MAKE DO AND MEND, ANNA DUMITRIU

1/ ***MAKE DO AND MEND*, AN ARTWORK COMPOSED OF SEVERAL ELEMENTS**

2/ **«REPAIRED» *E.COLI* BACTERIA GROWN ONTO SILK PATCHES**

3/ **FRAME WITH COVER FROM WORLD WAR II LEAFLET & PATCHES**

4/ **FRAME WITH PAGE FROM WORLD WAR II LEAFLET & PATCHES**

5/ **FRAME WITH PAGE FROM WORLD WAR II LEAFLET & ELECTROPORATION CUVETTES**

6/ **FRAME WITH ARTICLE ABOUT PENICILLIN & PATCHES**

7/ **THE TOY SEWING MACHINE**

8/ ***MAKE DO AND MEND*, MIRRORED AND ENMESHED STORYLINES**

1/ MAKE DO AND MEND, AN ARTWORK COMPOSED OF SEVERAL ELEMENTS

Make Do and Mend, FEAT exhibition at LifeSpace, Dundee, April 2017 – Photo Annick Bureaud

- A mannequin with a woman suit from the Second World War marked with the tag *CC41* (Controlled Commodity 1941) that meant it conformed to the government's austerity regulations of the time.
- *E.coli* bacteria where its genome has been modified by the artist using CRISPR/cas9 biotechnology techniques grown onto silk pieces of fabrics.
- 4 frames with pages from an original 'Make Do and Mend' leaflet from the Second World War, pages from a leaflet about penicillin, lab devices and the 'repaired-modified» bacteria grown onto silk.
- A toy « Singer » sewing machine, from the 1940's.

Close up of one of the patches, sewn on the suit. Photo Annick Bureaud

2/ «REPAIRED» *E.COLI* BACTERIA GROWN ONTO SILK PATCHES

The holes and stains in the suit have been patched and embroidered with silk patterned with *E. coli* bacteria grown using a dye-containing growth medium, forming pigmented colonies or spots.

The genomes of these *E. coli* bacteria have been edited using a technique called CRISPR to remove an ampicillin antibiotic resistance gene and repaired using a technique called homologous recombination to scarlessly patch the break with a fragment of DNA encoding the WWII slogan "Make Do and Mend».

Photo Anna Dumitriu

3/ FRAME WITH COVER FROM WORLD WAR II LEAFLET & PATCHES

This frame includes on the left, the cover of the 'Make Do and Mend' World War II leaflet and on the right ampicillin antibiotic susceptibility fabric grown with patients samples of gut microbiomes whose diversity has been impacted by antibiotic use. This element has been done in collaboration with Dr Nicola Fawcett at the University of Oxford.

Photos Anna Dumitriu

4/ FRAME WITH PAGE FROM WORLD WAR II LEAFLET & PATCHES

This frame includes on the left, a page from the 'Make Do and Mend' World War II leaflet with the metaphor of being a «doctor» to one's own clothes when repairing them and, on the right, a series of silk patches onto which were grown the «repaired» *E.coli* bacteria. The *CC41* logo, sewed with the silk patches and original darned *CC41* cloth fragments, links time, science, process and metaphors.

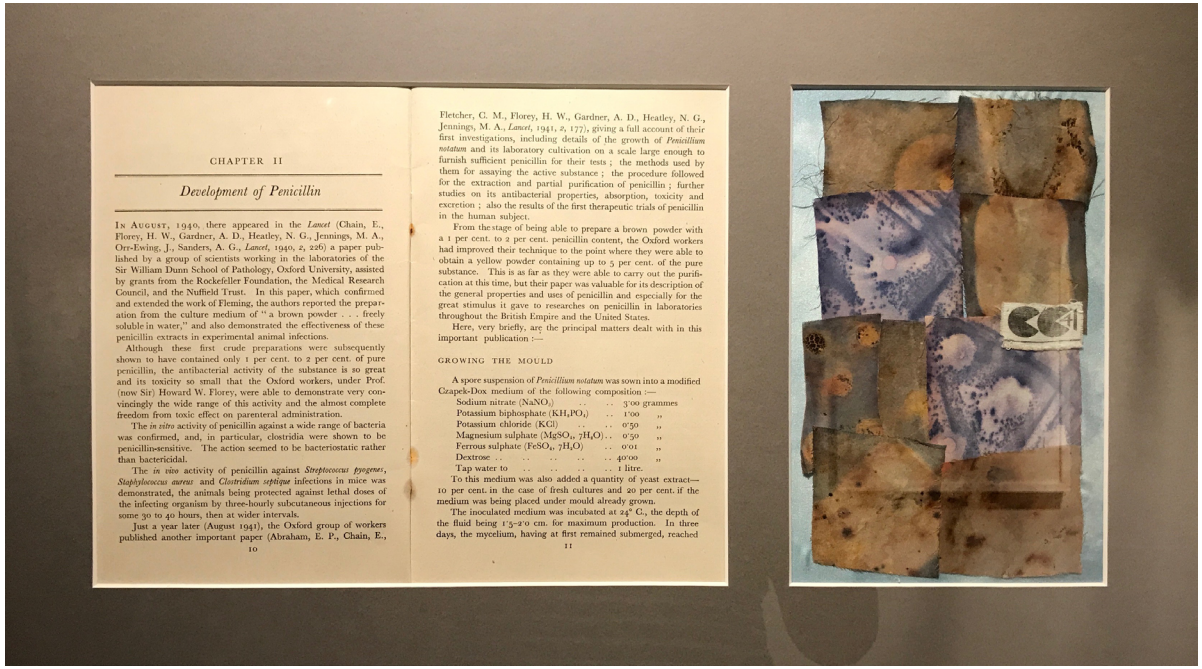
Photo Anna Dumitriu

5/ FRAME WITH PAGE FROM WORLD WAR II LEAFLET & ELECTROPORATION CUVETTES

This frame includes on the left, a page from World War II leaflet 'Make Do and Mend' explaining how to repair clothing using patching techniques. On the right, are three electroporation cuvettes covered with silk dyed with the modified bacteria on chromogenic agar, tied with embroidery silk. Electroporation is a technique in which an electrical field is applied to cells in order to increase the permeability of the membrane to introduce chemicals, drugs or DNA.

In the making of *Make Do and Mend*, electroporation cuvettes were used to electric shock the bacteria to take up the CRISPR/Cas9 and repair fragment plasmid DNA.

Resource :
https://en.wikipedia.org/wiki/Electroporation



CHAPTER II

Development of Penicillin

In August, 1940, there appeared in the *Lancet* (Chain, E., Florey, H. W., Gardner, A. D., Heatley, N. G., Jennings, M. A., Orr-Ewing, J., Sanders, A. G., *Lancet*, 1940, 2, 226) a paper published by a group of scientists working in the laboratories of the Sir William Dunn School of Pathology, Oxford University, assisted by grants from the Rockefeller Foundation, the Medical Research Council, and the Nuffield Trust. In this paper, which confirmed and extended the work of Fleming, the authors reported the preparation from the culture medium of "a brown powder . . . freely soluble in water," and also demonstrated the effectiveness of these penicillin extracts in experimental animal infections.

Although these first crude preparations were subsequently shown to have contained only 1 per cent. to 2 per cent. of pure penicillin, the antibacterial activity of the substance is so great and its toxicity so small that the Oxford workers, under Prof. (now Sir) Howard W. Florey, were able to demonstrate very convincingly the wide range of this activity and the almost complete freedom from toxic effect on parenteral administration.

The *in vitro* activity of penicillin against a wide range of bacteria was confirmed, and, in particular, clostridia were shown to be penicillin-sensitive. The action seemed to be bacteriostatic rather than bactericidal.

The *in vivo* activity of penicillin against *Streptococcus pyogenes*, *Staphylococcus aureus* and *Clostridium septique* infections in mice was demonstrated, the animals being protected against lethal doses of the infecting organism by three-hourly subcutaneous injections for some 30 to 40 hours, then at wider intervals.

Just a year later (August 1941), the Oxford group of workers published another important paper (Abraham, E. P., Chain, E.,

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Fletcher, C. M., Florey, H. W., Gardner, A. D., Heatley, N. G., Jennings, M. A., *Lancet*, 1941, 2, 177), giving a full account of their first investigations, including details of the growth of *Penicillium notatum* and its laboratory cultivation on a scale large enough to furnish sufficient penicillin for their tests ; the methods used by them for assaying the active substance ; the procedure followed for the extraction and partial purification of penicillin ; further studies on its antibacterial properties, absorption, toxicity and excretion ; also the results of the first therapeutic trials of penicillin in the human subject.

From the stage of being able to prepare a brown powder with a 1 per cent. to 2 per cent. penicillin content, the Oxford workers had improved their technique to the point where they were able to obtain a yellow powder containing up to 5 per cent. of the pure substance. This is as far as they were able to carry out the purification at this time, but their paper was valuable for its description of the general properties and uses of penicillin and especially for the great stimulus it gave to researches on penicillin in laboratories throughout the British Empire and the United States.

