Ideologies and Imaginaries in Blockchain Communities: The Case of Ethereum

Ann Brody
McGill University

Stéphane Couture
Université de Montréal

ABSTRACT

Background: Academic literature on blockchains has focused on Bitcoin, which is traditionally associated with right-wing libertarianism. This article looks at Ethereum, an alternative that emerged in Canada and is now the second most used blockchain technology after Bitcoin.

Analysis: Using participatory observation supplemented with publicly available material, this article examines the ideologies and imaginaries surrounding Ethereum and how they are articulated with its technical design.

Conclusion and implications: Ethereum's design ostensibly widens the ideological spectrum of cryptocurrency while "masking" certain currency ideologies still prominent within it. This complicates the distinction seen in the literature between blockchain as currency and blockchain as media and points to the increasing need to study non-currency-based blockchain technologies.

Keywords: Blockchain; Ethereum; Ideologies; Decentralization; Science and technology studies

RÉSUMÉ

Contexte : La recherche sur les blockchains s'est surtout attardé à Bitcoin, en l'associant aux idéologies libertariennes. Cet article aborde Ethereum, la technologie de blockchain la plus utilisée après Bitcoin.

Analyse : Basé sur l'observation participante et du matériel publiquement accessible, l'article analyse les idéologies et imaginaires entourant Ethereum et leur articulation avec son design technique.

Conclusion et implications : Ethereum élargit le spectre idéologique des blockchains tout en «masquant» certaines idéologies monétaires toujours proéminentes. Cela complique la distinction énoncée dans la littérature entre blockchains comme monnaie et blockchains comme média, et souligne la nécessité d'étudier davantage les usages non-monétaires des blockchains.

Mots clés : Blockchain; Ethereum; Idéologies; Décentralisation; Études sur les sciences et les technologies

Introduction

This article examines the ideologies and imaginaries of Ethereum—the second most popular blockchain and cryptocurrency technology after Bitcoin. Blockchains are often conflated with Bitcoin and associated with cyberlibertarianism (Golumbia, 2016; Scott, 2014). However, a growing number of studies and analyses have shed light on the diversity of blockchain-based technologies and the values associated with them (DuPont 2019; Husain, 2020; Scott, 2016; Swan, 2015). While it is true that Ethereum, Bitcoin, and many other decentralized currency projects all rely on blockchain technologies, they also significantly vary in their goals, visions, and imaginaries. For instance, while the Bitcoin (n.d.) website presents it as "an innovative payment network and a new kind of money" (para. 1), Ethereum (n.d.) describes itself as "the world's programmable blockchain" (para. 2). This article will analyze this difference in visions and values alongside the design and discourses surrounding Ethereum and its social imaginaries. Ethereum is worth studying within a Canadian context as it was created in the early 2010s by Vitalik Buterin, a Russian-Canadian programmer who spent his early life in Toronto. At a 2013 Bitcoin meet up in Toronto, he shared a white paper describing Ethereum as a kind of protocol that promised a vast number of usage cases. Notably, from its earliest origins, Ethereum was envisioned as a global platform for enacting smart contracts and building decentralized applications. While the Canadian dimension of this technology is not the focal point of this article, it is relevant to Canadian communication scholarship.

This article begins by presenting a brief literature review on blockchain technologies. It will outline the analytical and methodological framework used herein and then move on to describe Ethereum and analyze some of its core values and imaginaries. It will highlight some of the aspects of Ethereum that resemble and deviate from Bitcoin. Specifically, the "world computer" (Antonopoulos & Wood, 2018, "Introduction to Ethereum", para. 1) is invoked to characterize the ideological underpinnings of Ethereum as blockchain as the new infrastructure of the internet for any kind of usage case (i.e., beyond its currency aspect). In particular, this imaginary of the world computer leads to situating Ethereum in line with hacker cultures and ideologies, especially the ethos of tinkering (Coleman, 2012) and the idea of a recursive public, defined by Christopher Kelty (2008) as a public that is vitally concerned with the means of its own existence. Still, looking closer at Ethereum's design, there is a persistent prevalence of the currency feature and its influence on the ideological landscape of the project. This article's main argument is that Ethereum straddles the distinction between Blockchain 1.0 and Blockchain 2.0 and challenges a clean divide between them (Swan, 2015; Scott, 2016). While Ethereum

widens the spectrum of uses offered by Bitcoin, it still retains certain decisive design features of Bitcoin. Two main design features of Ethereum—the cryptocurrency and decentralized applications—are analyzed in relationship with different imaginaries, with a focus on how these features reflect and reinforce the cyberlibertarian ideologies and imaginaries of Bitcoin that continue to persist in Ethereum, despite being ideologically "masked" (Flichy, 2007, p. 99) to some extent by the world computer imaginary. Ethereum has certainly been addressed in the literature as part of the broader category of blockchain technologies and has been the object of specific inquiries (Bracamonte & Okada, 2017; DuPont, 2017a; Fairley, 2019; Fenu, Marchesi, Marchesi, & Tonelli, 2018; Gerard, 2017), but there is a need for a more detailed case study of Ethereum, specifically one that probes its social imaginaries. Following the argument that imaginaries have influenced the development of the internet (Flichy, 2007), examining Ethereum's imaginaries should help illuminate what the new computing paradigm that Ethereum is actively building toward might mean—or not mean—for our sociotechnical futures.

This analysis is especially important as Ethereum is now the second most important blockchain and is sometimes considered typical of the use of blockchain beyond cryptocurrency. The objective here is to provide a case study that specifically examines the mutual shaping of Ethereum's ideologies, imaginaries, and design, and to advocate more broadly for the study of these interrelations in other blockchain projects that are ostensibly established for purposes beyond market transaction.

Ideologies and imaginaries of blockchains: A brief literature review
In recent years, there has been a proliferation of studies surrounding blockchains and cryptocurrencies from a multitude of disciplines and perspectives. For instance, the Blockchain Research Network, edited by Quinn DuPont, listed at the time of writing more than 3,000 papers related to the subject, including about 1,300 in the "Social and Human" category. Within this literature, a growing set of studies focus on the ideologies and imaginaries of blockchain and cryptocurrency communities, a subject this article aims to contribute to. Within these works, Bitcoin has attracted the most attention (Brunton, 2019; De Filippi & Loveluck, 2016; Dodd, 2017; DuPont, 2014; Golumbia, 2016; Karlstrøm, 2014; Maurer, Nelms, & Swartz, 2013; Redshaw, 2017; Scott, 2014; Vidan & Lehdonvirta, 2019), partly due to its comparatively longer existence.

