

Art and NFTs: Past and Future

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INTRODUCTION—LOOKING BACK

I'm going to talk from an artist's perspective about "Art and NFTs—Past and Future." There are a lot of surprising details in the short history of non-fungible tokens (NFTs) and some pretty interesting ideas that are ready to unfold in the future.

As an artist, the work I've done has always been media-based, including video, software, and related forms. Not so long ago, I was making video artworks, akin to short, experimental, independent films. Along with my partner, Jennifer McCoy, I have produced "net art"—art made for viewing and audience participation on the Internet. Since all of the work that I—along with my friends and other artists in the community—made was digital and intangible, there was very little way to participate in the art market. There were no tangible works that could be made and sold. A digital media-based artwork could circulate in non-commercial contexts such as art or film festivals or museum curations, but rarely could it participate in the traditional art market like a painting could.

For example, in 2001, the Whitney Museum of American Art acquired a JavaScript-based project of ours called *201—A Text Algorithm*.¹ A code-based piece can enter the museum, but it is usually through donations and commissions rather than sales. That was the experience for my friends and me for a long time. Working with an intangible form are always on the sidelines of the greater visual arts community. As a result, I—along with many other artists—adopted a strategy of physicalization: you make your work sculptural and turn your media ideas into objects. We made physical media sculptures that were met with success. In 2001, the Metropolitan Museum of Art purchased an early work of ours *Every Shot, Every Episode*,² which was recently part of the exhibition *Pictures Revisited*. Although *Every Shot, Every Episode* is a media art piece, it is exhibited sculpturally in the form of a small, wall-mounted suitcase. In other projects, we created sculptures that included video and kinetics, such as miniature film sets made with small cameras. One of these is in the Museum of Modern Art (MoMA) collection and another was purchased by the Grand Duke Jean Museum of Modern Art (MUDAM) in

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1. *Gate Pages: June 01: Jennifer & Kevin McCoy*, WHITNEY MUSEUM OF AMERICAN ART, <https://perma.cc/U9Z2-MG5K> (last visited Mar. 24, 2022).

2. *Every Shot, Every Episode*, THE MET, <https://perma.cc/3D9N-7QD3> (last visited Mar. 22, 2022).

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Luxembourg.³ Although the projects contain software and media, their embodiment as physical objects allows them to be displayed and collected in traditional ways.

This was the course of my practice in the early 2000s. To be sure, I used the transition from digital to physical not only as a way to participate in the art market but also for artistic and aesthetic reasons. This choice certainly allowed my works to be collected and, as a result, a broader conversation about who was buying and supporting new media art began. It was an exciting time. But there lingered a real question about how one might make and sell work that is natively digital.

Then, to fast-forward a little, Bitcoin arrived. I found out about Bitcoin in a blog post on the tech forum *Slashdot* in 2010.⁴ *Slashdot* is an interesting place for a lot of conversations at the intersection of technology and culture. I didn't really think too much about Bitcoin the first time I encountered it; it didn't connect with me very much. Two years later, I rediscovered the topic, and this time I sat down and read the Satoshi Nakamoto white paper—*Bitcoin: a Peer-to-Peer Electronic Cash System*.⁵ This was an incredible turning point for me.

I had spent my whole creative life dealing with networks, software, and computers, so I was used to working within a system in which data was infinitely movable and copyable. However, Bitcoin brought together a software framework and a collection of techniques in a new, unique way.

One fascinating aspect of Bitcoin is its transparency. Every single part of it is accessible for review. The blockchain (the database itself) is there for anyone to download. All of it is completely available. One can see its full history. The software is open source.⁶ Anyone can download it and run it, joining the network. Everybody has access to everything, yet somehow, magically, my Bitcoin is mine, and your Bitcoin is yours. In addition, Bitcoin was ubiquitous and scarce at the same time. I found a magic alchemy in Bitcoin when I really started investigating it around 2012 to 2013. Seeing that it was ubiquitous but scarce was eye-opening for me as an artist. I realized that this could be something useful to digital artists, something that they could use to solve some of the problems inherent in the digital art medium. I saw in it a way to create new possibilities and new options for artists and their work. I thought that if that simultaneity of ubiquity and scarcity could happen with currency, it could happen for digital art as well.

