A major exhibition exploring the breadth and depth of computer art is now on view in London. The exhibition is a collaboration between Goldsmiths, University of London, and the Barbican Centre, London, and is timed to coincide with the recent emergence of a new wave of computer art. The exhibition, entitled Creative Machines: Computer Art, Artificial Intelligence, Robotics and Apps, has been developed since the 1980s.

However, with new techniques such as 3D printing, the once-superseded role of software and hardware development in the creative production of their work. The range of work on show, which could be broadly categorised as follows:

1. **Computer Art**: Software and hardware development in the creative production of their work. The range of work on show, which could be broadly categorized as follows:

2. **Robotics**: High-tech logistics, high-tech robots.

3. **Artificial Intelligence**: High-tech logic, high-tech robots.

4. **3D Printing**: High-tech logistics, high-tech robots.

5. **VR**: High-tech logistics, high-tech robots.

6. **Apps**: High-tech logistics, high-tech robots.

The vision for organising the Creative Machines Exhibition is to include artists as follows:

- **Bålint Bolygo**: A young artist originally from Hungary, who lives in London and who works with metal, wires, pen and ink, light, various surfaces, materials and technology. He is a BAFTA-winning filmmaker and writer whose work has been exhibited internationally. He is a regular contributor to the Kinetica Art Fair.

- **Memo Akten**: A BAFTA-winning filmmaker, who has a background as a games programmer and artist. He is a visionary in the field of computer art, Artificial Intelligence, robotics and Apps by making use of novel interface technology that has seen its work presented in creative settings as interactive installations. He has applied his knowledge of physics to allow embodied interaction with common-day consumer devices. His work has centred on interaction design and usability experience design at the Royal College of Art. His work has been recognized in various domains including Human-Computer Interaction, Product Design, Digital Art, and Learning.

- **Patrick Tresset**: An artist and programmer who has developed a research agenda at the crossroads between visual perception, AI and computer science at Goldsmiths and is also a senior tutor in Information Technology at Imperial College. His work has centred on interaction design and usability experience design at the Royal College of Art. His work has been recognized in various domains including Human-Computer Interaction, Product Design, Digital Art, and Learning.

- **Paul Brown**: A leading artist from Goldsmiths who has developed a research agenda at the crossroads between visual perception, AI and computer science at Goldsmiths and is also a senior tutor in Information Technology at Imperial College. His work has centred on interaction design and usability experience design at the Royal College of Art. His work has been recognized in various domains including Human-Computer Interaction, Product Design, Digital Art, and Learning.

- **Ernest Edmonds**: A leading artist from Goldsmiths who has developed a research agenda at the crossroads between visual perception, AI and computer science at Goldsmiths and is also a senior tutor in Information Technology at Imperial College. His work has centred on interaction design and usability experience design at the Royal College of Art. His work has been recognized in various domains including Human-Computer Interaction, Product Design, Digital Art, and Learning.

- **Daniel Berio**: A leading artist from Goldsmiths who has developed a research agenda at the crossroads between visual perception, AI and computer science at Goldsmiths and is also a senior tutor in Information Technology at Imperial College. His work has centred on interaction design and usability experience design at the Royal College of Art. His work has been recognized in various domains including Human-Computer Interaction, Product Design, Digital Art, and Learning.

- **Peter Todd**: A leading artist from Goldsmiths who has developed a research agenda at the crossroads between visual perception, AI and computer science at Goldsmiths and is also a senior tutor in Information Technology at Imperial College. His work has centred on interaction design and usability experience design at the Royal College of Art. His work has been recognized in various domains including Human-Computer Interaction, Product Design, Digital Art, and Learning.

- **William Latham**: A leading artist from Goldsmiths who has developed a research agenda at the crossroads between visual perception, AI and computer science at Goldsmiths and is also a senior tutor in Information Technology at Imperial College. His work has centred on interaction design and usability experience design at the Royal College of Art. His work has been recognized in various domains including Human-Computer Interaction, Product Design, Digital Art, and Learning.

- **Andy Lomas**: A leading artist from Goldsmiths who has developed a research agenda at the crossroads between visual perception, AI and computer science at Goldsmiths and is also a senior tutor in Information Technology at Imperial College. His work has centred on interaction design and usability experience design at the Royal College of Art. His work has been recognized in various domains including Human-Computer Interaction, Product Design, Digital Art, and Learning.

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Vesna Petronijevic is a Fellow of the Royal Society of Arts who has lived in London in 2005, together
with artist and film director Laurent Paul Robert, as an
Arup). She founded
in London in 2005, together
Rubedo
in architecture, art and music. She is a research fellow
on daily life, social relations, urban space and political
to achieve a dialogue. Some film doesn't need sound,
interrogates conceptions of progress through the devising
structures.
In the exhibition Brock shows a piece made of software-
computer art. which he started to explore and establish
the auto-aesthetic selection of bred organic form variants
also includes new work with
curtains.
Computer/Video Installation shows evolving complex
in his Interactive
forms
Clermont-Ferrand Film Festival. His work
work has been widely exhibited at the Venice Biennale;
steady. Quayola's
new and in this exhibition shows his print work
Paul Brown
University of Singapore.
industrial companies such as Dreamworks,
many years in film and special effects, taking leading
Andy Lomas
who recently won the Lumen Golden
Game Intelligence (IGGI) Centre for Doctoral Training,
and Atau Tanaka's MetaGesture Music (MGM) ERC grant.
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Simple Harmonic Motion

Simple Harmonic Motion is an ongoing series of projects and research investigating complexity from simplicity – specifically the emergence of complex behaviour through the interaction of simple multilayered rhythms. It is inspired by natural and mathematical phenomena, as well as works by the likes of Norman McLaren, John Whitney, Steve Reich, John Cage, Györgi Ligeti and Edgar Varèse.

The initial motivation for the project is a personal abstract memoir of growing up in and experiencing Istanbul. Inspired by Orhan Veli Kanik's poem Istanbulu Dinliyorum (“I'm listening to Istanbul with my eyes closed”), it is a very non-literal sonic interpretation of the cultural diversity of the city; a collision of cultures and intertwined opposites: progressive vs conservative, religious vs secular, liberal vs authoritarian, extreme decadence vs severely moral; interwoven not only in the same city but in the same streets, the same buildings. Seemingly conflicted yet managing to not only coexist, but to breed thriving and flourishing subcultures. In the chaos of the city, a rich tapestry of different lifestyles, different patterns and rhythms cross paths on a daily basis. The intersection of these rhythms create complex cyclical, quasi-periodic patterns. Movements that may initially appear to be random and arbitrary are actually governed by an elaborate order creating recognizable yet constantly evolving behaviour.

In the installation, both image and sound are driven by the same mathematical principles and algorithm: a complex signal, broken down into its basic elements operating at different frequencies. While this underlying fundamental principle – the fourier series – is a purely abstract mathematical theorem, it is also responsible for our understanding of almost every aspect of the physical, biological and social world; including but not limited to acoustics, economics, quantum mechanics, protein structures, DNA and the composition of distant stars and galaxies.

The Simple Harmonic Motion series of works transposes the invisible elegance found in these abstract mathematical equations, driving almost every aspect of our lives, to a medium we can see, hear and feel.

Through the use of customised software, a number of ‘agents’ are created and assigned a simple behaviour, a repetitive pattern of movement and sound. On their own, each agent is monotonous and mechanical, acting completely unaware of its neighbours and the bigger picture. However the interaction of the different agents’ behaviour creates complex, rich, evolving behaviours and compositions – both visually and acoustically.

