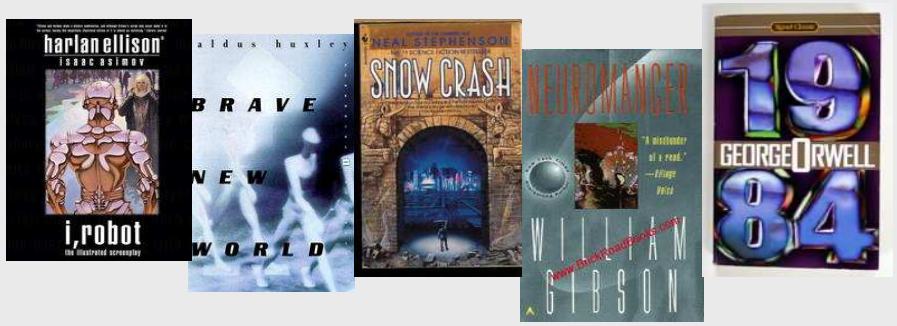
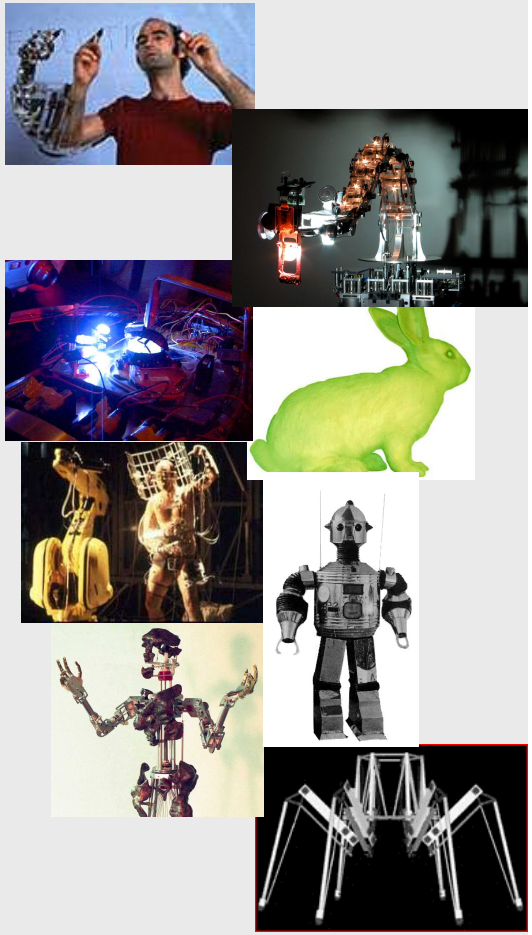
Robotic Art, a short overview…

Pericle Salvini





Is robotic art relevant for RoboEthics?

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Stelarc, 'the body is obsolete'

Discovering the psychological and physical limitations of the body…

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Stelarc, the "cyborg"

Developing strategies for **extending and enhacing the body** through technologies, both by using robotics and virtual reality…

Some of his performances:

- ***The third arm***
- ***The hexoskeleton***
- ***The third hand***

'Coupling the expression of an idea with the direct experience of it'

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Stelarc: 'The Hexapod'

'Although HEXAPOD looks like an insect it will walk like a dog with dynamic locomotion. The robot's locomotion and direction will be controlled by shifting my body weight and turning my torso. Lifting one leg releases 3 mechanical legs to lift and swing forward while restraining the others. So the robot is always balanced and stable.

There is no on-board computer or sensor system so the robot is in no way intelligent. It's the **hybrid human-machine architecture** that can effectively operate and navigate.
HEXAPOD is 5 metres in leg-spread and weighs approximately 250 kgms. It is powered by a combination of electrical and pneumatic systems.'

This project is in collaboration with the Performance Arts Digital Research Unit at
The Nottingham Trent University and the School of Cognitive and Computing Sciences at
The University of Sussex, supported by The Wellcome Trust.
CONCEPT & PERFORMANCE: STELARC (DRU)
ROBOT DESIGN: Dr Inman Harvey (COGS)
CHOREOGRAPHY: Dr Sophia Lycouris (DRU)
DRU DIRECTOR: Professor Barry Smith (DRU)
3D MODELLING & ANIMATION: Steve Middleton (RMIT)

Electrodes positioned on the flexor muscles and biceps curl the fingers inwards, bend the wrist and thrust the arm upwards.
The triggerings of the arm motions pace the performance and the stimulator signals are used as sound sources, as is the motor sound of the Third Hand mechanism itself.

