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# Beyond Representation: A Conversation with Golan Levin on Generative Art and Blockchain

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**Abstract:** This interview revisits key debates around computer art, blockchain, AI, and generative art, informed by Golan Levin's critically engaged artistic practice and framed within broader questions of power.

**Keywords:** blockchain, generative artwork, computer art, interactive art, Cytopgraphia.

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**Merve Güven Özkerim:** You've been producing algorithmic, generative and interactive art works for over 30 years. From a retrospective or chronological perspective, can you divide your works into periods?

**Golan Levin:** Honestly, this is more of a concern for the curators than it is for me. It could be divided according to the technology I was using at the time, whether it was Macromedia Director or whether it was Java, Flash, Open Frameworks, p5.js, or whatever the different toolkits are for programming, creative coding in the arts.

It could be based on the way I work in general, for a while I was doing audio-visual performances, but the thing is, I am a generalist in the field of new media arts. I've done a wide range of work. I've done performances, installations, net art that's in the browser, print work that's on the wall, and interactive installations.

I've had a consistent interest in gestural interaction and generativity for a long time. Primarily screen-based, but I've also done things that are quite far afield from that. For example, I did product design—a kind of intervention called *NeoLucida*, which was really about making a product and putting it out into the public realm. Or I did a kind of media intervention that involved 3D printing, called *The Free Universal Construction Kit*. Neither of these things really counts as generative art per se, at least not in the way we generally understand it in relation to the blockchain and so forth.



So it's hard to divide it into phases like that. I would really hesitate to try. I think someone can do that when I'm dead.

**Merve Güven Özkerim:** Do you think the terms post-digital and post-internet have any value to understand contemporary art production and your own works? How would you define them?

**Golan Levin:** I don't personally know any artists who use these terms to describe their own work, but they may be used by those writing about the field. The term "post" in English can mean both "after it's finished" and "after it's started," which leads to some ambiguity. When we say "post-internet," for example, we don't mean that the internet is over; rather, we acknowledge that the internet exists now, and that art is being created within that context. Similarly, "post-digital" doesn't mean the end of digital art, but rather that we are in an era where digital art is prevalent.

As a computational interactive new media artist, I create work that necessarily falls into the post-digital realm. There are many great examples of analogue in generative art. Then I've made some work that is definitely localised or in the context of the Internet, but couldn't exist without the con of the networked condition. So I certainly have some works that seem to depend on the Internet for their existence. These terms have no particular value for me. I think they're just nice-sounding terms that curators like to use in their articles.

**Merve Güven Özkerim:** If the history of post-digital/post-internet art were being written, how would you position your works within them?

**Golan Levin:** Well, computer art is older than acrylic paint. The first exhibition of computer art took place in the spring of 1965. I'm a third generation digital artist or computer artist.

The first generation is people like Vera Molnár, Georg Nees, Manfred Mohr, Kenneth C. Knowlton, Frieder Nake. All those people who were working in the late sixties, some of whom are still alive. Frieder is still alive. Manfred is still alive, Vera Molnár has just passed away. They're my parents' generation, and

they were active from the late 1960s. In the late 1960s there were about 10 people making art with the computer. That was the first generation. The second generation is people like Stephen Wilson, Barbara Nessim, or Maryanne Amacher. I mean, there's the computer art of the late 1970s and early 1980s.

I started being active in the 1990s, alongside artists like Joshua Davis, Leah Buechley, and Casey Reas. I'm 52 years old and have been working as a computer artist since around 1995. There are artists today who are inspired by my work, who see me as an influence—and I'm proud and happy about that. But much of it simply comes down to the fact that I had the privilege of being born 20 years before them.

Now, there are young artists who are becoming the next generation of computer artists—some of whom saw my work when they were younger and found inspiration in it, largely because I happened to be born earlier. Just as I was born after the people who inspired me, I was born before those whom I may have inspired.

**Merve Güven Özkerim:** Based on your artistic and educational practices, you wrote *Code as Creative Medium* (MIT Press, 2021), a creative coding guide for software art educators, with Tega Brain in 2021. In your opinion, how does the style-form-content relationship develop in artworks that use code as a tool or medium? How does this process work in your artworks?

