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Project

Year

Format

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Action

# THE 3D ADDITIVIST COOKBOOK



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In March 2015 we launched *The 3D Additivist Manifesto* as a call to expand and challenge the scope of the 3D printer. We hoped, at the very least, to begin a conversation about the material politics of this clunky, often over-hyped machine; a politics that might inspire tutors, and technicians into using and teaching the 3D printer in critical, poetic, and disruptive new ways. What we quickly realized was that as well as disassembling additive manufacturing into a range of images, metaphors and theoretical associations, we had also unwittingly birthed a term that offered us a way to think about the scale at which all actions – whether 3D printable or not – take place. #Additivism is a coinage of *additive* and *activism*, and as such, signals to the potential of small scale, incremental processes to have substantial and long lasting effects. The works in this cookbook are extensive in their capacity to transmute digital forms through the material world into human scale actions and impressions, but it is to a scale beyond single bodies and minds that we are most interested in attending. As we write this in late 2016 our manifesto's apocalyptic vision of a world accelerated to breaking point by technological prowess seems strangely comforting compared to the delirious political landscape we see before us.

Whether you believe political malaise, media delirium, or the inevitable implosion of the neoliberal project is to blame for the rise of figures like Farage, Trump and – potentially – Le Pen, the promises they make of an absolute shift in the conditions of power appear grand precisely because they choose to demonize the discrete differences of minority groups, or attempt to overturn truths that might fragment and disturb their all-encompassing narratives. These populist grand narrators join a long list of doomsayers, who seed utopian visions in the minds of their followers through a language of hate and fear. At this time we turn to the small scale motions of the 3D printer, and the incremental transformations locked up in recipes, toolkits and digital files for solace and inspiration. Though we invoked grand narratives such as the Anthropocene, human evolution and extinction, civilization collapse, cyborg uprisings, and large scale social unrest in our manifesto, it is from infinitesimal gestures and their collective enactment that we believe the most profound transformations arise.

#Additivism is attentive to more than the transformation of zeroes and ones into physical layers on a 3D print bed. Every text, work, and speculative proposal

contained in this Cookbook comprises a series of incremental steps necessary to manufacture other realities. It is in the tradition of *the recipe*, then, that the metaphor of #Additivism might be best understood. Recipes are one of the primary modes of making, learning, sharing, and revising (im)possible worlds. To follow a recipe is to grapple with forces well below and above the scale of the individual, for whether the maker is kneading yeast, flour and water into bread, or combining charcoal with saltpeter to produce gunpowder, the outcome of their work has the capacity to compel innumerable bodies into expressing further, previously invisible, motivations into reality. Recipes are powerful, from the Latin *posse*, 'to be able'. Recipes are political, from the Greek *politikos*, 'relating to, or among others'. And recipes, in that they promise to cause certain effects if they are followed, are theoretical, from the Greek *thea*, 'to look outward, or contemplate', and *horao*, 'to attend to something closely'. Even before their particular ingredients are collected, prepared, and combined, recipes harbor a radical potential to transform the given world.

The works submitted and curated for *The 3D Additivist Cookbook* were selected because we considered each of them - in their own unique, often subtle ways - to be radical. They each offer a position, a provocation, or a mode of thinking we found essential to further and even surprise our vision of the (im)possible. To maintain this openness we also found it necessary to interrupt our own conceptions and predilections. To achieve this we commissioned two artist collectives, *Browntourage* and *A Parede*, to curate subsections of Additivistic artist works. You will find these at the center of the Cookbook, woven together by a discussion between two of the commissions.

We chose to present the Cookbook in 3D-PDF format in homage to the long and checkered history of grassroots, DIY publishing. We are also distributing all of the 3D models in an accompanying Torrent, allowing the Cookbook to act as an open-source informational vehicle and archive for both its critical ideas and the practical means of realizing and mutating them. 3D-PDF may appear clunky and inefficient alongside more seamless, high resolution media, but whereas a HTML5 website can be blocked by the firewall of an institution or government, we believe a PDF is able to flow more freely and pass from screen to desktop printer, email to email, very much in the tradition of photocopied punk zines and radical pamphlets.

