

Imagination and Empathy – Eden3: Plein Air

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Abstract:

The key question of this chapter is can artwork contribute to the evolution of a tree from a thing to a being of value? The research builds on previous work that used discourse theory to reveal aesthetic and ethical issues embedded in the recovery of ecosystems and public space in a post-industrial landscape. In the current work a theory of empathy supports technology mediated experiments that intend to develop an instrument played by a tree, in response to chemical changes in the environment. This extends earlier work to inter-relationship with non-human others, raising questions about communication ethics.

Key words: Art, Empathy, Ethics, Interaction, Music, Science, Sound, Trees.

1 The problem of discourse and participation.

The key question of this chapter is can artwork contribute to the evolution of a tree from a thing to a being of value? Building on over twenty years of work the Collins & Goto Studio proceeds slowly, immersed in communities of interest and expertise; working across arts media, digital media, philosophy, science and technology we explore meaning and interrelationship through experience, discourse, reflection and in-studio practice. Early work was influenced by discourse theory and ethics moderated by ideas about power and agonistic plurality. That work was about changing ideas of the form, function and meaning of nature in a post-industrial context.

In our current work, we are developing a sculptural instrument that supports empathic experience with trees. The work is influenced by Edith Stein's (2002) theory of empathy; published from her doctoral dissertation¹. This research extends our earlier work to inter-relationship with non-human others. It contributes to current work in the field of art through attention to empathy with trees in practice. Empathic exchange is enabled through technology-enabled processes; the final form emerges through iterative method. The use of empathic projection and informed imagination raises issues in communication ethics.

In our reading of the participatory research literature we were struck by the idea of participation as a path to tyranny in the context of international development. Bill Cooke and Uma Kothari describe a tyranny driven by the intentions of facilitators, the potential for collective bias towards power and selectivity driving others out of participatory planning (Cooke and Kothari 2001, p. 1-15). They thus critique the culture of international development and its intentions and methods. This 'problem of tyranny' as intentional culture/institutional maintenance of the status quo, would be

keeping with John Friedmann's thinking about planning (1987). He examines the philosophical roots of allocative, innovative and radical planning in the public interest. He is clear about the cause and effect of intentions and methods, the ethical impact of institutional interests and the practices and relationships that differentiate the maintenance of the status quo from evolutionary change and structural transformation (Friedmann 1987, pp. 51-86). Can development interests meet their own institutional agenda and serve a public participation agenda at the same time? In Cooke's follow-on chapter on the social and psychological limits of participation he examines theories of collusion and false agreement, groupthink and brainwashing. He understands participation as "...yet another technology used with the Third World without the care and concern that would be expected elsewhere" (Cooke 2001, p. 120). This is a practical realm of powerful interests and conflicted manipulative agendas. John Friedmann suggests that institutions and state interests are ill suited to the emancipatory intentions of radical planning (1987, p. 306). Despite the radical intentions of the participatory planners, the problem of tyranny is more likely located in the institutional drive for development than the participative methodology; although the ethics would be socially revealed in practice.

Our regular reading spans art history, theory and practice. There are three relevant areas of work: related to place, related to environment and related to dialogue. The art critic Rosalyn Deutsche has examined art and spatial politics. She focuses on places where relationships between self and other are constantly settled and unsettled. She uses feminist critique and its relationship to identities formed in public space, to argue for a continuous disruption of interest to prevent the conversion of public space to private interest (Deutsche 1996, pp. 326-327). Miwon Kwon follows with an assessment of community practice and critical social practice in the arts. She concludes with the idea (following Jean Luc Nancy) "...only a community that questions its own legitimacy is legitimate" (Kwon 2002, pp. 154-155). It helps to consider that the tyranny previously described occurs where participation is part of a 'toolbox' to deliver development agendas and resources. In counterpoint the artist as cultural agent is concerned with power and the evolution of social creativity and subjectivity. The artist more often than not works in the interstitial spaces ignored by development interests.

There is a specific history of social and environmental art practices. Much of the early work in the field was about an integration of ideas and materials, a creative inquiry about life on earth. More recently, with greater attention given to environmental change, the practice and critical theory focuses on critical and transformative approaches to issue specific practices. Beginning in the early 1980's Lucy Lippard (1983, 1997, 2007, 2014) and Suzi Gablik (1984, 1992) began to reveal a new social and environmental context for making art. They shared a critical unease with the art world and outlined theories and described extant practices that integrated art, society and aspects of the environment. Rosalyn Deutsche (1996) theorized the agonistic role of artists working in urban settings and Miwon Kwon (2002) interrogated practices based on lived experience and relationality tied to place. Barbara Matilsky (1992), Jeffrey Kastner and Brian Wallis (1998) are noted for their work describing the environmental art field and its historic relationships to land and earth art. More

recently T.J. Demos, a theorist and curator working on the relationship between art, environment and politics, has challenged traditional criticism by asking cultural interests to think more strategically (2010, 2012, 2013, 2015). The critical view of this work continues to evolve; although somewhat more slowly than the practice.