Of course, at that time I didn't know how this could work. And so, I began a long research process. At that time in 2013, the crypto community gathered and discussed Bitcoin on a website called *Bitcoin Talk Forum*. It was a very intense time with interesting conversations (along with "flame wars" and controversy). I used this forum to pose the question of how to use blockchain technology as a method for assigning ownership of digital artworks. In a post from October 2013, I wrote:

3. Jennifer & Kevin McCoy, MOMA, <https://perma.cc/MK9S-5D7F> (last visited Mar. 25, 2022); Jennifer et Kevin McCoy, MUDAM, <https://perma.cc/8GFQ-A9DK> (last visited Mar. 22, 2022).

4. Teppy, Comment to *Bitcoin Releases Version 0.3*, SLASHDOT (Jul. 11, 2010, 4:09 PM), <https://perma.cc/8G5D-6F8Z>.

5. Satoshi Nakamoto, *Bitcoin: A Peer-To-Peer Electronic Cash System*, BITCOIN.ORG (Oct. 31, 2008), <https://perma.cc/2U8Z-PNEZ>.

6. *Bitcoin*, GITHUB, <https://perma.cc/J7RR-ZN5A> (last visited Mar. 22, 2022).

One big issue in the art world right now is buying and selling digital-based media. Although there are some interesting efforts made to address this issue, often artists resorted to making some kind of physical output or embodiment of digital code objects that can circulate more easily within the existing art market. I am interested in developing a method or system where a contractual ownership token or message can be embedded within a blockchain transaction. This way, artists working digitally can present their work in its native form on the internet. At the same time, they would have a mechanism for selling it to a collector who would have a verifiable and secure way of showing ownership and transferring ownership to another party.⁷

That idea became what we now call NFTs. Although the Bitcoin community at that time was uninterested in this topic, I made progress in coming up with a solution.

My efforts and experiments culminated in May 2014, when I finally realized that I could use another blockchain called Namecoin. Namecoin provided space to create a little bit of metadata along with the blockchain transaction. I designed a system for using that metadata together with a set of steps that created a way to publish, prove, and assign ownership for a digital work.

To explain further, NFTs are metadata. In the same way that a picture file on your phone's camera roll might *have* metadata—the date, the GPS coordinates, maybe the camera settings, and so on—metadata is not the data of the file, but draws from and relates to that file in specific ways. It adds relevant information *about* that file. Sometimes the metadata is part of the file itself (e.g., in Microsoft Word), and sometimes it is stored in a separate file. In the system that I proposed, the metadata is designed to be stored on a public blockchain, and it is connected to a piece of media but is separate from that media file. This metadata record is created in such a way that it can live on a public blockchain, and it can be transferred from person to person in a specific way that is capable of assigning ownership. I presented this idea along with my co-presenter, Anil Dash, at the New Museum, in an event produced by the digital arts organization Rhizome.⁸ We called the system “Monegraph,” a system to allow digital art to be assigned ownership on a blockchain. Few people at this presentation understood what I was talking about at all.⁹ Nobody got it. I organized a small group of collaborators into a company, and we built a larger system and tried to market the idea. Nothing happened. In 2015 or 2016, nobody cared. Nobody got it.

7. mccoyspace, Comment to *Using the Blockchain as a Method for Assigning Ownership of Digital Artworks?*, BITCOIN TALK (Oct. 24, 2013, 4:20 AM), <https://perma.cc/5MJJ-EAXF>.

8. *Seven on Seven 2014: Kevin McCoy & Anil Dash*, VIMEO (May 3, 2014), <https://perma.cc/QEL9-6DPH>.

9. For readers who are interested, there is a video available in which Anil Dash and I explain the concept. *Id.*

Eventually, I moved on to other projects. In the meantime, however, the idea did not die; it was rediscovered and adopted by others, including by the Ethereum community (a different blockchain from Bitcoin or Namecoin).¹⁰ The Ethereum approach was similar to mine in many respects. It also used a metadata record that pointed to the file in question. This new approach, however, didn't include specific rights language as mine did, nor did it include a reference to any form of social proof.