**Golan Levin:** It's really too difficult to generalize—people use computers for many things: to do business, to watch porn, to write, to make art. So how can we generalize about how people use computers? It's impossible. In the same way, artworks that use computers are as diverse as the ways in which people use computers.

This is one of the biggest problems I have with conventional art historical approaches to media art—they often assume that there's a specific message being conveyed through representation. Some art historians get really excited when they can identify an image of something being represented. Then they can say, "Oh, look what's being depicted here, and what it means." But there's a whole category of computer art that doesn't operate that way at all.

A lot of my work doesn't function that way either. I'm not showing a fucking picture of something. I'm not representing anything. I'm not making a painting of a person in a marginalized state to express that condition. That's simply not how my work works. And that's fine—I'm perfectly happy for other people to make representational work. But that's not what I do. There are good friends of mine, like Auriea Harvey, who create work rooted in representation. She makes three-dimensional computer video games and stunning 3D sculptures that depict recognizable forms. She's very successful—art historians and curators love her work because they can say, "Look, it's showing an image of something."

In contrast, some of my work focuses on direct experience. For example, my project *Yellow Tail* is an interactive generative artwork in which movement becomes mark-making, creating a feedback loop between the participant and the system. This approach is grounded in cybernetics, not in the art historical lineage of painting.

So it's much more about the lived experience of the participant—how their creativity is activated, how they become aware of themselves and their potential as creative agents through that interactive feedback loop. It's about pure experience, rather than looking at a picture and interpreting it as a representation of something.

**Merve Güven Özkerim:** Actually, this is not your first blockchain project; you published your first major NFT project, *Ambigrammatic Figures*, a series of 55 collectible cards, on Hic et Nunc in mid-2021. Are there any differences between your previous work and *Cytopgraphia* in terms of using blockchain technology? And do you plan to use blockchain technology in your future work?

**Golan Levin:** Blockchain technology can also be seen as a way to sell art. Why do you exhibit work in a gallery or sell it to collectors? These are questions you wouldn't typically ask, because there's an implicit understanding that an artist today exists within a capitalist system and needs to make a living and support their family by selling artwork for money. I could bullshit about stuff like, oh, well, the artwork doesn't live *on* the blockchain, so this will help with its preservation in the long term, because the artwork will persist forever on some digital blockchain. I have my doubts about that. So fair enough, and I respect the possibility that there are some artists who are using the blockchain itself. As a creative medium and that their work sort of comments on or operationalizes the blockchain in a unique way.

In my head I think of some examples like that but I know there are some where probably Rafaël Rozendaal or somebody like using the blockchain in some clever way. People are always coming up with —forgive me—gimmicks, I think, for new ways of selling something on the blockchain, where part of what makes the artwork unique is the way it's being sold. It's as if the content of the work *is* the unique new way you can buy it, and I don't happen to have made anything like that. It hasn't been a particular focus of mine. I have no problem with an artist who does that. There are definitely people who do that, but I don't currently or haven't yet used the blockchain as a creative medium.

I've used the blockchain, as you know, a way of selling work and that became really important during COVID-19. All the venues for exhibiting projects dried up then. Suddenly, all my performances, lectures, and exhibitions were cancelled. I was stuck at home, and the only way I could get work out to the public was on the internet. Suddenly, miraculously, blockchain arise and suddenly there's a way of sharing, exhibiting, owning, purchasing, and selling work, and it happens to line up well with some certain kinds of digital work. There's also kinds of digital work that don't line up well. For instance, there's things that can't be sold on the blockchain.

So I wouldn't say that there are meaningfully interesting differences between how *Ambigrammatic Figures* and *Cytopgraphia* use the blockchain. They happen to be on different currencies. It's sort of like saying like, well, I sold one in dollars and I sold the other one in euros. But it is, I mean, it's technically true that they are differ in that way.