Memo Akten (b. 1975) is an artist and engineer born in Istanbul (TR), currently based in London (UK). He develops systems that abstract behaviour to create unfamiliar familiarities and encourage new perceptions on our relationship to science, nature, technology and culture.

Memo Akten

Creative Machine

Simple Harmonic Motion, 2014

Audio, video, custom software

MEMO AKTEN

Simple Harmonic Motion

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Creative Machine
Copies Non Conformes (*"Certified Inaccurate") explores the erosion and mutations that take place in the reproduction of small sculptures of the 17 letters in the sentence: "JE NE DOIS PAS COPIER" (*I must not copy*). This line is inspired by the punishment commonly meted out to schoolchildren, who are ordered to copy fifty or a hundred times by hand prescriptions and proscriptions like "I must not talk in class". In this case, the prohibition is not copied by hand but by a digital duplication process: each letter is modelized and printed in 3D, and the resulting object is then digitized by a 3D scanner. This new model is reprinted, and so on and so forth, a certain number of times. Because each subsequent generation accentuates the previous morphological alterations, the last reproductions become unrecognizable. Copies Non Conformes diverts the printer and scanner from their usual functions, using them instead to generate shapes unobtainable in any other way. And through the random distortion of the letters, information is either added or lost at each stage. Copies Non Conformes might be glossed as expressing one of the paradoxes of our digital culture: on the one hand, we have the endless reproduction of information, and on the other, the physical media carrying that information (CDs, hard drives etc.) – and hence the information itself – are becoming increasingly fragile. Copies Non Conformes is in this sense a vanitas, a vision of the digital world in ruins – rather like Hubert Robert’s Vue Imaginaire de la grande galerie du Louvre en ruines, which he painted in 1796, the year the Louvre was closed due to structural defects only three years after the museum first opened to the public.

The installation Copies Non Conformes (*)"Certified Inaccurate") explores the erosion and mutations that take place in the reproduction of small sculptures of the 17 letters in the sentence: "JE NE DOIS PAS COPIER" (*I must not copy*). This line is inspired by the punishment commonly meted out to schoolchildren, who are ordered to copy fifty or a hundred times by hand prescriptions and proscriptions like "I must not talk in class". In this case, the prohibition is not copied by hand but by a digital duplication process: each letter is modelized and printed in 3D, and the resulting object is then digitized by a 3D scanner. This new model is reprinted, and so on and so forth, a certain number of times. Because each subsequent generation accentuates the previous morphological alterations, the last reproductions become unrecognizable. Copies Non Conformes diverts the printer and scanner from their usual functions, using them instead to generate shapes unobtainable in any other way. And through the random distortion of the letters, information is either added or lost at each stage. Copies Non Conformes might be glossed as expressing one of the paradoxes of our digital culture: on the one hand, we have the endless reproduction of information, and on the other, the physical media carrying that information (CDs, hard drives etc.) – and hence the information itself – are becoming increasingly fragile. Copies Non Conformes is in this sense a vanitas, a vision of the digital world in ruins – rather like Hubert Robert’s Vue Imaginaire de la grande galerie du Louvre en ruines, which he painted in 1796, the year the Louvre was closed due to structural defects only three years after the museum first opened to the public.

Cécile Babiole is a French artist based in Paris. In the 80s, she was active in the music field, and in the 90s, in electronic and digital arts. Her creations combine visual and audio arts through installations and performances that investigate digital media with irony, humor, and interactivity. She is the author of several objects, instalations, and performances, and is a member of the artist-curators collective Les sans titre (http://lesanstitre.net). Babiole is also a member of the artist-curators collective La sans titre (http://lasanstitre.net). Her recent works concentrate more on technological and mechanical issues. She aims to transpose and twist around standardised uses in the field of creation. Her work has been exhibited internationally: Centre Pompidou Paris, Musée National d’Art Moderne, New York, Tate Liverpool, MAL Lima, NAMOC Beijing, and many others. Babiole integrates the field of mechanical devices and mass culture to draw a confrontation between creativity and determination, past and present usage, obsolete and contemporary techniques.
Graffiti is the art of the abstraction of the letter form. Letters are distorted, fragmented and interlocked in complex ways, often to the point of becoming unreadable to the untrained eye. Daniel aims at transferring this same form of abstraction to his computer generated works with the process of Graffitization: The (computational) process that applies the stylistic principles of graffiti art to digital forms (media).

This iteration of the Graffitizer series explores the material aspects of graffiti style with the use of drips, which are a characteristic that can be commonly seen in tags made with a marker. A vertically mounted drawing machine produces drawings with ink on paper. The ink continuously flows to the tip of a modified pump marker, resulting in a design made of dripping lines. The chaotic dripping of the ink leaves a permanent trace on the wall on which the machine is mounted and results in a pattern that emerges in time during the course of the exhibition.

The machine is driven by a software system that is being developed by the artist, in which he has implemented a series of procedures that model the gestures, the grammar of forms and some of the compositional rules that govern his process when drawing graffiti letters. The system allows one to easily combine such procedures algorithmically into sub-programs that generate a variety of designs that are consistent with Daniel’s hand style but augment it with the ‘power’ of generative techniques.
Trace II

This is a sculptural device that alludes to scientific discoveries and the experimental apparatus of science. It is essentially a mechanical computer that draws its analogue programme from a revolving plaster head. The carefully balanced mechanism slowly measures the topography of a cast human head and translates its undulations onto a rotating cylindrical surface. The result is an evolving topographical diagrammatic depiction that is truly unique every time.

The work alludes to our notions of self and how through technology humans have found numerous visual representations for the individual. Medical advances have brought about well-recognised depictions such as DNA profiling, retina scans, MRI scans and 3D scanning. Thus, if one imagines the process behind the image making, and reconnects the viewer in a tangible way, with the process behind these fantastical images, this is not only a drawing machine that draws emphasis on the human condition but also questions our ability to understand the ever increasing advances in technology around us. Trace II uses the more visually transparent and tangible technology of the past – more likened to the nature of the fingerprint – to allude to technology of the present. In this respect Trace II attains a timeless characteristic, where the alienating nature of today’s technology is contradicted. Today so much of our technology comes through a screen from a complex array of codes and programmes that only a few can understand and even then it can be a less than fulfilling visual experience. This ‘technological alienation’ can often leave the viewer detached from the lengthy creative processes that lie behind the screen, constituting so much of a focus for digital artists today.

Trace II is a generative work where the artist’s head becomes the code for a complex mechanical algorithm. The plaster head is the ‘source code’ for the ‘Da Vinci’-like contraption that literally feels the undulations of the human head and converts these features into a spiralling topographical map of the 3-dimensional object.

Bolygó’s work explores the processes in the making of images and objects. His work harnesses natural forces to create tangible systems that move, make and create spectacular events where the ‘act of making’ of a work of art becomes just as important as the object itself. Bolygó lives and works in London.
This project is being created in an iterative process by the artist, where the code is developed according to the physical qualities of the machine.

Damien Borowik works with his machine in a dialog, where he is learning to nurture the mark-making qualities of the machine to reveal its inherent procedural aesthetics through the drawings it creates.

In its current state, the drawing machine uses pens and markers to create ambiguous and timeless drawings, where the viewer can contemplate a vision of our inescapable man-made world.

A small version of the Drawing Machine was created earlier this year, based on the CoreXY principles by Ilan E. Moyer at MIT. The machine quickly developed to its current state.