The more important change, however, was the fact that money was flowing through the Ethereum community. New wealth was available within that community because, beginning in 2016 or 2017, they invented systems of decentralized finance, or "DeFi."¹¹ DeFi is a whole other conversation—in an entirely different universe.¹² In short, DeFi is a way of using smart contracts on the Ethereum blockchain to re-engineer and reconstruct elements of our financial system such as lending, borrowing, derivatives, exchanges, and broker relationships. That is a big universe. A protocol called Uniswap is one of the most important tools in DeFi. The whole ecosystem is still being built, but it really started taking off in 2017 and 2018. A lot of money was created during these years.

The NFT boom that we are experiencing today is directly driven by this phenomenon of DeFi and smart contracts on the Ethereum ecosystem, both from the logic embedded in the smart contracts and from the money in people's wallets that these protocols generated from an expanding DeFi economy. And they found a home, eventually, beginning at scale, about a year ago in the form of NFTs. Suddenly, there was a new generation of platforms created, the platforms that you hear about today: OpenSea, Foundation, and Nifty Gateway. These were all created in the NFT rediscovery period around 2017 and 2018. If you've paid any attention to this world at all, you've heard about the NFT projects that rode that wave, like Crypto-Punks and Crypto-Kitties. The main artist that everyone now knows now is Beeple, because of the huge sale his work generated at Sotheby's auction house. After my experiments, and on the back of DeFi and the protocols that the Ethereum world built, this is now the world that we are in. There is now an infinity of details inside the NFT ecosystem today, including minting on side chains, on layer two chains, and new blockchains within different capacities.

I. LOOKING AHEAD

But now I want to look past that a bit and talk about what I see coming in the future. And it's not even really the future. It's more like tomorrow, because things are moving so quickly. In this world, the things that I am talking about are already happening. But I think that they're going to be increasingly prevalent as time progresses. The first trend I see is the creation of generative art works. I think

10. *What is Ethereum?*, ETHEREUM FOUND., <https://perma.cc/6GWY-2WQB> (last visited Feb. 18, 2022).

11. For more information, see *What Is DeFi?*, COINBASE, <https://perma.cc/S39J-VL9G> (last visited Feb. 18, 2022).

12. *What is DeFi?*, COINBASE, <https://perma.cc/S39J-VL9G> (last visited Feb. 18, 2022).

generative NFTs and generative concepts are going to be emerging as really important concepts in the NFT world. But what does “generative” mean?

A. GENERATIVE NFTS

The first step towards enabling the creation of generative NFTs is developing “smart contracts.” Smart contracts are basic software programs that live on the blockchain. The most important one is called ERC-721, which has become the standard. “ERC” stands for Ethereum Reference Contract. The whole ecosystem is built on this—it is literally the source code, written in Solidity. ERC-721 was written as part of the Crypto-Kitties project at the end of 2017. So, it’s been around for a while. It’s very tiny. There’s not much to it, just this simple little shell of an application. Basically, ERC-721 can only transfer from one wallet to another. It can have an owner, and it can delegate that responsibility to transfer to someone else, because that’s how the marketplaces work. And that’s all it can do.

What I mean by the word “generative” is based on the fact that there are all kinds of other ways that these smart contracts can be extended on the blockchain, where other kinds of things can happen. It is not just the NFT contract itself, but also other kinds of software-like functions that can live on the blockchain. The most important project of this variety going on right now is called Art Blocks.¹³ Art Blocks was created a couple of years ago and has proven to be an extremely popular project. For Art Blocks, artists generate source code that is in itself an artwork, tapping into a long pre-blockchain history of artists writing code as art. In the case of a project like Art Blocks, the artist creates code and memorializes it on the blockchain. When people acquire tokens for that artwork, it is usually done in an editioned series. Each work in the series passes through the software and so can be seen as generative code. But each picture that you see is just one instance of software that can produce other kinds of flavors.¹⁴

The closest example to this mode of work that you might have seen in terms of function is a screensaver. I personally think screensavers are vastly underappreciated. They can be pretty amazing pieces of software. There was no other place for them in the pre-Bitcoin and pre-blockchain era, so they were just given away as things to display on dormant computer screens. In Art Blocks, the idea of a stored program on-chain that produces a graphical output that someone can own as a token is a popular idea. And that is just one example of a generative artwork.

