fay (upper-right of the figure) and Howard (lower-left) encircled in red to identify our selection. We characterized Fay (30 years old, a freelance writer) as a stronger character than Howard, opinionated, introspective, not gullible, curious, starstruck, acquiescent; while Howard (34 years old, a lawyer) was careerist, starstruck, a social climber, dismissive, obsessive, who smiles with a purpose. These descriptions are merely a departure point, given the limited space of this paper. Using Stanislavski’s seven questions, the characters were more fully elaborated. Our characterizations of the complexity and dynamics of these two individuals and their union will become more evident in the scenarios presented (as excerpts) below.

Each student team created a moodboard (Figure 6) and a range of sketches (like the morphological chart found in Figure 7) as additional means to make visible the people, processes, and places of the fictional work.

III. Scenario-in-the-Text

At this juncture in designing better futures for Howard and Fay, the members of the class formed four teams of two to
four students with attention to mixing students from different departments to encourage a rich design trajectory. Each group composed a scenario that was inserted directly into the published text of Ballard’s dystopian story, very selectively, after the description of a traumatic incident, as a corrective measure, a turn in the tale, a possible preferred state that the team strives to achieve by way of the artifact designed. Each group focused on one area of the house, and the technology there, seeking to configure an improved state of affairs from the malfunctioning technological system afflicting the couple. The scenarios of each team, embedded into the original text, offer better prospects - for technology, for two people, and for us as the designers and inhabitants of a yet known future.

Presented below are each of the four team-generated scenarios (excerpts of which are presented below in normal type), embedded in the text of the story (shown in italics), with some additional text (appearing in brackets) to help convey the context to the reader. Interspersed in these blocks of text are photographs (Figures 8-12) of the working, ‘to scale’ prototype to help convey the scenarios and present the artifacts configured from them. Each of the four projects was assigned a title to capture the essence of the project’s intention: “Rejuvenating,” “Balancing,” “(Positive) Emoting,” “Healing.”

Rejuvenating
[Bogged down by the stress of her relationship and her career, Fay finds herself grappling to remain emotionally stable, and cites the house as inciting her psychological state. In this excerpt from Ballard’s story, Howard, who is more favorable to the habitability of the house, offers the following account. . . .]

Within five seconds we were in the middle of a blistering row. Fay threw all caution to the winds, deliberately, I think, in the hope of damaging the house permanently, while I stupidly let a lot of my unconscious resentment towards her come out. Finally she stormed away into her bedroom and I stamped into the shattered lounge and slumped down angrily on the sofa.

Fay sunk into her bed and began sobbing. She felt like her world was falling apart. She wasn’t enjoying her work anymore, and her relationship with Howard was strained. After a good cry, Fay found the reserves to continue working on
an editorial piece for her company. She stared at her blank notepad, nibbling at the back of her pen, restless and anxious. No progress.

Fay decided to invite her best friend, Clara, over for some wine. It would help relax her and get her mind off work for a while. [...] After an hour together, Fay, still unsettled, followed Clara to the door. She was still not ready to start writing her piece.

Suddenly, a slit appears in the front wall. It deepens and the front wall of her living room begins to open to the outdoors. Fay and Clara look at each other in astonishment. A small table with three colored marbles and three colored plates rises from the ground outside the living room. Fay and Clara walk up to the table, cautiously, and anxiously peek at the table. Having lived in the psychotropic house for almost a year, Fay knew that she was meant to choose a colored marble and place it on one of the three plates. Could this be something new in the life of this strange house? Clara was more apprehensive about touching anything in the house, but Fay went ahead, picking a yellow marble and placing it on the left-most plate.

In response to placing the marble, thought Fay, the ground beneath them began to violently vibrate. Fay and Clara held on to each other in fear of what this robotic house would do next. The landscape outside began to slowly rise, breaking free from the grass on the lawn. Fay and Clara gasped. What looked like small hills emerged in the yard as did brightly colored, organic-shaped lounge chairs. In the gentle movements and recomposition of the yard, Fay caught her breath and discovered a new calm. The different shallow and steep hills of the landscape and the colorful furniture made the whole of the yard enchanted. Fay sat atop one of the lounge chairs and eventually, there, pondered her creative work (Figure 8).

**Balancing**

[Howard finds Fay curious about the interactive kitchen system, or perhaps trying to disarm it . . .]

*One morning I caught her on her knees by the console, poking a screwdriver at the memory drum, apparently in an effort to erase the entire store.*

I knew that this would completely change the dynamic of the house... (Figure 9). I suggested we go to the reading room, where we could enjoy a space that allows for the ideal amount of indoor and outdoor space depending on our moods.

I was not surprised to find that, upon entering, Fay’s feelings of stress and tension were recognized by the room, which quickly transformed by brightening. A large wall display lit up with the encouraging message, “Let’s cheer you up!” Two walls unfolded, displaying the beautiful surroundings outside. A stairway folded out of another wall, allowing us to ascend onto an outdoor balcony that pivoted from the exterior wall. Fay and I enjoyed a moment to settle down under the bright morning sun (Figure 10 - left).

