UNIVERSITY OF LEICESTER

Process

Visualising DNA Research

Gillian McFarland & Ruth Singer, Artists in Residence,
Department of Genetics and Genome Biology and Genome Biology 2017

Contained

Our original inspiration to work with Petri dishes came from visiting the yeast labs at the University, where we saw stacks of dishes filled with huge yeast populations. The layers of dishes, each containing vast amounts of genetic data were our starting point. We created collections of Petri dishes each containing interpretations of the idea of personal DNA. Staff, students, other artists, school groups and members of the public have contributed their own Petri dishes. This has opened-up the project to a wide audience of non-scientists. The Petri dishes are tiny worlds. They draw in the viewer and encourage scrutiny and further investigation of what is contained within.

Process:

Visualising DNA Research is a project by artists Gillian McFarland and Ruth Singer.

Gillian and Ruth were artists in residence in the Department of Genetics and Genome Biology at the University of Leicester in 2017. During this time, they set up a studio in an empty office where they created their work and welcomed in staff and students to view and discuss their ongoing research and work. They also visited University labs to see DNA research in action and to interact with researchers.

McFarland & Singer initiated the project following discussions with Professor Turi King - of the Department of Genetics and Genome Biology at the University of Leicester - and developed the residency and chose the directions for artistic exploration. The project has been funded by Arts Council England as a pilot project to gauge the viability of a longer-term residency in the future (see back cover for details).

This exhibition presents some of the outcomes of McFarland & Singer's collaborative work with University staff. During the residency, more ideas and works-in-progress were developed; many more than it is possible to present in this exhibition. In the future, McFarland & Singer will continue to create work inspired by DNA research. They won the Bath Open Arts Exhibition Prize in 2017 with work from this series and will present a stand-alone exhibition in 2018. Work from this series has also been selected for Appealing to the Populous, the international art / science exhibition for evolutionary biology in Berlin.

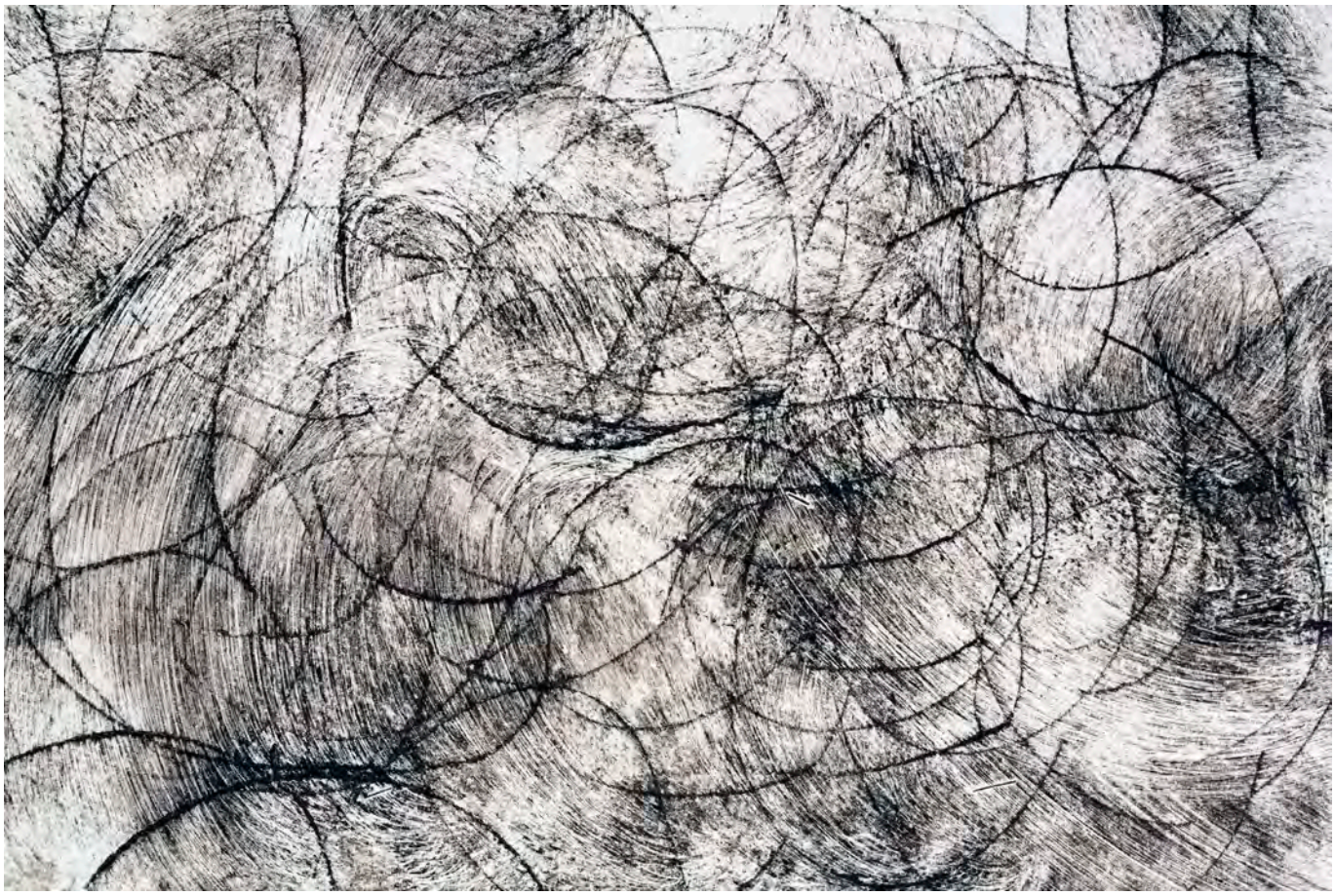
Conical Flasks (Degraded)
Altered scientific glass, in collaboration with Gayle Price, Scientific Glassblower at the University of Leicester.