Another example is an artwork by the artist Mad Dog Jones entitled *Replicator*, which was sold recently at Phillips Auction House.¹⁵ At first glance the project is simple: an NFT with a short video file depicting an old-fashioned office photocopier. The real action behind the project, however, happens on the blockchain as new NFTs

13. See generally ART BLOCKS, <https://perma.cc/K98U-U7FK> (last visited Feb. 18, 2022).

14. Leo Villareal, *Cosmic Reef*, ART BLOCKS, <https://perma.cc/VRT3-XJFK> (last visited Mar. 25, 2022).

15. Mad Dog Jones, *Replicator*, PHILLIPS, <https://perma.cc/K8DX-ABK6> (last visited Feb. 18, 2022).

are created, some as perfect copies and some with algorithmically produced “errors.” This extension of the ERC-721 contract is a whole other nested set of contracts that creates a replication function. And so, it takes properties that are pertinent that describe the artwork, and it creates copies of them. The photocopier is a metaphor for that. But Mad Dog Jones also programmed opportunities for the system to fail and to break. So, *Replicator* spins off these “sub-tokens” that are sometimes exact copies and sometimes faulty copies of the original. *Replicator* has a predetermined lifespan, during which it creates these copies over time. That code is all living on the distributed ledger of the Ethereum blockchain. Not to be outdone by Mad Dog Jones, Jennifer and I completed a generative project recently that I think is pretty interesting and important. We made a piece called *Quantum Leap* that has both on-chain and off-chain generative capabilities. It is housed at quantumleap.mccoospace.com.¹⁶ On the site itself, one finds only an information screen. However, if you own one of the *Quantum Leap* tokens and connect your Metamask wallet, this page changes to display a changing and evolving animation. *Quantum Leap* appears as an undulating mandala whose colors interact to create a kaleidoscopic effect. Shaping the image, software parameters describe the shape at its center and its overall color palette. The initial shape of the center element is determined by which of the eight tokens the collector owns. The first buyer begins the project with a triangle, but as the piece progresses, it evolves into a twenty-sided shape, each stage of which has a different color palette. Over time, and at each stage, the animation’s colors dim to grayscale as the piece ages. The animation then progresses to the next palette, cycling through twenty different stages. As this happens, the collector will see that new NFTs have been generated for their wallet, and grayscale tokens are produced—like a snake shedding its skin.

Quantum Leap has a kind of kaleidoscopic effect. In our software, this process takes about three years. It’s a long-term evolution. As it progresses over time, the owner gets additional tokens that can represent those different stages. So, if you buy the three-sided shape, you’re going to have a token that produces offspring. Along the way, as it evolves to a four-sided and then a five-sided shape, you get tokens that represent the earlier stages. So, in your collection, you have an artwork that evolves over time. But you also have additional NFT tokens that you can connect back to that are useful to view these earlier states again. Those are each their own NFTs that you could choose to sell, gift, or donate. There’s a secondary market concept built into the project’s ecosystem. For me, that is an exciting notion within the generative visual art concept that we propose with this work.

B. NFTS AS MARKERS OF COMMUNITY

Community is another important aspect of the NFT phenomenon’s future. NFTs are going to drive community participation as markers of common interests and common goals. An example of this kind of work is a project that Jennifer and I did

16. Jennifer McCoy & Kevin McCoy, *Quantum Leap*, MCCOYSPACE.COM, <https://perma.cc/6AKD-N256> (last visited Mar. 26, 2022).

with the Whitney Museum from 2018 to 2019 called *Public Key / Private Key*.¹⁷ At the outset, we wanted to make a tangible media object—something that was physical and that represented the history of moving image work. So, we created a 16-millimeter film depicting a woman walking up a long staircase to a rustic cottage. We then donated the film to the Whitney Museum’s Special Collections. The Whitney was willing to accept the donation, but first we asked: How does donation credit work? And do those credits ever change? Can somebody change the name of the work’s donor after the fact? The Whitney found examples of cases where a collector credit could change. We also asked if there could be multiple donors—the Museum responded that there could be a list of names attributed as donors.