Another important touchstone is the work of Grant Kester, who writes about the history, theory and practice of social and dialogical aesthetics (2004, 2011).ⁱⁱ He ascribes value by considering the inter-subjective ethics and indications of empathy that attend creative ‘dialogic’ arts practices (Kester, 2004, pp. 107-115). He also curated an exhibition and edited a catalogue examining the international artists that engage planning and policy (Kester, 2005).ⁱⁱⁱ Artist Jay Koh reflects on his international practice, considering justice-based approaches to subjectivity in ‘Art-Led Participative Processes’ (2015). Koh is attentive to ethics and competing intentions. He eschews singular value and belief systems as criteria for judgement. Arguing that the facilitating artist occupies a “...decentred position within reciprocal communicative relationships, so as to reduce the power imbalance(s).” (Koh 2015, pp. 161-162) There is significant overlap between Koh, Deutsche and Kwon and the ethical principles and performative methods explored by participative research authors such as Banks et al (2013); the ‘methodological modesty’ and pragmatism of Eubanks (2009); as well as Askins’ and Pain’s ideas about materiality and an ethics of care (2011). The ethical and empathic issues that were raised by colleagues such as Kester and Koh are part and parcel of our own understanding of the challenges of art practice, as discourse, dialogue and research across the boundaries of species.

2. The research.

In the early part of the new millennium various long-term ecological research programmes were set up by the National Science Foundation in the United States; including forest studies that explored the impact of an increase of carbon dioxide on trees. One of these was the Free Air Carbon Enhancement (FACE) experiment in North Carolina, where ecologists and biologists raised the CO₂ concentration in a specific area of forest, then wired the forest to measure the effect on plant/tree growth. During our visit, outdoors and four stories up in the canopy, we experienced an epiphany of sorts; a sense that we had engaged the essential nature or meaning of the tree; a simple intuitive leap precipitated by a flow of data. While watching the instrument sensor displays, we realized we were ‘seeing’ the invisible breath and sap flow of a tree. Sap flow was driven by temperature, while photosynthesis (light energy captured in leaves) and transpiration (the loss of water through the leaves) was shaped by available sunlight, localized atmospheric CO₂ (in constant flux), and humidity. This experience led to the development of a project plan using an experimental framework to develop sculptural instruments and technologies that enable exploration and exchange with plants and trees.

As we initiated this project we examined artwork with trees; projects widely recognized as historically important. In 1978 Alan Sonfist developed a native forest restoration *Time Landscape* in New York City (Sonfist, 2007). In this work the artist challenged ideas about what artists do and what it is that deserves our aesthetic attention. In 1982 Joseph Beuys initiated a symbolic planting of *7000 Oaks* in Kassel

Germany (Willisch and Heimberg 2007). At the opening of the 7th Documenta art exhibition in Kassel, the artist placed 7000 basalt columns in front of the Fridericianum museum, which were to be planted alongside 7,000 trees throughout the city. In 1993 Helen Mayer Harrison and Newton Harrison's completed *Serpentine Lattice* arguing for new policies to support the coastal redwood rainforest of the Pacific Northwest of North America. The project forms an illustrated narrative that initiates sympathetic response. It begins: "North America's Last Great Temperate Rain Forest is Dying..." (Harrison and Harrison 1993, p.3). Beuys and Sonfist were focused on public aesthetic value and experimental cultural policy and practice related to trees and forests. The Harrisons' take a sympathetic approach, which is closer to our own interest in relational aesthetic experience. We also considered recent science and technology informed artwork such as: Chris Chafe' and Greg Niemeyer's *Oxygen Flute*^{iv} (2001) which used sensors and a sound system in an enclosed environment with plants to 'hear' gas exchange in California. David Dunn of New Mexico conducted art-led research on the sound of invasive bark beetles. The composition *The Sound of Light in Trees*^v (2006) included reflective publication with a scientist. The Collective group 'Active Ingredient' from Nottingham UK collaborated with climate change scientists to develop technology-based work integrating temperature, humidity, carbon dioxide, light, colour and sound conditions in artworks such as *Dark Forest*^{vi} (2009) and *A Conversation with Trees*^{vii} (2010). More recently James Bulley and Daniel Jones, have produced *Living Symphonies*^{viii} (2014), presented in various forests in the UK, the authors claim it as a musical composition that 'translates a forest ecosystem' resulting in an ever changing sound experience. This contemporary work is about technology, sonification, creative expression and musical composition; it engages the artist-viewer relationship. We use some of the same techniques, but artistic authorship is in service to human-non-human interrelationship. For us the work begins with empathic intent, which we explain in detail below.

