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*COSMOPOLITICAL FUTURES – FATE MAPS - BLACK LACE*  
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## **COSMOPOLITICAL FUTURES – FATE MAPS - BLACK LACE**

### **Scanning Electron Microscope Narratives**

Keywords: Chantilly lace, scanning electron microscope, sericulture, biotechnology, theoretical physics, history of lacemaking, ethics, art and science

The Fate Maps – Black Lace series consists of 16 images that explore the cultural associations of lace in scientific contexts. The work explores the visual resemblance of Chantilly lace to a photographic negative, the quantum processes underlying of operation the Scanning Electron Microscope and the intrinsic mystery of metamorphosis and the co-alliances of humans and animals in social, cultural, economic and bio-scientific domains. The Scanning Electron Microscopy method to produce the work in this series is sometimes poetically referred to as *Dark Space Imaging*. The image magnification in the SEM is not a function of the power of an optical lens, but a fine pencil beam of electrons that moves like a TV scan to pencil out an image over time as the electrons scatter off target from the surface features of an object. The electrons travel in a vacuum and since a vacuum cannot support life, the system can only provide a view of dead structures. These fossil like readings have a wonderfully vivid depth of focus brought about by the submicron fineness of the electron beam. In the SEM electrons interact with the atoms of an object to produce deflection signals that contain information about its surface topography, physical composition and electrical conductivity. The information is blind and resonant like musical scores written in Braille. The underlying conceptual form of the work is based on theoretical work and ethical frameworking of philosopher of science, Karen Barad.

To create the work an antique Chantilly (black) lace sample indexed amongst Lady Cadbury's donations to the Birmingham Museum lace collection was meticulously prepared for microscopic imaging much like a biological specimen. Chantilly black lace importantly provided a number of culturally evocative metaphors. I was particularly interested in the natural origins of the silk, the protein fibers excreted from the larval silkworm and how these creature traces might be entangled into other debris, networks of patterns, knots and ligatures. I was equally interested in imaging Chantilly lace to evidence and reveal chemical and biological signatures that might reveal its species origins and spaces and residues from

lace making: corrosion from pins, bacteria from straw pillows etc. accumulated through its use. Black lace commonly associated with death and mourning, was dye fixed using compounds containing iron salts that oxidized to form corrosive compounds and I was curious to see if these traces might be uncovered. The Scanning Electron Microscopy process enabled me to draw attention to the biological pathologies and skeletal networks of lace net that are normally invisible to the human eye. The Chantilly net maker mimics polygonal networks found in nature but in the film, immensely magnified details reveal the lace's intrinsic "otherness" and silkworm origins.

My interest in lace is not new. In the 90's I made digital artworks that used raw poetics and early computer animation to address issues of technology and gender politics. The work was structured around the social history and labor-intensive female craft of lace making. Lace making required mathematical skills acquired through intense patience leading from necessity, through intellect to artistic expression.

In the biotech context, the chemical co-alliance of humans and the insect species is spectacular in its imagination but in many ways can be seen to follow on from the 5000-year scientific techniques of Sericulture. Sericulture refers to the production of silk from the larval cocoon of the silkworm *Bombyx Mori*. Silkworm base proteins are used in the development of many biomaterials, human collagen production for cosmetics, pest control etc. The caterpillar feeds solely on the leaves of Mulberry trees and there are no silk worms in the wild. The remarkable intricate developmental mechanisms of metamorphosis are little understood by science. My approach to the process of making the images was like that of the physicist peering into worlds beyond the physical limits of visible light into gravitational black holes of dark matter to build on the paradoxical optical and quantum principles of image processing to uncover a synthesis of hidden forms, wavelengths, signals at the heart of matter.