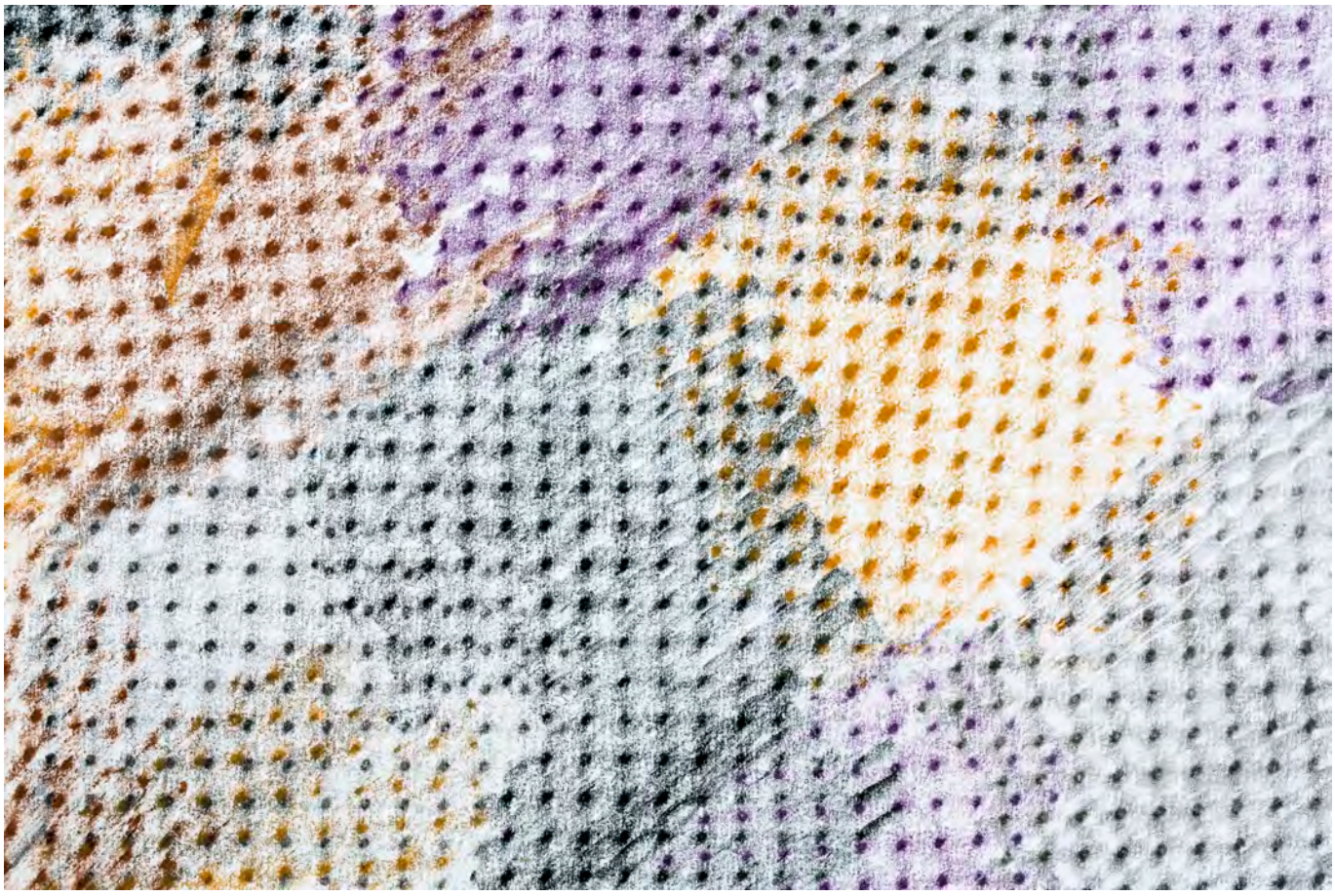
We have been fascinated by containers found in labs and have explored the idea of the scientific vessel as a metaphor for humans as containers of genetic information. We have created changes or mutations to each of the vessels, which transforms their outward appearance and purpose. The soot was a by-product of the alteration process. We found this intriguing and chose to keep it as a reference to degradation or damage to DNA in archaeological specimens over time. This group comprises 23 pairs of vessels, which echoes the 23 pairs of chromosomes normally found in each human cell.

Initial Pairing

This piece developed from our early explorations around genetic change and paired chromosomes. We began with a pair of tourist souvenir dolls, which we passed between ourselves, each making changes and alterations, including taking prints from the dolls' clothing.

Beakers (Mutated)





Work on paper, Ruth Singer

About McFarland & Singer

Gillian McFarland and Ruth Singer work in collaboration as McFarland & Singer alongside their distinct and established solo artistic practices. Gillian's work looks to understand how things are defined by the very processes that bring them into existence. Her practice begins with the processes of creating and develops in exploration of what unfolds. Ruth works mainly in textiles, with an emphasis on gathering inspiration from heritage and personal stories.

Gillian studied Fine Art at Central St Martins and worked as an art therapist for many years alongside her own art practice. Ruth began her professional life working in museums and specialises in running creative projects. Both bring diverse experiences and a true engagement with audiences to their collaborative partnership.

