EcoLogicStudio

THE DARK SIDE OF GREEN CITIES

What if the boundary between humans and ecosystems didn't exist? What if we could transform our waste into nutrients for other organisms? And what if we didn't fight natural events like pandemics, but tried to work with them instead? These are some of the questions that inspire EcoLogicStudio.

Words Polina Bachlakova
Portrait Andrew Meredith

Founded by Claudia Pasquero and Marco Poletto, EcoLogicStudio is a London-based architecture and urban design practice specialized in environmental design, urban self-sufficiency and building integrated nature. For almost two decades, the team has created projects and prototypes that demonstrate the transformative potential of combining different types of intelligence – ecological, human, technological and more. According to Pasquero and Poletto, learning from nature's intricate systems isn't just about ensuring human survival on this planet in the face of climate change. More than that, it's key to ensuring a good life on this planet – one that benefits all living things.

The term 'biodigital design' comes up quite frequently around your work. What do you mean by this, and what can it teach us?
MARCO POLETTO: Traditionally, designers have taken inspiration from nature in many ways. The formal aspect has probably been the most common source – looking at nature and trying to copy its beauty, forms and colours. But I think that today, we have resources that allow us to go one step further – which means that we can begin to *really* look at the way nature operates. We call the way that biological systems have evolved by finding different ways of adapting, surviving and being efficient *intelligence*. With the biodigital paradigm, we use digital tools to try to find this unique connection between performance and beauty, and between biological and digital intelligence. That way, the artefacts that we make have an embedded ability to coexist with the living systems that surround them – or are actually made from or growing within them.

Conceptually, we could argue that it's an inevitable convergence. Today in the Anthropocene, biological systems are in one way or another technologically enhanced or mediated. Certainly, this is the case for humans, but most of the other systems we interact with have this kind of technological engagement, too. We're trying to design this unavoidable convergence so that it can effectively benefit both human and non-human systems.

Your projects are as diverse as they are experimental. Is there a red thread that unites your work?
CLAUDIA PASQUERO: I think that our work seems diverse because it's often seen through a typological point of view. In fact, our approach looks at artificial and natural systems working across scales and integrating. We see this relationship between multiple scales as a necessity for going beyond the categories of product, architectural or urban design. We need to connect these 'categories' in order to think of ecological systems that are more bottom-up and grow a different city.

MP: Hopefully, this will have a repercussion not only on the way we understand cities – but also on the way we understand nature and ourselves. We are so used to thinking about ourselves as our bodies: our limit is where our skin ends. But we know that our bodies and minds are, in fact, interconnected and depend on relationships that are external to us. Our brain is actually not really in our head: it is much more distributed. It's the same with plants. You know, we talk about the tree as an individual thing that you plant. But that's actually not the way things work. They communicate through their roots

and mycelium networks in forests. This is a way of looking at design and cities and a new way of looking at ourselves and nature.

In contrast to the structure you just unfolded, so many of our cities are built on the paradigms of modernism – which separates humans from our built environments and from nature. In an ideal world, would you erase that paradigm and rebuild from scratch – or is it possible to effectively transform the built environment that already exists?
CP: From an architectural and technological point of view, we think it's totally possible to integrate some systemic logic back into our current building structure. The main obstacle we perceive at the moment is more the way in which production is conceived. One of the hallmarks of modernism has also been to segregate production from our living quarters and put it away from our sight and interactions as urban dwellers. But there could be a million other paradigms that take into consideration fungi, the non-human and bacteria that are usually associated with dirt and unhealthy conditions. These things actually have incredible properties that allow us to re-metabolize some of the pollution that we produce.

MP: This points us to the idea of dark ecology.