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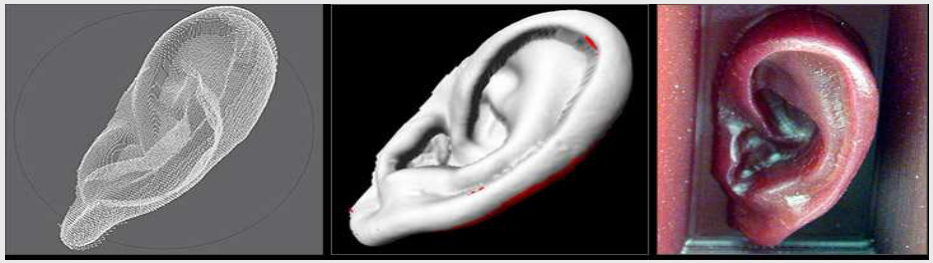
Stelarc's ***Extra Ear Project***

The ***Extra Ear*** is a surgically constructed ear to be used as an additional facial feature, that coupled with a wearable computer will act as an **internet antenna**, able to ear realAudio sounds

'In collaboration with Oron Catts and Ionat Zurr of Tissue Culture & Art a 1/4 scale replica of my ear has been grown using human cells. The ear is cultured in a rotating micro-gravity bioreactor which allows the cells to grow in a 3D structure.

The ear will be fed with nutrients every 3-4 days in a sterile hood. Once the ear can be grown with my own bone marrow cells it would be possible to disconnected from the face, the ear on the arm could be guided and pointed in different directions.'



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Stelarc: 'Muscle Machine'

'The Muscle Machine is a six-legged walking robot, five metres in diameter.

It is a **hybrid human-machine system**, pneumatically powered using fluidic muscle actuators. The rubber muscles contract when inflated, and extend when exhausted. […] This results in a more flexible and compliant mechanism, using a more reliable and robust engineering design. […]

The 6-legged robot both extends the body and transforms its bipedal gait into a 6-legged insect-like movement.

The appearance and movement of the machine legs are both limb-like and wing-like motion.'

PROJECT CO-ORDINATOR: Professor Barry Smith (DRU, TNTU)
ROBOT CONSULTANT: Dr Inman Harvey (COGS, Sussex University)
DEVELOPMENT/PROJECT MANAGER: Dr Philip Breedon (FaCCT, TNTU)
CHOREOGRAPHY: Dr Sophia Lycouris (DRU, TNTU)
SENSOR TECHNOLOGY & SOUND PRODUCER: Stan Wijnans (DRU, TNTU)

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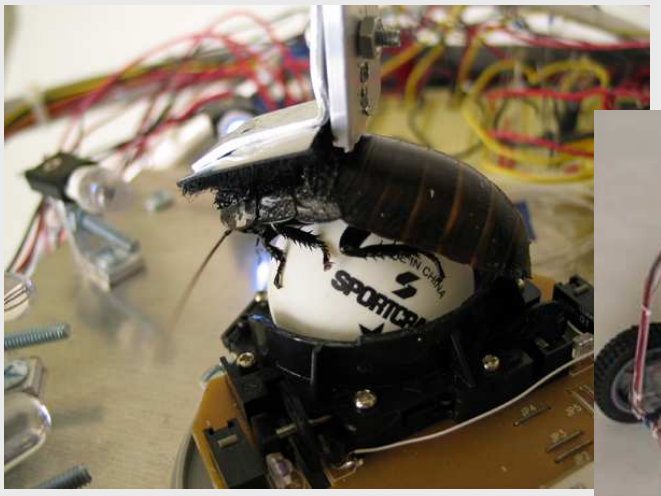
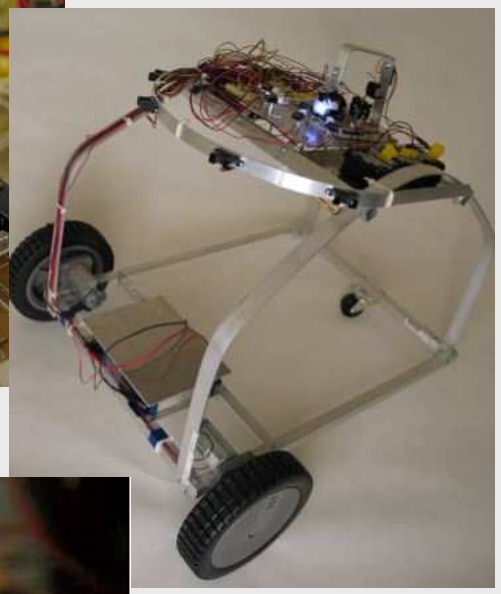
Garnet Hertz, biorobotic arts

