

THIS IS A PROJECT, NOT A PRODUCT

PREFACE

ABSTRACT

PART ONE

Defining Terms

An Individual is a Process

Technology and the Process of Becoming

Sleek Surface, Rounded Corners

Habit-forming Technology

PART TWO

Looming

Algorithms Creating Content

Surveillance Capitalism

Who or What is Acting

PART THREE

Design Methodologies

Speculative Art and Design

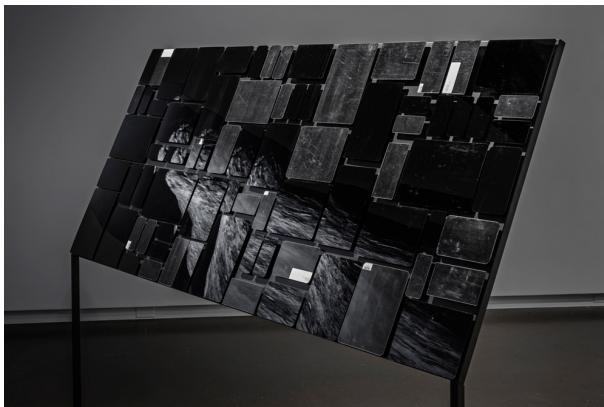
Hacking: A Reciprocal form of Interaction

Open Design: Take, Alter, Transform, Redistribute

A Method for Moving Towards a Deeper Relationship

BIBLIOGRAPHY

THIS IS A PROJECT, NOT A PRODUCT



ANTONIA HIRSCH, SOLARIS PANEL

PREFACE

When I first beheld **these** cut-out shapes of various models of contemporary hand-held devices, I was overwhelmed by emotion. It came from a feeling of immense comfort, in looking at these familiar shapes. I was left with the urge to investigate the relationship between humans and recent technology.

ABSTRACT

This text seeks to investigate the relationship between technology and humans in the process of the becoming of the individual. Central questions are: what are the conditions that form this process; how does design form our relationship with technology; how can technology be designed so that it facilitates the process of the becoming of the individual? Divided into three parts, wherein PART ONE outlines two theories: Gilbert Simondon's concept of "individuation" and Matthew Crawford's argument on the necessary conditions for the becoming of the individual. For Simondon the individual is a continual process, and for Crawford this process is dependent on acquiring skills and gaining competence. The way in which we do so is through and with technology, and so it follows that in order to gain competence and skill, the relation-

ship between technology and humans needs to be a collaborative and reciprocal one. PART TWO makes an analysis of the dominant designs of technology and makes the case that it is applied through a consumer ethic, placing the designer/creator at one end, and the consumer at the other. In so doing we become tools of technology, rather than establishing a reciprocal relation, thereby obstructing the process of the becoming of the individual. Drawing upon the two theories, PART THREE outlines designs of technology and methodologies which facilitate the process of the becoming of the individual, aiming at a deeper and more integrated relationship between humans and technology. The methodologies discussed in PART THREE are Speculative Art and Design which offer a space to be able to imagine and co-create possible futures and in that process reflect on what we are doing. The ethos of hacking and open design is discussed, where hacking is the practice of re-purposing existing designs of systems or objects in ways more precisely tailored to the users needs. It is an approach which facilitates the ingenuity to expand the potential of what has been created, by enabling the end user to be part of the process, and not only on the receiving end of it. Open Design, which is essentially about the concept of sharing, means that the user can take what is given, make alterations according to their needs, transform it and redistribute it to others. In this way it offers various entry points to technological engagement through which theoretical understanding can emerge. Lastly, a series of workshops that entail technological engagement and function to transform technologies as political practices are discussed.

PART ONE

Defining Terms

The use of the term 'individual' in this text is drawn from Simondon's concept of "individuation" and Matthew Crawford's argument on the necessary conditions for the becoming of the individual. There are parallel notions seen between Simondon and Crawford in that they both insist that it is types of conflict that are the source for the becoming of the individual. These types of conflict are elaborated in this text through Simondon, and then through Crawford. Simondon stresses that the individual is produced, it must coagulate in the course of an ongoing process. Note that Simondon's theory of individuation is not limited to single human being, rather it describes the dy-

namic process by which everything arises: technology, living beings, individuals, groups and ideas. For the sake of answering the questions put forward in the abstract of this text, the primary focus will be that of an individual's individuation, and the role of technology in that process.

An Individual is a Process

First at the physical level, there is a biological individuation into a living being. The living being then maintains its existence throughout its life in a series of continuing individuations. Prior to individuation, a being has "pre-individual" potential which is essentially parts that are available for individuation. After the physical individuation, two individuations occur that are in reciprocal relationship to each other: one interior to the individual (called the psychic individuation), and the other exterior to the individual (called the collective individuation). So once pre-individual components are in a state of individuation, further individuation can happen to any individual, and it can also happen "trans-individually"—on the level of a group. This applies to a wide range of social formations; as society consists of many individuations composed of more than one person or entity.

The crucial factor here is that individuation is not a result, but an ongoing process whereby the individual is in a perpetual state of becoming. That is, an individual for Simondon is a process. What then, is the process through which these potentialities come to be actualized? It takes place through a resolution of tensions and incompatibilities, seeking equilibrium pertaining to the system of potentialities. On other words, conflict is a source for the initiation of the process.

