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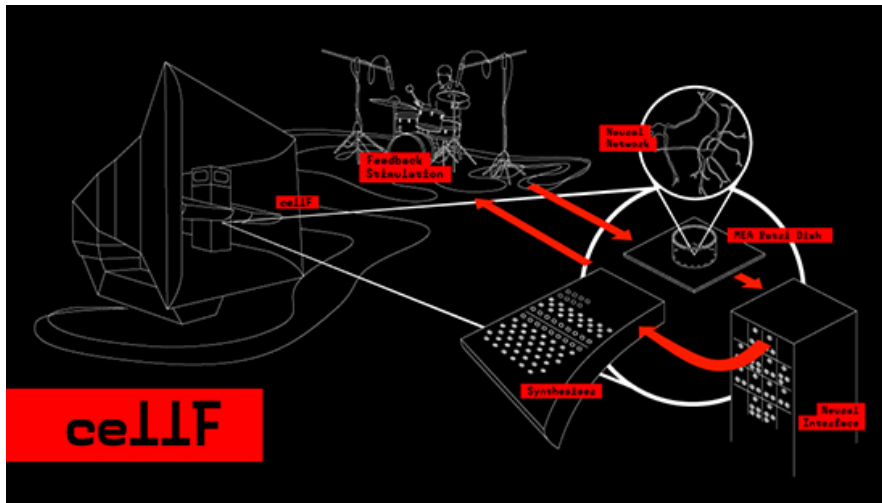
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A musical brain of your own

Gail Priest: interview, bio-artist Guy Ben-Ary



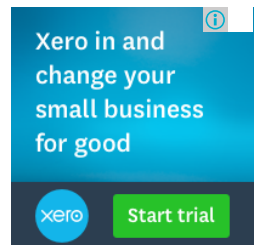
cellF system diagram, Guy Ben-Ary & collaborators
courtesy the artists

For the last two years I've been pondering what art will sound like in the future. One of my wilder speculations suggests that we will choose to dispense with the corporeal and upload ourselves into a hive mind. Because a hive mind shares hopes and dreams, and everyone's secret dream is to be a rock star, I conclude that at the end of time we will manifest as a band—The Omega Point Band—transmitting to infinite space.

As I was working on this scenario I came across cellF, a recent project by bio-artist Guy Ben-Ary, in which he grows neural networks (a proto-brain) developed from his own cellular material. And what does this brain want to be when it grows up? A rock star of course—well, an improvising musician really.

CellF has been in development for over four years, initiated when Ben-Ary received a 2012 Creative Australia Fellowship. It had its debut performance in Perth in October 2015, presented by SymbioticA, and will soon have a second iteration in Sydney as part of The Patient, the upcoming bio-art exhibition curated by Bec Dean at UNSW Galleries. I talked with Ben-Ary last year when cellF was still in development and followed up recently to see how his other “brain” took to its debut performance and their combined feelings around the upcoming tour.

To grow a brain



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Ben-Ary has been a key member of the SymbioticA team, along with Oron Catts and Ionat Zurr, since 1999. His particular interest is in growing neural networks outside of the body “because of the uneasiness—the idea that masses of them, when organised in a particular way, create consciousness or intelligence...I was interested in their erratic existence—how do they communicate and what do they do outside the body? Can they learn or would they be able to demonstrate emergent behaviour in the future?”

What Ben-Ary terms his “Eureka moment” occurred in the early 2000s when he discovered the work of scientist Steve Potter who has developed an interface to work with Multi-Electrode Array dishes. “It’s a Petri dish that you can grow neural networks in and it has 60 electrodes fitted on the base. You can record what the neural network is doing in 60 areas of the dish but at the same time you can stimulate the neurons in 60 areas of the dish. The stimulations can be variable from weak to very strong. So, symbolically, we can inform [the neurons] about events that are happening in the outside world and we can ask them to respond.”