According to the artist, the Drawing Machine is still in its infancy. Even though the machine and code are still primitive, Borowik currently wants to capture the aesthetic of their inner workings and translate them into the artwork they create.

In the Expanding Square drawings, the machine’s performance is being tested while creating a simple shape through 4 basic actions. The two motors controlling the motion are going backwards and forwards in turn, while the distance travelled by the pen is increased at the end of each cycle.

In the figurative drawings, Borowik has carefully taken photographs which he then simplifies to capture the essence of the subject matter through light, shape and texture, which he then extrapolates through the idiosyncrasies of the machine. Borowik has launched a crowd funding campaign to further develop his project, aiming to let the audience create their own drawings with the machine, and to allow him to carry on investigating the machine through code and technology. More info at http://indiegogo.com/projects/drawing-machine
I discovered computers as an art medium when I saw Cybernetic Serendipity at the ICA in 1968. I was immediately attracted but it wasn’t until 1974 that I was able to start using computer systems as a central part of my practice. After a period learning programming I began to produce works and Untitled, Computer Assisted Drawing is one of my earliest computational artworks and was made in 1975. It was produced by a FORTRAN programme run from punch cards on an ICL 1903A Mainframe Computer at Liverpool Polytechnic (now John Moore’s University). The programme produced a paper tape that controlled an offline Calcomp pen plotter. The entire process from conception to production of a drawing took around 2 weeks depending on the number of errors in the original programme. At that time there were no ‘apps’ and very little support software so I had to write all the necessary code (including things like device drivers) myself.

My early works like this used random numbers to distribute and orientate a set of square tiles. I also increasingly adopted an early artificial life technique called Cellular Automata that I had discovered in a Scientific American article in 1969. A-life methodologies like this have become a central part of my practice and I am now recognised as a pioneer of this kind of work. Early influences included the work of Kenneth and Mary Martin, the members of the UK’s Systems Group, the pan-European systems art movement and US conceptualists like Sol Lewitt and Dan Flavin. They showed me that art could be a process, or system, and that art production could be a ‘hands off’ process. In the decades since I have become interested in the concept of ‘art that makes itself’ and the potential of artificial intelligences that can produce art autonomously without the need for human input or intervention.

In 1976 I began to use stand-alone minicomputers (like the DEC PDP8 and DG Nova 2) to produced time-based works that are computed dynamically and are shown on screens. The first of these – Builder/Eater, 1977 – used a 96 by 96 pixel monochrome frame store displayed on a 9in CRT monitor. A recreation of this work was included in the Digital Archaeology section of the Digital Revolution Show at the Barbican earlier this year and is now on international tour.

Early in my career I had to carry around boxes of punched cards and then 10-inch tapes. Then there were boxes of floppy disks. Now almost everything I have done is on a high-capacity USB stick and, of course, is in the Cloud. My early works used to take weeks and sometimes months of work on expensive and hard to access computers using difficult programming languages like Assembler. Now tools like Processing and systems like the Raspberry Pi make it so much easier and cheaper to get involved.

Paul Brown is an artist and writer who has specialised in art, science & technology since the late 1960's and in computational & generative art since the mid 1970's. He has been a key contributor to the development of new media and is one of the early advocates of Cybernetic Serendipity at the ICA in 1968. He has been involved in a wide range of activities through his career, including the creation of large scale public lighting works for concerts and performance events like the Electric Proms, Color Television Vox, Pop Art, etc., and the use of computer-based technology in the late 1960's. He is an editor of a number of major international journals like the 1990s, Loci of Art and Chaos in the U.K., the Academic Press, WPPS in Spain, the Exhibition in Singapore and the Luminous Elements. His work is represented in public, corporate and private collections in Australia, Europe, Russia and the USA.

From 1990 to 1998 he edited Visualising, one of the few non-profit arts periodicals in the world and a leading editor of PAUL - the bulletin of the Computer Arts Society.

During 1996-1997 he was an Arts Media Fellow at the National Endowment for the Arts in the USA and in 1998 he was a senior editor of PAUL - the bulletin of the Computer Arts Society.
A new site-specific work, which shows a large sculptural LED screen curtain showing digital transformations, driven by video input and coded animating data structures. The work references flags and traditional ceremonial banners in churches, cathedrals and ancient buildings but is juxtaposed with the large scale LED technology now commonly used in retail, outdoor advertising, concerts and nightclubs. In terms of content it includes a frontal pixelated spiral structure endlessly forming as an animated tapestry form. The content for this LED Banner was developed in collaboration with William Latham and Stephen Todd.
What does it mean for software to be truly, independently creative? Through much scientific and artistic exploration, members of the Computational Creativity research community have identified that software has to be seen to be creative, in addition to producing artefacts of high value and innovating in technique, aesthetic judgement and imaginative reasoning. If it is to have any chance of earning the description ‘creative’, software needs to show genuine skill, appreciation, imagination, learning, accountability and intentionality in creative endeavours. With the Painting Fool project – described at www.thepaintingfool.com – we are implementing software which can reasonably be described as having abilities that exhibit these behaviours.

Gaining feedback from artistic communities has always been part of the process of building the Painting Fool, and criticisms of its processes and products have regularly led to changes in its code and advances in its sophistication. For instance, our latest project, for the You Can't Know my Mind exhibition in Paris, 2013, was understood that since by having the software paint portraits driven by a simulated mood that it gained through reading newspaper articles. In a terrible mood, the software told sitters to go away, with an explanation of its reasons for doing so. In better moods, it used the sitter as a source material for portraiture designed to inform it about its own painting styles. To this end, it used machine vision methods to tell whether it had achieved an image which was appropriate to its mood, and machine learning techniques to learn to be better at this in the future.

The Dancing Salesman Problem was produced by for an exhibition entitled No Photos Harmed in Paris, 2011. The name of the piece reflects the classic computer science problem where a Travelling Salesman has to drive from town to town without returning to one previously visited. Mapping towns onto colour regions and driving onto brush strokes, the Painting Fool produced these dynamic pieces with swoops representing large distances driven to find the next unvisited town. Each figure was generated with a context-free design grammar, showing that fully-automatically produced pieces can be representational rather than abstract, without requiring photographic input, hence no photos being harmed.

Chair #17 is a virtual painting by a virtual artist of a 3D chair in a virtual world, exhibited in La Maison Rouge, Paris in 2011. In the Furniture series from which this comes, the Painting Fool arranged objects in a 3D world, chose lighting and vantage points and then took an image from which 2D paintings were produced. The series had a very high curation coefficient, with around 80% of the images deemed to be of exhibition quality. That particular piece was chosen for exhibition due to the surprising nature of how much it contrasted with the other pieces in the series. The Painting Fool had free rein to choose colour palettes and simulated painting techniques in this series, and this piece was unique in being greyscale and showing a painting style which can bring much poignancy to the viewing experience.

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My Robot Companion (HARR1) is an ongoing project developed by Anna Dumitriu and Alex May in their role as artists in residence in the Department of Computer Science at the University of Hertfordshire. They worked in collaboration with Professor Kerstin Dautenhahn and Dr Michael L Walters from the Adaptive Systems Research Group to investigate their research into social robotics and to ask the questions, do we want and need robot companions? And, if so, what kind of robot companions do we, as a society, want?