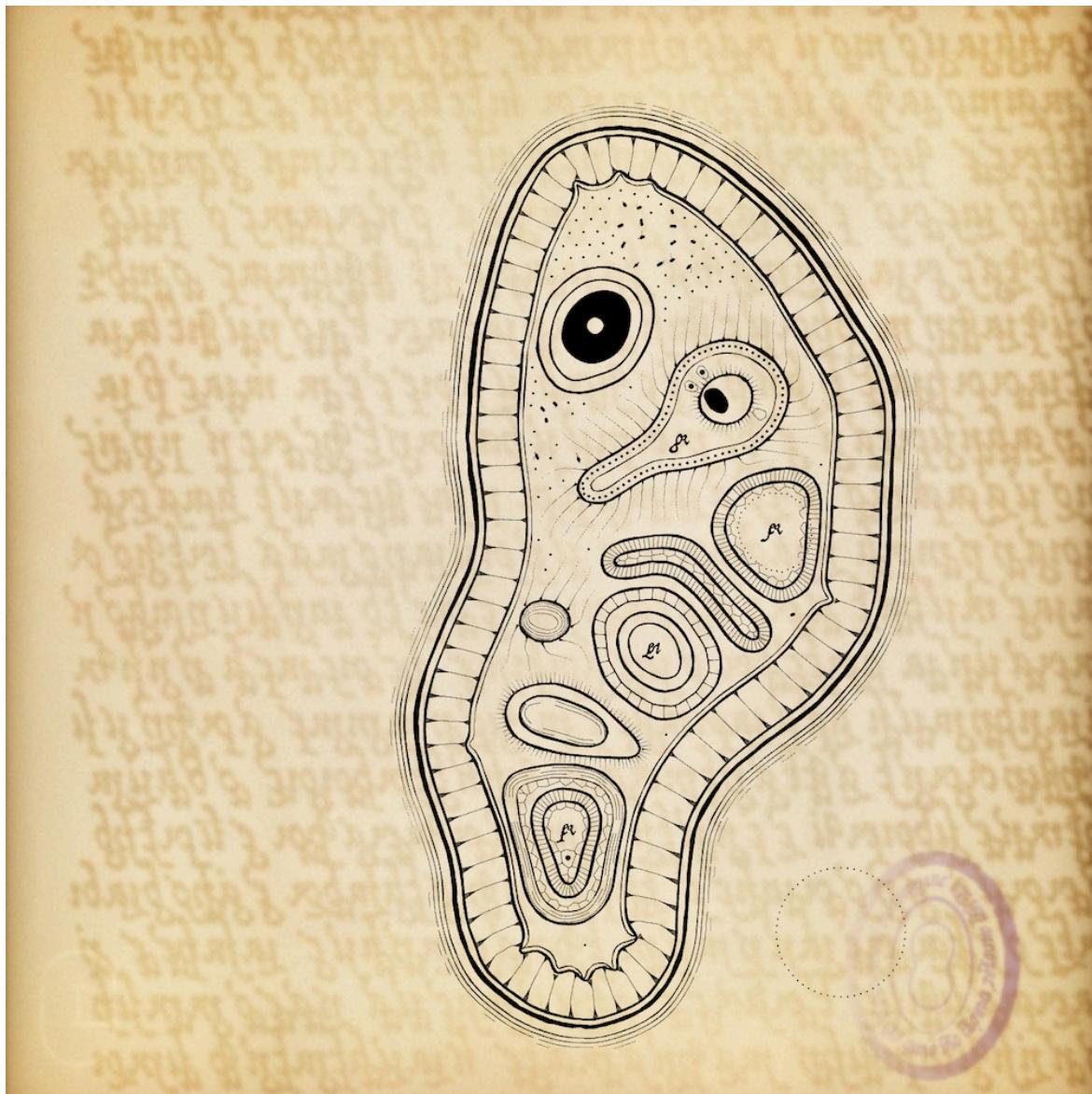


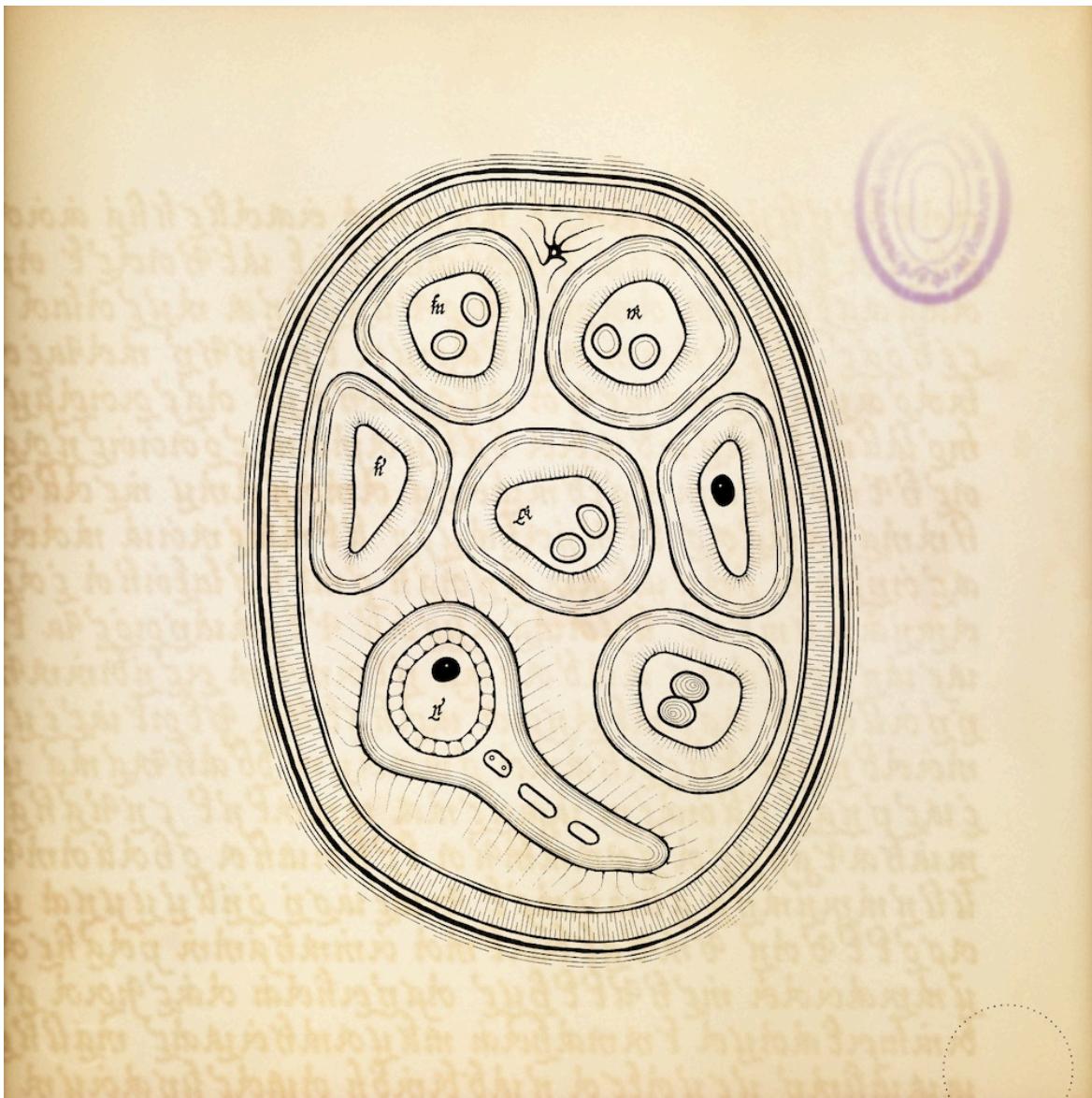
As for using blockchain technology in my future work, the question is: Do you plan to sell works from the gallery? Now look, there could be artists who are like, no, I reject the gallery system. I only want to make work which is free like the air. Or, someone might say, “I only want to do performances that can’t be sold or bought; you simply have to be there to experience them.” The blockchain is a convenient method for selling items and could also potentially serve as a useful way of archiving items, perhaps.

