EVERYTHING IS EXPERIENCING

Interview with Jennifer Gabrys
by Arie Altena

Air quality testing sensor.

In her book *Program Earth* and through her research with the *Citizen Sense* project, Jennifer Gabrys examines how sensor technologies are programming our environments. Sensors are now ubiquitous and compile massive amounts of data, including information about air, water, and climate. Jennifer Gabrys argues that these sensors not only record information about an environment, they also generate new environments and environmental relations and are a voice to the entities they monitor: animals, plants, people, and inanimate objects. Sensors thus program environments, and program the sorts of citizens and collectives we might become. Her work connects to intriguing contemporary discussions about the relations between technology and politics, between human and nonhuman actors, the transformation of environments, agency, and ideas about citizenship and the future city. Arie Altena interviewed her after her presentation at the 2017 edition of the Sonic Acts Festival.

Arie Altena (AA) Who or what is a citizen? Does citizenship always imply that there is a form of agency involved, and is it necessarily connected to human agency?

Jennifer Gabrys (JG) Inevitably, one of the first questions I am asked when I give a presentation on the *Citizen Sense* project is: how am I conceptualising a citizen? I think the question of who or what is a citizen unfolds in different ways through different types of practices, technologies, and environments. I attempt to engage with this question through looking at sensing technologies. In my book, *Program Earth*, I look at how sensing technologies are changing environments as well as subjects of experience and what that means for how political engagement occurs. Whether that engagement is a form of agency is an open-ended question. Agency is just one way of parsing the effect

and relationality of political engagement. There might be other ways in which those effects and relationality could be resolved. Why is the usual way in which we understand the political effect that of agency – of something that a citizen does? Why do we see it as an effect that a subject, whether human or nonhuman or more, has on the world? Or as something that technologies are meant to enable? The other question behind this is: are sensor technologies meant to enable forms of political agency? Or do they reinforce particular ways of monitoring the world in order to produce descriptive observations that don't necessarily enable the change they promise?

As a term, subject, and set of practices, the 'citizen' is usually articulated in relation to the nation state and the rights and responsibilities of particular individuals as discrete political subjects. The 'citizen' as configured in relation to *Citizen Sense* is, on one level, about how sensing enables forms of environmental citizenship through collecting data and also having more transparent and efficient channels of communication to regulators and policy makers. That's the general rhetoric and the imaginary of citizen sensing technologies. It is also what the *Citizen Sense* project is interrogating through practice-based research. How do these technologies materialise particular environmental concerns, and what does this mean for (environmental) citizenship? How do those scripts potentially break down or open up? How are they rerouted or rearticulated through different kinds of engagements and demands? In *Program Earth*, I suggest that it is possible to look at the citizen as a relational entity. In that respect, the citizen need not be exclusively human. Citizenship can be articulated through distributed practices that can also extend to technological and nonhuman entities. Citizenship can be articulated ecologically – this is also where my reading of Alfred North Whitehead and Gilbert

Street view of Lewisham Air Quality Monitoring Station, part of the London Air Quality Network, which provides hourly indexes of air quality, including sulphur dioxide, particulate matter 10 and 2.5, nitrogen oxide, and nitrogen dioxide. The data indicate whether the UK is meeting EU air quality standards for short- and long-term pollutants.

Dustbox particulate matter ($PM_{2.5}$) air quality sensor. The interior electronics consist of an optical $PM_{2.5}$ sensor, Wi-Fi connectivity, micro-controller, and miniature fan for constant airflow.

Simondon comes in. Simondon doesn't accept the settlement of the human; he throws that category open. He tries to understand how, through various processes, both relationships and subjects settle into particular entities, environments, and relations. If you apply this thinking to the idea of the citizen, then you can understand that who or what is a 'citizen' is always an open question. The openness to the environment in the thinking of Whitehead and Simondon also means that a cognising subject is not the apex of sense-making activities. In fact, it's the opposite. In Whitehead's case, it's the environment arriving at subjective satisfaction, where subjects are expressions of environmental experience. That is the way he understands processes unfolding in the world. To say that cognising actors are not necessary for decoding sensing activities is a real opening into practice. Instead, environments include vast arrays of sensing subjects – human and nonhuman – working with and alongside modes of theory that we might articulate as we make sense of the world. Sense is then rather something that arrives through collective and environmental experiences.

AA Does one still need human agency to have a political effect in the world?

