



# Shaking the Soil off the Roots

A Personal Reflection on Growing Systems of Support for  
Interdisciplinary Practice and Research, 1997–2007 (and after)

Dr Brona Ferran

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DOI: [10.82593/s8k2-3k73](https://doi.org/10.82593/s8k2-3k73)

A publication by The National Centre for Academic and Cultural Exchange (NCACE) 2026.  
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Report design: [KateRoncoroni.com](https://kateroncoroni.com)

## Introduction

1. This essay brings to life a series of policy and research funding interventions led by the author, and her colleagues working in Arts Council England, as well as a group of external collaborators, during a period of intensive development in art, science and technology domains (and their crossover) from 1997–2007. Bronač Ferran recalls certain key stepping stones as well as leading figures active in the interstitial spaces between different disciplinary arenas which were of catalytic influence on these processes.
2. Drawing on the prism of the present, through which the significance of what was emerging at the turn of the Millennium grows more legible, she begins a process of reflection on the importance of shaping a longer-term perspective on practice-led interventions in research and development contexts. In so doing, absence of cohesive work elsewhere on digging into the roots of what might be perceived to be a now long-term interdisciplinary turn affecting various specialist domains this century comes more clearly into focus.
3. Her essay highlights also the critical role played in such traversal shifts by what was generally known as ‘new media’ and ‘new technology’ during the 1990s–2000s; she refers to the period between the mid-1990s and mid-2000s as something of “a halcyon era between the introduction of the World Wide Web and the arrival of mainstream social media”. Reflecting back on that period, she notes the intensive work carried out both by practitioners and researchers exploring and probing the creative and critical properties of ‘openness’ in terms of concepts, code and content.
4. This became a shared ground of research and development activity that Ferran and ACE generally became closely involved with, supporting numerous strategic initiatives whilst joining in with major national and international projects, including the Collaboration and Ownership in the Digital Economy (CODE) conference held in Cambridge in 2001 at the height of EU policy debates about the patenting of software. Ferran reveals the critical role played by ACE’s Collaborative Arts Unit in generating this event, which grows historically more significant when seen through the lens of the future as the first ever conference anywhere to interconnect openness and peer-to-peer collaborative practices across various disciplines over centuries with what was emerging in the sphere of code and software in the opening years of this century (and millennium).
5. Through this retrospective analysis, it has become evident to Ferran that at one stage in the early years of this century, ACE was helping to shape a ground of policy around art and law as an arena that, may, had it not been disrupted by restructuring,

had an influence on what happened later in the contested space of authorial rights and their slippage in the era of generative AI and large language modelling.

6. Yet she also signals the lack of any long-term approach to archiving, distilling and disseminating the knowledge gained from and generated in such initiatives. That the [conference website remains live online](#) is, as she points out, a consequence only of the long-term personal commitment of its core organiser in Cambridge, Professor Alan Blackwell.
7. Pointing also to a further structural intervention in the 2000s, involving ACE and the then newly established AHRC working in tandem in support of Art and Science Research Fellowships, documented as a special section of *Leonardo Journal of Art and Science*, in 2006, Ferran takes the rare opportunity to go back to some of those involved, two decades after, to reflect on longer-term outputs from such a venture. The lessons learned she finds remain of significance with respect to today's increasing interest in interdisciplinary practices yet the learning from decades of exemplifying work in this direction can be difficult to access. Professor James Leach's summative question relating to the first phase of the Fellowships remains unanswered: where does the knowledge emerging from these intersections most appropriately reside?

## **8. Concluding observations:**

Her paper suggests the value of further work within academia to tap into some of the not yet fully excavated and yet deeply formative roots of today's leading edge interdisciplinary and knowledge-sharing ventures.

Among the questions and discussion points she raises are the following:

- What then might we learn from revisiting earlier processes of open-ended investment, where small allocations of funding can prove critically transformative?
- Are there wider lessons here that might be usefully assimilated into academic learning?
- What other reflections and stories might be added to this narrative?
- Is there a missing approach to archiving this material for future scholarly access?
- If so, where might this be best-placed, and how might it more fully disseminated?
- Does the context of knowledge-exchange and knowledge-transference allow for further work to take place in assembling various archives and personal memories of what was happening during a phase of critical emergence of co-creative approaches to art, science and technological domains between the close of the last and the beginning of the new century?

## The Vanishing History of the 1990s

It is hard to remember now exactly what it was like to live through a heady pre-millennial and post-millennial moment, when a surge of new technological and new media thinking, and invention, projected since the postwar decades, was coming into focus. In policy circles, the idea of new technology became hot, much as it had been during the ‘White Heat’ moment in the mid-1960s, when Harold Wilson and Tony Benn were pushing for a shift from an industrial to informational economy.

In the late 1990s, Blair’s Labour Government drove an agenda that situated the so-called creative industries — and the concept of a creative economy — as a powerful engine of innovation for this country, powered also by the ready availability of Lottery money just before and after the Millennium. Putting lottery funds into an expansion of the reach of arts and cultural activities, a decision taken originally by John Major’s Conservative government, can be viewed, with the benefit of hindsight, as a golden egg that was speedily devoured. Many feasibility studies were carried out into transforming former largescale industrial buildings in parts of Northern England into new media centres, a concept doomed at the outset by the decentralising tendencies that networked media brought in its wake.

In the halcyon era between the arrival of the World Wide Web and the walled gardens of social media, I was working at Arts Council England, bearing a sequence of job titles. I shifted between being described as Combined, Live, Collaborative and Interdisciplinary Arts, all of which made it difficult to fix exactly which areas of the arts I was working in. At the same time words like ‘access’ and ‘innovation’ were hanging in the air, like ripe fruits not yet fallen into overuse. So too artists and producers in various artform areas and academic researchers began probing the possibilities inherent in domains of interactive and participatory media.

As net art mailing lists, bulletin boards etc were evolving among early initiates into new media’s collectivising ethos, it was becoming clear that the advent of so-called new technology was something that was inherently about breaking and disrupting traditional [vertical] structures. For four issues, between 1995-1997, *the Guardian* newspaper entered into a collaboration with *WIRED UK* magazine, forming a hybrid connection that proved short-lived. The driving force behind this development at *the Guardian* was Tony Ageh, who was subsequently also an influential figure in the BBC’s development of its iPlayer, thus ensuring the national broadcaster would survive an incoming era where dispersion of attention would become quotidian.<sup>1</sup>

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1 I was reminded of the *WIRED UK* developments and Tony Ageh’s role in these interconnections in a conversation with artist, James Bloom, July 2025. Although not yet twenty, he had become a *WIRED UK* contributor to *the Guardian*, and was sent off to the West coast of the US to report on advanced military robotics, then in R&D stages, becoming in retrospect a reminder of the embeddedness of technological innovation with industrial-military forces, with which the language of creative uses of new technology that came to the fore culturally in the late 1990s was necessarily entangled. After *the Guardian*, Ageh worked for a project entitled ‘UpMyStreet’ then moved to the BBC in 2002.

It was also very much a period when the first networking events, to bring representatives of these divergent yet convergent forces together, around the concept of digital innovation were being historically introduced.

I remember a 1997 daylong symposium in Canonbury Square, London, organised by Frank Boyd, the visionary founder of Artec, an organisation that had thresholded many artists into new media possibilities. The event was called The Artist, The Citizen, The Entrepreneur and drew on Council of Europe funding. Both Frank and I sat on a Council of Europe advisory group related to New Technologies, Culture and Education.

One of the speakers was named Demis Hassabis. Frank told me he was very young and brilliant. He was just twenty-one in 1997. But he already transmitted a *'je ne sais quoi'* energy, like a new synthesis of chess-player, gamer, programmer and retro-musician. Perhaps we might now call it *'aut glamour'*.<sup>2</sup>

I can find no traces of this event online. Such was the evanescence of digital media development in Britain in the 1990s, a period calling out for detailed excavation.

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<sup>2</sup> This is a derivative of 'autglam', a term suggested to me, in recent dialogue about this event, by the editor of Nowness magazine, Ananda Pellerin.

## From Practice to Policy and Vice Versa

Working in the London Arts Board, then at ACE national office, I saw these shifts head-on.<sup>3</sup> We could see new kinds of applications being submitted to funding programmes, many of which were highly speculative. We began shifting funding categories to seek to fit with what was emerging.

Would the Arts Council fund an anti CD-ROM by antirom?<sup>4</sup> And what about an experiential, interactive game that took place on the streets involving members of the public? Or an ISDN-line link-up conceived by the Black-led Digital Diaspora group, between the ICA in London and The Kitchen in New York?<sup>5</sup> Or artists working with scientists on open-ended outputs? And how might this then be evaluated? Who was best placed to assess the effects of disruptive innovation?

I began to be invited to various policy fora, both in Europe and in the UK. I was even nominated by the DCMS to go to Cuba to take part in a conference (which turned out to be entirely in Spanish, with no translation as I was the only person not from Latin America who was attending). Those were the days.

One of the groups in which I participated was an Access and Creativity sub-committee, reporting to the Department of Trade and Industry, as part of its Foresight Creative Media initiative. It was chaired by Ernest Edmonds, a pioneering computer artist and Professor of Computing Science at Loughborough University. Edmonds embodied the intermediating bridge-building role called for in the late 1950s by C.P. Snow to address what Snow called “a gulf of mutual incomprehension” between science and the arts.<sup>6</sup>

Snow regrettably overlooked references to art and science parallels found in many earlier texts and works, from Marcel Duchamp to Naum Gabo, from Samuel Taylor Coleridge to Virginia Woolf.<sup>7</sup> He seemed unaware that he was following in the prefiguring footsteps of other scientists, including crystallography pioneer, J.D. Bernal who had written in a chapter on *Art and the Scientist*, two decades before Snow’s Rede Lecture: “Scientists and artists suffer not only from being cut off from one another but being cut off from the most vital part of the life of their times. How to end this isolation

3 I was Combined Arts Officer at the London Arts Board (1992-1996), then Senior Live Art and Combined Arts Officer (1996-1999), Acting Director of Combined Arts (1999), Head of Collaborative Arts (2000-2003) and Director of Interdisciplinary Arts (2003-2007) at the Arts Council’s national office.

4 Further information about Antirom, including its antiCD-ROM, can be found at: [antirom.com](http://antirom.com); accessed 20.9.2025.

5 This is a reference to the event, ‘Digital Slam’, organised by Derek Richards with Marc Boothe and Greg Tate, held at the ICA in 1995, as part of their wider ‘Digital Diaspora’ project. Richards reflects on the event and its context at: [derekrichards.me/25-years-of-jamming-in-the-space-in-between-a-retrospective-of-telepresence-in-live-performance/](http://derekrichards.me/25-years-of-jamming-in-the-space-in-between-a-retrospective-of-telepresence-in-live-performance/); accessed 20.9.2025.