**Merve Güven Özkerim:** What would *Cytopgraphia* be missing without blockchain technology? Does blockchain technology contribute to the main idea and existence of *Cytopgraphia*?

**Golan Levin:** *Cytopgraphia* is a generative artwork—each time you press the button, you receive a new iteration. What *Cytopgraphia* owes to the culture that has emerged around blockchain technology is the concept of limited edition tokens. In this case, there is a fixed set of 418 possible outputs that the system can generate. Although it is theoretically possible to create millions of unique runs, the work is distributed in large but finite editions through platforms like Art Blocks and fxhash. Entrepreneurs developed ways to sell this kind of work in large but limited editions.

I agree with Tyler Hobbs’ article on the difficulties of making long-form generative art on this topic. The core challenge of making a generative artwork is creating something that doesn’t get boring when you look at 400 of them. If you only have 40, like they’re gonna be wildly variable. And if you have 40,000, they’re gonna look like oatmeal. Kate Compton talks about the “10,000 bowls of oatmeal challenge,” right? It’s like, even if 10,000 bowls of oatmeal are mathematically distinct, they all look alike. So, with long-form generative art, Tyler Hobbs is talking about the challenge of making something that **coheres**—you can look at it and say, “Yeah, that’s one piece,” but it also varies, and you can say, “Well, yeah, these are different,” and as a set, it’s got meaningful variety. It’s a great challenge, and I’m up for it. I think it’s interesting to observe people who manage the challenge well. *Cytopgraphia* owes its existence to that, I suppose. I wanted to participate in the economy, and I wanted to test myself by creating a long-form generative work that I could be proud of or that I was good at.





Long-form generative art has been promoted as a means of creative expression, and *Cytopgraphia* fits within that framework. People have said some nice things about it, which is always good to hear.

However, I've come across some examples of long-form generative art that, in my opinion, lack variety or coherence. They don't hold together as a single, unified piece, which I believe is essential for this kind of work.

I think there are aesthetic challenges involved. But again, the question of whether the blockchain contributes to the core idea or existence of the piece is similar to asking whether the gallery system contributes to the core idea or existence of a given painting. Would the artist have made that painting if there were no gallery to sell it through? Or if there were no capitalist system encouraging people to purchase rectangles to hang in their homes—or store them away to let them appreciate in value?

Hopefully, *Cytopgraphia* does not owe its existence solely to the blockchain as a selling mechanism. I hope it offers something meaningful as an artwork in itself—something that stands independently of the blockchain. Of course, some artists are actively thinking about the blockchain as a creative medium. I don't think *Cytopgraphia* does. It's a long-form generative artwork that simply uses the blockchain as a vehicle—for distribution, and for creating meaningfully distinct units within its system.

**Merve Güven Özkerim:** Do you think that art and technology have historically developed centrally within power relations? Have their basic rules been determined around this understanding?

**Golan Levin:** That's actually a really good question. Computers exist because they are, they began as military objects. Computers were created and designed by governments as instruments of warfare. Then, when they got a bit cheaper, it was possible to use them for big business and meteorology. So, after we could design bombs with them, we could then use them to run a big business and predict the weather. When the very first computer artists started to work with computers in the late 1960s, they were criticized by other artists for aligning themselves with the military because they were using the tools of the military.

I think the first generation of computer artists really suffered from the fact that their work was not only accused of being cold and mechanical, or, you know, not art or whatever it was, but also of being what it was soon to be associated with: Military philosophies. And I think there has always been a group of artists who want to challenge those power relations. But I think if you look at the very first computer artists, they were interested in new aesthetics that were made possible by these technologies, new ways of thinking about form or about art in general that were made possible by computation. They used computers to explore new aesthetics because it's interesting to do so. This was without becoming a loss leader for these industries, without becoming an advertisement for the glorification of computers, without contributing in any way to techno-optimism, technophilia, solutionism, and so on. And I think that the first computer artists didn't have to deal with that at all.

