

# ICT & ART Connect: Connecting ICT & Art Communities – early outcomes

Camille C. Baker<sup>1</sup>

**Abstract.** This paper will discuss the progress of the project, which will have been completed for a couple months and all the analysis and reports on outcomes will be delivered, and discuss its findings and the outcomes of the project events and collaborative residencies. I discuss in depth a few selected supported collaborations as case studies and the different models of collaborations observed, as well as the policy recommendations made to the European Commission, based on these and the project activities and outcomes.

## 1. INTRODUCTION

Art and technology collaboration is not new and in the last 15-20 years many arts organisations, and even earlier tech companies in the US and elsewhere, have invited artists and technologists to work together to create something new. Music, dance and other performance practices have been incorporating technological approaches and tools for many years, dating back to the European *Musique Concrète* and *Elektronische Musik* in the 1940's and the residency of Edgar Varese at Philips Labs in Eindhoven, the Netherlands, that led to the world famous *Poème Electronique*. Interactions between ICT and artists can also be traced to the 1950's, when such works as the 'Oscillon 40' made by Ben Laposky, who "...used an oscilloscope to manipulate electronic waves that appeared on the small fluorescent screen... displaying the wave shape of an electric signal... constantly moving and undulating on the display..." (Victoria & Albert museum website: 2013). In the 1960s, electronic instruments began to be used to create music (for example as described in "White Heat Cold Logic: British Computer Art 1960–1980" (Brown et al, 2009).

Since then, artists have often been included in corporate R&D departments to help foster more aesthetic or cutting edge approaches to technological development, such as the artist-in-residencies in places like IBM with William Latham as their artist in residence, 1990 (Brown, 1996) and Sony Computer Science Laboratory with Atau Tanaka as one of their artists-in-residence (2001-2007).

## 2. ICT AND ART COLLABORATION

Art responds to the social currents of the time, whether it is increasing mobility and globalisation, environmental issues and the search for sustainable practices, or the influence of the smartphones and devices, and tablet computing. Today the interface between technology and art is constantly increasing in size and scope and attracting artists from a variety of disciplines and backgrounds. The use of digital technology, new media and digital networking in artistic practice, as well as the accessibility of online knowledge opens enormous opportunities for the creation of new forms of art and for the innovation. It also enables interaction with the public, due to the increasingly blurred boundaries between creators and audiences, which gives rise to a significant potential for learning and engagement with the public.

The rise of such powerful technologies have given birth to new forms of socially connected, interactive and collaborative creation, new ways of experiencing art (e.g. 3D projections of artworks, virtual tours of artists' works, cultural context webs), as well as to the abundance of totally new forms of cultural and educational media content, including e-books, iPads, e-paintings, digital 3-D/ interactive/or immersive videos.

The artistic landscape is rapidly shifting around us; as tablet painters, sketchers and smartphone photographers appear everywhere. The arts inspire the evolution of ICT, forming, informing and reforming ICT by instilling fresh and innovative design, style, interaction, and imagination – as can be seen at such places as the annual SIGGRAPH Conference and Expo or the International Symposium of Electronic Art Conference and Exhibition each year. Artists are often included in big corporate R&D departments to help foster more aesthetic or cutting edge approaches to technological development (i.e. artist in residencies in places like IBM ([William Latham](#)) and Sony Computer Science Laboratory ([Atau Tanaka](#)) in the past, more recently [CERN](#) and [The Centre for Computational Neuroscience and Robotics](#), and open calls for artists by companies like Nokia in 2009 for "free" R&D). However, ICT projects that seek to collaborate with artists have, as yet, not been as widespread or have received a sufficiently high profile.

At present, there are a plethora of different tools and technologies either in use, or in experimental stages, that enhance and facilitate the creative processes for artists, either working alone or in interaction/collaboration with other changes and dialogues. The ICT revolution is opening up a new landscape of opportunities for art driven by the emergence of devices, systems and interfaces, with entirely new capabilities.

---

<sup>1</sup> Camille C. Baker, PhD Digital Media, School of Engineering and Design, Brunel University, London  
Camille.Baker@brunel.ac.uk

Currently, there is a proliferation of tools for musicians incorporating tablet computers into their composition and performances as instruments and controllers. There are many examples of ICT being used as an integral part of the musical performance or exhibition, exploring new uses of emerging technologies, and finding innovative ways to engage with audiences. One example is, [Liveform Telekinetics](#) of Michelle Terran and Jeff Mann, a performance machine to be entirely operated by a networked audience.