6 C.P. Snow’s original Rede lecture, ‘The Two Cultures and the Scientific Revolution’, is available at: [ia800901.us.archive.org/32/items/snow\\_1959/snow\\_1959\\_text.pdf](http://ia800901.us.archive.org/32/items/snow_1959/snow_1959_text.pdf); accessed 20.9.2025

7 See Bronač Ferran, ‘Shifting the Mould: Between Retreating Snow Lines and Deepest Waters’, an essay in response to the exhibition, Mind + Matter: Towards Co-Creation, developed in partnership with UH Arts and Culture, University of Hertfordshire, March 2025. It is available for download at: [uharts.co.uk/\\_data/assets/file/0015/443301/Shifting-the-Mould-Essay-by-Bronač-Ferran.pdf](http://uharts.co.uk/_data/assets/file/0015/443301/Shifting-the-Mould-Essay-by-Bronač-Ferran.pdf); accessed 20.9.2025.

and at the same time preserve the integrity of their own work is the main problem of the artist of today. There are no ready-made solutions, but if the goal can be seen the way can be found”.<sup>8</sup>

Snow, too, seemed unaware that between the 1930s and 1950s, US scientist Bern Porter, who invented cathode ray tubes for television, had written several manifestoes on the ‘union of science and art’ as well as the ‘union of science and architecture’, the ‘union of science and communication’, the ‘union of science and literature’, the ‘union of science and music’ and the ‘union of science and theatre’. He even introduced the term ‘sciart’, that later would be used by the Wellcome Trust for a late twentieth-century programme to support collaborations across arts, humanities and the medical sciences. Porter shifted his focus to art as a countermeasure to a sense of profound guilt he felt, having worked with Albert Einstein, as part of the Manhattan Project, on research into the properties of uranium that fed into the production of the atomic bomb that fell on Hiroshima and Nagasaki.

Although the first line of his ‘union of science and art’ manifesto had stated “Infinite worlds of finite reality and beauty revealed by the tools and discoveries of science are ripe for aesthetic development”, such idealism was shattered forever by the application of scientific knowledge for the annihilation of many thousands of people in Japan.<sup>9</sup> Porter spent the rest of his life compensating through building international connections, as a pioneering figure in ‘mail art’, a countercultural phenomenon that fostered interconnections between individuals on a worldwide basis.<sup>10</sup>

Snow, meanwhile, began writing novels in the late 1930s, having studied spectroscopy at university. In the early 1960s his literary efforts were rather derided not least by Cambridge academic, F.R. Leavis, who commented of Snow’s fiction: “I have heard (can I have dreamed it?) that they were composed for him by an electronic brain called Charlie, into which the instructions are fed in the form of chapter-headings”.<sup>11</sup>

Snow, however, had argued in his 1959 lecture, “if scientists have the future in their bones, then the traditional culture responds by wishing the future did not exist”.<sup>12</sup> He joined the advisory group for the then newly established *Leonardo Journal of Art and Science*, set up by Frank Malina in Paris in 1968. Malina, like Porter, turned to art after World War Two, having been involved in rocket development at the Jet Propulsion Laboratory in Pasadena.

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8 Ibid., 119-123; Bernal was Cambridge-educated then moved to Birkbeck. He determined the structure of graphite in the 1920s, became a pioneer of the uses of X-Ray crystallography in molecular biology and was the author of influential books on Science and Society in the 1950s.

9 Bern Porter, in *A Something Else Reader*, ed. Dick Higgins, assembled by Alice Centamore, New York, Primary Information, 2022; 228-240, 235.

10 Further information on Porter’s involvement in mail art can be found at the Getty website here: [getty.edu/research/collections/collection/113YEE](https://getty.edu/research/collections/collection/113YEE) notably in the 1960s, Porter reengaged for a period with scientific research, contributing to the development of NASA’s Saturn V Rocket.

11 F.R. Leavis, *Two Cultures? The Significance of C.P. Snow with an essay on Sir Charles Snow’s Rede Lecture*, by Michael Yudin, London, Chatto and Windus, 1962, 6.

12 Snow, ‘The Two Cultures’.

Also in 1968 Cybernetic Serendipity, the world's first large computer art exhibition, took place in London, organised by Jasia Reichardt. Although Edmonds did not contribute to Cybernetic Serendipity, around then he was beginning to make art made using the Fortran programming language. Having studied mathematics and philosophy, Edmonds began working at Leicester Polytechnic (soon to become De Montfort University) in the late-1960s and was swiftly shunted into the role of Head of Department in Computer Science.

This coincided with a strengthening of a built research infrastructure for STEM-style subjects on the campuses of many new universities along with the first phase of acquisition of early computers. Only a few art schools or art departments had access to computing resources at that time; those that did, like the Slade School of Art proved to be critical incubators for the first generation of British computer art pioneers. The driving individual force there was 'Systems Artist', Malcolm Hughes.<sup>13</sup> He inspired others, including Paul Brown, a significant early pioneer of generative art, to take steps towards making autonomous art with software.<sup>14</sup>

By the late 1990s, Edmonds, then in computer science at Loughborough University, and Steve Benford, a human-computer interaction and mixed reality specialist at the University of Nottingham, were to the fore in establishing opportunities for artists, through placements, residencies, doctoral opportunities and collaborative project opportunities within their academic research labs. Both helped to shape a growing interest in the UK Engineering and Physical Science Research Council [EPSCR] in supporting artists within an expanding frame of creative technology.

Some of this early work was part-funded by Arts Council project funding, opening up pathways and relationships that led on to finding further and larger funding opportunities. Projects in the East Midlands seemed particularly ahead of the curve: the Nottingham-based NOW Festival specialised in performance and technological innovation. In the same location, a small group named Active Ingredient, led by Rachel Jacobs and Matt Watkins, became a leading agency driving forward art and interactive possibilities, whilst similarly a performance group named Blast Theory began working with Benford, traversing the mutable spaces between live art and participatory media, often bringing R&D processes into the public sphere.<sup>15</sup> In London meanwhile, Ghislaine Boddington and Debbi Lander, then under their collective name of shinkansen, were significantly ahead of the curve in probing the possibilities for new kinds of performative embodiment, including augmentation and telematic connections across distances, that new technological systems were bringing in their wake.<sup>16</sup>

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13 For further information on Malcolm Hughes, see his website at: [malcolmhughesartist.com/biography.html](http://malcolmhughesartist.com/biography.html); accessed 20.9.2025.

14 For further information on Paul Brown, see his personal website at: [paul-brown.art](http://paul-brown.art); accessed 20.9.2025.

15 The story of Active Ingredient is accessible via the organisation's website at: [i-am-ai.net/active-ingredient/](http://i-am-ai.net/active-ingredient/); accessed 10.1.2026; in 2018, Blast Theory and the Mixed Reality Lab led by Benford celebrated twenty years of working together; their account of this relationship is available at: [blasttheory.co.uk/20-years-of-blast-theory-and-mixed-reality-lab/](http://blasttheory.co.uk/20-years-of-blast-theory-and-mixed-reality-lab/); accessed 20.9.2025

16 Ghislaine Boddington and Debbi Lander co-founded shinkansen, which evolved into body>data>space, an interactive design collective, over the course of the 1990s. Whilst Lander moved on, Boddington remains core to this collective that has expanded into multiple interdisciplinary arenas and projects as documented at: [bodydataspace.net/who-we-are/](http://bodydataspace.net/who-we-are/); [accessed]; Boddington is also renowned as a n international speaker on these themes; see [ghislaineboddington.com](http://ghislaineboddington.com); accessed 25.9.2025.

All of this was productive of addressing Snow's original concerns, but simultaneously there were gaps widening between the growth of a hard STEM infrastructure in universities and more organic development in the ground of artist-led practices. Initiating the Creativity and Cognition (C&C) conferences, with creativity researcher Linda Candy at Loughborough University from the early 1990s, Edmonds sought to plug this gap in constructivist fashion. In 1999, the C&C theme was Intersections and Collaborations. Speakers included Harold Cohen, Marvin Minsky, Ben Schneiderman and Stelarc. I was invited to speak on a panel about new technology, art and innovation.<sup>17</sup>

The subcommittee chaired by Edmonds produced three recommendations in its final report. All began with the word 'access'. The first highlighted "the encouragement of artists-in-residence programmes that take place in information technology and creative media industry as well as academic research environments" adding, that the "concern is to give access to sophisticated technologies that would not normally be available in a private studio. The goal is to encourage and enable the development of new forms and new understandings rather than purely the generation of new works".

Edmonds had managed to persuade the DTI to fund a whirlwind visit in 1998 to Japan by the subcommittee members. We were shepherded at high speed around various R&D labs and art schools, carrying our golden mantra of individual creativity and seeing how far ahead of us some of the Japanese technology labs were, and how several were already offering access to international artists to spend time in the collaborative development of advanced media projects. We encountered Christa Sommerer and Laurent Mignonneau at ATR near Kyoto and bumped into Woody and Steina Vasulka by chance at ICC in Tokyo. Marshall McLuhan's view that artists are subliminal antennae who can sense what was coming further down the road began to seem real. I came back charged with a sense that we too in the UK were well-placed to create new R&D opportunities across arts and research contexts.

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<sup>17</sup> Details of the 1998 'Creativity and Cognition' conference (and others in the series) can be found at: [creativityandcognition.com/cc\\_conferences/cc99/](http://creativityandcognition.com/cc_conferences/cc99/) and [cc.acm.org/2025/past-conferences/](http://cc.acm.org/2025/past-conferences/); accessed 20.9.2025. In interview with Edmonds (31.8.2025) he has recalled how at the 1998 conference he directly introduced Nigel Birch of the Engineering and Science Research Council to me, with a view to encouraging potential intersections and collaborations around convergent domains of Creativity and Technology.

## Cross-sectoral Alliances

From 1992-1994, Arts Council England, through its Combined Arts departments at national level and at the London Arts Board, had introduced strands of support for collaborative projects, both at R&D and then production levels, stimulating practitioners from different disciplines to create something new from the sum of the parts, that went beyond simply joining together. In 1996, when I joined the national department, I was asked to come up with a new funding programme.

This became Combined Arts Projects, inviting applications for activities that might take any form as long as it was groundbreaking. Emphasis on a collaborative process was no longer the primary assessment criteria. We drew on a peer advisory group to make decisions, among whom were the artist and writer, Tim Etchells as well as musician and writer, David Toop. Works supported took many forms; use of new technologies grew manifest. I was invited to write a policy paper on *New Technologies and the Arts* for the Combined Arts Steering Group in 1997. In this I pointed to how the diverse and participatory nature of Carnival Arts, alongside the time-based nature of performance art and the multimedia dimensions of combined arts practices generally, had much in common with the potential then being displayed by the World Wide Web for widening access to creativity as well as disruptive innovation.

I remember writing most of it whilst in Boston on a family visit and, sitting in a flat near MIT, reading Nicholas Negroponte on why delegation to machine agents was the preferred pathway within the shaping of technological developments at the time. He made specific reference to having the digital equivalent of ‘an English butler’ to do things he did not have time to do online.<sup>18</sup> This seemed to me a moment when values that would eventually shape all our lives were being developed by individuals who were informed by their own sense of privilege and social hierarchy. I felt strongly that opening up gateways for more diverse participation in the shaping of technological futures, rather than reinventing existing power structures, was imperative. Might ACE be able to help to lever such opportunities?

Rising on the horizon at the same time were possibilities of largescale national collaborations among funding agencies. In 1996, the Wellcome Trust in London had introduced a programme to support artistic engagement with medical science. In 1999, Wellcome wrote to ACE, as well as to the Gulbenkian Foundation, and soon after to the recently established National Endowment for Science, Technology and the Arts (Nesta) to propose a ‘Sciart’ consortium.<sup>19</sup> The proposition was to pool funding together for a

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18 Nicholas Negroponte’s thinking in relation to machine and human agency the mid-1990s can be revisited at his website here: [web.media.mit.edu/~nicholas/Wired/WIRED4-05.html](http://web.media.mit.edu/~nicholas/Wired/WIRED4-05.html); accessed 20.9.2025.

