

A Floral Algorithm



“I want to look more broadly at issues of nature, ecology, biodiversity and loss,” the artist Daisy Alexandra Ginsberg told *Disegno* in [issue #24 of the journal](#). “We’re fucking up this planet and I’m not hopeful that we will stop.”

Ginsberg had recently completed a PhD by practice, ‘Better: Navigating Imaginaries in Design and Synthetic Biology to Question “Better”’, as well as a series of projects that revolved around interconnected questions. What does it mean to suggest that design can make things better? Better for whom? What can art and design actually offer in an age of climate collapse? And how might we think about “different ways that the world can go” in order to think through our own present values and priorities. “I’m not depressed!” Ginsberg assured *Disegno’s* interviewer, but she nevertheless acknowledged an emergent strain of melancholia within her work, which she characterised as having to come to “look more broadly at issues of nature, ecology, biodiversity and loss.”

Pollinator Pathmaker, Ginsberg's most recent work, sees the designer embark upon a more obviously upbeat path. Commissioned by Cornwall's Eden Project, Pollinator Pathmaker is an online platform that allows users to create gardens designed for pollinators, rather than humans. Users input a series of values (the size and rough shape of the land they wish to plant; soil type and PH; light levels; and a handful of other preferences), which are then assessed by an algorithm. Working through a list of suitable plants, the algorithm then generates a garden designed to specifically cater to the tastes and needs of as many pollinator species as possible (such as bees, hoverflies, butterflies, moths, wasps and beetles). The creation springs into life through a digital model rendered in watercolours painted by Ginsberg herself, with the model revealing how the garden will change across the seasons, and providing different viewing options to show how it may be perceived by pollinators.

"I want to look more broadly at issues of nature, ecology, biodiversity and loss. We're fucking up this planet and I'm not hopeful that we will stop."

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While Ginsberg's past work has been restricted to galleries and their ilk, Pollinator Pathway is intended to resonate more widely. Users are able to print off instructions to physically plant the gardens they create using the platform, while a flagship 55m-long pollinator garden has already been planted by Ginsberg at Eden. Further gardens are to be planted in 2022 at the Serpentine Galleries in London and the Light Art Space in Berlin.

Pollinator Pathmaker, then, sees Ginsberg's work take on a more explicit public and participatory edge, but it raises the same kinds of questions that have preoccupied her other recent works. A garden is typically a space in which nature is sculpted to suit human aesthetic tastes, but could the typology be reframed to meet the needs of other species and might our urge to "better" the world be extended to account for ideas other than its utility to humans? To find out more, *Disegno* spoke to Ginsberg over Zoom about the project.

Disegno The project is reminiscent of some of your recent work such as The Wilding of Mars, as well as your PhD and its exploration of the notion of “better” in design – better for whom? Extending those ideas to non-human pollinators is an interesting continuation. So how did Pollinator Pathmaker come about?

Alexandra Daisy Ginsberg I'm pleased that you spotted a thread! The four works I completed after the PhD – Resurrecting the Sublime, The Wilding of Mars, The Substitute, and Machine Auguries – form a series, putting into practice ideas I set up in my PhD, but didn't get to test. Pollinator Pathmaker learns from them and is the next step. Two questions that came up for me around those earlier pieces were “What does it mean to put this kind of work with this kind of subject matter – environmental crisis caused by certain humans – in a gallery?” and “What am I asking the gallery audience *to do*?” You may be emotionally affected by them, but then what? And does that matter? Is a moment of emotional transformation enough or should there be a call to action? Those four works use technology to bring attention to the paradox of our obsession with innovation; the idea that the new is somehow *better* than preserving what already exists. In different ways, they all try to make the viewer the subject of the work: The Substitute is a digital rhinoceros, that looks you in the eye–

Disegno Which is a very visceral experience.

Daisy –but can we then design from that perspective? How do we step into that perspective and use it to see the world through the rhino's eyes? Instead of highlighting how we use technology to better the world for ourselves, can we use it the other way around? Can we use technology to buffer the natural world from *us* and (in this case, with Pollinator Pathmaker) our aesthetic tastes, and instead focus on the tastes of other organisms and their interactions? What was fundamental with Pollinator Pathmaker was this existential question of what is it to make ecological artwork and put it in a gallery. When I was shortlisted for the Eden Project commission, it was really inspiring to learn about their principles. Eden wants their audience to feel a sense of awe and connection with the natural world and a sense of jeopardy, but also to inspire hope and agency. And it was that word “agency” that really resonated with the questions that I was facing.

Disegno In what way?

Daisy When *The Substitute* was shown at the Royal Academy as part of the *Eco-Visionaries* show, there was a review in *The Times* by Rachel Campbell-Johnston which picked it out and said something along the lines of “Ginsberg has no answers”. I loved that. I’m often told that I only have questions, but why are artists and designers expected to have solutions to the climate crisis? My PhD research challenged the assumption that design can “make the world better”, so why should artists and designers in particular have answers? *Pollinator Pathmaker* is not about finding a solution, but it is exploring the idea of agency. I’m trying to deal with my own panic. What on earth am I doing making pretty things that sit in museums?! I love doing that, and I’m not going to stop, but what else can I do? Can I usefully use my skills in other ways too?

“What does it mean to put this kind of work with this kind of subject matter – environmental crisis caused by certain humans – in a gallery and what am I asking the gallery audience to do?”

— Alexandra Daisy Ginsberg

Disegno How do you feel about exhibiting work in a more neutral forum? Galleries and museums can clearly be public spaces, but people are often in a particular mindset when they go into them: they’re perhaps expecting to see critical artworks, whereas an audience coming across a garden or an online platform is not necessarily primed for thinking about those as a means of challenging how we think about design or who we’re designing for. With *Pollinator Pathmaker*, you don’t have a gallery or museum doing some of that initial work in setting the tone for you.

Daisy Well, you say that people in museums are already in that kind of critical mindset, but lots of people might go to a museum for a date or something – they’re good places for lots of different things. But I agree that these spaces are places of reflection and so there all sorts of questions about how you design the communication around a project like *Pollinator Pathmaker*, which isn’t in a gallery, so that it makes sense to people. For the general public arriving at *pollinator.art*, how do you begin to explain that a garden is not just for us, but that this is an artwork for pollinators; that you can use an algorithm to create and download a garden design for free, which you can plant as your own edition, and join in to help create the world’s largest climate positive artwork. That’s a lot of new stuff to communicate and design for.

Disegno So how did you approach tackling that?

Daisy The first assumption we made is that people are going to end up on the website already having at least some idea of what it is, but we want to get them into the experience as quickly as possible. We tried to simplify the experience as much as possible as we developed the site with The Workers. But it's additionally challenging because there are so many different audiences that I want to reach. It needs to not be scary for the kind of person who probably has a garden, but who may be less interested in digital art or less computer-savvy, as well as for the kind of person who is interested in digital art, but has never gardened and may not have a garden. It's about getting through those first few stages of explanation such that you arrive at the algorithmically generated garden itself, this moment of excitement and wonder, and then you can start to understand it.

Disegno The website is very intuitive to use, but it's interesting because, typically, these platforms that let you design something – be it a character in a video game or a brand's AR system for trying out products in a space – are very centred on you as the individual creating something exactly for you. The experience is presented such that you can tailor something to suit you perfectly. But this project is explicitly about not designing for you.

Daisy For more experienced gardeners, there's a real challenge in that. In our user research, I spoke to volunteers at a community garden, who are all very experienced gardeners, and who got frustrated by the idea. They were like, "Well, I have certain plants that I want to use. Can't I just tell the programme which plants I have?" The loss of control may be fun for a beginner because it gives you a confidence to design that you otherwise might not have, but for the more experienced gardener there is this sense of "But I know more." What's conceptually interesting about that challenge, however, is that it presents this fundamental question of what is a garden and who is it for? That's a real mind shift. Why do you want to use the plants that you normally choose? Well, you may have spare cuttings or something, but a lot of it ultimately comes down to the fact that you probably like the way they look. But those plants may not be the best for pollinators. User testing was great fun because we had all these conversations, giving us understanding of what the work was doing. The tagline we ended up with – "if pollinators designed gardens, what would humans see? – sums up that feeling of this not being for you. "It's not for us, it's for the bees", as one of our testers explained to another.

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Disegno So what factors does the algorithm taking into consideration, because figuring out what pollinators actually want must be the central challenge.

Daisy An algorithm can never remove human bias, but I wanted to buffer design decisions. The algorithm was developed by Przemek Witaszczyk, who kept saying, “Daisy, what is the top problem to solve?” because I had this whole list of things that I wanted the algorithm to do. We figured out that the fundamental idea was to make a garden that’s empathetic to other species. Even if you were to design a pollinator friendly garden, you would still arrange the plants according to how you want them to look. You’re still making choices. You may prefer one foxglove to another, and you’re also making decisions about which pollinators you’re designing for. Even if you’re making an empathetic garden, you still have to define what empathy means. I had to make a codeable choice and I ultimately decided that empathy in this context should mean maximising diversity – optimising for the maximum number of pollinator species possible in every solution that the algorithm makes. Well, there’s lots of ways to skin a cat and part of the problem is that nature is really complex because co-evolution is an amazing thing. For example, it had never occurred to me before why flowers bloom at different times of the year – because that’s when their pollinators emerge! The flowers and their pollinators come out at the same time and the flowers are a particular colour because they’re pollinated by specific pollinators, who see different colours.

Disegno It starts to become very complicated.

Daisy Right. Every parameter is interlinked. The next task was to construct a plant palette – a database of plants that are good for pollinators - for our starting region of Northern Europe, which has 154 plants in it. We know each plant’s pollinators, when it flowers, its soil and climatic conditions, and more. Then there are different “architectural” groups of plants to ensure variation. So, there is an element of human aesthetic choice, but at the same time plant architecture also relates to what pollinates a plant. Small primroses will come out earlier, while taller plants that would otherwise shadow the primroses flourish later. As one of our advisors Marc Carlton put it beautifully, you need flowers of different sizes in a garden, with different shaped flowers for different shaped mouthparts. All these factors overlap and the algorithm uses them to compute a planting design that serves the maximum pollinator species possible.

Disegno But the user does have some influence on how the algorithm achieves that, right?

Daisy If it was less nuanced, it would just choose one flower that serves everyone and suggest a field of daisies or something, but then you don't have blooming across seasons, for example, so it's not the best solution. The algorithm solves the problem in multiple ways. The patterning itself is divided into different scales. There's the macro scale – pollinators coming into and across this big, bright field – which the human user can play with its boldness. If you choose to use more or fewer species, you're adjusting how many plants you're picking from the database, which is interconnected to the intricacy or boldness of the pattern. If you choose a bolder pattern, it will choose more plants that suit many pollinators, while intricacy is going to give you a more specialised species. The next field of scale, the mid scale, deals with how pollinators forage. Some, like bees, visit thousands of flowers in a day, remembering their locations, and calculating the shortest paths between them. We cater to them through a slider which offers you a choice between more paths, or more patches. Paths will select a subset of plants that suit bees and path-following species, and add more of those into the garden, whereas more patches will use a subset of plants in blobs for more random foragers, like beetles. Whatever solution it comes up with, it will still have calculated it to serve the maximum number of species.

“Even if you're making an empathetic garden, you still have to define what empathy means. ”

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Disegno Was it a difficult decision to include things like that which give people a degree of control? Because a key feature of the project is the importance of surrendering choice and thinking about things from a different perspective.

Daisy Well, although you do have choices to make, they're both for you and not for you. In a way, it's trying to make you feel a sense of responsibility: if I tweak this parameter, what will the effect be? There's also something in providing choice in terms of offering people a route into this. If it just gave you a garden once you'd inputted your environmental conditions, then you perhaps wouldn't have the same understanding of or compassion for what's going on. The options are a way to invite thinking about these issues. We have user inputted values, and we invite people to engage with them and their implications by calling them something weird like “paths or patches”. They're making choices, but they're choices they wouldn't normally make and which give them pause for thought. That's why put these parameters into the oddly-named “empathy toolbox”

Disegno The gardens have been executed as watercolours–

Daisy iPad watercolours.

Disegno They look beautiful, but I was curious as to why you adopted that art style. For a project that is about putting forward an idea of gardens that differs sharply from the familiar sense of them being principally for human enjoyment, it's the most traditionally "pretty" aesthetic you've worked with.

Daisy There are three reasons. Firstly, I don't want to not make the kind of work that I'm doing, but I wanted to not feel like the project manager or art director for once! It was a conscious decision that I really wanted to draw, which I basically haven't done since A Levels. I may not have 3D modelling skills, but I can paint.

Disegno That's interesting, because so many times people speak about the figure of the designer as a connector and someone who links everyone together. It's quite a romanticised framing that is often wonderful – and that way of working does enable some incredible things – but it also sounds much less glamorous and enchanting as a position when you describe it as "project management".

Daisy Right. I've been making big complex projects and you can see that when you look at the [credits list](#), so for Pollinator Pathmaker I was determined to do this myself. But the second reason for the aesthetic is that it was really important to me that it not be "scary" as an algorithmic artwork, given the audiences I want it to appeal to. I've previously used aesthetics as a way of gently prodding certain tropes that we're used to seeing in terms of a colonial representation of nature – which is something I looked at in [The Wilding of Mars](#), for instance, with the sublime landscape. Pollinator Pathmaker, however, uses the softer language of watercolours, rather than CGI, to make the experience of moving through an algorithmically designed garden more pleasurable and less intimidating. But it also brings a kind of synthetic newness to it. It's garish yet plays with the language of botanical illustration.

Disegno And the third reason?

Daisy When the pandemic hit, I had to essentially close my studio. When I was developing the pitch, I didn't have much option but to draw in coloured pencils. But that necessity gave an interesting juxtaposition between the naïveté of the initial sketches and the sophistication of the final algorithm – which ended up being the pleasure of the aesthetic. It's got a weirdness insofar as the illustrations are flat, so when you zoom around the garden you get a visual glitchiness. It's not perfect – plants become transparent, or go strange and bendy. It reveals the computation behind it.

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Disegno We've spoken a lot about the digital aspects of the work, but it's important to note that this project is also resulting in actual gardens – you can go to Eden and walk around the one you designed, and users are encouraged to plant their own. That must be satisfying for you.

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Daisy There are so many things that I'm experimenting with or excited to learn about with this. I mean, the Eden garden is 55sqm and 7,000 plants. That's exciting, particularly because in designing this garden, I didn't really know what it's going to look like, which is thrilling. I'm not a garden designer – I can't just visualise it from a plant list. When we designed the scheme for Eden, we generated hundreds of options and then narrowed it down to one, but we planted it without really knowing what it was going to look like, because the visualisation tool wasn't finished – I hadn't painted all of the flowers yet! Even with the tool, there is still an uncertainty about a garden: it's going to change, it's going to do its own thing like one plant taking over. There's something conceptually interesting that insects are going to come and steal bits of the artwork, give bits to it, or that new bits will grow.

Disegno And new gardens will emerge as people engage with the online platform.

Daisy You can plant a whole artwork from seed. You can create the design online, then go off to buy seeds online, and have them sent in the post. That's interesting in terms of distributed manufacturing and fabrication. I'd been in conversation with [Google Arts & Culture](#) [a partner on Pollinator Pathmaker, ed.] for a while about doing an online experiment, but I'd struggled with what an online experiment could be. The Google Arts & Culture digital experiments are fascinating, but I wondered whether they could also transition into the physical world, as something you could print or take away. What we've ended up with is something you can not only print out, but which you can subsequently plant in the ground – it's really nice to think about those online experiments as tools to make physical things. It's anti-NFT In a way,

Disegno I'm very relieved to hear you say that, because it would have been incredibly easy – and of the moment – for the algorithm to produce NFT gardens.

Daisy People have asked that: “Can you do NFTs?” No! If it's for private use, you can download your instructions for free, and then plant it at your own cost and risk. That's part of this ethos of empathy and generosity, which everyone who's been involved with this has been really excited about. I'm the caretaker of my DIY edition of the artwork, and I'll enjoy looking at it and watching the bugs that appear, but the artwork isn't really for me: I'm looking after it for other species. The idea is that there should be a generosity throughout the model: when new international editions of Pollinator Pathmaker are commissioned for new regions, the research that goes into developing a new database of plants is given back to the website, free for anyone to use. I'm very aware that it's an incredible privilege to have a garden at home; what we really want to work on next is the community element. The Pathmaker tool is for private use, but there's a form on the website to get permission to plant gardens in a community spaces or in schools, which I really want to happen. The challenge is finding a mechanism to help people do this. There's an inbuilt privilege to gardens and so to Pollinator Pathmaker DIY editions, but we don't want this to just be about private gardens. We need to find a way to make a network of big and small, private and public and shared pollinator gardens?

Disegno You could see it being useful in an educational context. It could provide a route into thinking about the way in which we treat the natural environment.