But for my generation in particular, we really did. We really had to ask ourselves. Is what we're doing contributing to the problem? Nowadays, a lot of people who are new media artists make a living on the side. They do advertising, right? They make media art, but because they are good at making sexy looking graphics on the computer, they get hired by companies to make their products look sexy.

In various ways, I engaged with this. For instance, in 2001, I did a performance called *The Telephony* where I was able to sort of dial and ring the mobile phones of the audience. The piece was entirely performed by choreographing the ringing and dialing of their mobile phones. A critic wrote about the project, "Dialtones (A Telesymphony)": When I developed the project, I was purely interested in what kind of new sounds are possible, what kind of spatial relationships are possible. What kind of distributed sound can we make? What's the experience like? Can we have an audience where you're also part of the orchestra? It was, you know, as a kind of interactive experience. And, but one critic wrote, this is a loss leader for the mobile phone industry, celebrating mobile phone culture and just kind of promoting the ideas of mobile phones. And I couldn't quite say that wasn't true because, you know, I had received funding and support from the mobile phone company to make the event happen. I was, in a sense, in bed with power. You know, corporate power in this case, rather than military power. Because you know it was 30 years or so after it was primarily a military tool. I think it would be safe to say that power is always involved in this kind of thing.



I don't think it's separable at all. I think it's great to be able to think about new aesthetics in ways that are purely about computation. But it's really hard to do that ultimately without acknowledging your complicity in the **telos** of the forces that produce and operate computers. I mean, we're in the Anthropocene, and you know that computers are involved in strip-mining rare earth metals, ruining the ecology, and dumping carbon into the atmosphere. So, if I'm just making cute circles and squares on a computer, even if I'm purely interested in geometry, I'm still complicit in that.

There are some really nice responses to this now from indigenous communities who are doing indigenous computation and you know like there's some Native American media artists for example who are sort of apologising to the earth when they use a computer for the way that the computer has stripped the earth and reorganised its materials in toxic ways.

And have their ground rules been established around that understanding? That's another interesting question. I think a lot of computation and media art, for example, involve iteration. I recall a really insightful article – though I can't remember where – that essentially argued: if a 'for loop' performs an iteration, executing a task hundreds or thousands of times, it effectively reifies a form of labor-saving. This aligns with the essential capitalist impulse towards efficiency and the elimination of manual labor. Even as an artist, if I write a program that saves me labor by performing a task repeatedly to create art, I am, in a sense, complicit in this capitalist drive.

It's a really interesting point of view, and I don't think it's completely wrong. I can hold both of those ideas in my mind. On one hand, I'm interested in the visual, spectacular, and sensory aspects of iteration and how it affects my perception. On the other hand, it saves me labor—I don't have to pay a village somewhere to do it for me, and that makes me complicit in it.

There was a really interesting critique of Refik Anadol's work recently, particularly his large project at MoMA, which presents an attractive, evolving visual display. I happen to be friends with him, I respect him, and I think he's very talented at what he does. However, the criticism of his project is that it functions as a celebration of pure AI, effectively serving as a loss leader for this industry. It's akin to proclaiming AI's greatness and showcasing its visual appeal as the primary content of the piece. While this might sound harsh, it might be more applicable to this particular project than to other artists' works.

This critique stems, perhaps, from his piece's focus on creating an attractive spectacle, its immense success in doing so, and its alignment with institutional power. It's literally the first thing one encounters on the ground floor of MoMA, suggesting that MoMA also seeks to advertise AI and its perceived progressive nature. Ultimately, I don't think you can separate power relations from art.

**Merve Güven Özkerim:** Nowadays, with blockchain technology, the word "decentralization" appears very frequently. In fact, the idea of going one step further and switching entirely to Web3 is also being discussed. On the other hand, there is still a central understanding of software and hardware. In this regard, have you experienced difficulties or conflicting situations arising from creating a decentralized product within a centrally developed system?

