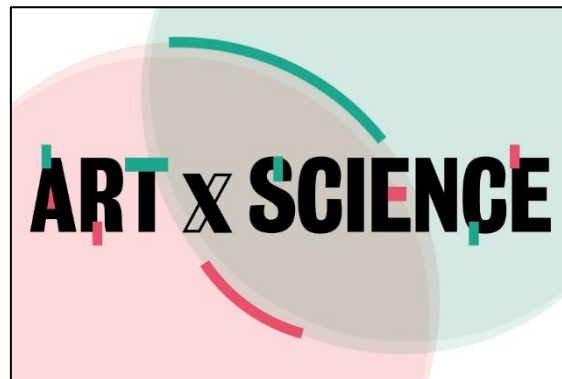


“...a new language of science...”



**Evaluation of the ART X SCIENCE project
for King’s College London and the Royal College of Art**

December 2021



NAVIGATOR CONSULTING

dommcdonald@hotmail.com / 07910 873147

CONTENTS

	<i>Page</i>
1. Context	2
2. Evaluation Methodology	4
3. Findings	6
4. Conclusion and Recommendations	10
Appendices	12

1. Context

ART X SCIENCE is a collaboration between the Royal College of Art ([RCA](#)) and the School for Biomedical Engineering and Imaging Science at King's College London ([BMEIS](#)). It ran for the first time in 2020, when the COVID pandemic meant that it had to take place entirely [online](#). In 2021, the organisers planned for a physical exhibition that would be delivered with input from relevant community groups.

In June 2021 students from the RCA and BMEIS were invited to take part in an online networking event to provide an opportunity for participants to identify possible collaborators for the 2021 iteration of the project. 5 scientists and 11 artists attended, and 5 applications were received for the project as a result.

2 projects were selected.

- *Hidden Stories of the Heart* focussed on research into how trauma can have an impact on the structure and function of the heart. During the development of their exhibit members of the team consulted parents from Guy's and St Thomas' [Maternity Voices Partnership](#) about their lived experience of pregnancy. One of the artists was a member of the Maternity Voices Partnership and set up a 2-hour meeting with 13 women from the group, which was moderated by that artist and the scientist. The final exhibit featured their written testimonies.
- *In Utero* explored research into how maternal physical and mental health impacts the development of baby's brains during pregnancy. During the development of the exhibit the artists and scientists consulted a number of women, mainly drawn from the [Mountain of Fire and Miracles Ministry](#) community, about their lived experience of trauma. This consisted of one-to-one conversations between one of the artists and a number of women of her acquaintance who had been through traumatic experiences. The final exhibit featured their spoken testimonies.

Each project team was awarded a budget of £2500 each. They were supported by a core team consisting of the Public Engagement Officer and Community Engagement Officer at BMEIS and the Community Engagement Manager at the RCA.

Over three months, each project team worked collaboratively to develop their exhibits. Due to the pandemic and the fact that students were based around the world, the majority of meetings took place online.

The resulting exhibits were showcased at the ART X SCIENCE exhibition in the Science Museum's Medicine Galleries on 9-10 October 2021, as part of the Great Exhibition Road Festival. During the exhibition weekend, an additional 20 BMEIS research students (referred to as volunteers in this document) engaged visitors with the exhibits.



Figure 1: Images from *Hidden Stories of the Heart* (clockwise from far left): One of the four papier maché sculptures of hearts affected by trauma; installing the LEDs that illuminated the papier maché sculptures; a woman and child interacting with an acrylic sculpture of a human female torso; children listening to the audio pieces that accompanied the papier maché sculptures.



Figure 2: Images from *In Utero* (clockwise from far left): The fabric sculpture of a uterus; a sculpture of an embryo that was suspended inside the uterus sculpture; visitors interacting with the uterus sculpture; sculptures of embryos and a developing brain.