For this project, which Ben-Ary refers to as “self-portrait,” he was determined to grow a neural network from his own tissue. “I had a biopsy done and skin cells taken off my arm [and then] took this piece of flesh back to the lab, chopped it, processed it and grew my own fibroblasts—connective tissue. Then I shipped those cells and myself to Barcelona to work with an Australian scientist, Dr Mike Edel, where we reprogrammed them to stem cells. Once we were sure that the clones were pluripotent [viable stem cells], we started to push them towards the neuronal lineage. When they reached the neural stem cell phase, we froze them and sent them back to Perth [where we] started to look at how to differentiate them from neurons. It’s quite complicated and it did take me about 18 months. I mashed up maybe 12 or 15 protocols [biological techniques]. I grew billions, and I’m not exaggerating, billions of cells and hundreds of cultures.”

The final result is a neuronal network grown onto the Multi-Electrode Array Interface ready to be stimulated. Which is where the aesthetic decisions—the life choices perhaps—began.

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TV Moore

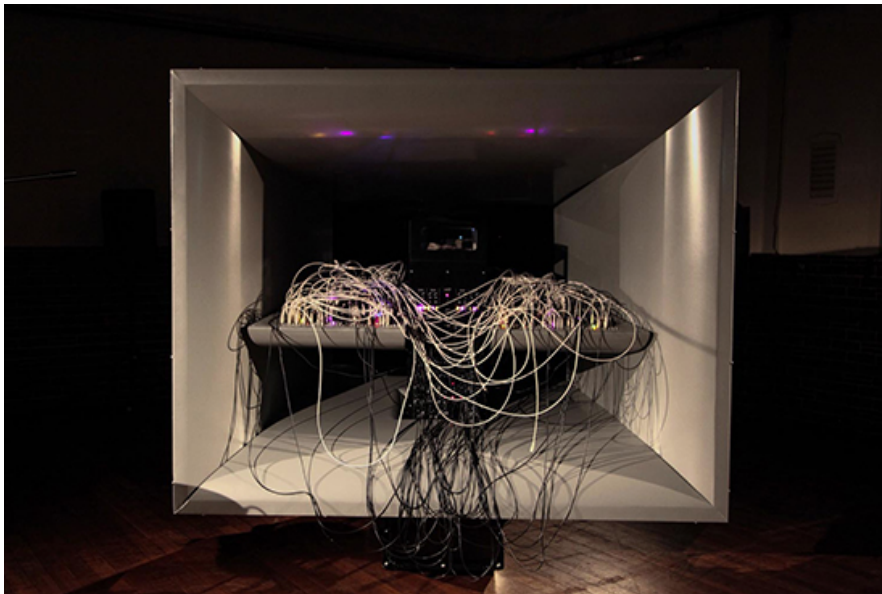
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collaborators

photo Yvonne Doherty

To find a body

While Ben-Ary's intention is to make a self-portrait, he wanted to avoid a predominantly visual representation. "I look at myself in the mirror enough, and I kept looking at the cells for 18 months—every single day—so I just couldn't think about humanistic portraiture, or describing myself in these terms." In previous works like MEART and Silent Barrage Ben-Ary has used robotics to physically manifest the work, but for cellF he wanted to go in a different direction.

He talks of his long-held fascination with music—"when I was 12 I'd put David Bowie's make-up on my face." In particular he developed a passion for experimental music and jazz—"John Zorn changed my life"—but he just never developed the skills to be a musician. So he decided that this self-portrait—this auxiliary Ben-Ary brain—could live this dream for him. Finally he could become a rock star.

In reality cellF might be a bit too experimental to be a mainstream rock star; rather it's aiming to be respected in the underground experimental scene. In discussions with his artistic collaborators, musician Darren Moore, analogue synthesiser specialist Andrew Fitch (Non-Linear Circuits) and artist/machine maker Nathan Thompson it was decided that the ultimate sonic manifestation—the sound body—would involve analogue synthesisers. Ben-Ary explains that the neuronal mass "is wetware but it's analogue: micro-voltages are passing between components. It's oversimplifying how neural networks work in the brain but modular synthesisers work the same way with control voltage."