Another example is, the Bristol organisation Watershed and its Pervasive Media Studio initiatives, involving support and funding to help theatre directors, actors, performance companies, and digital artists to make participatory theatre using mobile and pervasive devices (<http://www.watershed.co.uk/pmstudio/>) for work that incorporates pervasive media tools (RFID tags, QR codes, GPS or other location-based tools) into their performance productions. Another is artist/dancer Susan Kozel, whose work incorporates tweets into her choreography, as seen in recent projects *Inutweet*, and *alone or not* (<http://www.aloneornot.org>) Another example, the London-based artist, Kasia Molga (<http://kasiamolga.net>), trained as a painter and animator, who now uses interactive live data feeds and SMS to create digital paintings and other generative and interactive digital works (see some of these works discussed and shown in the Vague Terrain issue 22 on Mobile Performance curated by Camille Baker in 2012 <http://www.vagueterrain.net/journal22>).

Open-source technologies development and the accessibility of these tools enables more people to engage in and learn programming and electronics, to get involved in technological progress, making their own software applications and electronic devices. These communities produce and develop software tools and hardware, which have spread exponentially since Linux first became available, especially with the Creative Commons copyright (copyleft) and other such licensing methods taking more prominence (i.e. FLOSS etc.). Projects such as nuigroup ([nuigroup.com](http://nuigroup.com)) and OpenNI ([openni.org](http://openni.org)) provide access to cutting edge HCI techniques, while Arduino ([arduino.cc](http://arduino.cc)) and Processing ([processing.org](http://processing.org)) allow easy creation of software and hardware, targeted towards both creative practice and education. "Maker" communities have emerged around the world where engineers, programmers and artists or crafters get together, pool their resources and support each other to make new unusual projects – outside of traditional corporate and academic research environments (such as the London [HackSpace](#), or the worldwide [Dorkbot](#) or [Maker Faire](#) communities).

Musicians, artists, software developers and technologists have been increasingly making their own open-source tools and applications for their projects and performances for many years. Many digital art and technology festivals are sponsoring 'hack' events where artists and technologists meet up for the first time bringing sometimes only their ideas, skills and perhaps their laptops or DIY electronics kits, to build something together by the end of the day. This flurry of 'maker' 'crafting' or commoner art/ICT collaborations has great potential to increase innovation and enhance creativity which urgently needs to be studied, encouraged and supported, in order to understand how it might influence further art/science/technology collaboration.

There is also a growing number of organisations, events and initiatives across Europe and worldwide focusing on bringing ICT & Art worlds together, such as [The Computer Arts Society](#), [MusicTechFest](#), iMAL, V2 in Amsterdam, [Ars Electronica](#), [ISEA](#), [Siggraph](#), that explore the intersection between informatics and aesthetic practice.

### 3. FET-ART PROJECT / ICT & ART CONNECT

The EU funded project FET-Art project stems from the first "ICT & ART Connect" event, which took place in Brussels in April 2012 under the aegis of DG CONNECT, European Commission, and co-organised by the Future and Emerging Technologies Unit, Brunel University and University College London issued a series of recommendations, including the following ones:

*We need to study what problems art and ICT can solve together... Does there first have to be a convergence process between art, ICT, brain science, and psychology, whereby each discipline better understands the process and language of the other? ...Do we need to understand better the intradisciplinary benefits of art and ICT collaborations, before going on to understand the inter- and transdisciplinary ones? ...The element of the aesthetic in the ICT innovation process may also need more study. (Foden, 2012)*

The reported outcomes of the workshop and recommendations for future directions that the EU should take on Art and ICT co-creation, included:

1. *A plea to the EU and Europe to think harder about art and ICT as complementary ways of thinking; whereby both computational and creative thinking include making models and metaphors of the world/experience that involve choosing between a range of narrative options.*
2. *To recognise that Art is generally accepted as a good vehicle for public engagement with an understanding of science and technology, and that Art often provides a holistic view of the social conflicts of science's embodiment in technology. Art helps to convert knowledge into meaning.*
3. *To understand that Artists don't like environments in which they are an afterthought, getting a pat on the back for making technology or science look pretty.; and technologists don't appreciate being brought into creative projects just as technicians. So we must think about how the revelation processes of Art making can be integrated into scientific/policy methodologies; and what the right conditions are for true co-innovation.*
4. *Together, Art & ICT can help the wider public to engage in the ethical issues around policy; and through ICT-enabled communication channels, involving participatory democracy around different artistic interpretations of choice, the public can participate and affect decision-making. But first collective tools for community management, sustainable management and broad exposure across Art & ICT need to be established. (Foden, 2012)*

Other policy recommendations were:

- Explore other forms of engagement between art and ICT other than for dissemination purposes only;
- See how a stronger engagement of ICT with artists could help integrate ICT better in the social fabric and help ICT to better fulfil its role as catalyst of social change.
- Establish areas of research in ICT where stronger involvement of artists could be synergetic. Three candidates: Creativity, Social innovation, Global Systems science.
- Develop a rationale and operational steps to include artists more prominently in these areas.
- Establish a map of on-going activities that bring together Art and ICT across Europe (and possibly worldwide);
- Include events of the type organised in the fabric of ICT events (FET14, ICT2013);
- Plan an annual series of workshops in the spirit of ICT & ART CONNECT;
- Consider an organisational structure to facilitate interaction of artists with ICT projects ('in-project artists?');
- Explore other forms of CONNECT engagement with art than for dissemination purposes only (for instance co-creation, public engagement with ICT)(Foden, 2012).