Here, very briefly, are the principal matters dealt with in this important publication :—

GROWING THE MOULD

A spore suspension of *Penicillium notatum* was sown into a modified Czapek-Dox medium of the following composition :—

Sodium nitrate ($NaNO_3$)	..	3·00 grammes
Potassium biphosphate (KH_2PO_4)	..	1·00 ,,
Potassium chloride (KCl)	..	0·50 ,,
Magnesium sulphate ($MgSO_4, 7H_2O$)	..	0·50 ,,
Ferrous sulphate ($FeSO_4, 7H_2O$)	..	0·01 ,,
Dextrose	..	40·00 ,,
Tap water to	..	1 litre.

To this medium was also added a quantity of yeast extract—10 per cent. in the case of fresh cultures and 20 per cent. if the medium was being placed under mould already grown.

The inoculated medium was incubated at 24° C., the depth of the fluid being 1·5–2·0 cm. for maximum production. In three days, the mycelium, having at first remained submerged, reached

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Photo Anna Dumitriu

6/ FRAME WITH ARTICLE ABOUT PENICILLIN & PATCHES

This frame includes on the left a page from a leaflet about the development of Penicillin and on the right a series of silk patches onto which were grown the «repaired» *E.coli* bacteria. The *CC41* logo, sewed with the patches, acts as a link between time, science, process and metaphors.

Photo Anna Dumitriu

7/ THE TOY SEWING MACHINE

Toy « Singer » sewing machine dating from WWII, and which had belonged to the artist's mother, with one of the patches bearing engineered bacteria ready to be sewn.

8/ MAKE DO AND MEND, MIRRORED AND ENMESHED STORYLINES

Make Do and Mend is embodying several storylines and issues that are echoing each other through the different elements that compose the artwork.

Make Do and Mend **: connecting social-political history to history of biomedical science, over time.**

The Year 1941, a pivotal reference in the work, and the Second World War time are confronted with the 2010's, our present and potential future.

In 1941, the leaflet «Make Do and Mend» was published in the United Kingdom to help people, and more specifically women, through the restrictions and the shortage in goods due to the war.

Today, people are suggested again to «mend» goods, this time in order to have a lesser impact on the environment. It is called «upcycling» and has even become trendy and fashionable.

In 1941, a patient was treated for the first time in the UK with penicillin. Antibiotic appeared to be the ultimate solution to previously deadly bacterial infections.

Today genome editing, and new molecular tools such as CRISPR/Cas9 are sometimes considered the ultimate solution not only to some of the diseases we are facing but also to repair the mess we have created by over-using antibiotic.

- Can/should we imagine 'mending' the genome as we have been 'mending' clothes during the Second World War?
- Can we really 'go back in time' to a 'pre-antibiotic' era or a 'pre-polluted'/'pre-global warming' environment?
- Is it wise and ethical to think that our (new/next) technology will repair our mistakes from the past (use of a previous) technology? Will history repeat itself?
- How could/should we work with the CRISPR biotechnological tool beyond the lab and use it safely in the wider environment, in/for artworks like in this project?
- How do we know that we are using gene editing in a 'safe' and 'good' way?

MAKE DO AND MEND, ANNA DUMITRIU

1/ MAKE DO AND MEND, ABOUT THE TITLE

2/ *CC41* - CONTROLLED COMMODITY

3/ PENICILLIN

From the collections of the Imperial War Museum «How to make-do-and-mend.» https://www.youtube.com/watch?v=f4RpJcVs1VI

1/ MAKE DO AND MEND

Using as its title this very British expression 'make do and mend', a brochure was published by the British Ministry of Information during World War II to help housewives face the restrictions by recycling, reprocessing and repairing clothes and textiles in an inventive (and stylish) way.

From the collections of the Imperial War Museum «How to make-do-and-mend.» https://www.youtube.com/watch?v=f4RpJcVs1VI

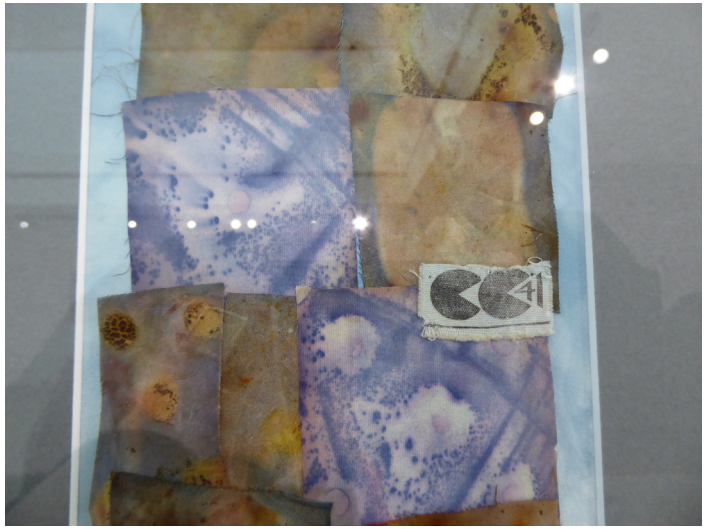
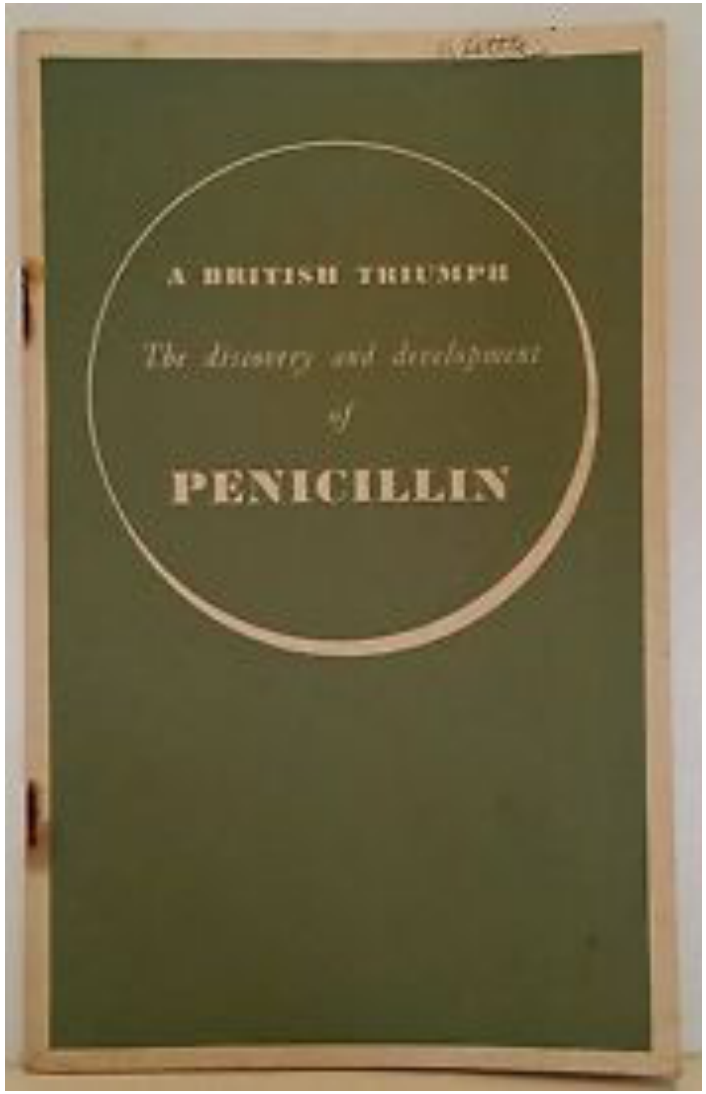


Photo Annick Bureaud

2/ CC41
CONTROLLED COMMODITY

The suit is marked with the logo *CC41*, which stands for 'Controlled Commodity 1941'. It was established by the British Board of Trade during the Second World War to label an item (such as clothes, furnitures, shoes, textiles) that met the governement's austerity regulations.

Resource :
The wikipedia entry:
https://en.wikipedia.org/wiki/CC41
The website of the '1940s Society':
http://www.1940.co.uk/acatalog/an-introduction-to-utility-clothing.html



https://en.wikipedia.org/wiki/Penicillin

3/ PENICILLIN

Make Do and Mend references the 75th anniversary of the first use of penicillin (an antibiotic discovered by Scottish scientist Alexander Fleming) in a human patient in 1941.

75 years later, we are facing a rise in antibiotic resistant bacteria.