In the end, Jennifer and I decided to create a list of fifty people who would be credited as the donors of this work after the fact. The museum staff agreed to this, and so we created a token that represented this donation credit. We issued that token, and people were able to trade it back and forth in different ways for a period of time, until the Museum locked and finalized it. Those who held the token at the conclusion are now listed as the artwork’s donors. This is an example of a token-driven community—a group of people that organized itself by nature of having that token around a certain activity or a certain thing.¹⁸ In this case, it was a museum donation credit that appealed to people who were interested in both the ecosystem of the blockchain and the ecosystem of the art world.

Lastly, I would like to mention Flamingo DAO. DAOs (distributed autonomous organizations) are another big conversation, with many panels devoted to discussing the DAO concept. But the Flamingo DAO is an NFT-centric organization that uses tokens to define membership in the community while also collecting NFTs. It is an NFT-driven community of collectors who are important leaders in the space.

C. USING NFTS TO ASSIGN RIGHTS

The last thing that I want to discuss is rights. This is the moment when all the lawyers will perk up their ears. My company, Monegraph, prosecuted several patents. The first patent that was awarded focused on the concept of rights transfers using Blockchain transactions.¹⁹ I think it’s a pretty important patent because of the importance of the idea of on-chain ownership rights. This will be how the rest of the world is going to come on-chain. Once there is an accepted model for property to come on-chain, it opens the doors for a lot of development, including deeds, intellectual property, and royalties. Obviously, in the world of creative media, that opens doors for work in music, film, gaming, television, and every other sphere of creative work.

17. *Public Key / Private Key*, WHITNEY MUSEUM OF AMERICAN ART, <https://perma.cc/4HSR-P5WN> (last visited, Mar. 26, 2022).

18. There are plenty of examples of this kind of community engagement through NFTs, including Friends with Benefits (FWB). FWB is essentially a large, sprawling social club that hosts a variety of different events and activities. You must purchase NFTs to join and participate. See FRIENDS WITH BENEFITS, <https://perma.cc/6WQV-LA2D> (last visited Mar. 10, 2022).

19. *Rights Transfers Using Block Chain Transactions*, JUSTIA PATENTS (Dec. 30, 2015), <https://perma.cc/A5FK-XJAC>.

Of course, there's a world of rights in many other spheres as well, but I'm focusing right now just on how it pertains to media. With on-chain rights, emerging technology opens up a lot of really exciting possibilities, which is something my company Monegraph is focusing on. One recent project was a collaboration with the musician Timbaland to develop a set of NFTs of his music.²⁰ In this case, the NFTs are "stem tracks" to new music that he's going to be releasing in 2022. Timbaland had a set of songs from his new EP, but before he released them on Spotify in the usual way—and because he owns the rights to the works—he subdivided the songs into their constituent stem tracks, the elements that come together to make a song during the recording process. Each one of these stems is an NFT that allows people to remix them.

The most important thing to note is that Monegraph is authorized—through negotiations with Timbaland and his team—to express on chain the rights necessary to allow people to create remixes using the stems. We recently released the first set.²¹ Already, there are fans that are super excited about the access that this enables. They are already creating mashups, which begins a whole pathway, a whole kind of conversation around how music is produced, distributed, and consumed. This is an example of how quickly one kind of project facilitating rights on chain can move the conversation forward.

CONCLUSION

I am proud of the fact that this whole idea started from an artist's perspective, in an art museum, and from the world of digital art. NFTs emerged to solve specific problems for artists. And so, to answer the underlying question this whole Symposium poses: I don't think NFTs are a fad, because the idea of sovereign digital property is just too important. Whether Bitcoin or Ethereum or whatever digital currency you have in mind goes up or down, the idea of being able to own something in the way that NFTs can facilitate is just too powerful and important to disappear. It will persist in the future.

Who knows what the market will do? Will the prices for any given NFT go up or down? Who knows? There are plenty of questionable NFTs, and the surrounding scene has been very complex—but the core idea is very important. The kinds of activities that I've alluded to here—including generative works, software-driven processes, community-defined activities, and on-chain rights articulation—are just some of the prospects that will continue to emerge as this technology develops.

20. TIMBALAND, <https://perma.cc/798K-VBKR> (last visited Mar. 10, 2022).

21. *Id.*