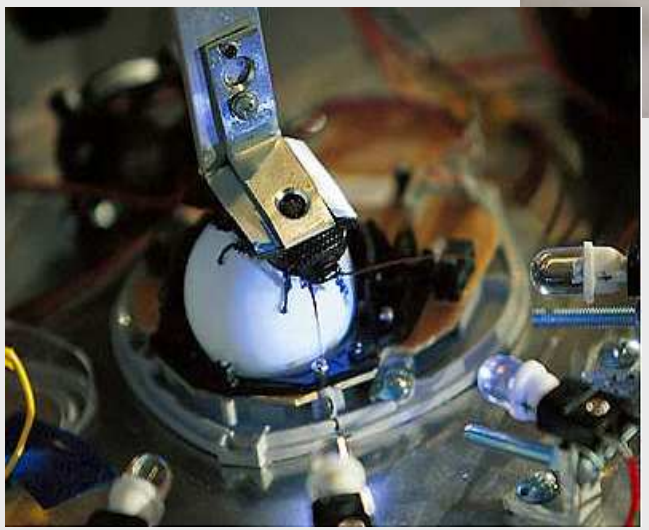
Roach Coach 'is a cockroach-controlled mobile robot system. The project investigates the '**Control and Communication in the Animal and the Machine'** : the 'mechanical system that amplifies and tranlates the bodily movements and intelligence of a giant hissing Madagascan cockroach into the locomotion of a three-wheeled mobile robot. Infrared sensors also provide navigation feedback to create a semi-intelligent system, with the cockroach as the Central Processing Unit (CPU).'





[…]

'The **hybrid biorobotic system** strives to illustrate that the simple embodied intelligence of a living cockroach provides a substantially captivating and novel control center (CPU) for a mobile robot, producing tounge-in-cheek "emergent" and complex behavior akin to the goals of artificial life and artificial intelligence research'.



(http://www.conceptlab.com)

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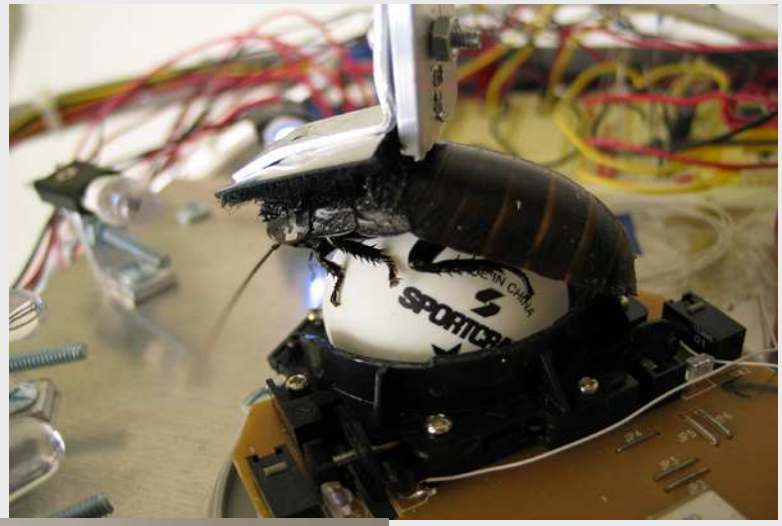
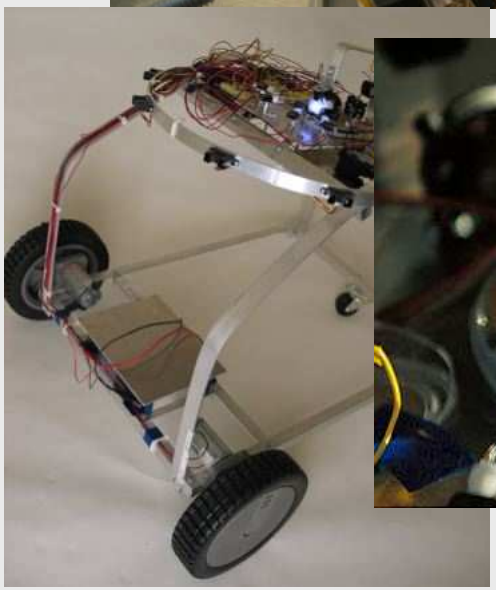
Garnet Hertz: ‘Roach Coach’