JG I guess that depends on how you understand human agency. I wouldn't say that human agency is required. It very much depends on the environments of sense in which responses are taking place. Take the moss cam for instance, which I write about in *Program Earth*. It is located at an ecological study site which has a vast array of different sensors including robot ducks, soil sensors, tree sap flow sensors, and webcams trained on different organisms: bluebirds, hummingbirds, and also moss on this boulder. Interestingly, the moss itself became a sensor for understanding climate change, shifts in the environment, and shifts in

seasonal timing. The moss itself was expressing these environmental shifts. On one level, it operated as a sensor through the sensor networks – so it was being understood as a sensing entity – but on another level, it was undertaking its own sensing operations in relation to climate change. It had relations to chipmunks and carbon dioxide and rainfall that did not require human agency to be part of the sense making. But through a sensor-based engagement with moss, it is also possible for humans to engage with the effects of climate change on other organisms and ecologies. So it really depends on at what point you want to insert the human in the sensory operations. There are numerous examples in which nonhumans have political effects in the world. The human is not the only entity through which political effects can unfold, but also the human is not settled as an entity – something that Simondon discusses at length – so 'human' political effects are also in the making. Humans might be entangled in those political unfoldings, but a key question is how and why the human always gets reinserted back into the centre of politics and the centre of action. Why should a human always be the decoding entity at the centre of how we understand environments and other entities? What would happen if we were to decentre the human and also not to take for granted that *we know* what the human is? How could the human become a site of re-articulation and experimentation, not just in the form of the human as a subject, but also in the relations that are necessary to sustain that particular kind of human? It is important not to assume or work again from the point of a cognising subject as a way of understanding how the world is experienced. Everything is experiencing, and if you take that experience seriously as a way to understand how environments are being parsed and expressed, then that opens up other ways of thinking about relations, of what subjects are, and what their possibilities are.

The Earth Resources Technology Satellite (ERTS) mock-up in a space chamber test at General Electric's Space Division. The ERTS programme represented a concentrated effort to monitor Earth's limited resources, to best conserve and utilise them in support of a burgeoning world population. The first ERTS was launched in 1972.

AA Is this how you conceptualise environmental citizenship?

JG In *Program Earth*, I try to sketch how to think in terms of environmental citizenship, but not as human subjects who are tasked with making the right decisions, nor as human subjects who are becoming more aware of their carbon footprints, the need to recycle, and so on. Instead, I show how environmental citizenship is distributed across entities and how the very possibility of expressing citizenship requires those relationships. The climate debate is very much about indicators such as two degrees Celsius, or 400 parts per million of carbon dioxide. Those are key indicators for scientific arguments, for ways of observing and monitoring what is going on in environments; they are not necessarily attached to particular ways of configuring what relations matter in environments. The science studies scholar and indigenous theorist Kim TallBear suggests that when attending to environmental change, it is also important to notice that entire ways of life are being put at stake, where worlds of relations with other entities are diminished or extinguished. This requires another way of understanding environmental relations. Environmental citizenship can then be about attending to these particular relations that are required in order for communities to be in the world. In chapter four of *Program Earth*, I attempt to understand how climate change is playing out in a whole array of relationships and how environmental citizenship exceeds a discrete individual subject exercising rights or taking on responsibilities.

AA How do you look at an issue such as granting rights to nature?

JG The granting of rights to nature is really a very interesting area. It opens up ways for understanding rights as distributed across multiple subjects that require each other for particular ways of life. It is not only or exclusively about an individual entity that exercises rights. If particular entities are put at risk in a forest, then some peoples' ways of life are also put at risk. They are subsequently not able to be in the world, the relationships that are vital to their survival become impossible without those other entities. It is about a co-constitutive way of understanding environments but also a co-constitutive way of understanding subjects. Subjects require other subjects. And those other subjects are inevitably going to be more-than-human subjects as well as human subjects.

AA You often use the word environment. In *The Ecological Thought*, Timothy Morton argues against this concept and prefers to think of entanglements, of a mesh of things. According to his thinking, things are not 'in' an environment.