The actual physical body of the neurons has been designed by Thompson to fulfil both practical and aesthetic needs. The system not only has to house the spaghetti monster that is a modular synthesiser system, but it also has to be a functioning bio-lab with a fridge, incubator, the neural interface as the "head" and a class 2 sterile hood because of the use of modified human cells. Drawing inspiration from Futurist Luigi Russolo's *intonarumori* noise machines, 1950s-60s giant gramophone speakers and the spiral structure of

the cochlear, the neuronal network's body is quite a magnificent sculptural object.

To play with others

As the whole point of cellF is that it is an improvising musician that wants to play with other musicians, the primary presentation mode is as a performance in which a human musician improvises with Ben-Ary's "mind." The musical output from the human is sent to the FriGate circuit, developed by Thompson, which converts certain frequencies into voltage information which is then passed on to the neurons. The neurons respond to this by outputting voltage information to the synthesisers and the two begin to 'play together.'

In the Perth manifestation the drummer Darren Moore went head to head with cellF. Ben-Ary was extremely happy with how this went, saying there was "a clear sense of responsiveness, of communication between Darren and the neurons. [It was] a jam session or improv scenario where it wasn't Darren playing with a programmed machine or the neurons doing something really chaotic—there was a sense of improvisation between them. It was just incredible to see."



Darren Moore playing with
cellF, Guy Ben-Ary &
collaborators
photo Yvonne Doherty

For the upcoming Sydney manifestation there will be three performances featuring different musicians each night— Chris Abrahams (10 June), Claire Edwardes and Jason Noble of Ensemble Offspring (11 June) and a trio comprising Clayton Thomas, Jon Rose and Darren Moore (12 June). The plan is to allow the performers to have a little more time than previously to rehearse with the system, to get to know each other. Ben-Ary is curious as to how the neurons will respond and develop over the performance series. He is also planning to use the same culture—the same neuronal mass—across the series: "Cultures like to be stimulated and the more you stimulate them the more chance for them to change their functional plasticity and produce more activity."

When the neurons are not performing, sleeping off their rock star hangovers in their fancy multi-electrode array hotel beds, the project can be experienced

via image and video documentation and prototype displays. Hoping to tour the work further, Ben-Ary also sees the opportunity for developing an installation version where the neurons can be allowed to spend their days composing—singing to themselves.

While cellF has a very playful presentation mode, it is a serious exploration of posthuman futures and our sense of 'self.' It probes fundamental questions: what makes a mind, what is consciousness and how are we connected to flesh and physicality? Guy Ben-Ary's approach illustrates the idea of art as a tool for speculative dreaming. He says, "Art can help us with imagining the future. We don't need to do it, we need to suggest. Symbolic gestures are sometimes enough, and pushing the technology to the limits, the nowadays limits, is enough to look at contestable futures." I look forward to checking out cellF's chops, and then I'll decide if this is a sonic future I want to come true.

See video documentation of cellF [here](#)

The Premier of cellF (2015)



cellF, Guy Ben-Ary in collaboration with artists Nathan Thompson, Andrew Fitch and Darren Moore, and scientists Douglas Bakkum, Stuart Hodgetts and Mike Edel, presented by SymbioticA

Performances as part of The Patient: Chris Abrahams, 10 June; Claire Edwards, 11 June; Clayton Thomas, Jon Rose, Darren Moore, 12 June; The Cellblock Theatre, National Art School, Darlinghurst, Sydney

The Patient. The medical subject in contemporary art, curator Bec Dean, artists Ingrid Bachmann (CAN), Guy Ben-Ary (AUS), John A Douglas (AUS), Bob Flanagan & Sheree Rose (USA), Brenton Heath-Kerr (AUS), Carol Jerrems (AUS), Eugenie Lee (AUS), ORLAN (FRA), Helen Pynor (AUS), David McDiarmid (AUS), Jo Spence (UK), John Wynne & Tim Wainwright (UK); UNSW Galleries, 3 June-6 August;

Parts of this interview also appear in audio format in the installation by Gail Priest, Sounding the Future, exhibited in ISEA2016.

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