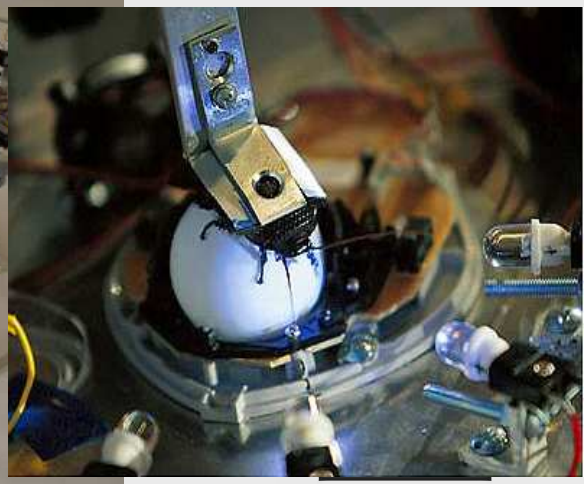
The project investigates the ‘**Control and Communication in the Animal and the Machine’** and consists of a cockroach-controlled mobile robot: ‘a mechanical system that amplifies and tranlates the bodily movements and intelligence of a giant hissing madagascan cockroach into the locomotion of a three-wheeled mobile robot. Infrared sensors also provide navigation feedback to create a semi-intelligent system, with the cockroach as the CPU.’

‘The **hybrid biorobotic system** strives to illustrate that the simple embodied intelligence of a living cockroach provides a substantially captivating and novel control center ("central processing unit", CPU) for a mobile robot, producing tounge-in-cheek "emergent" and complex behavior akin to the goals of artificial life and artificial intelligence research’.

http://www.conceptlab.com







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Garnet Hertz: ‘Roach Coach’ (3/4)

‘This […] project will provide no "middleware" to obfuscate or sanitize the intentions of the insect. As a result of this, this project will strive to not use any microcontrollers or complex logic. In essence, this device could be built primarily with pre-microprocessor (1940-era) circuitry which will also provide an anachronistic perspecitve on Weinerian Cybernetics and pre-AI/ALife hybrid/embodied-logic systems that never came to pass.

[…]

Roach Coach, ethical implications…

'Isn't it cruel to use a cockroach like this?
People are upset if cockroaches are healthy, happy and producing piles of babies in their kitchens. People are also upset if they are being hurt for the sake of entertainment. Both of these concerns are valid: people have a strong desire to **control "nature". This project strives to invert the control structure somewhat by having an insect control a mobile robot:** without the insect being "too" wild or controlled. The insects I use lead normal, healthy lives: if you don't believe me, send me your address and I'll slip some eggs under your front door'.

'In comparison, few people entertain the thought that taking a baby dog away from its parents, raising it with a bunch of humans in a house, putting a collar on it and feeding it cold food is cruel. Cockroaches aren't normally pets, and besides the Orkin man, we have few cultural norms regarding how to treat these insects besides crushing them in an emotional panic. It seems a little hypocritical, however, that the same people that swat mosquitos, lay ant traps, or have their houses sprayed for termites would object to a cockroach being used in a research (or creative) context'.

http://www.conceptlab.com

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Marcel.lí Antúnez Roca: *JoAn*, l'home de carn

- The fleshy robot (1992) integration of mechanics, computers and organic materials.
- Made with cow skin and pigskin
- It moves in random sequences triggered by sounds made by the spectators.
- The installation consists of a computer capable of detecting and analyzing sound characteristics and of sending the corresponding electrical signal to a series of motors. These motors in turn activate the joints of the figure: neck, shoulder, elbow and penis. The robot is inside a transparent cabinet of wood and glass.