2. Evaluation methodology

I was appointed in August 2021 to evaluate the project. I used a mixed methods approach in order to understand the project and its outcomes from a number of perspectives.

An initial series of meetings took place with members of the core team in late August and September. These led to the development of the evaluation framework which underpins this report and which is included as Appendix 1.

2.1 Theory of Change

The evaluation framework identified a number of outputs which were assumed to have the following outcomes¹. These have been evaluated within this report:

1. To create an opportunity for RCA and CDT students to learn from each other's disciplines, practices and perspectives... develop their ability to collaborate with practitioners from different disciplines to deliver high quality creative outputs relating to scientific research... develop their public engagement and communication skills.
2. To develop the students' experience and skills in meaningful community engagement with local partners for mutual benefit.
3. To spark visitors' curiosity into and increase their awareness of research in the field of medical imaging.
4. To increase the researchers' understanding of the public's perspectives, hopes and fears relating to their research.
5. To influence the future public engagement projects between the CDT and RCA.

It was assumed that these outcomes would contribute to the following long-term impact (which is outside the scope of this evaluation):

- To provide an opportunity for cross disciplinary learning between the RCA and CDT students, to create a space for participating students to listen and learn from relevant community groups and to engage members of the public through creativity, provoking conversations about our health and medical imaging research to increase the transparency and inclusivity of research.

2.2 Methodology

The project used a mixed methods approach consisting of:

- Overt observation of one meeting of each of the project teams (8&9 September)
- Unobtrusive observation of the first day of the exhibition (9 October) including counting the number of visitors entering the exhibit spaces during a 5-minute period at the start of every half- hour.
- Semi-structured conversations with 2 of the volunteers who supported the exhibitions on 9 October.
- Feedback cards completed by visitors to the exhibition (n=59 see Appendix 2). These invited responses to three questions: "How did the use of art impact your understanding of science?" (n=22), "What surprised you most about the medical imaging research?" (n=15), and "What was your main takeaway from the exhibition?" (n=22)
- Post-event online survey of volunteers from BMEIS who took part in the initial workshop and subsequently supported the exhibition on 9-10 October (n=11)
- Post-event 30 minute interviews with members of the project teams (n=7)

¹ These and the impacts that follow are drawn from the initial project documentation

- Post-event 15 minute interviews with members of the community group which gave input to the “Hearts” project group (n=4, all from the *Hearts* project)
- Observation of the post-event wash-up meeting with members of the project teams (3 November: screenshot below).
- A post-event meeting with the core team (10 November)

I am extremely grateful to everyone who took part in the evaluation process for their time and enthusiasm.



Figure 3: Screenshot from the post-event wash-up meeting on 3 November.

3. Findings

3.1 Learning (*Linked to Outcome 1*)

Students described three broad types of learning:

3.1.1. Learning about their professional practice: students identified a number of ways in which their experience might feed into their future work, with a particular focus on how the interaction between artists and scientists give new perspectives.

"[I understand that] we are presenting an interpretation of our science"

"I think I will continue to work with the [people in the] group...this opened up a journey for me"

"[This scientific research is] incredibly powerful – I will carry it into my [artistic] work"

"We don't have to be objective, quantitative... we're making a new language of science"

3.1.2. Learning about how to put on an exhibition: there were a number of concrete learning points about the process of developing and installing public exhibitions.

"Prototypes are really important"

"We need to think big but have a Plan B, C and D"

"I should have designed the [artwork] differently"

3.1.3. Learning about how to deliver projects and how to work in teams with diverse skills and experience.

"I will have more confidence to collaborate with [people from] other backgrounds... it's a big change"

"[I was] having to learn that this is not my turf. This is not a controlled environment"

The involvement of Community partners was particularly powerful for the students.

"[talking to the In Utero Community partners was] such an intense moment... really something that shaped my work and also shaped my life"

"We care a lot about the technical aspects but we never see the patients... the hearts... are just images. We forget we do this because there are people who need this."