HARR1 (Humanoid Art Research Robot 1) has been designed to be a customizable robot for artistic research created by the team. The artists are using the robot to investigate human/robot interaction from a cultural and ethical perspective, playing with touch, movement, vision, and appearance. The robot can even exhibit signs of boredom, body language, or demonstrate ‘caring’ actions such as putting its arm around someone.

In The Creative Machine HARR1 is seeking out things that are interesting in the exhibition space and those things will catch its attention, though it may soon become bored and drift off to its own ‘thoughts’ or processes. It fidgets constantly and unlike other robots is rarely still.

The team use art and performance techniques as a means of intervening within the scientific research process and the project won an AISB Award for Public Understanding of Artificial Intelligence in 2012.

Funded by Arts Council England and The University of Hertfordshire.

For more information on the project see http://www.myrobotcompanion.com

Anna Dumitriu’s work is at the forefront of art and science collaborative practice, with a strong interest in the ethical issues raised by emerging technologies. Her installations, interventions and performances use a range of biological, digital, and traditional media including live bacteria, interactive, interactive, interactive, and mobile. She has a strong international exhibition profile, having exhibited at the Picasso Museum in Barcelona, the Science Gallery in Dublin, the Museum of Contemporary Art (MCAX) Tokyo and the I & A Museum in London. She is a visiting research fellow artist in residence with Department of Computer Science at the University of Hertfordshire and Adj. at Residence on the Western European Multidisciplinary, Project at the University of Oxford. She is currently working on a new project called Sequence which investigates the technologies central to what genome-sequence mapping funders, funded by Arts Council England.

Alex May is a visual artist working with video projection, projection mapping, software programming, interactive real-time audio analysis, performance, and installation to explore the boundaries between human perception and digital technologies.

Alex has performed at Tate Modern and Watermans, and exhibited interna
tionally, including at the ICA, Science Museum, Wellcome Trust, the Museum of Contemporary Art (MCAX) Tokyo, the Science Gallery in Dublin, and the National Media de la Mèdula in Paris. He is a Visiting Research Fellow Artist in Residence with the Department of Computer Science at the University of Hertfordshire and a DigitalMedia Arts MA sessional lecturer at University of Brighton.

Anna Dumitriu and Alex May in their role as artists in residence in the Department of Computer Science at the University of Hertfordshire. They worked in collaboration with Professor Kerstin Dautenhahn and Dr Michael L Walters from the Adaptive Systems Research Group to investigate their research into social robotics and to ask the questions, do we want and need robot companions? And, if so, what kind of robot companions do we, as a society, want?

HARR1 (Humanoid Art Research Robot 1) has been designed to be a customizable robot for artistic research created by the team. The artists are using the robot to investigate human/robot interaction from a cultural and ethical perspective, playing with touch, movement, vision, and appearance. The robot can even exhibit signs of boredom, body language, or demonstrate ‘caring’ actions such as putting its arm around someone.

In The Creative Machine HARR1 is seeking out things that are interesting in the exhibition space and those things will catch its attention, though it may soon become bored and drift off to its own ‘thoughts’ or processes. It fidgets constantly and unlike other robots is rarely still.

The team use art and performance techniques as a means of intervening within the scientific research process and the project won an AISB Award for Public Understanding of Artificial Intelligence in 2012.

Funded by Arts Council England and The University of Hertfordshire.

For more information on the project see http://www.myrobotcompanion.com

My Robot Companion (HARR1) 2014

Humanoid robot with computer hardware (hacked shop mannequin, servos, motherboard, web cam, etc.)
Notes on Nineteen

Notes of prints are based on archive material relating to each of a number of critical steps in my work. They are, perhaps, part digital collage and part concrete poem. Shown on the right in this one is the construction that I made in 1968 and 1969 called Nineteen. Whilst computers had nothing to do with any of the square elements that made the piece up, I used a computer program to help me determine which piece went where. On the left is a part of that program, written in the computer language Fortran. I specified a set of conditions that should (or should not) be met, such as that two particular pieces should not be on the same row or column, and the program searched all possibilities for a solution that satisfied my requirement. In fact, in the three hours of computer time available to me (it was 1968) a solution was not found, although the computer came close. In the centre is a print out of the near solution with my pencil notes on how I could see a full solution by slightly modifying what the computer program had produced. In that way, a computer program, with a little help from me, solved the problem that I had set myself in completing Nineteen. So this Note print represents where I started writing computer programs as part of my art, beginning with the single mainframe computer that Leicester Polytechnic, where I worked, owned at that time. Arranging the elements of the 20-part relief by writing a program I realized that the systems that I, and others, used in our art could be described in computer programming languages. Once programming became used as art, this form of artistic known as ‘Generative’ appeared. It is important to point out that the art made by computer programmers is not to be equated with Digital Art in general. The later includes all kinds of ways of making artworks that involve computers, the Internet or digital data and may not involve the artist in writing programs at all. Where a program is the medium, the artist is encapsulating rules and procedures in a formal description and arranging for a computer to act out the consequences. This makes programming an obvious extension to the methods used in the art of the British Systems Group, for example. In this sense, the constructive tradition might be said to continue to break new ground through artists writing computer programs.

Ernest Edmonds (born in London, 1942) lives and works in Hathersage, UK and Sydney, Australia. He trained in Mathematics, Philosophy and Logic. His art explores value, time and duration in the context of other synthetic and systematic art. He extends the Constructivist tradition into the digital age. He has shown an international arena with BMA Contemporary in 1983 and published a generation-based comprehensive work in London in 1988 and featuring Europe. He has recently exhibited in Sheffield (two exhibitions entitled Light Logic) as well as in Sydney, Berlin, Nicosia and London. He is Professor of Contemporary and Creative Media at the University of Technology, Sydney, Professor of Contemporary Art at the Ryde University, London, and Editor-in-Chief of Transactions in the journal Leonardo. Recent books include: On New Constructs in Art, Art, Medina, London, (2005) and, with Linda Candy, Interacting: Art, Research and the Creative Practitioner, Libri Publishing, UK (2011).

Creative Machine
Love Love

Love Love is an endless game of digital tennis where the computer perfectly controls both players and the human controls the gaze of a single member of the audience.

Presented in a similar manner to Atari’s 1972 arcade game Pong, Love Love looks at player assumptions in video games, particularly expectations of agency. It is one of Ian W. Gouldstone’s larger body of queer video game forms.
Growth: Mysterious Galaxy

YOICHIRO KAWAGUCHI

Born in Tanegashima Island, Kawaguchi has been working on Computer Graphics since 1975, and has been recognized as a pioneer and a world-class authority of CG art by his unique style. Using the "GROWTH Model" as a self-organizing procedural modeling algorithm, he has become creating synchronous natural contents like figures.

Recent works include: development of CSG expression of natural beauty based on physical-based models, Ultra High Definition CG art, creation of fine traditional arts incorporating traditional craftsmanship and advanced IP-based expression; creation of artistic and artistic robot for planet exploration, development of "Gemotion" (Gene, Growth + emotion) 3D Bumpy display, which results with animation like living creatures.

He won ACM SIGGRAPH Distinguished Artist Award for "Lifetime Achievement" in 2010 for creativity and innovative ability, giving life to a pioneering aesthetic derived from his dedicated research in computer technology, biological forms, and contemporary artistic practice. In 2013, he received the Award from the Ministry of Education in the Art Encouragement Prize with Purple Ribbon.

Creative Machine

Many organic objects found in nature, such as, seashells, horns, claws, fangs and spiraling plants, exhibit a repetitive pattern in both coloring and form. They are formed when self-similar figures go through repeated and complex re-partitioning. The formation process of molded things from the natural world is based and materialized in a natural technique under the scope principle. And, I have been trying to apply that algorithm as an artistic method.