A living being faces incompatibility problems with the environment which come in physical form, such as that of hunger, or in the form of negative emotions. These problems compel the individual to action. The tension from these incompatibilities can be resolved interior to the individual (the psychic individuation), and others exterior to the individual (the collective individuation). The psychic individuation is the formation of the psychology of individuals, and the collective individuation is the formation of how these individual states are linked to the external world. The psychic individuation is itself composed of individuations of perception and emotion. Individuation of emotion involves the self in conflict with self, and perception, the self in con-

flict with the world. So perception is process where the subject invents a form or model with the goal of resolving a problem of incompatibility between itself and the environment. This process is the idea of personal growth by breaking out of comfort zones. Thus the individual is understood in terms of its relation to the environment from which it requires contact and sustenance.

Individuation of the living being is carried through its successive acts of psychological and social reformation. However, as stated earlier, individuation is not limited to individuals and collectives, it occurs also in technology: technical objects and technological systems. The operation of individuation at the level of the technical object however, does differ from that of the living being. In a way it is limited to the single moment of its creation. A technical object retains a dependency on a degree of exteriority of operation. Individuation of the living being is never perfectly individuated; it is only ever partial and never potentially lacking. The technical object however draws its individuality (its particularity) from the same operation of individuation that constitutes its initial creation. For example, the digital computer is not any particular computer in time and space. Rather, it is the fact that there is a sequence, a continuity, which extends from the first computers to those which we know and to those still in evolution. The technical being evolves by convergence and by adaption to itself; it is unified from within according to a principle of internal resonance. This does not mean that there is a linear process that renders the succeeding technical object as merely an improved version of the initial technical object from which it drew on its pre-individual potential. Say you have two types of computers: A and B. Computer A was created before computer B, and computer B drew from elements of computer A. You have two types of computers, but computer B is not a greater or superior to computer A. It is not merely an improved version of computer A, as both computers have qualities and functions that each fit better to different operations. Computer A came before and may have a completely different function than computer B, but it may still be better qualified for specific operations. The emphasis is on the continual change or becoming, not its constancy but its continuing ability to grow by altering itself. The possibility of alteration is thus a necessary condition—for the individual, for the collective, and for the technical object.

To return to individual individuation, Crawford insists that for the individual to come into being in the first place, the relationship between the individual and the collective, and the human and non-human, is contingent on the form of communication. Non-

human here refers to our environment—the material, the technical, the mediated. Given our current situation of the widespread connected world of computing, and the pervasive presence of technology in an increasingly rich information environment between and amongst humans and technical objects, it follows that technology is integral to the process of becoming.

Technology and the Process of Becoming

When the humanity of another becomes apparent, it is because you have noticed something particular in that person. This particularity cannot be seen without discrimination. As for the person having this particularity, this comes from developing individuality and seeks to be recognized as such. In his book "The World Beyond Your head", Crawford argues that developing individuality comes from cultivating some particular excellence or skill. In line with Simondon, Crawford contends that this developmental process is contingent on how we encounter other people and how we encounter objects. Via Hegel he states, "**one knows oneself by one's deeds, which are inherently social.**" The meaning of an action depends on how others receive them. This implies that individuality too, is something that we achieve only in and through our dealings with others. The question then arises: how can you make yourself intelligible to others through your actions, and receive back a reflected view of yourself? When we act in the world we make a tacit normative claim for ourselves—for the justifiability of the act. The question of justification only arises if you are challenged by another—the person rejects the validity of your claim to be acting with justification. Confrontation leads you to evaluate your actions. This is necessary if you are to own your actions and identify with them as your own.

Humans are embodied beings who use tools and prosthetics in the world. It is a world we act in, not merely observe. In Being and Time, Martin Heidegger proposed the concept of Dasein—"being there", being-in-the-world—in which existence is attached to space. This idea suggests that the world of objects pervades human lives. Therefore, since we share interactive status with our tools, technology is not a means to an end, but rather a mode of our existence. Technical activity thus involves the capacity to perceive and invent new relationships among heterogeneous things, to produce forms. This means that when you acquire new skills, you come to see the world differently, and see possibilities not previously visible to you.

Becoming an individual is thus strongly linked to the acquisition of skills and gaining competence, and it is through and with technology that we do so. If we act through and with technology, then it is impending to ask how it shapes our sense of agency. Agency is the question of whom or what is acting, and what the intention of the action is. If we don't know who or what is acting, then how can we hold the action up for contestation? When acting with and through technology, how can we have control of the action, or in other words, how can we know that the intent is congruent with the function. If individual agency is contingent on a reciprocal and collaborative relation between technology and the human, then it follows that the possibility of this relation relies on technical knowledge and understanding. Essentially, **as put forward by Simondon**, there is need for a social pedagogy of technics aimed at the integration of technology into culture.

Sleek Surface, Rounded Corners

Dominant design of technology however, seem to engender an epidemical obscurantism. It can be seen in the general societal rejection of technical understanding as it manifests in the advent of sleek, shiny, corporate-controlled objects, platforms and services, from the smartphone to self-driven vehicles. Our interactions with these devices form experiences that are highly mediated (both in encountering objects and encountering other people). In turn, individual agency, the experience of seeing direct effect of your actions in the world and knowing that these actions are genuinely your own, and acquiring skills and gaining competence, may become not only elusive but illusory.