This event clearly confirmed that a great potential exists in fostering dialogue between ICT and Art practitioners, and this is the right time to efficiently support such dialogue, in light big changes in the way the EU funds research project and the Horizon 2020 mandate for funding in order to contribute to the emergence of novel FET research topics and the identification of new emerging research areas.

The funded follow-on project to this event, FET-Art, is a one-year project that started in June 2013, and is intended as a catalyst project, devoted to connecting the European technology and artistic communities, and fostering productive dialogues, engagement, and collaborative work between them. The core objectives of the project are to consult within the art and ICT communities in the European Union, identify associated challenges and impacts of ICT and Art collaboration on technology, art, science, education and society in general, and develop new research avenues and directives from the results of this project.

There currently exist a great number of organisations and individuals in Europe and worldwide, who have been attempting and successfully bringing two cultures of Art and technology, together to create something new. Recent initiatives and studies across various EU countries have also signaled that art and technology collaboration is moving up the agenda of future research and innovation. The FET-Art project, and its many pan-European activities, has been attempting to overcome the fragmentation in efforts by bringing together the two communities to create critical mass of professionals interested in connecting Art and ICT, to take it to the next level.

In this context, a group of committed partners from 3 UK countries (UK, Netherlands and France) who were involved in this event have decided to develop the FET-ART project,

building on the outputs of this event, and on the following additional considerations:

- Collaboration between technology and art can create new knowledge, ideas and processes beneficial to both fields and to society in general. Artists and technology researchers approach creativity, research and innovation in different ways and from different perspectives; when working together they open up new ways of seeing, experiencing and interpreting the world around us, thus stimulating novel solutions to technological challenges, and the emergence of novel research topics. Through a series of residences, it is possible to **boost such collaborations**, and **offer a methodologies toolkit**, which will facilitate such practices in the future and **ensure a long-term impact**.
  - Art in its broad sense, including visual art, music, performance and media art, enables people from different cultural backgrounds and walks of life to engage in productive dialogue. The fine and performing arts and, more recently, digital and electronic arts, have challenged society and engaged with the current local, national and global issues that people face daily, and simultaneously exposing current social, cultural and political realities that may otherwise not be readily apparent or not otherwise addressed. It is necessary to enable **new societal insights** from **multicultural and multidisciplinary crossovers** and **exchange of knowledge** between technology and art practitioners and stakeholders.
  - Artists are able to add critical reflection and have the ability to communicate complex technological ideas and discoveries in concise and engaging ways. Artists can interpret the social dimensions of technological research challenges and make them more accessible and transparent. The use of digital technology and networking in artistic practice, as well as the accessibility of online knowledge, has opened up enormous opportunities in the last ten years, through the creation of new forms of public engagement and through personalised education and interaction with ever widening audiences. This allows audiences to become participants in art, either directly or indirectly and, where the art relates to science, to have an intimate and engaged relationship with science as a process. Audiences are now participants in art (Bourriaud, 2002), with significant sectors of contemporary art being directly participatory in nature. Thus, we need to develop processes and forms that will **enhance the visibility and accessibility** of ICT & Art collaborative research **to the widest audience**.
- Some of the questions this project has stated that it would like to address at the end after all the events and residences have been completed include:
- How can we stimulate the dialogue between art and ICT?
  - What can ICT bring to art and what can art bring to ICT?
  - How can artists contribute?
  - What novel solutions could we imagine?
  - How can co-creation between art and ICT best be facilitated?
  - How can art and ICT collaboration best enhance citizen engagement in new innovations in ICT?

## 4. ACTIVITIES OF FET-ART/ICT & ART CONNECT

The FET-Art project brought together art and technology communities in order to foster productive dialogue and collaborative work. It is expected to contribute to the emergence of novel future emerging technologies research topics, as well as the identification of new emerging research areas in the art and technology domains and beyond. The project had an all-inclusive approach to collaboration, crossing the full breadth of the fields of art and technology; from traditional and visual arts, to digital media, music, sound and design; and equally across all technology and science practices. In order to harness new, unique and excellent collaborations from across such broad horizons, crucial frameworks and resources have been mobilised.