19 Nesta now describes itself as ‘the UK’s Innovation Agency for Social Good’; more information can be found at its website, [nesta.org.uk](http://nesta.org.uk); accessed 20.9.2025.

larger programme that invited applications for support of research and development and project funding stages of art and medical science projects, with an open call due to go out ahead of the millennium. This felt like a partnership that would bring strong symbolic value. It helped seal the emergence of a small R&D Collaborative Arts Unit at ACE after the Combined Arts Department was entirely dissolved in the last year of the century.

The Wellcome Trust, however, administered the ‘Sciart’ scheme and managed the selection committee process, meaning that other members of the consortium had a relatively hands-off engagement. In this form, it ran for two years, funding fifty projects, and raised the profile of art and science interactions significantly. Whilst questions were being raised about the depth of what was being funded, with collaborations seeming to have been scrambled together to fit the guidelines, the early stages of this joint program was also a laboratory of learning with respect to how one might design schemes to support qualitative processes of engagement between different specialists. Among the constraints that this project seemed to me to reinforce was a relative asymmetry of relations between (often tenured) salaried scientific team members and (often independent) artist participants, who would receive a small fee but work all out to produce something to be shown to others. This seemed to me to be a deficit to redress in future initiatives.

On a broader note, however, the commitment of the Wellcome Trust, established by an endowment in Henry Wellcome’s will in 1936, to an open knowledge ethos seemed to me close to the public domain values of a national arts development agency such as ACE. Wellcome then further iterated and evolved its support for science and art interactions under various other programs and projects for six further years.<sup>20</sup>

Indeed, Ken Arnold, head of the Sciart project at Wellcome collaborated with ACE on a ‘New Audiences’-funded project in 2002, which led to a DVD, entitled *Play Garden*, that “aimed to develop better understanding of the challenges involved in programming art and science projects in diverse venues”. Within this we documented four ACE or Wellcome Trust projects being shown in various arts and science museum venues nationally, showing how qualitative modelling of different communication and interpretation strategies affected responses from venues, artists and visitors. We held a workshop with art and science communicators, entitled *Always in Translation*, in partnership with the Natural History Museum and the RCA, as well as the Wellcome Trust. This is also documented in the DVD which was available for free to all who were interested.<sup>21</sup> These activities fitted within a wider ecosystem of public domain activities – often Wellcome Trust or Gulbenkian Foundation supported – during the opening years of the new century in which a shared space of creativity crossing arts and science

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20 A report, *Insight and Exchange*, an evaluation of the Wellcome Trust’s Sciart programme, in its various iterations over more than a decade, written by Paul Glinkowski and Anne Banford, was published in 2009. It is available at: [wellcomecollection.org/works/xn7qhxqx](http://wellcomecollection.org/works/xn7qhxqx); accessed 20.11.2025.

21 ‘*Play Garden*’, a DVD with introduction from Bronač Ferran and Ken Arnold, for ACE and The Wellcome Trust, produced by Sian Hamlett, Arts Council England, 2005. The featured projects were *Polaria*, by London Fieldworks; *Primitive Streak* by The Helen Storey Foundation; *Chemical Garden*, by Active Ingredient; *Clean Rooms* by Arts Catalyst. Venues included the Eden Centre, Cornwall; *Magna* in Rotherham; *The Wapping Project* and Natural History Museum London; the Northern Gallery for Contemporary Art, Sutherland.

borders was increasingly being recognised. What this led to were various short-term initiatives that can be viewed in retrospect as having a historical significance as symbolic pathfinders towards future directions in policy and practice.<sup>22</sup>

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22 In 2002, the ICA in London, for example, played host to the (first?) scientist in residence in a contemporary arts venue. The appointee was Dr Daniel Glaser, who studied Maths and English literature at Cambridge then Cognitive Science at Sussex, [3ammagazine.com/litarchives/2002\\_jun/interview\\_daniel\\_glaser.html](http://3ammagazine.com/litarchives/2002_jun/interview_daniel_glaser.html); the ICA residency was supported by the Gulbenkian and the Wellcome Trust, as well as ACE through its core funding of the venue. Glaser has remained a key figure traversing structures and boundaries inside and outside academia, fitting again with the figure of the scientist who helps catalyse interdisciplinary practices. He is a fellow of the Institute of Philosophy at the School of Advanced Study, University of London. In 2025 he assumed responsibility for directing the development of a public venue for Google Deep Mind in Kings Cross in London. See [danielglaser.co.uk](http://danielglaser.co.uk) for more information.

## Changing the Language, Shifting Ways of Seeing

The Collaborative Arts Unit was the smallest in the Arts Directorate at ACE. We worked primarily worked by developing partnerships with agencies outside the specialist arts funding system, around topics and issues that fitted within a series of priority areas that we identified, including art and ecology, art and industry, art and law, art and science and art technology.

Inevitably there were overlaps and cross-pollination between these fields, that were in turn supported by the team's approach to making links through events and publications, that took into account the increasingly slippage that existed between the arts and a wider spectrum of creative practices. Our interest was in locating the most current and critical edges in these interstices and intersections and devising along with partner agencies a series of strategic interventions, the outputs from which we would share publicly.

This turned out to be an effective strategy, allowing us to move quickly and to engage with ideas that appeared to be percolating up into the public domain rapidly in the opening years of this century, and to respond quickly to strategic proposals that might come in from someone or somewhere we had not anticipated. Our concern overall was to make a difference that might otherwise not occur. If something or someone else was already doing what was being proposed, there could be no justification in our tiny team with its tiny budget getting involved.

At the top of our agenda, meanwhile, became the impulse to lever degrees of influence to create spaces for artists, not only to spend time in places to which they might not otherwise have access, but also to ensure that they had enough agency and autonomy to be truly creative in those contexts. Having an Arts Council imprimatur behind this brokerage, and to argue for the independence of the artist, proved an effective tactic.

My colleague Tony White played a significant role in many aspects of what Collaborative Arts and Interdisciplinary Arts accomplished. He was simultaneously a successful published novelist. I remember him saying to me that William Burroughs had observed (and I paraphrase), that if you can change people's language, you also change their minds. The nomenclature of Interdisciplinary Arts was a suggestion I came up with, that found support from ACE's Executive Director of Arts, Kim Evans, who was a firm advocate of the work we were doing.

How to develop our art and science brief was a process fertilised meanwhile by a brief month or so of sabbatical I was given in early 2002. On the invitation of Alan Blackwell, then a lecturer in the Computer Lab at the University of Cambridge, with whom we had worked on a major event in 2001, I spent this time as a Visiting Researcher at Darwin College Cambridge, reading about Isaac Newton's involvement with alchemy alongside

his ‘discovery’ of the earth’s gravity. Blackwell became co-founder in 2001 of the Crucible network for interdisciplinary design innovation in Cambridge, the crucible being also a term associated with alchemical domains.<sup>23</sup>

Chemical experimentation as art and science were closely associated in the 1960s with Gustav Metzger, founder of auto-destructive and auto-creative art. He was early to manifest the creative destruction that later was adopted by the technocrati. From the outset he was working to position the artist as an active and critical change agent within this scenario. He became a good friend of our fledgling department and told us that what we doing was important.

He had opted to be legally a ‘stateless’ person. In 2005, Metzger was given his first retrospective exhibition at the Generali Foundation in Vienna but lost his travel documents two days before he was due to go there. He came for help to ACE and Tony took action, managing to get through on a direct line to the Home Office, who sorted out for Metzger to be given emergency travel documents by the end of the day. The Viennese exhibition was also a turning point for Metzger, whose primary concern, as he told me in our first-ever conversation, in 2000, was securing the future of his archive, by which he meant being remembered by the next generation.

By the time he died in 2017, his star was high in the cultural firmament and is indeed still rising. Having realised the importance of placing what was happening then in a longer-term critical context, we introduced the idea of Pioneers in Art and Science, through which we commissioned the first DVD about Metzger, made by film auteur and professor, Ken McMullen. From 1999–2003, moreover, McMullen had been involved with a project at CERN entitled Signatures of the Invisible, led by the University of the Arts, London, where he was then based.

McMullen also directed a DVD featuring John Berger in dialogue with experimental and theorist physicists at CERN, which became the first DVD to be distributed through the ACE film and video collection. An email from Berger’s wife was received replying on his behalf when we wrote to ask for a quote for the cover of the publication. Berger said he thought a scientist should be asked to provide the statement. Along with a change of language came a different way of seeing. Or was it vice versa?

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23 Crucible was initially supported by the shortlived Cambridge-MIT Institute but grew beyond this. Its related outputs with respect to interdisciplinary innovation include a 2010 report on ‘Creating Value across Boundaries’, commissioned by NESTA, available at: <https://www.nesta.org.uk/report/creating-value-across-boundaries/>; and, in a longer version, at: [cl.cam.ac.uk/techreports/UCAM-CL-TR-760.html](http://cl.cam.ac.uk/techreports/UCAM-CL-TR-760.html); accessed 20.9.2025.

## Collaboration and Ownership in the Digital Economy

It had become evident to us that certain questions worthy of research level input were being generated from within the ground of emergent arts practices during this formative period. Both then and now I had a sense of a primary importance historically residing in the then shifting models of collaboration and ownership at work in emergent practices bridging arts and technology domains. We duly supported the first research, carried out by Christian Alhert, into adoption of Creative Commons licenses by artists. This was in liaison with Damien Tambini at the IPPR and then LSE. It was an initiative that gains value and significance over time, not least as the use of these licenses now is firmly rooted in the norm. That legal instruments were being introduced to fit with the appropriating, consumptive, inter-authorial nature of new media ahead of the curve of mainstream AI is also worth noting.

We were building related partnerships with external agencies, within academia, in particular. The most paradigmatic project that developed from this nexus was entitled ‘Collaboration & Ownership in the Digital Economy’, or CODE for short. It took place in April 2001 at the University of Cambridge. Although initiated by ACE it was brought to realisation in close partnership with a steering group, comprising Peter Colyer, for the Academia Europea organisation; Blackwell, representing the University’s Computer Lab and the Crucible Network for Interdisciplinary Design; John Howkins, a creativity expert, influential on Chris Smith’s Creative Industries agenda, and Bill Cornish, Professor of Intellectual Property in the Law faculty at Cambridge.

The initiative grew directly out of my encounter in 1999 with Michael Century, a Canadian-born academic and artist, who spent some time at SPRU in Sussex, whilst working on a report entitled Pathways to Innovation. Within this, Century stated<sup>24</sup>:

*This report presents a framework for thinking about the artist as an actor in the innovation process in information and communication technologies. The framework differs from most approaches to the interactions between the creative arts and techno-science in two ways. First, it attempts to identify and characterize the range of innovative outcomes and the factors that shape them along multiple dimensions – aesthetic, technological, scientific, economic – and time frames, both long and short. Second, the framework stresses the importance of a new class of hybrid innovative institution, the studio laboratory, where new media technologies are designed and developed in co- evolution with their creative application.*

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<sup>24</sup> Michael Century, *Pathways to Innovation*, [drive.google.com/file/d/1W3vnmXfD1ztnwTTSWQckiVZjUoRVVu5k/view](https://drive.google.com/file/d/1W3vnmXfD1ztnwTTSWQckiVZjUoRVVu5k/view); accessed 27.9.2025.