There are designs which facilitate a reciprocal relation between technology and the human, and there are designs which obstruct it. Before elaborating on design of technology and methodologies that could lead to a deeper and more integrated relationship between humans and technology, the following will first give an analysis of the current situation of the dominant design of technology and its socio-cultural and political-economic implications. Let us consider the design of the smartphone, and the products and services it contains. Products and services come in the form of applications. You interact with the device and software applications through predefined motions on its sleek surface, known as touchscreen gestures. These gestures are performed with ease and the applications are most often simple, and easy enough on

the mind to use. Why are they designed this way, and what kind of relationship does it form between the individual and the collective, and the human and non-human? The most common uses of the smartphone are making calls, taking pictures, instant messaging, social media, watching videos, and gaming. There are numerous apps for each of these categories. What is the intention that guides the design and dissemination of the smartphone and the major social media platforms—YouTube, Facebook, Instagram, Twitter, and Pinterest? These products and services rely on advertising revenue—the more frequently we use them, the more money they make. It follows that the aim of their design is to harvest attention. They do this by manufacturing habits, and there is a formula for how to do that.

Habit-forming Technology

Nir Eyal, a business entrepreneur, has laid out a business model for how to build habit-forming technology. He calls it **The Hook Model: a four-step process companies use to form habits. The four steps are: trigger, action, reward, and investment.** These are all based on the psychology of human behavior which will now be further explained.

An external trigger is something that prompts a user to action. This sensory stimulus is delivered through any number of things in our environment. Digital examples are the play button, e-mail icon, an app icon, or the log in and sign up buttons. Then, internal triggers are built, which involves making mental or emotional associations with the product. So for instance, feelings of boredom, loneliness, frustration, confusion, and indecisiveness, often instigate a mental itch, thus prompts an action to remedy the negative sensation. A habit-forming technology seeks to solve the users' itch by creating an association so that the user identifies the technology as the source of relief. How does Instagram apply this? The app icon and the push notifications serve as external triggers to get users to return to the product. The fear of losing a moment instigates stress, and this negative emotion is the internal trigger that brings users back to the app. A trigger is followed by the action: the behavior done in anticipation for the reward. Based on research and studies by psychologist J. B. Fogg, Eyal explains that the less effort it takes both physically and mentally to perform the action, the more likely humans are to perform it. Herein lays the reasons behind the ease of the tap gesture and the simplicity of social media homepages where you are prompt-

ed to register or login. After the action, the reward follows. In an experiment conducted in the 1950s by psychologist BF Skinner, it was revealed that humans seek rewards in three forms: social rewards (we seek to feel accepted, attractive, important and included), rewards of resources and information, and intrinsic rewards of mastery, competence and completion. The "feed" on many online products for instance, is algorithmically designed to take advantage of rewards associated with the pursuit of resources and information. The stream of limitless information is filled with both dull and interesting content. So when you log in to a platform, one of ten items may be interesting, or one of a hundred, and this is the reward. To gain more rewards all you have to do is keep scrolling. Checking your notifications and feeling the need to click on each of them is an example of how the search for mastery, completion, and competence moves users to habitual and often mindless actions. The number of unmarked notifications represents a goal to be completed. In another **experiment conducted by B. J. Fogg**, it was shown that reciprocity is not just a characteristic expressed between people, but also a trait observed when humans interact with machines. We invest in products and services for the same reasons we put effort into our relationships. In congruence, the last step of the Hook Model is investment. Investments enable the accrual of stored value in the form of content, data, followers, reputation, or skill. The more users invest time and effort into a product or service, the more they value it. Storing value in the form of content for instance, would be the followers, playlists, likes, and comments. In aggregate, it becomes more valuable over time and thus the service and product tied to it becomes more difficult to leave as the personal investment grows. Another form of investment is skill. Investing time and effort into learning to use a product is a form of investment and stored value. Simply, once users have invested the effort to acquire a skill, they are less likely to switch to a competing product.

The major social media platforms are exemplary of designs based on The Hook Model. Pinterest in particular is an encompassing example of this. The internal trigger for users of Pinterest is often boredom. Once you have registered the only action required is to scroll, and in return you are provided with rewards. It displays rewards surrounding the hunt for objects of desire—images. The rewards of the tribe come from the variability of posting images as a communication medium. And users invest in the site every time they pin, re-pin, like, or comment on an image. Through the no-

tifications of when someone else contributes to the thread, the user is triggered to visit the site again. It becomes a constant loop.

Psychological irritation is something that compels us to action. It is, as shown, part of our brains operating system. What are the consequences of relieving these itches through the aforementioned technologies? If we seek skill and competence and pursue this through and with technologies that are designed to relieve us of these mental itches, what are the skills and competences acquired? Is the act of caressing your touchscreen a valuable skill? The information in your feed—the two-second visual puns, click-bait headliners, and the like—is it valuable information? And have these habits replaced our time spent on concentrating on more difficult and demanding tasks required for personal and professional development, that is, education? How can it be rendered productive?