My visual research and studies on the history of lacemaking revealed how the superfine silk fibers of black Chantilly lace were extraordinarily hard to work with. The skilled maker not only had to work the mathematics of hundreds of bobbins to produce the tonal transparencies and even tensions but also had to visually overcome the problem of working virtually blind, since black silk provides little shadow and contrast as the thread crosses. The gloss of black silk thread only reveals its three-dimensional aspect in relation to direct light sources and therefore its manufacture was limited to bright daylight conditions. These methods of making and that take account of visual ambiguities of black silk; the resemblance of Chantilly lace to a photographic negative, the veiled transparency of the material and the working of the thread seemingly beyond the limitations of retinal vision lent themselves to the poetic metaphors of "dark imaging" of the work. The precise management of hundreds of low contrast fibers with their iridescent spectra required heightened sensibilities to wavelengths of visible light. Makers working in these conditions to produce the shadowy mist like appearance of the lace

must have almost always become blind over a period of time. Human vision involves the register of light in the retinal nervous system and brain. The non-optical electron materialization of the Chantilly net in the work alludes to phenomena of biophysical metamorphosis within the SEM imaging process.

The configuring, re-configuring and assembling of the work was influenced by the theoretical writings of Karen Barad, a Professor of Feminist Studies, Philosophy and the History of Consciousness at the University of California. Her book, *Meeting the Universe Halfway – Quantum Physics and the Entanglement of Matter and Meaning* (2007) has been highly influential to my creative practice. Her writings suggest how phenomena associated with theories of quantum entanglements; emergence, and matter, might usefully be applied as thinking experiments and novel methods for artistic production. Barad argues for the paradigmatic collapse of divisions between the mind, matter and meaning; the animate and the non-animate and the human and the non-human, arguing that entanglements of time, space, matter and meaning come into existence through simultaneous reconfigurations.

Figures 1 – 6 COSMOPOLITICAL FUTURES – FATE MAPS - BLACK LACE, 2016  
Select series of 6 of 16 bw, scanning electron micrographs with data captions (594mm x 841mm)

### **Notes**

The term FATE MAP, refers to the predictive mapping of the surface of an early embryo or fertilized egg to indicate which regions will form the various tissues and body parts.

The series title COSMOPOLITICAL FUTURES, is derived from the volume collections authored by the chemist and philosopher Isabelle Stenger's looking at the role of science in modern society and a vision of a world politics linked to ideologies of the scientific enterprise.

### **Key references:**

Barad, Karen, *Meeting the Universe Halfway – Quantum Physics and the Entanglement of Matter and Meaning*, Duke University Press (2007)

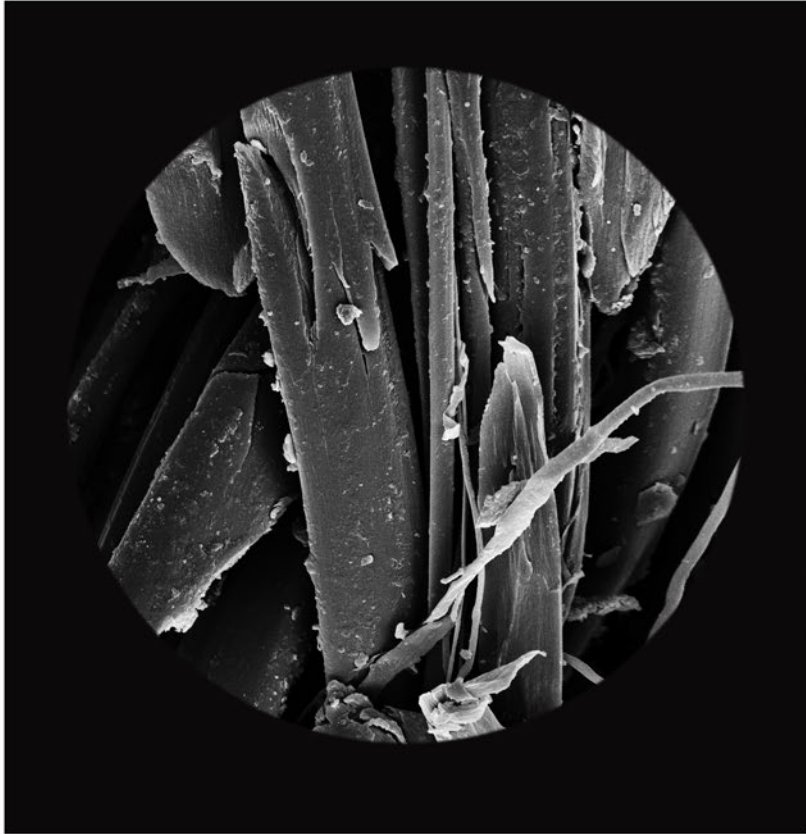
### **Kathleen Rogers**

Kathleen Rogers is a London-based artist and researcher working with digital media, video, sound, photography and installation. Her media art practice intersects multiple disciplines, informed by an interest in social and political and cultural issues in our converging technological landscape and the modification of biological matter through nanotechnology and gene transfer. Her research interests explore affinities between life sciences, the science