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http://www.marceliantunez.com/tikiwiki/tiki-index.php?page=Video_Joan_l_home_de_carn#

Marcel.lí Antúnez Roca: *Epizoo*

Epizoo, (1994) is a performance-installation in which a series of pneumatic mechanisms **deform parts of the artist's body**: the nose, buttocks, pectoral muscles, mouth and ears. The pneumatic mechanisms are **operated by the public**, who interact with a touch screen that presents 12 different virtual representations of the artist's body. By touching graphical elements on the computer screen, spectators simultaneously modify the audiovisual environment of the installation and activate the pneumatic mechanisms. The artist stands on a rotating platform in the center of the room and in front of a large-screen graphics projection.

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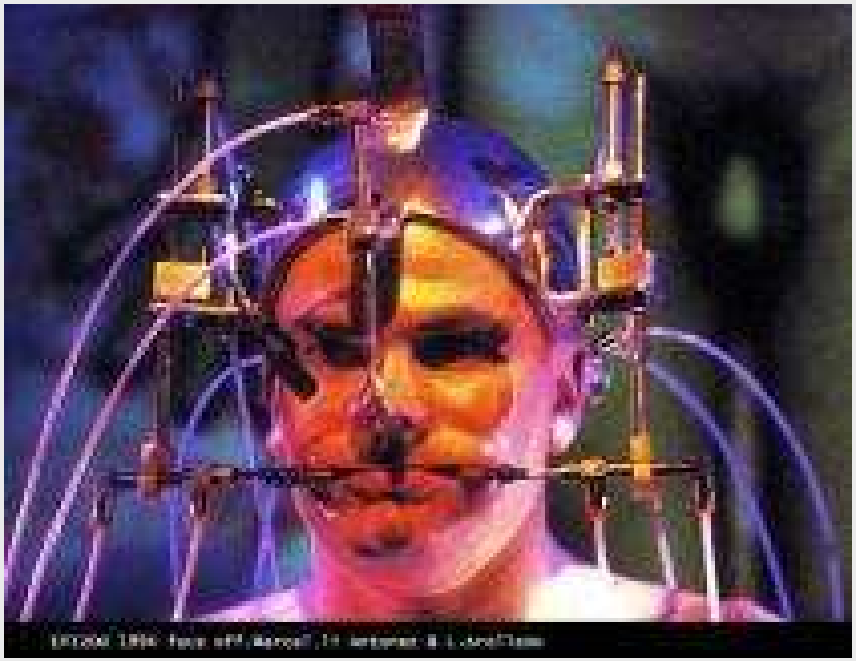
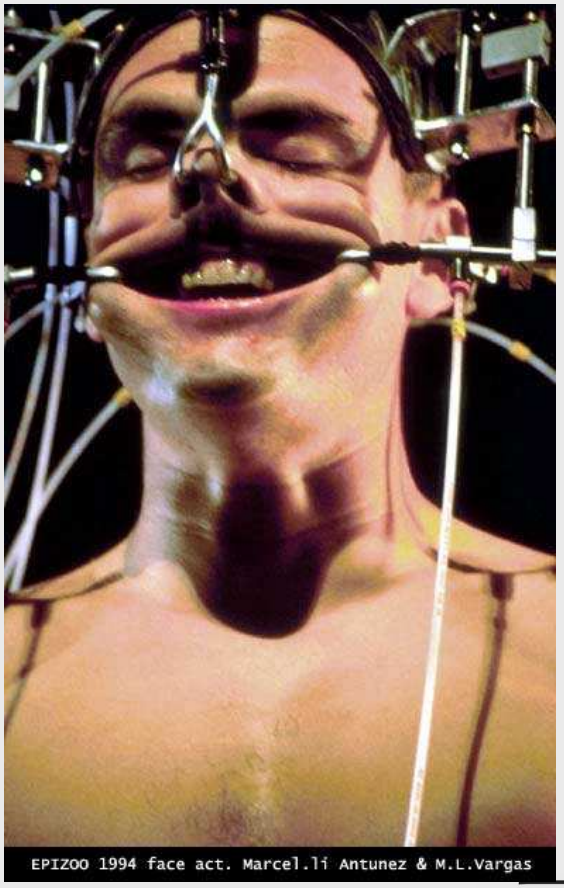
Marcel.lí Antúnez Roca: *Epizoo*





The performance usually ends with a gas flame firing out of the costume's helmet. In a remote-control-guided action of pleasure and torture, the spectators manhandle the artist without dirtying their hands.