We endlessly hear about how fragmented our mental lives have become—diminished attention spans and a widespread sense of distraction. This is often related to some new neuroscience finding on how our brains are being rewired by our habits of information gazing and electronic stimulation as exemplified in the previous chapter. The attractions of our attentional environment that we willingly invite into our lives (our feeds) and the unwanted intrusions (advertising) are both troubling in form. If this is the dominating form of stimuli, it leaves little time for higher order thinking that is required in education. Education forms individuals, and requires powers of concentration and a focus on cognitively demanding tasks that are not immediately gratifying. This is a threat if our mental capacities are exhausted by distraction. In our frenetic technology age, our distractibility seems to indicate that we are incapable of taking a position on the question of what is worth paying attention to—that is, what to value. What is at stake of human flourishing if our need to acquire skill and competence is psychologically satisfied by means of manipulation? This tendency is one of disconnection, and stems from a peculiar consumer ethic. Disconnection—tapping or swiping to make something happen—facilitates an experience of one's own will as something unconditioned by all those contingencies that intervene between an intention and its realization. How then, with our fragmented mental lives, are we to maintain a self that is able to act according to settled purposes and ongoing projects, rather than distractingly float about? This is meant both on the level of the individual and on the level of the collective. What are our common aims, how do we discuss going about achieving our aims, and what are the results of going about it? These

questions are especially important considering how much of our time is spent using habit-forming technologies rather than on activities that contribute to spiritual, personal, professional, or social development. In Simondian terms, individuation and trans-individuation.

As outlined, it seems the designers behind our sleek screens and its delicious rounded corners are intent on keeping people in the category of consumers. They are designed to foster distraction and disengagement. Much like the factory worker, we become a tool of technology. Further suggested, not only are we severed from embodied agency, we are severed from political agency. Can the tap gesture on a sleek screen be a kind of agency? Or is this gesture, so entirely emblematic of contemporary life, just an empty notion of human agency? Has choosing from a menu of options replaced doing for the finger-tapping smartphone gazer?

PART TWO

Looming

There are problems on global, regional, local, and personal scales, and the world becomes more confusing and seemingly controlled by vast impersonal forces that no single individual can fully bring within view. When headlines span from topics of concern about big data and information privacy, surveillance, financial crises, the climate change that everyone chooses to ignore, endless war on terror, fake news, meanwhile political discourse is a performance art of fake outrage, it is difficult to both grasp and take action. Using an example put forward by **James Bridle**, and expanding on a theory by **Shoshana Zuboff**, the following will outline how human to human interaction and with systems through technologies, make our sense of agency seem elusive.

Algorithms Creating Content

In a **recent article** James Bridle documented the way YouTube's algorithmic curation drives enormous amounts of viewers to content made purely to satisfy those algorithms. The production process of these videos and the intention behind them is not

clear. These series of videos consist of confusing low-budget animation sequences with seemingly algorithm-chosen titles like "BURIED ALIVE Outdoor Playground Finger Family Song Nursery Rhymes Animation Education Learning Video". Like many other such videos with millions of views, it is an uncanny mixture of nursery rhymes, non-sensical storylines in which low-quality 3D models of Disney characters meet gory violent ends. As Bridle points out, it is difficult to tell exactly what is happening. "These videos, wherever they are made, however they come to be made, and whatever their conscious intention (ie to accumulate ad revenue) are feeding upon a system which was consciously intended to show videos to children for profit." And on the question of trusted sources and validated channels: "One of the traditional roles of branded content is that it is a trusted source. Whether it's Peppa Pig on children's TV or a Disney movie, whatever one's feelings about the industrial model of entertainment production, they are carefully produced and monitored so that kids are essentially safe watching them, and can be trusted as such. This no longer applies when brand and content are disassociated by the platform, and so known and trusted content provides a seamless gateway to unverified and potentially harmful content." But the traumatizing nature of these YouTube videos are essentially beside the point.

To expose children to this content is abuse. We're not talking about the debatable but undoubtedly real effects of film or videogame violence on teenagers, or the effects of pornography or extreme images on young minds. Those are important debates, but they're not what is being discussed here. What we're talking about is very young children, effectively from birth, being deliberately targeted with content which will traumatised and disturb them, via networks which are extremely vulnerable to exactly this form of abuse. It's not about trolls, but about a kind of violence inherent in the combination of digital systems and capitalist incentives. This, I think, is my point: The system is complicit in the abuse. And right now, right here, YouTube and Google are complicit in that system. The architecture they have built to extract the maximum revenue from online video is being hacked by persons unknown to abuse children, perhaps not even deliberately, but at a massive scale. I believe they have an absolute responsibility to deal with this, just as they have a responsibility to deal with the radicalisation of

(mostly) young (mostly) men via extremist videos—of any political persuasion. They have so far showed absolutely no inclination to do this, which is in itself despicable. However, a huge part of my troubled response to this issue is that I have no idea how they can respond without shutting down the service itself, and most systems which resemble it. We have built a world which operates at scale, where human oversight is simply impossible, and no manner of in-human oversight will counter most of the examples I've used in this essay.

He continues to say that if everything he has written about in his essay were to be expanded upon, it could with very little effort turn to be not about child abuse, but about "white nationalism, about violent religious ideologies, about fake news, about climate denialism, about 9/11 conspiracies."