**Can you explain what you mean by 'dark ecology'?**
MP: It's the idea that ecology is not just green. If we only look at the green side of ecology, we are trapped in an understanding that is sanitized of aspects that are essential to ecology's functioning. It's time that we start »
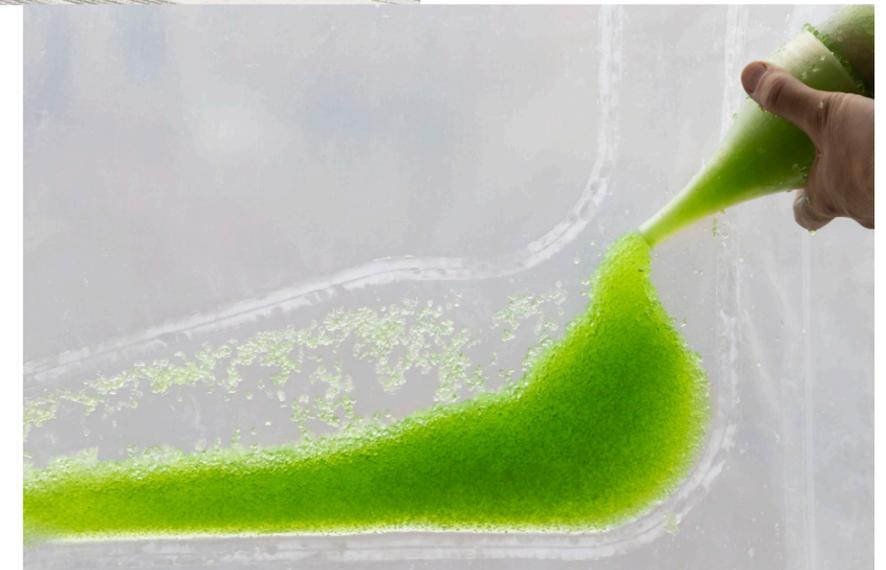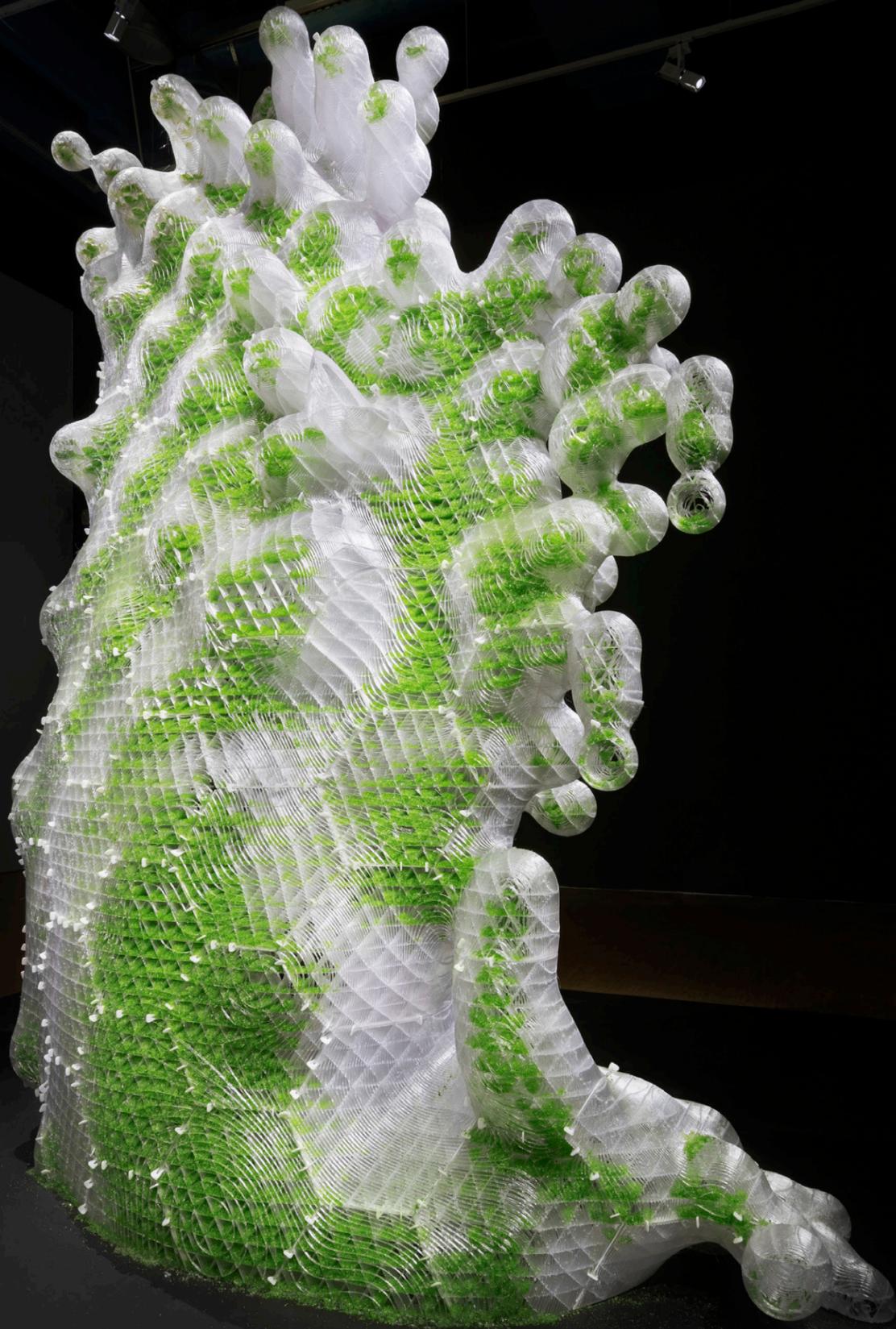
'It's time we start to understand "pollutants" as components of the ecosystems of our cities'