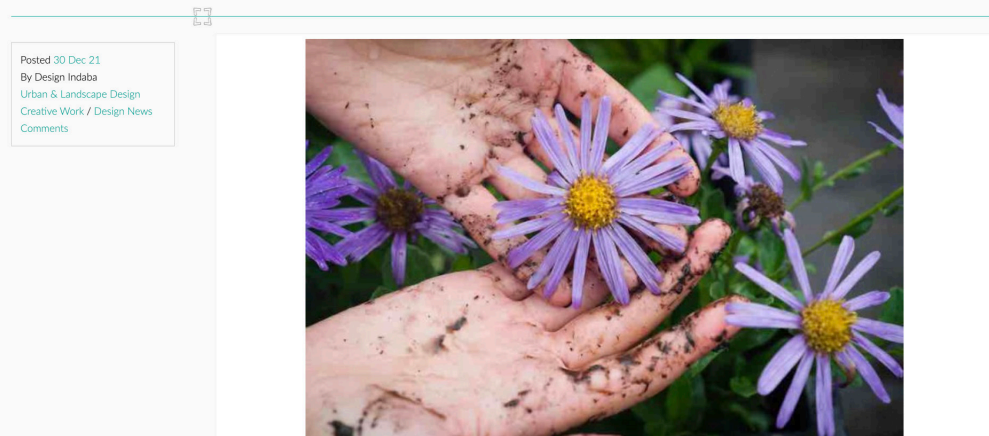
ALEXANDRA
DAISY
GINSBERG

Daisy It's very challenging to talk about this from a place of privilege and say, "Well, what is a garden? Who's it for? Well it's not for people, it's for insects." Especially given what we've all been through with the pandemic, and the privilege that access to gardens represented during this period. The gardens on the website are built on 50cm pixels, which we had to set as a minimum to include fully grown plants. To get an interesting pattern, you do need a bigger plot, but we also give advice on how to scale the pattern down to flowerpots, for instance. Actually, none of the specificities of the garden really matter. What matters more is thinking about what we plant, where we plant it, who it's for, and why that matters. We want to get people engaged with thinking about how we do better for other species.

Design Indaba
December 30 2021

Exploring interspecies art

Alexandra Daisy Ginsberg has developed an algorithm that caters for pollinator preferences



Posted 30 Dec 21
By Design Indaba
Urban & Landscape Design
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Last year, the UK's Eden Project – an organisation that explores the interconnections between all living things – commissioned artist Dr Alexandra Daisy Ginsberg, a Design Indaba alumnus, to create a digital artwork fabricated in living plants that would raise awareness about the global plight of pollinators, which are in decline.

The artwork forms part of the 'Create a Buzz' programme supported by the Garfield Weston Foundation. Misha Curson, Senior Curator at the Eden Project, says the programme embraces a cross-disciplinary approach, breaking down silos in art, science, horticulture and audience to communicate the story of pollinators and suggest ways to support them.

"When I was commissioned by the Eden Project to make an artwork about pollinators and their plight, I suggested instead making an artwork for pollinators," Ginsberg tells Design Indaba. "With a 55m slice of Eden tantalisingly available for a permanent installation, why not fill it with forage for pollinators? We could make a living artwork whose main audience is more-than-human."

"I decided to develop an algorithm that would create gardens designed with empathy for other species. The algorithm would select and arrange plants for me, so my aesthetic sensibilities didn't get in the way. The challenge was how to encode empathy into an algorithm: What is the actual problem we are asking the algorithm to solve? I chose to define empathy as supporting as many pollinator species as possible."

"Since the algorithm is made by humans – in particular by string-theory physicist Dr Przemek Witaszczyk – it can't remove human biases, but it can help to dull them. Choosing and arranging plants from a special plant database curated with Eden's horticulturalists and pollinator experts, the algorithm creates gardens that support pollinators' behaviours and tastes, rather than our own. The gardens look quite different to gardens that humans design. They feature every shape of flower to suit different pollinators, have odd juxtapositions of tall and short plants, and dramatic colour clashes," Ginsberg explains. "Pollinator Pathmaker creates unnatural gardens, designed for nature."

Intriguingly, insect pollinators see colours differently to us. Ginsberg says that bees can't see red but can see UV, while butterflies can generally sense red, green, blue, and UV. "The co-evolution of plants and their pollinators means that flowers bloom when their favourite pollinators emerge, and different pollinators forage in different ways - some species, like bees, memorise the shortest routes between the patches of flowers they visit (and they may visit 10 000 flowers in a day), while others such as beetles randomly forage."

The unique 'interspecies art experiment' will be the largest-ever climate-positive artwork in the world. But the Eden garden is just the beginning and the first in a series of large, commissioned editions. A second artwork, commissioned by the Serpentine Gallery, will be planted in London's Hyde Park in 2022. The first international Edition will be in Berlin, created with Light Art Space and a local expert panel of horticulturalists and pollinator experts. "Since the Berlin region has a different climate – it's much hotter in summer and much colder in winter – we will be creating a new regional plant palette, which will be added to [pollinator.art](#)," Ginsberg explains.

Design Indaba asked Ginsberg if a South African edition was on the cards. "I'd absolutely love that – my family is from Cape Town and since I'm named after the Namaqualand daisy (*Dimorphotheca sinuata*), I hope it would make it into a South African list!" she says, adding that creating a South African plant palette needs a South African commissioner to join the team, and she encourages interested parties to reach out to her.

Ginsberg has made the algorithm she helped to pioneer available to any gardener in the world via an [interactive website](#). Although the current plant palette is suitable for northern Europe only, this is likely to expand. "We can see people are playing with the garden generator all over the world, flying through and exploring their digital gardens visualised in 3D using my plant paintings," Ginsberg says. "We've had lots of enthusiastic messages from all over with users asking when a plant list will come online for their region."

"I suggested that we put the algorithm online so that anyone could play with it and could create their own unique edition of the artwork, complete with downloadable planting instructions, then plant it at home or in a community space. With the support of the Gala Art Foundation and Google Arts and Culture, we made this happen."

What's next on Ginsberg's agenda?

"I think Pollinator Pathmaker will be keeping me muddy for the foreseeable future!" she says. "The launch of the work is the beginning of a big experiment, which opens many avenues of exploration, from asking what a garden is, to how art can be used to give us agency in the environmental crisis, to developing art commissioning models that bring together experts, institutions, collectors and members of the public around the world, and even to scientific research - we're beginning to explore how we can run experiments to see how pollinators are interacting with Pathmaker gardens."

Pollinator Pathmaker is not just for the green-thumbed, and Ginsberg admits that her DIY garden is only the second she has ever planted (with the first at the Eden Project). "I'm very lucky to have a space to plant, and that's a really important issue. Gardening is in many ways a privileged activity, and of course, access to space is part of the problem, one that became far more evident in the last two years of lockdowns," she muses.

ALEXANDRA
DAISY
GINSBERG

"We want to develop the community aspect so that if you don't have a garden or a place to plant, you can still get involved by planting in a school or community space, for example. Pollinator Pathmaker should be a creative way to give agency in this age of climate and biodiversity crisis."

Can participation in an art-led campaign be used as a mechanism to help empower people to see the world from other perspectives? If anyone has the answer to this question, it's Ginsberg.

Surface
November 11 2021

ART

What If Gardens Were Designed for Pollinators?

After resurrecting extinct flower aromas and birdsong choruses, the experiential artist Alexandra Daisy Ginsberg devises an algorithm that designs gardens with pollinators in mind.

BY RYAN WADDOUPS
November 11, 2021



Alexandra Daisy Ginsberg. Photography by Steve Tanner

Bees, butterflies, and other pollinators are essential for plant species and ecosystems to flourish. Unfortunately, these crucial insects are facing alarming population decline due to pesticides, human-made habitat loss, and climate change. This prompted [Alexandra Daisy Ginsberg](#) to ponder what gardens would look like if they were designed from a pollinator's perspective, rather than our own.

It's not an unusual question for Ginsberg to ask. The Londoner was already investigating our fraught relationship with nature through experiential artworks that explore designers' impulse to "better" the world. "What is better?" she asks. "Whose 'better' is being delivered, and who gets to decide?" In one artwork, called [Resurrecting the Sublime](#), in collaboration with Christina Agapakis of Ginkgo Bioworks and Sissel Tolaas, she recreates scents from extinct flowers lost to 20th-century colonialism; [Machine Auguries](#), meanwhile, sees an AI deepfake recreate a synthetic dawn chorus from thousands of birdsong snippets impacted by human-made light and sound pollution.

For [Pollinator Pathmaker](#), Ginsberg teamed up with horticulturists at Eden Project, pollinator experts, and an AI scientist to devise an algorithmic tool that will make the most empathetic landscape design for a garden. What exactly does that mean? Ginsberg defines it as planting that supports the greatest diversity of pollinator species. The custom algorithm chooses and arranges flora from a curated palette of locally appropriate plants, yielding slightly different gardens each time that are guaranteed to support the maximum number of pollinator species possible.

“I wanted to make art for pollinators, not about them,” says Ginsberg. “*Pollinator Pathmaker* is an ambitious art-led campaign to make living artworks for other species to enjoy. Can the audience for an artwork be more-than-human? And how can art be useful in the ecological crisis?”

Though the first real-life edition of *Pollinator Pathmaker* is a 180-foot-long permanent green space at Eden Project in Cornwall, the algorithm’s utility isn’t only restricted to large-scale public projects. Inquiring minds can use the tool for free online to create a personalized garden artwork based on various environmental conditions. Within seconds, the algorithm designs a custom garden that changes with the seasons, shows what the flowers look like from the pollinators’ perspective, and gives more information about each plant species. Each garden also serves as a one-off edition of an artwork that resembles the 480 garden paintings that Ginsberg created during quarantine.

What Design Can Do
November 9 2021

'I WANTED TO MAKE AN ARTWORK FOR POLLINATORS, NOT ABOUT THEM'

**ALEXANDRA DAISY GINSBERG UNVEILS NEW GARDEN DESIGNED
FOR BEES AND BUTTERFLIES**



Deep in the English countryside, work is finally complete on the planting of a new and rather unusual garden. As its name suggests, *Pollinator Pathmaker* is a living artwork that has been designed for a more-than-human audience. Every flower and shrub in the artwork has been selected, planted and optimised for the tastes of pollinating insects, using a unique algorithm developed by a team of horticulturists, scientists and machine-learning experts.

Commissioned by the [Eden Project](#) in Cornwall, *Pollinator Pathmaker* is the brainchild of multidisciplinary artist [Dr Alexandra Daisy Ginsberg](#). The former WDCD speaker is known for creating artworks that examine our fraught relationships with nature and technology. Her experiments touch on subjects as diverse as artificial intelligence, synthetic biology, conservation, and evolution. In line with Ginsberg's practice, the garden uses technology to invite empathy between species, and raise awareness about the vital role of bees in sustaining our ecosystems. Ahead of the public launch of the project, we caught up with Ginsberg over email for a fascinating conversation about the vision behind *Pollinator Pathmaker*, which is anticipated to be in full bloom by Spring 2022.

CONGRATULATIONS ON THE FIRST POLLINATOR GARDEN! TAKE US BACK TO THE BEGINNING — HOW DID YOU FIRST BECOME INVOLVED WITH THE PROJECT?

After a year and a half of collaborating in the virtual world, we unloaded thousands of plants at Eden this past September. It was brilliant to see so many different species of pollinators feeding on them before we even got the plants in the ground!

The work began before the pandemic when I was shortlisted for Eden's new pollinator commission, part of a larger programme called *Create A Buzz* funded by the [Garfield Weston Foundation](#) to bring attention to the jeopardy facing native pollinators. We rely on pollinators — the bees, wasps, moths, butterflies, and more that enable many plants to reproduce — but their numbers are in alarming decline because of human actions. Instead of bringing attention to pollinators by making something *about* them, I suggested making an artwork *for* them. With a 55m slice of Eden's beds tantalisingly available, why not fill it with forage for pollinators as a living artwork?

I was struck by how pollinators perceive the world very differently to us. For example, different species see colours differently to us, and each other. Many garden plants that we find aesthetically pleasing have been bred for our preferences, whether smell, colour, or abundance of petals. The energy the plant puts into growing these “features” for us can mean that they produce less nectar and pollen or that their supplies are inaccessible to insects. That was the beginning: what would a garden look like from the point of view of pollinators? How could I create a garden that was empathetic to their tastes, not ours?

I was struck by how pollinators perceive the world very differently to us. For example, different species see colours differently to us, and each other.

THE ALGORITHM YOU DESIGNED IS 'OPTIMISED' FOR POLLINATORS, RATHER THAN HUMANS. WHAT DOES THAT MEAN EXACTLY?

Pollinator Pathmaker is a search for empathy for other species. How can you encode empathy into an algorithm?! I decided to define empathy as supporting as many pollinator species as possible. Since the algorithm is made by humans (in particular, our brilliant string-theory physicist Dr Przemek Witaszczyk of Jagiellonian University, Kraków,), it can't remove human biases. But it can help reduce them as it overrides design choices. The algorithm creates gardens that support pollinators' behaviours, rather than how we might like gardens to look.

WHAT WAS THE RESEARCH PROCESS LIKE?

Figuring out what we needed to make this algorithm a reality was a massive research task in the studio and beyond. We've worked with Eden's incredible horticultural team, with pollinator experts and scientists, and done a literary review to establish the parameters to focus on. There is surprisingly little scientific research on the specific pollinators of the vast majority of garden plants.

The algorithm draws on a database where each plant has been carefully researched and chosen for its known benefits to particular pollinators and to ensure it is appropriate for the location. Ultimately, it balances out flowering times and pollinator diversity to create a garden that supports as many different species from long-tongued bumblebees to butterflies, over the year. The plants are also arranged to suit different foraging styles, and over the winter, it provides habitat.

WHY WAS IT IMPORTANT FOR YOU TO STEP AWAY FROM HUMAN-CENTRED DESIGN? WAS IT DIFFICULT TO DO IN PRACTICE?

I want the work to invite (human) viewers to see the world from other perspectives, as a way of decentering us. I've been working on this approach in a number of my recent pieces, and this was such an amazing opportunity to step outside the gallery and fabricate the experiment in plants over 5 years, telling this story while offering tangible benefit to our primary audience, the pollinators and plants themselves. They'll be busy taking away pieces of the artwork and bringing pollen back to it from elsewhere. Of course, in practice, the work is made by humans and our biases always creep in. I like to think of this as an unnatural garden designed for nature.

I want the work to invite (human) viewers to see the world from other perspectives, as a way of decentering us.

ALGORITHMS CAN BE UNPREDICTABLE. IS THERE ANYTHING THAT SURPRISED YOU ABOUT THE FINAL DESIGN OF THE GARDEN?

We'll see when it starts to bloom! I'm hoping that the juxtapositions of plants and colours will be shocking to our aesthetic sensibilities, but delicious for its more-than-human visitors.

THE SECOND PART OF THE ARTWORK IS A NEW WEBSITE INVITING AUDIENCES TO GENERATE THEIR OWN POLLINATOR GARDENS. WHAT DO YOU HOPE THAT PEOPLE WILL TAKE AWAY FROM THIS?

At [pollinator.art](#), anyone can play with the algorithm to create their own unique DIY edition of the artwork. They can explore it through the seasons in a painted visualisation with a soundscape and even see it through an interpretation of pollinator vision. And then they can download their *Pollinator Pathmaker* plan and plant it!

I was really inspired for this whole work by Eden's core principles: encouraging a sense of connection, awe, and jeopardy towards our natural world, and above all, giving us hope and agency to protect it. Making the algorithm that we used for the Eden installation accessible via the website is a way to empower people. I feel frozen in place by panic when I think about the climate and ecological emergency, but learning what the issues are and feeling that there is something you can do to feel agency is positive.

Making the algorithm that we used for the installation accessible via the website is a way to empower people.

We've worked with [Gaia Art Foundation](#) and [Google Arts & Culture](#) to develop this online part of the work. We want it to expand by developing a commissioning model based on collaboration and generosity. The *Pollinator Pathmaker* garden at Eden is the first edition of the artwork. We're also inviting partners from museums to institutions to collectors to commission new large gardens. Each new international edition will involve developing a new local plant palette that will then be added to the website, so that more local users around the world can plant their own DIY garden.

I hope we'll see artworks for pollinators blooming around the world!

The Guardian
November 3 2021



Art

Art for bees: 'mad-looking' installation suits pollinators' tastes



Steven Morris

[@stevenmorris20](#)

Wed 3 Nov 2021 00.01 GMT

She admits that, to the human eye at least, her new installation may turn out a little garish - clashing colours, odd shapes, curious juxtapositions - but the artist [Alexandra Daisy Ginsberg](#) doesn't mind that at all.

Ginsberg's 55-metre long piece, which is taking shape at the eco-visitor attraction [the Eden Project](#) in Cornwall, is not designed, like most art, to please humans, but rather to appeal to bees, butterflies, moths, wasps and other endangered pollinators.

