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## ALGORITHMIC IMAGINATIONS: RETHINKING “ALGORITHMIC” AS A HEURISTIC FOR UNDERSTANDING COMPUTATIONALLY- STRUCTURED CULTURE

Ted Striphas  
University of Colorado Boulder

Blake Hallinan  
Hebrew University of Jerusalem

CJ Reynolds  
Hebrew University of Jerusalem

Mikayla Brown  
Temple University

Hector Postigo  
Temple University

### Panel Rationale

Friedrich Nietzsche once wrote, “with words it is never a question of truth, never a question of adequate expression...The creator [of language] only designates the relations of things to people, and for expressing these they lay hold of the boldest metaphors...” (1993, p. 82; translation modified). Generations later Frantz Fanon, writing about the dehumanizing elements of colonialism, noted that making sense of things was “an endless task. We accumulate facts, we discuss them, but with every line that is written, with every statement that is made, one has the feeling of incompleteness” (2008, p. 149). It is thus that we come to revisit how we imagine “algorithmic” *anything* (be it culture, decision-making, the internet, etc.) and the

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consequences thereof. We are motivated by a feeling that, after nearly a decade of technological change and critique, it's become heuristically imprecise, infused with its own predilections, and taken up as a catchphrase describing a host of vastly complex human/institutional/technological relationships.

For purposes of this panel, how we imagine our place within the structure of sociotechnical-human relationships is our “algorithmic imagination.”<sup>1</sup> Many people, for example, no longer just imagine if attending a political rally will be understood as conferring support to a collection of points of view, should someone they know see them there. Taina Bucher (2017) noted that informants from her study of a small set of Facebook users do indeed imagine how algorithms *imagine them*, so much so that they were moved to tweet about it. She coined the phrase “algorithmic imaginaries” to conceptualize her informants’ ruminations about how Facebook sees them. We follow that logic here but connect it more directly to social relations reified in algorithms.

Awareness of a deterministic, barely visible computational hand shaping society is evident in academic scholarship, which has experienced a proliferation of studies on the subjects of: the oppressive dimensions of algorithmic decision making, particularly with respect to race and gender (Benjamin 2019; Browne 2015; Cheney-Lippold 2018; Gandy 1993; O’Neil 2016; Nakamura, 2009; Noble 2018); the nature, definition, and historicity of algorithms (Gillespie 2017; Goffey 2008; Seaver 2017; Striphas 2021); algorithmic culture (Galloway 2006; Striphas 2015); the relationship between algorithms, media systems, democracy, and public life (Andrejevic 2019; Pasquale 2015; Vaidhyanathan 2012; Vaidhyanathan 2018); and more.

Importantly, however, the algorithmic imagination isn’t confined to the academy, nor only to academic scholarship. It is also evident in spheres such as journalism and popular culture, as epitomized by two recent, high-profile examples (among many others): *The New York Times*’ feature story on Robert Julian-Borchak Williams, “Wrongly Accused by an Algorithm,” which explores racist patterns in the computationally directed surveillance of Black people and populations (Hill 2020); and Disney’s family-friendly film *Ralph Breaks the Internet* (2018), which includes in its cast an algorithm named Yesss, voiced by Taraji P. Henson.

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<sup>1</sup> We do not mean “algorithmic imagination” in the way Ed Finn used it to describe “the growing cognitive traffic between biological, cultural, and computational structures of thinking” (p. 185), challenging those observing the role of algorithms in public life to consider how the category “imagination” was no longer the exclusive provenance of human beings. We mean “imagination” as C. Wright Mills (1959) meant it, and “algorithmic” a reification of what he meant by “the sociological,” i.e., the complex of institutions and human relationships that structure groups’ places in and movements through society.

The purpose of this panel is to explore the “algorithmic imagination” as it manifests in particular scholarly, historical, socio-cultural, and technical contexts. We prioritize how social actors, situated in distinct settings, go about constructing an “algorithmic imagination” in conversation/opposition with how computational systems have “imagined” them; panelists will also reflect critically and self-reflexively on the implications of an algorithmic imagination, so conceived. We demure from monolithic understandings of the “algorithmic imagination,” and also embrace algorithmic intersectionality, the idea that because intersectionality dictates that “no person has a single, easily stated, unitary identity [...]” (Delgado and Stefencic 2017) the algorithmic imagination so informed is poly-modal.

Confronted with this complexity, we are reminded of J. K. Gibson-Graham’s observation that “[i]t is the way capitalism has been ‘thought’ has made it so difficult for people to imagine its supersession.” Similarly, this panel contends that the ways in which algorithms have been “thought,” or imagined, have made it difficult to conceive of practicable strategies for transforming algorithmic cultures and, indeed, for delinking them from both state and corporate control. Algorithms then are sites ripe for political contention.