Resource:
https://en.wikipedia.org/wiki/Penicillin

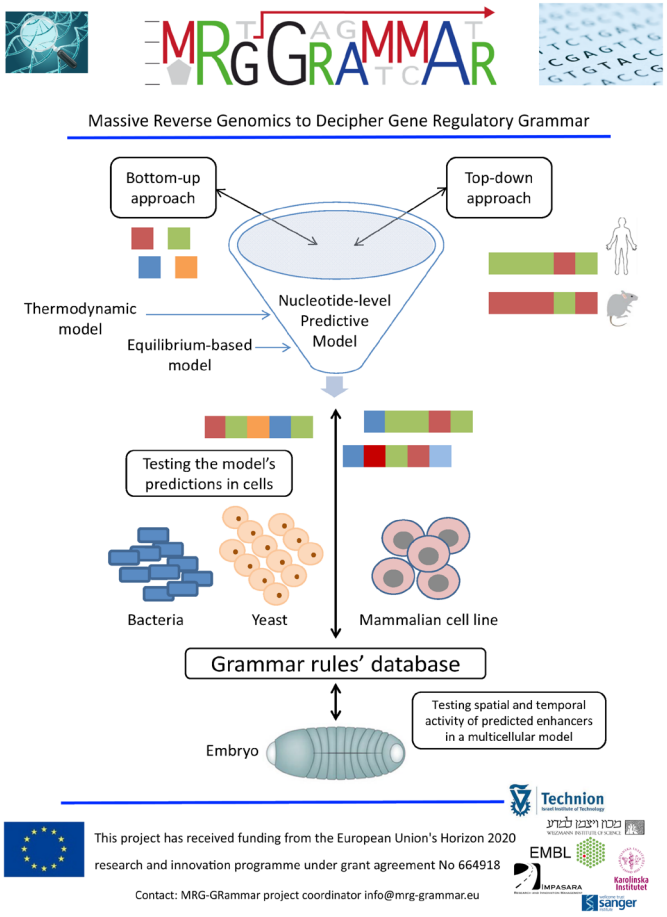
MAKE DO AND MEND, ANNA DUMITRIU

1/ MGR-GRAMMAR, A SYNTHETIC BIOLOGY FET OPEN PROJECT

2/ THE RESEARCH GOAL AS SEEN BY THE SCIENTIST

3/ THE RESEARCH GOAL AS SEEN BY THE ARTIST

4/ GENOME EDITING & CRISPR/CAS9



1/ MGR-GRAMMAR, A SYNTHETIC BIOLOGY FET OPEN PROJECT

MRG-Grammar: Massive Reverse Genomics to Decipher Gene Regulatory Grammar

Make Do and Mend is an artwork that has been created as part of the artist residency in the MRG-Grammar consortium, one of the European Union Horizon 2020 FET/Open Future and Emerging Technologies projects.
FET Open supports the early-stages of the science and technology research and innovation around new ideas towards radically new future technologies.

The MRG-Grammar project is developing a new strategy for deciphering the regulatory rules of gene regulation using Synthetic Biology, DNA synthesis technologies and high-throughput analysis to generate new types of biological datasets that systematically explore all possible regulatory landscapes. It aims to lead to a profoundly deeper understanding of the origins of many diseases. The project aims to produce models that will serve as a reference in designing and implementing accurate and more controllable synthetic biology devices, with applications in fuel production, healthcare and other industrial fields.

Resource :
https://www.mrg-grammar.eu/

2/ THE RESEARCH GOAL AS SEEN BY THE SCIENTIST

The goal of the research of MRG-Grammar explained by the scientist Sharon Alon

https://www.youtube.com/watch?v=FJE4YzoXug0

3/ THE RESEARCH GOAL AS SEEN BY THE ARTIST

The goal of the research of MRG-Grammar explained by the artist Anna Dumitriu

https://www.youtube.com/watch?v=-UY9nMDH08w

4/ GENOME EDITING & CRISPR/CAS9

Genome editing are technics of genetic engineering in which DNA is inserted, deleted or replaced in the genome of a living organism using engineered nucleases also called «molecular scissors.»

A nuclease is an enzyme that can break or cut the DNA double-strand at specific location.

Beyond the text editing metaphor that makes it look as easy to do as a «cut and paste» on a computer, it remains a whole long complex process.

Resource:
https://en.wikipedia.org/wiki/Genome_editing

CRISPR/Cas9 is a new technique of « molecular scissors » that have been discovered in 2012 and that Anna Dumitriu used to create the artwork *Make Do and Mend.*

Resource:
https://en.wikipedia.org/wiki/CRISPR
https://en.wikipedia.org/wiki/Cas9

MAKE DO AND MEND, ANNA DUMITRIU

1/ THE FEAT COLLABORATIVE RESIDENCY MODEL, PERSPECTIVE OF THE ARTIST

2/ FROM THE LAB RESIDENCIES: THE MAKING OF *MAKE DO AND MEND*

3/ BACTERIA AS AN ART MEDIUM
Conversation between Anna Dumitriu and Annick Bureaud (podcast)

4/ *LEONARDO* ARTICLE ABOUT THE PROJECT

1/ THE FEAT COLLABORATIVE RESIDENCY MODEL

as seen by Anna Dumitriu in her position of artist partner in the FEAT project

https://www.youtube.com/watch?v=h6p2PTbpyEE

2/ FROM THE LAB RESIDENCIES: THE MAKING OF *MAKE DO AND MEND*

(Compiled from Anna Dumitriu's reports - All images © by the artist

In order to create the 'mended' bacteria and to bring it back to a « pre-antibiotic era » state for her *Make Do and Mend* artwork, Anna Dumitriu had to remove the antibiotic resistance gene from the *E. coli* genome, insert her 'Make Do and Mend' repair fragment, grow the bacteria on silk fabric, and sterilize them before sewing them onto the suit or using them as independent patches in the various framed works that also form part of the installation.

In order to do so, she had to learn several techniques and new knowledge by spending time in residence in several laboratories which are part of the MRG-Grammar consortium in Israel and in the UK.
Those laboratories are:

The Teichmann Group at The Wellcome Trust Sanger Institute :
http://www.sanger.ac.uk/science/groups/teichmann-group

The Segal Lab at the Weizmann Institute of Science :
https://genie.weizmann.ac.il/

The Synthetic biology Laboratory for the Decipherment of Genetic Codes at Technion - Israel Institute of Technology:
http://roee-amit.technion.ac.il/

The artist worked with a **TOP10 *E.Coli*** strain which is a «lab strain», meaning that it is very well characterized but that has also been subject to many modifications.

The 'Make Do and Mend' repair fragment was designed by converting the phrase from English language to base 4, via ASCII code, to match the ATCG's of the DNA nucleotides.

1/ OCTOBER 2016

Anna Dumitriu was in residence with the Teichmann Lab (http://www.sanger.ac.uk/science/groups/teichmann-group) at the Wellcome Trust Sanger Institute in Cambridge, UK.

She explored their work in trying to understand how enhancer genes influence the 1% of genes (in mammalian cells) that actually make proteins. In the future this area of research is likely to be hugely important in understanding health and disease.

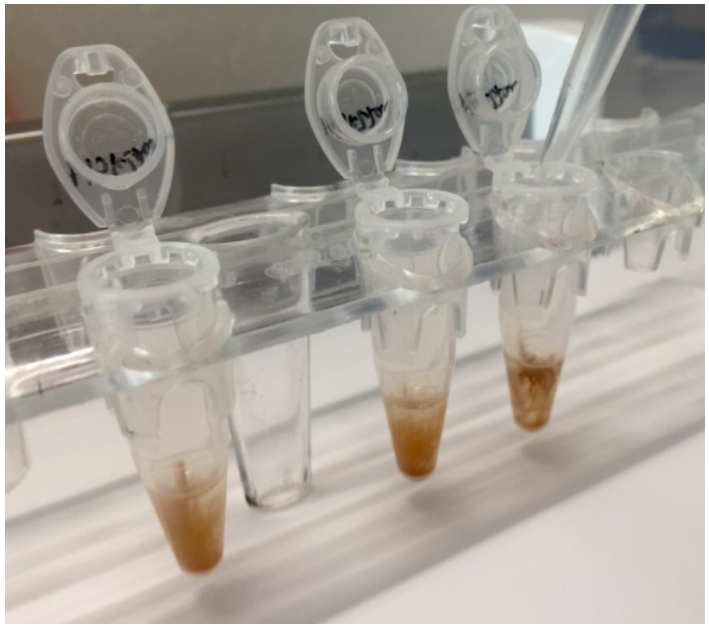
She worked with Sarah Teichmann, Head of Cellular Genetics at the WT Sanger Institute, and researchers including Xi Chen, Michal Kosicki, and Tomas Pires de Carvalho Gomes, looking at ChIP-sequencing, the use of CRISPR/Cas9 gene editing tools, and bioinformatics approaches to handing the large amounts of data produced.