"It means that I've ended up with this mad-looking design," said Ginsberg in a break from the chilly, muddy business of autumn planting. "There are strange juxtapositions of shapes and patterns and colours that no gardener would think of planting. It is designed to be of greatest benefit to pollinators, suiting their tastes rather than ours."

The piece, [Pollinator Pathmaker](#), should be in full bloom by late spring or early summer and new editions of the work are to be planted in London and Berlin.

Ginsberg was originally trying to dream up a piece on pollinators when the thought struck her: “Why not create a sculpture for the pollinators rather than about them?”

At Eden, Ginsberg has worked with professional gardeners, experts in pollination and a master beekeeper, Rodger Dewhurst, but a surprising team member is the string theory physicist [Przemek Witaszczyk](#), of Jagiellonian University, Kraków, who helped create an algorithm for the piece.

Witaszczyk factored in elements such as the shape and style of journeys taken by different pollinators and when individual flowers come into bloom to make sure conditions are good for as long as possible. “We want to serve the greatest number of pollinators,” said Ginsberg.



▲ Ginsberg sees her artwork as a call to take action against the loss of bees and butterflies. Photograph: Jim Wilman/The Guardian

Horticulturists, students, apprentices and volunteers have braved dismal conditions to plant thousands of plants, which will erupt into crazy colours at the Eden Project’s Wild Edge Zone, stretching around the perimeter slopes of the gardens and visible from across the site.

Another crucial element of the project is the launch on Wednesday of a website allowing people to use the algorithm to design their own unique version of her work.

Users can input the size of the patch they want to plant, the position of their garden and soil conditions, then see a 3D visualisation of their unique garden bloom on their screen. The images that emerge are in themselves a work of art, each plant hand-painted by Ginsberg.

Some of the specimens included on the site are as extraordinary as the pollinators that will benefit from them, such as *Echium pininana*, a rare example of a plant that produces nectar across the whole day, and *Cynara cardunculus*, the artichoke thistle, which is a valuable source of nectar for bumblebees.

Ginsberg sees this as “an international cultural campaign” and an “interspecies art experiment” to help save endangered species of pollinating insects.

She hopes people will grow these in whatever space they have available - at home, in fields, community gardens, even in a window box if this is all the space they have. The artist admits the gardens could be expensive if they covered a large, intensively planted area, but the cost could be kept down in more modest schemes. “I hope we can create the largest ever climate-positive artwork together by planting living artworks for pollinators around the world.”

The Pollinator Pathmaker project is part of Create a Buzz, a three-year programme for the Eden Project that includes new plantings of fields of wild flowers and a range of community and education projects.

Misha Curson, senior curator at the Eden Project, described Pollinator Pathmaker as a “mould-breaking commission”, combining technology, conservation, horticulture and visual arts. “It’s a really powerful way of helping us as human beings think beyond our own needs and wants and consider the impact of our actions,” she said.

Bloom Magazine
October 2021

‘It’s an unnatural garden designed for nature’

Artist Alexandra Daisy Ginsberg has created software for bugs and put an algorithm in charge of a garden created solely for the pleasure of pollinators

Interview Aoife Fannin

We often think of gardens as being a space for people, and we design them based on human desires – but as we’re becoming increasingly aware, we aren’t the only ones who need and enjoy them. Artist Dr Alexandra Daisy Ginsberg has tipped the design process on its head for a new, permanent art installation at the Eden Project in Cornwall, and is in the process of planting a 52m-long garden for pollinators, rather than people.

Collaborating with horticulturalists and pollinator specialists as well as tech experts, she’s created a unique algorithm that draws on a database of plants and selects and arranges them according to the various foraging habits of bees, butterflies, moths and the like (which are essential to life on Earth, but in alarming decline).

The result is a perfect garden design in the eyes of these tiny creatures, and one that brings together unexpected

planting combinations and unusual aesthetic decisions. The project also makes the algorithm available to the public to create their own living artwork for pollinators.

Where did your love of nature come from?

My parents instilled in me a deep love of the natural world. We moved from London to the countryside when I was eight and I watched my father spend years learning about traditional formal gardens and transforming a field into one. He got so into topiary he even started a topiary nursery, so I spent my holidays helping to tame hedges into unnatural shapes. For a while he also had an organic shiitake farm, growing mushrooms on logs in the woods in the traditional Japanese way. We’d beat the logs with sticks to simulate thunderstorms and a stress response to make mushrooms. Mushrooms are incredibly fashionable

now, but in the 1990s it made me seem extremely weird at school.

Were you ever nervous about the aesthetic outcome of the garden?

The algorithm is designed to maximise empathy, and the aim is to reduce human aesthetic bias as much as we can. The garden site at the Eden Project is divided into pixel squares, and the algorithm chooses what should be planted in each pixel based on a curated database of plants.

The garden may look very different to a conventional planting scheme: for example, we have every colour in the database, as different pollinators see different colours, so the aesthetic may not suit humans. But I hoped it would look quite strange. It is an unnatural garden designed for nature. And it’s an artwork that leaks into the world, as pollinators take pieces of it away and allow it to flourish elsewhere.



What plants can we expect to see?

The design is about balancing plants proven to be beneficial to a range of different pollinator species, with plants that bloom at different times of the year, and also those that have different-shaped flowers for different feeding styles.

The algorithm draws on a plant palette of perennials that are locally appropriate, but we are not obsessed with native species. Some cultivars are included, but we've excluded those that are bred for human tastes in appearance or smell, because this often reduces their usefulness to pollinators (they often provide less pollen and nectar or, the pollen and nectar may be inaccessible).

The planting depends on what the algorithm chooses each time it generates a scheme of a specific place, and which scheme is ultimately selected – human biases always creep in!

For an artist so interested in nature, tech plays an unusually large role. How did that come about?

I knew pretty much nothing about technology, but was intrigued by the novelty of a new MA at the Royal College of Art called Design Interactions and enrolled in 2007. I learned to use design in a critical way to explore the social, cultural and technical implications of emerging technologies. And I learnt about a new field called 'synthetic biology' – an approach to genetic engineering where DNA is reimagined as programming code to make biology work as a design material in order to make useful things for humans.

It was astounding, and I wondered: when it comes to designing the very matter we are made of, what would good design be and who gets to decide? This led me to a ten-year adventure hanging out with synthetic biologists

in labs around the world, making work that reflected on their vision of engineering biology.

I went on to explore our relationship with the natural world and the crises it faces. I experimented with other lifelike technologies, such as AI, questioning our obsession with the new, rather than what already exists. For example, why is so much invested in AI, while we make some species go extinct?

How do you think people will respond to the garden?

It's a very different way of thinking about what a garden is and who it is for: can humans design things that are not ultimately for our benefit? I hope my work can instill an unexpected emotional response and inspire a call to action, and that making an artwork for pollinators can show how we can see the world through non-human eyes. [▶](#)

edenproject.com / daisyginsberg.com

ALEXANDRA
DAISY
GINSBERG

Art Quarterly
Autumn 2021

Autumn 2021 Paula Rego Museum of the Year Dante Creative Solutions to Climate Change Peru

Art Quarterly





'General Ecology', the Serpentine Galleries

Inspired by its collaborations with the late artist Gustav Metzger, who believed artists should create works that address the most urgent threats facing society – in his view, the extinction of other forms of life on Earth – the Serpentine Galleries, in London, has chosen to embed ecological principles in everything it does, from its programming and publications to its underpinning systems and structures. Since 2018 this has been put into practice, drawing on research into complex systems, non-human-centric views of the world, climate justice and environmental balance, under the title 'General Ecology'. The General Ecology Network (see also page 83) brings together more than 100 multidisciplinary individuals and organisations working in this area.

The project 'Back to Earth' is the public face of 'General Ecology' between 2020 and 2022, marking the Serpentine's 50th anniversary. It is made up of environmental campaigns devised by more than 60 artists, architects, filmmakers, poets, scientists, thinkers and designers. Artist Alexandra Daisy Ginsberg has created *Pollinator Pathmaker*, which uses an algorithm to optimise the selection and placement of plants for pollinators – what she calls an 'artwork for pollinators, not about them'. It will be realised as a garden at the Eden Project, Cornwall, and Kensington Gardens, London, and as a website. Tomás Saraceno, meanwhile, has devised an app that conjures two giant augmented-reality spiders outside the Serpentine Galleries. Learnings from 'Back to Earth' are shared through the gallery's own website and podcasts as blueprints for other organisations.

A related 'Back to Earth' book, *140 Artists' Ideas for Planet Earth*, reflects the belief that such a complex problem as climate change requires diverse, interconnected responses. Writer Alexis Pauline Gumbs forms her idea as a spell, using words from an Audre Lorde poem; film director Apichatpong Weerasethakul suggests readers impersonate an animal for two minutes; economist Kate Raworth, in three sentences, outlines a new socioeconomic system; and artist Olafur Eliasson tells us to look down, look up and stay put, which speaks to the project's central tenet – why leave this planet to find a better one, when together we can build a better world here on Earth?

● *140 Artists' Ideas for Planet Earth* (2021) is published by Penguin. To find out more about 'General Ecology' and 'Back to Earth', visit serpentinegalleries.org

Nature Biotechnology
September 2021



Where others might seek to reconstruct a woolly mammoth from centuries-old sequences, Ginsberg is part of an interdisciplinary project to recreate the scents of plant species lost to human colonial destruction of their habitat. Ginsberg trained in architecture and design, earning a PhD from the Design Interactions program at the Royal College of Art in London. For her art installation *Resurrecting the Sublime*, she collaborated with the scent researcher and artist Sissel Tolaas and the biotech company Ginkgo Bioworks. The installation has been shown around the world, from the Cooper Hewitt Smithsonian Design Museum in New York to the Pompidou Centre in Paris, and is currently on view at the 17th International Architecture Exhibition in Venice.

Why were you first known as a 'guerrilla' artist?

In 2009, I turned up at MIT's International Genetically Engineered Machine (iGEM) competition with the University of Cambridge iGEM team. While the student team was on stage presenting their work, I was showing a briefcase filled with stool samples made in wax, each a different color, to everyone who might listen. The Cambridge students had genetically engineered [*Escherichia coli*] strains to produce different colored pigments, and, together with designer James King, we imagined a potential future application: a person would drink probiotic yogurt laced with these synthetic *E. coli*, turning their [feces a different color](#) depending on the chemical markers of different diseases sensed in the body.



Did the colorful turds do more than shock, did they create buy-in for your ideas?

Appearing at a genetic engineering competition with a briefcase of colorful poos was a way to start conversations with the people building this new field. Humor allowed us to start talking together about what synthetic biology might be and how it might affect our lives, in positive, negative and unexpected ways. This led to me joining and curating a large NSF/EPSCRC-funded research project, called Synthetic Aesthetics, set up by synthetic biologists Drew Endy and Alistair Effick and social scientist Jane Calvert. We paired six artists or designers with six synthetic biologists, from the US to Australia to Japan. They spent a month together in each other's space: first in the lab and then in the studio.

Were the synthetic biologists reticent to enter an artist or designer's studio?

We asked them only to spend the month thinking about: What does it mean to design life? Can you design it? How might you design it well? This was all extremely unusual. It was a pure scientific research project, not Sci/art or public engagement, with no specific deliverables apart from developing a critical conversation. The pairs continued working together—in some cases they are still working together ten years later—and it established a powerful precedent for synthetic biology to collaborate closely with art and design. You can read more in our book [Synthetic Aesthetics. Investigating Synthetic Biology's Designs on Nature](#).



How did the extinct flower aroma project come about?

Resurrecting the Sublime started with Ginkgo Bioworks' co-founder Jason Kelly saying, "Would it be possible to use synthetic biology to reproduce the smell of an extinct flower?" To Ginkgo, whose customers include fragrance companies, the idea of using synthetic biology as a creative force was really powerful. In 2016, Christina Agapakis, Ginkgo's creative director, went to the Harvard University herbarium and took tiny tissue samples from the specimens of extinct flowers in their collections. This led to a multiyear research project and then to installations in galleries where hundreds of thousands of people around the world have now experienced a memory of a lost flower.

Which were the three flowers you chose to resurrect?

The *Hibiscadelphus wilderianus* Rock, or Maui hau kuahiwi, grew in ancient lava fields in Maui, Hawaii. It was decimated by colonial cattle ranching, and the last tree died in 1912. The *Orbexilum stipulatum* was last seen in Kentucky in 1881 before it went extinct and its cultivation failed. In the 1920s a dam completely destroyed its habitat. The *Leucadendron grandiflorum*, originally from Wynberg Hill, behind Table Mountain in Cape Town, was lost to colonial vineyards. It was last seen in a collector's garden in London in 1805.

Did you manage to piece the DNA back together?

The DNA was degraded, so the Ginkgo team worked with paleogeneticists at University of California Santa Cruz to [extract the DNA](#). The Ginkgo team then used synthetic biology to first compare the sequences to known sequences from other species that produce fragrance enzymes, in a kind of matching process, and filled in the gaps. They then resynthesized the gene sequences, put them into yeast, and tested the fragrance molecules using mass spectrometry.

Hadn't this been possible before?

I think the work was really new, although of course DNA sequencing and DNA synthesis tools had been around for decades. And no one had focused on lost flowers before this. The Ginkgo scientists and engineers produced a list of smell molecules that each plant may have produced. I was blown away. Christina had been telling me about this project for a few years, and now the list was real. It was dizzying. It inspires the sense of the sublime, an eighteenth-century theory from art and literature that encapsulates this feeling of awe and terror at the natural world.

How would you describe the flowers' smells?

I am not a smell expert, unlike Sissel Tolaas, who reconstructed the smells from Ginkgo's lists. But as an amateur I would describe the *Leucadendron* as deep and tobacco-y, the *Orbexilum* as citrusy and candy-like, and the *Hibiscadelphus* as rich.

What do you see as the rationale for bringing back lost scents?

It raises a lot of questions. We built these synthetic versions of each flower's overall smell. But of course, they're not accurate because we don't know which molecules were actually in the flower, in what quantities, whether the molecules' function was smell-related, or even if the genes were switched on to produce those molecules. Hibiscus flowers don't really smell, as they are bird pollinated. What we end up with is a blurry picture of the past, a false yet powerful memory. But experiencing this creates an emotional, physical connection with the natural world. It is that sense of awe and terror and nature's fragility in the face of human devastation. Each lost species has a knock-on effect on the pollinators it provides for, affecting the species that rely on those pollinators, affecting habitats, and step by step, contributing to climate breakdown. These plants may seem lost and insignificant, but their loss is significant.

How did your gallery installation capture and transmit that smell to visitors?

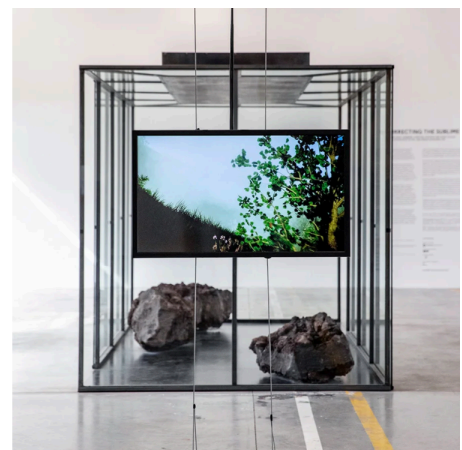
The installations are set up like traditional natural history dioramas. But instead of having a stuffed animal as the center of an extinction story, you, the human, are in the frame. In the version at the Natural History Museum, Bern, Switzerland, visitors enter the back of the diorama, turn the corner, and suddenly find themselves in a room containing no sign of living nature, just its traces: limestone boulders, the smell of the lost flower, the soundscape of its lost habitat, all whilst being watched by others. The intention is to make you slightly uncomfortable, to say: "this extinction is because of us."

What are you trying to say to people by reviving these flowers' aroma? How does your work touch people's lives?

Why do we fetishize the new over what already exists? We see technology and nature as separate, but we are part of the natural world and will not survive without it. We invest billions in innovation, on creating new life, whether synbio or AI, but have shamefully failed to protect the extraordinary lifeforms that already exist (of course, the 'we' here is not all peoples). Is it because we don't see other lifeforms as useful to us, whereas new technologies are seen as useful to humanity? This idea of utility is horrifically short-sighted. This paradox is both fascinating and something we urgently need to understand.



Christina Agapakis of Ginkgo Bioworks taking tissue samples from a dried specimen of *Hibiscadelphus wilderianus* at the Harvard University Herbarium. Credit: Grace Chuang, courtesy of Harvard University Herbaria, © Ginkgo Bioworks, Inc., the Herbarium of the Arnold Arboretum of Harvard University.



Installation of *Resurrecting the Sublime* at Biennale Internationale Design, Saint-Étienne, March 2019. Each booth is filled with the smell of an extinct flower. Credit: Christina Agapakis, Alexandra Daisy Ginsberg & Sissel Tolaas, with support from Ginkgo Bioworks and IFF Inc. © Pierre Grasset

ALEXANDRA
DAISY
GINSBERG



You describe your latest AI-driven work at the Eden Project as an unnatural garden. Why so?