Two works are particularly relevant to this article. First, an early and polemical work by David Golumbia (2016) called *The Politics of Bitcoin: Software as Right-Wing Extremism*. Here, the author argues that blockchain technologies, and Bitcoin in particular, are premised on right-wing politics, both in their design and ideological constitution. Providing a more nuanced perspective, Lana Swartz (2018) identified two imaginaries that shaped the development of Bitcoin: *digital metallism*, referring to the belief that money supply should be determined by interna-

tional currency markets rather than state policies (and should be free from state control), and *infrastructural mutualism,* which views cryptocurrencies as a decentralized platform for moving money, leading to more freedom of information and creating the potential for an alternative to centralized banking. Swartz goes on to explain how these two distinct economic imaginaries influenced Bitcoin and led to the rise of ideological contentions within the Bitcoin community.

Other authors have looked beyond Bitcoin to study the potentialities of blockchains more broadly in a shift that some have attributed as a move from Blockchain 1.0 to Blockchain 2.0 (Scott, 2016; Swan, 2015). For Melanie Swan (2015), Blockchain 1.0 is primarily concerned with cryptocurrencies whereas Blockchain 2.0 relates more to "contracts."[1] Referring to blockchain-based protocols such as Ethereum, Counterparty, and Omni, Aaron Wright and Primavera De Fillipi (2015) note that blockchain technology enables not only decentralized currencies but also "self-executing digital contracts (smart contracts) and intelligent assets that can be controlled over the Internet (smart property)" (p. 1).

Similarly, Brett Scott (2016) also sets Bitcoin apart from other Blockchain 2.0 technologies and projects such as Ethereum, Counterparty, and Blockstream, which he contends have "more overtly communitarian ideals" (p. ii) and "potential for creating cooperation at scale" (p. ii). In particular, Scott (2016) identifies two visions of blockchains: the "conservative libertarian" view grounded in a criticism of state-controlled currencies, echoing Golumbia's perspective, and the "communitarian anarchist" vision advocating for "non-hierarchical and solidarity-based" (p. 15) systems. DuPont (2019) also revisits some common narratives found in crypto and blockchain communities and envisions cryptocurrencies and blockchains as two distinct media forms. He argues that the shift from Bitcoin—which is seen as money—to blockchain technologies in the general sense has resulted in "an abstraction (and elimination) of ideology and meaning" (p. 43), as they are now less about money and more about "purer tools" (p. 43) due to the greater possibilities they offer as open ledger systems. It is thus important to critically examine how these divergent value systems and visions of digital transactions map onto projects such as Ethereum that do not neatly reflect this "purer" aim.

Analytical perspective and methodology

Golumbia (2016) and Swartz's (2018) analyses of the ideologies and imaginaries of Bitcoin provide a starting point for this analysis. In fact, the first version of this article was intended as a counterargument to Golumbia's analysis of blockchains (in the case of Bitcoin), which differed from how the authors understood Ethereum blockchain at the time. While this study—through the literature review and empirical work—has developed a more complex view of blockchains and Ethereum, Golumbia's work on Bitcoin provides an interesting starting point that serves as a good comparative basis for this study of Ethereum. DuPont (2017), who

also criticizes Golumbia for his polemical and one-sided approach, notably refers to a specific aspect of Golumbia's work:

> Golumbia also makes a case that these political commitments are integrated into the design of the technical system, for example, through seemingly innocuous choices to limit algorithmically the supply of Bitcoins (ostensibly) to curb inflation, or by requiring computational "proof of work" to create new coins (as a metaphor for gold mining). (p. 474)

Following this approach, this analysis aims to look at the articulation of political views within the design of the technical system of Ethereum. Further, it takes more broadly into consideration "imaginaries," drawing on Swartz's (2018) analysis of distinct imaginaries within Bitcoin (digital metallism and infrastructural mutualism) to enrich the understanding of Ethereum. The analytical goal is thus to look at the ideologies and imaginaries of Ethereum and how they are articulated in its design as a technical system.

This approach is situated within scholarly work in science and technology studies (STS) (Akrich, 1992; Flichy 2008; Jasanoff & Kim, 2015) as well as in ethnographical work on software communities (Coleman, 2012; Kelty, 2008), looking at the articulation of values, imaginaries, and technological design. For instance, in STS, and within actor-network theory in particular, Madeleine Akrich (1992) writes that much of the work of technological design involves "inscribing" a certain vision of the world into the technical content of the new object, which, in turn, contains a "script" (p. 208) or a scenario of the way it should be used. Contemporary STS works also look at this articulation of design through the concept of sociotechnical imaginaries, which Sheila Jasanoff and Sang-Hyun Kim (2015) define as "collectively imagined forms of social life and social order reflected in the design" (p. 4). Patrice Flichy (2007) also proposes a model for the role of "technical imaginaries," (p. 13) relying on Paul Ricoeur's distinction between utopias and ideologies, where utopias are used to open possibilities while ideologies are used to legitimize new technology projects. In particular, Flichy (2007) uses the concept of "mask ideology" (p. 11) to refer to a utopia that has become an ideology, partly masking a reality but also mobilizing actors. Common to all these works is a sociotechnical perspective that sees technological design and worldviews (taking the form of values, imaginaries, ideologies) as mutually shaping and constituting each other.

This article also draws on the ethnographies of software communities (often intersecting with STS perspectives) to analyze how ideologies play out in software design. Christopher Kelty (2008) and Gabriella Coleman (2012), for instance, note the limitations and difficulties that classical ideological frameworks (such as "right wing," "left wing," "socialist," or "liberal") present when studying software communities. Coleman (2012) remarks on the "political agnosticism" that character-

izes free and open source software developers who "actively disavow political associations that go beyond software freedom," permitting them to "escape the various ideological polarizations" (p. 22). Kelty (2008) writes that ideologies, in relation to free software, cannot be apprehended a priori but rather emerge from technological practices: "geeks do not start with ideologies, but instead come to them through their involvement in the practices of creating Free Software and its derivatives" (p. 8).