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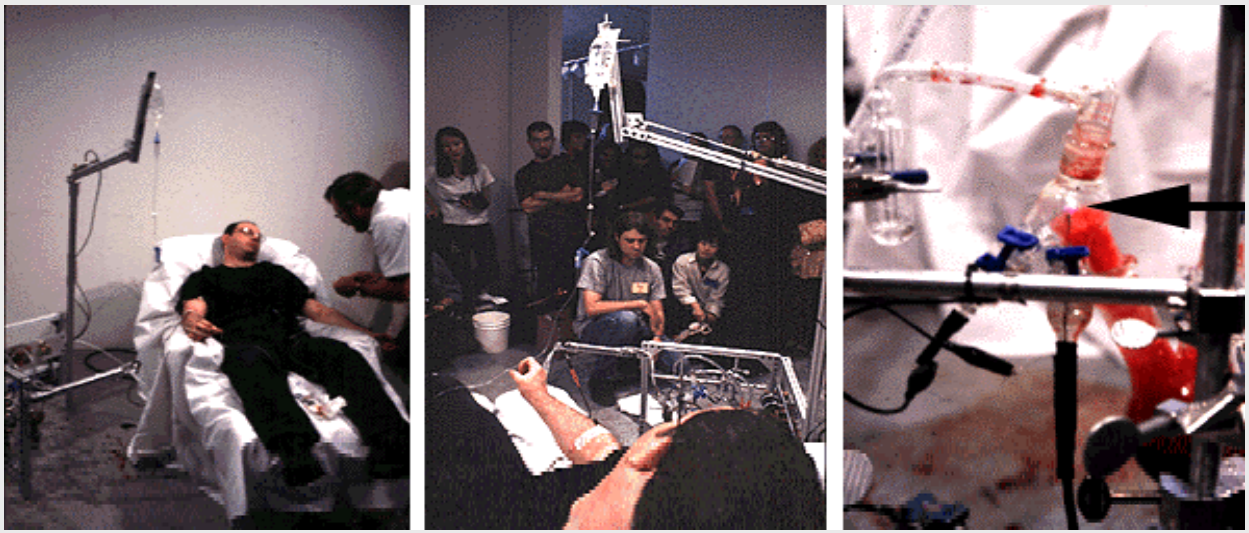
Eduardo Kac's ecology: ***A-Positive***

A-Positive (1997), a biobotic work by Eduardo Kac and Ed Bennett, was experienced on September 24, 1997, at Gallery 2, in Chicago. In *A-positive* a **dialogical exchange** between a human being and a robot took place through two intravenous hookups.

'In *A-positive*, red blood cells carry oxygen from the lungs to tissues, and then provide the remaining oxygen to the biobot. The biobot extracts the oxygen to support a fragile and erratic flame (above). Since the oxygen content of each person is different, each individual dialogue with the biobot will yield a unique flame with differentiated behavior and life span.'

(www.ekac.org)



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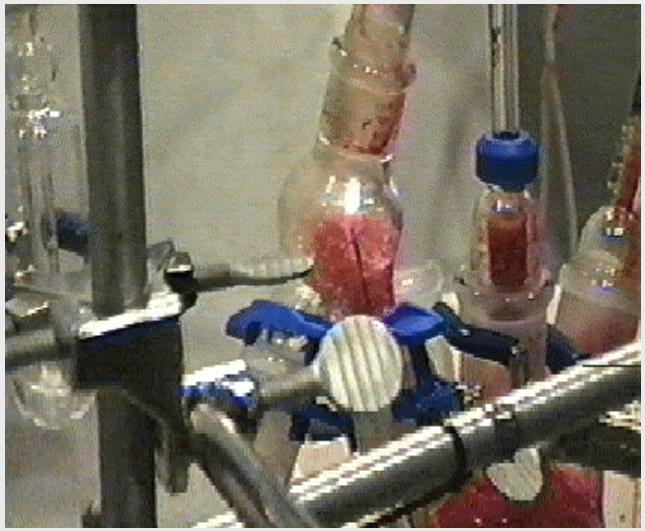
Kac: A-positive

A-positive does away with the metaphor of **robotic slavery** and suggests a **new ecosystem** that takes into account the new creatures and organic devices that populate our postorganic pantheon, be they biological (cloning), biosynthetic (genetic engineering), inorganic (android epistemology), algorithmic (a-life), or biobotic (robotics). We have always asked what can machines do for us. Now might be the right time to ask **what we can do together**.