The room underneath us started to restructure itself again into a more intimate space, and Fay’s desk swiveled into a sunny corner where she could enjoy the sun from the comfort of the indoors (Figure 10 - right). A now mellowed Fay decided she wanted to finish the article she was writing for her new clients.

**(Positive) Emoting**

[Another battle ensues between Howard and Fay. While eating dinner at the dining table, Fay accuses Howard of being overly attached to the psychotropic identity of the house, shaped over years by the previous owner, Gloria Tremayne, a glamorous...]

![Figure 8. After her initial disbelief, a newly-calmed Fay climbs atop an outdoor sofa that gently springs upward as if a cloud.](image)

![Figure 9. A model of a segment of the house as considered in the “Balancing” scenario. The stairs and a wall element are here shown folded flush with the rear wall.](image)

![Figure 10. Stairs to the roof-top (left image) unfold upon sensing the emotional need of Howard and Fay for a brief escape together. Fay soon descends the stairs and finds a sunny interior space to be productive at work.](image)
Hollywood starlet suspected of killing her husband, Vanden Starr, during their residency in the house. In this excerpt, an enraged Fay challenges Howard’s attachment to the human figment absorbed by the house...

Upset - ? Howard, what are you talking about? Haven’t I a right to my own husband? I’m sick of sharing him with a homicidal neurotic who died five years ago. It’s positively ghoulish!

Hitting a breaking point, the dining table had completely turned into an enraged red (Figure 11-left), signaling the collective fury of both Fay and me. That was the table’s cue to begin separating us (Figure 11-right). From sitting directly across from each other, Fay and I began to move sideways in opposite directions. Each end of the table slowly moved along its track, until only half of the table surfaces were still touching. This new additional space required me to slightly crane my neck to the right in order to maintain eye contact with Fay, which hopefully would be enough to make us realize our disagreement was getting out of hand.

But, despite the table’s separation, our argument raged on. The table, however, knew what it had to do: complete separation. The table’s motors started-up once again, and swiftly separated each of its halves. Sliding along their track, the table halves ended their journey when they reached their opposing docks at the far walls of the room. In order to give us some space to decompress, the chairs swiveled around the table halves. The combined dock and table at each end of the room created for each us our own precinct. Staring down at our meals, we continued eating our meal in silence.

The next afternoon... I knew that I was, in fact, treating Fay in exactly the way that Vanden Starr had treated Gloria Tremayne, recapitulating the steps of their tragedy with consequences that were equally disastrous.

Walking into the kitchen, I saw a deep blue light emanating through Fay’s table. This was one of the features of our psychotropic house. Each of our tables had an array of LEDs that illuminated through its translucent surface. The lights’ color corresponded with our current mood. My hunch was affirmed, hitting me like a pile of bricks. Seeing the color of Fay’s sadness displayed in the table’s surface made clear the consequences of my actions, and I knew I had to do something to help mend my mistakes. I approached Fay’s table and placed a red marble onto its surface to express my love for her, to help comfort her, and the red immediately radiated through the table, blending with Fay’s sullen blue (see Figure 14 on the next page). This was my way of signaling to Fay that I heard her, and I was there to support her. Next time Fay arrives in the kitchen, she will hopefully discover my olive branch.

Healing
[This scenario follows the same text as the first one. Howard offers this account...]

Fay sank into her bed and buried her head in her hands. Downstairs, she could hear Howard stomping around... Suddenly, a low whirling bass began to reverberate through the house. Fay recalled an almost-forgotten conversation with the real-estate agent shortly before they had purchased the house: not all of the house’s actuation was powered by bioplastic. Before the pioneers of psychotropic architecture had managed to completely realize their insane dream of making people feel like they were living in the internal organs of a giant, some engineers had managed to sneak normal electrical motors into the design. Fay almost wanted to cry with relief.

Fay ventured out of her room and began to descend the stairs. Some of the stair cross-sections which connected the two floors of the house had slid past one another, forming a path downstairs where Howard was waiting (Figure 12). Cautiously, Fay made her way down.

Once Fay and Howard were at the bottom of the stairs, the cross-sections began moving again. This time, a portion of them moved to the left, revealing a lowly-lit, intimate dining room. Fay and Howard both entered the room. Over the course of the next few hours, they talked-out their interpersonal differences, chief among them being Howard’s neuroses and manipulative ways.

Configuring the Artifat
In configuring the artifact, the designer can use all manner of making visible the people, processes, and places of the fictional work, including moodboards (see Figure 6) and hand-
drawings and diagrams like the morphological chart found in Figure 7, all of which were integral to the process of this case study. Prototyping was both low-fidelity and higher-fidelity, and the mechanisms to render the prototypes functional sometime become quite complex, as in Figure 13 which shows the underside of the “Rejuvenating” scenario that creates the morphing, outdoor landscape. In this prototype, a rack-and-pinion actuator was laser-cut from transparent acrylic sheet and driven with hobby servo motors. The end-effectors of these actuators were 3D-printed segments of altered sphere geometries which create a playful collection of hill formations, rising and falling. Also seen in this prototype are 3D-printed outdoor furnishings (figure 8) in amoebic shapes, later painted bright colors, that also, gently, rise and flow as if with the tide (or, in our case study, as with emotional states).