The panel, thus, makes three primary contributions. First, we situate, define, and distinguish the concept, “algorithmic imagination.” Second, the panel provides analyses of key facets of the algorithmic imagination, in specific historical settings and life-worlds defined by intersectionality. Lastly, it aims to contribute, however provisionally, to a political theory that recognizes the deterministic power of computational systems but rejects the notion that power is inherently democratic or monolithically insurmountable. The panelists’ papers address, respectively: the cultural-historical and socio-semantic entailments of the algorithmic imagination; the agenda-setting function of popular “algorithmic audit” videos appearing on YouTube; the role of algorithms in the shaping of the “digital afterlife, and vice-versa; and the possibility of hacking algorithmically-trained AI systems, in an effort to mitigate gender and other pernicious biases manifest in algorithmic culture.

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# MATHEMATICS IS ORDINARY: CULTURE, COMPUTATION, & PHILOLOGICAL POWER

Ted Striphas  
University of Colorado Boulder

This essay contributes to the ongoing body of research on the subject of “algorithmic culture” (Galloway 2006; Striphas 2015; see also Gillespie 2016). It is inspired by and situated with respect to studies of the relationship between algorithmic processes and instances of racism, ethnocentrism, sexism, classism, homophobia, and more, both on- and offline, in the present day (e.g., Gandy 1993; Gandy 1995; Ananny 2011; Browne 2015; O’Neil 2016; Sandvig et al. 2016; Gillespie 2017; Cheney-Lippold 2017; Noble 2018). It also seeks to complement and provide deeper context for recent investigations into vernacular understandings of algorithms and of algorithmic processes, or of what Bucher (2017) characterizes as instances of “the algorithmic imaginary” (see also Finn 2017; Seaver 2017). Throughout this paper, I endeavor to situate both concepts—“algorithmic culture” and “algorithmic imaginaries”—within a broader historical frame by inquiring into the origins, as it were, of the term *algorithm* in English and adjacent languages. The paper does so by adopting (and in certain respects going beyond) the keywords approach developed by the Cultural Studies scholar Raymond Williams (1983), and also by positing numbers, computational processes, and forms of quantitative reasoning not merely as instances of mathematics, generally, but as technologies more specifically.

The etymology of the word *algorithm* leads almost unfailingly to Moḥammed ibn-Mūsā al-Khwārizmī, a polymath who lived and worked in Baghdad in the ninth century C.E.—a member of Caliph al-Mamun’s “House of Wisdom” whose research was carried out at the height of the so-called “Golden Age of Islam.” Al-Khwārizmī’s surname is the source, supposedly, of the word *algorithm*. Instead of accepting this account, which posits an irreducible point of origin for the term, this paper explores the relations of power and authority that produced that origin in the first place. The process begins by digging deeper into al-Khwārizmī’s life and, more specifically, into the history of conquest, coloniality, and ethnic and religious persecution that may have landed him in Baghdad, his reported home; he or his ancestors, it turns out, probably hailed from the steppe lands of Central Asia, an area that was brutally conquered and colonized by the Persian Empire. Next, this paper follows al-Khwārizmī’s treatises on algebra and the Indo-Arabic number system as they wound their way west into Europe and eventually to England, where, in the nineteenth century, they are taken up by the very same brand of Orientalist scholars whom Said (1979) devastatingly critiqued in his path-breaking work.

The first English-language translations of al-Khwārizmī's mathematical writings were published in 1831, under the auspices of England's royally-chartered Oriental Translation Fund. The objective here is to show how the standard al-Khwārizmī "story" was forged under conditions of English colonialism and, more specifically, an Orientalist desire to imagine al-Khwārizmī's Asia as Europe's proctological past. Moreover, I argue that Henry Thomas Colebrooke and Friedrich Rosen, Al-Khwārizmī's translators, mischaracterized the texts in regarding them strictly as elementary mathematical treatises, or as evidence of "the art and sciences among the Arabs" (Colebrooke 1817, vii). The texts, in fact, had (and continue to have) so much more to say. The final main section of the paper consists of a close reading of al-Khwārizmī's *Algebra*, highlighting the text's intricate mapping of relations between kith and kin under conditions of slavery. The text brings to light some early affinities between culture and computation; it also shows how mathematics and mathematical formulae were used to perform something strongly resembling "cultural" work albeit in the absence of the word, *culture*.