Surveillance Capitalism

In line with Bridle, Shoshana Zuboff expands on the threats of the prevailing and expanding presence of Google, Apple, Amazon, Facebook and Microsoft products and services. Zuboff uses the term "**surveillance capitalism**" which is in essence about surveillance marketing from the above mentioned major companies that are compiling data on our behavior. It includes everything we do—the movement of our cursor on a computer screen, the clicks on links, the online movements and purchases we make, the games we play, and the communication we engage in. From this perspective, social media is one giant surveillance apparatus where human beings are turned into pile of data that then gets manipulated, repackaged, and sold. The goal being: "to change people's actual behavior at scale." Zuboff writes, "The assault on behavioral data is so sweeping that it can no longer be circumscribed by the concept of privacy and its contests. This is a different kind of challenge now, one that I am thinking of matters that include, but are not limited to, the sanctity of the individual and the ideals of social equality; the development of identity, autonomy, and moral reasoning; the integrity of contract, the freedom that accrues to the making and fulfilling of promises; norms and rules of collective agreement; the functions of market democracy; the political integrity of societies; and the future of democratic sovereignty." Google, and the other industrial dominant players of our era—Apple, Amazon, Face-

book, and Microsoft, have entered just about every area of life and keep expanding. The issue stressed by both Bridle and Zuboff is that they do not offer any way for us to make collective decisions about what they do and how they operate. They provide services and products predefined and packaged by the corporations themselves. In this way they threaten our self-determination and individual agency.

Who or What is Acting

We can through our screens, or with the push of a button, or even without bodily movements (through algorithms), create changes in the non-human in various scale. But if Facebook convinces us whom to vote for at the next election, defines our social relations, and is the public place where we express freedom of speech; if Google tells us what treatment to seek when we are ill, its maps not only provides our route but also suggest a destination based on the data of our behavior which is sold to anyone who wants a piece of our behavior for profit; if YouTube's algorithmic curation results in content where the intention and production is based on accumulating ad revenue; and smartphones, refrigerators, and public transport passes are in constant interconnection, tracking and determining our daily movements, then who or what exactly, is governing reality? How do we begin to deal with complex and planetary challenges? The size and structure of a lot of our problems dazzle and overwhelm us, but have at the same time been engineered by us—technology, economical systems—but have become performative actors that plan our present from the future. How can we upgrade our ideas, concepts, actions, in order to stop following into a prescribed direction, being swallowed up by a process without understanding how it works and how we influence it?

PART THREE

Design Methodologies

We have now discussed technology and the individual in terms of a consumer ethic. The preliminary position was that the process of becoming an individual is a continual process and is dependent on acquiring skills and gaining competence. The way in which we do that is through and with technology. And so it follows that in order to

gain competence and skill, the relation between technology and the human needs to be a collaborative and reciprocal one. To be proposed and discussed now are design methodologies which in combination are valuable efforts in establishing this relation, and in undermining the dominant design of technology that places the designer/creator at one end, and the user/consumer at the other. There are two approaches in art and design: speculative art and design, and hacking and open design. Wherein Speculative art and design offer a space for reflection, and hacking and open design having qualities of share-ability, comprehensibility, alterability and offer various entry points to technological engagement through which theoretical understanding can emerge.

Speculative Art and Design

By placing new technological developments within imaginary but believable everyday situations, speculative art and design projects allow us to debate the implications of different technological futures before they happen. Through such projects, it is possible to critically reflect on the development and role of technological objects and systems in society. Returning to the art piece by Antonia Hirsch mentioned in the beginning of this text. As I beheld touchscreen devices out of its usual context, it led me to reflect and question the emotional bond we have to our handheld devices. Why is it that its design is sleek, closed, and ultimately manifest a fetishistic relationship? Further, it led me to investigate what kind of relationship we have with technology and how design influences this. In the same way, speculative art and design offers a space for this kind of critical reflection.

Speculative design ideas, ideals, and approaches, take form in fields of design, architecture, cinema, photography and fine art, spanning from political theory, philosophy of technology, literary fiction and surely more. Examples given will be focusing on Kim Laughton's digital rendering artwork which often depicts a merging of consumer products, technological fetishism, image production and labor, and Bruce Sterling's design concept of Spimes which speculate and reflect upon the future of more preferable and sustainable technological products.

Kim Laughton's artworks are images of a near future. In his digital rendering artwork, a discussion about the power of technologies and images is encouraged. **His CGI videos are often reflective on the creation of images using CGI software**, that is

to say, the videos are **self-reflective**. He demonstrates that these seductive digital surfaces have greater potential of **layered meaning** concerning our frenetic technology age, when they fall apart, revealing their construction when in the hands of the human and the computer. There is often something bizarre and uncanny, and at the same time oddly comforting and familiar in these digital images. And sometimes you are almost made think you are really just looking at **an ad gone awry**.