He added, “the sites of innovation with which we will be concerned in this report, ‘studio- laboratories’, need to be understood as emergent formations fed by, and flowing into artistic, techno-scientific, economic and discursive sources. This anti-reductionist approach is unavoidable, given the complexity of interests in and about digital media today”.

On meeting Century and discussing what he was doing, I decided to commission him to write a report also for ACE about the potential application of open source models within the arts. This was a topic that had not yet been addressed anywhere else. The essay he produced laid the foundations for what became the CODE conference, with Century its primary consultant.

He became the sole North American based representative of the advisory group, securing significant funding and support for the project from key figures with whom he was in direct contact at the Rockefeller and Daniel Langlois Foundations, with applications submitted by ACE. We also received funding from the Linux-related Red Hat Foundation. UK support came both from ACE and the EPSRC, with Birch responding to an invited application from Blackwell, whose team led on the event logistics. We were overwhelmed by the amount of interest from delegates and potential contributors from various parts of the world.

CODE brought together, for the first time internationally, practitioners and theorists working in anthropology, art, astronomy, literature, genetic science, law, policy and software, to debate the potential of free and open source software and peer to peer methods within innovation contexts across various disciplines. It played a role in shaping EU policy at the time towards IP and software patenting. Its timing coincided also with the year when the human genome was fully decoded, reinforcing the symbolic importance of our earlier close association with the Wellcome Trust, and marking a moment in time in which a commitment to open data was being heavily endorsed by public agencies globally.

It also coincided with various other policy decisions internationally around open source approaches to knowledge. In retrospect, CODE seems a landmark event in early 21st century cultural history. The Rockefeller Foundation’s Director of Arts, Joan Shinegawa, commented at the close of the event how exemplary it had been with respect to showing the lead that the arts could take in terms of important areas of policy as well as act a critical lever of interdisciplinary debate and analysis. It mirrored the convergent forces that seemed to be gathering around us all at the time, as a moment in which a praxis of peer to peer openness and a non-proprietary approach to ideas and to the underlying codes that fuelled innovation in multiple fields seemed to be in a techno-cultural ascendant. That its website continues to be maintained is a testament to Blackwell’s attention to its legacy.<sup>25</sup>

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<sup>25</sup> The CODE (Collaboration and Ownership in the Digital Economy website) including audio documentation of its presentations can be found at: [cl.cam.ac.uk/events/code/](http://cl.cam.ac.uk/events/code/); accessed 20.9.2025.

## New Technology Arts Fellowships

Like Benford and Edmonds, Blackwell is one of the leading intermediaries within UK scientific fields who has opened doors that would otherwise have remained closed to artists.<sup>26, 27</sup> In 2001, Blackwell and cultural producer Lizzie Muller, then at The Cambridge Junction, designed an innovative programme of New Technology Arts Fellowships, offering a selected group of artists supported access to Cambridge scientific research labs and their teams. The fellowships involved working towards work-in-progress showings at Kettle's Yard Gallery.<sup>28</sup>

Simon Biggs, an internationally known artist, who was highly computer literate, became one of the New Technology Arts Fellows. An article he wrote jointly with Blackwell on the project, 'Making Material Culture', conveys what occurred during this initial Fellowship that was then developed into a second phase with subsequent funding from ACE and the (then) AHRB.<sup>29</sup>

The other artist appointed to a fellowship was Dr Alexa Wright, who otherwise was employed at the University of Westminster. Her NTAF project was from the outset an activation of multi-institutional relations; her interest in the research area of facial recognition systems, had already been fostered by an invitation issued by Professor Alf Linney, Head of Medical Physics at UCL, who first saw Wright's work when she was awarded the Imaginaria Digital Prize at the ICA in 1998.<sup>30</sup>

Linney, a member of the jury, invited Wright to visit his lab and meet his team, that was making early inroads into the development and use of software for systems of facial reconstruction. Linney has spoken of how Wright from the outset brought a critical element of difference that pushed the project team in directions that otherwise they would not have taken.<sup>31</sup>

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26 Alan Blackwell's Computer Lab site at: [cl.cam.ac.uk/~afb21/](http://cl.cam.ac.uk/~afb21/) and his home page at: [cl.cam.ac.uk/~afb21/research.html](http://cl.cam.ac.uk/~afb21/research.html); accessed 20.9.2025, convey aspects of his wide-ranging research and practice.

27 I was put in touch with Blackwell by Nigel Birch at the EPSRC when we were in early planning stages for the CODE conference, having met Birch through Edmonds (see note 17). Birch saw Blackwell as the perfect collaborating agent for our project within the EPSRC-funded networks.

28 In dialogue for this essay, Blackwell has informed me that the idea of doing the Fellowships had emerged in a conversation he had with Lizzie Muller at one of the events that took place alongside the CODE conference, in this case notably a performance event at Kettle's Yard that Ernest Edmonds had generated. It included a trumpet performance by Jonathan Impett, using the Supercollider audio programming language invented in 1996 by James McCartney, that became a critical dimension of the live coding movement that took off a year later.

29 Simon Biggs and Alan Blackwell, 'Making Material Culture', (2006/2008), available at: [littlepig.org.uk/texts/material.htm](http://littlepig.org.uk/texts/material.htm); accessed 20.9.2025

30 This was the first digital art award in the UK. It was initiated by the commercial software consultancy, Cap Gemini and supported also by ACE, the Foundation for Art, Culture and Technology (FACT) in Liverpool and the ICA. A critical reflection on Imaginaria prize and on digital art, by Ewan Morrison and Matthew Fuller, can be read at: [metamute.org/editorial/articles/name-art-ewan-morrison-and-matthew-fuller-imaginaria-and-digital-art](http://metamute.org/editorial/articles/name-art-ewan-morrison-and-matthew-fuller-imaginaria-and-digital-art); accessed 20.9.2025

31 Alf Linney's reflection on the process of beginning and sustaining work with Alexa Wright forms part of a filmed interview with both carried out by Elizabeth Murton, UH Art Gallery and Collections Curator, available at: [uharts.co.uk/whats-on/2025/mind-matter-towards-co-creation](http://uharts.co.uk/whats-on/2025/mind-matter-towards-co-creation); accessed 20.9.2025.

The project developed at Cambridge was entitled Face Value. Among those whom Blackwell recruited to become involved in the project was a PhD student (who began her study at the Computer Lab the same day as the NTAF interviews were held). Her name was Rana el Kaliouby; she is now one of the leading figures globally in affective computing.<sup>32</sup>

After the NTAF period, Wright's project evolved over the next three years to become 'Alter Ego', a canonical work in an interactive media art lineage, that toured nationally during 2005. It then lay dormant for twenty years until being shown at the University of Hertfordshire [UH] in early 2025, as this essay refers in section 9.<sup>33</sup>

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32 Rana el Kaliouby completed her doctorate in Cambridge, then went into Affective Computing at MIT. She co-founded and is now CEO of Affectiva, [affectiva.com](http://affectiva.com); [ranaelkaliouby.com](http://ranaelkaliouby.com); accessed 20.9.2025. Her book entitled Girl Decoded was published in 2020.

33 The interview with Alexa Wright and Alf Linney, conducted by Elizabeth Murton, UH Art Gallery and Collections Curator, is now available at: [uharts.co.uk/whats-on/2025/mind-matter-towards-co-creation](http://uharts.co.uk/whats-on/2025/mind-matter-towards-co-creation); accessed 20.9.2025. The impulse to resuscitate 'Alter Ego' for contemporary audiences came from Sam Jury, one of the co-leads on the Art:Sci Lab at UH.

## Arts Council England/Arts and Humanities Research Board Art and Science Research Fellowships Programme

Introducing a ‘Special Section’ of *Leonardo Journal of Art and Science* in 2006, as Director of Interdisciplinary Arts at ACE, I stated, “Building an appropriate set of support structures for art and science collaborations can be a slow process. As with all such cultural developments a conjunction of good design combined with responsiveness in the policy arena is needed”. This feature was co-guest edited with James Leach and Tony White. It included texts written by nine of the artist-researchers and their scientific collaborators.<sup>34</sup>

My introduction also made reference to a then influential document entitled ‘*Imagination and Understanding*’ published by the Council of Science and Technology (CST) in the UK in 2000 that “declared that the divisions in education and research between the arts, humanities and science were anachronistic and detrimental to the future of Britain’s economy”. I pointed also to the ‘Lisbon Agenda’ launched in 2000, that had sought to make the European Union the “most dynamic and competitive knowledge economy in the world by 2010”.<sup>35</sup>

Sixteen projects were selected for funding in the summer of 2003. We had agreed when shaping the program on the privileging of openness and knowledge sharing across disciplines and seeking to achieve something new out of this synthesis and symbiosis.

The operational dimension of the program was devised together with the AHRB, involving at least three peer reviewers drawn from art and science disciplines, with a shortlist then going before a judging panel chaired by Dame Marilyn Strathern, an internationally acclaimed social anthropologist, whose field site was in Papua New Guinea and who had become known by the 21<sup>st</sup> century as a world-leading figure active in “studies in interdisciplinarity, especially the articulation of relationships between creativity and issues of ownership”.<sup>36</sup>

Others on the panel included a historian of science, a science/music specialist and a media arts expert. A total of £535,558 was allocated, with an average of £32,000 give to

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34 ‘Special Section: Arts and Science Research Fellowships – Arts Council England and Arts and Humanities Research Board’, *Leonardo Journal of Art and Science*, Volume 39, No. 5, 2006, 441–479, co-edited by Bronac Ferran, James Leach and Tony White, is available at: [direct.mit.edu/leon/issue/39/5](https://direct.mit.edu/leon/issue/39/5); accessed 20.9.2025.

35 See Bronac Ferran, ‘Creating a Program of Support for Art and Science Collaborations’, *Leonardo*, 2006, 443–445; The report ‘Imagination and Understanding’ Council for Science and Technology, London, 2001, was in 2006 archived at: [cst.gov.uk/cst/reports](https://cst.gov.uk/cst/reports) although, if still available on that site, is now deeply buried. The ‘Lisbon Agenda’ was a summary phrase used to apply to the research-related recommendations adopted by the EU at a summit in Lisbon in March 2000, details of which are available at: [europarl.europa.eu/summits/lis1\\_en.htm](https://europarl.europa.eu/summits/lis1_en.htm); accessible 20.9.2025.

36 See for example, Marilyn Strathern, ‘Experiments in Interdisciplinarity’ (2007) described as a “truncated version” of the earlier article: Marilyn Strathern, ‘Social property. An interdisciplinary experiment’, *POLAR. Political and Legal Anthropology Review*, 27 (2004): 23–56, American Anthropological Association. The 2007 text is available via: [onlinelibrary.wiley.com/doi/abs/10.1111/j.1469-8676.2005.tb00121.x?msocid=2ad7d10c7772605a27b9c737769b6162](https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1469-8676.2005.tb00121.x?msocid=2ad7d10c7772605a27b9c737769b6162); accessed 20.9.2025. Also M. Strathern, *Commons and borderlands: Working papers on interdisciplinarity, accountability and the flow of knowledge*. Wantage: Sean Kingston Publishing, 2004.

each of the sixteen projects for a period of up to eighteen months. From the perspective of ACE, “a primary aim of the scheme was to the try to place the artist ‘in the driving seat’ relative to previous support programs for art-and-science collaborations” which had “arguably been under-resourced, particularly in the level of funding available to the artists”. My introduction referred to our aspiration to introduce what seemed to be “optimum conditions for the realisation of innovative outcomes” which more clearly framed “the role of the university in the research” and that would “utilise research frameworks developed by the AHRB” including “outlining the collaborative research proposal at the outset alongside a clearly defined research context, research questions and methodology”.