3. The move towards empathic research.

Previous work in Western Pennsylvania *Nine Mile Run*^{ix} (1997-2000) and *3 Rivers 2nd Nature*^x (2000-2005) dealt with the restoration of postindustrial ecosystems. Working with scientists we initiated new knowledge about waterfront ecology and refined key points for public presentation and discussion. Out of this came ideas of strategic knowledge; concepts that had the potential to reshape human perception, experience and normative values – the structure upon which decisions and policies are made. The failure of the industrial economy in the local area had enabled a 30-year natural recovery and produced a community aware of the aesthetic value of restored landscapes. Extant land-use policies and private development interests saw forest cover and functioning ecosystems as an impediment to progress on steep hillsides and riverfronts. Nature could be seen as an agglomeration of subjects needing release or abeyance from the constraints of industrial and postindustrial culture. In response to this we organized research with communities that wished to consider nature in new ways.

We entitled the new series of work *Eden3*: and aimed to consider how empathy could support the development of moral duty through art practice.^{xi} The work engaged the

cycle of carbon/oxygen exchange; attending to the breathing in of one species (trees) and the breathing out of another (humans). Why trees? Trees are the largest most ubiquitous living ‘things’ in the world. They provide aesthetic life enhancing benefit to a myriad of living things. Trees do not have the same biochemical senses, the physical mobility or the same kind of agency that humans do. They respond to light, temperature and humidity as well as the chemistries of soil and air. Humans and trees share and shape the environment in distinct and different ways. For the most part we do not perceive a tree’s subtle and quick responses to changes in the environment; this makes them appear to be significantly other to us. Yet some of us have an ability to read the physical state of plants and trees; most recognize life and death over time and seasonal changes. It is possible to sense/see vitality or ill health in plants. Many of us that spend time with plants can recognize complex shadings of well-being linked to available moisture, soil, light, nutrients or predation.

Below we focus on the developmental tracks of this research; theories of empathy, work with sensors and sound, the form and practice of working toward empathic exchange with trees. The word empathy comes from the Greek word *empathis* (*em* + *pathos*) referring to passion, feeling and emotion. In the late 19th century the theory of empathy became a particular concern within philosophy (Steuber, 2014). The word “empathy” translated into English from the German word ‘*Einfühlung*’ means feeling into. It was not a literal meaning of going inside of the other person but relying on careful observation and nonverbal communication such as facial expression, eye contact, body gestures and other behaviours and experiences beyond one’s intellect. Theodor Lipps (1851-1914) a German philosopher conceptualised this human ability to understand the other as inner imitation. Phenomenologists such as Edmund Husserl, Max Scheler and Edith Stein expanded on this idea in the early 20th century. Husserl claimed our consciousness is always active and directed toward others and the environment. Phenomenology was a reconsideration of emotions that are not located in discrete bodies and persons, and thus by expression, proposes affect as a phenomenon anterior to the distinction of persons (Burgess 2011, pp. 289-321). Husserl, Scheler and Stein shared a common ground, understanding “empathy as a kind of act of perceiving, sui generis” (Stein 2002, p. 11). For these theorists, empathy is a perception that is unique, of its own kind. Stein was open to the application of empathy beyond human-to-human relationship; this position informs our work.

The idea of plants and trees as sentient or sensory aware subjects with memory remains controversial. Until recently, mainstream science has been unwilling to consider ideas like sensory perception, communication, memory, agency and knowledge in plants. But there are some cracks in that armour. Biologist Anthony Trevawas (2003, 2005) has written a series of articles that explored ‘plant intelligence’ arguing that plants are territorial and competitive; forever changing their ‘architecture, physiology and phenotype’ in the intelligent pursuit of resources for growth and reproduction. (2005, p. 413). More recently, Daniel Chamovitz (2012) argues for awareness (rather than intelligence). He makes a case at the bio-chemical level for specific sensory perceptions, and a form of memory enabling response to changes in the environment. It is important to note this work has vociferous critics,

Richard Finn's (2004) response to Trevawas' 2003 paper, makes a point-by-point rebuttal before demanding limitation on anthropocentric description. We would argue this moral constraint against anthropocentrism must be reconfigured as a caution; to intend no harm or overt obfuscation, rather than a line separating humanity and its range of world-views from everything else in the world.