Unlike images such as **these**, which are artworks that draw on the emotions of the viewer, Sterling's speculative concept is a diegetic prototype—a system that speculates on a future of more preferable and sustainable technological products. In “Shaping Things” he has laid out this speculative design system through what he calls the concept of Spimes. A Spime is a location-aware, environment-aware, self-

logging, self-documenting, uniquely identified object that transmits data about itself and its environment to a system. Here is a brief summary of what constitutes a Spime and how this system would work. You would first encounter the Spime as a virtual image while searching on a website. This image would be linked with three-dimensional computer-designed engineering specifications of the object. It would include material specifications, engineering tolerances, and so on. This object would not exist until you legally guarantee that you want it—by purchasing it. Your account information would be embedded in that transaction and it would be integrated into your Spime management inventory system. Upon delivery you have the object's unique ID code, consisting of information about its material, ownership history, geographical tracking to establish its position in space and time, and other information that could contribute to any modification of the object. At the end of its lifespan, it is deactivated, disassembled, and put back into the manufacturing stream. And its data will remain available for historical analysis.

Sterling's diegetic prototype is a source for thinking of how sustainable and manufactured object might look like and how it could work in a system, as opposed to the disposable products that currently permeate our society causing havoc to the global climate system. Since the publication Shaping Things, there have been some real world initiatives in this area. Like Cisco and IP For Smart Objects Alliance, and larger firms like **IBM**, Nokia, and Microsoft has also been working on what is called **smart networks**. There has also been smaller startups such as Touchatag and Openspime which are directly inspired by Sterling's theory.

That is not to say that his theory is a flawless prototype that is meant to be precisely adopted in practice, but rather a source to invent possible outcomes and reflect on them. For instance, reflecting on what the possible downsides of location-aware, self-identifying, always-on devices, will inevitably lead to that of privacy concerns—"there a lot of socio-political functional personal reasons to be suspicious of how tracking might be (mis)used both by individual and by governments. It is already a rapidly advancing technology with dark sides. From a company providing technology to spy on ones employees or ones spouse and children, to governments or corporations surveilling your online activity and possibly prosecuting you based on the data." Beyond that, the vitally important part of this theory, is the critical issue of recycling. This theory makes it more possible to begin thinking about the greenhouse effect, which is the problem of the abundance of trash.

Point being, we need such theories to be able to imagine and start co-creating possible futures and in the process of doing so reflect on what we are doing.

Hacking: A Reciprocal form of Interaction

The way in which the practice of hacking is understood in this text, is that serves to undermine and dismantle current designs of technology. "**Hacking is about overcoming the limitations of an existing object, service or system which was set for one purpose, and finding an access point, intellectually or physically, where its original function can be expanded, altered, or improved to serve a new purpose or solve a problem.**" It is the will to re-purpose existing designs of systems or objects in ways more precisely tailored to how you want to use it. It merges rather than separates design and people, and yields benefits in the process. This merging fosters a different type of engagement between the product and the user, and a reciprocity between the user and the designer. As stressed throughout this text, the dominant model for design has placed the designer/creator at one end, and the consumer at the other. Hack design serves as a process that facilitates the ingenuity to expand the potential of what has been created. By enabling the end user to be part of the process, and not only on the receiving end of it. This approach result in designs that often give the impression that the object or system is unfinished—something that is in process. It may therefore be unstable as it is presented, but this entails that it pertains the potential role of being didactic, that is to say it requires and fosters education. Hack design is an approach that enables alterations that are inevitably variable in outcome. It also bears the possibility of improving the skill and competence of whomever should encounter the object or system.

How would you for instance go about tailoring Facebook to your own needs? Being informed that the Facebook "feed" is designed to keep you scrolling, engaging in a mindless activity, how could you prevent yourself from this pattern of behavior that it results in? Seeing as Facebook does not provide a enable/disable feature for your feed, hacking would be an approach for you to intervene in its design. An example of this would be hacking the Facebook feed through your browser. In early 2017, I set out to reveal the intent of the habit-forming design of the feed. It was based on a common experience: logging in to Facebook to quickly check something, only to find yourself mindlessly scrolling an hour later. The aim was to make the user not only aware of the mindless activity is due to its design, but also to prevent the habit. To-

gether with **Kees van Drongelen**, I developed a browser extension which makes your Facebook feed disappear. Only upon scrolling hastily and constantly does the feed appear. Once you stop scrolling the feed disappears again. This extension, made [available on GitHub](#), is an example of how to elucidate the intentions of technology's design that do not have your best interest in mind.

Open Design: Take, Alter, Transform, Redistribute

Open design are designs which invite hacking. Qualifications of open design are open-source, comprehensible, alterable, constructible. These qualifications will be elaborated on in terms of software development. Note though, that open design is not limited to immaterial production, as the same method of production that has come to dominate the world of open source software and freely available (often user-generated) content on the internet, **also extends to designing and making material things**. Essentially **open design** is about the concept of sharing. This means the user can take what is given, make alterations according to their needs, transform it and redistribute it to others. The implications of open source, a material ontology of sharing practices, therefore strongly bears a social dimension.