I am creating an artwork not for humans, but for [pollinators](#), whose numbers are in global jeopardy. In September 2021, we are planting a 52-meter-long garden at the Eden Project in Cornwall [UK], designed by an algorithm to optimize 'empathy' for other species. I've defined that as planting to support the maximum diversity of pollinators, using carefully developed regional planting lists that the algo selects and optimizes from. Hopefully, this garden will look strange to human tastes—with every color and size and shape of flower included, plus patterning to support different foraging strategies. It is an unnatural garden designed for nature. I want to challenge what we think of as a garden and who it's planted for. The algorithm will be online so anyone can create their own artwork for pollinators which we invite them to plant. Keep updated on the [Eden Project website](#).

PORT
2nd July 2021

Garden of Eden

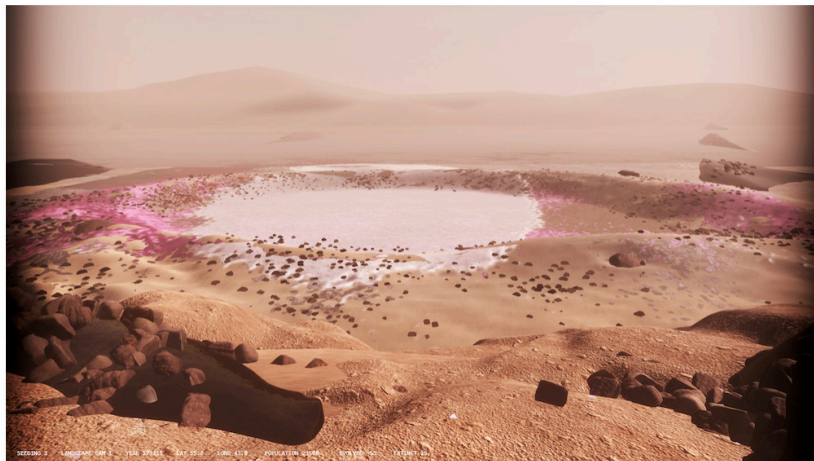
Dr Alexandra Daisy Ginsberg explores the fraught relationship between the natural world and technology. Spanning artificial intelligence, synthetic biology, conservation, and evolution, her artwork considers how dreams of a brighter future shape our designs, for better or worse



Often, what we call ‘good design’ is design that makes something better. However, what we mean by ‘better’ varies enormously. Do we mean better looking: more visually appealing? More economical? More efficient? And when we say that things have been made better, it begs the unspoken question: *better for whom?*

These questions – and how they relate to our attempts to design the natural world, in particular – are central to the multidisciplinary work of the artist Dr Alexandra Daisy Ginsberg, whose next commission will open at the Eden Project in spring this year as a permanent installation. “To paraphrase Margaret Atwood: better for some will always mean worse for others,” she tells me. “That’s incredibly important to me.”

Ginsberg has taken a roundabout route to seeing herself as an artist first and foremost. She started out studying architecture, followed her nose into design, and eventually went into the realm of synthetic biology and biotechnology, through a master's degree in design interactions at the Royal College of Art. "I was learning about engineers who were designing DNA," she explains, "and I started to wonder: What would good design be like if it was made out of biology? And what is the role of the designer, and who gets to decide?" Thinking along these lines led her to write her PhD on the notions of 'better' in the context of the dreams realised through design and technology, and post PhD she began to make artworks that explore these notions even further.



In 2019, she exhibited a suite of four works. 'Resurrecting the Sublime' was a series of immersive installations for visitors to experience the smell of three long-extinct flowers, whose fragrances had been brought back in collaboration with the biotech company Ginkgo Bioworks and smell researcher and artist Sissel Tolaas. 'The Substitute', commissioned by the Cooper Hewitt museum, consisted of a video of a digitally rendered northern white rhino winking in and out of existence, a subspecies on the verge of extinction that scientists hope to resurrect by implanting harvested eggs and sperm from one of the species into a southern white rhino. 'Machine Auguries', part of Somerset House's 24/7 show, was a sound-and-light installation featuring a dawn chorus produced by AI trained on bird song to explore the effects of night light and noise pollution on birds' ability to communicate. In 'The Wilding of Mars' at the Design Museum, Ginsberg explored the idea of sending 16 plant species chosen with help from NASA to 'colonise' Mars instead of humans, and exhibited pairs of video simulations of the possible outcomes doing so could produce on the planet in thousands of years' time.



There could hardly be a more suitable time to be making work about what an improved future might consist of. “The last year has seen the crumbling of the structures upholding modernity and ideas of what a better world looks like,” says Ginsberg. “All these intertwined emergencies that we’ve seen around health, social justice, inequality, the climate, biodiversity, and the economy – these are all problems manifesting from the modern world that we’ve built. The question is, are they too complex to find solutions that are better for us all?”

And by all, she decidedly means the non-human world as well as ours. Her work asks whether it is possible for us as humans to reprioritise other species over our own, a possibility that can seem farfetched. “Humans exploit nature. That’s what we do. I think I’m not hopeful,” she tells me, “but in me there is optimism.”



Although her work is speculative, looking at possible different worlds, it is not exclusively about the future. The past and the present can also be the location of our shared societal fictions. “Golden Ages are social imaginaries,” she notes. “Things like ‘Make America great again’, or ‘Bring back control’ reflect an imagined past that somehow a group of people buy into, and these powerful fictions can affect the present and the future. So whether the other world that you create is in the future, the past, or parallel to the present, it’s about creating a space for reflection.”

This notion of a simple space for the viewer to reflect is important to Ginsberg, and is one of the greatest strengths of her work. Each project is the culmination of often highly complex scientific research and takes on philosophical ideas, but each one can be enjoyed by a viewer with no prior experience in these fields. “What I really want the person experiencing the work to do is to feel something, an emotional response; then they can look further, but it’s really important to me that you don’t need to read the label,” she says.

Having made these four works that create what she terms an “immersive, emotional space” for a viewer, she is now grappling with a difficult problem for any artist making work around ecological crisis. “I was left with the question: what am I asking the viewer to do? What on earth do we do? We’re fucked. What’s my contribution? We can put stuff in a gallery and people can look at it and feel sad, but how can I give agency?”

Her upcoming work for the Eden Project’s large outdoor plot is a partial answer. “I was asked to propose an artwork about pollinators, but I decided I wanted to make an artwork *for* pollinators,” she explains. “The way we’ve understood design has been about the manufacture of stuff, as part of capitalism. But design can mean other things; other organisms design. Is it possible to help other species to create a better world for them? Or in doing so are we always creating a better world for ourselves?”



She decided to design a garden by algorithm that would be optimised from the perspective of bees and other pollinators, using plants they prefer, in arrangements that include reducing the distances they need to fly to visit similar flowers. They're not necessarily the ones most beautiful to the human eye, which is often the guiding principle by which we design a garden. In partnership with Eden's horticulturists and external experts, she is building a database of these pollinator-friendly plants, and an algorithm that dictates where on the plot they will be planted for maximum blooming periods over the year. "Hopefully we're going to create a garden that looks really strange, very different to a tastefully laid out, human-planned garden!"

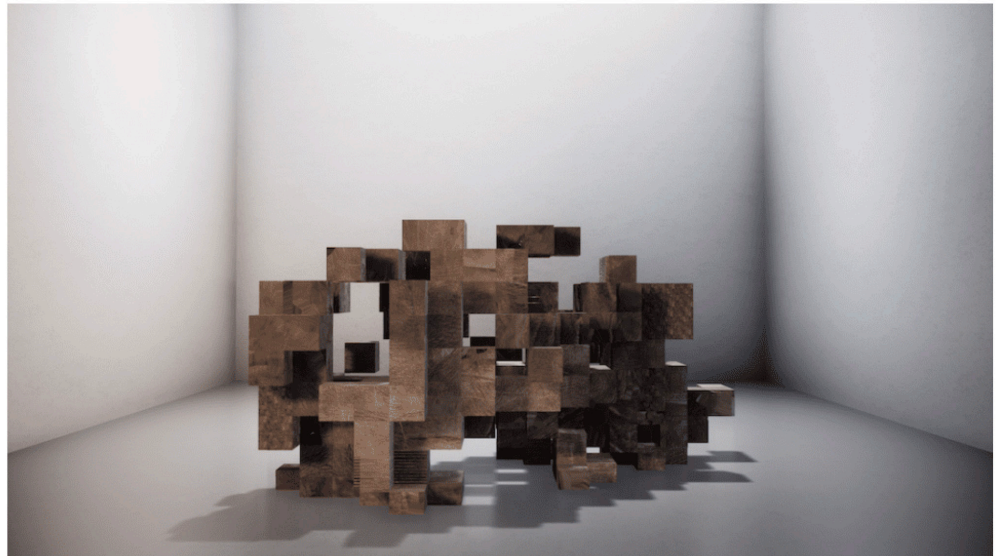
The second part of the project, and the part that gives that all-important agency to the viewer, is making the algorithm available online to the public, so people can plant their own version of the garden. "I was very inspired by being under lockdown while creating the proposal. Pollen, data, seeds, these are all things that can travel while we're locked down at home," she adds.

Designing the natural world can be an uneasy undertaking. Instinctively, something feels *unheimlich*, even ethically dubious, about engineering what is natural. But Ginsberg's works taken as a whole show a confidence that posing questions around this unease is just as valuable an undertaking as proposing solutions to them. "The more I learned, the more I realised that these boundaries between nature and technology are artificial, as is the idea of nature itself," she concludes. "Broccolis aren't natural, they were bred for human benefit. My puppy is not a natural wolf, he's half poodle. Genetic modification is nothing new. It's not so much the technology, it's what we do with it – who gets to decide – that is interesting and messy."

AESTHETICA

4th June 2021

Working With Nature



Alexandra Daisy Ginsberg's (b. 1982) artworks explore our relationship with non-human life, considering how the natural world might evolve in a "post-biological future" – one that human beings are creating. Her project *Better Nature* (2009-2015) paired artists and designers with synthetic biologists to envisage a range of bioengineered species. Now, the Eden Project has commissioned Ginsberg to create a major new permanent installation in its outdoor gardens. Launching later in 2021, her algorithm-based planting project will draw attention to pollinator decline and explore how we can counter the problem.

A: What do our readers need to know about pollinator decline, and why have you chosen to focus on this issue?

ADG: Pollinators are utterly essential to life on Earth, enabling the plants that have evolved alongside them to reproduce. They support life as we know it. But over the last 30 years, global insect populations have crashed by 25%. Whilst the threats that honeybees face are increasingly publicised, they are not the only pollinators. In the UK, 24 species of wild bumblebees, 230 solitary bee species, as well as moths, butterflies, flies and wasps all play a crucial role in pollination. The pollinator commission is part of a larger programme at Eden called *Create-A-Buzz*, funded by the Garfield Weston Foundation, bringing attention to these pollinators' alarming decline.



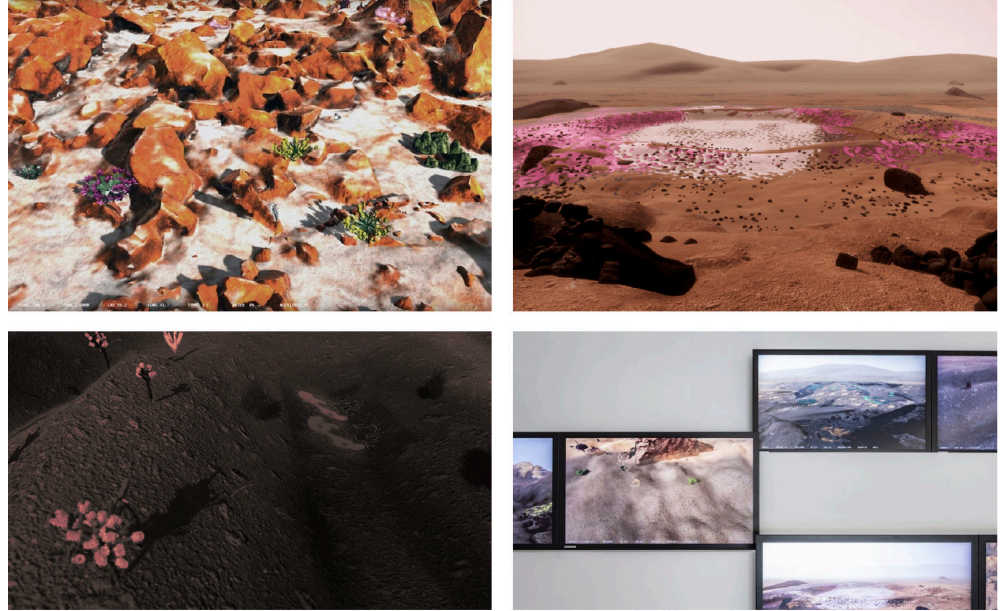
A: Your new installation for the Eden Project's outdoor gardens uses algorithms to create pollinator-friendly planting schemes. Can you tell us how the project will work?

ADG: Given the chance to create a work for a 52m-long piece of the Eden's Projects gardens, I suggested that rather than an artwork *about* pollinators, we make an artwork *for* pollinators. Moving outside of the gallery, could we fabricate a digital artwork in flowers?

The way we see the world is just one version of reality. For example, different pollinators see different colours to us, influencing the colours of the extraordinary variety of plants they serve. The artwork began with seeking a way into the shared reality of plants and pollinators; it is a search for empathy for the more-than-human. Rather than designing gardens for us, what does a garden created from a pollinators' perspective look like, and how can we make one? The result is an algorithmically designed garden optimised for pollinators, not human aesthetics.

I wanted the algorithm to maximise empathy. I was then faced with the challenge of turning that idea into something that could be coded by Dr Przemek Witaszczyk, a brilliant string-theory physicist with whom I have worked before. I decided we would define "empathy" as maximising the diversity of different pollinator species.

The algorithm selects plants from a palette of perennials curated with horticulturists at Eden and pollinator experts. First it selects plants that match Eden's conditions from this database, then generates unique pixelated garden designs that serve as many different species as possible, from long-tongued bumblebees to butterflies. For example, it optimises the plant choices to maximise blooming across seasons, whilst making patterns to suit different foraging strategies. The algorithm assigns a plant species to each pixel square, which is then translated to plants in the ground.



A: You have also created a website where UK audiences can use algorithms to create their own planting schemes. What was the thinking behind this?

ADG: The ambition is to create more than an artwork: an art-led campaign. We are putting the algorithmic tool online so anyone can create their own unique artwork for pollinators – a garden planting scheme – which they can plant if they have a garden or community space. They can make their own DIY edition of the artwork, complete with an edition certificate downloaded from the website.

We want to make a network of sister artworks for pollinators around the world, large and small. Empathy and generosity are at the heart of this. We are looking for international museums, botanic gardens, or collectors to commission large “Edition” gardens. For each, we’ll create a new regional plant database suitable for the garden’s location, which will be donated back to the website. This in turn will allow visitors to plant their own local DIY editions, seeding a garden network.

A: What role do you think art can play in helping us to imagine new ways of living alongside non-human animals such as pollinating insects?

ADG: An artwork won’t save pollinators. I’m experimenting instead with how art can be used to give people agency to do something amidst the ecological crisis we have created, not just feel a sense of panic and loss. The dedication needed to care for a garden allows us to connect more deeply with plants and their pollinators. Making an artwork for the more-than-human invites us to see the world from their perspective. Art doesn’t need to be useful, but it can be transformative. I was really motivated by Eden’s mission to inspire not only a sense of jeopardy about nature, but also connection, hope and agency in its visitors.



A: Could you tell us about the role that technology plays in this work? Are there ethical questions to answer about how we interact with artificial life as well as animal life?

ADG: Using an algorithm to make garden designs meant we could do some fiendish computation as well as reduce some human aesthetic biases. Of course, no algorithm is neutral, since every decision made in building it requires a human decision and the data it draws on is also assembled by humans. We can't escape our own touch.

I have made other works that use machine learning (*Machine Auguries*, 2019) and explore AI (*The Substitute*, 2019), which both frame the paucity of artificial life compared to the intelligent life that already exists. That said, they also tease us with the thrilling possibilities of these new technologies and our fascination with lifelikeness that intrigues us, from the Golem to Frankenstein's monster. I've spent a lot of time exploring "lively" technologies: I've worked with synthetic biologists since 2008-2009, learning how engineers are manipulating life, transforming organisms into biological machines to make useful things for humans. The ethics of the desire to control life is a question I explore often in my work, such as in *Designing for the Sixth Extinction* (2013-2015).

I am particularly fascinated by the current preoccupation with creating new life forms, while neglecting existing ones. We absolutely must challenge the technologies that we make and ask who they serve, and who benefits from their existence.

Find out more [here](#).