Consistent with the four team projects, as elaborated above as scenarios and figures, is a “marble” interface (See the foreground of Figure 8 and also Figure 14) that was functional for many of the prototypes. Here, a colored marble is placed in one of several receptors, which then activates in the interactive environment a display of color, a physical change of form, the text on a small display, or sounds emanating from an audio speaker. The marble appears full-scale and functional (Figure 14-left) and to-scale (Figure 14-right) to thread tightly together the narrative in the mind of the viewer, who the designer is implicitly asking to ‘jump scales’ in assembling the unfolding user experience.

Evaluation Defined by Enactments in Social Settings
With respect to evaluation, our framework (as earlier acknowledged) is in concert with Golbeck’s pedagogical approach, whereby the interactive system is tested with respect to the protagonists encountered in the work (of dystopian fiction, in our case) and their interactions with the designed artifacts in designated instances of the text and the scenarios embedded within them. Following from our advocating the use of “user enactments” in Configurative Design, the four teams of students evaluated their designs formatively and summatively by having team members assume the role of Howard and Fay, tracing the unfolding text and embedded scenarios, constructed (to the fullest extent possible) in the physical form and the social context of simulated futures. This process of user-enactment to scale, which follows the CoDAS method of [2], advanced the developing designs from low to high-fidelity prototype, and permitted qualitative assessment of the final outcomes and a basis for reflecting on each of them. Essentially, the four prototypes, all designed around a single house for a single site, served as the stage for various events to transpire over time in what represents an extended, rather complex day-in-the-life of interactions between people, processes, and places.

DISCUSSION
Configurative Design leverages design-thinking-through-making to give form to capacious, socio-material artifacts envisioned for use today and, by design, anticipating their use in circumstances yet known to us. Leveraging the nimble means of rapid prototyping, designers can quickly explore myriad high fidelity versions of future interactive environments. The designed configurations address the trade-off Kozubaev raises between a futurist’s expectations to design for the future, while creating knowledge that’s useful for today [26]. Furthermore, these configurations go beyond addressing single interactions between a user and an interactive technology. Expanding upon Design Fictions, Configurative Design leverages the rich worlds of dystopian fiction as its narrative to frame multiple interactions among humans and technologies over extended periods of time and cyber-physical space. Dystopian fiction informs these frames by providing problems in need of intervention, as well as rich social contexts that illuminate how both the user and intervention are configured. As argued by Kozubaev, “the potential for imagining truly novel alternative futures lies not in merely amplifying voices or clarifying them, but rather in creating novel social and technological conditions under which such imaginings can happen” [26].
Configurative Design fosters a more generative design process to envision and make a preferred state of the future. However, while Configurative Design works well as a framework for designing new futures, it is not seen as a replacement for Human-Centered Design and its many user-study methods. Configurative Design is a generative design process used to create novel artifacts that address the problems of our future. As such, it should not be used to iterate upon current products, where users, environments, and problems have already been determined. In addition, although Configurative Design produces artifacts that may be used to speculate possible futures, these artifacts are often evocative and not meant to meet the requirements of market viability. We envision Configurative Design to be used in more exploratory applications that require questioning or probing relationships across people and their surroundings. For academic design-researchers, Configurative Design offers a productive vehicle for producing knowledge about how new interactive technologies may impact our society of the future. For industry and the academy alike, Configurative Design offers a method for exploring new ecosystems of possible future technologies, and how these may affect possible futures.

CONCLUSION
In a recent New Yorker article [21], Adam Gopnik pondered the question, “Can we learn from the . . . utopians?” Dystopia and Utopia are entwined; or as John Stuart Mill proclaimed, “Dystopia is how utopianism turns back upon itself” [21]. Given the entanglement of utopia and dystopia, we have pondered in this paper much the same as Gopnik: What might we learn from a dystopian work of fiction? And (in consideration of our case study) What is the value in designing a few rooms inspired by the single, detached home described in such a work? Gopnik provides an apt response: “If it seems callous to suggest that making . . . beautiful rooms can make for a better world, it’s immensely moving to see how powerful that idea was for the utopian thinkers of the later nineteenth century” [21]. Gopnik cites in particular the wallpaper of William Morris as the threshold from the interior to a better world outside it, an indelible physical token of Morris’ courageous vision for the future.

Configurative Design is a framework for pondering and probing relationships across people and their surroundings found in dystopian fiction as a means to materialize interactive technologies for possible futures. An early validation of the framework, our case study grappled with a dystopian future of psychotropic houses wreaking havoc on a young couple, which students reconfigured as a series of rooms that offered the couple a happier home, a preferred state of affairs. In offering Configurative Design, the authors of this paper strive to show one way out from the confining dystopia to a more promising horizon. “We always want to get past the room we’re in,” writes Gopnik, “in order to break out and change the universe.” “The lesson that life tends to teach,” he continues, “is that change begins at home, and that we can’t escape rooms on our way to worlds. The world is made of rooms” [21].

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REFERENCES