4. Theories of empathy

“Empathy...is the experience of foreign consciousness in general, irrespective of the kind of the experiencing subject, or of the subject whose consciousness is experienced.”

Edith Stein, 2002, p. 11

For Stein, empathy is a practice that can be developed and refined through intimate attention to people and things over time. Following Stein, empathy is an act of perceiving in which we reach out to the other to grasp his/her/its state or condition. It is based on one's emotional and physical experiences. Empathic experience is focused towards something foreign rather than something familiar. It motivates something within that enables different forms of expression than we could know on our own. It adds something to the world that would not otherwise exist. In contrast, Stein understands sympathy as assuming feeling in another based on what we already know about our self and our interests (2002, pp.14-18). In Stein's theory of empathy, outward expression is a symbol of body and mind relationship. Stein says "...a sad countenance is the outside of sadness" (2002, p.77). Goto understood that facial expressions can be interpreted in two ways: 1) empathy drives a symbolic relationship about how this feels, and 2) sympathy drives a sign relationship about what 'this means.

Our epiphany in North Carolina at the FACE experiment was based upon a symbolic relationship between a tree, the sunlight, clouds and our interactions through plant physiology equipment. The experience gave a sense of lived connectedness. Stein calls it the "phenomena of life [that includes] growth, development and aging, health and sickness, vigour and sluggishness" (2002, p. 68). She extends this idea further, "...we not only see such vigour and sluggishness in people and animals, but also in plants. Empathic fulfilment is also possible here" (Stein, 2002, p. 69). With empathy we not only understand, but we feel the other's health, well-being or emotional state. Empathic projection helps us to imagine ourselves as if the other is looking at us and judging our behaviour. Lakoff and Johnson define it as an "...imaginative experience of the other" (1989, p. 566). This specific imagination is cued by the empathic relationship between what is perceived and the perceiver. Imagination works through metaphor to enable our understanding of the 'other' and the environment. This is key to an empathic approach to non-human living things.

5. The Research Method.

The first artwork in the *Eden3* series, titled *Plein Air*, consists of a chamber holding a leaf. Air is pumped through the chamber and connects to high quality sensor technology embedded in a traditional painting easel with a computer processing

equations that measure and sonify photosynthesis and transpiration. The measurements focus on leaf reaction and the reduction of carbon dioxide and the increase of humidity. What is ‘heard’ is the sonic representation of tree leaf photosynthesis and transpiration data (this is explained in more detail below). There is also a sensor-based indication of carbon dioxide and humidity exchange as the tree-leaf stomata (thousands of small pores on a leaf) open and close in response to changes in local atmosphere and weather conditions.

With this artwork we sought to respond to the theories and experiences discussed above and to explore cross species (tree-human) empathy and inter-relationship. We did this through a focus on revealing reactions to shared environmental conditions. Trees are alive, yet perceived as non-reactive entities operating within a time scale at the edge of human perception. Humans affect our shared environment through anthropogenic production of carbon dioxide as a by-product of industry, transport and development, as well as by breathing. Yet people have little sensitivity to the local impact – the small-scale cause and effect we have on atmospheric conditions in places we frequent. A tree, on the other hand, can react to small changes in the amount of carbon dioxide in the air (in parts per million). *Plein Air* is an experimental approach to a relationship with another species that shares our everyday context. The research, in both its technical and artistic forms is focused on the reactions of trees and creating conditions where attention (guided by aesthetic experience) enables potential for empathic exchange over time.

6. Sensors and sounds.

The intention was to embrace key elements of our experience in North Carolina and to develop a portable sculptural instrument that would support an attentive empathic experience with trees, and that would develop over time. We were working with the recognition of the speed of reaction as a tree leaf responds to changes to carbon dioxide and sunlight, and the move from a language based visual-sign output to a sensory sound-symbol output. The challenge was how to retain the focus on a tree and its environment. The mediated experience with sensors and sound interrupts perception and the idea (the normative value) that trees are slow moving things out of sync with human experience of time and place. Following these ideas the sculptural interface needed to work in real-time. The constantly changing environmental conditions and physiological response of the leaf needed to be closely synchronized with the sound interface, if the sensitivity of plants to atmospheric change were to be revealed.