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to understand the particles that we meet, the so-called pollutants, as components of the ecosystems of our cities. We also need to understand that there are organisms that can feed on them and produce other substances that we could use as material or processes.

The idea of a circular city is very much possible, in our opinion. But we need to design for it. By eliminating conceptual, aesthetic and technological boundaries, we can find new solutions. For example, creating urban agriculture requires bringing together the productive and industrial layers with elements of leisure, gardening and day-to-day living. And I think from an architectural point of view, this means creating environments that are exciting because they're a mixture. These functions can come together in incredibly beautiful and fun ways.

What role does beauty play in dark ecology?
MP: When we talk about environmental or sustainable design, we often have this idea of performance versus aestheticism. There's this notion that if something is truly sustainable, it's not designed to be beautiful. But when you begin to look at the way nature performs, its aesthetic qualities are very much a manifestation of biological intelligence – performative elements, survival strategies and more – which leads to a very different kind of aesthetics. In some cases, these aesthetics are not green at all. When we look at the world of micro-organisms, we often find habitats that we intuitively feel disgusted by. That's because they tend to operate in the realm of decomposition. This is a fundamental side of nature – so it should be a fundamental side of our cultural understanding of nature. When it comes to design, I think we need to push this idea forward. There won't be true sustain-

ability until we go beyond the green paradigm and the sanitized version of nature.

That brings to mind algae, which you work with a lot in your practice. Why are algae crucial for the biocity of the future?
MP: At the material level, we can look at algae as biomass and organisms that are some of the oldest in the biosphere. They've evolved to have a sophisticated biological intelligence, which makes them capable of growing in pretty much any environment – even a contaminated one. For algae, contaminants are nutrients: algae can re-metabolize pretty much anything. As a consequence, the biomass that we extract from algae has properties that can be used in several industries. From a biological point of view, we think that algae are one of those organisms that presents a kind of unexplored layer of the biosphere. They're already inhabiting our cities and are just waiting to be incorporated.

On the conceptual, design level, algae are microscopic. That means that we can create artificial habitats for them to grow in pretty much any form or configuration that we like. And with algae, we don't have the limitations that we have with large trees or other complex organisms. Trees need a lot of space. They need to be close to each other, otherwise they perform very badly or struggle to survive. But with algae, we have a whole new degree of freedom in terms of efficiently bringing living organisms into our urban fabric and built environment. In that way, their cultivation can become part of our daily life.

Recently, you've been working with artificial intelligence as a means to develop a new green planning interface. What can artificial intelligence enable in this case

and beyond that human labour cannot?
MP: Cities have reached a complexity that exceeds everybody's understanding. The idea that a designer or a planner plays the role of coming up with brilliant solutions is no longer possible to imagine. It's obvious that no one has the perfect recipe for a city. So at this point, it becomes necessary to figure out what forms of intelligence may underpin the functioning of such a complex organism – and how we may approach its design in the future. That's where the paradigm of artificial intelligence (AI) becomes very, very interesting. It allows us to start visualizing, planning and designing a city from a non-Anthropocentric perspective. Rather than following the top-down, 'one man-one vision' way of doing things, AI enables us to look at biological models that help us find and distribute resources as well as dispose of waste efficiently. Systems have evolved over billions of years to do this. Now, we can train algorithms to learn the behaviour of these organisms – and then apply that to urban design, networks and infrastructure.