Gillian and Ruth began working together in 2014 while sharing a studio; a space that allowed them to share ideas and approaches. In addition to the work created for this residency, McFarland & Singer have a strong convergence of interest around the archaeology of stains and marks of time.

https://mcfarlandsinger.com

http://gillianadair.co.uk

https://ruthsinger.com

Petri Dishes

Beakers (Mutated)

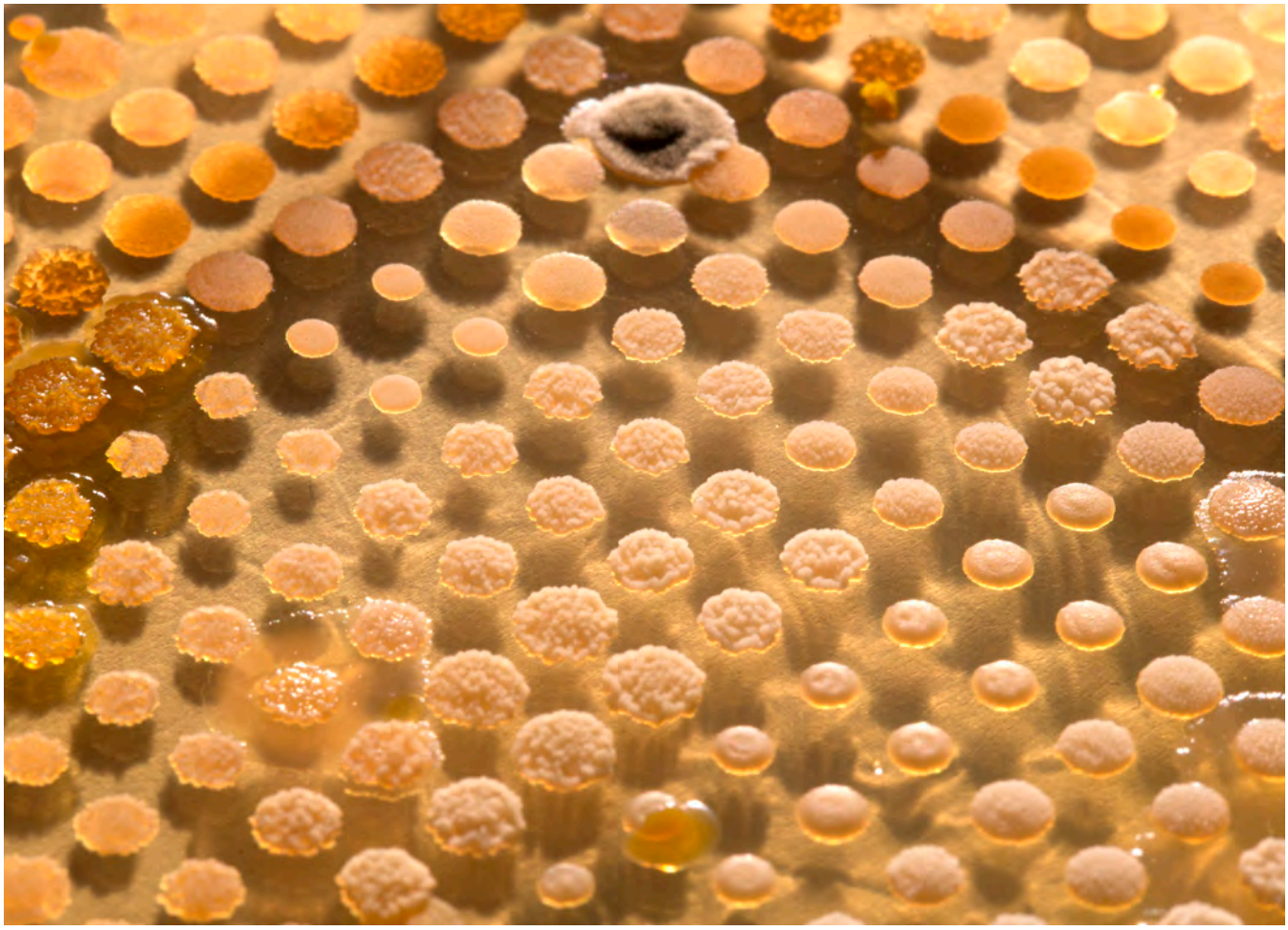
Interview with the artists, led by Annie Cattrell

During the project, McFarland & Singer were mentored by artist Annie Cattrell. Annie posed these questions to explore the narratives exposed by the project.

Annie Cattrell: What does working together bring to your thinking and making?

Gillian McFarland: Working together extends our thinking and moves us to focus on making sense of a landslide of information. I think it strengthens us in our developing practice, as, with each new challenge we face, we have an initial phase of discussion and reflection. It is reassuring to work with a like-minded creative colleague similarly focused on making sense of what we are processing visually, in what is, to us, a new type of research-focused environment.

Ruth Singer: For me, it allows me to think in different ways and explore new ideas in a way that really pushes my creativity forward. The created by collaboration has enabled me to question my own thought processes and working practice. Working with Gillian has opened me up to the possibilities and opportunities of working in new materials and for different outcomes than I have previously, which has been very liberating.



Recovered Populations, Photography by Carl Vivian

We were fascinated by the precision and structure presented by the robotically-prepared yeast plates used in the University labs. We scavenged the unwanted and contaminated plates and observed the yeast's development. The photographs turn the yeast into artworks.

AC: *How does it actually work?*

RS: Much of our collaborative work is around discussion of ideas; about how we each perceive and interpret the information presented to us. Our meetings at the University in our office / studio space were busy but reflective. We talked a lot, taking strands of ideas and pulling them apart, twisting them together and reforming them into new constructions.

GM: We invited staff and students to come along to the Open Studio sessions and get involved creatively on a weekly basis. In the afternoons, we tended to make visits to the labs or glass blowing facility to follow-up on lines of enquiry.

RS: Our visits to the labs were intensive, exciting adventures into unknown territory that we approached with child-like wonder - the equipment, environment and research taking place. We asked a lot of questions, took a lot of photos, attempted to absorb massive amounts of information that often felt like a foreign language, as we are so removed from scientific research in our lives outside this project.