Here we provide a brief overview of the project phases. The project was initiated when, one of the authors, Goto was offered a bursary for doctoral research at Robert Gordon University in Aberdeen, Scotland; six months later Collins secured an interdisciplinary research grant from the University of Wolverhampton in the West Midlands in England. It has evolved through iterative development. In 2008 the project was conceptualised and initial sensors and plant materials purchased. The project functioned in terms of data collection and data sonification in two separate steps. Between 2009-10 we spent three months running science/sound experiments at the Headlands Center for the Arts in California, where the sculptural form of the

project was also developed. Upon return to the UK we took up residency in the University of Wolverhampton Crop Technology Unit where we worked with agricultural scientist Trevor Hocking and PhD researcher Mat Dalgleish to refine the scientific interface and establish a real time sound system. During this residency, the second version of the sculptural form was built and we decided the sound interface would be based on standard synthesizer software. The project was then exhibited with funding from Peacock Visual Arts, Aberdeen Scotland (2010). In 2011 the project, along with a live-sound response, was presented at two university seminars and one group exhibition. From 2011-2012 we worked with Michael Baldock and Clare Cullen musician/composers with sound programming expertise to experiment with specific compositions and sound systems. Chris Malcolm an experienced programmer and alternative musician came on-board in 2013 to help rethink the interface and rewrite the software. The sculptural form was redesigned including a new visual interface and additional high quality speakers. Major changes were made to the computer and electrical systems. The project became the centrepiece of an exhibition at the Tent Gallery at the Edinburgh College of Art (2013). Final refinements were then made to the sound system and the form, and a new live leaf-video programme was produced for an exhibition and performance in Cologne, Germany in 2015. As we will discuss below, a key issue for the project was how to sonify the data in order to create the empathic experience we were seeking.



The first iteration was a desktop full of plant physiological equipment used to collect data and a separate software sound system to play (and test) the data. We devised a series of creative experiments within these limitations during our residency at the Headlands Center for Arts in California.



The **second iteration** was a real time art/science field instrument, a sound easel run by batteries. To keep the project moving (with winter coming on) we needed plants to work with. The residency in the Crop Technology Unit provided input from a plant physiologist and access to light and climate-controlled chambers as well as a greenhouse. There we were able to refine and reengineer the components to create a functioning real time sound system (based on the Windows OS sound synthesizer), and a final design for the easel. *Plein Air* had become a complex instrument; it was tuned and tested by an engineering consultant. A custom/portable hardwood easel was hand crafted. It was used in fieldwork and then for extended exhibition in Aberdeen, Scotland. A woodwind and a piano were chosen from the standard synthesizer library as the ‘voice’ for the sonifications. The piano voice was chosen for its data clarity; however it was criticized during the first exhibition and subsequent seminars. The identity (the image of a piano as the source) of sound overwhelmed the tree. The woodwind was less jarring, since it had more conceptual congruity, but its data clarity was ambiguous. The visibility of the technology would also be examined. Changes would be made in the next iteration.

The **third iteration** was characterized as a robust musical instrument played by a tree. Sound artists, Michael Baldock and Clare Cullen sampled specific wood/forest sounds for percussion and used a complex programme to create an integrative (data-driven) rhythm track. Working from London they developed a composition with five tracks. It was beautiful and captivating, but difficult to sense the changing physiology of the tree. We then met with Chris Malcolm, a Glasgow programmer known in the alternative music community. He listened carefully to what had been done. He decided to abandon the sampling idea and work with data driven custom sound synthesizers and banks of resonators. Working closely with Goto and specific trees on weekends, he approached the work like a jazz musician trying out different programming riffs and refining them to hear the changes occurring with the tree over time. We agreed to develop a data/sound library the tree could play. We spent months in development, testing his programming once a week with different live trees. The effort began with a distinctive data driven bass line that would reveal increases and decreases in photosynthesis and transpiration. Malcolm then developed a complex set of accompanying tones ‘shaped’ by subtle changes in specific sensor data. The final product was robust, providing the listener with a sense of the changing conditions through experience and imagination. It also required a new computer, and a new dedicated live leaf/data display. The new sound required better speakers; the weight and additional equipment drove another reconstruction of the *Plein Air* form. It had become less portable, but the sound was fantastic and more importantly the output reflected the changes to tree physiology; while retaining musical integrity.

7. Evaluating the empathic experiment

Work on *Eden3* was complicated by the fact that deciduous trees are in leaf only five out of twelve months per year in the UK. The system that was initially conceived as a simple group of sensors had also grown into a complicated array of electronics. Planned as a lightweight interactive sculpture with a laptop for outdoor use; it evolved into a robust musical instrument that required mains-power. Our practice moved from dynamic outdoor environment to a stable indoor environment in order to achieve clarity of function and purpose tied to the pursuit of empathic practice with trees.