Growth: Mysterious Galaxy was first presented at the SIGGRAPH'83.
Mutation Space

Using software modeled on the processes of evolution, it blends organic imagery and computer animation. The work includes large-scale printed translucent curtains and printed metal floor tiles which create a visually rich 3D design space within which human and machine interact.

Through computer touch screens and Kinect input, viewers are able to shape and mutate vibrant mutating organic forms in real time on a large projection screen and on small computer screens. Starting with a simple horn-like form, the Mutator2 code introduces random ‘mutations’ in order to generate increasingly complex three-dimensional creations that resemble fantastical, futuristic organisms, by a process that Latham describes as “evolution driven by aesthetics.” These creations, like the Rorschach ink blot test, are open to multiple interpretations, as the viewer perceives content emerging from the endlessly mutating variations: some forms resembling Giger-esque ancient fossils, some looking like protein molecules, others like heavy metal structures and others resembling Escher-like alien spaceships. The installation includes very recent work with Stephen and Peter Todd and Lorenzo Ciciani in which the computer generates mutated variants which are then automatically culled by the computer based on aesthetic rules that are mathematically defined, removing the need for the artist or public viewer to steer the evolution. The work reflects the artist’s long-term interest in harnessing basic evolutionary processes for creative ends.

The work is a result of William’s long-term collaboration with Stephen and Peter Todd since the late 80s and includes very recent work on Fractal Mutation and aesthetic rules by his postgraduate student Lorenzo Ciciani. Darren Cleary worked on textiles and tile production.

Latham’s considerable career also encompasses national and international exhibitions. The Conquest of Form toured to over ten galleries between 1987-1991 including the Arnolfini Gallery in Bristol, (1989) for Munich Museum, London (1993) as well as the Cultural History Museum, Magdebur, Germany (1988). In 1988 he presented work in the group show Lineup Art at Centre D’Ensemble Pompéi, Paris, France and in 1988 Mutation Room at the British Council Show in Hong Kong. More recently, Latham’s solo exhibitions Mutator 1 + 2: Evolutionary Art at Phoenix Wright was part of Digital Art Biennale in 2013 and toured to the MAC, Dalry in Lochgilphead, in 2014.

He is a director of SoftV Ltd involving gamification and neuroscience, collaborating with UCL (University College London).
Inspired by the work of Alan Turing, Ernst Haeckel and D’Arcy Wentworth Thompson, Cellular Forms uses a simplified biological model of morphogenesis to explore the generation of complex three-dimensional structures. Each form starts with a small initial ball of cells which is incrementally developed over time, adding iterative layers of complexity to the structure. The aim is to create forms emergently from the interactions between individual cells, exploring generic similarities between many different shapes in nature rather than emulating any particular organism. The process reveals universal archetypal forms that can come from growth-like processes rather than top-down externally engineered design.

Cell division is controlled by accumulated nutrient levels. When the level in a cell exceeds a given threshold the cell divides, and various parameters control how both the parent and daughter cells re-connect to their immediate neighbours. Rules can also be adjusted for how nutrient is created, such as by being randomly uniformly created by each cell, or by incident light rays creating nutrient in cells hit by photons. Nutrient can also be allowed to flow to adjacent cells. The simulation process is repeated over thousands of iterations and millions of particles, with typical final structures having over fifty million cells.

A number of internal forces affect the structure, including linear and torsion springs between connected cells. Additional forces exist within the structure that induce them to change shape dynamically with surfaces naturally folding into complex organic forms.

Two complementary rendering methods are applied to the simulation data to visualize the generated data and reveal different aspects of the forms. The first shows the cells as sphere primitives illuminated with a diffuse light from all directions, revealing the three-dimensional shape of the forms through self-shadowing of the surface. The second uses a density accumulation map, with each cell represented as a sphere of equal density. This digital emulation of an X-Ray reveals internal details of the structures that may not be apparent from the external surface.

ANDY LOMAS

Andy Lomas is a mathematician, digital artist and Emmy award winning supervisor of computer generated effects. Cellular Forms is the latest part of Morphogenetic Creations, a series of work which explores how complex organic structures, such as those seen in nature, can be emergently generated using cellular processes.

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Creative Machine
The sci-fi film FACELESS plays in an eerily familiar city, where the reformed RealTime calendar has dispensed with the past and the future, freeing citizens from guilt and regret, anxiety and fear. Without memory or anticipation, faces have become vestigial – the population is literally faceless. Unimaginable happiness abounds – until a woman recovers her face...

The film was made under the constraints of Luksch's Manifesto for CCTV Filmmakers – images are obtained from existing CCTV systems by the director/protagonist exercising her rights as a 'surveilled person' under data protection legislation. To comply with privacy legislation, CCTV operators are obliged to render other people in the recordings unidentifiable – typically by erasing their faces, hence the 'faceless' world depicted in the film. The scenario of FACELESS thus derives from the legal properties of CCTV images: a 'legal readymade'.

There was no traditional shooting script: the plot evolved during the four-year long process of obtaining images. Scenes were planned in particular locations, but the CCTV recordings were not always obtainable, so the story had to be continually rewritten.

The medium, in the sense of "raw materials that are transformed into artwork", is not subsequently described as simple video or even captured light. More accurately, the medium comprises images that exist contingent on particular social and legal circumstances – essentially images with a legal superstructure. Faceless interrogates the laws that govern the video surveillance of society and the codes of communication that articulate their operation, and in both its mode of coming into being and its plot, develops a specific critique.

Manu Luksch is a media artist whose practice interrogates assumptions of progress through the deconstruction of utopian utopias and the unmasking of promises, with a strong emphasis on research and collaboration – often with groups whose experience and expertise are under-recognized. She is founding director of ambientTV.NET, a crucible for independent, interdisciplinary projects at the intersection of art, technology, and social criticism.

Her focus is on the effects of emerging technologies on daily life, social relations, urban space, and political structures – specifically, possible futures of individualism, the materiality and contradictions of public space, and the traces of data that accumulate in digital environments.

Works are shown at venues and festivals internationally, such as Whitechapel Art Gallery (London 2012), Centre Pompidou (Paris 2008, 2009, 2013), LABoral (Gijon 2010), MiMA (Middlesbrough 2009), Hors Piste (Paris 2008, 2009), Ars Electronica (Linz 2007, 2002), NTT ICC (Tokyo 2006), Witte de With (Rotterdam 2006).

Luksch was awarded the Austrian Media Arts Prize 2012 and the Manfred von Willemer Prize for Digital Arts 2011 (Ars Electronica Center & City of Linz).
Niche construction is a biological process whereby organisms modify the conditions and resources of their environment to create heritable niches for themselves and their offspring. For example, Beavers build dams which influence river flow and lake formation, creating a niche that changes plant composition and decomposition dynamics in the immediate area of the dam.

In the standard view of evolution, the gene is the main unit of selection in evolving populations of phenotypes. Species develop adaptations to their environment and the responsible alleles proliferate in the gene pool. From a niche construction perspective, organisms modify their environment – and possibly that of other species – creating a heritable environment for offspring.

Advocates of niche construction argue that this forms an important feedback process in the natural evolutionary process.

This work is part of a series of experiments where we have applied biologically-inspired processes to the development of creative generative systems.