Words: Greg Thomas

Image Credits:

1. Video still from *The Substitute*, 2019. Alexandra Daisy Ginsberg. Visualisation/animation by The Mill.
2. Alexandra Daisy Ginsberg, *The Wilding of Mars*, installation view at *Moving to Mars*, The Design Museum, London, 2019. Photo credit: Photo: © The Design Museum, Ed Reeves.
- 3,4,5. Simulation shots, *The Wilding of Mars*, 2019. Alexandra Daisy Ginsberg.
6. Alexandra Daisy Ginsberg, *The Wilding of Mars*, installation view at *Better Nature*, Vitra Design Museum Gallery, 2019. Photo: © Vitra Design Museum, Bettina Matthiesen.
7. Preparatory sketch by the artist, 2020. © Dr Alexandra Daisy Ginsberg.

Posted on 2 June 2021

CLOT
March 2021

ALEXANDRA DAISY GINSBERG, creatively asking how we can make the world “better”

Biomedica, Interviews, STATE Studio



With the many impending crises looming over humanity, it is difficult to imagine what the world of tomorrow may be like. Our reliance on technological innovations to envision a possible future where life will be better has become creative fuel for artist and designer Alexandra Daisy Ginsberg. In her practice, Ginsberg sets out to creatively critique and ask what different versions of better mean and who will benefit from these possible realities.

Coming from a background in architecture, Ginsberg has been inspired by futuristic thinking and topics emerging from synthetic biology, which caused her to shift her creative practice into areas related to speculative and critical design. As a graduate of the Design Interactions Masters programme at the Royal College of the Arts, Ginsberg has continued to pursue creative ventures and a transdisciplinary research practice. She has not only collaborated with scientists, artists, and institutions from all over the world but has had notable publications such as her edited book *Synthetic Aesthetics: Investigating Synthetic Biology's Designs on Nature*.

Her work *Designing for the Sixth Extinction* seeks to rearticulate the role design plays in the field of synthetic biology and opens a window into a possible world filled with biotechnologically aided surreal landscapes. The work was last featured in STATE Studio's exhibition *Hypertopia*, which sought to reflect on artistic proposals that confronted the major crises of our time. In STATE Studio's Digital Field Trip with Alexandra Daisy Ginsberg and Josef Settele, Ginsberg discusses the positioning for *Designing for the Sixth Extinction* as a confrontation to a type of solutionism emerging from society's desire to fix ecological problems with technological innovation. While solutionism holds design and technology as a saviour for impending global issues, Ginsberg critically reads into the oversimplification of the complexities involved in solving the problems of our planetary crises.

Upon reflecting on *Designing for the Sixth Extinction* in the age of the current and growing ecological crisis, Ginsberg's work continues to be highly relevant and critical of how we can make the world “better”. In her upcoming work with the Eden Project, Ginsberg is creating a new permanent outdoor installation with a garden specially designed to cater to the needs, wants, and desires of pollinators. The garden aims to act in opposition of the traditional notion of a garden, which sets out to meet the needs and desires of humans. The work will be accompanied by a website where people can use specially designed algorithms to create their own planting schemes using local flora and will debut in the Fall of 2021.

You are an artist whose works cross the boundaries between fiction and reality, the future and now, as well as art and science. For our readers who may not be familiar with your work though, can you tell us about yourself and your practice?

My work explores our fraught relationships with nature and technology. We might think of them as opposites, but they're not: they're both things that humans have made to make sense of the world. I use technology to understand how we look at nature as something *other* to us, and to think about why we create technology that further distances ourselves from the natural world that we are a part of. Infused through all of that is my ongoing interest in design. I describe myself as an artist now, but I have a very strong interest in design. We design to make things better for ourselves: to improve our circumstances, and I think, since the beginning of the Industrial Revolution, we have increasingly used that idea of design to solidify this barrier between us and our natural environment. We imagine that 'better' lies somehow within this artificial world. To explore these ideas, I create installations and quite complex projects that bring together large teams of experts and practitioners from many different disciplines, often pushing the boundaries of emerging technologies to ask questions of them.

What was the moment in your career that drove you towards working in this intersection between synthetic biology, technology, art, and design?

I did my first degree in architecture, and I lasted four months in an architecture practice afterwards. I realised that this profession was not for me. I am just not that into buildings! What I realized did fascinate me was this question of design, and the impact that design had on the way we lived—the way it shapes our lives. That led me on a winding path. I started working in urbanism at City Hall for the Mayor of London, where we were thinking about the future in fifty or hundred-year leaps, and that was my first introduction into thinking about how design – and designers – actually shapes the future and how it's political. I ended up going to the Royal College of Art in 2007 to study in a very new Masters programme called Design Interactions. The department was experimentally using design as a critical tool to explore the implications of emerging technologies. What it was offering was so far from anything that I even understood, I decided to leave architecture and leap into this new space.

It was there, under the supervision of Tony Dunne, Fiona Raby and the other tutors, that I started looking at biotechnology. Then, in January 2008, my friend and collaborator Sascha Pohflepp, who very sadly died last year, came back from Berlin. He'd been to a meeting at the Computer Chaos Club, where Drew Endy, a synthetic biologist from MIT, had been giving a talk about introducing this new field, which I had never heard of. Sascha said to me, "I think you'd find this amazing", so I started reading more about synthetic biology. I saw this new field where engineers, bioengineers, synthetic biologists were going to become designers because essentially, they were describing what they did as design: the design of living matter. I began to wonder if *they* are going to be the designers, why am I studying design? What will I be doing in the future? What will a good design be? Who will get to decide that? Those first questions really set me off on this path.

You have worked with many different scientists and institutions all over the world when creating your projects. What has been the most interesting or surprising thing that has emerged from these transdisciplinary collaborative relationships?

I think the creativity. I don't have science training. I did a mixture of arts and science subjects in school, but I am not a scientist. I think what really surprised me, and something that I learnt on the *Synthetic Aesthetics* project, was the way that science is projected to the world is very different from how scientists *do* science. In our *Synthetic Aesthetics* book, there's a lovely chapter by one of the pairs of residents who talked about this issue of "day science" and "night science". For the scientists involved, it was really surprising to spend time in a design company [IDEO] and see that when the designers were at the stage of the project when you don't know what's going to happen or when you're looking for creative ideas and everything is thrown on the table, that moment is celebrated as part of the process. However, in science, it's kind of kept under wraps. I also think that failure is hidden more in science, and that's also connected to how some really key words have different meanings which has ramifications for how we collaborate across disciplines. One is 'experiment': if I experiment as an artist or designer, it means I don't know what the answer is, and I don't know what I am looking for. It's a moment of playful freedom, whereas the 'experiment' in science is a very different thing. It's a way to close down options in a way, in the process of verifying a hypothesis. We use these words quite freely, but their meaning is greatly different between the two groups. Being able to understand that is key to making these kinds of collaborations work.

You have said about your upcoming work with the *Eden Project* that you want to make an artwork for pollinators. How do you approach these more-than-human interactions in your artistic practice to cross this species divide?

My forthcoming commission for the Eden Project is about pollinators. Instead of making something *about* pollinators, I suggested making it *for* pollinators. I was given this huge patch of earth to build something. I proposed to make a garden, but a garden that wasn't for human aesthetics or enjoyment, rather it's for pollinators. That brief presents a lot of really interesting questions. Can you design just for other species? Is there always a human impulse in design and is it ultimately always for human benefit? I think it's very difficult to design not for humans because we are part of the natural world.

For this project, I am really curious to explore this idea of 'more-than-human' design. We are designing an algorithm – I am working on this part with a wonderful string theory physicist called Przemek Witaszczyk. The algorithm is designed to optimize planting for pollinators, maximizing the periods with flowers in bloom, enabling a diversity of plants from a database that we have curated, and arranging those plants in ways that may be more attractive to pollinators. It's a really interesting problem: if you are not prioritizing human aesthetics, what will the garden look like? Where do we stop making choices? The garden will be planted at Eden in September, and we are going to put the algorithm online then too. The project is supported by the Garfield West Foundation, Google Arts and Culture, and the Gaia Art Foundation, and their support is enabling us to build a website where users will be able to play with this algorithmic tool and generate their own unique plantable pollinator artwork schemes. There's a more ambitious plan embedded within this, which is developing an approach to creative activism. Users can generate a scheme, plant it, and have their own edition of the artwork for pollinators growing in their garden.

You originally began working on *Designing for the Sixth Extinction* around 2013. Since that time, we have seen more and more species suffer at the hands of the growing ecological crisis. How do you feel now about people interacting with your work vs. when you first debuted the piece?

That work was a response to a conference that I went to about the future of nature, organized by conservationists. It was the first formal dialogue between synthetic biologists and conservationists, and I knew little about the ideas being surfaced there around protecting or preserving or rebuilding the natural world using synthetic biology. I think the *Sixth Extinction* project takes on a different position now in some ways. At the time, I used this as a vehicle to talk to synthetic biologists. I was reflecting on their discussions about synthetic biology as a form of solutionism to the ecological and biodiversity crisis, and it was a really useful vehicle to stimulate debate within the field. And now, I am curious how people are responding to it eight years down the line. Those ideas in synthetic biology have not gone away. At the time, I was accused of it being Utopian by people in the synthetic biology field, who suggested the public may be disappointed when the engineers failed to save nature in the way my hyperreal images alluded to. Today, there may be more of a shift towards the sense that there is nothing else that we can do and a grim acceptance of more technological solutions.

Your artworks and projects often focus on these notions of "better", whether this a 'better' design, 'better' organisms, or 'better' environments. What do you think about emerging visions of 'better' in our post-pandemic world and who do you think will be impacted by these possible versions of 'better'?

There is no one 'better'. Better for some will always be worse for others to paraphrase Margaret Atwood in *The Handmaid's Tale*. Better is subjective. There is a post-pandemic drive to 'build back better': even Joe Biden's presidential website is "buildbackbetter.com". Better for whom? Who decides? For these questions, there are no correct answers. I would argue that we need to create a world that's better not just for humans and not just for different groups of humans, but also better for the ecosystems that we rely on and are a part of. Better doesn't have a moral value to it. The idea of Progress was about uplifting all of humanity with knowledge. But better doesn't have such aspirations. It is simultaneously powerful and meaningless. It needs a definition, and each of my works are trying to present that problem or reveal it in some way.

What is your chief enemy of creativity?

Admin and my inbox. The time spent managing creativity instead of the time spent creating.

You couldn't live without...

The natural world.

FORBES
10th December 2020

Award-Winning Artwork Uses AI-Generated Bird Song To Recreate The Dawn Chorus



Eva Amsen Contributor 
Science
Writing about the overlap of science and art

Follow

Bird sounds at the crack of dawn are not part of everyone's morning. If you live in a city, there's a good chance that bird populations have migrated elsewhere, as they struggled to compete with urban lights and sounds. That inspired artist [Alexandra Daisy Ginsberg](#) to question what would happen if birds disappeared altogether. How would the dawn chorus change?



Alexandra Daisy Ginsberg's *Machine Auguries*, 2019. Installation shot from 24/7 exhibition at Somerset ... [+] LUKE ANDREW WALKER FOR A/D/O

Ginsberg's work "Machine Auguries", which uses artificial intelligence to mimic bird sounds, was commissioned by Somerset House in London. It's currently part of an exhibit at [FACT](#) in Liverpool, which recently reopened after England's latest lockdown. The work was also one of this year's ten [Science Breakthroughs of the Year](#) at the annual Falling Walls event in Berlin. Being entirely online this year, the event didn't fully do "Machine Auguries" justice. It's an immersive work, meant to be experienced by walking inside of it.

"When you go into the installation, you're in the silvery blue light of the pre-dawn," says Ginsberg. "The first bird sings, and it's a real bird. Then you hear another bird sing from somewhere else in the room — also a real bird. And then you hear the first machines bouncing back."

This call-and-response between artificial bird sounds and the recorded sound of real birds in mimics how birds communicate. But the way the generative adversarial network

([GAN](#)) learns how to make bird sounds also resembles how real birds learn to sing. One bird sings and another bird copies it in response.

To create this collection of artificial bird sounds, Ginsberg worked with physicist Przemek Witaszczyk, sound recordist Chris Watson, and several others. One of the challenges they encountered is that they would need a collection of bird sounds with very little variation in ambient sound, to prevent the AI from interpreting background noise as bird song. Through the British Library they found a collection of dawn chorus sounds recorded every day for a year in the same location. They also used the website [xeno-canto](#), where people share bird sounds from around the world, to get species-specific recordings, and with this and other collections they had a wide variety of training data for the GAN.

The work includes artificial bird sounds taken at different points in the AI training process. "We wanted to show this evolution," says Ginsberg. "The beginning of the piece has the first attempts, which are very clunky, noisy and weird. But over the next ten minutes, the machine ones become increasingly lifelike."

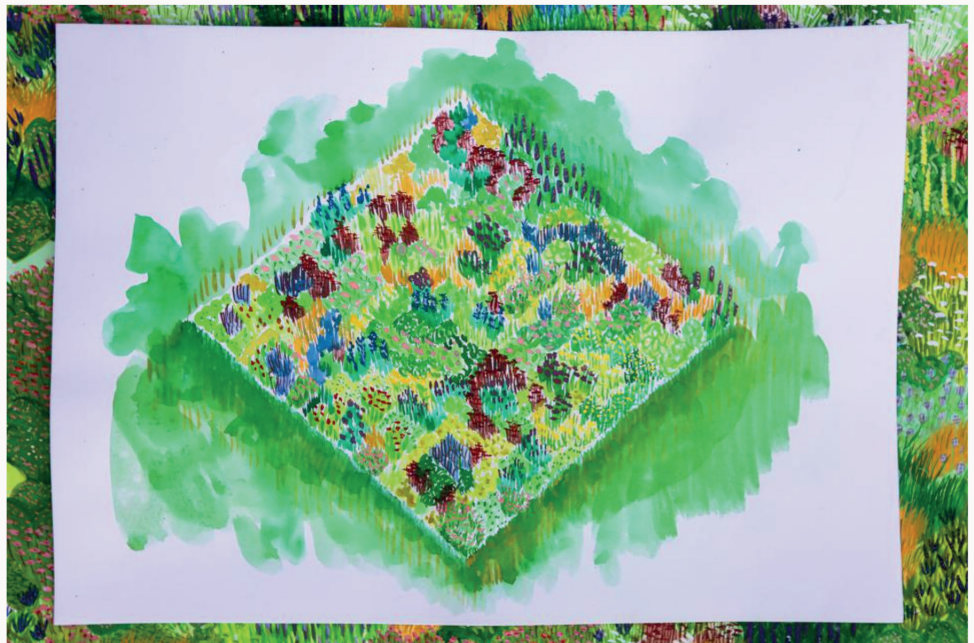
With "Machine Auguries", Ginsberg wants to encourage people to think about the birds around them and reflect. Do you normally hear a dawn chorus where you live? If not, why not? What's happening to the birds? And what would it be like if we lost this altogether?

Recently, Ginsberg moved from London to the countryside, and suddenly she hears birds — real birds — around her every day. She has also started to take up gardening, but that's part of the preparation for her next large exhibit: Ginsberg has recently been commissioned to create a new permanent installation for the [Eden Project](#).

The Eden Project consists of several biomes and a large garden in a disused clay quarry in Cornwall, England. With a mission to educate people about plants and the environment, the organisation regularly works with artists to start conversations around conservation, and the site includes several permanent and temporary artworks.

But Ginsberg didn't want to build yet another physical structure. "Instead, I said, why are we making an artwork for humans? Let's make one for pollinators!"

The proposed project is a garden on a 45- by 30-meter outdoor plot, designed using an algorithm that creates the perfect garden for different types of pollinators, including bees, moths and butterflies.



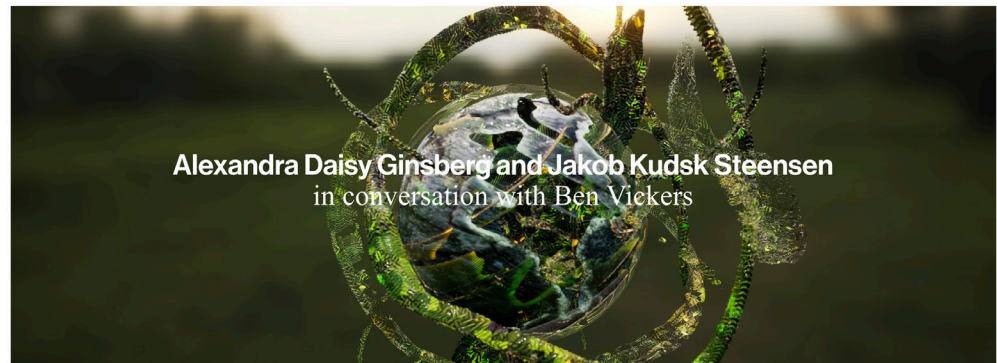
Preparatory sketch suggesting what the final pollinator garden at the Eden Project might look like. ALEXANDRA DAISY GINSBERG

But it's not all for the bees: There's an interactive element for humans as well. The algorithm used to design the garden will be made available online, so that people can create their own unique garden.