The challenge was to develop artwork that would provide a reason for 'being with' trees. There were only two options for the development of this research to be with trees in nature, or for the trees to be with us. We worked with six potted trees (alder, ash, aspen, birch, hazel and oak) that were nurtured behind our flat in Glasgow. The practice of working with trees has changed from the experimental initial effort to managing the equipment and seeing patterns in the enquiry. Next was a long-term project of experimentation with the idea of 'being with' trees; trying to see the environment through the trees with the help of the real time instrument. As *Plein Air* evolved over time it has come to embody a certain self-contained gravitas as an object and an imaginative instrument to be played by a tree.

The painting easel was a metaphor unto itself, an important compositional element of the artwork. It provided a classic sculptural body and counter-balanced the scientific aspect. The easel was an early technology that embodies a history of visual attention to, and human expression of the landscape and nature. This also connected the development of the artists' empathic ability to embrace and express the condition of the landscape 'other.'

We sought the input of colleagues and audience at every step of development. Some colleagues were curiously clear about what they would expect to hear from trees, many assumed that the sound would be soft and soothing. Others found themselves engaged by the sound-computer-tree relationship; they wanted to know the science and technology behind it. Still others got very caught up with the interrelational aspects of listening to the metaphorical sound, the breath of a tree. During the second iteration in Aberdeen we worked outdoors with more than half of the fieldwork sites being urban. All were public spaces. The form and function of the sculptural interface engendered curiosity in these contexts, but little sustained interest. As we were both present, most people wanted to hear an explanation of what was going on. Maybe half would take the time to listen to the sound and consider the environmental context. These were indications of sympathetic engagement, in Stein's sense, where there was sensitivity to the experience but it was processed through what was known, rather than resulting in a relational, imaginative projection which we were hoping to encourage. Installing the sculptural interface in the Aberdeen gallery (2010) within a greenhouse with trees was more effective. Without someone present to explain things, viewers would sit in a chair and relax as they took in the experience. Here there was more potential to engage the tree and the imagination at the same time. The more or less private space of the greenhouse supported engagement, but the mise-en-scène carefully developed for an intimate empathic relationship with a tree was

compromised by the dominant sound-image conjured by the piano ‘voice.’^{xii} The primary insight from attention to and dialogue with the audience at the exhibition was that sustained attention over time was a necessary element of the empathic exchange we were looking for.



Detail of *Plein Air: The Ethical Aesthetic Impulse*, at Peacock Gallery, Aberdeen (2010).



Detail of field work with *Plein Air*, above the River Dee, Aberdeen.

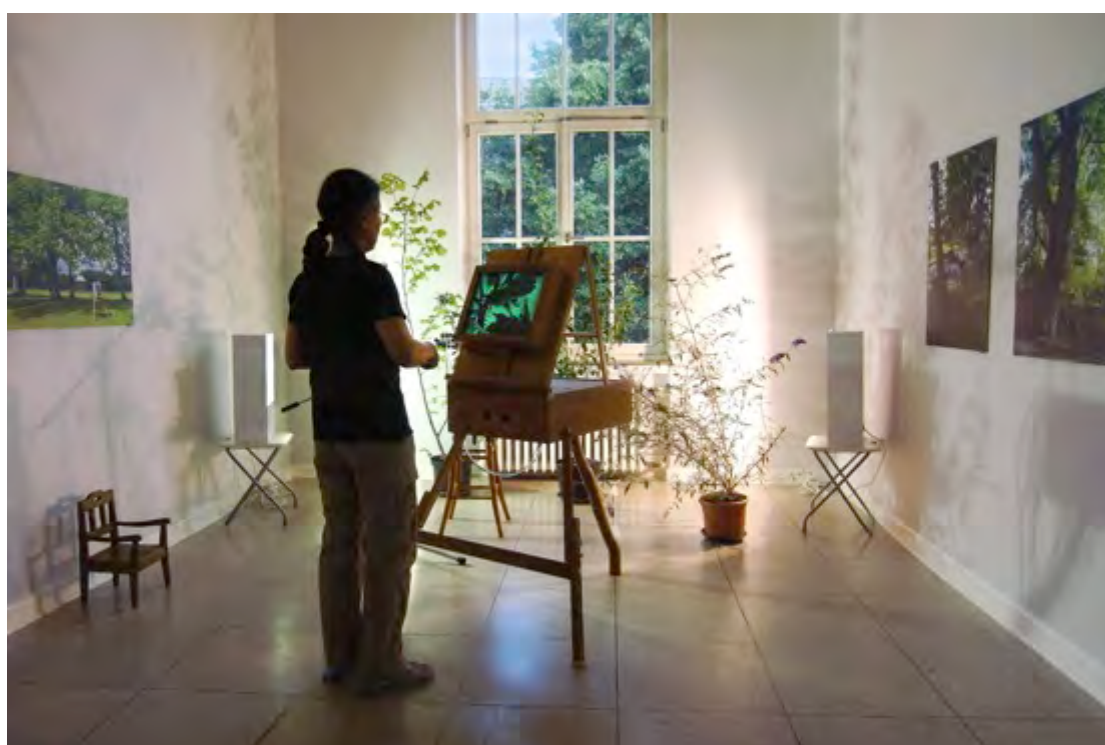
During the exhibition in Edinburgh (2013) the project was shown on a raised platform with four trees; documentation of its development was presented on the walls. With the laptop replaced by a mini-computer, a graphic image was developed and presented on a flat screen. The audience could logically link the sensor display to the sound data; but this would again elicit more interest in the scientific meaning than the experiential feeling. Without the greenhouse enclosure the audience had less impact on the atmospheric chemistry, and so that aspect of the experience was not as variable and somewhat less effective; although the new sound programme was a significant improvement. The response to this exhibition was robust and cross-disciplinary (leading to additional opportunities). We came away with a clear sense of a final series of changes to the form, function and graphics.