The conclusion returns to the present day. There, I reflect on both the politics and idiom of algorithmic culture, which I see as closely connected to one another. The goal is to think through what a historically-driven, keywords approach might offer in terms of understanding the relationship between culture, technology, and language today. More specifically, I draw links between the historical insights of the paper and a brief series of recent examples. But the intention isn't to suggest that we're prisoners of language, or that we're trapped in some dizzying eternal return. The point is to embed contemporary algorithmic imaginaries and experiences of algorithmic culture in a deeper historical timeframe, so that observers may better appreciate the degree to which they are not alone in history. And the message, ultimately, is to listen more closely to the "terms and conditions" of these everyday algorithmic imaginaries, by which I mean the words contemporary speakers may or may not use in making sense of digital-computational decision making.

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# USER-GENERATED ACCOUNTABILITY: AUDITING AND THE ALGORITHMIC IMAGINATION OF YOUTUBE CREATORS

Blake Hallinan  
Hebrew University of Jerusalem

CJ Reynolds  
Hebrew University of Jerusalem

“Congratulations sir, the youtube algorithm has chosen you,” reads one of the comments beneath the “70 subscriber special” video from YouTube creator Nickolas Green Outdoors, a video that has since acquired more than 17 million views. As the tiny camping channel added subscribers by the thousands, people left comments explaining that the YouTube algorithm had “randomly recommended” the video to them. Despite the language of randomness, a sudden surge of popularity attributed to algorithmic promotion is a familiar script on the platform, the latest iteration of the “chosen one” narrative. All this talk about the algorithm in the comment sections of viral videos highlights the growing public interest and engagement with algorithmic culture (Hallinan and Striphos 2016).

From the personalized mix that populates a user’s Home page to the order of search results to the selection of videos “up next,” algorithms are inescapable on YouTube. Beyond the more visible aspects of the interface, algorithms also power decisions around the placement of ads, the eligibility of videos for monetization, the enforcement of copyright, and the moderation of content. These techniques of automation both respond to and enable the immense scale of YouTube, a platform with more than two billion monthly users and 500 hours of content uploaded every minute (YouTube 2021). Accordingly, the algorithm often stands in for the broader system of platform governance that mediates what audiences see, which creators are seen, and the possibilities for extracting social and economic value. However, details about the back-end operations of the platform are scarce, constrained by technical challenges and economic incentives (Ananny and Crawford 2016), and compounded by the power differential between platform and users (Postigo 2003).

Unsatisfied with the black-boxing of algorithmic governance on YouTube, some creators have begun to seek accountability through other means, deploying their skills, audiences, and situated knowledge to investigate the platform's operations. These efforts translate to an emerging video genre which combines industry lore with methods of systematic testing to explain how recommendation and moderation work, and why audiences should care. In other words, creators transform "algorithmic audits" (Sandvig et al. 2015) into content. One prominent example, a collaboration between Andrew Platt, Sealow, and Nerd City, begat over three million views across two videos. The team developed a "demonetization detector based around machine learning AI" to generate and test more than 15,000 words by uploading sample videos with thousands of linguistic combinations (Platt 2019). The tests revealed that the term "gay" and related terms like "gay marriage" and "gay pride" were automatically demonetized. Follow-up tests found that replacing the words with "friend" or "happy" made the videos eligible for monetization. Nerd City characterized the platform's denial of these discriminatory results as "YouTube's biggest lie." The discrimination enacted through algorithmic operations plays a significant role in the development of a platform's networked public (boyd 2010), determining who encounters content from creators and topics relevant to them and who does not (Sobande 2017). As the example shows, audit videos go beyond discourse about social media optimization and position YouTube algorithms as matters of public concern.

In this paper, we conduct a grounded analysis of algorithmic audit videos alongside official corporate communications about algorithmic recommendation and moderation. Because content creators are structurally incentivized to both care about and contest platform governance (Caplan and Gillespie 2020), creator perspectives and practices offer insight into the conditions of cultural production on YouTube and reveal novel political strategies. Accordingly, we frame algorithmic audit videos as a strategy of *user-generated accountability*, providing an account of how the platform operates while simultaneously using publicity in an attempt to hold the platform accountable. By auditing practices of recommendation and moderation, YouTube creators intervene in how the platform imagines and cultivates its desired creators and audiences. In other words, creators intervene in the production and popularization of particular algorithmic imaginaries (Bucher 2016).