Sharing (open-source) code is a relatively recent form of cultural sharing. Sharing is part of how a community operates within any field that creates media. **Steve Lambert**, explains how we are familiar with "**the image of scientists working in labs, researching, generating and testing hypotheses, then publishing their work in journals or otherwise presenting their work to the scientific community. As an analogy, this method of researching and publishing extends to writers, performers, musicians, software developers, and anyone else who creates media. Extending this analogy, repeating the research someone else has done is redundant. The goal of publishing research outcomes is to make progress. This can only happen if the work is documented so that theories, techniques, and knowledge can be built upon. Through this process, scientific theories are established, art movements emerge, musical styles develop into new styles, software becomes more sophisticated. Knowledge is collected and developed, and progress is made over generations. This is why we share our research.**" For software, open design means that the result is not a product, but a project. The Free Software Movement ethos will be introduced in order to talk about what qualifies software as open design.

The Free Software Movement emerged in the early 1980s in response to efforts to withhold software program source code to increase profit, such as non-disclosure agreements and the patenting of software concepts. Richard Stallman the founder of Free Software Movement, created **Four Freedoms** of what constitutes a free software:

Freedom 0: You are free to run the program, for any purpose.

Freedom 1: You are free to study how the program works, and adapt it to your needs. Access to the source code is a precondition for this.

Freedom 2: You are free to redistribute copies so you can help your neighbor.

Freedom 3: You are free to improve the program, and release your improvements to the public so that the whole community benefits.

Well-known examples of programs that meet all freedoms include the Linux operating system, the Apache Web Server, Mozilla Firefox web browser, and the web publishing software WordPress. In a case study in web art and design, Steve Lambert **held up Adobe Photoshop against these four freedoms** to examine the implications of not meeting the qualifications:

Freedom 0: Are we free to use Photoshop for any purpose? Sure, we can use Photoshop to make everything from a corporate presentation to pornography.

Freedom 1: Are we free to study the program and adapt it to our needs? In one way, yes, we can get an Adobe Photoshop manual and learn how the program works, and we can customize the workspace and write Photoshop Actions to script the program and adapt it to our needs. But, these are relatively insignificant changes. The source code is not publicly available and we cannot adapt the software by changing the source code, so thereby Photoshop fails to meet this freedom.

Freedom 2: Can we redistribute copies of Photoshop to help our neighbors?

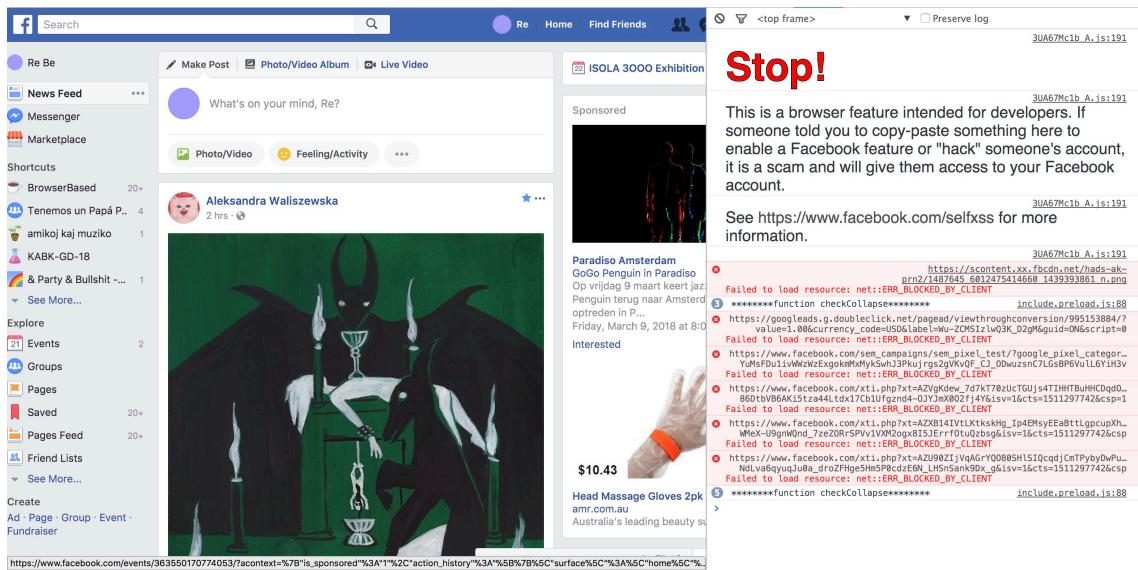
While that may be how some people obtain copies of the program, technically this is a violation of the user license, and therefore illegal. The third freedom is violated.

Freedom 3: Can I make improvements to Photoshop and release, or even sell, the Photoshop “Steve Lambert Edition” for the benefit of Photoshop users? No, absolutely not. This freedom is also violated.

Adobe’s model is based on selling licenses of their software. Each license (copy of the software) has to be bought. For innovation, one could argue that Adobe creates quality products and it certainly is an industry leader. But we are not free to improve their work, we are not free to examine it, and we are not free to distribute it. What if Adobe were to stop supporting or releasing one of the programs they currently distribute? Their code remains inaccessible, and as explained by Steve Lambert, in the case of **WordPress, this project would never have come about if the abandoned project b2cafelog, from which WordPress was developed, had it been licensed with a proprietary license.**