Eden3: Trees are the Language of Landscape, Tent Gallery, Edinburgh College of Art (2013).

The most recent presentation of the work (2015) was in a music venue, Neue Musik Koeln, in Germany. The audience included artists, musicians and composers. In preparation for the exhibition Collins refined the structure of the easel while Goto

redesigned the screen image. She also introduced a live-video image of a leaf where the colour saturation was controlled by linking it to the photosynthesis rate. Malcolm developed the software, which resulted in an image that was incredibly beautiful, and suggestive. We felt that the work, its sound, form and image were now producing an imaginative realm, where the viewer might grapple with the metaphor of the sound of a tree breathing. In Germany people sat with the instrument and the tree; the impact was clearer. They also listened more carefully than a typical visual-arts audience. There was a lot of discussion about the tree and attention to the subtle complexity of the sound and the range of the instrument. In response, we are currently finishing a final proofing edit of the software and graphics. A touring version will include a vinyl recording and notational output. The installation will include photographs that support the material development of the project as well as the empathic response of the audience.



Sound of a Tree, Curated by Georg Dietzler. In Visual Sounds: Bioakustische Musik, ON - Neue Musik, Cologne Germany (2015).

Exhibitions and seminars revealed issues demanding attention. Our ideas about the instrument and our role as artists seeking interrelationship with a tree was rightly problematised. The technology would demand additional cost and complexity to achieve real-time experience. Then the form and function would be visually and experientially edited to insure the ‘presence’ of the tree itself. Sound and interface would be refined over and over again. Questions of ethics and appropriate representation would need to be addressed. Creative authorship, form and method would continue to move into the background, so the experience of being with a tree could come into the foreground.

Goto has spent her life as an artist working with non-verbal, animal and vegetal others. Creating a work that enabled an attentive space, where an empathic epiphany with a non-human other could arise was the fundamental intent of this work.

8. CONCLUSION:

In this research, and following Stein, we have ‘reached out’ to grasp the vegetal other. As describe above, Goto identified the potential for empathic experience through attention to the ‘vigour and sluggishness’ in people, animals and plants. We have also found support for (what may be) a plant consciousness in the theories and science of Chamowitz and Trevawas. The *Plein Air* instrument has been developed and tested in a series of iterations. Results to date are cultural outcomes; although science is important to the work. Our collaboration with a plant physiologist establishes (on one level) the authenticity of our effort by supporting attention to the quality and method of gathering the data, as well as in the pursuit of programming that would let us hear the tree (through its physiological response). To ‘hear the tree’ we had to focus on that idea and control the foreground/background relationships. There is an implied truth and some confirmation of ethical intent in this intention and outcome.