The main focus of the project was aimed at organising at least five consultation and matchmaking events to bring together art and technology practitioners, and to facilitate interaction and exchanges between them, then encourage the emergence of collaborative pairs who would compete to start residencies at each partner organisation projects. The goal of the consultation was to discuss and collate past collaboration experiences that artists and technology professionals had had, either with others within their profession or across disciplines, and to glean recommendations for future collaboration process approaches to feed into the collaborative residencies in the phase 2 of the project. Events took place in Nantes, France, Brussels, London (twice), Edinburgh, Amsterdam and Barcelona over a 12 month period. Each event was organised differently and some included Hackathons or fast project prototyping to ignite partnerships, while others focused on showing successful art/tech projects and discussing the issues and problems of art/tech collaboration more deeply.

The activities of each event of the project, interpreted slightly differently by each partner, include:

1. Consultation with experts as well as art and technology practitioners on past collaborations and issues;
2. Matchmaking activities to bring art and technology practitioners together to create new, more informed collaboration proposals for our residency activities;
3. Case study 1 day (hackathon-style) to 3 month residency to try out a new project for the team to study, analyse and report back to the EU.

### 4.1 CONSULTATION PROCESS AND OUTCOMES

One of the main aims of the FET-Art project branded ICT & Art Connect has been to both seek and document consultation with experts and with the arts and ICT technology practitioners themselves on the issues and process of collaboration. Experts consulted have included some of our partner members, such as Waag Society, with many years of such residency and co-creation facilitation in the Netherlands. However, and active effort has been made to find outside, objective experts from

other European and international institutions and organisations, who have experts within them who have witnessed, researched and/or otherwise facilitated and nurtured numerous art and technology collaborations. Some of those that were invited to speak and to get involved in our events and residency proposal selection include:

1. **Lindy Candy**, a writer and computer scientist, from both England and Australia, co-founder of the [Creativity and Cognition](#) conference, and leader of the relevant art/technology collaboration research project in the late 1990's–early 2000's in England called COSTART.
2. **Christiane Paul**, long-time new media curator in both Europe and the US, [Director](#) of the Media Studies Graduate Programs and Associate Professor of Media Studies at The New School, NY.
3. **Ruth Catlow** and **Marc Garrett - Furtherfield** - a non profit arts organisation, founded in 1997 and sustained by the work of a community of artists, technologists, academics- thinkers and doers.
4. **Ghislaine Boddington** - director of [Body>Data>Space](#) - a London based org dedicated to Performing Arts and ICT creation, research and collaboration for over 15 years.
5. **Honor Harger** – A curator from New Zealand who has a particular interest in science and technology. She joined [Lighthouse](#) in March 2010 as Director, and became Artistic Director on 1 February 2013.
6. Professor **Lizbeth Goodman** – PhD Chair of [Creative Technology Innovation](#), Professor of [Inclusive Design for Education](#), Executive of the [Innovation Academy](#) (UCD/TCD), Founder/Director of the [SMARTlab](#) and the [MAGIC](#) Multimedia and Games Innovation Centre.
7. **Irini Papadimitriou** - the Victoria and Albert [Digital Programmes](#) Director and [Digital Curator](#) of Waterman's Gallery.
8. **Hugues Vinet** - Scientific Director, [IRCAM](#), Paris. IRCAM, the Institute for Research and Coordination in Acoustics and Music, is one of the world's largest public research centres dedicated to both musical expression and scientific research.

\*More experts can be found on our website <http://ict-art-connect.eu>

The advice and input from these experts on collaborative process and facilitation between artists and technologist has been invaluable and has shaped our residency analysis framework, but also the overall policy recommendations we will feedback to the European Commission. Advice from the experts include:

From Ruth Catlow:

- Determine what you want and who you are before beginning a collaboration;
- Try to agree on the starting point: conditions, materials and context of the project;
- Realise that the same words mean different things in different disciplines, so learn each other's definitions;
- Collaboration can be slow;

- Code is not clay – easily moldable – so understand the technological constraints (esp. artists);
- Trust - know who you are working with. Be curious;
- Create the brief together – commit to it as if your life depended on it;
- Communicate the (changing) schedule to everyone.

From Ghislaine Boddington:

*The challenge for artists and technologists is how to engage, comment and disrupt the mass global view of this digital world in a way that takes the debate well beyond a display of digital aesthetics, produced by the technological tools of the day.*

For inter-authorship collaborative process to work:

- Skills specialisation are practised within collective working methodologies;
- All should learn and teach equally;
- All should work together to cover day-to-day practicalities;

Key elements of the creative process:

- The pooling of ideas;
- Continuous weaving of content and artistic development and technology;
- Chains of interaction between participants - deep collaboration;
- Open studios at all times and regular process showings;
- Debate threaded throughout practice; and
- Integrated documentation reflecting the process as it happens.