User-generated accountability is a response to uneven power dynamics on YouTube that grant risk-averse corporate stakeholders of the platform, including parent company Google, paid advertisers, and large-scale copyright holders greater capacity to influence the public culture of the platform than the creators and audiences who generate the vast majority of its content and views. As Michael Power, a leading scholar of auditing argues, “audits are needed when accountability can no longer be sustained by informal relations of trust alone but must be formalized, made visible and subject to independent validation” (1997, 11). By critiquing the operations of algorithmic culture, audit videos take on an agenda-setting function for how audiences understand, relate, and respond to YouTube's algorithms. Algorithmic audit videos also enroll creators and audiences as active stakeholders in platform governance through the publication of participatory investigations that reveal and critique how the platform operates. YouTubers thus combine strategies from labor activism (Ferrari and Graham, 2021), academic research (Rieder, Matamoros-Fernández, and Coromina 2017), and investigative journalism (e.g., Larson et al. 2016) to identify discriminatory practices, call for their redress, and respond to the limitations of official, top-down mechanisms of accountability.

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# DATA, ETERNITY, AND DEATH: IDENTITY AND THE DIGITAL AFTERLIFE

Mikayla Brown  
Temple University

Identity “captures the implicit and explicit responses to the question, “who am I” (Nagy 278)? This malleable cultural identity we undertake is largely due to social events such as globalization, modernity, and the digital society we find ourselves existing in (Koç 38). Previously, our identity and legacy were “confined by physical realities and constraints of the here and now,” but currently, modern identities have taken on a malleable form constantly forming and transforming “in relation to the ways we represent or address the cultural systems which surround us” (Hall 277). In a society of “constant, rapid and permanent change” (Hall 277), our identity has become constructed by and permanently embedded in an entirely new arena – the virtual.

Our digitally mediated lives have blurred the boundaries between the physical and the virtual, making us revisit and reimagine our identity posthumously. As we begin to explore what it means to be digitally immortal, death, in a traditionally defined sense, will become a distant concept of the past. Cracking the mortality myth creates an arena where we can construct our posthumous identity and legacy in a much more multifaceted, permeable, sentient, and editable manner (Nagy 279). As new technology arises to bring ourselves and our loved ones back to life posthumously, our digital presence, from avatars to blog posts, can be imagined as immortal and conscious living units instead of as fixed artificial entities (Nagy 280). The concept of digital immortality expands the idea of the “algorithmic imagination” to include areas of memorialization and the human condition concerning what it means to die and to grieve in an era of digital immortality.

The idea of a posthumous identity is commonly discussed and written about in its attempt to mirror consciousness using AI and machine learning. Instead of only focusing on the data being fed into the machine and how the machine sees us now, we should begin to imagine and worry about how the machine will continue to “see” once we are not around to make corrections. As Orwell noted, “the one who controls the past, controls the future” (Orwell 32). The way our data immortalizes our identity leaves



history susceptible to curation through the lens of the individual and the algorithm, not through the evolutionary lens of facts and time. History is left vulnerable and susceptible to being reimagined and reborn through the "algorithmic imagination," changing the presentation of history.

The possibility of an algorithmically driven, fluid history points out our need to not only begin reimagining our identities posthumously but begin considering how "imagining" will inevitably be algorithmically lensed. What pieces will the machine deem essential to highlight or unworthy of remembrance? How will we be remembered through the imagination of an algorithm?

Faced with the capitalization of humanity's natural tendency to grieve and the commodification of our desire for immortality, the treatment and delivery of lived histories and memories are at the whims of companies and their black-box algorithms. As we consider digital immortality, posthumous identity, and the "algorithmic imagination," ethical concerns of power and control, equity, accessibility, autonomy, and ownership become transparent. With no regulations, "ethicists argue that digital afterlives should be treated with the same postmortem dignity as our corpses" (Robitzski), provoking questions about data inheritance, data ownership, and platform adaptation. Confronted with today's data grabs and money-making business models, we should worry more about what we want to be remembered, what we would like to be forgotten, and what it would mean for an algorithm to reimagine or rewrite our personal history.

While digital afterlife services can readminister to the dead a minimal form of digital agency, allowing more adept intervention than when they were elderly, terminally ill, or close to their biological death (Meese et al.), the identities created online can be molded and personalized posthumously by others and through the "algorithmic imagination." People often leave wills containing instructions about how they wish to be remembered, but they have little say on how algorithms will tell their story. With the rise of Web 2.0, the idea of inheritance has been extended into an eternal, digital presence that is constantly learning and, most importantly, constantly changing. Now, a person not only exists in the memory of friends or relatives but also through their online personhood. Like comments on long-forgotten forums, the digital record will tell more than we want or

less than we hoped and be more a history of a changing self and less of a snapshot in time.