JG Morton's work is informed by Heidegger who has a very particular conception of environment and worlds as being relatively fixed. For Heidegger, worlds and environments are existential backdrops. I work with Whitehead's very different understanding of environments as being in process along with the subjects that are also in process. Whitehead goes to great lengths to make the distinction that environments are not the ground against which figures are experiencing or engaged in processual activities. For Whitehead, environments continually exist in different formations. At the same time, he emphasises that an environment is not a kind of endless Bergsonian flow without moments of articulation or sedimentation. For Whitehead, environments are ways in which subjects extend beyond themselves. Subjects are not sites from which sense-

Tree sap flow sensor as part of the CENS testbed, the University of California James Reserve.

making activity unfold. Environments are the possibilities for subjects to make sense in the first place. This is why his term subject/superject is critical. Superject is a processual environmental way of understanding, a kind of extended *milieu* (to use Simendon's term) in which an array of entities and relations takes place, which I wouldn't describe as a mesh or a network. I find environment an interesting term because of its troubled and interesting history and because it points to concerns about environments. You could use the term *milieu* but, in a way, environment grapples with the worlds that we're bringing into being, the kind of processes that we're engaged in, and the ways in which we're becoming along with our environments. There is also a kind of material register to those processes that cannot be waved away with forms of abstraction in an attempt to theorise the 'soup' that we're stewing in.

AA Do you think that ideas such as nature having rights, plants that think, are also beginning to play a more important role in the popular imagination and in popular science? A book like Peter Wohlleben's *The Hidden Life of Trees*, for example, has found a large readership.

JG That's an interesting question in terms of what counts as popular science or the popular imagination and the work the term popular does in an age of populisms. The popular imagination gathers people together in collective modes of making sense. In *Brilliant Green* – another 'popular' book – Stefano Mancuso elaborates on how plants can be understood to be intelligent, and thus he reworks notions of what intelligence is or might be. He shows how we've developed a very human-centred way of deciding what intelligence is as a way to favour ourselves and to say that we, as humans, are the most intelligent. This is the same kind of argument Whitehead puts forward when he talks about how environments are expressed through entities. One also finds these kinds of understandings of intelligent ways of making sense of the world in both academic and popular science. Examples are the 'Wood Wide Web' discussion and the ways in which intelligence is conceived as being distributed through entire forests, requiring many entities to communicate and make sense of what is going on in a forest. Many of these descriptions and processes resonate with some of the philosophies that are current in academic and artistic circles. I find such alignments interesting. They are enabling each other. It is interesting to look where the conversations between worlds are taking place.

Monitoring station with Bird Box Cam as part of the CENS testbed, the University of California James Reserve.

AA Can you think of an example where such a conversation takes place?

JG Anna Tsing's book *The Mushroom at the End of the World* is a good example. She is an anthropologist who is in conversation with Donna Haraway and Isabelle Stengers. She's also doing collaborative fieldwork with matsutake mushroom pickers in different locations around the world. She's engaging with scientists and discussing the ways in which forests express intelligence, what that means for

Moss Cam with weather station at James Reserve. Image and Infrared data are compared to weather observation data to understand the moss lifecycle.

Moss Cam capturing images of a boulder with the moss *Tortula princeps* at James Reserve.

how we think of ourselves within those environments, and how we might rethink our own practices and modes of subjectivity. One of the things I find very interesting in her book is how she engages with discussions of disturbance ecologies and how we have long assumed that we should keep the human apart from ecological systems that should be conserved and preserved. In fact, there are certain disturbance ecologies with greater biodiversity due to human interventions. I think she offers quite a potent suggestion for ways in which we might see these entanglements. She opens up different ways of thinking about subjects and environments as opportunities for new kinds of practices. She proposes new disturbance practices that are aware of and working with and alongside other entities to craft and form ways of being in the world that extend hospitality. These ways of being in the world are enriching communities or creating possibilities for communities to go beyond the limited and reductive notion of what a human, subject, or environment is.

AA How about our sense of temporality? We are increasingly aware of temporalities that are extending way beyond the limits of human history. For example, we produce waste with a 'lifespan' of millions of years.

JG The question of temporality is more present in my earlier work on waste and digital rubbish through the figure of the fossil (and natural history) and also in my work on plastic. In *Accumulation*, my text about plastic, I look at where plastic goes, how organisms and environments are changing through plastics, and how plastics are involved in creating new environments of indeterminate longevity. Plastics are often transforming environments and entities in problematic and difficult ways. These environments will very likely

outlast us. Climate change is also a key example of this transformation of environments and collision of temporalities: we're using up fossil fuels that have been accumulated over hundreds of millions of years, and in rapidly doing so, we are transforming the environment. Grappling with this collision of temporalities, and adjusting temporalities in order that they might not be on a collision course is a necessary site for practice and experimentation. Through engaging with different temporalities we might accommodate multiple other ways of being in the world.

AA Could you give an example of how to engage with different temporalities and accommodating other ways of being in the world?