The *3D Additivist Cookbook* was, and is, the collective creation of a large community of people. To behold this compendium of recipes, toolkits, theoretical writings, and potential objects is to contend with an assembly of speculative worlds we have no desire to limit. We hope the diversity and scope of these works inspires actions and narratives into being that far exceed the scope of our collective vision. The 3D Additivist Cookbook is an idea, a community, a movement, an archive, and a collective effort to inspire and challenge narratives for governing, acting, networking, and creating together. #Additivism proposes that multiple, infinitely colorful and profoundly different worlds can and should exist simultaneously. #Additivism proposes that the time to start designing, prototyping and manufacturing those radical worlds – in abundance – is now.

Morehshin Allahyari and Daniel Rourke,  
November 2016

# ADDING TO SUBTRACT: 3D PRINTER RECIPES TO DISRUPT OUR DESIRE FOR MORE

“THE FOLLOWING  
TWO RECIPES  
ARE ADDITIVIST  
PROPOSALS TO  
INTERVENE IN THE  
CULTURE OF  
MORE.”

For years 3D printing has been expected to democratize manufacturing. By extruding a bead of plastic layer by layer, this technology lets individuals create physical objects from virtual models. But what ideologies are embedded in this endless stream of processed petroleum? Does 3D printing free consumers to be creators or does it reinforce existing power structures? What is the relationship between capitalism's need for growth and the 3D printer's need for more plastic? With the following paragraphs I argue that additive technologies reflect, support, and extend a culture that always craves more, and propose two additive recipes that aim to neutralize this cultural imperative.

We live in an era of constant measurement. Our actions are both driven and evaluated by numbers. This often starts with school, where children's academic performance is assessed using test scores. Our accountability grows as our bodies do. Amazon tracks every second its workers spend to retrieve and ship a product.<sup>1</sup> Corporate managers are ranked against each other using measurements of productivity.<sup>2</sup> Health insurance companies utilize numbers to surveil patient compliance with prescribed treatments before supporting or declining claims.<sup>3</sup> In other words we are constantly assessed, tracked, ranked, and surveilled through metrics.

Technology – particularly software – has expanded and accelerated a shift into audit culture. It is software that gathers the metrics necessary to evaluate worker efficiency or patient health. But it is not just our actions in physical space that are tracked in these ways. Software collects, stores, analyses, and reports on every aspect of daily life, determining what we see and who sees us. The number of 'likes' we click on Facebook changes the content of our news feed.<sup>4</sup> The amount of email we send to overseas family members affects the likelihood our email is read by an NSA analyst.<sup>5</sup> Neoliberal ideology asks us to consider every interaction as a transaction. Every action has a value, and this valuation governs our lives.

Audit culture wants more. In everything from worker productivity to actions on Twitter, more is better than less. If we create more widgets per hour we rank higher than our peers. If we get more followers on Twitter, our speech reaches more people. Capitalism is a world system that requires an endless growth of products and consumers.<sup>6</sup> This need for growth informs everyday life and drives a collective desire for more.<sup>7</sup>

3D printing is a technology in ideological alignment with – and thus supportive of – audit culture. Just as this era of measurement drives us to excel in metric

terms, 3D printing technology manifests in physical space as a fetishisation of addition. 3D printing is an additive process that builds objects through the accumulation of layers of material. Just as a Facebook user without regular new posts becomes less visible to their friends, a 3D printing process without addition builds nothing. Just as corporate manufacturing enables the production of new material products without caring for the old, 3D printing lets everyone transform oil into plastic objects that will never go away. Additive manufacturing thus reflects and fuels capitalism's need for growth, and reinforces the imperative it creates: more is better.

How might we use the ideology of the 3D printer against itself? 3D printers are being used to create everything from printouts of our heads to one-off parts for obsolete machines. Additive manufacturing helps multinational corporations prototype new products meant for millions (or billions) while also enabling the creation of short-run objects for the long tail<sup>8</sup> (further enhancing capitalism's creation of and reach into new markets). Can we use the additive mechanism of 3D printing to disrupt the control of and our accountability to audit culture? Can we print objects that limit accountability structures, mechanisms, directives, and interfaces? Put another way, can we add to subtract?