The key question, as we suggest in the introduction, is can artwork contribute to the evolution of a tree from a thing to a being of value? In a recent lecture we argued that science (generally) contributes to our understanding of what a set of things are in form and function, while art focuses our attention on the individual qualities that sets people, places and things apart from common truths. The experience produced by *Plein Air*, mediated by sensors and software, lets us hear the (otherwise silent) metaphorical sound of one leaf/one tree breathing; does our sense of moral duty change as we listen? The tree is primarily (commonly) understood as property, as a utilitarian resource and as a non-sentient thing. The presence of trees in our daily lives and their bio-chemical agency can be construed as more public than private. Here the ecofeminist critique of a generative, reproductive body inappropriately subsumed by instrumental private interest and in need of emancipation has some traction; (Plumwood 1993, p. 145; Merchant 1996, p. 10-11; Salleh 1997, p. 29). Where moral duty is afforded to a tree it is normally due to radical species loss,^{xiii} or unusual cultural value.^{xiv} Empathy is the leverage point that we have chosen to work with. We shaped the project over three iterations refining the form, the image and the sound to the point that it has become a simple instrument that sits between ourselves and one leaf, one tree. The experience designed to insinuate ethical duty.

To return to the question of participation that is the focus of this collection, we would argue that our project problematizes the discourse ethics of participatory research. This became particularly clear during our involvement in the *In Conversation with...* project, which is described in the chapters by Bastian and Heddon. We were invited to contribute to the final workshop that explored how a participatory ethics framework developed by Banks et al (2013) might inform research with/on water. In reflecting on our discussions there, we would suggest that *Plein Air*, which skirts the edges of communicability and objectivity, calls the workshop’s aims into question; the anthropocentrism of the ethics framework cannot simply be extended to human-non-human exchanges whether this be with water, trees or other others. At best we can

intend active listening and positive change. Hippocrates' phrase is useful in this work; '*primum non nocere*' first, do no harm. Our intentions cannot be matched, balanced or challenged by the trees we work with. The ethical charge of active hearing and making a difference are our sole responsibility. When we work with the non-human other we are operating within a power differential that can only be checked by other human advocates. We know that everything we do has an impact upon perception, cognition, imagination and experience of the human-tree relationship. In the final form of *Plein Air* we have repeatedly edited and reduced the material and technical presence, to create an instrument that can be connected to a leaf, for a tree to play. We have worked to produce an experience that focuses the audience on what Goto calls "...a sense of lived connectedness" (2012, p. 108).

Theodore Adorno has said, "Art is not an arbitrary cultural complement to science but rather, stands in critical tension to it" (1997, p. 231). Working with *Plein Air* the tree becomes the sensual other that we seek empathic interrelationship with to extend our experience and perception of the environment. The work follows ideas in science, and expands current theory and practice in our discipline. It raises questions about participative ethics in social science, planning and design. It offers a small challenge to the instrumental relationships we have to more-than-human life. Working in the realm of imagination and metaphor this work requires deliberative agonistic response. The epiphany is to art, as discovery is to science.

End.

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End notes:

- ⁱ The degree was awarded in 1916 at the university of Freiburg in Breisgau, and the dissertation was published in 1917 at Halle, Germany.
- ⁱⁱ Authors Claire Bishop (2004, 2012) and Nicholas Bourriaud (2002) provide a critical counterpoint to Kester, questioning the dialogic aesthetic by focusing on material output.
- ⁱⁱⁱ We commissioned Grant's work as editor and curator while working at the Studio for Creative Inquiry, at Carnegie Mellon University. See Collins, T. and Goto, R. (2005) *Initiating the Groundworks Exhibition*. p.10-15.
- ^{iv} <http://chrischafe.net/oxygen-flute/>
- ^v <http://www.acousticecology.org/dunn/solit.html>
- ^{vi} <http://www.i-am-ai.net/work/the-dark-forest/>
- ^{vii} <http://www.i-am-ai.net/work/a-conversation-between-trees/>
- ^{viii} <http://www.livingsymphonies.com/>
- ^{ix} <http://nmr.collinsandgoto.com>
- ^x <http://3r2n.collinsandgoto.com>
- ^{xi} For more information on the historic context, theory, method and initial work see (Goto Collins, 2012a). Also a book chapter that looks at empathy across historic environmental art practices in (Goto Collins and Collins 2012b).
- ^{xii} This was confirmed in conversations with colleagues at a panel discussion during the exhibition; then at a follow on seminar and presentation of the system at the Institute for the Advanced Studies in the Humanities, at University of Edinburgh.
- ^{xiii} The common juniper of Scotland and Wales, for example, is considered a species of concern; protected under the Wildlife and Countryside Act 1981.
- ^{xiv} *Chinju no mori* or sacred groves around Shinto shrines are protected as the dwelling place of the *kami* spirits, although it is the *kami*, which are worshipped, the trees are the cultural ecology which supports their presence.