CRISPR/Cas9 is a recent technique for gene editing
Resource:
https://en.wikipedia.org/wiki/CRISPR

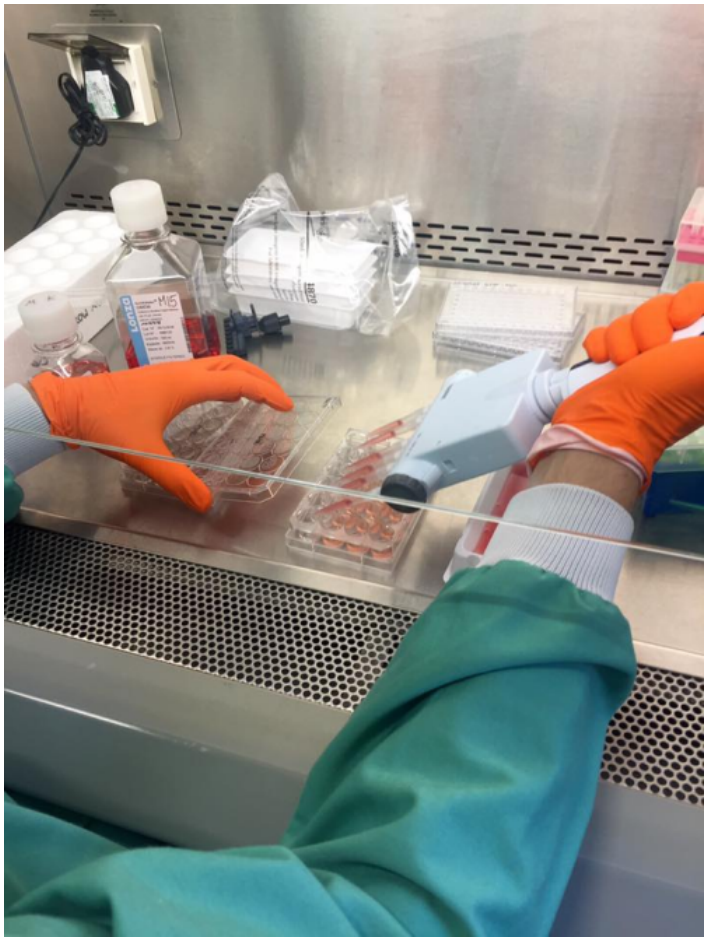
ChIP-sequencing is a technique to study the interactions between proteins and the DNA.
Resource:
https://en.wikipedia.org/wiki/ChIP-sequencing

Bioinformatics is the development and the use of computer and software methods and tools to process and understand biological data.
Resource:
https://en.wikipedia.org/wiki/Bioinformatics

Extracting mouse T cell DNA at the Wellcome Sanger Institute.

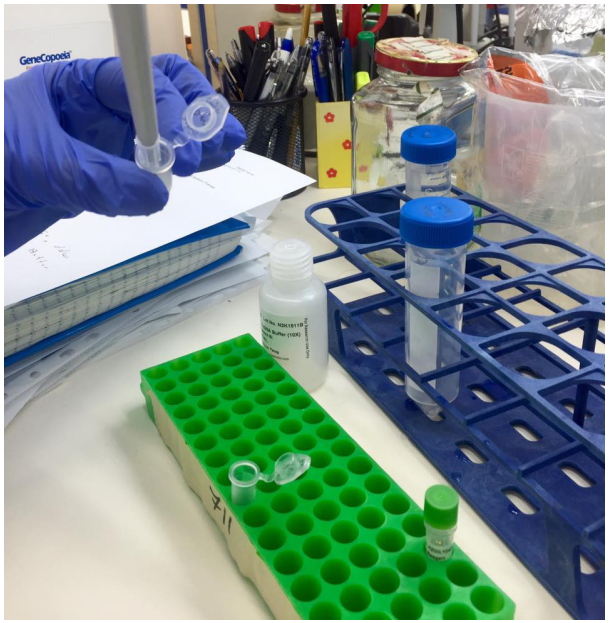


CHiP Sequencing at the Wellcome Sanger Institute.

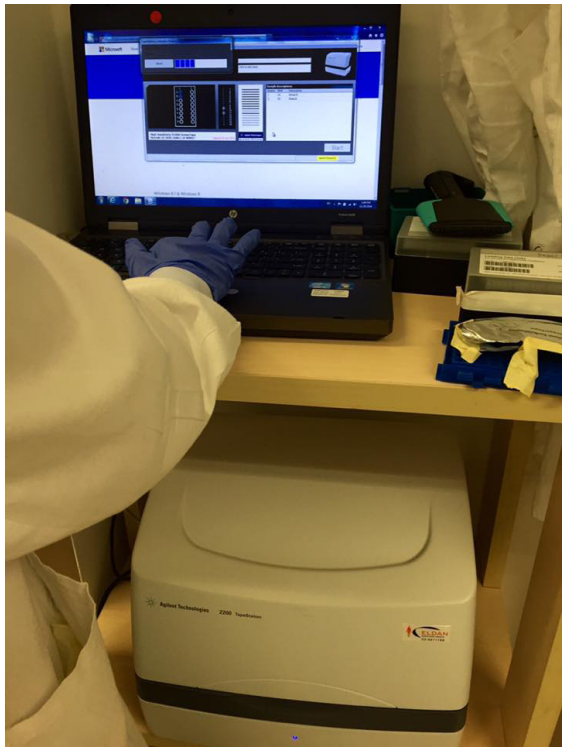


Working with CRISPR to cut mouse embryonic stem cell DNA at the Wellcome Sanger Institute.

2/ NOVEMBER 2016

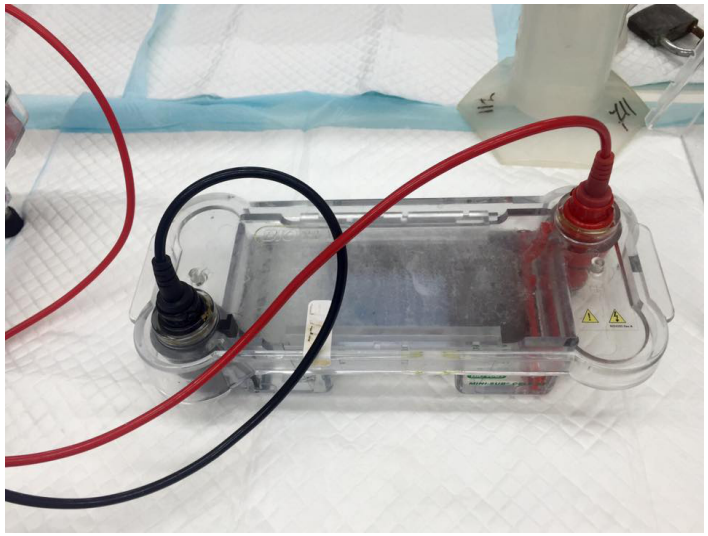


Dumitriu extracts DNA from her microbiome for whole genome sequencing at the Segal lab at the Weizmann Institute Tel Aviv.

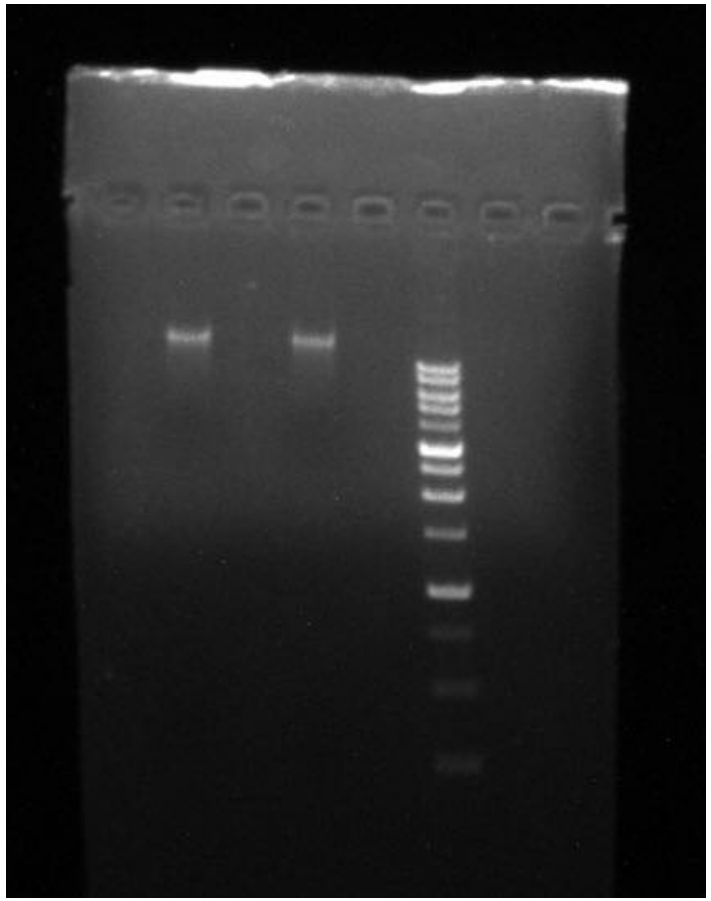


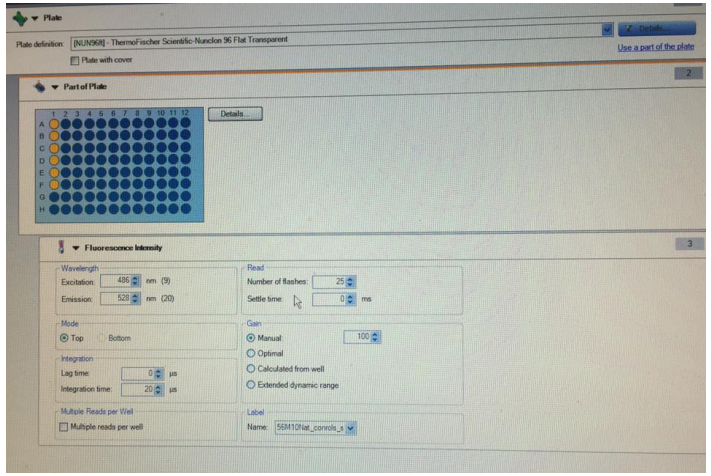
Dumitriu travelled to The Segal Lab at the Weizmann Institute (https://genie.weizmann.ac.il/) in Tel Aviv, Israel where she worked mainly with Adina Weinburger, Maya Lotan-Pompan and Hadas Elisar.