Let's turn to the open design software Mozilla Firefox web browser. You do not have to purchase it, you are free to build on it by contributing core code, or through extensions and add-ons (sub-programs that extend the browsers functionality), or creating Firefox software offshoots like CELTX. This makes Mozilla Firefox a project, not a product. You can alter it by adding existing plug-ins which are themselves projects, you can build a plug-in (in collaboration with others), or you can make larger alterations by working on the source-code. And going from user, to designer, to programmer, of course requires interdisciplinary skill sets, but it is nevertheless not inaccessible. And the user is thus not merely a consumer, as making small low-skill alterations using plug-ins to making large high-skill alterations by tinkering the source-code, are not only possible but encouraged. On the Mozilla blog there are posts documenting **ways to hack Mozilla Firefox**. These hacks include plug-ins and add-ons, new developer editions, etc. And their **source code is available on the software development platform GitHub**, where anyone can file issues or design requests. Notice though, in the example given of the project that involved hacking Facebook through a browser extension. When tempering with the existing code using the Page Inspector tool, not only did Facebook developers try to hinder tempering by restrictions written

in the code, but also prompted a **warning message** from which you are implicitly made to feel you are doing something malicious or suspicious. That is because Facebook is a product, not a project. But if it were, then it likely would not resemble its current state. It would take on a different form and in turn we could perhaps begin to change the presuppositions of Facebook which defines social relations, identity, the individual and how it is expressed.



A Method For Moving Towards a Deeper Relationship

In a series of workshops involving technological engagement, **two researchers** of the Department of Digital Humanities at King's College London, aimed to rethink the contested relationship between technology and the human. The workshops brought together interdisciplinary participants (hackers and non-hackers) to increase understanding of the socio-cultural and political-economic dimensions of datafication. They did so by exploring smartphone apps as technical objects to better understand their social and cultural dimensions. In so doing, the workshops aimed to augment critical and creative agency, and on a practical level exceed the normative utility of the data smartphone users generate. The following will be a summary of one of the series of workshops and then an analysis in terms of its potential as a method that facilitates gaining agency, and in terms of Simondon, facilitates individuation.

During the workshops, apps were decompiled and its source code examined, revealing permissions written into the software that regularly captures and facilitates the flows of data to third parties and data brokers. They used **various tools** which al-

lowed them to move apps from smartphones onto laptops for closer examination; to render the computer-readable code that programs the apps into more human-readable Java; and to capture and analyze data flows—the normally hidden traffic between apps and servers. Through these tools the participants were able to see and experience the direct movement of personal data.

Through engagement with the materiality of these technical objects, demystifying the otherwise inaccessible datafication process, it not only enabled those with more advanced technical skills to modify the application to their particular needs, but it also created a space that grounds social and cultural critique. For example, by decompiling the Facebook Messenger app, participants were able to make visible the permission-based security files that governs data flows in and through the app. During this procedure they identified 40 different permissions wherein the developer of the app coded legal means for gathering data from its users. One significant permission of the app stated that if the user is logged in and sends an MMS message from their smartphone, it can read all of the user's texts. Other permissions stated that the app can send SMS messages without the user's confirmation, and that the camera can collect images that it is seeing at anytime. Reading these permissions led the participants to the following observations: the permissions written in the code are much more comprehensible and straightforward than the terms and conditions of the app, and many of the permissions are invasive. In other words, how the app is used, is made more clear to third parties than it is to the user of the app. A subsequent question that follows these findings is: how might we interact with our apps differently if we had direct access to these permissions?

Through this type of collective technical engagement, skills and competence on practical and theoretical levels are developed, and new perspectives on the social and political dimensions of technology are gained. Clearly drawing from the open-source ethos and hacker ethos of technological engagement. Essentially these series of workshops have both creative and critical potential. As a method, not only does it demonstrate how theoretical understanding emerges through and from practical engagement, but it also functions as a intermediary between the participants and as a space for collaboration. That is to say it acts as a space for translation—through different levels in participant skill sets, areas of expertise, and technical capacities. As the researchers that organized these workshops explained, "**we had to observe and learn about hacking practices so we could meaningfully communicate with**

coders, programmers and hackers. In working through these interdisciplinary translation issues, myriad possibilities oriented around rethinking and re-articulating social and political theory arose through the different ways in which we could engage the technology itself." In this way the workshop exemplifies what Simondon called transduction—through the articulation of the technical, socio-cultural and political economic, between interdisciplinary participants, making possible for individuation and trans-individuation to occur.

The workshops can be considered a method for developing a social pedagogy of technics, which in turn can change our relationship with technology—understanding it beyond being primarily a tool of production. As Simondon posited, elements of a technical object always have potential beyond their presented utility. Specifically on the topic of datafication, these workshops can help us think differently about the data we generate. For instance, to consider the permissions as technical elements, which can be modified, is to enact the excess of the technical object beyond the intended utility. This means we can begin to think about how our social and cultural data can be used beyond its function within the data brokerage ecosystem of marketing and advertising. In its fullest potential it is a method through which the human can draw on its pre-individual, to continue individuation and to participate in collective trans-individuation. As previously elaborated on the practice of hacking and open design—from open-source material production, the creation and circulation of software, to the cultivation of hacker cultures intent on making accessible or elucidating what otherwise might remain opaque to the user/consumer—these series of workshops can serve as a method to engage and transform technologies as political practices. It is a method that has the potential to move us towards a reciprocal relation between technology and the human. It is inevitably an ongoing project.

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