Ginsberg is looking forward to seeing the outcome of the interactive part of the project. "I hope that for people who aren't experienced gardeners, this might be a fun way to plant something that they might never have planted and be guided through it. And they can say, 'here's my artwork'."

Like *Machine Auguries*, Ginsberg's upcoming work for the Eden Project combines technology with ecology to encourage visitors to reflect on our interactions with the natural world — whether that's waking up to bird song or creating a garden for bees.

CURA
December 2020



Alexandra Daisy Ginsberg and Jakob Kudsk Steensen
in conversation with Ben Vickers

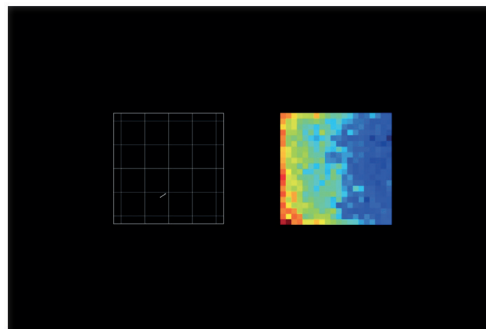
This conversation tackles themes such as extinction, technology, synthetic biology, and more generally the impact that new technologies are having on the arts today.

BEN VICKERS: I would like to start our conversation by talking about the work *Resurrecting the Sublime* by Daisy: it is a simulated environment, part of a broader exploration that you undertook with the biotech company Ginkgo Bioworks. Daisy, could you give us an overview of that process and how you arrived at producing this particular work?

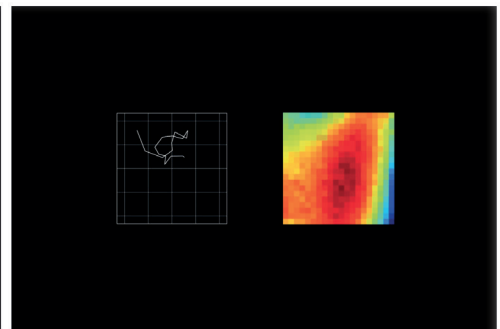
ALEXANDRA DAISY GINSBERG: The video is part of a larger work called *Resurrecting the Sublime*, which is a collaboration between myself, the smell researcher and artist Sissel Tolaas and Christina Agapakis, the creative director of Ginkgo Bioworks. The video is a reconstruction of Mount Haleakalā on the island of Maui in Hawaii around 1912, the year the tree that you saw in the video, the *Hibiscadelphus wilderianus*, was last seen. *Resurrecting the Sublime* is an investigation into the smell of extinct flowers. Ginkgo is a biotech company which at the moment is focused on COVID-19 diagnostics and therapeutics, but which normally, amongst other things, designs organisms to produce useful molecules. Ginkgo started the research project about four or five years ago: Christina Agapakis went to the Harvard Herbaria and started looking for extinct flowers. She found about 20 specimens and took samples of tissue, from which the scientists extracted the DNA despite the degraded tissue of the pressed flowers, eventually deciphering what smell molecules each plant may have produced. I say may have produced because it is impossible to really resurrect it in the way that we would imagine. The aim of the work at Ginkgo was to try to match the little fragments, like a jigsaw puzzle, against sequences that are already known that produce molecules that smell interesting to us. Once they had a series of predicted sequences, the next step was to synthesize or print the DNA, put it into yeast, grow the yeast and then work out if the yeast was actually producing the smell molecules. Eventually they ended up with a list of molecules from three different flowers, and sent them to Sissel Tolaas (who works with IFF, International Flavors & Fragrances), to explore their smell. She had to find comparative smell molecules, or find the exact same molecules if available, and rebuild the smell. I designed installations where the public could experience these smells once again. The most recent iteration of this project is at the National History Museum in Bern in Switzerland: it's a giant room filled with rocks and the smell of an extinct flower diffused around them. Then they leave the room through a hidden door at the front and can look back through the glass, watching other people coming in. The human becomes the subject of this extinction diorama. The three flowers are from Hawaii, Cape Town, South Africa, and Ohio. This project gives a glimpse of the past but it's not a true reconstruction. Accompanying the installation were the digital reconstructions and a soundscape that was recreated with Sam Conran for each of the different flowers.

BV: Both of you consider current climate crises in your work and how we can think about that in relation to technology and rapidly changing conditions. Jakob, could you tell us about the process of making Catharsis, which was originally commissioned by the PinchukArtCentre and we restaged and extended online at the Serpentine at the beginning of this year as part of the CONNECT project with K-pop band BTS. Could you tell us about this work?

JAKOB KUDSK STEENSEN: Catharsis is a virtual forest made in videogame software, simulated in real time, shown inside Serpentine Galleries, and streamed onto a website where people can experience the forest, live. The forest itself is based on different types of ecosystems and forests across north America, where I have gone and 3D-scanned various plants to get the textures from roots, trees and natural elements. I also recorded the sound with a collaborator of mine, Matt McCorkle. The forest seems like a virtual representation of something real, it's photorealistic, but it's an illusion, an imagined impossible ecosystem. The wind, the water and all the natural elements follow different time paths in the work. Through technology you can merge them together to something we humans can perceive. And the work also goes from a bacterial scale, onto water, flowers, then up into the trees and in the end you're seeing an entire landscape. So there's also this romantic scale, a holistic scale. A lot of the redwoods suffered from fires in California, this past summer, so this piece is an extension of a work I've been doing about extinction, natural history archives and digitizing different places in nature. I often collaborate with Natural History institutions and field biologists: we go for months into different landscapes, and I try to convert this body immersion in a landscape into a virtual space where I believe to make something really sensory in a digital space. I try increasingly to work between an inner, psychological landscape, and an exterior landscape, where things are vanishing because of extinction, and connect those two elements into immersive installations or live streaming.



Alexandra Daisy Ginsberg, Video still showing DeepMind experimental data, from The Substitute, 2019



Alexandra Daisy Ginsberg, Video still showing DeepMind experimental data, from The Substitute, 2019

BV: Your respective practices deal with issues of extinction. Could you speak about what you believe is at stake in the antagonism between the emerging fields of biotechnology and how they intersect with what the world is facing now through a moment of extreme encounter with other forms of biological life?...

ADG: I think the COVID-19 crisis is happening in days, in weeks, in months, and climate breakdown and biodiversity loss is not that far behind. We are getting to the point where it is also an imminent risk. Last year I produced a work called *The Substitute*, which was recently shown at the Royal Academy: it is a reconstruction of a northern white rhino. The last male of the subspecies died in 2018 and sperm and tissue samples were taken from him. The idea is to try to resurrect the subspecies either through some form of IVF or even to develop stem cell technologies that maybe would be able to bring it back. A nice example of some of the issues here is shown with the *Leucadendron grandiflorum*, which is one of the three flowers in the *Resurrecting the Sublime* project. Conservationists in Cape Town hope there may be seeds of this flower still buried in the soil of Wynberg Hill, a suburban area behind Table Mountain in Cape Town, which was the habitat of the lost flower. I have been working with these conservationists who have been planning to burn this hill to see if they could germinate any of the seeds (if they happen to still be buried in the soil) through a controlled burn. First that fire was postponed by climate change because there was a huge drought in Cape Town, then last year it rained the night before each time the fires were planned and finally this year it was all set up for March, when the pandemic hit. You have this imagined potential of a buried seed of a flower that was last seen 200 years ago in a collector's garden in London, not in Cape Town. Again this loss is a product of colonial extinction. But what is essential to that seed and the possible regeneration of the flower is the rehabilitation of the landscape around it. You need the habitat. It's the same with the rhino. Even if you could bring it back with technology, is it really a northern white rhino without its habitat or members of its species to be a rhino with? The solutions (if there are any) are complex social and ecological ones, not technological fixes.

JKS: My friend Britt Wray wrote a book about extinction where she interviews scientists all over the world working with a team. What she found out from discussing many different approaches was that none of them are truly recreating the species that were lost. Preservation is the most prevalent strategy, rather than trying to resurrect what is already lost.

ADG: I think we both have an obsession with natural history archives and collections... I completely agree that these rhino skin and tissue samples should be collected because otherwise there is nothing. And what is our responsibility to future generations? We are unable to look after what already exists, so looking to invest in what's new is a very interesting human trait and it may not be possible to resolve that but maybe it's a product of the modern human imagination.

JKS: Regardless if you are able to bring back specific animals, you are also engaging with the story of the animal, with its organic material. You are provoking some debates, some narratives, you are making people aware of it. Spreading ideas, emotions and information.

ADG: I think there is an interesting underpart of this whole conversation, which is about the sexiness of the technology that we work with being a way of getting interest and bringing people back into nature. I was watching the *Catharsis* video, while behind my screen I'm very lucky to be looking at a garden with trees and birds, and it's a very strange juxtaposition. At the same time, when I saw it at the *Serpentine* in the middle of the park there was this very artificial nature... I feel the same with my work, creating artificial nature as a way to make people look at nature.

BV: One of the things I particularly loved about having *Catharsis* in that context on the large screen in the park was how it drew your attention to the simulated nature of the park itself. How do you imagine your work going into the future? Because presently it is presented within the context of art exhibitions, but you are hitting on subjects and utilizing technologies that open up the possibility of working beyond the institutions. Do you envision a moment in the future where your work might not be seen within a gallery, but it may serve another cultural function?

ADG: Yes, with my next project....

JKS: Definitely.

ADG: That's a really important challenge that I face. I love working with museums and galleries, and part of the argument is that while these are privileged spaces, we are primed to be thinking differently in them. I think for me the next step is to actually engage with the outdoors, to bring some of these themes as a way to test moving into the next dimension. Not just inspiring people or connecting with them but actually finding ways to experiment with giving people agency.

JKS: I did another project a few years ago, also in Hawaii but about an extinct bird. We were working with an ornithologist who spent 40 years of his life studying this bird. It was a project based on his emotional connection to the loss of that species, of losing what he explored for 40 years. What I am thinking more and more about, especially with COVID, is this very human dimension among field biologists, whose approach is as experimental as a lot of contemporary artists. I see them as equal collaborators, similarly to when I work with a sound artist or something like that. Digital media can be highly collaborative and be shown across widely different fora, and they can be very engaging for diverse audiences. For my projects it doesn't matter to me if it's in a gallery, or if it's an app, or a festival, they are just different platforms and avenues. What matters to me, is the concept, the collaboration, and their connections to the audience...

BV: You both have extensive skillsets and domain specific knowledge coming from other fields. For Daisy it is the design world and synthetic biology, whilst for Jakob is your expertise in the world of video games. In order to produce this kind of work right now you really need to have this diverse set of perspectives and be sitting inside different communities. Why does it end up in an art context? What is there in art that allows you to produce in a different way?

ADG: That's a good question. Since 2008 I worked in the field of synthetic biology engaging very deeply with engineers and scientists, making projects and curating work within the field, which gave me lot of insights and left me with a lot of questions. I wanted to make larger projects and what I have learned from that is that you need a lot more people. My studio has been very affected by the pandemic, I had an amazing team, who I had to let go because all the work dropped off a cliff with all the exhibitions shut. But it was a team effort to make these projects. For a recent work called Machine Auguries, I rebuilt the dawn chorus using machine learning in collaboration with an incredible team of theorists, physicists, sound designers, naturalists, and curators. Now it is in an art gallery, but it could be in a cinema, it could be outdoors, it could be in a book, it could be in a podcast. At the moment the art gallery seems like a really good place, but it might be much more appropriate at a zoo or on Netflix. I don't think it should be restricted and I'm really interested in different media.

JKS: I completely agree. I think what you are mentioning Ben is the necessity of building partnerships. It also means that as an artist you need to engage in different conversations. You need to be open to an entity or a person that might have a different approach to a theme, fields and another agenda. I find this kind of interactions very fruitful, as they create something that goes beyond the idea of the individual artist making an art work that is then presented to someone. When I go to museums and talk about a project, the first point of conversation is the concept, or the idea of an experiment. I think that's a more dynamic process. When my first point of contact is in the tech world, they ask "Ok so, your project, how do we get it out to 10,000 people?" Then you construct the design around meeting that goal. When you go to institutions it's kind of the other way around, which I find more meaningful. You start with the idea, the concept, the meaning of a work and collaboration. Institutions have key roles to play in making space for new collaborations. Institutions can instigate and facilitate. They can allow individual artists to enter into forums, where they cannot otherwise go.

ADG: After I finished my Masters I turned up with my collaborator on a project at the International Genetically Engineered Machine Competition at MIT with 5000 engineering students who were designing organisms. For me that opened up a world which was a very different way of entering, as an artist and practitioner, into the field of technology.

BV: You both have a very sophisticated practice where you're able to communicate across different worlds, and interact with them in a research-oriented manner. One of the things that is interesting to consider in this moment is how can artists be a part of a larger process of transformation and what role could they play going into the future? We're in a moment of history that represents extreme flux, the rules and systems of art are being dismantled and now facing significant change and recalibration. How are your practices changing at this moment?

JKS: My attention is on virtual collaboration with people I work with. I'm missing being in the environment: I'm artist in residence at Luma Foundation in the south of France, and for the first three months of this year, I was working specifically on documenting organic soil transformations in the landscape. Now I can't go there anymore. I'm now working through this organic material virtually, and I think for me it is a way of connecting more directly to the landscapes. I collaborate with several people on the project through a virtual platform we have. Maybe in the future I will do more long-term projects in a specific landscape, with people in different locations.

ADG: What am I doing? Painting, writing. My studio in Somerset House is locked, I am at home and, as I mentioned, my studio is really affected by this situation. Many museums don't know when they are going to reopen, projects are cancelled or postponed. But also this situation is giving me a chance to think about what kind of collaborations I have been running for two years. How do you make deeper engagements and actually allow people time to really engage with the content, that's what I hope also changes with this...

BV: I pray every day that that is going to happen. I really believe that this is a moment in which to pause and reflect on what has gone before, to break away from the cycles of production that are now really out of sync with the present and future. I think it is going to be really critical to how art continues, that production slows down.

ADG: I've been reading *The Future We Choose: Surviving the Climate Crisis* by Christiana Figueres and Tom Rivett-Carnac. The question is how do we rebuild differently and as an artist, what can my voice do in helping tell stories to get people feeling empowered enough to demand change. So that's why I think that the Serpentine Campaign movement *Back to Earth* is really interesting: how do all these things sort of interlock with what we are doing. Now we need to act appropriately, encouraging optimism and action as a way forward.

EVENING STANDARD

16th October 2020

ALEXANDRA DAISY GINSBERG, 38, ARTIST

16 Oct 2020



What item was your companion during lockdown?

Nature! Getting out into the woods every day and painting the trees at

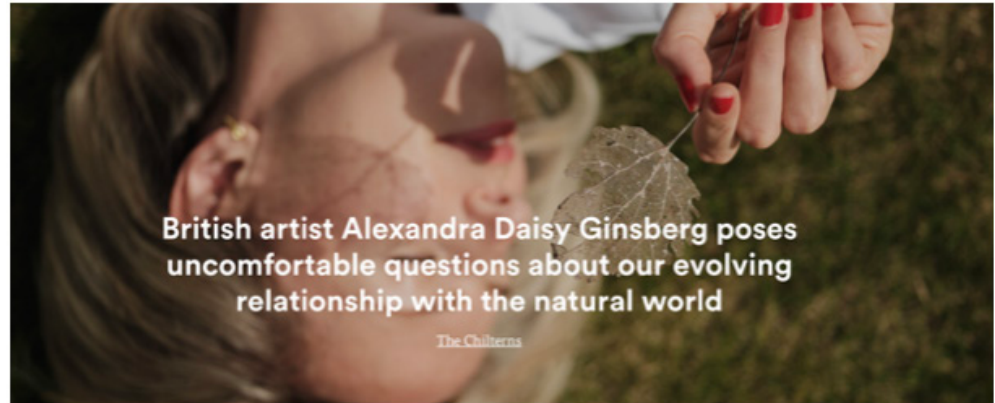
the end of the garden over and over kept me going. And since restrictions lifted, I've been volunteering at a charity-run garden.

What changes would you like to see in a post-Covid era?

It feels like we're being bombarded with multiple crises of health, of the economy, of social injustice and of biodiversity. But these are really all the same crisis: a crisis of modernity. 2020 revealed the structural failure of the world we have built over the past few hundred years. Change requires a radical rethink of how we create things, whether that means places, technologies, laws, goods, food or education. Will we change? We have to work at optimism.

FREUNDE VON FREUNDEN

29th September 2020



Investigating the human impulse to “better” the planet, Alexandra Daisy Ginsberg’s artwork combines speculative design with complex scientific processes to dream of alternative futures.