In Niche Constructions, line-drawing agents move over a virtual canvas, leaving a trail of ink as they move. While drawing, they might reproduce, giving birth to new lines with similar drawing behaviour. If an agent intersects with an existing line, it dies. Eventually, all species become extinct; the drawing space fills up, all the agents die off, and the drawing is complete.

Each agent’s genetic structure contains a special gene that represents the optimum image density the each individual and its descendants. The value of this optimum is genetically determined, but can vary between different species of agent.

As the agent moves around the canvas, the density of ink is measured in a small area surrounding the agent’s current position. This density measure is used to determine how suited the environment is to the agent’s density preference. The closer the match, the more successful the agent is in terms of longevity and reproduction.

Over the life of the drawing, the agents modify the environment to suit their niche preference. Additionally, through evolution, the genetically determined density preferences adapt as the drawing space fills with lines and becomes more dense.

The niche construction drawings show much greater variation in density and drawing style than the drawings made by agents without this mechanism. Niche construction introduces more complex behavioural dynamics into the drawing process using a relatively simple mechanism. ‘Founder’ agents often draw large, closed boundaries to protect their low-density children from being invaded by high-density loving invaders, for example.

We often think of creativity as a complex cognitive function that is most developed in humans. Niche Constructions shows how the bottom-up interaction of many simple, low-level processes can result in a system that exhibits creative behaviour.

Jon McCormack is a researcher in computing and an internationally acclaimed electronic media artist. He is currently an ARC Australian Research Fellow in the Faculty of Information Technology at Monash University in Melbourne.

With a background in art, mathematics and computer systems, his research seeks to discover new kinds of usability using computers. This research spans ubiquitous and virtual environments, evolutionary systems, creative intelligence, human-computer interaction, virtual computation and several arts.

McCormack has been the recipient of more than 15 international awards for both art and computing research, most recently the 2012 Bateson Prize for Innovation in Computer Science. His awards have been widely exhibited in leading galleries, museums and symposia, including the Museum of Modern Art (New York, 1992), Tate Gallery (Liverpool, UK), ACM SIGGRAPH (USA), Ars Electronica (Austria) and the Australian Centre for the Moving Image (Melbourne).

McCormack’s latest book, Computers and Creativity, published with the MIT Press, has won the Leonardo award as the best new creativity book of the year.

McCormack’s research and development work has been exhibited at the Museum of Modern Art (New York, USA), Tate Gallery (Liverpool, UK), ACM SIGGRAPH (USA), Ars Electronica Museum (Austria) and the Australian Centre for the Moving Image (Australia). McCormack’s most recent book, Computers and Creativity, published with the MIT Press, has won the Leonardo award as the best new creativity book of the year.

McCormack’s most recent book, Computers and Creativity, published with the MIT Press, has won the Leonardo award as the best new creativity book of the year.
A pervasive source of conceptual anxiety is the notion of intentional in-existence: that something can exist in a mind yet nowhere else. For the reductive theorist it seems an attractive hook on which to hang the distinctiveness of the mental, for it seems both fundamental and unparalleled in the non-human world. Though we had little use for the idea before the scholastics brought it back to defective life, a conceptual attack on it is too deflationary for the current intellectual market. So here instead I turn to empirical, guerilla warfare, by creating a machine that confabulates images that exist nowhere but in an “mind” yet have the reality of the most human of imagined unreals: the inexistent face. Employing deep-learning techniques I have created a new kind of machine, a facievore, that consumes human faces it can find on the internet and extracts canonical, archetypal representations, automatically shaped by “imhomogeneities” in the population, pictorial or categorial. It consumes both face surrogates (photographs, masks) and face representations (painting, sculpture), sometimes confabulating from the real, and sometimes from the human-imagined. Though seemingly part accidental, part reality-driven, its complexity pushes it into territory where the distinction between the stochastic and the deterministic becomes opaque.

Aside from smiling at the implausible reductiveness of dominant ideas in the philosophy of mind, this machine has another, positive aspect. For it drives a truth to which machine-learning more powerfully than any other set of ideas will awake us: that the domains of the human and the physical-biological are one, must be one, and so to understand the biological we must humanise it.

This work supports a Wellcome Trust & Department of Health funded translational research project to develop a clinical system for detecting anomalies in brain scans with the aid of machine-learning (HICF-R9-501).
Structure in Flux, 2010

Investigating flow, rhythm and growth, the video piece was generated during a live performance. Structure in Flux (Rubedo, 2010). Here, 3D structure is being shaped, in real-time, in response to frequencies, modulations and rhythmical patterns of the sound piece composed and performed during the performance.

3D structures rendered as fluid light react to the acoustic parameters of the music; this creates a constantly-evolving visual experience of the installation.

The outcome is alike a moiré pattern – a figural effect produced by superposing fields of sonic loops and light patterns, with complex behaviours and experiences resulting from a combination of regular, repetitive elements.

This transmediation of sonic to visual organisation makes it possible to create an ecology of sound and light – a system based on its capacity for variation in space and time.

The result is an evolving landscape of light and sound that allows the viewers to discover their own sense of order, and engage with emotions arising from the experience.

Rubedo (Laurent-Paul Robert and Dr Vesna Petresin Robert) are a London based art practice and think tank exploring relations between aesthetics, complex geometry, acoustics and synaesthesia, through performance, installation and visitor experience.

The practice integrates multiple material supports (sound, space, moving image, narrative) and customised digital and analogue tools.

The work integrates live broadcast and physical worlds as spaces of radical theory, as well as composition methods based on stochastic, chance, emergent patterns and particle fields. Transmediation becomes a vehicle for transfiguration, condensation and systematic evolutions of the work that seeks to merge the domains of art and science, music and space, thinking and the collective.

Rubedo are recipients of industry and arts grants (British Council, UK Dept. of Innovation, Business and Skills, Arts Council, Crafts Council) and sister industry Advisors to Sheffield College [Training Research Unit]. Their work has been awarded a three-year Creative Office Fellowship at the 35th International Festival of Comics, also contributing to two events (Luma, Biennale, 2009-10), as well as patents and the first non-commercial satellite.

The practice uses broadcast and physical events as a means of radical theory, as well as composition methods based on ambiguity, chance, emergent patterns and particle fields. Topology becomes a vehicle for conceptualisation and symbolic mediation of the work that seeks to merge the dualism of art and science, micro and macro, the intimate and the collective.

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The work recently featured at Tate Modern, ArtBasel Miami, Royal Academy of Arts, Royal Festival Hall, Venice Biennale, Cannes International Film Festival, Institute of Contemporary Arts London, World Architecture Festival, Sydney Opera House, Beijing Architecture Biennale, Venice Biennale, Kings Place, Pierre Paulin, Silicon Valley Art Fair and Vienna Secession.
Iconographies #018  
Venus & Adonis' after Rubens

Iconographies is an ongoing project focusing on the analysis of renaissance and baroque paintings via computational methods. Religious and mythological scenes are transformed into complex abstract formations. By removing iconographic narratives, the paintings lose their original context to become new objects of contemplation.

Iconographies #018 is a large-scale print inspired by Venus & Adonis (1610), a Peter Paul Rubens painting – Museum Kunstpalast, Dusseldorf, Germany.

Quayola's work has allowed him exceptional access to the art and architecture of churches, monasteries and museums throughout Europe, such as Notre Dame and the Vatican. In his work, original masterpieces and collections become raw canvas, as Quayola anchors a video-based exploration in a conversation about archives, collage, intellectual property, and the appreciation of an object. In an age of the Google Art Project, which offers unprecedented access to the literal surface of a painting, Quayola handles the time we spend looking at art as a plastic artifact, something to be sculpted and suspended. The gaze is a place where the logic of a picture unfurls, seemingly excavated from beneath the image.