We also decided to put funding towards establishing a “learning network” among the first-round awardees. This was convened by Dr James Leach, a social anthropologist (whose field site was also in Papua New Guinea) whose research into kinship, land and the role of creativity within this, proved very applicable with respect to domains of interdisciplinary exchange.<sup>37</sup>

Blackwell was responsible for planting this seed, having invited Leach to observe Biggs’s interaction with Terentjev, during the NTAF process; this had led to innovative consequences and prompted the proposition that Leach might assume the role of ‘attached observer’ for the ACE/AHRB scheme. He brought his insights and different perspectives to the task in rather transformative fashion. Having a social scientist observe art and science interaction in practice was a highly novel concept.

Rather than embarking on the search for models of good practice in such a scenario, which would be normative with respect to evaluation of largescale ACE strategic projects, Leach led us in a different direction, approaching the role of attached observer by enquiring, “Where does value lie in the transaction across disciplines”. In his article *Extending Contexts, Making Possibilities: An Introduction to Evaluating the Projects*, Leach told us that he had chosen this title because of the “emergent technologies and new artistic ideas in new combinations” involved in the program. He then posited that, “there is no readymade context available in which to understand the outputs”. This was perceptive at the time and remains true in retrospect.

Leach’s approach to the role of attached observer involved, as he put it, “detailed and intensive fieldwork with two of the projects” and “visits to all but three of the others” as well as development of “a network among participants within which they could share experiences, exchange ideas, learn from each other and plan new ventures together”. As he noted, this included two residential meetings over two weekends, with a central organising thread being “the notion of ownership itself, of the ownership of ideas and of transactions in knowledge and of the value each recognised in others’ disciplines”. This in turn led to questions of value, how might this be translated “from one context or domain into another”? And how did this perhaps change in the process of working together. As Leach also stated in his article, having someone “asking questions at a tangent to the actual concerns of the collaborators” and not doing this in an evaluative

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<sup>37</sup> For details of James Leach’s research and publications, see: [pacific-credo.fr/equipe/james-leach/](http://pacific-credo.fr/equipe/james-leach/); accessed 20.9.2025.

or judgmental sense, was perhaps a “useful external reference”.<sup>38</sup> This was absolutely the case.

Invited recently to reflect back on his role, Leach has recalled that “the value each collaborator placed on the other’s input often re-centred many of the interactions in contexts where mutual misunderstanding, and/or structural differences in expectations, threatened to disrupt the collaboration. Further, finding a vocabulary with which to describe how artist or scientist understood value also usefully defined boundaries and limits to what was negotiable or at stake for each”.

This seems to me to be a significant observation, that recalls in turn for me how what he was doing was productive of a shift in the art/science discourse towards a context in which a sense of relation, as an embodied and situated positioning, became manifest. Moreover, the presence of an ‘attached observer’ doing fieldwork in and around this relation, was a factor that refined perspectives on what Leach has called “models of commodification, objectification, or senses of self, present in, even elicited by, the cross disciplinary engagements”.<sup>39</sup>

Among the funded proposals was one that brought writer, and lecturer at the University of Chester, Alan Wall, together with physicist Gron Jones, at the University of Birmingham, on a “collaborative exploration of the use of metaphor in science” discussing “the use of metaphor in scientific thought as a process of transferred pattern recognition”. Another was *Musical Agents: Towards Computer-Aided Music Composition Using Autonomous Software Agents* that brought together Swedish-based composer, Palle Dahlstedt with Peter McBurney, a computer science researcher at the University of Liverpool, researching the development of software and techniques for the composition of generative music.

One of the (then) non-academic artists involved was Jo Joelson (Figure 2). Her project, “Little Earth: A Solar-Planetary Investigation” was developed with Stanley W. H. Cowley in the Department of Physics and Astronomy at the University of Leicester, along with three of Cowley’s colleagues in the Radio and Space Plasma Physics group at Leicester. Also involved was Joelson’s frequent artistic collaborator, Dr Bruce Gilchrist, with whom she worked under the title London Fieldworks. Joelson has recalled working on these ideas as symptomatic of a time when she felt that “big ideas” were welcomed. She has spoken also of remembering it as a time when, in contrast to now, “a homebrew” approach to technological invention was in the air, when one could do things with kit that was pulled off the shelf, doing something with this that was inventive and new, and not simply pre-produced by corporate interests.<sup>40</sup>

Heather Barnett’s project, meanwhile, involved working with diverse research groups in the School of Life Sciences at the University of Sussex. Her primary collaborating scientist was Robert Whittle, a fruit fly geneticist. They produced a book together

38 James Leach, *Extending Contexts, Making Possibilities: An Introduction to Evaluating the Projects*, *Leonardo*, 2006: 447-451.

39 Stated in email from Leach to author, 14.9.2025.

40 Stated by Joelson in conversation with author, September and October 2025; Joelson completed a doctorate in 2022. Her book, *Library of Light* was published in 2019 by Lund Humprheis. As an independent artist-researcher, she co-curated a national event on 4 November 2025, inspired by Metzger: [remembernature.art](https://remembernature.art); accessed 20.9.2025.



Figure 2: Jo Joelson and Bruce Gilchrist, *Little Earth, the twinning of the observatories: Ben Nevis Meteorological Observatory and Haldde Northern Lights Observatory*, photo montage, 2004.

entitled the *Drosophila melanogaster (fruit fly) Enthusiast's Manual*. Whittle, who had worked previously with Barnett on an art and science project and exhibition in 2000, commented of this project that it had grown in a way that neither would have created alone. He found it “fascinating” that Barnett had started by asking “which parts of the fruit fly” he “thought were the least beautiful”. He added, “Because the main focus of science/art collaborations often lies within the world of art rather than science, I am curious to experience what happens with a science/art project anchored more deeply within the science base”.<sup>41</sup>

41 Robert Whittle, in Heather Barnett and Robert Whittle, 'Drawing the Line: Some Observations on an Art/Science Collaboration' in *Leonardo*, 2006: 459-460; 460.

Another project linked to the University of Sussex involved artist Sol Sneltvedt working with neuroscientist, Michael O'Shea, with input also from a wider team including computer scientists, computational neuroscientists and the artist Charlie Hooker.<sup>42</sup> Their project, which remains of strong contemporary interest, was entitled 'Mindscape: An Attempt to Visualise the Working of the Brain'. It was described as setting out to visualise "complex brain activity, attempting to bridge the distance between scientific imagery and artistic representations" and to see if together they might "create a visualisation of the unlimited scale of human thought". The output was a largescale audio-visual installation at the Unitarian Church in Brighton in 2004, showing digitised highly magnified images of nerve cells in the brain combined with sound to try to represent the dynamics of the brain in action. Sneltvedt reflected in *Leonardo* on how before the ACE/AHRB call was issued, she had approached O'Shea to ask how she might somehow make a connection with his lab, to realise her desire to "make a time-based artwork that suggested a journey through a number of states of mind".<sup>43</sup> He had invited her to be an intern in the department, laying the ground in the two years ahead of making what turned out to be a successful application. She also referred to the warm reception that the project had received, not only in the exhibition in Brighton, but also in presenting it at the European Commission's 2005 forum on Science and Society. It was reviewed positively in *Arts Professional* in 2004, by Evelyn Wilson.<sup>44</sup>

One of the most fruitful projects in terms of ongoing connections beyond the initial phase of the Research Fellowship was entitled 'Bodies Meet Minds: Choreography and Cognition'. The artist-researcher was Wayne McGregor, who was introduced by Scott deLahunta, a dance and technology specialist, to Blackwell, who became one of the lead scientific researchers, and brokered connections to a group of cognitive and neuroscientists, some of whom then worked with McGregor afterwards for several years. Blackwell still recalls McGregor's basic research question: "I want to discover what is happening in my mind when I dance".<sup>45</sup> As the article in *Leonardo* observed, "The project was a central influence on *AtaXia*, a major new choreographic work" that McGregor created for the Random Dance company. It added, "The focus on impaired physical coordination in neurological disease is superficially paradoxical in a dance company renowned for its 'physical intelligence'. In seeking to embodyneurological condition of ataxia McGregor expressed powerful themes of disconnection and incoherence".<sup>46</sup>

DeLahunta maintained a site entitled *Choreography and Cognition* capturing the process documentation.<sup>47</sup> He also wrote a personal reflection for the *Leonardo* feature, entitled, 'Willing Conversations: The Process of Being Between'. In my opening text,

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42 Sol Sneltvedt is now an Adviser in the Division of Student and Academic Affairs at the University of Bergen, as documented at: [uib.no/en/find-employees/Sol.Sneltvedt](http://uib.no/en/find-employees/Sol.Sneltvedt); accessed 23.9.2025.

43 Michael O'Shea and Sol Sneltvedt, 'Mindscape: An Attempt to Visualize the workings of th Brain' *Leonardo*, 2006: 455-457.

44 Evelyn Wilson, 'Brain Waves', *Arts Professional* 86, no. 4 (2004).10, is available at: [artsprofessional.co.uk/magazine/86/article/arts-and-science-brain-waves](http://artsprofessional.co.uk/magazine/86/article/arts-and-science-brain-waves); accessed 20.9.2025.

45 Stated by Blackwell in conversation with author, Cambridge, 24 September 2025.

46 Rosaleen McCarthy, Alan Blackwell, Scott deLahunta, Alan Wing, Kristen Hollands, Philip Barnard, Ian Nimmon-Smith and Anthony Marcel, 'Bodies Meet Minds: Choreography and Cognition', *Leonardo*, 2006, 475-477; 475.

47 See project site for *Choreography and Cognition* at: [choreocog.net](http://choreocog.net); accessed 20.9.2025.

I commented of this that it transmitted deLahunta's "inspiring thoughts about the importance of empathy and other human factors in the interchange between disciplines and across specialist boundaries".

In 2000 Collaborative Arts had commissioned deLahunta to write an exploratory paper on ways that one might build a more effective ecology of relations on art and science and technology borders that might evolve beyond short-term funding. His interest in dance, notation and software was formative as an intervention shaping the ground of responsiveness among various funding agencies to such traversal fields and processes. His two reports were primarily internal and were titled *Ground Work* and *Pre Ground Work* respectively; summaries of these are available to read on deLahunta's website.<sup>48</sup>

There were several exciting spinoff developments from the relations spawned through 'Bodies Meet Mind: Choreography and Cognition'. Outputs included a jointly authored paper by deLahunta and Leach entitled 'Dance Becoming Knowledge' published in 2013 in *Leonardo*. It is a reflective exploration of dimensions of a major exhibition at the Wellcome Trust in the same year that drew wider attention to the fascinating connections between choreography and cognition that the 2003 Research Fellowships had initially generated.<sup>49</sup> A co-authored chapter for *Contemporary Choreography*, (2009), by deLahunta, McGregor and Barnard also documented these interactions.<sup>50</sup> There is a tracing line also on McGregor's website.<sup>51</sup>

One is tempted to perceive the longevity of relations and ongoing iterations of projects and ideas across practice and academic arenas to be a marker of success in terms of this venture. Supporting a non-UK resident, Warren Niedich, to become the Fellow at Goldsmiths College, where he was hosted by Professor Robert Zimmer, Head of Computing, had numerous spin-off outputs, not least in catalysing several conferences, one of which foregrounded Niedich's early interest in the phenomenon of the Phantom Limb, another was on the theme of Neuroaesthetics and another was entitled Creative Evolution.<sup>52</sup> Taking place in 2005, Creative Evolution, which attracted additional ACE funding, was a major milestone in terms of theoretical understanding of the impact of software on culture and on concepts of growth and emergence in understanding artistic practices from the nineteenth century to the present.<sup>53</sup>

In temporal terms, the most sustained connection came to my attention in preparing this essay, when I was speaking to Gordana Novakovic, recipient of one of the second

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48 Scott deLahunta's Ground Work and Pre Ground Work report summaries are available at: [sdela.dds.nl/gw/attach.html](http://sdela.dds.nl/gw/attach.html), and <http://www.sdela.dds.nl/gw/intro.html>; accessed 20.9.2025.