Imagine Mars populated by plants. Rather than speculatively placing humans on the red planet, the British artist takes a non-human perspective with her project *The Wilding of Mars*. By simulating the growth of a wild terrain seeded with plant forms from Earth that thrive over millennia, Ginsberg wants us to imagine a future where life is able to flourish without human intrusion. Imagine that. It’s a timely daydream when this summer sees not one but three missions to Mars from the United States, the UAE and China. While varied in their approach, all share a common goal: to further understand Mars’ potential as a habitat for life. By challenging the global assumption that humans must benefit from colonising places, including space, Ginsberg redresses our perspective. *The Wilding of Mars* includes multiple simulations with endless outcomes: “The aim is not to terraform Mars; here it is simply a repository for the mechanism of life,” she states of the 2019 project. Ginsberg closes the piece on an uncomfortable question for us to ponder: “Might leaving the planet to other life forms be the ultimate unnatural act for humans?”

“The question I’ve been asking for seven years is what is better? Who gets to decide? And who is it better for?”

In a parallel universe, Dr. Alexandra Daisy Ginsberg (who goes by Daisy) would be residing in Bloomsbury, London and working on her upcoming projects at her Somerset House studio. Instead, she’s currently located in her family home in the Chilterns where she retreated to at the onset of the global pandemic. The view from her window is a verdant garden surrounded by trees—a stark contrast to the goods yard vista of her studio in the English capital. In this rare moment of isolation, it has also become a time to pause and reflect, to assess how we want to live our lives and address how we can do better—something Ginsberg has long been questioning in her growing body of work.

“I wrote my PhD about this problem of “better”, she says of her 2017 thesis, which investigated how dreams of better futures shape the things that get designed. “There are a lot of calls at the moment for rebuilding a better world, that after all this we’re going to make better decisions, or that we’ve had this time to better ourselves. And the question I’ve been asking for seven years is: what is better? Who gets to decide? And who is it better for?” This desire to untangle the complex paradox of “better” permeates Ginsberg’s work. In a 2018 Conference talk titled *Designing Nature*, she elaborated further: “Better isn’t the same as good... better for some may be worse for others. Better is contingent on people and context.”

“Humans are driven to innovate and create new things. But shouldn’t we preserve the things that we have that are amazing as well?”

After reading architecture at the University of Cambridge, Ginsberg went on to complete her MA in Design Interactions from the Royal College of Art. It was here that she began investigating biotechnology before a friend recommended she look into the emerging field of synthetic biology. “I was just fascinated. These were engineers who were coming into biology saying they knew how to manipulate it better than biologists, and that because they have an engineer’s rational mind, they were somehow going to be more successful. And they were going to be designing biology,” she exclaims. Ginsberg spent the next year and a half focusing on the subject before gaining a fellowship between Stanford and Edinburgh universities to help run a project bringing together six other artists and designers and six synthetic biologists. Bringing these two disciplines together and asking philosophical questions such as ‘what does it mean to design life?’ culminated in the book *Synthetic Aesthetics: Investigating Synthetic Biology’s Design on Nature* (MIT Press, 2014) for which Ginsberg was the lead author. “It was just the most extraordinary experience and allowed us to ask so many interesting questions, like how can bringing these two different sets of approaches together actually help us have a greater diversity of opinion in the design of something as important as designing living matter? And should we even design living matter?”

Ginsberg has continued to approach her art through technology and synthetic biology to examine the broader issues of conservation, biodiversity, and our climate emergency, focusing on the anthropocene era. In Ginsberg's *The Substitute*, 2019, showcased at the Eco-Visionaries exhibition at The Royal Academy of Arts, we see a pixelated image slowly transform into a northern white rhino, stamping and snorting his way around the white room. Is he real? It's hard to tell. The life-sized screen projection depicts the now extinct animal in hyperreal CGI-rendered form paired with sound recordings of the last northern white rhino. Digitally brought back to life yet out of its natural context, the work raises the question of what is better – the digital substitute or the real thing? "Humans are driven to innovate and create new things. But shouldn't we preserve the things that we have that are amazing as well?" asks Ginsberg rhetorically, her belief in the duality of progress and preservation mirroring how organic cosmetics brand Dr. Hauschka strives to develop innovative skincare products while maintaining sustainable practices, conserving nature in the process. "What is it about being human that makes the new somehow seem better than the old?"

In *Resurrecting the Sublime*, an ongoing immersive smell installation produced in collaboration with olfactory artist Sissel Tolaas and Dr. Christina Agapakis and her team at Ginkgo Bioworks, Ginsberg again presents the question of extinction. This time, she invites us to smell three flowers decimated by the impact of colonising humans. Using DNA extracted from the specimens of each flower stored at the Harvard University Herbaria, Tolaas reconstructs the flowers' smells, fragments of which diffuse within the installation. "It's a three-dimensional experience," explains Ginsberg. "It's about stepping inside. It's about experiencing of objectivity becoming subjective. As you step inside the installation and smell the extinct flower you become the subject of the natural history display."

With each project Ginsberg pushes the viewer to question their own impact, to look more closely at what we have lost—and are losing—but not to abandon all hope. Presenting us with the past and reminding us of what once was or is rapidly diminishing puts a mirror up to our own fraught relationship with nature. "I started finding myself being asked what's the role of the artist in the ecological crisis? My answer is that I try to tell stories and through those stories to ask questions about our values and our relationships towards the natural world, and to think about western society's and my own hypocrisy. We say we care for one thing and yet we do the absolute opposite," she explains.

Ginsberg's narrative artworks have been criticised in the press for not offering more solutions to the issues she discusses, but is this really the role of the artist? "Why would we as artists and designers have a solution to really complex social problems when they should be addressed by citizens, governments, companies and communities; we can perhaps do most in our role as citizens," she argues, raising a point made in a talk she gave against solutionism.

“Why would we as artists and designers have a solution to really complex social problems when those are problems that we should be addressing as citizens, as governments, as companies, and as communities?”

And yet, while there are no models for the golden ideal of a better future, Ginsberg’s work is no less impactful for it. Whether shining a light on the now extinct northern white rhino, a destroyed plant indigenous to ancient Hawaiian lava fields, or the diminishing soft dawn chorus of birds in springtime, each of Ginsberg’s beguiling and immersive work demands our attention, willing us to emotionally engage and react, even if momentarily. “I’m very interested in activating emotional responses,” says Ginsberg. “I feel both tenderness towards nature and despair at its loss, but also excitement and interest in technology. Maybe the direction the work’s taking isn’t right to inspire change, but at least it reveals a whole set of other possibilities.”

While technology has propelled Ginsberg’s works, it is the physical presence of an engaged audience that gives the experiential projects life. With over twenty exhibitions or projects currently on hold or canceled due to the global pandemic, it begs the question, where does Ginsberg go from here? “We’re in a really strange zone,” she says. “What does it mean if you can only have a local audience for an exhibition where only a limited number of people can see it puts into question what exhibition making is, and what the museum is if not a meeting place.” For Ginsberg, resorting to a virtual exhibition isn’t the answer, and she questions, “is an artwork just a picture that you can experience on a screen, or is the experience of coming face to face or sitting inside something really important? And I think it is.”

Dr. Alexandra Daisy Ginsberg is an artist examining our fraught relationships with nature and technology. Through artworks, writing, and curatorial projects, her work explores subjects including artificial intelligence, exobiology, synthetic biology, conservation, biodiversity, and evolution, as she investigates the human impulse to “better” the world. Looking forward, she will be working with [The Eden Project](#) in Cornwall, U.K. on a new commission for 2021. To find out more about Ginsberg’s work and stay updated about her upcoming project, head over to her [website](#) or follow her on [Instagram](#).

This interview is part of [Let Nature In](#), a content series produced in collaboration with organic skincare brand [Dr. Hauschka](#). Showcasing inspiring female creatives for whom the concept of the beauty of nature is intrinsic to their practice, the series also features portraits on Barcelona-based artist [Tana Latorre](#) and Berlin-based Michelin starred chef Dalad Kambhu.

Text: [Andie Cusick](#)

Photography: [Liz Seabrook](#)

CREATIVE REVIEW

12th August 2020

CAN SOUND MAKE US CARE MORE ABOUT NATURE?

Artist Alexandra Daisy Ginsberg talks to us about her machine learning installation inspired by birdsong, and why sound is a powerful tool in engaging people on the topic of the environment

By Megan Williams 12/08/2020



For years, much of the discourse surrounding climate change, biodiversity and the environment has been illustrated by harrowing images: bulldozed forests, barren landscapes, displaced populations, destroyed habitats. It seems the prevailing tactic has been to shock us into action, yet as climate change statistics and natural disasters continue to intensify, it seems this hasn't been enough to make the Western world change its behaviours.

Whether due to being deemed fearmongering, guilt-tripping, or simply ineffective, such images have gradually been replaced by new forms of communicating the gravity of society's impact on the environment. Organisations like [Extinction Rebellion](#) have placed graphic design at the heart of their campaigning, while a growing number of visual artists are choosing to portray the immense beauty of the natural world in a bid to underline what we're at risk of losing.

One such artist is Dr Alexandra Daisy Ginsberg, whose practice revolves around exploring our relationship with technology and nature, and how the two domains are intricately interwoven. In recent years, she has co-edited MIT's [Journal of Science and Design](#), worked on programmes and commissions for the V&A and Design Museum, and held a residency at Somerset House. Last year saw her join up with the latter once again for its provocative exhibition [24/7](#), which investigated the emergence and implications of modern society's non-stop lifestyle.

Ginsberg's contribution to the exhibition was [Machine Auguries](#), an audiovisual installation commissioned by Somerset House and A/D/O that seeks to demonstrate how human actions impact bird populations, which have been in decline over the last few decades.

Originally designed for Somerset House's Chapel, the piece invites visitors to sit and experience the sound of early morning birdsong – known as the dawn chorus – surrounded by diffused colours evoking the soft morning light. The work is now on display at [Fact in Liverpool](#) as part of a new group exhibition called [And Say The Animal Responded?](#), which features other audio installations including a “choir of whales and dolphins” and “a live colony of leafcutter ants turned scratch DJs”.

STUDIO INTERNATIONAL

14th May 2020

Alexandra Daisy Ginsberg – interview: ‘We need to radically rethink our behaviours, globally’

The coronavirus pandemic is a chance for people to ask how they can do better by nature, says Ginsberg, who talks about her work using artificial intelligence and technology



Alexandra Daisy Ginsberg (b1982, London) is very much an artist for the Anthropocene age. Her multifaceted investigative installations incorporate CGI, sound and game design, sculpture, architecture and a multitude of sciences to examine where our faith in man- and machine-made solutions has brought us, and where it could take us as a species.

Her subject matter ranges from planets – she proposed the wilding of Mars, very much without the toxic impacts of human colonisation, for London’s Design Museum’s *Moving to Mars*, earlier this year – to the technological reincarnation of extinct animals (*The Substitute*, for the Royal Academy’s *Eco Visionaries* exhibition, which ended in February) and the revival of plant species via synthetic biology (*Resurrecting the Sublime*, various exhibitions).

Machine Auguries, her installation evoking the decimating impact of urban noise on bird populations, commissioned by Somerset House, London, for its recent *24/7* exhibition, was exhilarating and deeply discomfiting, as the sound of a real dawn chorus emerged from speakers placed high in the room, to be interwoven with a robotically replicated version created via an advanced artificial intelligence programme.

An alumnus of the Royal College of Art’s legendary design interactions master’s (launched in 2005, it closed in 2015 after its founders, Anthony Dunne and Fiona Raby left the programme), her work has evolved significantly since she completed a PhD, also at the RCA, in 2017. From the speculative provocations around synthetic biology of 2009 to 2015 to the more recent multisensory and multidisciplinary installations, her practice has moved firmly into the art arena, helping to expand the debate around our prevailing Anthropocene fixations. It has done so thanks to the profound impact the works have, visually, intellectually and emotionally. Her work, she tells us, seeks to evoke a “sense of anxiety and loss and beauty ... mixed together to create a certain reaction”.

The last two years have been extremely productive, with her installations appearing in 2019 at a multitude of exhibitions in leading international museums and galleries, as well as cultural festivals (including Broken Nature, at the Milan Triennale and the Saint-Étienne Design Biennale), and culminating in her solo exhibition Better Nature, at Vitra Design Museum. Her 2020 calendar had looked set to continue that trajectory, with 10 museum or gallery shows scheduled, some of which had already opened - such as Survival of the Fittest at the Kunstpalais in Erlangen, Germany, Apocalypse – End Without End at the Natural History Museum in Bern, Switzerland, and the Eden Project's Radical Botany, in Cornwall. But as the museum and gallery worlds shut down in March 2020, her schedule collapsed. As we spoke, she was contemplating the prospect that her invitation to show at the Venice Architecture Biennale, in its postponed August slot, could be the main event in her 2020 calendar.

Veronica Simpson: These are very troubled and worrying times for everyone, but the culture sector is going to find it particularly hard to recover.

Alexandra Daisy Ginsberg: With ticket sales down, the whole industry will be hit. I don't see how many practices will survive, and if there are no commissioning budgets for next year, ramifications will continue. I don't know how our sector deals with this. I have a studio of five and it's not going to look the same very soon.

More important than this, however, is what world will be rebuilt? That's how I would like to start this interview. That's the optimistic angle on all of this. We've had to radically change our lifestyles in a matter of weeks and there is an opportunity to say how do we radically continue to change our lifestyles ... How do we make sure we don't rebuild the same world?

The theme of the Venice Biennale – How will we live together? – took on a new meaning with all of this. Now, it is about how will we live together, apart? That question is so important. Many of the ways we live together don't function. And when we live together with other species, we definitely don't function. We need to radically rethink our behaviours, globally. This coronavirus is horrific in terms of the devastation it's going to wreak on people's lives. The question is: what happens next? It's a one-year state that we'll be stuck in. What can we do now, while we are all in this together, to plan differently, while we are forced to. And how do we look after each other because the structures we expected to be in place might not survive.

VS: Let us hope that this gives us a chance to reshape our future into something better. Speaking of which, you have had an extraordinary few years since finishing your PhD, also titled "Better". Looking at the number of exhibitions you have been in over the last 18 months, and the shift in the quality and kind of work you have produced, where did that drive and momentum come from?

ADG: In 2017, I felt no excitement about my work. The PhD was so hard. And the RCA was going through a very difficult time. The design interactions course closed while I was doing my PhD, which made it much harder to be able to practice work I wanted to do ... I have been involved in synbio (synthetic biology) since 2008. It was initially a critical space for artists and designers to work within, but as the field solidified and industrialised it became much more instrumentalised, and the kind of thing we saw emerge was the [education programme and competition] [Biodesign Challenge](#).

What I looked at in my PhD research was how people in synbio were constructing different visions of better around their own belief systems and how what they proposed reflected their own values. I finished by making a heavy analysis of biodesign and looking at how artists and designers were colonising the synthetic design space. I wanted to position myself quite differently from that.

VS: Do you think that moving more firmly into the art space and calling yourself an artist has given you more freedom?

ADG: I feel like I'm an artist, although I really enjoy operating within the design world. It is a shame there is such a boundary between art and design. Occasionally, you see crossovers, but there is very strong delineation. They are essentially two different universes. It is very hard to cross that boundary in terms of all sorts of different economies. But it feels quite freeing to not have to defend a position of being a designer who doesn't solve anything. I think design is an optimistic activity, but art doesn't have to offer solutions.

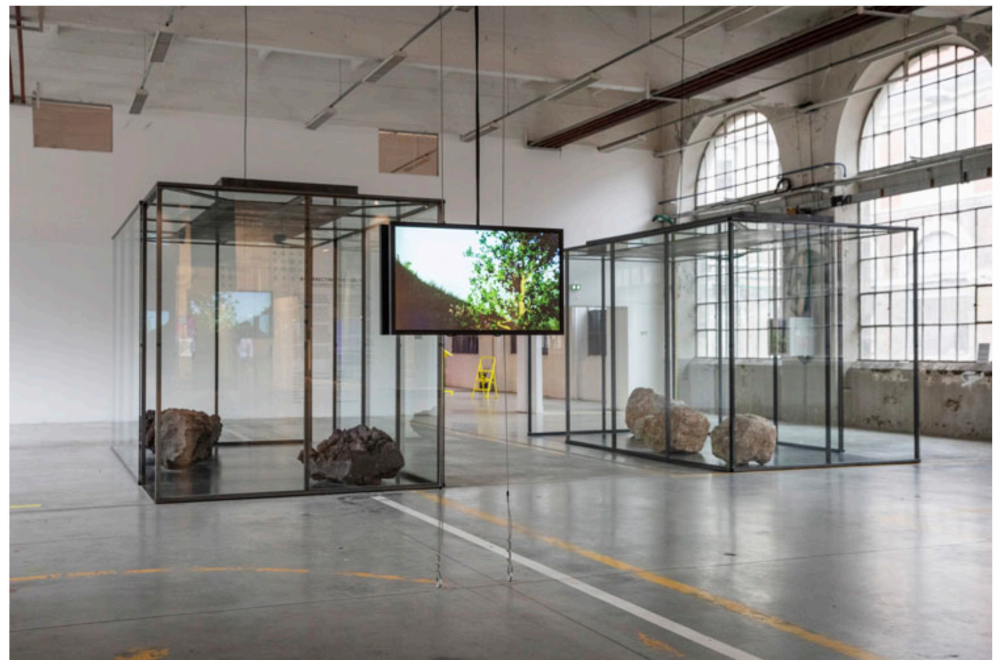
The way the design world operates is about products. I'm not doing design thinking or service design. It feels easier to explain my situation as an artist who is interested in design - although it has shifted, with my environmental concerns, to being an artist interested in nature.