Many of the descriptions for this case study are informed by Ann Brody's active participation in the Ethereum community during the last three years, including one full year as an MA student (Brody, 2019), during which she conducted formal participatory observation at Ethereum's fourth annual conference, Devcon IV, in 2018, and conducted seven interviews, some of which were used in this article[2]. Brody also attended other Ethereum international events and local meet ups, and these observations are supplemented in this article by references and the analysis of materials that are "publicly available"—to use Kelty's (2008, p. 21) term—and produced by Ethereum actors. These materials were not collected or analyzed in any systematic fashion but rather from an ethnographically inspired perspective.[3]

The case of Ethereum

Ethereum was introduced by Vitalik Buterin, a Russian-Canadian programmer who spent his early life in Toronto, Canada. Buterin reportedly got involved in Bitcoin as early as 2011 (Peck, 2016), and he soon started imagining a protocol that could enable greater use cases. At a 2013 Bitcoin meet up in Toronto, Buterin shared a white paper describing his vision of Ethereum as a blockchain-based platform that promised vast possibilities beyond monetary transactions (Filiba, 2018). That document, *A Next-Generation Smart Contract & Decentralized Application Platform*, described how blockchains could be used to enable applications such as smart contracts and what Buterin (2013) has referred to as "decentralized applications" (p. 11).

Similar to Bitcoin, Ethereum is based on blockchain, a technology that at its core involves creating a chain of records or "blocks" that are cryptographically linked to each other. Theoretically, it is impossible to retroactively modify one of the blocks without altering the whole chain. As with Bitcoin, Ethereum's blockchain is also *distributed*, meaning that the blockchain is collectively managed on a peer-to-peer network instead of a central organization. For this reason, a distributed blockchain is often compared to a public digital accounting ledger that makes it possible to record and store data in a transparent and immutable way.[4]

While the concept of blockchain was first implemented in Bitcoin to support cryptocurrencies, it is now used for much broader goals. This is where Ethereum differs from Bitcoin. As the title of Buterin's (2013) white paper states, a defining feature of Ethereum is its ability to execute smart contracts, which are computer

programs intended to automatically execute a transaction on the blockchain according to predefined terms. While some features of smart contracts are implemented in Bitcoin to exchange currency, they can be used in Ethereum to exchange anything that holds value (such as property or shares) without requiring the services of third parties.

Another defining feature of Ethereum, and central to the argument here, is its ability to facilitate decentralized applications, usually referred to as dApps. These applications function in a similar way to Apple iOS or Android apps but are decentralized and run on the blockchain instead of on centralized servers. For example, *CryptoKitties*—a blockchain game that allows players to buy, sell, and exchange digitally animated cats—was once one of the most popular dApps on Ethereum. By being validated through the blockchain, each CryptoKitty is unique and cannot be transferred (bought or sold) without the agreement of its owner. *Status* is another popular dApp that combines a peer-to-peer messenger, a wallet (for storing cryptocurrencies), and a secure web browser into a private and secure communication tool. In his white paper, Buterin (2013) envisioned many kinds of dApps use cases, such as financial derivatives, identity systems, decentralized file storage, and even "decentralized autonomous organizations" (para. 3).

Despite this defining difference, Ethereum still shares many similarities with Bitcoin. Ethereum has its native cryptocurrency, called Ether, that can be traded on the market in the same manner as Bitcoin. For instance, on April 16, 2020, one Ether (or ETH) was worth CAD$240.30. In 2020, there were approximately 110.5 million Ether in circulation, for a total worth of about CAD$26 billion (Malwa, 2020). This cryptocurrency is also used for paying fees for running smart contracts, dApps, or any other feature requiring transactions on the Ethereum blockchain. Moreover, as with Bitcoin, creating a new currency token in Ethereum is called *mining*—in reference to gold mining—and involves a complex computational process called *proof of work* that consists of confirming new, recently made transactions and adding a new "block." This mining process often involves vast amounts of computer resources and has been criticized for its energy requirements and ecological costs (Egiyi & Ofoegbu, 2020). For this reason, Ethereum is currently developing Ethereum 2.0 to replace proof of work with *proof of stake*, a process that reduces mining resources and is thus more ecologically sustainable. At the time of writing, Ethereum 2.0 was being run in test mode.

The following sections analyze three themes prevalent in Ethereum to show how it distinguishes itself from some of Bitcoin's imaginaries while also reproducing others. The first section addresses the imaginary of the "world computer." The second describes the culture of experimentation and the ethos of building evident in Ethereum. The third section shows how, despite these described imaginaries and values that appear to be different from Bitcoin, discourses on cryptocurrency and cyberlibertarianism still persist in Ethereum. After presenting these empirical

analyses, the last section discusses whether or not Ethereum can be characterized as "right wing" by bringing it into conversation with Golumbia's (2016) analysis of Bitcoin.

Beyond currency: The imaginary of the "world computer"

Ethereum promises a vast range of uses of the blockchain that extend beyond cryptocurrency transactions. In terms of design, Ethereum can be understood as a "Turing-complete" virtual machine, meaning that any kind of computational problem could theoretically be solved using Ethereum, as its script is not limited to solely facilitating monetary transactions. In particular, Ethereum's smart contracts are usually written in a programming language called Solidity that is also geared toward Turing-complete operation. This is unlike Bitcoin's programming language, known as SCRIPT, which is limited to executing simple currency transactions. In his white paper, Buterin (2013) explains the open potential of Ethereum's Turing-completeness:

> What Ethereum intends to provide is a blockchain with a built-in fully fledged Turing-complete programming language that can be used to create "contracts" that can be used to encode arbitrary state transition functions, allowing users to create any of the systems described … , as well as many others … yet imagined, simply by writing up the logic in a few lines of code. (p. 1)

Akrich's (1992) theorization of scripts can be used here to emphasize the distinction between Ethereum's flexible design and Bitcoin's more restricted design. Ethereum's design as a virtual machine, and especially its programming language Solidity, is scripted in a way that imposes minimal user constraints, promoting different courses of actions and preferences. This promotes a broader ideological orientation than what is permitted by Bitcoin's limited programming language, which is primarily intended for financial transactions.