JG Lichens as bio-indicators is an example of another way of sensing, bringing attention to different temporalities and the different ways we understand environments. Lichens have been studied, at least since the late nineteenth century, as bioindicators of air pollution. Extensive surveys and protocols have been developed, looking at the ways in which air quality can be judged on the basis of where lichens grow, the types of lichens growing, and the characteristics and morphologies of those lichens. Lichens grow very slowly, living for centuries in some cases. Computational sensor technologies are signalling and communicating in ways that we can understand within the temporalities of digital exchange. Lichens are sensing according to vastly different temporalities. They are signalling different kinds of relationships, endurances, and durations – other ways of understanding environments. They don't measure air pollution as an amount of micrograms per cubic metre at a certain hour, at a certain intersection; rather, they sense an entire ecosystem taking shape within an area because of an array of polluting activities and

Lichens as air quality indicators used to monitor pollutants, such as mercury, at the Mercury Monitoring Station of the Wisconsin Department of Natural Resources.

industries. These activities mean that certain types of lichen survive and others do not.

AA Should those types of sensing also be part of the 'smart city'?

JG It would be amazing if a smart city had a lichen bio-indication network! I have been thinking about temporality and the smart city in another way. Increasingly, the design of urban space is not conceived as a spatial intervention but rather as a scenario, which is a temporal way of remaking the city. It is about syncing, coordinating, making things more efficient, more streamlined, and more instantaneous. Spatial design thus becomes a set of operations that are meant to make a city a more liveable and engaging place to be. But a smart city that is completely streamlined sounds rather nightmarish to me. It means there is no space for delay, for pause, or for daydreaming. It implies a temporality geared towards particular types of production and economic activity; it is about maximising the capacities of the subject to proceed without error or interruption. It takes a very simplistic notion of automation, mapping it onto humans and cities and their processes, and presents that as a utopian scenario because the city becomes maximally productive. In *Program Earth*, I look at what a human citizen sensor becomes in these smart city scenarios. These scenarios outline citizen sensing in a particularly reductive way. A citizen sensor is just an activation node. Its form of 'good' citizenship within the smart city is to ensure the seamless and constant flow of goods, services, and processes. That's why it's so interesting returning to Deleuze's famous essay 'Postscript on the Society of Control' and its anecdote of Felix Guattari having an electronic card that does not grant him access to the city. How do we grapple with the moments when the seamlessness and efficiency of the smart city

no longer unfold so easily? What sort of citizens and subjects do we become when the smart city breaks down and is not functioning how it should, whether through deliberate intervention or obfuscation, or citizens simply not understanding the instructions they are meant to follow? The smart city, through its inability to run seamlessly or according to plan, reveals its cracks and fissures and its limited understanding of citizens as sensors. I am surprised people are still talking about smart cities. The narrative has been packaged and repackaged, recycled, shoved into one marketing pitch after another, but it still manages to have a foothold, and it still manages to organise actors around it. What if we were to organise in relation to different understandings of urban spaces, urban engagements, temporalities, and what citizens might be? Indeed, what would a smart city be with a lichen sensor network? How would we then adjust our temporalities and our understandings of the urban environment? It would be nice to see many more experiments in this area of urban sensing.

AA You often use the term speculation, could you explain why this term is important to you?

JG Speculation has become an attractor for many different ways of doing work and ways of thinking about political and creative engagements. Speculative design, speculative realism, speculative finance, speculative fabulation, and critiques of speculation. Nowadays, theory itself seems committed to the speculative in order to develop a post-capitalist or nonproductive way of understanding engagements and subjects. I use speculation in relation to the work of Whitehead and Stengers. For both of these thinkers, speculation is not an activity that a human cognising subject undertakes but rather that we engage in speculation in a distributed way. In writing about Pinar Yoldas' work, for instance

– in a text about speculative organisms in the ‘plastisphere’ – I use the phrase ‘futures actually speculate us’. There are new environments unfolding in the oceans because of plastics. We wouldn’t be able to forecast or backcast those transformative processes because the indeterminacy of those processes are the conditions with which we have to operate. Those environmental futures are already, in a way, speculating the entities we might become because of the ways ocean sinks are changing or because of the ways in which endocrine disruption is occurring across bodies. So, I don’t use speculation in the sense of a human entity speculating about a future. I think rather about the distributed conditions of speculation, the processes of new entities coming into being, and the kinds of propositions and relations that we have to work with. In this way, speculation points to practices of experimentation.