Linda Candy states from her COSTART research that there are different models of collaboration based on different cognitive and thus thinking styles. She provides strategies for collaboration for artist / technology teams:

- Work with experienced and high calibre people;
- Develop the work in closely with partners
- Examine the impact of ideas and artefacts in progress in a meaningful (honest) way;
- Engage in reflection on all aspects of the work through conversation as interviews;
- Use interviews as reflective insights towards creating new knowledge and new works.

Candy states that the partnership models works best and involves:

1. Roles of equal importance but different goals;
2. Partners generate, implement and evaluate together;
3. New technology is developed alongside new art forms;
4. Technology is not available in the marketplace and the challenge is to make art and technology in parallel;
5. The partners develop relationships with longer-term prospects.

## Models of Collaboration

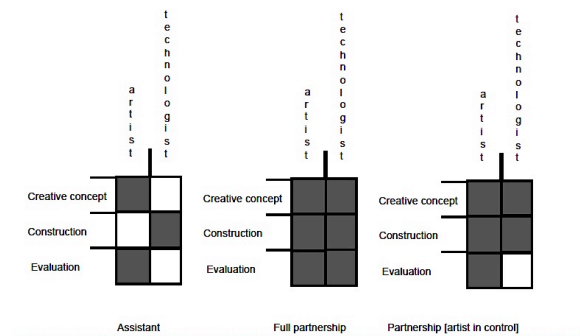


Figure 1. Linda Candy COSTART research project 2002

From the UK consultation events, with art and tech participants discussing previous cross-collaboration experiences, the some concerns seem to be coming up again and again:

- Communication is very important – often this is a lack of clear communication and goals;
- Trust is critical to collaboration;
- Ego can often get in the way between collaborators and each should come with a more open mind about what can happen in the project rather than preconceived ideas;
- Collaborators need to be equals on all levels and there need to be common motivators for the project;
- Translation is required across disciplines as the same words can mean different things in each discipline;
- People need to “learn” how to collaborate;
- There are differences in expectations of timing / flexibility between collaborators, etc.

These are just a few that have surfaced, and as a more objective text analysis is done using NVIVO software, we will have a better sense of the patterns surfacing and can make a more clear analysis.

Some recommendations from participants to the European Commission on future funding for Art and technology/ICT collaborations from our January consultation, include:

- More diversified funding (across disciplines);
- Sustainable, centralised platforms for distribution of open source tools;
- Involvement of artists in projects of any discipline as a rule;
- A matchmaking database of interdisciplinary collaborators;
- Distributed collaborative spaces around Europe to be visited and used by artists and technologists from Europe, with access to technologies (these spaces could be newly created ones or existing ones in universities and labs and be obliged to share them);
- More transparency about or new standards for evaluating proposals (more access to decision makers/making).

## 4.2 MATCHMAKING PROCESS SELECTION

The matchmaking activities happen usually separately from and after the consultation and other activities (such as the performance activities of the London events) that enable participants to discuss views with each and socialise together to enable them to “pre-match” or connect with people that they may end up partnering with.

During the actual matchmaking activity, based on the speed-dating model for dating services and the adapted speed-networking model of corporate networking events, the goal is to give each person a sampling of the people, expertise and projects available to possibly partner on. In practice, one person will sit and remain seated for the duration of the speed-networking activities. When asked to, the another person sits across from the 1<sup>st</sup> person. Each pair then has 5-10 minutes to pitch their skills, ideas and project idea to each other. Each pair has only 10 minutes in total, so that everyone in the room has an opportunity to pitch to each other and discover all the ideas and people in the room. When asked to move again, one group – either the artists or the technologists – get up and move clockwise to start their next pitching. After all have met each other they are asked to find the people whose ideas they liked the most and would like to work with and start to discuss the project idea a bit further. All are then guided through the proposal requirements and told of the deadline and sent away to try to develop a proposal together for the next deadline. In the first round, we only had a few proposals, but as the project aims and vision spread and more events took place to bring people together to meet, each round has received more proposals. Sadly, since it is just a 12-month project, the momentum began and but only 3 deadlines were possible, but the partners hope the project can be extended somehow.

All collaborative teams are first required to complete the form ‘ICT & Art Connect Proposal’, available through the ICT & Art Connect website, in order to be considered for a residency. Copies of the ‘ICT & Art Connect Proposal’ made available and are discussed at the matchmaking events and also available on the website with the documents accompanying this guide. An ICT & Art Connect consortium partner notifies the expert judges when there is a proposal awaiting review. Project proposals are then assessed based on the expert’s knowledge in relation to the criteria below.