There was, however, no sense that interaction with visitors to the exhibition had any real impact on the project teams.

3.2 Visitor numbers and impact (*Outcome 3*)

3.2.1 Visitor numbers

Based on my experience of museum spaces over the years, I would say that the Science Museum was rather quiet on the day that I observed the exhibition (Saturday 9th October). It is unclear whether this is part of a pattern post-COVID, or whether that day was exceptionally quiet.

From observations on the Saturday I estimate that 200 people passed through each of the exhibition spaces on that day. Reports from the core team suggest that Sunday was busier than

Saturday and they estimate that around 1000 people interacted with each of the exhibitions over the two days.

Most visitors (around 2 in 3) explored the exhibits with a significant degree of interest. A significant proportion of visitors stayed for many minutes (and in some cases, over an hour) looking at the exhibits and talking to the artists and scientists.

Around 1 in 3 visitors passed straight through the exhibition space without engaging with its content.

3.2.2 Impact on visitors

As outlined in the evaluation framework (see Appendix 1) it is not realistic to capture longer-term impacts of an exhibition of this sort from an evaluation process that only takes place during the exhibition itself: any impacts will only emerge months or years later as visitors incorporate their experience at the exhibition into their complex lives.

However, we can say that visitors were engaged with the exhibition and were able to express a wide variety of opinions about the exhibits themselves and their relevance to visitors' lives. The overwhelming majority of these comments were positive and a number of visitors expressed a desire to engage further (Appendix 2).

Therefore we can say that the exhibition successfully provided the necessary conditions in which we would expect deeper impact to develop over time.

3.3 Volunteers (*Outcome 4*)

I had a conversation with one of the volunteers about each exhibit. They were enthusiastic and polite but not well-informed about the exhibits. As normal with these sorts of volunteers, it took time for them to warm to their role of engaging with visitors but once they did so they appeared to perform the role well.

In the post-event survey volunteers were asked to use three words to describe their experience. Of the 21 words used all had strongly positive connotations, with the three most frequent being "fun", "engaging" and "exciting". They were also asked to describe what they had learned from their experience and they described a number of positive learning outcomes, both in terms of public engagement in general, and public engagement with their research in particular.

"[I was surprised by] the range of audiences we engaged with - from those with a passing curiosity to those with detailed knowledge of medical imaging."

"[As a result of taking part in ART X SCIENCE] I might look to incorporate artists in my future engagement activities..."

"... [I] didn't realise people would be interested in knowing more about what we do and that conversations with the public and stakeholders let you view your research from a different angle."

"[As a result of taking part in ART X SCIENCE] I'll modify my approach to talking to the public about MRI".

3.4 Project team structure and roles (Outcome 1)

Both project teams struggled with the fact that they were required to work remotely. In the case of *In Utero* this was exacerbated by the fact that two members of the project team were based outside the UK and were therefore not able to be present in person for any aspect of the project. This slowed the process of them developing the shared vision and trust which is so crucial when delivering a new project in a short time to an immovable deadline. As the delivery timeline for *In Utero* became very squeezed, this lack of personal connection led to relationships within the team becoming very strained.

"It felt a bit like for the project to succeed it was forgotten to think about the humans"

As is common when installing this sort of exhibition, both teams found themselves improvising their roles at the last minute as unexpected problems arose. As a result they drew heavily on the expertise of the core team in order to deliver the project successfully.

3.5 Core team structure and roles (*Outcome 5*)

The core team worked efficiently to deliver the project.

Several members of the project teams offered unsolicited positive feedback about the role played by the core team, who acted as backstop in a variety of situations throughout the project, but particularly during the installation of the exhibitions.

"[Bella, Hannah and Deanne] really made it smooth - 50% of the success of the project [is theirs]"

"The way that Hannah, Deanne and Bella took us through the process was great... we felt very looked after"

The core team struggled to manage the expectations of the project teams, with the fluid nature of the project meaning that the specifications for the exhibition space were changing over the short project timescale. As part of this they found themselves having to move between several of the Belbin team roles²: Plant, Monitor-Evaluator, Shaper, Specialist, Completer-Finisher.

