

## THE AUSTRALIAN

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### Art-science collaborations bring a human perspective

PENNY DURHAM THE AUSTRALIAN 1:53PM August 8, 2016

Science labs and art schools used to be very distinct places. But around the world, researchers and even politicians are realising that scientists, engineers and artists can work more meaningfully together than in their traditional silos.

Jill Bennett, professor of experimental arts and director of the National Institute for Experimental Arts at UNSW Art and Design, works at the conjunction of arts and STEM, often called STEAM. The concept may be more recognised in the US, where a bipartisan caucus of congressmen is devoted to promoting it, and in the UK, where the Wellcome Trust is a keen investor.

But Bennett says Australian institutions have been at the forefront in establishing the spaces for collaborative research, such as UNSW Australia's Creative Robotics Lab. Set up in 2011 by Associate Professor Mari Velonaki — co-director of the Centre for Social Robotics at the University of Sydney, whose first training was in the arts— the CRL works across disciplines and in partnerships with art and science institutions globally.

What artists can bring to science and engineering, Bennett says, goes far beyond just a decorative overlay, or data visualisation, or PR and communication.

“Artists are very good at designing potential uses and interactions,” Bennett says. “Often scientists and engineers will contact artists very late in the piece and assume that their role is knowledge transfer once the knowledge has been produced out of the scientific process. What we're interested in, and what the really exemplary projects are doing, is opening up new lines of inquiry so the collaboration is established upstream.”

Israeli artist and researcher Guy Ben-Ary specialises in tissue engineering, microscopy and biological and digital imaging. After studying law in Tel Aviv and working in programming, he came to Perth to visit his friend Oron Catts, director of SymbioticA, a laboratory for arts and life sciences at the University of Western Australia— and never left. He has been an artist in residence there since 2000 and is the manager of CELLCentral in the school of anatomy and human biology. SymbioticA, Ben-Ary says, is the first studio in the world where artists have the same access and status in the labs as scientists. “Artists can be one of the members of the school and have equal rights and access to every lab, without asking for favours and trying not to annoy

anyone — can you teach me this? , he says. It's quite an incredible piece and there's nothing like that in the world.”

His work *cellF* (“self”), a music machine that had its Sydney debut in June after premiering in Perth last October, is the culmination of 15 years’ research into bioengineered “brains” and “bodies”. He calls it “a rock star in a petri dish”.

It comprises a neural network cultured from his own cells (the symbolic brain) grown on an array of electrodes hooked up via a custom interface to an array of analog modular synthesisers (the body). In each performance, human musicians play and their input is fed as electrical stimuli into the neural network, which responds through the synthesisers in an “improvised post-human sound piece”.

This sound is amplified on 16 speakers, each corresponding to a place on the network, which the audience can walk through — like walking through the artist’s “external brain” in real time.

This biological self-portrait — Ben-Ary wanted to be a rockstar — involved having a biopsy of his skin cells, transforming them into stem cells via induced pluripotent stem cell technology and differentiating them into neurons, coaxing them to grow and react to stimuli, and building the interface between the neurons and synthesisers.

“It is a collaborative project. I could never, ever do it by myself,” he says, crediting neuro-engineers Steve Potter and Douglas Bakkum, neuroscientist Stuart Hodgetts, stem-cell scientist Michael Edel, new-media artist and designer Nathan Thompson, electrical engineer and synthesiser builder Andrew Fitch, and musician Darren Moore, who provided the idea of the synthesiser as “body”.

Even though his neural network is only 100,000 cells, rather than the up to 100 billion in an actual brain, the work explores notions of sentience and has implications in emergence, plasticity and the future of engineered intelligence, although so far its responses are chaotic rather than predictable.

“This work is about computation,” he says, “but it’s also about life. It’s our job to be playful but also critical about new trends in biotechnology.”

*CellF* is part of *The Patient*, an exhibition at UNSW Galleries that finished on August 6, curated by PhD student Bec Dean. “There’s been a gear shift in how artists and scientists are working together,” Dean says. “There’s starting to be a lot more reciprocity.”

Artist Eugenie Lee has worked with neurologists on complex regional pain syndrome.

aka chronic pain. A sufferer herself, she says patients are lacking information while the scientists are lacking a way to present their results to the public.

Her exhibit, *Seeing is Believing* — which is experienced one on one, guided by Lee herself — includes a nightmarish virtual reality simulation of chronic pain that conveys some of the anxiety the condition causes. She collaborated with Body in Mind web-media team at the University of South Australia and Neuroscience Research Australia in Sydney, with support from the Australian Network for Art and Technology, which promotes artistic experimentation.

Another disturbing work in *The Patient* is by Helen Pynor, who trained in biology and works at the indistinct borders between life and death. Pynor has taken still-living tissue from a chicken bought at a supermarket and restarted the cells' growth process. Visitors can watch video of their replication.

Bennett herself works in memory. On one project funded by the Australian Research Council, she has worked with cognitive neuroscientists on the practical task of devising techniques for memory retention and consolidation for dementia sufferers.

“[The scientists] had established that automatic cameras were remarkably effective as a memory aid, but they didn't progress to doing any analysis of the visual stimuli or the conditions in which the photos were viewed. If you bring in an arts team, we immediately begin looking at the visual components that are useful and the sensory interaction, and how we might design interactions differently.”

Artists specialise in the sensory, the aesthetic, the experiential, and can also be better than engineers at the human dimension of a project. You just have to choose the project wisely.

“Not every research question requires artists on it — artists aren't going to cure cancer,” Bennett says. “But in other critical areas, it could well be that artists, designers and creative thinkers play a key role, particularly in areas that require that we understand the human factors very deeply.

“We're sometimes able to completely reframe a research question and suggest new pathways. And I think that's the holy grail for a lot of arts-science collaborations: can it change the pathway of science?”

Ideally, the art is not just serving the science, nor vice versa. “Many of our big projects

have multiple outputs: scientific papers, art outputs and applied community-engagement outputs.

“These are really multifaceted and playing to everybody’s strengths. These are mature disciplines bringing the best they’ve got to offer to some really important research questions. I think this kind of approach will come to seem more and more intuitive.”

*Learn more about Eugenie Lee’s work at [eugenielee.com](http://eugenielee.com) and Guy Ben-Ary’s at [guybenary.com](http://guybenary.com).*



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