We are no more masters of our machines than we are at their mercy. We are as intrigued as we are perhaps fascinated and terrified by the notion that we are embodying technology. We are intrigued because of our innate and insatiable curiosity about our own limits; we are fascinated because of the new possibilities of an expanded body contemplating the notion of eternal life; and we are terrified because these technologies, originally developed to aid ill or physically impaired persons, are in fact not desirable for a fully healthy body and therefore renew our fear of confronting our own mortality.

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Kac 'RC Robot'

- In 1986 Kac worked with radio-controlled telerobotics in the context of the exhibition "Brasil High Tech", realized at the Centro Empresarial Rio, in Rio de Janeiro.

  Kac used a 7-feet tall anthropomorphic robot (left) as a host who conversed with exhibition visitors in real time. The robot's voice was that of a human being transmitted via radio. Exhibition visitors did not see the telerobot operator, who was telepresent on the RC Robot's body.

- Still in the context of the exhibition, the robot was used in a dialogical performance realized with Otavio Donasci, in which the robot interacted with Donasci's videocreature. Through the robotic body, a human (hidden away) improvised responses to the videocreature's pre-recorded utterances.

- The robot was built by Cristovão Batista da Silva.

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Kac: *GFP Bunny*, transgenic art

The first phase of the *GFP Bunny* project was completed in February 2000 with **the birth** of "Alba" in Jouy-en-Josas, France. The second phase is the **ongoing debate**, which started with the first public announcement of Alba's birth, made by Kac in the context of the Planet Work conference, in San Francisco, on May 14, 2000. The third phase will take place when the bunny comes home to Chicago, becoming part of Kac's **family and living** with him from that point on.

GFP Bunny's objectives

1) ongoing dialogue between professionals of several disciplines (art, science, philosophy, law, communications, literature, social sciences) and the public on cultural and ethical implications of genetic engineering;

2) contestation of the alleged supremacy of DNA in life creation in favor of a more complex understanding of the intertwined relationship between genetics, organism, and environment;

3) extension of the concepts of biodiversity and evolution to incorporate precise work at the genomic level;

4) interspecies communication between humans and a transgenic mammal;

5) integration and presentation of "GFP Bunny" in a social and interactive context;

6) examination of the notions of normalcy, heterogeneity, purity, hybridity, and otherness;

7) consideration of a non-semiotic notion of communication as the sharing of genetic material across traditional species barriers;

8) public respect and appreciation for the emotional and cognitive life of transgenic animals;

9) expansion of the present practical and conceptual boundaries of artmaking to incorporate life invention.'

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Thanks for your attention

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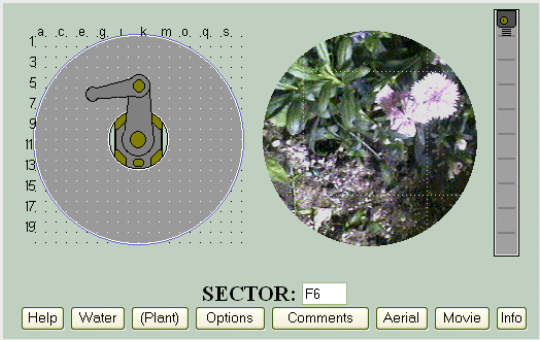

- The TeleGarden is an art installation that allows web users to view and interact with a remote garden filled with living plants. Members can plant, water, and mon progress of seedlings via the tender movements of an industrial robot arm.
- And the notion of responsibility…
- http://queue.ieor.berkeley.edu/~goldberg/garden/Ars/
- His question: "My work considers the distance between the v and what is being viewed. How does technology alter our perceptions of distance, scale, and truth?"
- "telepistemology": how distance influences belief, truth, and perception. (Goldberg)

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