3.6 Community partners (*Outcome 2*)

The Community partners who were interviewed all spoke positively about their experience.

"When I saw the creativity, the connection and connectivity it made me happy that people can learn from [my mother's] story. It's the best way for her story to be shown to the world"

"It was a therapy for me because... nobody has heard what happened to me. I felt so good that I have let it out."

Although some had been nervous about the way the project developed, and the use of their stories in a public space such as the Science Museum, they felt that their concerns had been sensitively listened to and their fears allayed.

"[The] team acted with the utmost decorum and sensitivity..."

"I was hesitant about my recording going into the Science Museum... but the recordings were done really well... the whole presentation told a story"

² <https://www.belbin.com/about/belbin-team-roles>. I'm not normally a huge fan of this but I think it provides a useful framework on this occasion.

Other commitments meant that some Community partners were unable to visit the exhibition and so their ability to engage with the final output was limited.

3.7 Venue (*Outcomes 1, 4*)

The fact that the exhibits were hosted in the Science Museum was a significant attraction for both scientists and community partners.

"I couldn't imagine that in my life I would end up [at the Science Museum]"

However, this was not mentioned by any of the artists.

3.8 Money (*Outcome 1*)

No interviewees mentioned the need for extra financial resources, suggesting that the money allocated to the project is adequate.

3.9 Timetable (*Outcome 1*)

The timetable to deliver the programme was very short. There is, of course, always a call for more time in any project of this sort but in this instance the short timescale, allied to the time of year, led to a number of stresses within the project teams which could have been avoided.

In this case the short timetable was exacerbated by the fact that the project was being delivered in the period June-September, which meant that it cut across the end of the academic year, when students from BMEIS and the RCA were producing final projects.

It is also a period where summer holidays mean that people's availability is more limited and so it was harder for members of the project teams to meet in the same place at the same time (whether physically or virtually).

4. Conclusion and recommendations

Overall, this was a successful project that delivered an excellent learning experience to the students involved. It treated community participants with respect and created exhibitions that visitors found engaging and intriguing.

When set against the outputs that were identified in the Evaluation Framework (Appendix 1) the findings suggest that:

- Students involved in the project teams, students who helped out as volunteers, and the core team were all able to elucidate their learnings
- Community partners did feel that the experience was valuable
- Community partners have not yet had a chance to feed back to the students what might have made their experiences better.
- Visitors to the exhibition were able to express what they had taken from it and did express a desire to engage further.

Recommendations

4.1 Timing (*linked to Finding 3.9*)

The core team have indicated that one option for ART x SCIENCE is to move it to the period February to June 2022. Two factors make me confident that this is achievable

The first is that the project team will be delivering the project in this way for the second time, and so they should be able to apply the learning from this year as they deliver it in 2022. The second factor is that the project teams will be more able to focus on their project because the timetable will not straddle the summer holiday or the busy period at the end of the academic year.

Therefore, although the project timing is still tight it should be easier to deliver than it was in 2021, when the team delivered high quality outputs.

4.2 Community Partners (*Finding 3.6*)

It is clear that the students and the community partners gained a lot from the experience, and this aspect of the project should be maintained. This can be made more effective by ensuring that Community partners who are not able to visit the exhibition in person are given an opportunity to engage with it e.g. via a video call during the exhibition or via photographs sent afterwards.

This evaluation should also be shared with the Community partners.

4.3 Venue (*Finding 3.2, 3.7*)

Any venue comes with a number of costs and benefits, and the Science Museum is no different. It brings an audience (although on this occasion not an enormous one) and has an undeniable cachet (although maybe more for the scientists and Community partners than for the artists). These factors come at a cost of being in someone else's space and being tied down by their rules, approach and agenda.