1. Artistic or ICT / science merit
2. Quality of collaborative concept
3. Innovative nature of the project
4. Probable Citizen Engagement in ICT outcome
5. Impact in arts and ICT / science industry
6. Ability to carry out the project (time, logistics and skills)
7. Budget

Experts are also asked to answer the following relating to each project proposal:

- The assessment of project worth and viability;
- Whether they would recommend this project to be put forward; and
- Any comments or advice (possible pitfalls/difficulties, realism of timeframe/budget etc.).

## 4.3 RESIDENCY METHODS & MONITORING

The second phase of the project includes taking the proposals from the art and technology pairings from the matchmaking activities and from our online matchmaking tool, and each consortium partner taking 3-4 selected, and expert reviewed proposals to the residency stage. They then host and facilitate these pairings for 1 day to 3 months and fund them to work together intensely, either in one of the project partner locations or within the work space of either of the collaborators, in order to get started on their project ideas.

A residency is defined as a period of collaborative work bringing together an ICT scientist/technologist and an artist over a period of time (between 1 and 4 weeks) focussing on one of our two key themes of ‘co-creation’ or ‘citizen engagement in ICT’ (see above).

The key themes that all residency projects are required to incorporate somehow by the project aims (written in our proposal and description of work) and set by EC DG-Connect that funded it, include:

- **Co-creation** – means that: where the partnership is able to create a new outcome, formulate a new concept or develop an innovation that would not have been possible without a verbal and practical dialogue between the authors of the work. In this case, the notion of authorship of the work will be shared, as will methods and areas of expertise.
- **Citizen Engagement in ICT**  
‘Citizen Engagement in ICT’ refers to the issue of public understanding of science, in this case ICT. Artists and ICT professionals will work together to develop creative ways of widening understanding and engagement in debates around emerging technologies in ICT or in the core concepts of ICT. Arts projects have proved a successful way of conveying complex scientific ideas to ‘non-scientific’ audiences in a way that can be very accessible.

A pairing consists of two or more collaborative partners, at least one taking the role of technology specialist partner and at least one taking the role of artist partner. It is recognised that in some cases the boundaries may already be blurred in terms of roles and disciplinary boundaries, so participants are asked to self-define their role and to provide evidence of their ability to fulfill their chosen role. Our definition of ‘art’ is broad and includes traditional fine art media, dance and music and well as new media such as digital art and bio-art. ‘Pop Up Pairings’ were developed as a way to define certain special events that some partners wanted to use as their residency opportunities and took the form of short, intense, collaborative partnerships lasting up to twenty-four hours or ‘hackathons’. There was a separate application process for these through the specific events.

Residencies are arranged on a case-by-case basis to support the needs, working practices and time schedules/commitments of those involved. Artists’ studios or working space provided by one of the consortium members, if available, and the residency may be focussed on that space. Each host partner have provided their own or other arranged facilities to support each residency,

but some pairs have chosen to work in a different location, such as the workplace of the tech professional/scientist, or the studio of the artist. However, there we did not have or provide a budget for equipment costs and pairings were encouraged to use facilities either provided by the project's host organisations, or the technology collaborator's facilities, or provide their own equipment. Only travel and other expenses, time replacement and other costs were covered, divided between for each consortium member's 3-4 residency projects as appropriate, to enable travel and accommodation to pairs to meet in person and to otherwise meet the needs/length of the residency, on a case by case basis.

Each host partner provided mentoring support for all residencies, in order to provide expert guidance in the facilitation of the collaborative working process. The assigned mentor from each host partner addressed any and all concerns or needs by collaborators, and a weekly meeting between the mentor and the pair was advised and provided to aid in monitoring, but also to discuss progress and any issues or concerns. Residencies were evaluated using interviews, visits and surveys as well as regular reporting and analysis of residency will be done at the end of the project at the end of May 2014. The results of each pairing will be analysed in terms of the overall collaborative processes, communication, and overall interaction, which will then be fed back to the EU via policy recommendations for future funding initiatives.

During each residency, participants are asked to complete two surveys, one prior to the start of the residency 'pairing' and one after the completion of the residency. These are to capture participants' hopes and fears about the collaboration at the start, garner their reflection on the process, and then capture their perception of the outcomes at the end. Background data about the participants' is also captured, as well as the nature of their working environment, and the outcomes and their future plans (if any). The aim is to create easy to use surveys that capture useful data, for this reason we ask participants to complete the surveys via the widely used, online platform Survey Monkey. If the residencies take place in publicly accessible sites, or if the outcomes end up exhibited, then feedback from the wider public is captured also, depending on the event a suitable survey/data collection method arranged in response to the specific needs of the situation. These are likely to differ depending whether the residency focus is co-creation or citizen engagement in technology and are intended to capture views on new visions and directions for future research.

Residency participants are also requested to use the Offbot monitoring tool developed through the Lighthouse Gallery in Brighton for this exact purpose: "*a (mostly) friendly robot who helps small teams keep a journal of their projects*". Offbot sends collaborators emails each day, asking for brief updates about what they are working on, so this has become a great way of capturing regular updates of each project. Offbot reports are captured for each pairing and used for analysis at a later stage in the project.