Indeed, this design characteristic of Ethereum has been a source of many imaginative futures aligning with the "world computer" imaginary. This term seems to move through Ethereum's history (Cuen, 2019; Gupta, 2005; Quénetain, 2018; Wu, 2020). It was coined at the first Devcon conference in 2015 by Ethereum co-founder Gavin Wood, who gave a presentation called "Ethereum: The World's Computer." Buterin spoke of Ethereum in these terms when he described it as a platform that would enable developers to execute their code in exchange for a fee:

> [Ethereum is] a massively replicated Turing-complete state machine, to which anyone in the world with the ability to buy 0.3 cents worth of Ether can upload code which every participant in the network will be forced to run on their local machine. (Ogundeji, 2016, para. 13)

In short, this perspective imagines Ethereum as a type of computer that does not reside in a single system but is ubiquitous. Applications are run on a vastly decen-

tralized computer system that cannot ever be shut down and that anyone with access to an internet connection can implement.

Other similar terms could be associated with the world computer imaginary. For instance, a developer at Devcon IV described how he envisions Ethereum's prospective use cases:

> Distribution of power and wealth in a more egalitarian way. That would be the ideal impact, although simply the use of this technology in the backbone of the internet (for example, DNS) will make the internet and digital communication more secure and guaranteed compared to what it is today. (Alex, Interview 3)

While this quote hints at blockchain's broader political aims, the idea of Ethereum being the new "internet backbone" imagines Ethereum restructuring internet architecture, allowing people that do not necessarily know or trust each other to settle transactions. It also emphasizes a kind of internet model where monopolized power cannot take hold.

A related term put forward by Ethereum co-founder Gavin Wood is Web 3.0, or simply Web3, the idea of a new version of the web where information that is exchanged is authenticated or "trusted" through the blockchain. Wood (2018) described his aspiration in the following way:

> Web 3.0 will engender a new global digital economy, creating new business models and markets to go with them, busting platform monopolies like Google and Facebook, and giving rise to vast levels of bottom-up innovation. Cheap government attacks on our privacy and liberty like widespread data trawling, censorship, and propaganda, will become more difficult. (para. 19)

This new web model could empower users to be in charge of their data thanks to blockchain's encryption techniques that, in theory, would enable users to maintain pseudo-anonymity and share personal information only on a permissioned basis. Events such as account suspensions, denials of services, and service disruptions would also be significantly reduced. In certain ways, this perspective is in continuity with many historical or contemporary peer-to-peer or decentralized network projects, such as the Interplanetary File System, Free Net, and Mojo Nation. These networks implement distributed data storage, meaning that when one downloads files, one is downloading them from someone else's computer rather than a central server. Unlike these file-sharing projects, Ethereum can be used to automate broader transactions in an authenticated way (through the feature of smart contracts), thus pursuing the original idea of the world computer, instead of just a file system.[5]

In some respects, the world computer imaginary aligns with Swartz's (2018) characterization of mutual infrastructuralism in the case of Ethereum, which is

imagined as a new decentralized and mutualized computing infrastructure. However, Swartz's imaginaries are primarily concerned with economics and monetization. The world computer imaginary, on the contrary, encompasses a vision of blockchain, the internet, and even computing that goes well beyond economic usages. And yet, rather than a rupture, the imaginary of the world computer can probably be best characterized as *an extension* of mutual infrastructuralism to encompass a broader vision of infrastructures. At the same time, it is important to note that digital metallism—Swartz's other imaginary, which emphasizes the provision of an alternative to state money—still seems to be present in Ethereum; namely, it continues to prevail through the metaphor of "mining," inspired by gold standard economics.

Buidl versus *hodl:* The ethos of building and experimentation in Ethereum

During an interview, an Ethereum developer named Moe made an interesting comparison between the Ethereum community, which he described as inclusive and experimental, and the Bitcoin community, which he described as more "tribalistic":

> I would describe Ethereum as being more about openness, fairness, equality, and what I like about it is that you're allowed to experiment more. … If you compare these kinds of values to Bitcoin, they are more skeptical, more tribalistic, and they believe if you're very open and nice to people, you're going to open it up to all kinds of people that are going to change Bitcoin. … People from different networks are welcome here because Ethereum is all about experimentation. (Moe, Interview 7)

Certain Ethereum developers said they were drawn to Ethereum because of its intellectual challenge. One developer put it this way:

> I always wanted to learn coding, and hearing about blockchain finally became a reason to learn it and immerse myself into something that seemed to me completely unknown and a big challenge at the time. … I like that it's open and inclusive. … Cooperation instead of competition—people working on the same topic but don't feel like competitors. (Dan, Interview 1)

This mention of "cooperation instead of competition" is worth paying attention to, as it suggests that Ethereum's commitments do not strictly fall under rigorous right-libertarian precepts of competition. Two other developers expressed how Ethereum's culture played a significant part in sustaining their participation:

> Ultimately [blockchain] keeps me engaged and brings me in contact with some of the most interesting, thoughtful, and kindest people I've ever met. (Mark, Interview 4)

> Ethereum has a strong underlying current of altruistic ideology. It influences our decision-making; it inspires our work and allows us to coordinate a multitude of projects that serve the greater good of the Ethereum community. (Aaron, Interview 5)
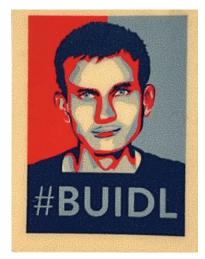
> The goal is mainly to make widespread use of blockchain and streamline this technology throughout society. It's open to new ideas, new people, and new use cases. I find the Ethereum community really healthy and diverse. (Alex, Interview 3)

In addition to the interviews we conducted at Devcon IV, the conference demonstrated the sheer scope of possibilities for Ethereum use, such as Islamic finance, helping sex workers stay safe, and implementing tools of resistance in Venezuela. This range of possibilities further magnifies the distinction between Ethereum and Bitcoin. Indeed, different analysts, including those within blockchain communities, echo this distinction. For instance, Kay Kurokawa (2018), a software engineer active in crypto communities, sees Bitcoiners placing a premium on restrictive access and securitization based on their rigorous cryptographic code of conduct. Ethereum, on the other hand, is described as more inclusive and left leaning: "because their main instinct is to hope for best-case scenarios, their focus is on innovation … and innovation for left-wingers involves creating new ways to utilize the blockchain or inventing some alternative decentralized consensus" (para. 5).