GM: The day would finish with us reviewing what we had achieved, discussing the possibilities in this and deciding on a course of action and research for the following week.

AC: *Where do you connect?*

GM: In an exploration of the surface and what lies behind the surface.

RS: We have a shared love of containers, containment and things within things throughout this project. The use of scientific vessels has become a metaphor for knowledge contained within the University. We overlap in our fascination with detail, with how processes and activities leave behind traces.

GM: … and we both have an enormous curiosity in the strangest of things!

AC: *Have you devised systems?*

RS: Our system is organised chaos! We are both busy with other things outside of this project and parachute ourselves into the defined space of our DNA project with great joy and a sense of release from outside distractions.

GM: Outside our residency day we would work separately and meet to work on collaborative pieces.

RS: We have established a routine on 'University days' of sharing our thoughts and research and then going out and about to gather yet more information, make contacts and share ideas.

AC: *How did the project come about in the first place?*

RS: While sharing a studio space in 2014, we began talking about our shared perspective on aspects of our work, particularly around stains and marks.

GM: After a conversation with Professor Turi King, who engaged us with Richard III's story and her painstaking research to piece together the truth about the man and to place him firmly within time and history, we decided we wanted to collaborate in the space between art and science where stories dwell.

RS: This grew into a proposal to work collaboratively and the first phase of this is Process: Visualising DNA Research with the University of Leicester.

AC: *You both have specific, individual practices. How has working together challenged and changed this?*

GM: The challenges have been good ones: learning to collaborate and share the similarities in our work and interests, and learning to appreciate our differences in approaches and focuses. Ruth is extremely efficient and well-organised - I am not. There is some enjoyment to be found in trying to square this up. I have had to verbalise my thinking processes more and at an earlier stage in developing ideas, which has been very beneficial to thinking about my work. The collaboration has made me quicker at sifting through a wealth of information, picking out areas of interest, prioritising some and filing away others to come back to.

RS: I'm aware of quite a radical shift in my own thinking about my work since I have been working with Gillian. I am stepping away from defining myself as a textile artist and exploring how my work fits in with the wider art world outside of the limiting definitions of craft. I have felt able to try new techniques to explore ideas, for example, working with print. Gillian has challenged my need to define everything at the start of the process and to make sure it fits in with a fixed idea. I am more open to exploring things that fascinate me simply because they fascinate me, whether or not they 'fit' with my research and my self-imposed boundaries.

AC: *What does your residency in the Department of Genetics and Genome Biology contribute to your collaboration and to the scientific environment?*

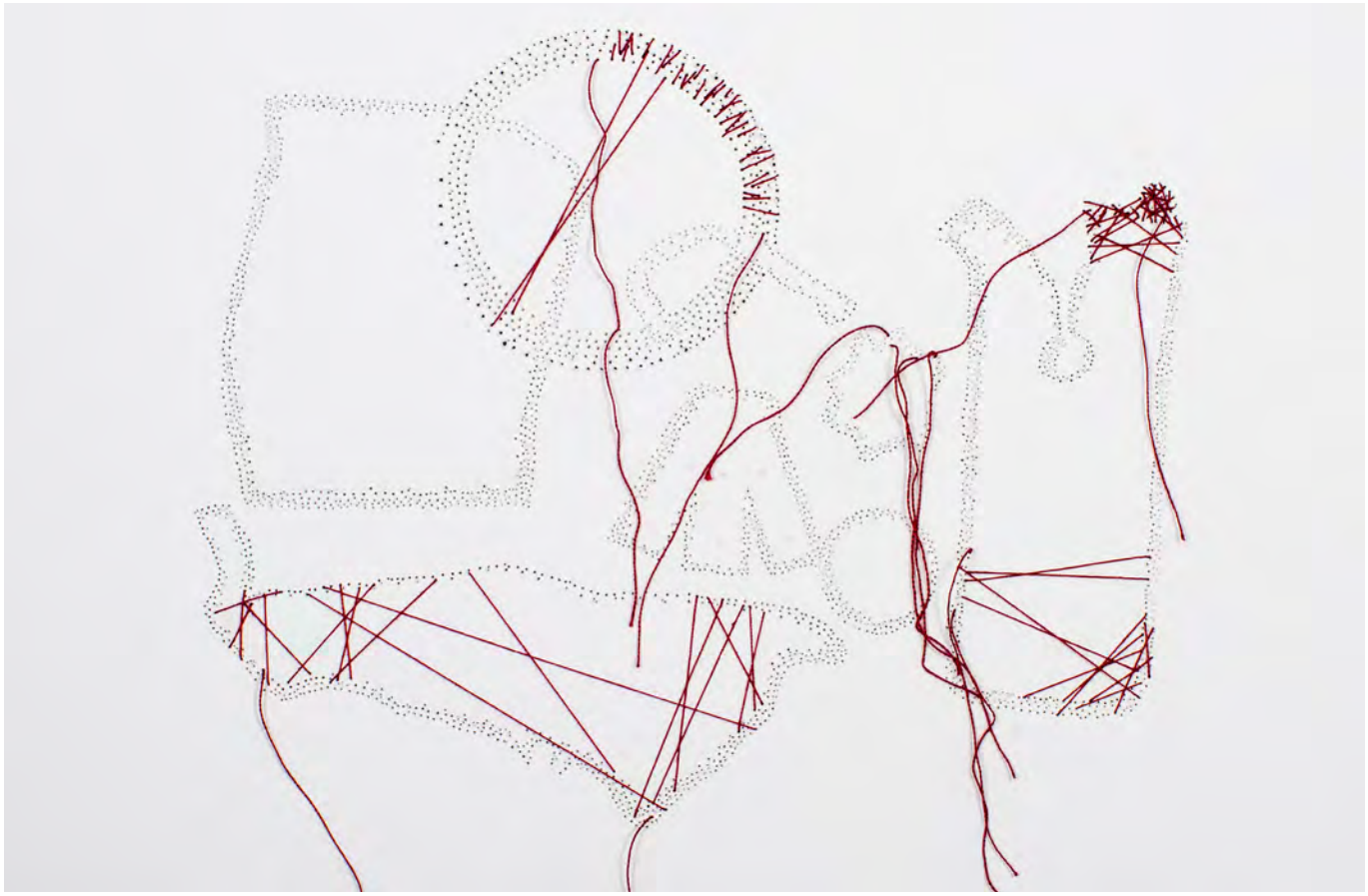
RS: I feel that McFarland & Singer has developed from a pool of shared ideas into a fully formed and defined practice over the course of this residency. The residency has focused our minds on finding ways to work together and enabled us to see routes to develop our work inside and outside of scientific research environments.