Each residency 'pairing' receives at least one face-to-face, or Skype interview, with either the consortium member overseeing the residency. Participants within the pairings are each

interviewed, initially to attempt to uncover any potential personality conflicts that may arise between the collaborators, as well as to establish any specific complimentary skills or competencies not otherwise discovered in the proposals stage, and to help the collaboration process. At the end of the residency, each participant is again be interviewed one-on-one, to determine what worked and what did not, in terms of the communication, interaction, creative process, and project development, to final project completion. Both interviews and surveys are intended to capture different aspects of the collaboration: interviews are for the host mentor to objectively understand the collaboration process and for research and documentation purposes, and in-person interviews determine the personality types and suitability for the pairing, on a personal level. The survey is intended to capture the subjective perspective of the tasks and content of the pairing and residency.

The documentation of the residencies and residency outcomes include: Project blog, Videos, Websites Photographs, Media coverage, Social Media postings, Academic papers, etc. (This is not an exhaustive list).

These should also be available for use by consortium members for PR, research and dissemination purposes.

At the time of this writing, very few full residencies have taken place and many have just started, with only the 24-hour and 3-day hackathon "pop-up residency" events have taken place and not yet documented or analysed. Therefore, it is too early to discuss this phase and dimension of the project for this paper. However, 3 of the 5 EU consortium partners have begun hosting their 3-4 residency pairings and have begun to monitor and mentor the collaborative process.

Each of these pairings is considered a case study to understand the different styles, processes and methods of collaborating between artists and technologists, and the framework for analysis will be based on the expert advice and research from Lindy Candy, Ghislaine Boddington and Ruth Catlow in particular, toward further research by other 'sister' projects to follow on from after the end of this project.

## 5. CONCLUSION

The FET-Art project relies on a balanced partnership of committed organisations offering renowned expertise in the ICT and Art domains, important connections with ICT and Art practitioners in Europe and worldwide, many references at the ICT and Art interface, and longstanding experience of planned activities. This partnership is composed of [Sigma Orionis](#) (coordinator), [Brunel University](#), [Stichting Waag Society](#), [Stromatolite](#) and [BCC](#). It would not be possible without the hard work and collaboration of all the partners, who include The Black Cube Collective – emerging artist support organisation in Edinburgh; Sigma Orionis – Project Management in Nantes; Stichting Waag Society – internationally well-respected institute for art, science and technology in Amsterdam; Stromatolite and London-based design innovation company responsible for the well-known MusicTechFest and Brunel University, well-known for its Engineering history and namesake Isambard Kingdom

Brunel, as well as other academic performance and technology pioneers such as Stelarc and Johannes Birringer.

At the moment, a new EU research tender has just started mapping art and technology collaboration activities around Europe. However, additional research needs to be directed toward creating new guidelines and training on art and technology collaboration process, methods and facilitation, to be shared across Europe. This research would provide recommendations and feed into future research and innovation and research funding policies by the European Commission and other European Arts and Technology funding bodies. The ultimate goal then is the blurring of disciplinary boundaries or merging them for a more productive, exciting collaborative future.