One of the discursive tropes prevalent in Ethereum that captures this ethos of experimentation is the slang term *buidl*. At Devcon IV, buidl appeared on customized conference stickers featuring Vitalik Buterin (see Figure 1). An intentional misspelling of *build*, it is used to encourage the development of new blockchain applications to maintain the Ethereum ecosystem.

Figure 1: conference sticker from DevCon IV

Buidl is a sibling of the term hodl, which first appeared in a Bitcoin forum in 2013 when a thread with an accidental misspelling of *holding* was posted by a user stating, "I AM HODLING" (Bitcoin Forum, 2013). Hodl picked up cultural traction in the Bitcoin community, encouraging crypto enthusiasts to hold on to their cryptocurrency rather than sell it and to stay strong when crypto prices dropped. Buidl challenges hodl, to some extent, by promoting the building and expansion of the blockchain ecosystem rather than simply holding out for lucrative moments.

The imaginary of the world computer and the ethos of building reveals how Ethereum is committed to more than a market investment logic. Indeed, the ethos of building resembles what Coleman (2013) refers to as a kind of "tinkering" in her description of open source hacker communities. The world computer imaginary also points to Ethereum as a recursive public, which has been defined by Kelty (2008) in the case of free and open source software as a "public that is vitally concerned with the material and practical maintenance and modification of the technical, legal, practical, and conceptual means of its own existence as a public" (p. 3). It might be more apt to consider Ethereum from the perspective of hacker ideologies which, as Coleman (2013) and Kelty (2008) note, are difficult to characterize on the left-right spectrum. Ideologies, the authors write, emerge from technological making and are centred around the kinds of tinkering and experimenting associated with free and open source software and hacker communities.

Currency, finance, and the persistent prevalence of libertarianism

While the imaginary of the world computer and the ethos of experimentation seem to be significatively present in Ethereum and absent from Bitcoin, ideological aspects related to currency that are normally associated with cyberlibertarianism nevertheless remain prevalent in Ethereum. For example, Ether, the native currency of Ethereum, holds significant monetary value. It is also significant that Vitalik Buterin, for instance, has a net worth of over USD$21 billion, most of it relying on Ether assets (Chipolina, 2020). Beyond the conversations that take place in the community concerning building, experimentation, and visions of the world computer, certain cyberlibertarian tendencies prevail in Ethereum's discourse. For instance, Joe says:

> To change something, you have to build a new model that makes the existing model obsolete. If we design this system with that in mind, I see cryptocurrencies reducing the role of central parties that have been shown to mishandle the public treasury and financial institutions who reap the benefits of currency manipulation and inflation. (Joe, Interview 2)

Indeed, Ethereum is well known for its use of Initial Coin Offerings (ICOs) in creating other cryptocurrencies. Functioning in the same manner as Initial Public Offerings (IPOs), which consist of offering shares of a company on the stock market, ICOs offer new kinds of tokens (or "coins") that are expected to gain value in the future. It is worth mentioning that Ethereum itself started as an ICO, selling Ethereum tokens (Ether) that could be bought with Bitcoin. In 2017, the total amount of funds raised by ICOs exceeded USD$4 billion (Zetzsche, Buckley, Arner, & Föhr, 2017), and as of February 2018, more than 1,000 ICOs had been held on Ethereum, comprising 80 percent of all ICOs (Fenu et al., 2018). ICOs were very quickly seen as "catnip for scammers" (Morris, 2017, para. 3), given that they were

not initially regulated by any government bodies. It is not surprising that places such as China and South Korea have outlawed them completely, and that they have gone through securities regulation in Canada and the United States. They are evaluated in Canada on a case-by-case basis to assess whether or not crypto is considered a "security" (for example, a tradable financial asset).

Another notion originating out of Ethereum, which Golumbia (2016) linked to cyberlibertarianism in his last chapter on the future of blockchain, is the decentralized autonomous organization (DAO). A DAO is conceptualized within blockchain communities as an organization (profit or nonprofit) whose constitutive rules and transactions are encoded within a blockchain. This helps shareholders and participants establish their contractual relationship without the need for central management or a central authority (as would be the case in a "classic" enterprise, which would need to register with a national government to be legally recognized). Although DAOs are still in an experimental stage, the first one launched on Ethereum played a significant role in Ethereum's early history. Dubbed as "the mother of all DAOs" (Hare, 2020, para. 2), it was created to serve as a business model for other DAOs and as a venture capital fund aiming to serve and collect funds for Ethereum projects. It was not registered in any state and had no conventional management structure, such as a board of directors. Instead, it operated according to rules that were encoded into the smart contracts that governed them.

This "mother" DAO is largely characterized as a failure that caused a significant schism in the community. In May 2016, when the DAO crowdfund was launched, it earned its place as one of the biggest crowdfunds in history, amassing up to USD$120 million in digital currency (Waters, 2016). A few weeks later, a hacker found a loophole in the code and stole around USD$50 million in Ether from the fund. To repair the damage, the Ethereum community decided to fork the code and create a new chain entirely. From the onset, many Ethereum members were struck by this software fork. In the end, two Ethereum blockchains stemmed from this event: Ethereum Classic (ETC), the initial blockchain that was preserved based on "code is law," and the more recent Ethereum (ETH), which is often associated with the idea of "extra-protocol intentionality," meaning that it is the responsibility of the community to repair an injustice, even if this means changing the blockchain (De Filippi, 2016). The latter blockchain is the focus of this article.

A recent movement called Defi (short for decentralized finance) has also had a marked impact on Ethereum activity. Defi, which is committed to shifting traditional financial products into decentralized ones that do not rely on government regulation or enterprises, is also a response to so-called centralized cryptocurrency exchanges that are owned by private businesses, especially as some of these have been the subject of allegations of fraud (Kauflin, 2020). Ethereum is a popular

blockchain for Defi applications, partly due to its smart contract feature. One popular example is Uniswap, a protocol that allows decentralized exchanges (or *dex* in the cryptocurrency vocabulary) between Ether (ETH) and other cryptocurrencies. Defi Pulse, a popular website for viewing the latest analytics and rankings of Defi projects, reports that as of November 8, 2020, about USD$2.83 billion in crypto was "locked-in" to various Defi projects. Defi has been compared to the 2017 ICO craze, a period in crypto when prices started significantly rising overnight. With Defi, however, more actors from conventional finance are participating (Roberts, 2020).