42
Different Ways to Infinity

D.W.I gathers experiments as fictional strategies to generate infinity: the complexity of chaos, the space filling capacity of the rhombic dodecahedron, the replication of motorized mechanical systems as clones, or a machine's effort to raise a pendulum against gravity to find perpetual equilibrium.

The ancient alliance has been destroyed; man knows at last that he is alone in the universe's indifferent immensity out of which he emerged only by chance – Jacques Monod.

In the late 70's, chaos theory challenged traditional science's mechanistic vision of the universe (La nouvelle alliance 1979). Reality became an open system based in change, disorder and entropy.

Following the Prigogine paradigm, D.W.I Chaos and D.W.I Clones, focus on those aspects of reality such as: disorder, instability, disequilibrium and non-linear relationships. The installation confronts the viewer to the anatomy of nature as an open system: entropy, the metaquantification of complexity, gravity, the control of chaos;...•

D.W.I: Clones

Clones are represented as identical mechanical machines (inverted pendulums) that using human behaviors, fuzzy logic, drift to find endlessness equilibrium.

Clones uses two identical inverted pendulums: based in a motorized mechanical system, the pendulums are mounted with the pivot point on a cart that moves horizontally. This movement makes the pendulum swing, and once the pendulum rotates to its inverted vertical point, an algorithm takes control of the movement of the cart and tries to find equilibrium against gravity.

The artist explores the expressiveness of the system, using human size heavy pendulums, capable of generating enough inertia to generate self-rotation. He also tries to humanize the system in a game of failures and successes.

Creative Machine

FÉLIX LUQUE SÁNCHEZ

Félix Luque Sánchez (Oviedo 1976) creates audiovisual and spatial art-works, for which he develops software / hardware and uses digital fabrication technologies.

He has exhibited his works at Sonar Barcelona (Barcelona), the Electronic Arts, MMX Museum (Barcelona), the Barça Atrium (Barcelona), the Barça Atrium Museum (Barcelona), the MACBA Museum (Barcelona), among others.

From 2001 to 2007, he was a faculty member at UAB, the Autonomous Institute of the Prince Pablo University (UPC) in Barcelona.

He currently lives in Brussels where he works as iMAL's FabLab manager.

Félix Luque Sánchez

Different Ways to Infinity

44
This work is part of an ongoing technical and artistic exploration of feedback-based processes. It represents a refinement of some of these techniques into a form which is minimalistic in its algorithmic structure while – like an early Steve Reich phase piece – beguilingly complex in its perceptual effect.

In contrast to the pervasive feature-creep that can infect software development, much of the process behind this work is concerned with the removal of elements non-essential to the pure expression of the underlying phenomena. As works in their own right, these stand coherent and fully-formed. The starkness of their largely black and white appearance is not a technical limitation, but a facet of the desire to retain clarity as well as a reflection of the underlying simplicity.

The techniques used need not necessarily have these austere limitations and indeed can – in different variations, not presented here – incorporate rich palettes of colour. Other uses may also complement more complex environments in peculiarly satisfying ways.

In the case of both of the variations displayed here, the process involves video feedback of the form where the results of the previous frame’s rendering are used as visual input to each new frame. This colour value is inverted and rendered onto some simple geometry which remains static while the viewer’s manipulation of the ‘camera’ through which it is viewed changes. The use of colour inversion helps to ensure that the results do not tend to ‘blow out’ or decay excessively as patterns converge or diverge, allowing wide ranging exploration of the space of possible patterns without too often being stranded in featureless deserts.

Also crucial to the design of these variations is the use of solid ‘frames’ of pure black (or black with a white stripe), which serve to provide the system with a consistent input signal encouraging the formation of stable patterns.

Peter Todd grew up in a household where writing code to generate art was an everyday fact of life, and as such finds nothing unnatural in the idea that the formality of algorithms can have a symbiotic relationship with ostensibly ‘freer’ creative aesthetic explorations. Son of mathematician Stephen Todd, whose collaboration with artist William Latham at IBM led to the production of pioneering evolutionary computer art, he now pursues similar interests both independently and with Latham’s “Mutators Research Group” at Goldsmiths.

Feedback Variations

Peter Todd

Creative Machine
Space Flower series

Naoko Tosa’s new series of works pays homage to Rimpa, one of the major historical schools of Japanese painting that was founded in Kyoto in the 17th century.

Naoko Tosa’s series of works pays homage to Rimpa, one of the major historical schools of Japanese painting that was founded in Kyoto in the 17th century.

Famed for its usage of luxurious golden colour, one of its key exponents was the artist Korin Ogata, whose paintings of Wind God and Thunder God have become representatives of the style. The fragmentation of flowers by the elements of wind and thunder serves an allegory for the fading of old customs and the beckoning of a new future.

Oiran alludes to the eponymous courtesans popular during the 18th and 19th century; the roses, as though performers in a Kabuki piece, exude a gallant beauty while their fragility evokes a dreamlike presence, at once ephemeral and elusive.

A flower blooming in space in Space Flower symbolizes life and refers to one’s individual self. Perhaps the act of maturing requires one to reject one’s past, an act that inflicts hurt upon one’s self, but the individual more often than not comes out stronger.

Space Jungle depicts a jungle on a planet far away from ours. Abundant water and flora abound on the surface while an array of minerals and plants inhabit the underground, navigating the chaos of zero gravity in an elaborate space of dance. Drawing inspiration from Ogata’s painting Red and White Plum Blossoms, a national treasure of Japan, Moon Flower considers how red and white plum blossoms would appear on the Moon, presenting a continuous kaleidoscope of exploding moon flowers. The deified characters of Ogata’s Wind God and Thunder God take centre stage with Tosa’s reimaginings.

Wind God shows a figure approaching and unfolding onto the scene before departing while Thunder God invokes the Japanese thunder god Susanoo, who remains likeable in spite of his selfish and mischievous personality.

Naoko Tosa is an internationally renowned Japanese media artist, born in 1961 in Fukuoka, Japan. After receiving a PhD for Art and Technology Research from the University of Tokyo, she was a fellow at the Centre for Advanced Visual Studies at Massachusetts Institute of Technology (MIT) from 2002 to 2004 and is currently a professor at Kyoto University. She has had several exhibitions at the Museum of Modern Art, New York, the New York Metropolitan Art Museum and Japan Creative Center in Singapore among many locations worldwide. She has exhibited her artworks at the Museum of Modern Art, New York, the New York Metropolitan Art Museum and Japan Creative Center at Singapore among many locations worldwide. In 2000, she received a prize from the Interactive Art section in ARS Electronica. Also in 2004, she received 2nd prize for Nabi Digital Storytelling Competition of Intangible heritage organized by UNESCO. In 2012, Naoko Tosa was asked to create a digital artwork for the Kins Route of Fluxus in Ginza by EMEK. A digital gallery with a 4.8-metre screen measuring 30 meters by 30 meters, the exhibition digital artwork called Pearl God Shawl symbolizing the role of Asian traditional four gods governing Asia. The work was funded by the Asia 21 Committee.

www.naokotosa.com

Creative Machine
Paul-IX le vaniteux

Paul-IX le vaniteux was born by drawing a still-life from observation. The ensemble of objects depicted seems reminiscent of a Vanitas of the XVIth century; a type of motif traditionally depicting objects that symbolize different aspects of the futility of human earthly pursuits.