For example, we can train an algorithm to behave like a slime mould – one of the biological models we're looking at that's really incredible. It's a monocellular organism that creates networks to reach out to nutrients and distribute them. It's a fascinating creature; even scientists still don't understand exactly how it works. But with AI, we can train an algorithm to behave like that organism. And even if we don't understand it rationally, we can apply that logic to the design of cities – to make them behave similarly to that organism and reach out and distribute resources. AI can be an ally in helping us expand our understanding of intelligence and where we can find it. »

Marco Cappelletti
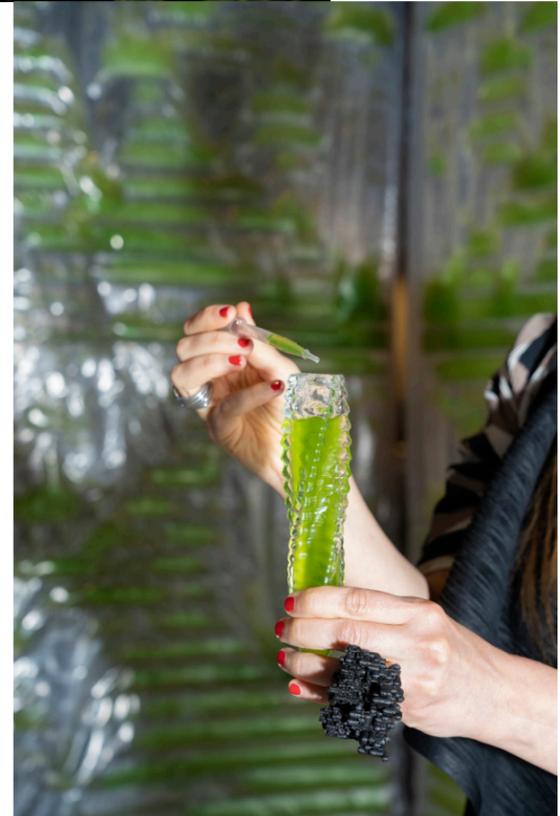
Presented at the 2021 International
Architecture Exhibition in Venice,
the installation BIT.BIO.BOT is an
immersive experiment in the domestic
cultivation of the urban microbiome.

What can Covid-19 teach us about how we should design urban habitats?

CP: It starts with looking for a different paradigm, in which design isn't seen as a means of protection from the external environment. Rather, design can become an interface that allows us to communicate with forms of intelligence. For example, when we work with microalgae, it's not about using them: rather, we create alliances where something that is considered negative for humans is a resource for them. They don't just clean the air: they nurture themselves with elements present in air or water. If we become more aware of these cycles and are able to read them in terms of food and energy production, then we know that the number of disrupted ecologies – such as the one that has generated the pandemic – will reduce.

MP: It still surprises me how little visual communication there is around the pandemic. If you think about it, we keep looking at numbers – the number of cases, or number of hospitalizations. It's as if that's all there is to know about the pandemic. But in reality, it would be very critical to explore much more complex and dynamic forms of representation that showcase the pandemic as an organism – one that moves across the urban sphere. In that sense, we would begin to discover that the pandemic is a beautiful type of dynamic system. We could learn how to manage and coexist with it more effectively. Right now, we don't have a visual understanding of the pandemic – but as humans, our best skill is to read patterns and make our decisions intuitively based on what we understand. This is where design could contribute.

What is your vision for the resilient city of the future?

CP: Trying to understand how production is integrated and establishing a different social practice. We need to develop prototypes that allow us to interact differently with the planet. The questions for me are: How can we undo some of the segregation brought upon by the first industrial revolution? How can we deepen our level of awareness of social and cultural ecologies so that cities will be more 'resilient'?

MP: If we look at cities from a non-Anthropocentric point of view, the question is not so much about whether cities will be able to survive. The question is whether we will be able to inhabit the urban sphere successfully to our own species' benefit. In that sense, I think that we need to reframe what we mean by resilient cities. That's why we talk about urban spheres as operators in a global infrastructure truly enmeshed with the biosphere – so you cannot distinguish one from the other anymore. If we understand that we are one of the many, many systems that compose this network, our vision for the future of cities will be very different. As the years go by, we'll be able to make more specific visualizations of this network and how it behaves. We'll be able to programme this network to recirculate material information and energy within itself successfully. This will enable us to create new supply chains that allow us to free ourselves from waste by recirculating material energy. And then, I think we will be able to get closer to what we want the future to look like.●

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Located within the public green space outside Warsaw's Copernicus Science Centre and designed for Otrivin Breathe Clean, AirBubble is 'the world's first biotechnological playground to integrate air-purifying micro-algae', creating a true bubble of clean air for children to play in.

In Practice