**Golan Levin:** I'm a fan of Cory Doctorow, who is critical of closed-source hardware, for example, and the way it creates lock-in effects. I also admire Cory Doctorow for his views on the "shitification" of the internet, where what was once a kind of hippie wonderland—a decentralized space where anyone could publish, create their own website, and share their work, as I did in the mid-90s—has now turned into something where we're all plugged into systems like Facebook, Twitter, and Instagram. This kind of centralization, and the way content has to fit into the boxes these companies have produced, is concerning.

I've seen artists who perform well on Instagram do well as artists, while artists whose work doesn't lend itself to Instagram struggle. These kinds of systems have been, I think, mixed blessings. The centralization of the internet into these walled gardens like Instagram and Facebook has made it easy for some artists and difficult for others. Even my students, who are too late to get a good handle and a username on Twitter or whatever, are suffering from being too late to the scene. They should have been there 20 years ago or when it started. Whatever Cory Doctorow has to say about it, I'll agree with it.

**Merve Güven Özkerim:** *Cytopgraphia* is a software that produces long-form generative art on the Blockchain. How do you think *Cytopgraphia*'s dynamic behavior communicates with the viewer in terms of Aura and hyper-ownership?

**Golan Levin:** The term "hyper-ownership" sounds like a buzzword to me rather than a real concept. In the case of *Cytopgraphia*, I wouldn't say it directly benefits from blockchain technology, but it does benefit from the marketplaces for long-form generative art, such as Art Blocks. These marketplaces have evolved into a selling structure that requires a limited edition to be successful. In a way, this is a kind of radical return to older methods of doing things. It used to be that a printmaker would create an edition of 100 prints, and once they were made, there were only 100 prints available.

In January, we all thought, "We have infinite variety! Forget about these old methods with their narrow limits; we can have infinite variation!" Honestly, it was a tough sell. People asked, "If it has infinite variety, how do we know which ones are any good? Aren't they all just equally bad?" If there's infinite

variety, does it mean they're all infinitely worthless? Or, is it even art if I can't pinpoint it? If it's constantly changing, unstable, and has different manifestations, can it still be considered art? Art, after all, is supposed to be something fixed, so I know what it looks like, so I can know it's in my collection.

This retrograde idea is what platforms like Art Blocks and FX Hash have embraced: artificially limiting the size of the edition. *Cytopraphia*, for instance, was limited to 418 pieces. But honestly, that's a bit of a stretch. It's generative art—I could press a button and make a million more. Yet, the market wants a limit, and maybe there is something to it. What gives it that "aura" is the idea that it's unique and belongs to the owner. It's special because, even though there could have been millions or billions of others, there are only 418. My piece is unique, encoded with my hash code and tied to my wallet.

In terms of the viewer, this limitation restricts their experience. But for the owner, it provides a sense of ownership, a feeling that what they possess is unique and limited.

**Merve Güven Özkerim:** The history of algorithmic art dates back to the 1960s. As humanity, we are going through a period in which our relationship with algorithms is quite intense. Algorithms play a determining role in many areas, from the movies we watch, the music we listen to, the products we buy and even our political preferences. Do you see a relationship between the qualitative and quantitative development of algorithmic art and the fact that algorithms have become so effective? How can we understand this and what are the implications for art?

**Golan Levin:** I'm thrilled that people are finally paying attention to algorithmic art. Honestly, it's been a long time coming—over 50 years, in fact. The fact that there's a marketplace for it now, that friends of mine are making a living from it, and that I can support myself and my family through it, is fantastic. However, I do think that the proliferation of algorithmic art is leading to a kind of glut in the marketplace. We're seeing a lot of the same ideas being repeated over and over again, which makes it hard to find work that feels truly distinctive—and just as hard to create distinctive work that feels special.

There will always be people who are really good at it, people who can copy them well, people who copy them poorly, and of course, there will always be those who produce work that looks like, well, unicorn puke.

**Merve Güven Özkerim:** I think one of the things that makes *Cytopraphia* special is its content and the way it deals with the subject, in addition to all its artistic and technological features. It invites us to think and question non-human-centered subjects through human interaction. On the other hand, related to the previous question, in an environment where algorithms affect life practices so much through software, do you think that many products produced in the artistic field may face the danger of becoming uniform in terms of content, message and interpretation?

