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Oribotics [SLQ]

Artists's Statement

Paper has structural memory. The creation of any fold causes the breaking and deformation of the paper fibres. The resultant creaseline constitutes a permanent memory of the fold. Unless the paper is returned to pulp and cast as a new sheet, the paper will not forget the fold.

In 1953 scientists James Watson and Francis Crick published a research article revealing the structure of DNA—the building blocks of life. The landmark discovery of genetic structure laid the pathways for a boom in the scientific exploration of genetics, including the Humane Genome Project. Subsequent scientific discoveries revealed that proteins created by DNA begin as strands that fold rapidly into their functional shape. The 'origami of nature' takes microseconds to complete thousands of folds, and a single folding error can profoundly effect the survival of the lifeform.

In 2004, at Melbourne's Next Wave Festival, I presented *Oribotics*, the first generation of folding origami robots, or 'oribots'. Primitive, mechanical blossoms, the *Mechaniflorum Quinqueplicaticum*, clicked and whirred their way through a fragile and finite lifespan. Their folding process was slow but beautiful, and their original mechanical design quickly corrupted the paper memory. Witnesses of this exhibit were touched by the visible fragility of the flowers, and commented that the blossoms appeared to be withering. The death of that first generation of oribots soon followed; they are now preserved in a static condition.

2005 saw the birth of a hardier, more robust species, the Atom Generation (named after Astro Boy), during an Australia Council residency in Takadanobaba, Tokyo. This species was first exhibited at Melbourne's Asialink Centre, in a work titled *Oribotics [laboratory]*. At the core of each generation of oribots is a mechanical structure of folds. I often liken the structure to a genetic program. Somewhat like DNA, the structural program is responsible for the oribot's expression of movement and shape. The expression determines the mechanical actuator design, whilst the degree of stress in the structure determines the lifespan of the oribot. Through my research, I discovered that the key to the longevity of an oribot was to reduce the amount of stress required to generate movement—a key that keeps this generation of oribots alive today.

Each generation of oribots has been fed with a digital flow of information; the origin of the information has been a natural source. In the installation *Oribotics [laboratory]*, the oribots were connected to live weather information from 55 cities

around the world. Users—or those interacting with the oribots using their mobile phones—could remap the cities to any oribot, changing the flowers' appearance, and their soundscape. In *Oribotics [network]* (2007), the constant flow of internet news was transcoded into a feed of changing colour and rhythm to a more complex oribot with multiple blossoms. Users—in this case either online, or working via mobile devices—were able to have secondary, long-term effects on the oribot ecology by modifying the colour mappings of individual words. As words were consumed by the digester software, they were encoded into colour according to past user input. Such a flow of information is impermanent in its consequences for the oribots, apart from incrementally causing the motion to gradually break down and destroy the flowers' electronic and mechanical components.

The present exhibition at the State Library of Queensland features the 2005 Atom Generation of robotic blossoms. They are linked to localities of Queensland, and they reflect the history of Queensland through an electronic photographic archive. The installation asks visitors to choose a location of meaning to them, be it their home town, a favorite place, or another place of personal significance. The work will search the photographic database, and electronically fold a projection of the relevant photos over the installation, bringing the oribots to life with light.

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For further information see www.oribotics.net/

See also

Lang, Robert J, ed. "A Brief History of Oribotics", 4th Origami Science Mathematics and Education proceedings. : A K Peters Ltd.
Gardiner, Matthew. "The code in the fold. Origami as Art and Science", Bell on the Hand, Future Design Institute, Tokyo 2007.
Troup, Cynthia. "Mechaniflorum Quinqueplicaticum M. Gardiner et sp. Nov", UN Magazine 01. 2005: 27-28.