I am not seen as a typical artist because my studio is more like a typical design practice. I like working with teams; my projects are very collaborative.

VS: Do you think that collaborative approach – and your scientific rigour – comes from your training as an architect? After all, you studied architecture at Cambridge to BA level. And yet you abandoned architecture after four months in practice. What was it that didn't agree with you, or that you didn't agree with?

ADG: I saw an incredibly troubled discipline and decided that what I was interested in was design - not how you design a building, but the ethics of design practice. That remains. I want to understand questions like: how did we get ourselves in this pickle? How do we get ourselves out? And thinking about our relationships with the natural world, our relationships with technology as part of the problem.

However, I think it's such a fantastic degree and I don't regret doing it. It gave me a rigour and a way of thinking at different scales. In Cambridge, in particular, you get this incredible history and theory bombardment. I am so fortunate to have done that. Actually, the whole team in the studio has studied architecture to master's level. I picked them because I knew we were building installations and they would have the skills to be versatile. It is funny that when I go to (synbio and biodesign) events, I realise how many people there studied architecture and are not architects. There are lots of escaped architects out there.



Alexandra Daisy Ginsberg. *Resurrecting the Sublime*, Saint-Étienne Design Biennale, 2019. A collaboration with Christina Agapakis of Ginkgo Bioworks and Sissel Tolaas. Photo: © Pierre Grasset.

VS: When I first met you, in 2014, you had just embarked on your PhD, but already you were worried about the influence that scientific funding was having within synbio - that the scientific community's sudden enthusiasm for design collaboration would mean your mission would be co-opted by the strings that invariably come with scientific research grants.

ADG: There were problems I was encountering around public engagement, and that the end goal with science and synbio was more towards public acceptance than engagement. A lot of what I had characterised to scientists and myself as scientific engagement was around bringing society into science. So, for me, one of the vows I made after my PhD was setting myself up in a cultural institution to see if that made it easier. I have worked with scientists over the last few years, but the relationship has been different. Working with Ginkgo Bioworks on *Resurrecting the Sublime* was brilliant; I was able to work towards a narrative that I was really pleased with – it wasn't about synbio, it was about flowers, about extinction and biodiversity loss. (*Resurrecting the Sublime* was a collaboration with Christina Agapakis, the creative director of the biotechnology company Ginkgo Bioworks, and the smell researcher and artist Sissel Tolaas, the idea being to resurrect the scent and stories of flowers driven to extinction by human endeavour. Agapakis used synthetic biology to extract tiny amounts of DNA from specimens of three particular extinct flowers stored at Harvard University's herbaria, and Tolaas recreated the likely scent, based on the same or similar molecules identified from the DNA).

VS: You seem to relish delving into new scientific and technical arenas with each project. Tell me how Machine Auguries evolved?

ADG: Somerset House wanted us to come up with something about the effects of non-stop life on our bodies and ourselves. I asked if we could think about other species. I had not realised how much birds are affected by humans. Noise and light pollution levels stop them from being able to communicate. Birds sing as a way to communicate with each other, find their mates and defend their territory. They are now singing louder, longer and at a higher pitch to combat noise pollution, and expending more energy to do so. This has impacts for bird populations and diversity. In the US, the bird population has declined by 30%. We decided to build a new dawn chorus and look at how birds learn from each other. We built thousands of artificial birds and put them into a dawn chorus. We start with a real redstart and the machine sings back. By the middle of the piece, machines have taken over, and, by the end, a few real birds start to come back but it's hard to tell which is which. You leave, I hope, feeling ambiguous. I want people to ask themselves: how do we do better by nature?

VS: What your work seems to do so well is mine that uncomfortable ethical terrain around what is real and what we can create artificially, through CGI or AI. Do you worry that the seductions of these beautifully realised fictions play too strongly to our almost childish belief that technology can solve all our problems – which you clearly don't believe?

ADG: I play with beauty. I'd like to think all my work is beautiful. I play with aesthetics, especially in the more recent works. There is a strong frame of reference to the history of art and landscape. I am playing with tropes we recognise and know and finding this uncomfortable line. There is this sense of anxiety and loss and beauty and things mixed together to create a certain reaction. Resurrecting the sublime is an intensely aesthetic experience. It's like a zen garden, just rocks and nothing else.

With The Substitute, that plays very much with hyperrealism and using the tools to give us a sense of intimacy and the different kind of experience you would have, for example, on a Hollywood blockbuster. I was working with animators who wanted to push it in all sorts of other directions, to make the landscape more realistic. I said: "No, we are putting it in a white box."

VS: I really enjoyed that work, though I was a little disappointed by [the Eco-Visionaries show](#), knowing that there are plenty of people working in the field of design and architecture who really are trying to address the ecological issues we face, and yet the exhibition was largely dystopian.

ADG: I was really surprised by some of the reviews. I was asked to talk about the role of the artist in the environmental crisis. What insights can we give? I said I don't have a clue. I don't have any solutions. Why are we expecting artists and designers to come up with solutions? There are solutions (we can find) as citizens, and solutions that we demand for dramatic change. The Times reviewer wrote about my work, saying: "Ginsberg has no answers." And that's my mantra now. I can contribute as an individual, and as a citizen, we can all contribute.

VS: We were both at 2018's Beirut Design Week seminar, and there you mentioned the Futurama exhibition that Norman Bel Geddes organised (for General Motors, as part of the World's Fair in New York in 1939-40), showcasing all the ways in which technology would make our lives better. You suggested that we need a new Futurama exhibition. Do you still think that?

ADG: I don't know. What I really struggle with is that some of the technology I have worked with in the last year, such as the AI tools, are eminently seductive. You play with these tools and it is incredible what you can do. To watch a system learn and grow is amazing. Then you think how much money it would take to save a species and you have to ask yourself - what are we doing? AI can be used for good. And it can help us run our lives more smoothly. But, for me, the reckoning is social and ecological. I went to the [UN Climate Change Conference] COP25 in December 2019. I seriously hope the IUCN (International Union for Conservation of Nature) World Conservation Congress happens in June. [Since this interview took place, the congress has been postponed until January 2021.] To see the mechanisms of global governance in action is terrifying because you realise how hard it is to get people on the same page. Our interests are different... that's where some of the actions around Extinction Rebellion are really interesting. There is a lot of critique around them, but what has been incredible is watching people I wouldn't have expected to be interested in environmental issues emerge who are cognisant and wanting to do their part. A Futurama, if it were to happen, would not be around technological innovation.

I think we need to be more aware than ever now that art and the cultural sector is essential to civilisation and keeping that going is vital. It is non-expendable. We are going to have to really pull together as an industry, if we can call ourselves that, to find ways round the impacts of the current global lockdowns.

THE GUARDIAN
2019

Artist creates deepfake birdsong to highlight threat to dawn chorus

Somerset House exhibit will feature natural birdsong being taken over by artificial sound



▲ The dawn chorus, reimaged by Alexandra Daisy Ginsberg - audio

The dawn chorus is one of the wonders of the natural world, but a discordant note will be struck when a soundtrack of hundreds of birds is heard in [London](#) this month. The chiffchaffs, great tits, redstarts, robins and thrushes almost sound like the real thing, but they have been created by a machine as part of a major art installation warning of an apocalyptic world where Britain's bird population has been allowed to diminish.

The synthetic bird sounds are the creation of the artist Alexandra Daisy Ginsberg, who has worked with scientists at an AI company more used to researching Donald Trump [deepfake videos](#) to create the work.

Through the installation, opening on 31 October within the vaulted chapel of Somerset House's Embankment Galleries, Ginsberg says birdlife is under threat from modern urban lifestyles, with the cacophony of city life taking its toll.

Birds sing to warn of danger, woo mates and establish territory. Against light and noise pollution, they struggle to be heard, risking vocal injury, while mating patterns are also disrupted, leading to falling populations.

In the installation, a natural dawn chorus is taken over by the sound of artificial birds. With the sound designer Chris Timpson of Aurelia Soundworks, the artist has combined recordings of real birds with machine-generated responses, which are distinguishable by the machine-like distortion.



▲ Alexandra Daisy Ginsberg: 'Even building shapes affect how birds sing.' Photograph: Nathalie Théry

Ginsberg said: “We chose species that would be found in an urban area ... All are affected by the encroachment of sound and light pollution. Even building shapes affect how birds sing.

“My work has been about our relationship with nature ... I want the piece to ask difficult questions. What would we replace [birds] with and what do we lose? It will make us feel uncomfortable ... but the piece will be enjoyable to listen to.”

She added: “Urban birds such as sparrows, blackbirds and great tits have been found to sing higher, louder, and earlier, putting them at risk of predators. Near airports, blackbirds sing for longer and modify their song. Research has shown the chorus starting 23.8 minutes earlier in those environments.”

This year, the Royal Society for the Protection of Birds (RSPB) [released a track](#) of pure birdsong to raise awareness of the loss of over 40 million birds from the UK in just 50 years. It warned that the sound could be lost for ever as 56% of species in the UK were in decline.

Ginsberg, who studied at Cambridge University and the Royal College of Art, has exhibited worldwide, including at the MoMA in New York and the Centre Pompidou in Paris. She creates artworks, writings and curatorial projects that focus on ecology and technology. An [earlier collaborative](#) project resurrected the smell of extinct flowers, extracting DNA from a pressed hibiscus specimen.

She has collaborated with Faculty, a London-based AI company, one of the leading researchers into AI-generated deepfakes of humans and of ways to combat their misuse. They worked with an NGO called Alliance of Democracies, set up by the former Danish prime minister and Nato secretary general Anders Fogh Rasmussen, to highlight the threat to democratic elections posed by political misinformation in the form of AI-generated deepfakes of politicians making controversial or inflammatory statements. As part of that work, Faculty built an AI [deepfake Donald Trump](#) and also worked on a detector to help people identify when a piece of audio or video is fake.

The company also runs a fellowship programme for science PhDs, during which they can work on an AI project for a company, charity or, as in this case, an artist.

By adapting a technique known as the generative adversarial network (GAN), which has been used to generate lifelike fake images of human beings, they have been able “to learn and generate” the songs of different bird species.

Ginsberg said: “Not much work has been done with sound so far. We’re feeding thousands of individual recorded bird solos into the system to generate increasingly realistic clips of birdsong.”

Synthetic sounds will be mixed with real sounds of species such as blackbirds, goldfinches, flycatchers and wood pigeons to create a 10-minute version of a dawn chorus.

She said: “It will start with one bird singing, a natural bird - we’re choosing a [redstart](#), which is normally one of the first birds to sing. That bird will sing his song solo. Normally the redstart would sing and he’d be saying, ‘I’m in this tree, I’m here,’ and another redstart would sing back. Instead, we have a machine singing back to him.”

The work, titled Machine Auguries, will be accompanied by a light installation that mimics the rising dawn, beginning with “a blue-grey, silverly predawn light”, according to Ginsberg.

SURFACE
12th December 2019

An Artist Whose Medium is Extinct Flower Aromas and Birdsong Choruses

Alexandra Daisy Ginsberg looks at our fraught relationship with nature through experiential artworks that explore our impulse to better the world.

BY RYAN WADDOUPS

December 12, 2019

At the landmark “[Nature–Cooper Hewitt Design Triennial](#),” on view in New York through January 20, 2020, one artwork sends viewers ricocheting between hope and despair. *The Substitute*, a video projection, depicts the virtual creation of a life-size male northern white rhino—the last of which died in early 2018. In actuality an artificial agent created through AI, the animal appears first as a blurry mass of gray pixels roaming around a virtual white cube, gradually evolving to become more lifelike and intelligent. By the film’s end, the rhino appears to be a living, breathing specimen, one whose virtual form could easily be mistaken for real-life footage. Is this resurrected creature, brought to life divorced from its natural context, a better substitute for the real?

It’s a question posed by [Alexandra Daisy Ginsberg](#), a London-based artist whose work explores humanity’s relationship with nature and technology, and our impulse to improve the world. Trained in architecture and interactive design, Ginsberg has been especially interested in the emerging field of synthetic biology—the design of living matter. She is also intrigued by designers’ desire to make things “better.” “What is better?” she asks. “Whose ‘better’ is being delivered, and who gets to decide?”



How Ginsberg distills hard science into a digestible artwork is one of the most remarkable aspects of her practice, which often involves head-spinning scientific processes. Another of her works included in the Cooper Hewitt Triennial is *Resurrecting the Sublime*, an installation that re-creates scents from extinct flowers lost as a result of 20th-century colonialism. The project arose from a long-term collaboration with Harvard University's herbarium, biotechnology company [Ginkgo Bioworks](#), and smell researcher Sissel Tolaas. Using tiny amounts of DNA extracted from specimens of three extinct flower species stored in Harvard's collection, Ginkgo Bioworks resynthesized gene sequences that might yield fragrance-producing enzymes. Tolaas reconstructed the flowers' aromas using identical or comparative smell molecules, which were then diffused in an immersive installation (imagine a giant fish tank where visitors can enter to sniff specimens) designed by Ginsberg.

"What does it mean to miss something that you didn't even know existed?" says Ginsberg. "You have a double whammy: It's gone, and it's impossible to bring back. You don't need to know much about the science in order to understand." As she points out, recreating the exact smell is impossible: the amounts of each scent are lost to history.

As a visiting student at Harvard, Daisy pivoted from design to the then-emerging field of synthetic biology, which involves redesigning organisms by engineering them to have new abilities. (One of her earliest projects, *E. Chromi*, created colorful stool sample simulations as a litmus test for rare illnesses.) In 2018, Ginsberg received a PhD in Design Interactions at the Royal College of Art.

She enjoys pitching tough questions—many of which lack immediate answers. "Better," she says, is a nuanced term with manifold interpretations; one person's better often comes at another's detriment. "Our entire growth economy is based on this idea of Gross Domestic Product (GDP) as a measure of better," she says, "but those who created GDP to measure the U.S. economy after the Great Depression admitted it doesn't gauge human well-being." She recalls a metaphor made by economic historian Dirk Philipsen, who described an American driver who mows down a pedestrian while texting behind the wheel of his SUV. "Everyone involved is harmed, but the situation is brilliant for GDP because of medical bills, legal bills, and gas," she says. "This system is so broken, and it doesn't take into account what's better for the environment. That affects us, and it's not better for us."

Ginsberg's latest projects toy with these modes of thinking. "If we view ourselves as separate from nature, which stems from Enlightenment thinking, one could selfishly say we need to protect nature because it's better for us." One way to convince weary viewers, she argues, is to trigger emotional responses rather than barrage them with facts and figures.

The scale and complexity of her projects has only increased in recent years. "Sometimes we don't communicate very well so I stop every now and then and ask: What are people getting from this?" The answer is an emotional experience, rooted in both loss and hope, that prods us to consider our impact and reflect on what we truly value. "Our increasingly urban lives afford modern-day conveniences like ordering takeout in plastic containers," she says. "Ask yourself: What have I excluded in that choice, and did I actually care about it?"

ALEXANDRA
DAISY
GINSBERG

Her newest project, *Machine Auguries*, commissioned by A/D/O by Mini, and Somerset House, where it is on view until February 23, illustrates this dynamic firsthand. The dawn chorus—the birds’ greeting of a new day—is one of the world’s natural wonders. Light and sound pollution means that birds must sing earlier, louder, for longer, or at a higher pitch to communicate effectively, and only those who adapt survive. Seeking to recreate a synthetic dawn chorus, Ginsberg fed thousands of birdsong snippets into an artificial intelligence network to create a chorus by deepfake species, which alternates with the natural edition over 10 minutes. The musical back-and-forth portends the insidious impact of our actions on birds: “We don’t consider how artificial sound and light diminishes their ability to communicate—they can’t find each other to mate because they can’t talk to each other,” she says.

Although her work ruminates on the destruction of natural resources, Ginsberg maintains a surprisingly sunny demeanor. “All my latest projects deal with loss, so people have been asking me if I’m depressed,” she says with a laugh, preferring to temper doom with hopefulness. She’s keenly aware of the effect of her inquiries on viewers. Creating provocative projects that ask hard questions can make a difference, she says. “It’s within our power to effect change.”