GM: It has pushed us to be clear in our aims, to negotiate terms of progression with ourselves and our scientist partners. To the scientific environment we have brought a degree of mess, fun, lots of open-ended questions, engagement at a visual and cerebral level, a raised awareness of the visual ordering around us, and a renewed focus on understanding and making sense of what we see, how we share this and its value for society.

RS: I hope that our residency has opened up the Department to alternative ways of looking and of thinking, and that there is a greater understanding of the science and art worlds as a result. From talking to Department staff, I perceive there is as much misunderstanding of what an artist does as there is, in the art world, about scientists. I hope our project enlightens both the arts and the sciences to see the similarities in creative thinking and process.

(Re)paired Pieces

This work explores pairs of chromosomes and the precision of scientific process. The print is created from cloth captured between two sheets of paper, which has then been cut and reformed. The puncturing and stitching on the paper are a metaphor for containing and recording information. These marks reflect scientific processes, such as using pipettes and the containing of shapes with puncturing refers to Petri dishes and scientific vessels.



Stitched Prints

Beakers (Mutated) Altered scientific glass, in collaboration with Gayle Price.

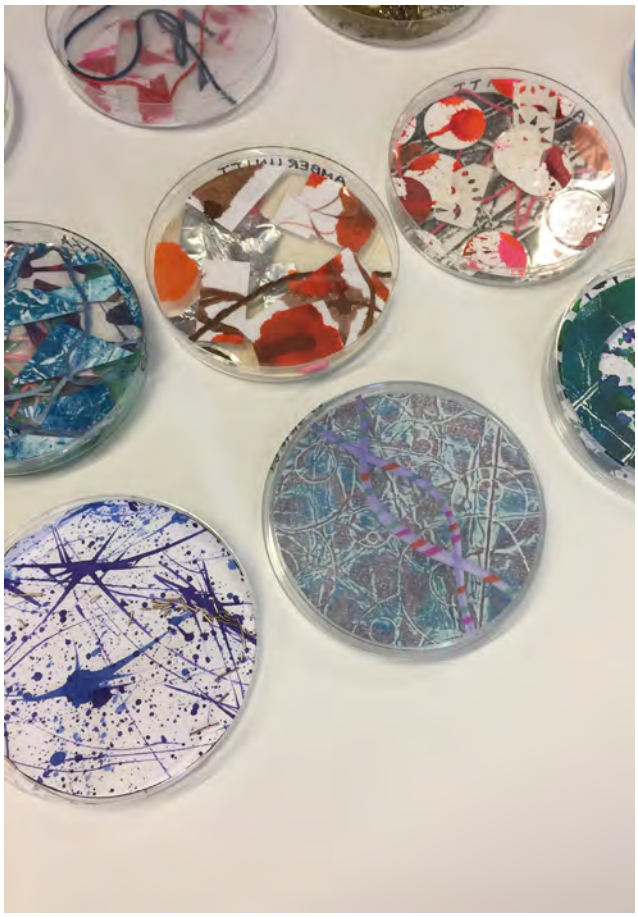
With these small glass beakers, we wanted to have a creative impact on the purity and perfection of the scientific process. The subtle shifts represent tiny changes in genetic code, which create individuality. The beakers were transformed under strong photographic light into widely varying shadows. Each mutation of the glass creates a shadow with its own genetic code.

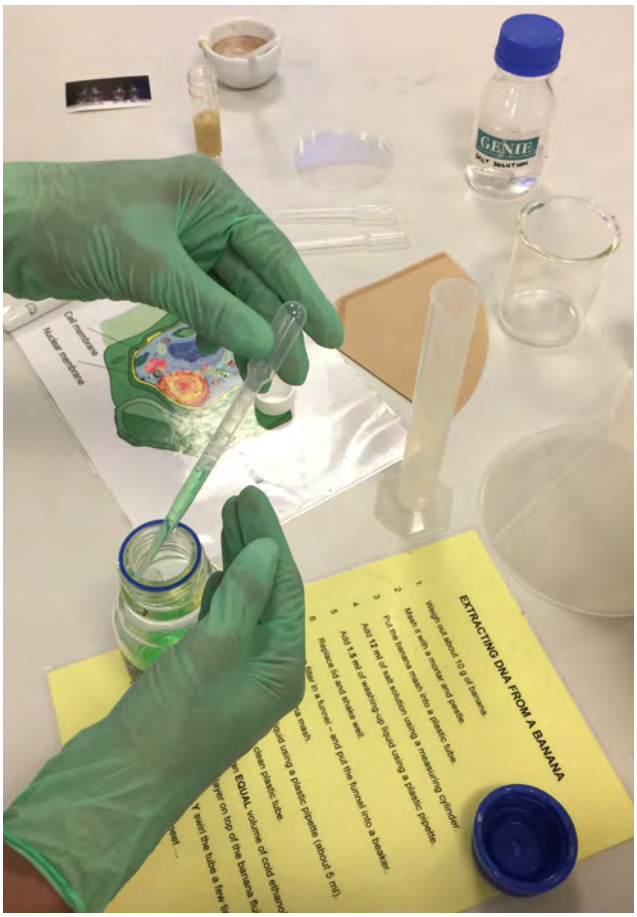
Community Engagement

A key part of the collaboration is to open up the project to wider audiences, McFarland & Singer's research and the ways in which they work.