This renewed importance granted to finance points to the persisting prevalence of cyberlibertarianism, and a libertarian worldview more generally, in Ethereum use. One actor who was interviewed for *Forbes* magazine echoed this perspective, noting that many people are interested in Defi because "they have a libertarian streak" (Kauflin, 2020**,** para. 5), while others are simply fascinated by the technology itself. This points to a defining tension within Ethereum between the aims of decentralizing finance and the more general ethos of building a new internet culture.

Discussion: Between building and finance, is Ethereum "right wing"?

Recall that Golumbia (2016) contends that Bitcoin and blockchain more generally are premised on right-wing values, both in their design and their ideological constitution. But what about Ethereum? What are the politics of Ethereum? A certain diversity of ideologies and imaginaries inform and sustain Ethereum: while the significance of ICOs and the Defi movement point to the influence of libertarian views on how Ethereum is used, the importance granted to experimentation, openness, and inclusiveness seems to point to other ideological horizons that more closely align with the hacker ethics of tinkering (Coleman, 2012) and the making and sharing of new and inclusive uses. This diversity of ideologies echoes some of the literature reviewed here, in particular what has been noted about the coexistence of communitarian and libertarian ideals within blockchain communities (DuPont, 2019; Scott, 2016). These conclusions also echo the findings reported by Coindesk, a popular news site specializing in cryptocurrencies, which revealed in a survey that the majority of Ethereum *users* (not necessarily the developers) identify as "liberals" and "socialists," contrary to Bitcoiners who identify more often as "conservative" or "libertarian" (Ryan, 2018). It is safe to conclude that as a community, Ethereum is best characterized as a space where different ideological horizons cohabitate while leaning decidedly toward the left.

Recall, however, that Golumbia (2016) argues how Bitcoin "*in its very design*" (p. 12) can only make sense within right-wing ideology. Without necessarily adhering to Golumbia's right-wing imaginary, it has to be recognized that Ethereum still shares many design features with Bitcoin. The process of proof of work, associated

with gold mining, is one of these, which Golumbia has criticized. More generally, Ethereum, similar to Bitcoin, has a native currency that plays a central role in successfully conducting transactions. Other blockchain platforms, such as Yosemite, have chosen to peg the value of their token on fiat government-approved money instead of relying on a native currency. For Ethereum, rooting a native currency so centrally in its design is a choice, and an ideological one for that matter, that is echoed by the persistence of speculating practices and discourses. These are most notably expressed through the aforementioned ICO craze and the new Defi movement, which casts a light on the cyberlibertarian character of Ethereum.

That said, Ethereum differs significantly from Bitcoin based on the way that it supports Turing-complete programming languages to enable (at least in theory) any kind of application to run on the blockchain. Ethereum's Turing-completeness is antithetical to the kind of "right-wing" design that Golumbia (2016) ascribes to blockchains in general.[6]

Conclusion

Ethereum straddles what has been categorized in the literature as the distinction between Blockchain 1.0 and 2.0 (Scott, 2016; Swan, 2015)—or, to use Dupont's (2019) characterization, between blockchain as money and blockchain as media more generally. While the stated purpose of Ethereum is to be used in different ways beyond currency, defining itself according to the diverse potentials of Blockchain 2.0, certain features of Ethereum nevertheless remain grounded in finance and cryptocurrency culture. Yet, rather than viewing the world computer imaginary and imaginaries related to finance and currency in opposition, it might be better to comprehend them as mutually reinforcing. In terms of design, this appears quite clearly in the way Ether, as a currency, is used as a "gas" to fuel the Ethereum as a world computer, which in turn reinforces the value and stability of the currency itself. In terms of ideology, the world computer ideal and related discourses of inclusive building and experimentation function as a "mask ideology" (Flichy, 2007, p. 11). For Flichy, utopian discourses concerning the revolutionizing impact of new technologies are later displaced or transformed in the cycle of technological development, minimizing or "masking" some other aspect of reality. The characterization of Ethereum as a world computer is mobilized to enroll actors more inclined toward the building aspect of Ethereum, while at the same time "masking" the fact that Ethereum seems to be still foremost used as a financialization tool.

Future studies should examine more thoroughly the way ideologies and imaginaries not only co-exist or are in tension in blockchain communities but also how they might mask or legitimize each other. It would also be important to better locate or situate these ideologies and imaginaries within different categories of actors by looking at how they are differentially expressed by developers, investors, or or-

dinary users (Brody, 2019). Finally, and especially in the context of communication studies, more work should address the imaginaries of blockchain technologies that are not centred around currency and assess their potential for sustaining alternative digital infrastructures or acting as media (Dupont, 2019). While libertarian worldviews seem to be prominent within cryptocurrency-based protocols, the situation might be quite different for blockchain projects intended to pursue other purposes, such as smart contracts in the case of Ethereum.

Notes

1. Swan (2015) also mentions Blockchain 3.0, which addresses "Justice Applications beyond Currency, Economics, and Markets" (p. 27).
2. The first author is a white female who has experimented with decentral finance and markets on Ethereum for research purposes. The second author, a white male, was her first supervisor during her MA studies and has been active in research and advocacy work related free and open source software (Couture, 2017, 2020).
3. Characterizing this approach as "ethnographically inspired" rather than firmly ethnographic draws on Hine's approach (2000, 2007), which consists of maintaining a relationship with ethnography as a methodological "inspiration and source of guidance," (Hine, 2007, p. 668) without necessarily relying on canonical versions of what this methodology should be.
4. For a more thorough description of blockchain, see Dupont (2019).
5. Some efforts are being made, however, to articulate blockchain and distributed file systems (see Huang, Lin, Zheng, Zheng, & Bian, 2020).
6. Ethereum distinguishes itself from Bitcoin in other design details that are not addressed here. For instance, while Bitcoin has defined an algorithmic limit on the supply of Bitcoin to curb inflation—something that Golumbia (2016) associates with a right-wing perspective—there is no such fixed cap in Ethereum, although this choice is sometimes called into question (Sharma, 2019).

Ann Brody is a doctoral student at McGill University. Email: ann.brody@mail.mcgill.ca.
Stéphane Couture is Assistant Professor at Université de Montréal. Email: stephane.couture @umontreal.ca.