The irony of an artificial agent commenting upon human behaviours, aspirations and mortality is counterbalanced by the knowledge that, just as the Nexus-6 in P. K. Dick's Do androids dream of electric sheep, the Paul series of robots, if not maintained, have a short life expectancy. Anyway, what is the point for a robot to dedicate its time to criticising human existence rather than be a useful machine as expected of it?

The Paul series of robots are artificial agents obsessively focused on the drawing practice. Paul predecessors were originally developed to palliate a debilitating painter's block and as such can be seen as creative prosthetics or behavioral self-portraits. Even if the way the Pauls draw is based on Tresset's technique, their style is not a pastiche but rather an interpretation influenced by the robots' characteristics. The software driving the Pauls is based in part on technologies developed by Tresset in the context of AIkon-II, a research project hosted within Goldsmiths College's computing department. The AIkon-II project investigated the observational sketching activity through computational modeling and robotics, and was funded in part with a research grant from the Leverhulme trust. Patrick's work has been internationally exhibited in solo and group shows, in association with major museums such as Victoria & Albert Museum, Science Museum, Tate Britain, The Précis-Collection, The Israel Museum and events such as Ars Electronica Festival, London Art Fair, Korea Art Fair and Indonesia Biennale.

Patrick's artistic practice focuses on human creativity and its relationship with technology. In the context of his MA, he has designed and built a robotic drawing machine called “The Paul”, which is a self-reflective, self-modifying agent that draws its own images. The Paul is a robotic painter that is able to paint using a variety of techniques and styles, from classical to abstract. The robot is able to learn from its own paintings and improve its skills over time. The machine is equipped with a camera that captures images of the world around it and a robotic arm that can move in response to the visual input. The robot is also able to generate new images based on the existing ones, creating a feedback loop that allows for continuous improvement.

Patrick Tresset is a French artist and scientist who investigates human artistic activity and our relations with machines, in particular our relations with robotic entities. In the context of his MA project, Patrick was interested in creating autonomous robots that are capable of drawing from observation. This was a way for him to explore the intersection of art and technology, and to consider the role of robots in the creative process.

Patrick's work is informed by his background in computer science and robotics, and he has a deep understanding of the technical aspects of his projects. He is also a trained artist, and his work is characterized by a strong sense of aesthetics and composition. His projects often combine elements of both art and science, creating a unique and compelling visual experience for the viewer.

Patrick's work has been featured in major media including The Times (UK), The Independent (UK), The Telegraph (UK), Le Monde (FR), New Scientist (UK), El Mundo (SP), L'Oeil (FR), Tank Magazine (UK).
Tantalum Memorial

Tantalum Memorial was produced by Harwood, Wright and Yokokoji between 2006 and 2009. The work is a telephony-based memorial to the people who died as a result of the ‘coltan wars’ in the Congo from 1998 to the present. Coltan ore is mined for the metal tantalum – an essential component of mobile phones that is now more valuable than gold. The work is constructed from redundant electromechanical Strowger switches – the basis of the previous generation of telephone exchanges. These switches are reanimated by tracking the phone calls from Telephone Trottoir – a social telephony network also designed by the artists for the Congolese radio programme Nostalgie Ya Mbo in London. Their precisely poised movements and sounds create a sculptural presence for this otherwise intangible network of circulating conversations and weave together the ambiguities of globalization, transnational migration and the impact of our addiction to constant communication.
This is the first time Lillevan and Adam have performed together. They will improvise with a set of prepared materials.

Lillevan’s practice investigates non-narrative facets of film, focusing on the musicality of the imagery, thus defining the moving imagery as an instrument in its own right as opposed to accompanying music. Intensity and texture are more important than narrative and figure. The relationships between the image’s elements and the viewing eye, between the eye, the mind and the soul are explored. The world of media archaeology is of major interest, while questioning viewing habits and manipulative image-creation. Lillevan recontextualises, combines and politicises existing film images and fragments. The images are a communicative medium interacting with the music. The selection of the images can either support the sound, or work against it, the aim being to achieve a dialogue.

Adam will be performing using 3 Beagleboards (single board computers): bare circuit boards which are essentially computers without screens, housing or keyboards, running granular synthesisers and algorithmic, unpredictable sequencers.

Light sensors mounted on the Beagleboards create unstable connections between Lillevan’s images, reduced to vectors of intensity, and the soundscape, allowing both performers to interact with the sound and find areas of expressivity and conflict.

The performance will take place at the Private View for the Creative Machine exhibition on Thursday 6th November in the SONICS surround audio visual installation in the main exhibition space.

LILLEVAN

Adam Parkinson is an electronic musician and researcher at EAVI, Goldsmiths. He likes running Pure Data music software on anything he can get his hands on – from mobile phones to single board computers, exploring the possibilities of making “computer music” with things that don’t look like computers.

In his duo with Kiti Sotiri, he has performed across Europe and America. As a musician and programmer he has worked with Atau Tanaka, Giacomo Berenzon, Phil Noyce, Rhodri Davies and Kaffe Matthews and released on Entr’acte records.

cargocollective.com/manwithfeathers

Creative Machine

54
Consciousness and Creativity

JAMES BISHOP
Goldsmiths, University Of London

It is commonly held belief that there is a crucial barrier between computer models of minds and real minds, the barrier of consciousness2 and that information – processing and the conscious experience of raw sensations1 are conceptually distinct12. Indeed, Cartesian theories typically describe cognition in terms of its object of subjective aspects, so breaking down the ‘problem of mind’ into what Dretske (1995) calls the ‘easy’ problem of perception – the classification, identification and processing of sensory information – and the ‘hard problem’ of consciousness – the difference between the easy and the hard problems – and the apparent lack of a link between theories of the former and account of the latter – has been termed the ‘explanatory gap’. But is conscious experience a necessary prerequisite for the simulation of cognition and genuine mental states?

1 Fully automatic perfect auctioneers: “I am not a computer, I am a computer!” (1972). I. J. Good.
2 The Chinese Room Argument is John Searle’s (in)famous critique2 of the idea that an appropriately programmed computer can genuinely feel or understand anything of the world.
3 Tristan Tzara and William S. Burroughs both famously utilised the machine as ‘shibboleth’ by electing to describe his own work merely to produce art ‘autonomously’) retreated from this very notion shortly after 1960.

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In all realities – both natural and artificial – it seems that nature suggests that it is – the study of the mind in the study of consciousness. The study of the mind and the study of consciousness is the study of consciousness. Specifically, refer to the first person, subjective phenomenal sensations: consciousness Ned Block terms ‘phenomenal consciousness’ [6] and by this people; in the context of this essay I specifically mean that aspect of con-sciousness that is essentially subjective and private and that which we refer to as “external objective”).

The difference between the easy and the hard problems – and the apparent lack of a link between theories of the former and account of the latter – has been termed the ‘explanatory gap’. But is conscious experience also necessary for an agent to be considered ‘creative’ and, furthermore, can a machine consciousness, is the ‘Dancing with Pixies’ of artificial intelligence. Indeed, one argument that I have advanced is that a computer program can bring forth consciousness has not gone unchallenged. Indeed, one argument that I have advanced is that a computer program can bring forth consciousness has not gone unchallenged. Indeed, one argument that I have advanced is that a computer program can bring forth consciousness has not gone unchallenged.

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