Students from Beauchamp College signed up to two days of activity in June 2017, including a research visit to the University and artist-led activities in the school's art studios. Professor Turi King introduced the students to a teaching lab, and undergraduate learning and study spaces, followed by an in-depth exploration of her DNA research to identify the bones of Richard III.

Students also extracted the DNA from a banana and tried their skills at a variety of tests and quizzes around DNA replication, probability and matching, and created fingerprint versions of a portion of Richard III's DNA. The artists introduced the ideas they have been exploring around the representation of complex data and invisible information.





School workshops

Wider participation

Department of Genetics and Genome Biology staff, students and other University members have been invited to collaborate and participate in experimental activities throughout the project. The artists ran Open Studio events where staff and students had the opportunity to engage with creative ideas and share their thoughts, as well as create their own pieces for inclusion in the exhibition.

Petri Dish Project

The Petri dish installations include contributions from staff, students, other artists, members of the public and scientists, and explore a wide and diverse interpretation of DNA and responses to genetics research.

BBC Inside Science

In May 2017, McFarland & Singer, with lead scientist Professor Turi King, appeared on BBC Radio 4's Inside Science programme to talk about the collaborative work created during the residency.

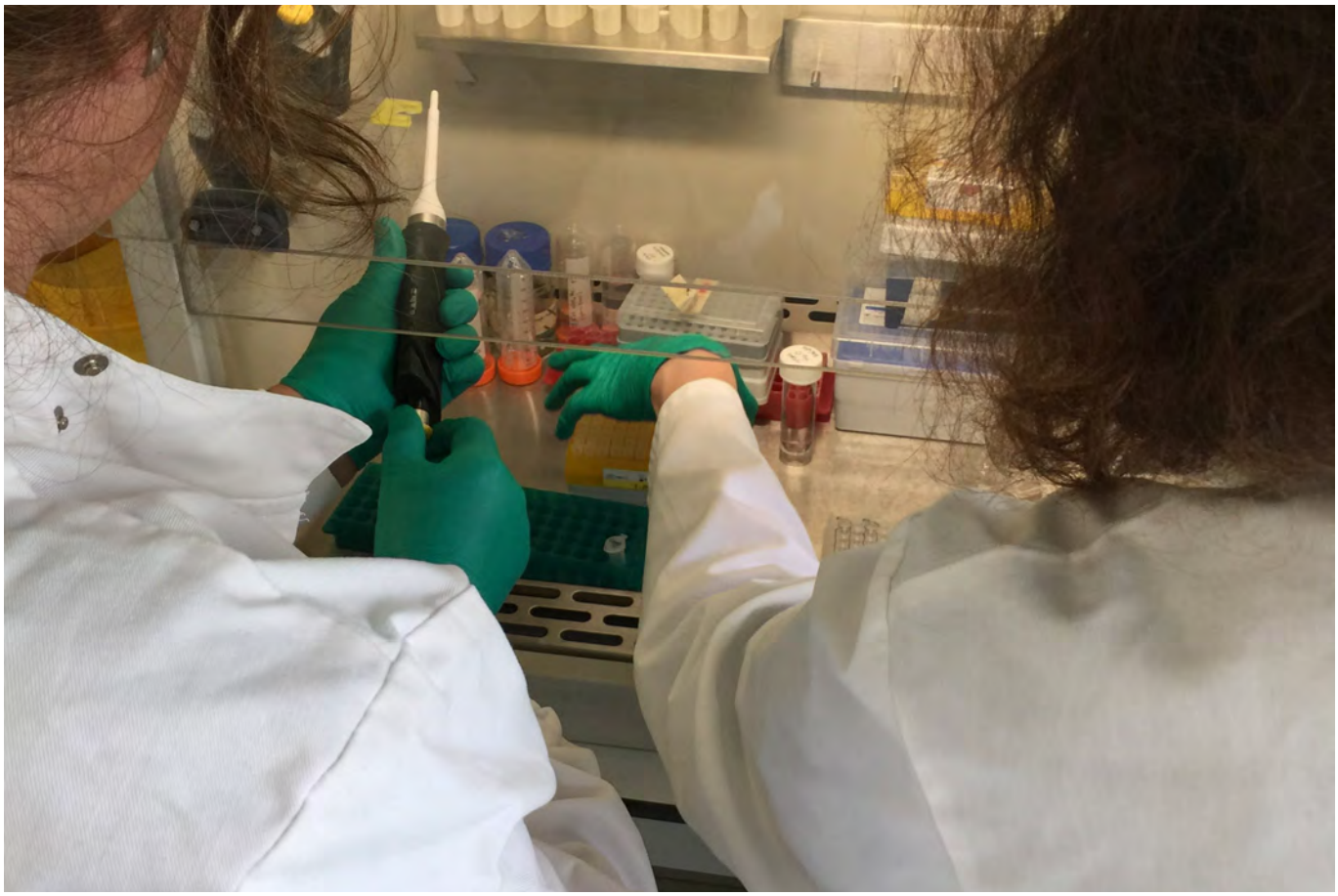
Exhibitions

Collaborative work resulting from the residency was submitted to the Bath Open Arts Prize at the Bath Arts Festival in May 2017. McFarland & Singer were awarded the solo exhibition prize by 44AD Gallery and will be showing their work there in January 2018, as well as at an international arts / science exhibition in Berlin, November 2017.