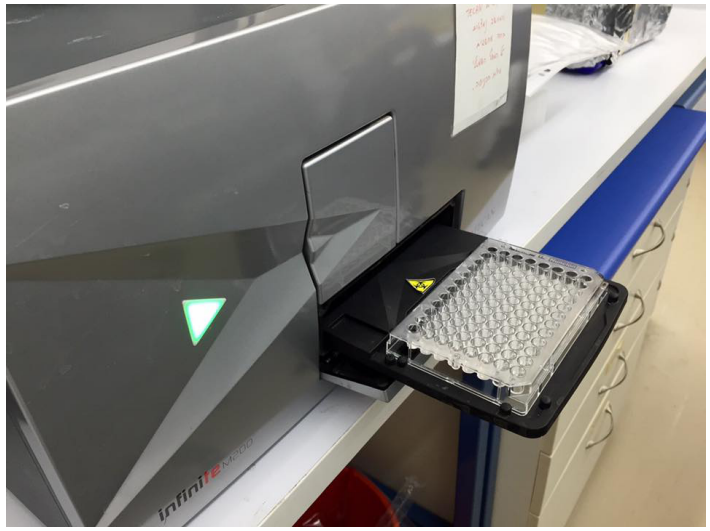
As part of the project she learned to whole genome sequence her gut microbiome and developed an understanding of using synthetic DNA libraries to search for potential targets for novel antibiotics.



Whole genome sequencing at the Segal lab at the Weizmann Institute Tel Aviv.







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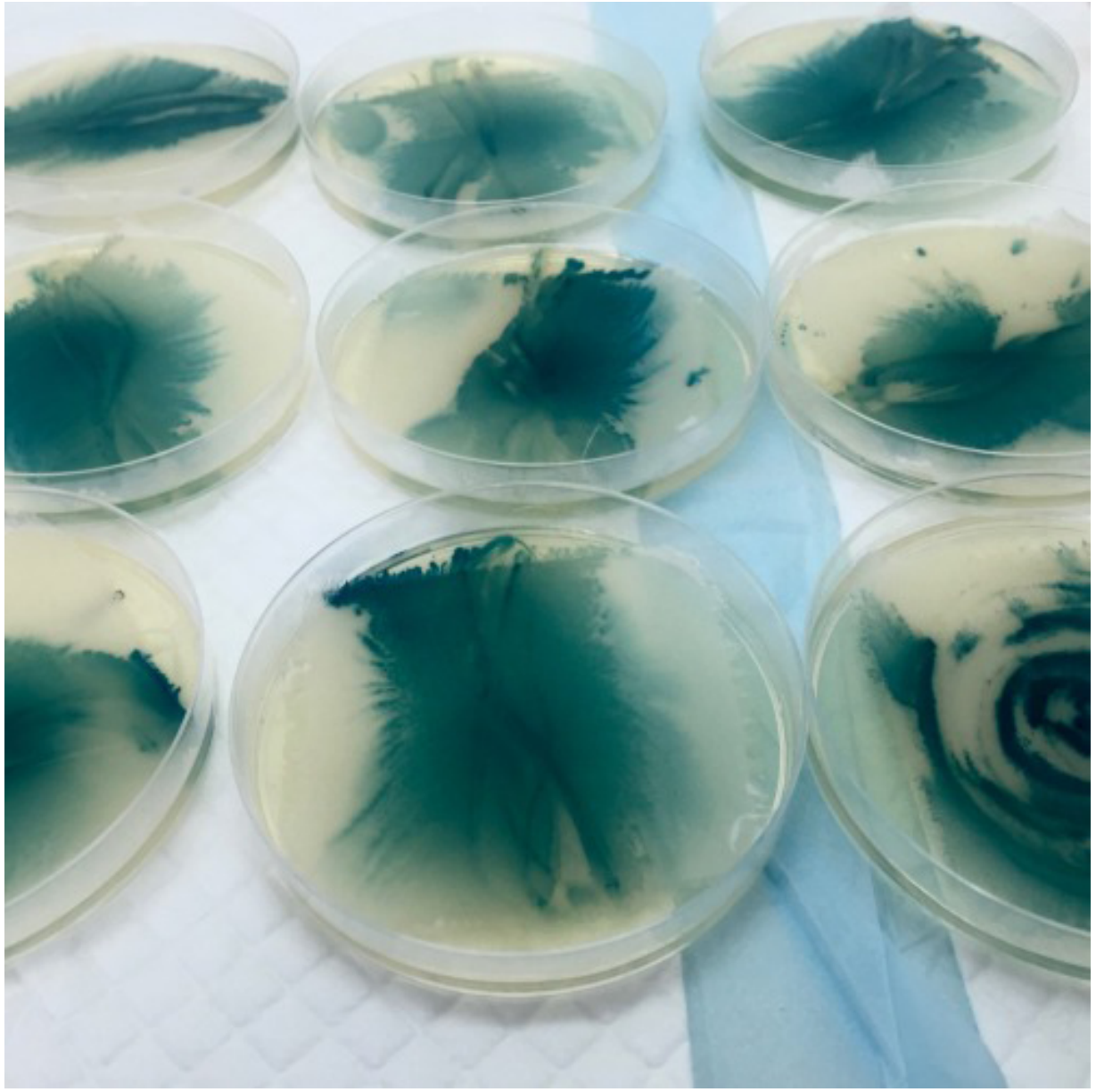
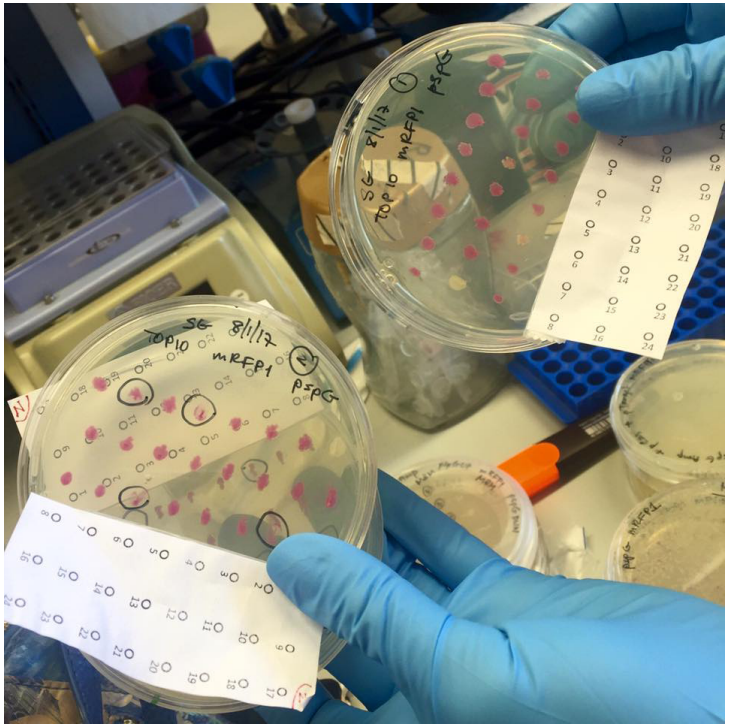
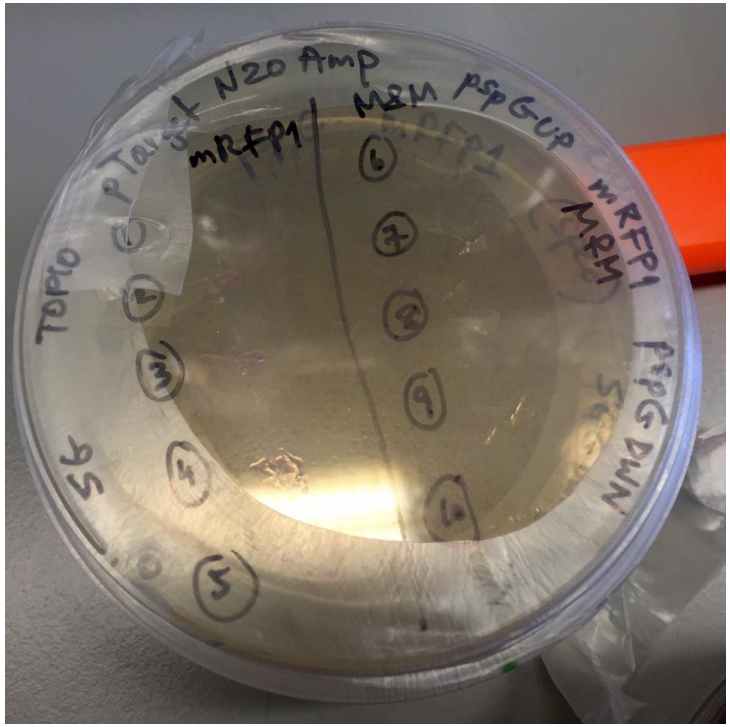