Websites

Blockchain Research Network, www.blockchainresearchnetwork.org
Blockstream, https://blockstream.com
Coindesk, https://www.coindesk.com
Counterparty, https://counterparty.io
Defi Pulse, https://defipulse.com
Free Net, https://freenetproject.org
Interplanetary File System, https://ipfs.io
Mojo Nation, https://mojo-nation.com
Omni, https://www.omnilayer.org
Yosemite, https://yosemitex.com

References

Akrich, Madeleine. (1992). The de-scription of technical objects. In W. Bijker & J. Law (Eds.), *Shaping technology\building society: Studies in sociotechnical* (pp. 205–224). Cambridge, MA: MIT Press.
Antonopoulos, Andreas M., & Wood, Gavin. (2018). *Mastering ethereum: Building smart contracts and dapps.* URL: https://cypherpunks-core.github.io/ethereumbook/01what-is.html [January 21, 2020].

Bitcoin. (n.d.). Bitcoin [Website]. URL: https://bitcoin.org/en [January 2, 2020].

Bitcoin Forum. (2013, December 18). I am hodling [Website]. URL: https://bitcointalk.org/index.php
?topic=375643.0 [February 15, 2020].

Bracamonte, Vanessa, & Okada, H. (2017, August). The issue of user trust in decentralized applica-
tions running on blockchain platforms. *2017 IEEE International Symposium on Technology
and Society (ISTAS)*, 2017, pp. 1-4, doi:10.1109/ISTAS.2017.8318975

Brody, Ann. (2019). *Mapping ideologies in cryptocurrency and blockchain communities: The case of
Ethereum* [Unpublished M.A. thesis]. Toronto, ON: York University.

Brunton, Finn. (2019). *Digital cash: The unknown history of the anarchists, utopians, and technologists
who created cryptocurrency*. Princeton, NJ: Princeton University Press.

Buterin, Vitalik. (2013). Ethereum White Paper. GitHub repository. URL: https://github. com
/ethereum/wiki/wiki/White-Paper [September 8, 2020].

Chipolina, Scott. (2020). Vitalik Buterin sold half his Bitcoin in 2013 to avoid going broke. *Decrypt.*
URL: https://decrypt.co/51341/vitalik-buterin-sold-half-his-bitcoin-in-2013-to-avoid-going
-broke [September 10, 2020].

Coleman, Gabriella. (2012). *Coding freedom: The ethics and aesthetics of hacking.* Princeton, NJ:
Princeton University Press.

Couture, Stéphane. (2017). Values and configuration of users in the design of software source code.
International Journal of Communication, *11*(2), pp. 1112–1132, http://ijoc.org/index.php
/ijoc/article/view/4179 [November 1, 2020].

Couture, Stéphane. (2020). Free and open source software. In M. O'Neil, C. Pentzold, & S. Toupin
(Eds.), *The Handbook of Peer Production* (pp. 153–168). Hoboken, NJ**:** Wiley. doi:10.1002
/9781119537151.ch12

Cuen, Leigh. (2019, October 11). Devcon shows Ethereum's "World Computer" is a movement, not
a product. *Coindesk.* URL: https://www.coindesk.com/devcon-shows-ethereums-world
-computer-is-a-movement-not-a-product [November 5, 2020].

De Filippi, Primavera, & Loveluck, Benjamin. (2016). The invisible politics of Bitcoin: Governance
crisis of a decentralised infrastructure. *Internet Policy Review*, *5*(3), 1–32.

DuPont, Q. (2014). The politics of cryptography: Bitcoin and the ordering machines. *Journal of Peer
Production*, *1*(4), 1–10.

Dupont, Quinn. (2017a). Experiments in algorithmic governance: A history and ethnography of
"The DAO," a failed decentralized autonomous organization. In M. Campbell-Verduyn (Ed.),
Bitcoin and beyond: Cryptocurrencies, blockchains and global governance (pp. 157–178). New
York, NY: Routledge.

DuPont, Quinn. (2017b). The politics of Bitcoin: Software as right-wing extremism, by David
Golumbia. *Journal of Cultural Economy, 10*(5), 474–476.

DuPont, Quinn. (2019). *Cryptocurrencies and blockchains.* Cambridge, UK: Polity Press.

Dodd, Nigel. (2018). The social life of Bitcoin. *Theory, culture & society*, *35*(3), 35–56.

Egiyi, Modesta, & Ofoegbu, Grace. (2020). Cryptocurrency and climate change: An overview.
International Journal of Mechanical Engineering and Technology, *11*(3), 15–22.

Ethereum. (n.d.). *Ethereum.org.* URL: https://ethereum.org/en/what-is-ethereum [January 2, 2020].

Fairley, Peter. (2018). Ethereum will cut back its absurd energy use. *IEEE spectrum*, *56*(1), 29–32.

Fenu, Gianni, Marchesi, Lodovica, Marchesi, Michele, & Tonelli, Roberto. (2018). The ICO phenom-
enon and its relationships with Ethereum smart contract environment. In *2018 International
Workshop on Blockchain Oriented Software Engineering*, 26–32. IEEE.

Filiba, Jack. (2018). Why Ethereum co-founder Vitalik Buterin is a blockchain icon. *Coinsquare.* URL:
https://news.coinsquare.com/blockchain/russian-canadian-ethereum-vitalik-buterin
[May 11, 2020].

De Filippi, Primavera. (2016, July 11). A $50M hack tests the values of communities run by code.
Motherboard. URL: https://www.vice.com/en_us/article/qkjz4x/thedao [February 24, 2020].

Flichy, Patrice. (2007). *The internet imaginaire* (1st ed.). Cambridge, MA: MIT Press.

Gerard, David. (2017). *Attack of the 50 foot blockchain: Bitcoin, blockchain, Ethereum & smart contracts.*
Seattle, WA: CreateSpace Independent Publishing Platform.

Golumbia, David. (2016). *The politics of Bitcoin: Software as right-wing extremism.* Minneapolis, MN: University of Minnesota Press.

Gupta, Vinay. (2015, October 21). Ethereum, smart contracts, and the world computer. *ConsenSys.* URL: https://consensys.net/blog/news/programmable-blockchains-in-context-ethereum-smart-contracts-and-the-world-computer/ [October 5, 2020].