The following two recipes are additivist proposals to intervene in the culture of more.<sup>9</sup> The first is ready to bake today, enabling personal action against found metrics within physical space. The second is speculative, imagining an eventual post human blend of additive technologies with the body that could suppress audit culture by disrupting our reliance on metrics in everyday life.

- 1 Kantor, Jodi and David Streitfeld. '[Inside Amazon: Wrestling Big Ideas in a Bruising Workplace](#)', The New York Times, Aug 15, 2015.
- 2 See Welch, Jack and John Byrne, Jack: Straight from the Gut (New York, NY: Warner Business Books, 2001), for a description of 'forced ranking' used in corporate management.
- 3 For example, see Schwab, Richard J. et al. 'Continuous Positive Airway Pressure Adherence Tracking Systems', Am J Respir Crit Care Med Vol 188, Issue 5, pp 613–620, Sep 1, 2013. 5, pp 613–620, Sep 1, 2013.
- 4 Bucher, Taina. 'Want to be on the top? Algorithmic power and the threat of invisibility on Facebook', New Media Society 2012 14: 1164, originally published online 8 April 2012. DOI: 10.1177/1461444812440159.
- 5 Savage, Charlie. '[N.S.A. Said to Search Content of Messages to and From U.S.](#)', The New York Times, Aug 8, 2013.
- 6 Graeber, David. Debt: The First 5,000 Years (Brooklyn, NY: Melville House, 2011), 346.
- 7 I discuss this concept of a 'desire for more' at length in: Grosser, Benjamin, 'What Do Metrics Want: How Quantification Prescribes Social Interaction on Facebook', Computational Culture, Issue 4, 9 November 2014.
- 8 Anderson, Chris. '[The Long Tail](#)', Wired, October 2004.
- 9 Allahyari, Morehshin and Daniel Rourke. '[The 3D Additivist Manifesto](#)', 2015.

### Recipe 1: Print Metrics to Hide Metrics

1. Find metrics in your physical environment. These might be numbers on a sign that track the meters to the next McDonalds, the current state lottery total, or, with today's networked and animated billboards, the hours, minutes, and seconds left until the nearby Dunkin' Donuts opens.
2. Measure the height and width of the metrics.
3. Photograph the sign with its metrics clearly visible.
4. Use a font identification app to determine which font was used to print the metrics.
5. Create numbers with that font that match the photographed metrics using a vector drawing app, import them into a 3D printing program, and extrude as appropriate.
6. 3D print the numbers at the previously measured height and width.
7. Spray paint the numbers to roughly match the original color of the metrics in the photograph.
8. Affix the 3D printed metrics to the sign so that they occlude – and thus, obscure – the 2D metrics. The choice of adhesive is yours, whether it's a temporary solution such as double sided tape or something more permanent like superglue.
9. Photograph the modified sign and post to social media using hashtags #addtosubtract, #hidethemetrics, and #additivism. Leave the numbers in place indefinitely.

### Recipe 2: Print a Vision Manipulation System to Erase Metrics Everywhere

In 1945, Vannevar Bush imagined and described a number of technologies in his article *As We May Think*.<sup>10</sup> From 'dry photography' (digital cameras) to a camera on one's forehead (Google Glass), from 'associative trails' (hypertext) to the 'memex' (a personal database), Bush imagined future technologies based on need. Without knowing how these technologies might be assembled, he charted a future that includes them. His work was eerily predictive; as technology advanced, others started to create the very objects he imagined.

Science fiction also imagines new technologies of the future. In the movie *They Live*<sup>11</sup>, a man discovers that earth's elite are really aliens disguised as humans. The aliens control society using hidden messages in mass



Illustration by Stephanie Lenchard Warren

media that encourage endless spending and acceptance of the way things are. The man's discovery is enabled when he finds a special pair of sunglasses that show the world as it really is, revealing the aliens' true appearance and the hidden messages everywhere.