49 See Scott deLahunta and James Leach, 'Dance Becoming Knowledge' available at: [jamesleach.net/downloads/leon\\_a\\_01074%20\(1\).pdf](http://jamesleach.net/downloads/leon_a_01074%20(1).pdf); accessed 20.9.2025.

50 The chapter was entitled 'Augmenting choreography: insights and inspiration from science: Scott Delahunta, Phil Barnard and Wayne McGregor' and was published in *Contemporary Choreography*, eds. Jo Butterworth and Liesbeth, Taylor & Francis, 2009. See: [taylorfrancis.com/chapters/edit/10.4324/9780203124918-40/augmenting-choreography-insights-inspiration-science-scott-delahunta-phil-barnard-wayne-mcgregor-scott-delahunta-phil-barnard-wayne-mcgregor](http://taylorfrancis.com/chapters/edit/10.4324/9780203124918-40/augmenting-choreography-insights-inspiration-science-scott-delahunta-phil-barnard-wayne-mcgregor-scott-delahunta-phil-barnard-wayne-mcgregor); accessed 20.9.2025.

51 The material on Wayne McGregor's website is available at: [waynemcgregor.com/research](http://waynemcgregor.com/research); accessed 20.9.2025.

52 For further information about these events, see the interview with Niedich as the following link: [artbrain.org/journal-of-neuroaesthetics/journal-neuroaesthetics-5/introduction-to-the-conference-of-neuroaesthetics/](http://artbrain.org/journal-of-neuroaesthetics/journal-neuroaesthetics-5/introduction-to-the-conference-of-neuroaesthetics/); accessed 12.12.2025.

53 Although documentation of *Creative Evolution* is thin online, it was trailed on the Rhizome website, at [rhizome.org/community/5187/](http://rhizome.org/community/5187/); accessed 25.9.2025.

round of ACE/AHRC Research Fellowships. She has told me that she has remained an artist in residence at the Computer Science Department at UCL ever since the initial award, in 2004.<sup>54</sup> Like with Snelvedt, a connection had already been engendered with this department, where, even before the Fellowship period, Novakovic applied successfully to ACE for project funds to work with Professor Peter Bentley. He told her then that she would show she was serious about what she was doing if she raised funding that was not just for the artist but for the wider research project. This she delivered in 2004, being successful with both an ACE/AHRB Fellowships proposal and a Leverhulme grant application for their project entitled Fugue.

It achieved some significant impact and research outputs, including being shown in Dublin Science Gallery and featuring in the journal, *Nature*, in an article entitled “The immune system as an invisible, silent Grand Fugue”.<sup>55</sup> In 2006 Novakovic was asked by Bentley to present the work at the 20th Anniversary Summit of Artificial Intelligence.<sup>56</sup> After both Fellowships ended, Novakovic was invited by UCL to continue her association and given a small monthly stipend. She stresses that she has always wanted to remain an artist rather than to become an academic. She has been made welcome on this basis within Computer Science at UCL. In effect, her difference has been appreciated. Novakovic has been told that she holds the record as the longest-running artist-in-residence at any one location. We must acknowledge the sustained openness of UCL in terms of this relation.

What becomes clear moreover over time is that the project that Novakovic and Bentley initially proposed to research together found a new pertinence in the recent pandemic when questions of the human immune system became a mainstream topic. Belief in a step change that might be possible from the insertion of independent artist-led research into academic research contexts, within the sphere of inter or transdisciplinary collaboration, made for a series of unprescribed outcomes, that continue to gain traction in the light of future reflection.

But Leach’s summative question relating to the first phase of the Fellowships remains unanswered: where does the knowledge emerging from these intersections most appropriately reside? Something of the same enquiry applies it seems to me in considering processes of development of these inter and infrastructural interventions, and considering the role played by individuals such as Edmonds and Blackwell, Roger Malina and indeed Robert Zimmer, at Goldsmiths, whose agential influence tends to be elided as projects they helped to generate have found further and future lives.

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54 Computer Science at UCL’s announcement of Novakovic’s arrival as an artist in residence remains live at: [haig.cs.ucl.ac.uk/csnews/artist\\_in\\_residence.htm](http://haig.cs.ucl.ac.uk/csnews/artist_in_residence.htm); accessed 20.9.2025.

55 Stated by Novakovic in interview with author, 20 August 2025.

56 The proceedings of the 50th Anniversary of AI event are available at: [www.scribd.com/document/349149628/ai50proceedings-web](http://www.scribd.com/document/349149628/ai50proceedings-web); accessed 20.9.2025.

## Blue Sky Placements

### (i) Capturing stardust

In 2005, Interdisciplinary Arts was asked to lead a further ACE-wide strategic initiative, where funding was made available for what we called Blue Sky Artists Placements. These were developed both in this country and elsewhere.

Much as the ‘Sciart’ scheme and the NTAF programme were useful testbeds for the Art and Science Research Fellowships program, so too we drew on the open-ended nature of the latter to feed into our approach to these placements. The allocation was described by Senior Management as Artists’ Time, Space and Money, and took into account not only what had been learned from our projects but also the successful effects of a series of International Artists’ Residencies, coordinated by Tim Eastop, Senior Visual Arts Officer, in the early years of the century.

We devised one of the most successful of our projects under this theme jointly with astronomer Roger Malina, who had been a CODE speaker. He was also Executive Director of the *Leonardo Journal of Art and Science*, founded by his father in 1968. Malina had a close association with the NASA-funded Space Sciences Laboratories, [SSL] at University of California, Berkeley and approached them about the possibility of setting up a Blue Sky Placement, to be collaboratively supported by Arts Council England and SSL.<sup>57</sup>

We arrived at a partnership agreement, building on the learning from the earlier projects. We took the decision to advertise the opportunity openly, in *the Guardian* newspaper, and brought together an interview team, comprising Roger, Nicola Triscott from the Arts Catalyst, Tony and me. From a competitive shortlist, we selected artist Liliane Lijn and the duo, semiconductor. Both ran with these opportunities in directions that could not have been prescribed at the outset, achieving astonishing, mind-flowing, results. (Figure 3)

I remember that in her interview, Lijn told us that in the early 60s in New York, she had managed to get access to perspex and liquid polymers by knocking on factory doors. Similarly in the 1970s, now living in England she had cold-called British Insulated Callender Cables and The Post Office having heard about an experiment they were doing with a new communications technology called Wavelength. She was given the capacity to create a large public kinetic sculpture using this commissioned by the Milton Keynes Development Corporation, called ‘Circle of Light’. As a panel, we were struck by her persistence and prescience. Yet the time of being interviewed, she felt her early work had gone relatively unappreciated.

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<sup>57</sup> The Space Sciences Lab at Berkeley, University of California, is one of the leading centres of NASA research in the US and the world generally; its website is at: [ssl.berkeley.edu/our-impact/](https://ssl.berkeley.edu/our-impact/); accessed 20.9.2025.



Figure 3: Liliane Lijn, *Stardust Ruins, Heavenly Fragments*, 2008. Aerogel Fragments of cone and disc on grey mirror in Perspex case, perlescent metallic coated square column housing dvd player, projector, 295 x65 x 65 cm; Video: *Visions of the East*, 50' looped dvd. Photograph: Liliane Lijn.

At the Space Sciences Laboratories, Lijn developed close dialogues with many leading space scientists. One of her closest collaborators was John Vallergera with whom she collaborated in placing specially designed heliostats on the two towers of the Golden Gate Bridge, an installation that was a part of their ongoing larger project to delineate the horizon with points of spectral light. A work they subsequently made together entitled *Sunstar* was installed at the Mount Wilson Observatory in Pasadena and was most recently promoted as part of a largescale art and science festival in California in 2024.<sup>58</sup>

She also worked closely with Dr Andrew Westphal, who had been involved with the *Stardust* mission, which sent probes beyond Mars equipped with a new material called Aerogel, which could absorb and capture remnants of interstellar space dust (and bring these back for analysis). Lijn immediately recognised the potential of aerogel for artistic expression and negotiated transporting some of it back to London, where she developed a process of transforming the aerogel into intangible lustrous artworks that were subsequently shown in a central London Gallery and received considerable press

<sup>58</sup> The Lijn/Vallergera *Sunstar* project is described at the Mount Wilson Observatory site, here: [mtwilson.edu/sunstar/](http://mtwilson.edu/sunstar/); accessed 20.9.2025. It was visible as part of the PST Art and Science Collide festival across various venues in California on 4-5 October 2024, detailed here: [pst.art/en/events/sunstar-walk-through-a-rainbow](http://pst.art/en/events/sunstar-walk-through-a-rainbow); accessed 20.9.2024.

attention. The ‘Fragments of Stardust Ruins’ series she made with this material now resides behind perspex in her London studio. The pieces radiate a ghostly, unearthly, beauty. Lijn has spoken of them as making manifest for her the concept of matter as “frozen light” advanced by quantum physicist, David Bohm.<sup>59</sup>

Over the course of 2024–2025, Lijn became increasingly celebrated in various places. A retrospective touring exhibition that began in Munich in 2024, then went to Vienna and to Tate St Ives.<sup>60</sup> Her work was also a high point of ‘Electric Dreams’ at Tate Modern in late 2024. This, alongside the recently published autobiography of her early years as an artist, *Liquid Reflections*, have finally drawn the attention of mainstream audiences and the national press to her extraordinary practice. An interview with Lijn in *The Telegraph* in May 2025 described her ‘Sculpting with Stardust’. It made reference to the importance of her time on a NASA-funded residency in Berkeley.<sup>61</sup> ACE and *Leonardo’s* initiating role here auto-creatively vanishes from art history, at least the version that can be found in *The Telegraph* newspaper. But what made the period under discussion here most interesting, at least in my memory, was how we combined forces together to open up otherwise difficult to penetrate spaces for individualistic and independent artists to gain privileged access to powerful research and development opportunities. That is how it seemed to me at the time.

## (ii) Space-time conjunctions

That such ventures may shift the ground of emergent expectations around what artistic research and development can bring to other science-led scenarios was affirmed also by the second residency held at SSL, involving artist-researchers, Ruth Jerman and Joe Gerhardt, who are known as semiconductor. As I discovered on a visit to their studio in Brighton in early 2025, on a bright, blue sky day, under a Moon and Venus conjunction, their experiences at SSL laid down a template for other relations they have subsequently built in other world-leading laboratories over the two decades that have followed.