Hare, Mercuryo. (2020, October 27). Decentralized autonomous organization as a way to manage defi projects. *Mercuryo.* URL: https://medium.com/mercuryo/decentralized-autonomous-organization-as-a-way-to-manage-defi-projects-4905d4789e27 [November 12, 2020].

Hine, C. (2000). *Virtual ethnography.* London: SAGE.

Hine, C. (2007). Multi-sited ethnography as a middle range methodology for contemporary STS. *Science, Technology, & Human Values*, 32(6), 652-671.

Huang, Huawei, Lin, Jianru, Zheng, Baichuan, Zheng, Zibin, & Bian, Jing. (2020). When blockchain meets distributed file systems: An overview, challenges, and open issues. *IEEE Access*, 8(March 2020), 50574–50586.

Husain, Syed Omer, Franklin, Alex, & Roep, Dirk. (2020). The political imaginaries of blockchain projects: Discerning the expressions of an emerging ecosystem. *Sustainability Science*, 15(March 2020), 379–394.

Jasanoff, Sheila, & Kim, Sang-Hyun. (2015). *Dreamscapes of modernity: Sociotechnical imaginaries and the fabrication of power.* Chicago, IL: University of Chicago Press.

Karlstrøm, Henrik. (2014). Do libertarians dream of electric coins? The material embeddedness of Bitcoin. *Distinktion: Scandinavian Journal of Social Theory*, 15(1), 23–36.

Kauflin, Jeff. (2020, December 16). Why everyone in crypto is talking about defi. *Forbes.* URL: https://www.forbes.com/sites/jeffkauflin/2019/04/26/why-everyone-in-crypto-is-talking-about-defi/?sh=af68fe1723f3 [December 21, 2020].

Kelty, Christopher (2008). *Two bits the cultural significance of free software.* Durham, NC: Duke University Press.

Kurokawa, Kay. (2018). Left/right political ideologies of hodlers: Part 1. *Hacker Noon.* URL: https://hackernoon.com/left-right-political-ideologies-of-hodlers-part-1-faa71ed689e4 [May 3, 2020].

Malwa, Shaurya. (2020, August 08). "How many Ethereum in circulation?" asks the Bitcoin community. *Cryptoslate.* URL: https://cryptoslate.com/how-many-ethereum-in-circulation-asks-the-bitcoin-community [November 12, 2020].

Maurer, Bill, Nelms, Taylor, & Swartz, Lana. (2013). "When perhaps the real problem is money itself!": The practical materiality of Bitcoin. *Social Semiotics*, 23(2), 261–277.

Morris, David. (2017, May 31). The rise of cryptocurrency ponzi schemes. *The Atlantic.* URL: https://www.theatlantic.com/technology/archive/2017/05/cryptocurrency-ponzi-schemes/528624 [May 13, 2020].

Ogundeji, Olusegun. (2016, June 8). Vitalik Buterin sets milestones on Ethereum's route to be the "World Computer." *Cointelegraph.* URL: https://cointelegraph.com/news/vitalik-buterin-sets-milestones-on-ethereums-route-to-be-the-world-computer [May 16, 2020].

Peck, Morgen (2016). The uncanny mind that built Ethereum. Backchannel. *WIRED.* URL: https://www.wired.com/2016/06/the-uncanny-mind-that-built-ethereum [June 15, 2016].

Quénetain, Stanislas. (2018, March 13). Ethereum: The first world computer. *Blockchains Expert.* URL: https://www.blockchains-expert.com/en/ethereum-the-world-computer [October 5, 2019].

Redshaw, Tom. (2017). Bitcoin beyond ambivalence: Popular rationalization and Feenberg's technical politics. *Thesis Eleven*, 138(1), 46–64.

Ryan, Peter. (2018). Left, right and center: Crypto isn't just for libertarians anymore. *CoinDesk*, URL: https://coindesk.com/no-crypto-isnt-just-for-libertarians-anymore [May 10, 2019].

Scott, Brett. (2014). Visions of a techno-Leviathan: The politics of the Bitcoin blockchain. *E-International Relations.* URL: https://www.e-ir.info/2014/06/01/visions-of-a-techno-leviathan-the-politics-of-the-bitcoin-blockchain [December 6, 2020].

Scott, Brett. (2016). *How can cryptocurrency and blockchain technology play a role in building social and solidarity finance?* (Working Paper No. 2016-1). Geneva, CH: United Nations Research Institute for Social Development.

Sharma, Rakesh. (2020, September 12). Why is Ethereum co-founder proposing a hard cap? *Investopedia.* URL: https://www.investopedia.com/news/why-ethereum-cofounder -proposing-hard-cap/#:~:text=Ethereum currently doesn't have, regulated on a yearly basis [December 5, 2020].

Swan, Melanie. (2015). *Blockchain: Blueprint for a new economy.* Sebastopol, CA: O'Reilly Media.

Swartz, Lana. (2018). What was Bitcoin, what will it be? The techno-economic imaginaries of a new money technology. *Cultural Studies, 32*(4), 623–650.

Vidan, Gili, & Lehdonvirta, Vili. (2019). Mine the gap: Bitcoin and the maintenance of trustlessness. *New Media & Society, 21*(1), 42–59.

Waters, Richard. (2016, May 17). Automated company raises equivalent of $120M in digital currency. *CNBC.* URL: https://www.cnbc.com/2016/05/17/automated-company-raises-equivalent-of- 120-million-in-digital-currency.html [May 10, 2019].

Wood, Gavin. (2018). Why we need Web 3.0. *Medium.* URL: https://medium.com/@gavofyork/why- we-need-web-3-0-5da4f2bf95ab [May 10, 2019].

Wright, Aaron, & De Filippi, Primavera. (2015). *Decentralized blockchain technology and the rise of lex cryptographia* [SSRN Scholarly Paper, ID 2580664]. doi: http://dx.doi.org/10.2139/ssrn .2580664

Wu, Daniel. (2020, January 22). Ethereum 2.0: The road to being the world's computer. *Medium.com.* URL: https://medium.com/ppio/ethereum-2-0-the-road-to-being-the-worlds-computer -663d4e6a90f1 [October 5, 2020].

Zetzsche, Dirk, Buckley, Ross, Arner, Douglas, & Föhr, Linus. (2017). *The ICO gold rush: It's a scam, it's a bubble, it's a super challenge for regulators.* (Working Paper No. 11). Germany, University of Luxembourg Law.