These kinds of speculative designs<sup>12</sup> develop alternative visions of the future based on critical understandings of the present. With this in mind I now outline a future additive technology to radically neutralize everyday metrics. We already have 3D printers that output non-plastic objects, such as those that create biomaterials like bone, tissue, and cartilage. We also have experiments in bioelectric materials that combine electronics with tissue. Imagine a time when 3D printers can output a class of objects that integrate not only with the human body but the visual cortex. For want of a better term, I'll call these objects VISNIPS, short for 'VISual maNIPulators.' These objects, or more accurately, additively-produced bioelectronics, can be taught to manipulate visual information as it travels down the optic nerve. Some might use VISNIPS to insert new information into the visual data stream, creating an augmented reality that adds overlays with contextual information. But another use of the VISNIPS would be to augment vision by intelligently subtracting visual information. This subtraction could filter out all metric representations found in any medium viewed by the human eye. From metrics on a poster announcing the number of steps you should take each day to the quantifications in

10 Bush, Vannevar. 'As We May Think', The Atlantic, July, 1945.

11 They Live. Dir. John Carpenter, Universal Pictures, 1988.

12 Dunne, Anthony and Fiona Raby. Speculative Everything (Cambridge, MA: MIT Press, 2013).



social media interfaces tracking one's followers, the VISNIPS could intelligently identify and surgically erase each individual metric in our environment before each metric's visual representation is processed by the brain.

VISNIPS may take a physical form that suggests vision manipulation to others, such as a pair of metric-erasing glasses. In this way the VISNIPS would act as an inverse of the glasses in *They Live*; instead of showing a user the hidden messages that drive our behavior these glasses would remove the metrics that hide in plain sight. Another form might be more covert, such as a bioelectronic printed contact lens. Whatever form it takes, one could envision this technology supporting many types of artistic interventions beyond metric removal, erasing out undesired material such as propaganda in advertising or specific interface elements designed to encourage free labor in social networks. With any new technology it is important to consider not just its obvious benefits but also its embedded ideologies and biases. 3D printing technologies have been and will continue to be touted as a boon to individual maker culture, democratizing manufacturing by enabling everyone to be both engineers and entrepreneurs. But how are the designs of these 3D printers leading us to act and think? What points of view do they reinforce? I have argued that additive technologies both reflect and fuel capitalism's need for growth, reinforcing a collective desire for more. With these two 3D printer recipes I have provided blueprints to thwart that desire by additively creating an anti-metric that encourages – through the act of subtraction – alternatives to our culture of measurement, audit, and accountability.

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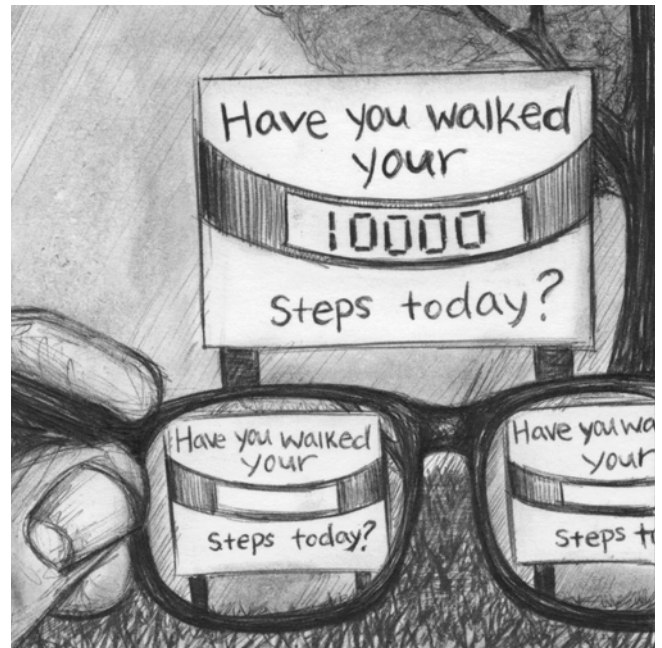


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