This means that some of the learning-about-exhibitions (see 3.1.2 above) might be better served by being in a more generic venue such as an exhibition stall elsewhere within the Great Exhibition Rd Festival. However, this is a secondary outcome that was not identified in the Evaluation

Framework and so on balance I would recommend that the project continues to use the Science Museum as a venue.

4.4 Volunteers (*Finding 3.3*)

The training that the volunteers received about the exhibition was not adequate to allow them to talk knowledgeably about the exhibits. This should be prioritised in order to ensure that they understand the “meaning” of the pieces as well as the science underpinning them.

4.5 Project team structure (*Finding 3.1, 3.4*)

Project teams should be given more advice on how to structure themselves. My recommendation is that Project teams identify three roles: a Project Manager/budget holder, a Scientific Director and a Creative Director (in teams of two people then the Project Manager will also have one of the other roles). Whilst it is important to recognise that the boundaries of these roles will remain fluid throughout the project, identifying them up front will lay the groundwork for a situation in the future when the question “who has overall responsibility for this?” gets asked.

4.6 Project team location (*Finding 3.2*)

The fact that the *In Utero* Project team was spread across countries and time zones made things much harder than they might otherwise have been. Given that this is a site-specific project I recommend that the application form states that members of the Project team should be based in London, or at the very least that (barring emergencies) they should be able to attend the rehearsal and installation.

4.7 Core team role (*Finding 3.5, 3.8*)

The core team’s knowledge and experience are a key resource for the Project teams. I recommend that the core team impose some more structure on the creative process so that the Project teams have a clearly laid out timetable that they are working towards. It is in the nature of these projects that this timetable will frequently be ignored but it will provide a reference point that the core team can use to focus discussions as the process develops. This will allow the core team to be clearer about which of the roles they are “supposed” to be playing at any one point in the process, and will enable the learning about projects to embed itself more as the Project team works its way through the project.

Appendix 1: Evaluation Framework				
Long term "Impacts"	Medium term "Outcomes"	Short term "Outputs"	Indicators	Methods
What is the project trying to do in the long term?	What is the project trying to do in the medium term?	What is going to happen in this project for whom?	How would the organisers know they had done what they are trying to do?	How can we get the data to demonstrate this?
To provide an opportunity for cross disciplinary learning between the RCA and CDT students, to create a space for participating students to listen and learn from relevant community groups and to engage members of the public through creativity, provoking conversations about our health and medical imaging research to increase the transparency and inclusivity of research.	To create an opportunity for RCA and CDT students to learn from each other's disciplines, practices and perspectives... develop their ability to collaborate with practitioners from different disciplines to deliver high quality creative outputs relating to scientific research... develop their public engagement and communication skills	RCA and CDT students will collaborate to produce and deliver an exhibit at the Festival	Students will be able to elucidate their learning	Post event interviews with exhibit leads (ie 2 artists +2 scientists) touching on overall experience, learning about PE, new insights for their research.and liaison with community groups
	To develop the students' experience and skills in meaningful community engagement with local partners for mutual benefit	RCA and CDT students will engage with community partners to develop an exhibit at the Festival	Students involved in the project teams will be able to elucidate their learning Community partners will feel that the experience was valuable from their point of view and will have a chance to feed back to students what might have made it better	Post event survey of project teams touching on overall experience, learning about PE, liaison with community groups, and new insights for their research. Post-event survey with community groups touching on feelings about the process and the eventual exhibit
	To spark visitors' curiosity into and increase their awareness of research in the field of medical imaging	Visitors to the exhibit will engage with the content and will want to engage more afterwards	Visitors will be able to express what they have taken from the exhibit and will express a desire to engage further	Feedback wall Observation of Festival stand