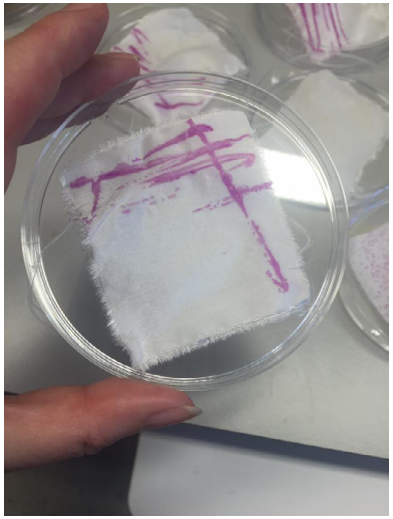
Looking for potential antibiotic targets at the Weizmann Institute. Silk pieces grown with *E. coli* bacteria each with a slightly different gene knocked out.

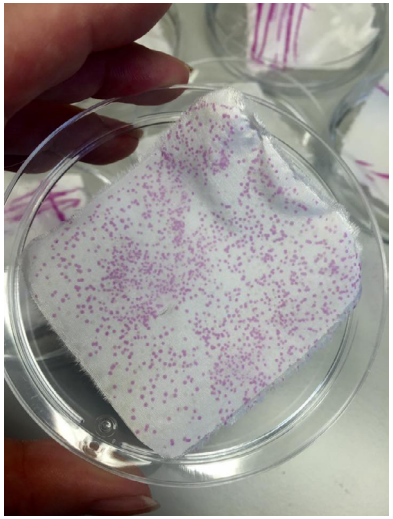
3/ DECEMBER 2016

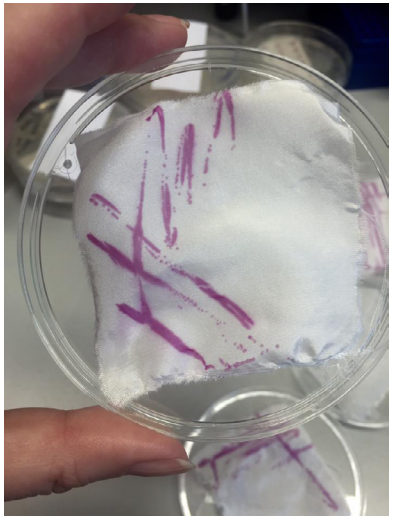
Dumitriu travelled to Haifa, Israel to work with The Amit Synthetic Biology Laboratory for the Decipherment of Genomics Codes at Technion (http://roee-amit.technion.ac.il/) where she learned how to edit bacterial genomes in their regulatory regions using the CRISPR technique.