## REFERENCES

- [1] Ahmed, S.U., Camerano, C., Fortuna, L., Frasca, M., Jaccheri, L., (2009) *Information technology and Art: Concepts and State of the Practice*, Handbook of Multimedia for Digital Entertainment and Arts, 567-592. Available online at [http://prosjekt.idi.ntnu.no/sart/publications/BChapter2\\_IT&Art.pdf](http://prosjekt.idi.ntnu.no/sart/publications/BChapter2_IT&Art.pdf) (Accessed Jan 10, 2013)
- [2] Brown, P. et al (2009) *White Heat Cold Logic: British Computer Art 1960–1980* (Leonardo Book Series) Available online at: <http://mitpress.mit.edu/books/white-heat-cold-logic> accessed April 2013.
- [3] Burnett, R. (2004), *How Images Think*, Cambridge, Massachusetts: The MIT Press.
- [4] Bourriaud, N. (1998, 2002), *Relational Aesthetics*, Dijon, France: Les Presses du Réel pp. 84-102.
- [5] Candy, L. and Edmonds, E. (2002), *Modeling Co-Creativity in Art and Technology*, Proceedings of the 4th conference on Creativity & cognition, 134-141, ACM. Available online at [http://dl.acm.org/ft\\_gateway.cfm?id=581731&type=pdf&CFID=168552758&CFTOKEN=86563620](http://dl.acm.org/ft_gateway.cfm?id=581731&type=pdf&CFID=168552758&CFTOKEN=86563620) (Accessed April 5, 2012) See also Candy's other research here <http://research.it.uts.edu.au/creative/eae/candy/LCandyPubsMar08.htm> and conferences here <http://www.creativityandcognition.com/research/themes/>
- [6] Candy, L. and Edmonds, E. (2002) "Explorations in Creativity and Cognition" Chap. 5, *PRACTICE IN Explorations in Art and Technology*, XVI, Springer-Verlag: Berlin, Heidelberg, pgs 69-83. Available online at <http://www.springer.com/978-1-85233-545-8> (Accessed April 5, 2012)
- [7] Candy, L. and Edmonds, E. (2003), *Collaborative Expertise for Creative Technology Design*, Proceedings of the 5th conference on Creativity & cognition, Australia. Available online at <http://research.it.uts.edu.au/creative/COSTART/pdf/files/Expert03.pdf> (Accessed April 5, 2012)
- [8] Candy, L. and Zhang, Y. (2007) "A Communicative Behaviour Analysis of Art-Technology Collaboration", *IN A Communicative Behaviour Analysis of Art-Technology Collaboration: Human Interface, Part II, HCI 2007, LNCS 4558*, Springer-Verlag: Berlin, Heidelberg, pgs. 212–221.
- [9] Dixon, S. (2007), *Digital Performance: A History of New Media in Theatre, Dance, Performance Art, and Installation*, Cambridge, Massachusetts: MIT Press.
- [10] Foden, G. (2012) *ICT and Art Connect: Engaging Dialogues in Art and Information Technologies*, DG INFSO, European Commission, Brussels. Available online at <http://www.euclidnetwork.eu/files/artandictreport.pdf> (Accessed Jan 10, 2013)
- [11] Honig, B., Rostain, A. (2003) *Creative Collaboration: Simple Tools for Inspired Teamwork*, Crisp Publications Inc. USA Available online at <http://www.axzopress.com/downloads/pdf/1560526874pv.pdf> (Accessed Jan 11, 2013).
- [12] Kidd, Paul (2013) *ICT-ART CONNECT in the Horizon 2020 ICT Programme: Preliminary Reflections on Realising the Potential*, Final Report on the Roundtable Discussion held at the European Parliament, Brussels, November 11, 2013. Available online at [http://ictart.artshare.pt/ICT-ART\\_CONNECT\\_EP\\_Rountable\\_Discussion\\_Report\\_Final.pdf](http://ictart.artshare.pt/ICT-ART_CONNECT_EP_Rountable_Discussion_Report_Final.pdf) (Accessed February 25, 2014).
- [13] Kozel, S. (2007), *Closer: Performance, Technologies, Phenomenology*, Cambridge, Massachusetts: The MIT Press.
- [14] Kresin, F., Reitenbach, M., Rennen, E., van Dijk, D., Sabine Wildevuur (eds.) (2011) *Users as Designers: A hands-on approach to Creative Research*, Waag Society. Available online at [http://Waag.org/sites/Waag/files/public/Publicaties/Users\\_as\\_Designers.pdf](http://Waag.org/sites/Waag/files/public/Publicaties/Users_as_Designers.pdf) (Accessed Jan 10, 2013)
- [16] Leggett, M. (2006) "Interdisciplinary Collaboration and Practice-Based Research", *IN Convergence: The International Journal of Research into New Media Technologies*, Vol. 12: 263 Available online at <http://con.sagepub.com/content/12/3/263> (Accessed April 5, 2012)
- [17] Miller, A.I. (2000) *Insights of a Genius. Imagery and Creativity in Science and Art*, London: The MIT Press.
- [18] Perello J., Murray-Rust D., Nowak A., and Bishop S.R. (2012) *Eur. Phys. J. Special Topics 214*, pgs 597–634.
- [19] Shanken, E.A. (DATE?), *Art in the Information Age: Technology and Conceptual Art* [publisher?]. Available online at: <http://artextra.files.wordpress.com/2009/02/shankenartinfoage.pdf> (Accessed Jan 10, 2013)
- [20] Wilson, S. (2010), *Art + Science Now: How scientific research and technological innovation are becoming key to 21st-century aesthetics*, London: Thames & Hudson.
- [21] Turney, J (2006), *Engaging Science: thoughts, deeds, analysis and actions*, London: Wellcome Trust. Available online at: [http://www.wellcome.ac.uk/stellent/groups/corporatesite/@msh\\_publicising\\_group/documents/web\\_document/wtx033010.pdf](http://www.wellcome.ac.uk/stellent/groups/corporatesite/@msh_publicising_group/documents/web_document/wtx033010.pdf) (Accessed Jan 10, 2013)
- [22] Victoria & Albert museum website. Available online at: <http://www.vam.ac.uk/content/articles/a/computer-art-history/> accessed April 2013.