They told me that after their time at SSL they had a series of other residencies and placements that have brought them to major centres of scientific research in four continents. Indeed, semiconductor are internationally seen as exemplifying the capacity of artists to bring a transformational, transmutational, vision to their encounters with leading-edge scientific research and researchers.

The remarkable, award-winning, ‘Brilliant Noise’ and ‘Magnetic Movie’ (Figure 4), both made as a consequence of time spent at SSL were the first testimonies to this capacity.<sup>62</sup> They have recalled in our recent dialogue how what they were doing (as

59 This section is adapted from Bronac Ferran, ‘La Lumière Retourne à sa Source’, *Liliane Lijn, Early Works, 1961-1967*, exhibition catalogue, RCM Galerie, Paris, 2015. The citation from Lijn relating to Bohm is from this essay.

60 I reviewed Lijn’s touring exhibition, ‘Arise Alive’, in its Munich iteration, for *Studio International* magazine, at: [studiointernational.com/index.php/liliane-lijn-arise-alive-review-haus-der-kunst-munich](https://studiointernational.com/index.php/liliane-lijn-arise-alive-review-haus-der-kunst-munich); accessed 20.9.2025

61 Interview with Liliane Lijn, by Lucy Davies, *The Telegraph*, 18 May, 2025.

62 Semiconductor’s ‘Brilliant Noise’ has been acquired by the Centre Pompidou in Paris; it is available to watch here: [semiconductorfilms.com/art/brilliant-noise/](https://semiconductorfilms.com/art/brilliant-noise/); ‘Magnetic Movie’ is at: [semiconductorfilms.com/art/magnetic-movie/](https://semiconductorfilms.com/art/magnetic-movie/); accessed 20.9.2025.

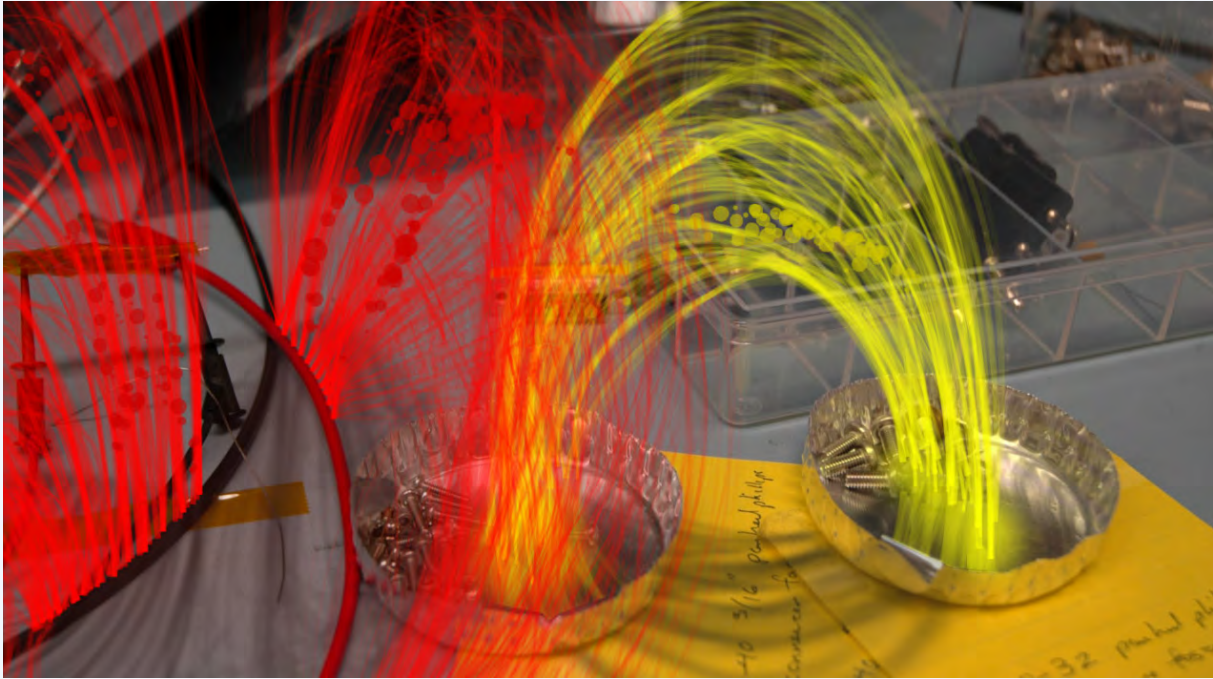


Figure 4: *Semiconductor, Magnetic Movie* (still), 2007. Magnetic Movie was an Animate Projects commission for Channel 4 in association with Arts Council England. Shot at the NASA Space Sciences Laboratory, UC Berkeley, California, USA.

artists in residence, working quietly in a corner of the lab and having open-ended conversations with the scientist-researchers) suddenly seemed to make sense to these same scientists when they finally showed them what they were doing. This the scientists then began to speak of in positive ways to their peers. As anyone who has seen what semiconductor produced from that opportunity recognises straightaway, they created something wholly unexpected that grew precisely out of the specific context and location.

This is an approach they have maintained to the present. Their latest work, *Light-In-Flight*, developed from a residency with the ‘Extreme Light’ research group at the University of Glasgow, is being shown in Singapore during the writing of this essay.<sup>63</sup> This latest residency has brought semiconductor into productive dialogue with scientists working on quantum photonics.<sup>64</sup> Invited to comment on how they manage to maintain a sense of openness to each new opportunity, semiconductor told me that they treat each project as if it is the first, whilst having learnt something in the process that they feel makes sense universally, “for us, art, science and technology map to different kinds of understanding – technology as known knowns, science as known unknowns and art as unknown unknowns”.<sup>65</sup> This strikes me as enduringly wise.

63 Information about semiconductor’s ‘Light In Motion’ is available at: [semiconductorfilms.com/art/light-in-motion/](http://semiconductorfilms.com/art/light-in-motion/); accessed 12.10.2025.

64 For further information about the University of Glasgow’s Extreme Light research, see [extremelight.org.uk](http://extremelight.org.uk); accessed 12.10.2025

65 Stated in conversation with Joe Gerhardt and Ruth Jerman, semiconductor, 3 January 2025; reinforced in an email to the author, 28.1.2025.

## Waves upon Waves

Writing this essay has also reminded me that cultural interventions, if well-timed, can create circular wave patterns that then disperse, shifting the flow of the water up and downstream. Others too can have effects more like Brownian motion, like grains and particles moving in seemingly random directions. Sometimes cultural patterns resurface decades later after years of hidden incubation or latency, reforming in ways that go further than what has gone before, as if becoming part of stronger forcefields in the intervening intervals.

What I have been discovering in this present-day unearthing is that many of those involved in the early years of this century in spanning disciplinary boundaries through creative interactions have been continuing down that pathway. Moreover, it strikes me that many artists, from a younger generation, are creating their own self-generated residencies and readily assimilating scientific references into their independent practices.

The environment now is of course quite different. Those whom I have spoken to have stressed that STEM subject areas are, at least in terms of structural funding, very much in the driving seat and that opportunities for artistic involvement generally avail of public communication of science sources. Whilst some artists steer away from this, viewing it as an instrumentalising of their practice, others have turned this act into a critical agenda through which attention can be drawn to contentious and urgent issues, such as the potential for extractive deep-sea mining to be given the go-ahead. This has formed the basis for Emma Critchley's current touring exhibition, recently on display at Tate St Ives.

Critchley's work is both artistically stunning and scientifically precise as well as environmentally crucial. The development of the project has involved spending time in various scientific research contexts and becoming engaged in international processes of resistance involving marine scientists, indigenous coastal dwelling peoples, legal specialists in the rights of the sea, and others.<sup>66</sup>

What seems to me to have fundamentally altered since the early twenty-first century is that the focus of these interventions is no longer on the how and the why of such interdisciplinary interactions but is increasingly on de-centring, co-creative, processes and network-building outcomes. The open knowledge and collaborative exchange direction that was fostered among the projects through the involvement of Leach and indeed the production of a special feature in *Leonardo* was a useful pointer in the same direction.

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<sup>66</sup> Further details of Emma Critchley's Sounding project and its touring venues can be found at: [tate.org.uk/whats-on/tate-st-ives/emma-critchley-soundings](https://tate.org.uk/whats-on/tate-st-ives/emma-critchley-soundings); accessed 20.9.2025

Meanwhile, I am frequently reminded in reflecting on a trajectory of emergence in relatively recent art and science developments of Biggs’s description of his long-term preoccupations, articulated in his joint text with Blackwell, published originally in 2006. This had stated: “Biggs’s artistic work, over a period in excess of 20 years, has largely been concerned with the development and application of digital technologies in interactive environments and other interactive artefacts (such as adaptive software, self-authoring texts, etc)”. It continued: “His interest, as developed through that body of work, is the way in which artworks that are apparently able to author or manifest themselves create a mutual shift in perceived roles of author and reader, and thus a problematization of the sense of self – this is an ontological enquiry”.<sup>67</sup>

After the NTAF and Art and Science Fellowships programs were completed, Leach contributed to Biggs’s edited book, entitled *Remediating the Social*.<sup>68</sup> His chapter reflected on how different conceptions of ownership and the person were integral to different possible modes of collaborative production. Leach’s articulation of this way of thinking and seeing has been radically strengthening of a discourse within art and science, beyond Snow’s two cultures agenda.

Adapting this framing to look through the lens of relational processes had close synergy with the access and innovation nexus that became dominant around the turn of the century, that was also formative in shaping new funding programs and supporting policies and partnerships between various agencies, as this essay has sought to show. The turn, if you like, of the century was also a turn away from singular, solo-authored style practices towards a view of art as distributed, networked, something held in common, ridden with slippages away from humancentric to other modes of being, in which the challenge of the technological was to seek to humanise it enough to make it speak and interact and interrelate, like a collaborating agent.

We see this embodied in the aforementioned work by Wright and Linney and his team at UCL, with input from Cambridge researchers. That it was functionally brought back to life for the Mind+Matter: Towards Co-Creation exhibition at the University of Hertfordshire [UH] was due to its software being upgradable, a task carried out by Daren Macdonald, a computer programmer, who was part of the original UCL research group.

As Visiting Research Fellow at the Art:Sci Lab at UH during 2024–2025, I was invited to contribute an essay in response to the exhibition. I observed of ‘Alter Ego’:

*It is essentially the same interface, exposed to a changed context of reception twenty years after its initial airing. A relative ‘clunkiness’ or slight delay that now becomes visible in the transfer of a human face into the machine’s visage, when we sit in front of it, takes on a new meaning in light of how we assent to the seamless submergence of our most personal aspects of ourselves — our faces — within*

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<sup>67</sup> Biggs and Blackwell, *Making Material Culture*.

<sup>68</sup> Simon Biggs’s essay, ‘Remediating the Social’, is available at: [littlepig.org.uk/texts/RemediatingtheSocial.pdf](http://littlepig.org.uk/texts/RemediatingtheSocial.pdf); accessed 20.9.2025. It was first published in *Remediating the Social*, edited by Simon Biggs, published by ELMCIP, University of Bergen, Norway, November 2012.