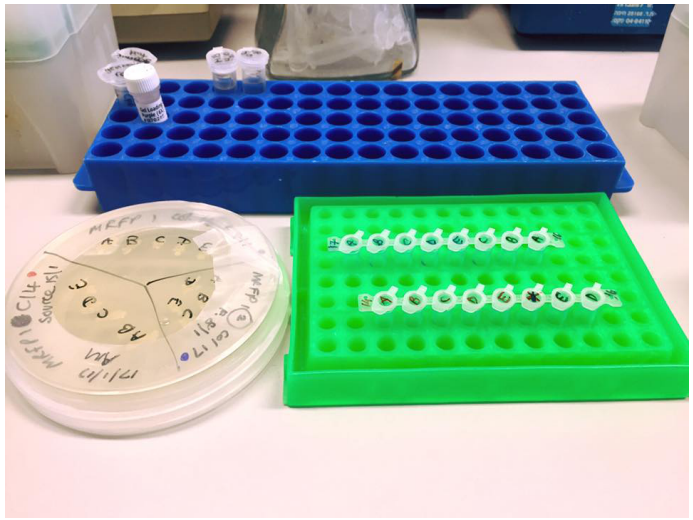




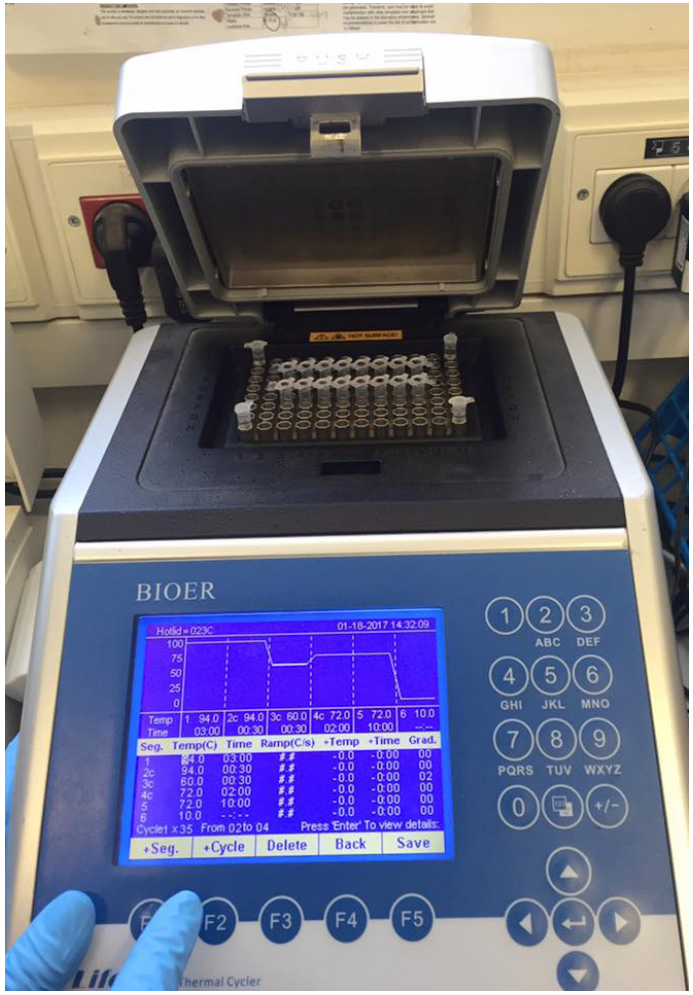


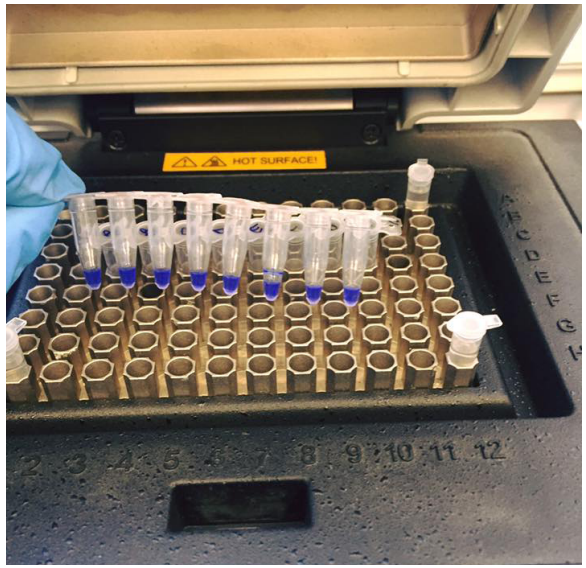


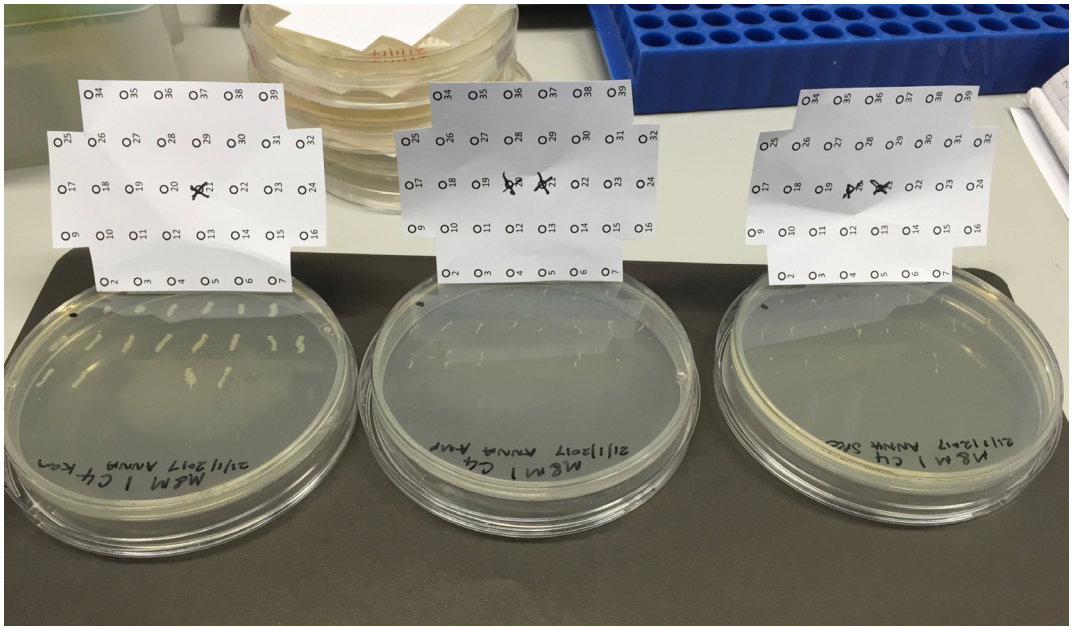
Gene editing at the Amit lab at Technion.



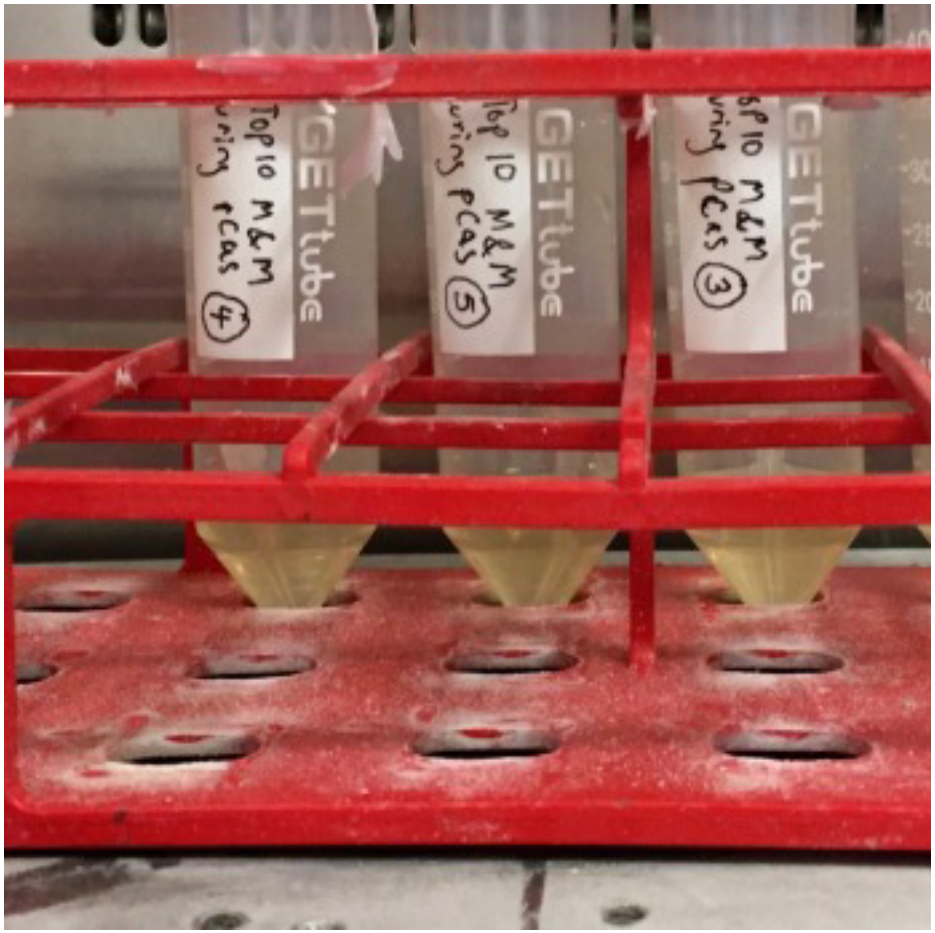
Screening for edits at the Amit Lab for Synthetic Biology at Technion.







Creating the **Top10 Make Do and Mend strain** of CRISPR edited *E. coli* bacteria at Technion.



Top10 Make Do and Mend strain of CRISPR edited *E. coli* bacteria at Technion.

Chromogenic Agar in Birmingham lab.

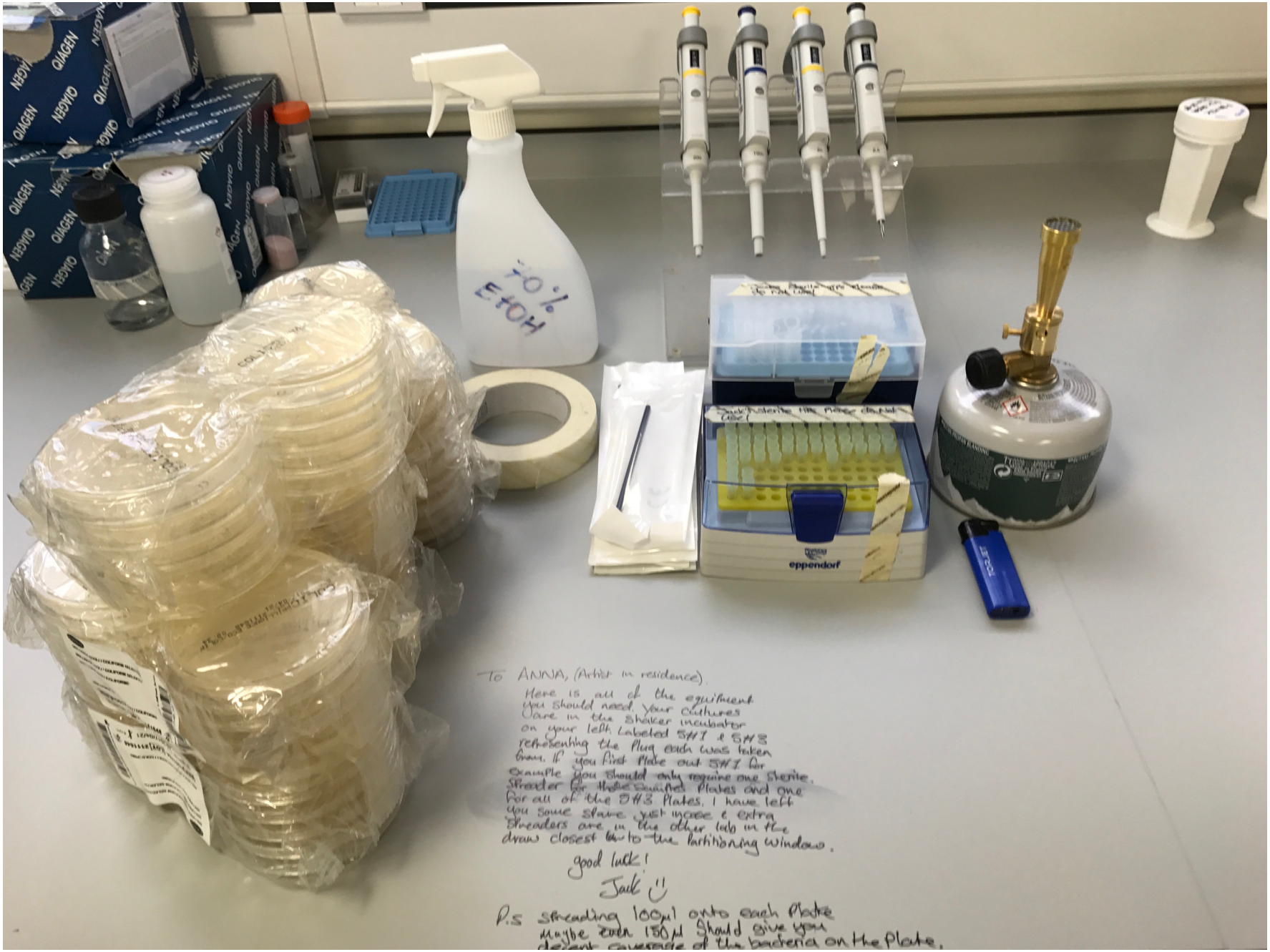
4/ JANUARY 2017

Dumitriu went back to The Amit Synthetic Biology Laboraroty at Technion in Haifa to complete the work.

5/ GROWING THE 'MENDED' BACTERIA

To grow the modified 'mended' bacteria, Dumitriu needed chromogenic agars, a growth medium (nutrient for bacteria) with substrates that react to certain enzymes resulting in different coloration of the bacteria colonies.