Annie Cattrell working in the lab with yeast and ink

Staff participation workshop

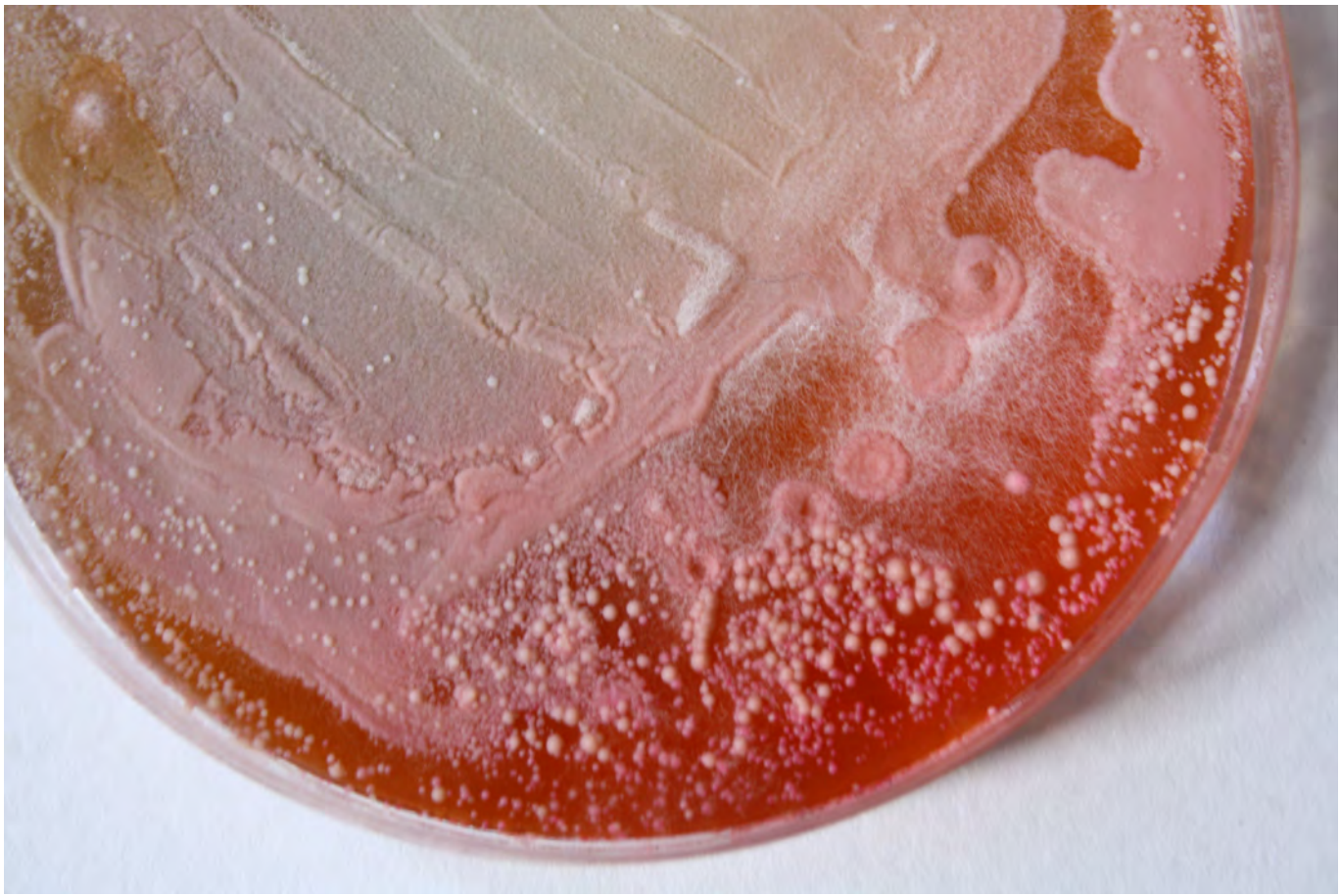
Gayle Price working on glass



Gillian and Turi working in the lab

Population Growth, Created by Ruth Singer, Gillian McFarland, Annie Cattrell and Alex Hinks Roberts

For these pieces, we subverted and altered the scientific process to grow our own yeast populations. The Petri dishes were filled with agar jelly as normal, onto which we applied different strains of yeast that grew and developed at different rates. To these we added coloured drawing ink to create additional patterns. Over the course of a week the yeasts bloomed, the surfaces transformed and the contaminants introduced in the creative process turned the Petri dishes into colourful miniature worlds



Beakers (Mutated)

10ml Flasks (Mutated)

There are many different kinds of glass and, in the modern world, it is such a common item that we rarely ever stop to consider how different the world would be without it. Glass can be as intricate as a snowflake, as strong as steel, as fragile as a rose and as vibrant as a rainbow. Glass has provided answers to age-old questions about the structure of the cosmos, the composition of the atom, the nature of infection and antidote, and the intricacies of our own evolution. Indeed, few discoveries have altered the course of human development quite so profoundly.

Contributing to this project has been a wonderful way of exploring the links between scientific knowledge and artistic expression. The glassware I usually produce for use in the laboratories tends to be of uniform size and appearance, so it's been very liberating to deliberately include 'flaws' as part of the finished pieces. Seeing regular scientific glassware subtly altered in so many different ways is a fantastically fun and effective way of demonstrating the small deviations in our own genetic coding over time.

Gayle Price, Scientific Glassblower, University of Leicester

It was very interesting to see the dynamic interface between lab materials and art that engaged various lab members.

