Sequence

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1. INTRODUCTION

“Sequence” is a new Arts Council England funded project by artist Anna Dumitriu, in collaboration with artist/creative technologist Alex May. This biodigital installation will be exhibited for the first time at EVA 2015. The project involves the research, development and creation of an installation, which fuses leading edge digital technologies with bacterial bioart, biohacking, traditional media and altered artefacts, to artistically investigate the emerging technology of whole genome sequencing of bacteria and consider what it means to us personally, culturally and socially. This emerging technology is currently being developed and tested as a diagnostic and epidemiological tool within the UK health service.

Figure 1: DNA Preparation for Whole Genome Sequencing

The project involves collaborations with microbiologists, bioinformaticians, computer scientists and ethicists from the Modernising Medical Microbiology Project (a collaboration between Public Health England and the University of Oxford), the University of Hertfordshire, and the Wellcome Trust Brighton and Sussex Centre for Global Health Research.

2. INVESTIGATING WHOLE GENOME SEQUENCING FROM A CULTURAL PERSPECTIVE

The team have taken the 2.8 million base pairs of the sequenced DNA of the penicillin resistant *Staphylococcus aureus* bacteria cultured from Dumitriu's own body as a starting point to investigate how this new biomedical technology operates in both a practical and cultural context, set against a backdrop of public concerns around privacy, the commercialisation of data, the threat of new pandemics and the lack of new antibiotic treatments.

Whole genome sequencing is an important new technology that gives a very detailed picture of a sample of bacteria, including the precise diagnosis, any drug resistances, and small variations in the genome that reveal how it is evolving.

2.1 *Staphylococcus aureus*

Staphylococcus aureus is part of the normal skin flora and can be found on around 30% of the population, but drug resistant strains have evolved, including the famous MRSA (Methicillin Resistant *Staphylococcus aureus*), which is known as a 'superbug'. The strains cultured from Dumitriu's body are penicillin resistant and this is typical for around 80% of *Staphylococcus aureus* currently.

The first patient treated with penicillin by Nobel Prize winners Florey and Chain at the Radcliffe Infirmary in Oxford was infected with *Staphylococcus aureus* and a strain of *Streptococcus*.

2.2 Embedded Artist's Residency with the Modernising Medical Microbiology Project

To create the work Dumitriu has embedded herself within the research setting of the Modernising Medical Microbiology Project and learned hands-on how to extract and prepare the bacterial DNA and whole genome sequence it.

Dumitriu and May have worked with the data alongside bioinformaticians to reveal hidden personal narratives from within very large data sets. The project investigates the algorithms behind how the DNA sequences are pieced together, focussing on two methods: mapping and de novo sequencing.

Figure 2: *Staphylococcus aureus* bacteria cultured from Anna Dumitriu's body

3. ARTISTS' BIOGRAPHIES

3.1 Anna Dumitriu

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 and a focus on microbiology and healthcare. Her installations, interventions and performances use a range of biological, digital, and traditional media including live bacteria, robotics, interactive media, and textiles. 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

(MOCA), Taipei, and the Victoria and Albert (V&A) Museum in London. Her work is held in several major public collections, including the Science Museum in London. She won the 2012 Society for Applied Microbiology Communication Award and holds the post of Artist in Residence on the Modernising Medical Microbiology Project at the University of Oxford in collaboration with Public Health England, a Visiting Research Fellowship: Artist in Residence position with the Department of Computer Science at the University of Hertfordshire, and a Visiting Research Fellowship: Lead Artist position with the Wellcome Trust Brighton and Sussex Centre for Global Health Research.

3.2 Alex May

Alex May is an artist exploring a wide range of digital technologies, most notably video projection onto physical objects (building on the technique known as video mapping or projection mapping by using his own bespoke software), also interactive installations, generative works, full-size humanoid robots, performance, and video art. He has performed art at Tate Modern and Watermans, and exhibited internationally including at the V&A, Science Museum, Bletchley Park, the Museum of Contemporary Art in Caracas, Venezuela, the Science Gallery in Dublin, the Rockefeller Arts Center at the State University of New York, and the Grande Halle de la Villette in Paris. Alex is a Visiting Research Fellow: Artist in Residence with the computer science department of the University of Hertfordshire and a Digital Media Arts MA sessional lecturer at the University of Brighton.

4. REFERENCES

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