Getting those agars turned to be an expensive endeavour in Israel as she would have needed to buy huge quantities. Therefore, she sent the bacteria back to the UK to labs licensed to work with genetically modified organisms and with which she has collaborated before (Heather Macklyne at the University of Sussex and Dr Rob Neely at the University of Birmingham).



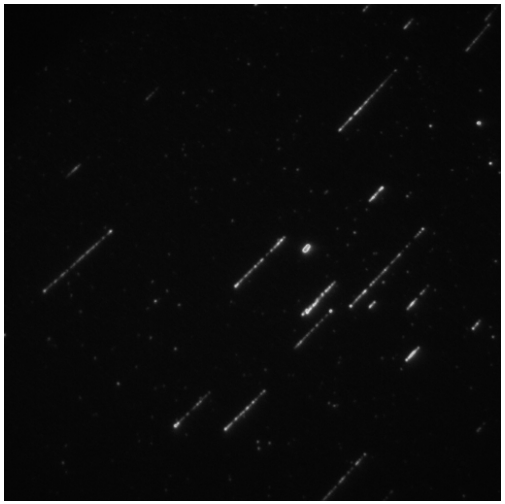
Birmingham Lab: Equipment with note left for the artist.

Autoclave for sterilising bacteria

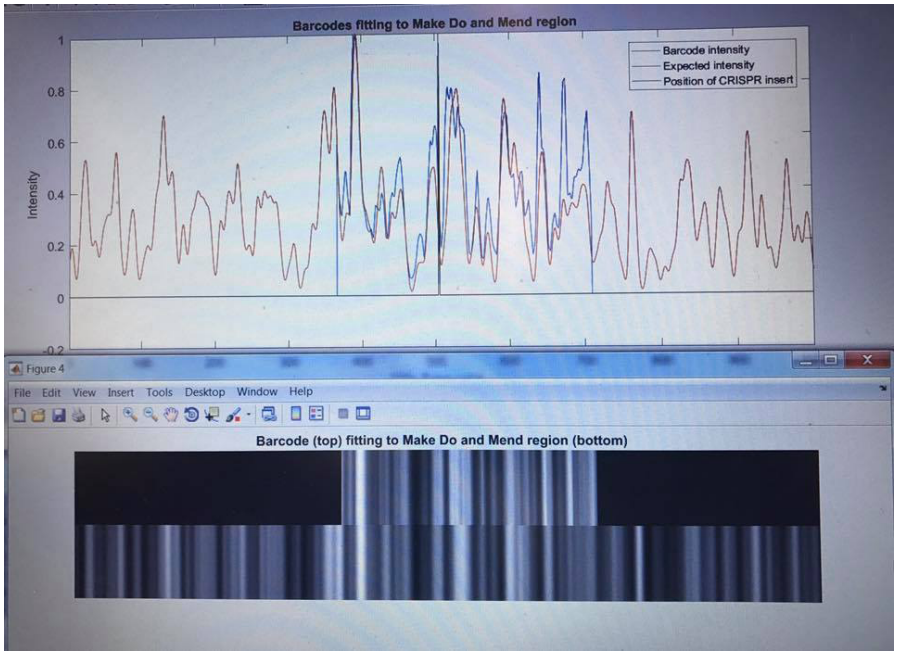
6/ HEALTH & SAFETY

Bringing modified organisms outside of the laboratories and exhibiting them in public places can be done only under strict rules and health and safety regulations. The silk pieces of fabrics with the 'mended' bacteria were sterilized before beeing sewn onto the WWII woman's suit.

Modifying the genome in this manner is not as easy as the word «editing» might suggest in our digital routines. It is very complex and fiddly with no guarantee of success. It is possible to really know whether you have been successful or not only until every step is completed and less that 10% of such experiments to modify a genome this way are successful. Working non stop, it takes about three weeks to complete the process assuming you are successful at the first try.



DNA fluorescence microscope image of the
'Make Do and Mend' CRISPR edit on *E. coli* genome



Visualization of the DNA sequence of the 'Make Do and Mend' CRISPR edit on *E. coli* genome

7/ MOVING FURTHER IN 2017

Beyond her residency with the FEAT MRG-Grammar consortium, Anna Dumitriu is pursuing another residency in the Department of Chemistry at the University of Birmingham in the lab of Dr. Robert Neely.

In June 2017, she could see the actual repair fragment region of her CRISPR genomic (homologous recombination) edit «Make Do and Mend» *E. coli* using cutting-edge technics of optical DNA mapping technologies. Dr. Neely group is pioneering fluorescent labelling of the DNA molecule using an enzymatic approach. The result is a visualization of the DNA sequence, something akin to a barcode that can be used to easily identify species.

3/ BACTERIA AS AN ART MEDIUM

Conversation between Anna Dumitriu and Annick Bureaud (podcast)

https://creativedisturbance.org/podcast/bacteria-as-an-art-medium-meeting-with-anna-dumitriu-eng/

4/ *LEONARDO* ARTICLE ABOUT THE PROJECT

«Make Do and Mend» : Exploring Gene Regulation and CRISPR Through a FEAT (Future Emerging Art and Technology) Residency With the MRG-Grammar Project», Anna Dumitriu, *Leonardo*, MIT Press

http://olats.org/feat/Dumitriu-leon_a_01466.pdf

MAKE DO AND MEND, ANNA DUMITRIU

***MAKE DO AND MEND*, STORYTELLING IN ART AND SCIENCE, BY ANNICK BUREAUD**

MAKE DO AND MEND, STORYTELLING IN ART AND SCIENCE

Central to *Make Do and Mend*, when one encounters it for the first time, is the patched suit on the mannequin followed by the toy sewing machine on its pedestal. The four framed pieces, on the wall, appear as some kind of background information, as secondary items, before revealing their content and role at a closer look.

Make Do and Mend is not a self explanatory artwork and is almost as complex to explain as the science it is using and reflecting upon. Non self explanatory artworks are common in art-science projects as well as in average (non art-science) contemporary art, but there are different ways of being so.

Make Do and Mend can be described as what I call 'intermediary-objects', carrying stories to be told and unfolded. It does not «stand for». It is actual objects embodying the story lines. In other words, *Make Do and Mend* is a narrative spread between different artefacts.

It would be easy and a mistake to focus only on the 1941 suit, patched with the silk fabrics onto which the *E. Coli* bacteria, repaired using the so called «mollecular scissors» CRISPR/Cas9, were grown.

All the elements, echoing and mirroring each other, are equally important. In this respect, the four frames are like ''tablets' antique tablets' that are providing clues to decipher the work, which not only includes cutting-edge biomedical research but is also rooted in local history both from the Second World War in the UK and, more generally, in the history of Western science and is based on strong cultural references. The audience becomes like archaeologists 'reading' the history through remaining fragments that would have been over written.

Anna Dumitriu is using craft techniques, often connoted as feminine, in her artworks while working with the latest biotechnologies to address crucial contemporary issues. In *Make Do and Mend*, the «low-craft» aesthetics of the antique vintage elements not only refers to WWII and

year 1941 but also confronts and opposes our vision of the clean-sterile-high-end lab aesthetics and the very notion of progress.

Each technique acts as a metaphor to the other to deploy the embodied ennmmessched stories. In this respect, the homologous recombination technique can be compared to patching and the whole process of gene editing to craft with its meticulous steps and endless pipetting and 'cooking' procedures. Moreover, the clichés of 'male-science' and 'female-craft' are put upside down: science is craft.
The mending metaphor is even more powerful and the sewing machine the real key element of the piece for bringing to the forefront the ethical issues that the work carries: it is a toy which is the exact replica of the real machine. Are we like kids playing with matches when thinking of 'repairing' faulty genomes or our own past medical and scientific mistakes?

In the late '90's, when bioart emerged, one of its key elements was that the Living itself had become a medium for art, a living that had to remain alive, at least throughout the exhibition time. Formerly, many of those artworks had a 'lab-aesthetics' as they needed to maintain the living element alive, for instance in bio-reactors, and one of the struggles was precisely to bypass this drawback. One good example to have been successfull in this respect is Eduardo Kac's Genesis where the modified bacteria were alive but part of a larger (media) art installation.
Increasingly, due to health and safety regulationsregulations, to other kind of constraints (nobody would like the pathogenic pathogenic bacteria that are in many of Anna Dumitriu's projects to continue growing), to the expansion of speculative bioart, or to aesthetical choices, an important segment of bioart is finding its way into traditionnal art mediums and sometimes even out of the living matter itself. *Make Do and Mend*, as many of the artist's other works, belongs to a bioart trend that I would term «non-living bioart» in that it includes 'for real' bio elements such as modified bacteria, but killed. The fact that it is genuine, both in its biotechnology techniques and vintage items, and for real, makes all the difference. It is neither «about», nor hypotheses. It is.

Annick Bureaud, Paris, September 2017

Photo Anna Dumitriu

THE ARTIST

Anna Dumitriu is a British artist whose work fuses craft, technology and bioscience to explore our relationship to the microbial world, biomedicine and technology.

Resource : www.normalflora.co.uk

CREDITS

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