Professor Ed Louis, Director of Centre for Genetic Architecture of Complex Traits, University of Leicester

I've always been interested in the overlap between art and science as they're both very creative pursuits exploring the world and feeding back what we've discovered. While many people see art and science as being diametrically opposed to one another, it hasn't always been this way: Leonardo Da Vinci is perhaps the best-known embodiment of this, being both a famous artist and scientist.

Working with artists and seeing their interpretations of the research you do, makes you see your work, and its relevance to the world, in a completely different way. It's refreshing and invigorating to see your own world through the eyes of such creative colleagues and just simply fun to use artists' materials to express our own scientific passion through unfamiliar mediums.

Both art and science are absorbing pursuits: you can lose yourself in them in a creative flow of experimental energy. The Artists in Residency project, I think, was indicative of this overlap between art and science and was great fun for all involved.

Professor Turi King, Reader in Genetics and Archaeology, University of Leicester

Beakers (Mutated)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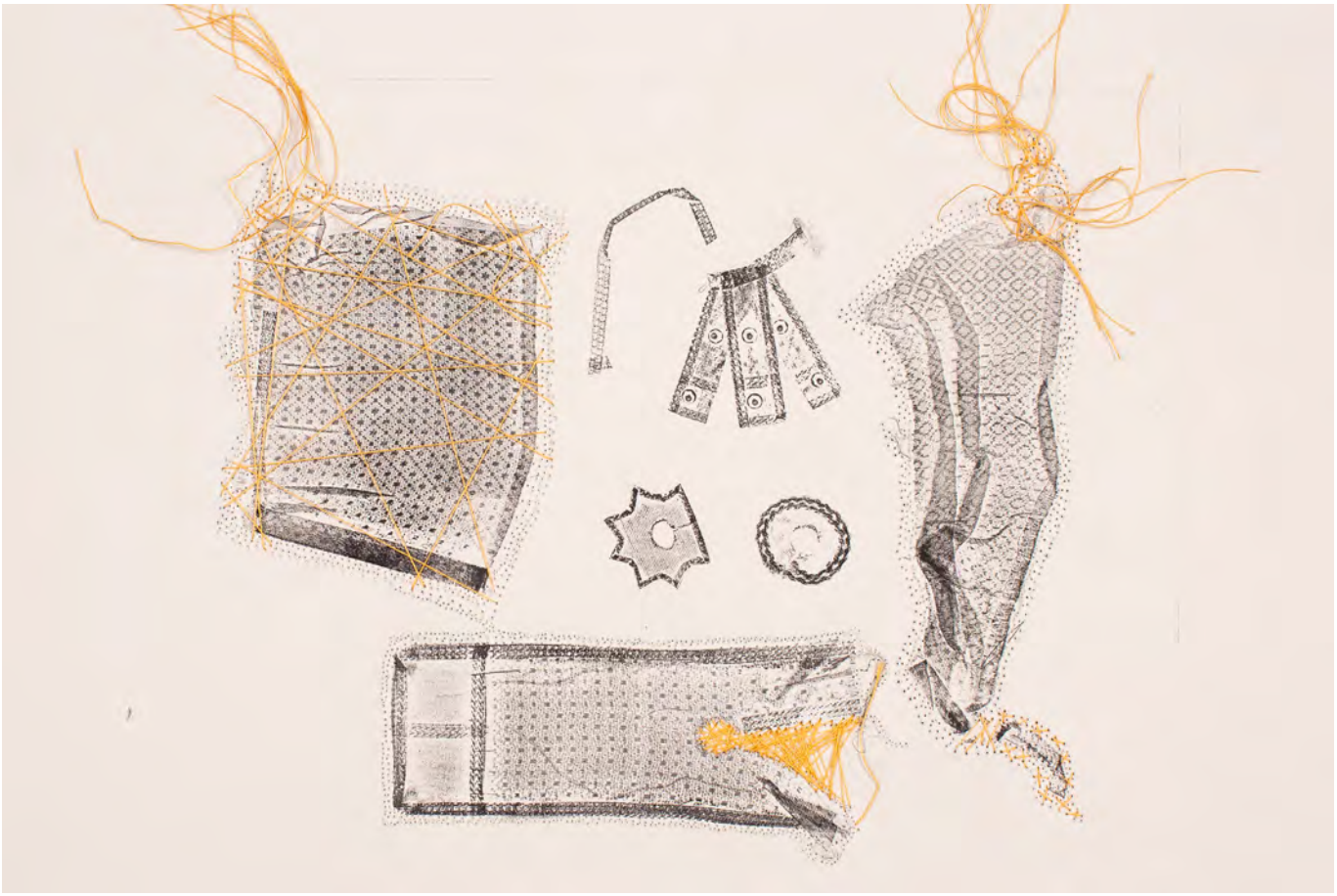
CUMULATIVE VOLUMES

Plants from the University's Herbarium

Conical Flasks (Degraded)



Stitched Prints

Conical Flasks (Degraded)

This project has been funded by Arts Council England with financial contributions from the University of Leicester and the Fine Art and Photography Research Group at De Montfort University.

Art materials, for use in school workshops and in the creation of art works, were provided by Specialist Crafts.

McFarland & Singer wish to thank the University of Leicester and the staff of the Department of Genetics and Genome Biology, for hosting and supporting the project. Particular thanks go to Alex Hinks Roberts, Ed Louis, Richard Gornall and Cas Kramer. Special thanks to Professor Turi King for her enthusiasm in developing this project, commitment to seeing it through and support in enabling the artists to share and celebrate their work with wider audiences.

The artists were mentored by Annie Cattrell, Royal College of Art.

Glass work by Gayle Price, University of Leicester.

Editing and proofreading by Amy Jane Barnes.

Film making by Carl Vivian, University of Leicester.

Photos on pages *** by Carl Vivian, University of Leicester.

Photos on pages *** by Sarah Salotti.

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