**Golan Levin:** I mean, you see it on platforms like FX Hash, where there's a lot of similar-looking generative art. This happens partly because everyone's using the same tools, partly because people are chasing the same dollars, and partly because some lack originality. As for how to maintain your originality, that's really the question of how to be a good artist. It's hard to stay at the forefront throughout your entire career. Sometimes you're on top, sometimes you're at the bottom. You just have to keep an eye on where things are going, look where others aren't looking, or simply keep your head down and follow your own vision.

**Merve Güven Özkerim:** Does *Cytopraphia* actually begins in 2021 as part of an assignment you gave to students in your Drawing with Machines class at CMU? How was this developed and how was it taught?

**Golan Levin:** I explained in one of the articles that I give an assignment that I have just given again in my class to make a blob. I assign the task of creating a blob with code because too often we rely on the same tools—like Processing or P5.js—and within those tools, we use the same commands, like circle or rectangle. I want students to think beyond that and start making their own shapes. The blob project is wonderful in that there's no right answer to how to make a blob. Everyone creates their own blob, and it marks the beginning of eliciting their own voice, whatever that might be.

For the blob assignment, I don't give template code, but I show some approaches. I write some code and say, "Here's one way you could do it," then I write some more code and say, "Here's another way." Then I just keep tinkering with my own code, experimenting with pushing it this way and that. It actually turned out to be kind of fun. Before long, it became *Cytopraphia*.

**Merve Güven Özkerim:** Do you have suggestions or tips on this subject to educators/students who want to produce algorithmic or long-form generative art?

**Golan Levin:** My suggestion is simple: do a lot of work. Take someone like Zach Lieberman, a former student of mine and a good friend. He produces an enormous amount of work—he really puts in the effort. If you look at his Instagram, you'll see that he makes work every day. When you create consistently, you end up developing your own unique world, and people start to notice the voice that's expressed through your work. But you don't discover your voice unless you're doing a lot of work.

So, I do a lot of work.

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## ABOUT

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### GOLAN LEVIN

Golan Levin is Professor of Computation Arts at Carnegie Mellon University, where he also holds Courtesy Appointments in the School of Computer Science, the School of Design, and the Entertainment Technology Center. Since 2009, Levin has also served as Director of CMU's Frank-Ratchye STUDIO for Creative Inquiry, a laboratory for atypical and anti-disciplinary research across the arts, science, technology and culture. A two-time TED speaker and recipient of undergraduate and graduate degrees from the MIT Media Laboratory, Levin was named one of "50 Designers Shaping the Future" by *Fast Company* magazine in October 2012. He has exhibited widely in Europe, America and Asia. Levin's research explores new intersections of machine code and visual culture, combining equal measures of the whimsical, the provocative, and the sublime in a wide variety of media. His work has spanned themes such as gestural robotics; the tactical potential of personal digital fabrication; novel aesthetics of non-verbal interactivity; and information visualization as a mode of arts practice. Through performances, digital artifacts, and virtual environments, often created with a variety of collaborators, Levin applies creative twists to digital technologies that highlight our relationship with machines, make visible our ways of interacting with each other, and explore the intersection of abstract communication and interactivity.

## MERVE GÜVEN ÖZKERIM

Merve Güven Özkerim is a Professor of Art at Giresun University and a visual artist. She completed her PhD in 2016 as a scholarship holder and research assistant under the Higher Education Faculty Member Training Programme (ÖYP) at Dokuz Eylül University, focusing on the development of a critical pedagogy approach in art education. In recent years, she has been conducting research on the practical manifestations of digital and algorithmic visual culture in conceptual and contemporary art. Her research primarily focuses on new media art, AI-based artworks, data art, generative art, crypto art, the Web3 cultural and artistic landscape, as well as post-digital aesthetics and critique. She also engages with ecological humanities and feminist science and technology studies. In 2024, she was a visiting researcher at the University of Sussex with the support of TÜBİTAK.

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