There are no answers and concrete solutions to the tension between the fixed and the fluid. However, by envisioning what we want our posthumous identity to be alongside what we want to be forgotten, we can begin to critically address the idea of “algorithmic imagination” in relation to digital immortality. Working off of Foucault’s idea of the panopticon, we are constantly connected, constantly surveilled, constantly online, and constantly redefining who we are. This eternal digital lifecycle brings us to contemplate ephemerality, yearning for the fleeting but accepting a conflicting algorithmic self. What agency should the dead possess when being shaped by the “algorithmic imagination?”

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# **Hacking Diversity into Creative Artificial Intelligence-Assessment: Categorization and Remedies for Gender and Race Bias in Natural Language Processing Models for the Creative Industries**

Hector Postigo  
Temple University

When I was a boy in the 1980s, freshly arrived in the US, my mother worked two jobs. I was often left at home alone, so I watched a lot of television. The characters of *All in the Family* reruns, Archie Bunker, Edith, Gloria and Mike (Meathead), were my English tutors. In one episode, during the family's usual bickering, Gloria posed the following riddle: *A boy and his father are on a drive. There's a terrible car accident and the father dies. The boy is injured and rushed to the hospital for surgery. Upon seeing the boy, the surgeon says, "I can't operate on this boy. He's my son." How come? Caveat: the boy is not adopted.*

I've been posing that riddle to people here and there for almost 25 years. The majority of respondents are usually stumped or use magical thinking to explain what was going on. There are two answers that don't tread on fantasy: 1) the surgeon could be the boy's mother, or 2) the surgeon could also be his father from a same sex marriage and surrogacy. The research supporting this paper is inspired by that riddle. The biases that make it hard for most respondents to proceed with Occam's razor to answer the riddle is baked into American culture by gendered professional barriers and by idiomatic custom, which have for centuries established "he" as the default pronoun when there's ambiguity. Those cultural realities create imprecise language and epistemology for understanding ambiguous, context-based categories.

As we surrender more of our work and administrative processes to artificial intelligence (AI) and the algorithms that comprise them, how those algorithms imagine culture and society will be how it comes to be reified in music, literature, images and film. If our biases are baked into our forms of cultural communication, then it follows that computationally-generated models for culture AI use are also biased. The research presented here will: 1) catalogue how culturally implicit biases, embedded in our use of the English language, show up in the computationally-derived assumptions of AI, designed for the natural language processing (NLP) AI when they write stories, movie scripts or poetry. For this project OpenAI has given me beta access to their natural

language processing (NLP) AI, GPT-3, via its API. Through open source licenses I also have access GTP-2 (OpenAI's previous model for NLP). The paper shows findings from testing those AIs.

Over the years, researchers from various disciplines have pointed out that “algorithmic bias” or the “politics of platforms” are present, but few have analyzed their code and the modules that implement it, or hacked at them, unpacking them so that we may know how exactly those biases make the voyage from culture to AI (Striphas n.d.; Anderson n.d.; Gillespie n.d.; 2018; Corbett-Davies et al. 2017; Diakopoulos 2016; Žliobaitė 2017; Woolley and Howard 2016) Are they in the code that dictates AI's computational logic? Or are they in what machine learning (ML) practitioners call “unknown layers,” where the computational leaps taken by AI reproduce meaning and structure from language patterns? Or are the data corpora, exogenous to AI systems and used to train them about the human world, biased? Researchers critiquing AI and algorithms have pointed out they are purposefully designed to serve the logic of a platforms' business, and platform owners misrepresent what AI or algorithms are actually doing. They note patterns in outputs that are biased, a laudable finding, but with too few exceptions, (Burrell 2016; Raji et al. 2020; Sandvig et al. 2014) Offer little about how AI's actual inner workings got to those outputs and how that might be corrected through minor hacks to otherwise unwieldy computational systems.

As an exercise in theory and praxis, the research presented in this paper also shows how to modify AI models to inoculate against gender and race biases in creative AI outputs writing scripts, song lyrics and other text-centered creative work. For example, findings from research show that GPT3 and 2 both default to male normative narratives when prompted to write stories about doctors, lawyers and judges. The frequency at which men are represented in those roles by AI exceeds the actual real-world presentation in US job census data. AI, trained on unstructured data, mirrors the biases in English speaking cultures to assuming the default male in the profession tested. Interventions in this paper have empirically shown to correct those biases. The algorithmic imaginary in this case is layered. It's composed of both the cultural imaginary, which is reflected in English speaking cultural creative outputs, and the computational models derived therefrom, which are mathematically sound but unreliably applied. In this research, ongoing work is seeking to determine how deeply and widely cultural biases—not only about gender but also about race and class—have permeated

through already existing AI that are helping creative industry and other professionals make new content.

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