*seconds, in the context of today's facial recognition systems. In retrieving this 'moment of transference', bringing it out of retirement so to speak, what is also being cached is a threshold in cultural history that demarcates a stage of unfamiliar and even uncanny human-machine facial interaction ahead of the curve of selfies, social media and unlocking access to the phone by waving it in front of the face.*

I continued: “however, this finds a mode of renewal in the performative acts within the gallery by visiting school children and others who are somewhat bemused by the installation. Through these Gen.Alpha eyes it is a machine that seems vintage but then also looks somewhat spookily like themselves”.<sup>69</sup>

What I found most interesting about this resuscitation, in observing the behavioural patterns of people of various ages who interacted with the work, is that it appears now to have slowed down time to allow us to revisit a moment that even then appeared to be looking forward, into the distance of a potential merger between the human agent and a symbiotic, beyond human, other. In opening this up again to participatory interaction, a point of conjecture is amplified towards negation in the light of what has occurred in between. Within this shifting plane of relation, the field of software becomes a critical boundary object that elides established patterns of authorship and ownership as well as concepts of a finished art object. As such it then remains open as a work to the changing context of reception from generation to generation, both in terms of human and indeed technological development.

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69 Ferran, 'Shifting the Mould: Between Retreating Snow Lines and Deepest Waters'.

## New Shoots

### (i) Towards a more fluid intelligence

Barnett, who is now Pathway Leader for the MA in Art and Science at Central St Martins, was also a contributing artist to the UH exhibition. Early in 2025, she showed me around the ‘wet lab’ that exists inside CSM, made available to students on different courses for bioart and biodesign experiments and for teaching purposes. As one of the few joint degrees in this area to exist internationally, the CSM Masters in Art and Science is currently expanding at present to include doctoral students. Its existence points to evolutions within higher educational structures in adaptive transdisciplinary directions.

Four works Barnett made using slime mould were among the UH exhibition highlights. She sees her contribution to the slime mould’s creativity as one of intermediation and refers to this single cellular organism as offering endless possibilities for discovery and re-interpretation. Her time-lapsed films and drawings of the evanescent, and yet slow-moving organism reveal its emergent properties as a living system. It has, as she has put it, a “wet intelligence”.<sup>70</sup>

In my text for UH, I described how she was making “visible the dynamic properties of the living material known colloquially as ‘slime mould’” and how “its scientific title, ‘myxomycetes’ is applied to organisms, often invisible to the human eye, that thrive in dark and dank places, such as deep woodland habitats or under wood in the garden”.<sup>71</sup> Seeing this at work in the gallery, I began to recognise it as a paradigmic reflector of the leakages and slip-sliding between disciplinary descriptors and nomenclatures that have characterised the terrain on which this essay has been focussing.

The image overleaf ([Figure 5](#)) is of a still from one of the slime mould works that Barnett was showing at the UH exhibition. She has described this to me as following a “continuous conversation between an organism” and “the shape-shifting Icelandic landscape” where “an intelligent amoeba, the slime mould *Physarum polycephalum*, navigates its world through a process of chemical sensing, constantly assessing changing conditions and responding to unpredictable events”.

An interest in working with slip-sliding between domains of knowledge and specialist fields is also embodied by one of the CSM Masters in Art and Science graduates, Libby Heaney. She did five years of postdoctoral research in quantum theory before shifting to art in 2013. She has become known internationally as someone whose practice elides easy definition, bringing ideas drawn from quantum theory into conjunction with

<sup>70</sup> Stated by Heather Barnett in interview with author, 11.2.2025.

<sup>71</sup> Ferran, ‘Shifting the Mould: between Retreating Snow Lines and Deepest Waters’.



Figure 5: Heather Barnett, *Ripple Rift* (film still), 2024. Three screen UHD video. Film by Heather Barnett. Sound by Matt Donovan.

making works of art in material and dematerialising formats. She has been using IBM's 'QuBit' quantum coding in her art production in 2019. In a solo exhibition from October 2025 to March 2026 in London she is showing six works in response to three paintings by J.M.W. Turner, as part of a series of events marking his 250th anniversary.<sup>72</sup> Like Barnett, Heaney often makes reference in her practice to the virtues of sliminess.

## (ii) Quantum mutations

Edmonds, too, in October 2025, revealed a series of new artworks made using quantum computing, (Figure 6) to which he has lately had access via a collaborator in Australia, the hardware engineer, Jonathan Knoblauch.<sup>73</sup> Edmonds has told me that this development allows him to explore randomness (true randomness) in his art for the first time. He was known among his peers in early computer art for his resistance to using the pseudo-randomness adopted by others. What we then see in Edmonds's related works are lines that are no longer just vertical and horizontal but slanting in various directions.

<sup>72</sup> My review of the exhibition, 'Shadowscapes: Heaney, JMW Turner and Quantum' is available at: [studiointernational.com/index.php/shadowscapes-heaney-jmw-turner-and-quantum-review-orleans-house-gallery-london](https://studiointernational.com/index.php/shadowscapes-heaney-jmw-turner-and-quantum-review-orleans-house-gallery-london); accessed 23.10.2025.

<sup>73</sup> The exhibition 'Quantum Computing Art', featuring Ernest Edmonds and Jonathan Knoblauch is at the Phoenix, Leicester; [phoenix.org.uk/events/ernest-edmonds-and-jonathan-knoblauch-quantum-computing-art/](https://phoenix.org.uk/events/ernest-edmonds-and-jonathan-knoblauch-quantum-computing-art/); accessed 12.10.2025.



Figure 6: Ernest Edmonds, *QT5*, 2025, digital print, one of ten commissioned by the Computer Arts Archive, Leicester, drawn from Edmonds's distributed work, *Quantum Tango*, 2025, shown at SIGGRAPH, Gazelli Art House and in Padua, Italy.

He sees these first steps into art and quantum computing as 'markers' towards future possibilities. His concern, as he has told me in interview, is still the same as it has been since the 1960s, i.e. to find the most important questions arising from ongoing technological innovation.<sup>74</sup>

Knoblauch (Figure 1) meanwhile has recently pointed out that in his professional work as an engineer engaged in quantum computing he has come to view current research in this context as equivalent to the early internet period, where largescale applications are "still a few years away". He sees quantum computing as a shift in our appreciation of "reality", "exploring the boundaries of human thought"; moreover, he has concluded that "nature is quantum" and therefore cannot be understood using classical computing processes.<sup>75</sup>

74 Ernest Edmonds, interview with author, Leicester, 7.10.2025.

75 I am drawing here from an excellent talk about their project and their process by Edmonds and Knoblauch entitled *Demystifying Quantum Computing Art*; this is available at the website of the Computer Arts Society, at [youtu.be/h3M1oPls7Bs?si=zs81XI4AViYpB6oV](https://youtu.be/h3M1oPls7Bs?si=zs81XI4AViYpB6oV); accessed 20.12.2025..

At a time when multi-hyphenated classifiers and self-identifiers are now abounding, is the old chestnut of art and science as a duality ready to be superseded by quantum entangling and super-positioning? Or does Art and Science as a construct gain even more importance as a signifier of a different way of seeing the world, given the heavy dominance of STEM-subject areas in terms of attention and resources?

In October 2025, news of a centre for the Arts and Humanities at the University of Oxford, being developed to help rebalance a shift of attention towards innovation in science and technology, was publicly announced. The promotional video included a reference to the involvement of Wayne McGregor in a potential future residency.<sup>76</sup>

Might this be an opportunity to help to promulgate new ways of thinking within academic and artistic contexts about how the learning from past ventures might inform future possibilities? Or are such cross-disciplinary projects doomed to be forever in a state of reinvention? Is there a space in scholarship between academic and arts practice for a new repository of knowledge with respect to interdisciplinary innovation?

In mid-October 2025 an exhibition entitled Evolution and Foundation opened in London. It brought into focus an innovative partnership involving William Latham and his long-term collaborator, Stephen Todd, a software programmer with whom Latham began to work with in the late 1980s at IBM in Winchester, along with Dylan Barnese, a research engineer at Google DeepMind. The exhibition description told us that in this project AI agents are being afforded the status of artists. In a talk on this topic in January 2026, Latham described how he now believes that a historical emphasis on singular artists is now shifting towards collectivist creativity and stated that he welcomes these developments.

Are we living at a point of inflection, when earlier collaborative shifts in this direction are now finding mainstream traction? How are other pathfinders in the arts and humanities responding? And indeed, what might follow?

On completion of this reflection on shifts between the last century and this, in relation to research policy and practices in arts and academia, I see those who were active progenitors of interdisciplinary projects as being like extremophile plants, taking root in relatively unprepared soil, so shifting the conditions of the habitat so that others might follow. In revealing how new shoots may relate to older roots, I have tried to enact a new grafting, to make somewhat intangible lines of force of creative evolution more tangible, and riper perhaps for future growing.

### **Dr Bronač Ferran (2026)**

Commissioned by National Centre for Academic and Cultural Exchange (NCACE),  
School of Advanced Study University of London

Email: [bronac.ferran@sas.ac.uk](mailto:bronac.ferran@sas.ac.uk)

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<sup>76</sup> The video announcing the new Stephen A. Schwarzman Centre for the Arts and Humanities at the University of Oxford is available at: [youtu.be/e4kRCLrmdqM?si=qRmMTW-KRqsReQkB](https://youtu.be/e4kRCLrmdqM?si=qRmMTW-KRqsReQkB); accessed 12.10.2025.

## Acknowledgements

My deepest thanks go to Evelyn Wilson, Co-Director of NCACE for the invitation to write this essay. I would like to also extend thanks to Noshin Sultan for her endless patience in helping it to completion and to Kate Roncoroni: Graphic Design for the perfect layout. My gratitude goes also to Dr Heather Barnett, Professor Alan Blackwell, James Bloom, Professor Ernest Edmonds, Joe Gerhardt and Ruth Jerman, Dr Rachel Jacobs, Dr Jo Joelson, Professor James Leach and Gordana Novakovic, for comments and interviews. I am grateful also to Kim Evans, John Howkins, Liliane Lijn, Roger Malina, Professor Marilyn Strathern and Tony White for earlier inspirational conversations. I would like to also acknowledge the generous permission of the copyright holders of the featured images for their reproduction in this essay. As a completion of my period as Visiting Research Fellow in Art and Science at the University of Hertfordshire [UoH] (2024-2025) I was invited by UH Arts+Culture curator, Elizabeth Murton and Sam Jury of the UH Art:Sci Lab, to write an essay in response to the Mind+Matter: Towards Co-Creation exhibition at the UH Gallery. It provided a key stimulus towards this longer text. All views and opinions expressed in the document, except where otherwise directly cited, are my own.

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Figure 2: Jo Joelson and Bruce Gilchrist, *Little Earth, the twinning of the observatories: Ben Nevis Meteorological Observatory and Halde Northern Lights Observatory*, photo montage, 2004. © London Fieldworks

Figure 3: Liliane Lijn, *Stardust Ruins, Heavenly Fragments*, 2008. Aerogel Fragments of cone and dison grey mirror in Perspex case, perlescent metallic coated square column housing dvd player, projector, 295 x 65 x 65 cm; Video: *Visions of the East*, 50' looped dvd. Photograph: Liliane Lijn. Courtesy Liliane Lijn and Sylvia Kouvali London/Piraeus. © Liliane Lijn

Figure 4: *Semiconductor, Magnetic Movie* (still), 2007. Magnetic Movie was an Animate Projects commission for Channel 4 in association with Arts Council England. Shot at the NASA Space Sciences Laboratory, UC Berkeley, California, USA. © semiconductor

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The National Centre for Academic and Cultural Exchange (NCACE) is part of the School of Advanced Study, University of London and funded by Research England.