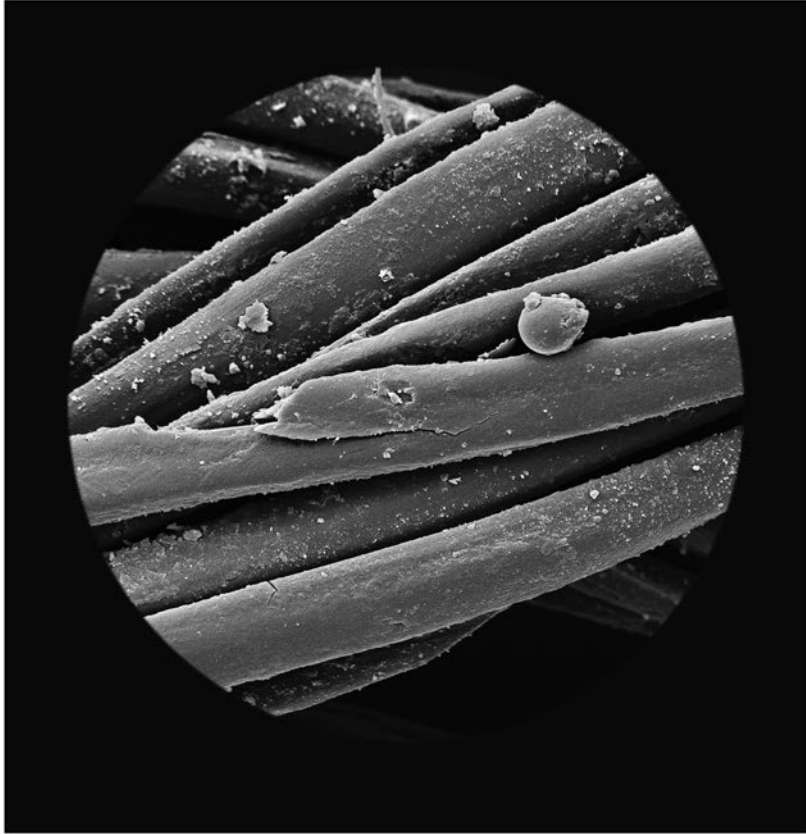
of consciousness and cosmology. Her research contributes to debates in contemporary biotechnological discourse that challenge assumed boundaries between human and non-human entities in contemporary science and culture. Her interest in molecular science developed from her research in the 90's looking at the mythical status of the maize plant in pre-scientific cultures and making links between biotechnology, the environment and concepts of the gene in ancient and contemporary Mayan culture and agriculture in Mexico. Her work is exhibited nationally and internationally, including representation in the Netherlands, Switzerland, Portugal, USA, Japan, Russia and Lithuania, Albania and is held in international public collections the UK and Russia. She is Professor of Media Arts and Science in the School of Fine Art and Photography, at the University for the Creative Arts, UK.



HV 10.00 | Spot 3.0 | Sig SE | WD 9.11mm | Mag 167x | 200  $\mu$ m



HV 10.00 | Spot 3.0 | Sig SE | WD 9.15mm | Mag 2943x | 20  $\mu$ m



HV 10.00 | Spot 3.0 | Sig SE | WD 8.95mm | Mag 2136x | 20  $\mu$ m



HV 10.00 | Spot 3.0 | Sig SE | WD 9.11mm | Mag 175x | 200  $\mu$ m





HV 10.00 | Spot 3.0 | Sig SE | WD 8.60mm | Mag 175x | 200  $\mu$ m



HV 10.00 | Spot 3.0 | Sig SE | WD 9.19mm | Mag 350x | 100 µm