NAVIGATOR CONSULTING – ART X SCIENCE Evaluation Report – December 2021

	<p>To increase the researchers' understanding of the public's perspectives, hopes and fears relating to their research</p>	<p>Researchers will be exposed to a variety of public views. NB Includes attendees at the workshop, and Festival volunteers.</p>	<p>Researchers will be able to elucidate their learning</p>	<p>Post event survey of Festival volunteers and workshop attendees touching on overall experience, learning about PE</p>
	<p>To influence the future public engagement projects between the CDT and RCA</p>	<p>The project team will deliver and reflect on a project</p>	<p>Organisers will be able to elucidate their learning</p>	<p>Post-event wash-up meeting with Bella, Deanne and Hannah touching on learning for future iterations of the project</p>

Appendix 2: Visitor Feedback Cards transcribed verbatim as far as possible <i>Key [xxxx] = drawing. xxxlyyy = obvious new paragraph</i>
How did the use of art impact your understanding of science?
Julia, Thank you for taking your time to explain your work and piece. So much yet to discover. Rev
I did not realise how much the baby moved in the womb until I saw the film
[Drawing] This is a bad drawing of a baby in a womb (looks like a kidney). \Better spacial awareness. \Images and illustrat of processes improve learning.\ 10/10/21\ Lora, 18 Today\ Shoutout Bulgaria!
Looking at Children's brain to see the world as children see it.
By translating the emotive elements of biology (Hidden stories of the heart)
It helped me view it from a different perspective.\Very interesting
Provided visual interpretations and sensory experiences of the scientific research. Very cool, thank you!
This show the interwoven nature of everything in life\The various art works (heart) highlighted by the pulse lightnings (electricity) shows the nature of what goes on in the body (science). This is beautiful and there should be more of this\Sesun
Hidden stories of the heart. It was quite fascinating to see visualized the marked differences in the heart as effects of trauma. When people hold their chest during emotional times, this exhibition gives meaning to that. Bravo!
It shows you was is including science
Imagine a world where everyone could get an MRI a few times a year
Absolutely stunning. It came from science engineering, but completely different. Beautiful and fragile.\There should be a soundtrack of all different body parts. Heart, stomach, kidney, how they work together is like an orchestra. How our body functions is similar to it.
In Hidden Stories of the Heart\The music and the lights help you connect with the physical changes the heart undergoes [arrow] you are aware of the change through sound and sight rather than just reading text and trying to make sense of it.\Sensory experience of the transformations
[drawing of a baby in a womb and a heart within a pair of headphones] Athina\Anika\Helena\ a complex concept explained visually and cereatively. It helped us gain appreciation for a topic we weren't initially educated in and something we now want to learn more about \ Hearing personal accounts gave a more relatable perspective and allowed us to see how it related to everyday life.
Let me imagine and picture things more easily. It helped me understand more.
It helped me gain a more holistic understanding of the impact of trauma (and especially how <u>complex</u> it is) on our precious hearts.\Thank you for putting this together.\Lucy
Created an emersive experience abd allowed me to understand and appreciate our underlying mechanisms
Amazing Exhibition\very powerful to see motherhood through the veil of science not just emotion. [five stars]
[Smiley face\Heart] Greetings!\Many fields overlap in a vast amount of cases\Combining two separate ones gives more understanding about both of them\-Gusie [heart]
The ability to take still images of the baby in vitro using an MRI and spinning them into video really astounded me as well as widening my understanding of what pregnancy is like for the mother & baby.
It enriched my [illegible] of the Nervous System and How the heart Shapes changes with our Emotions Carol
As someone who is 27 weeks pregnant, it was super awesome! We had a lovely time chatting with Julie, she taught us so much and was like a new parent therapist. \Thank you\ Alexis + Simon

What surprised you most about the medical imaging research?
Julia, It was lovely to talk to you about your research, it amazing research
[drawings of organs] Anatomy\Sebastian\Age 6 +3quarters
When I listened to the sound of the patterns w/heart disease, I almost could not tell that it's from someone with disease. This music is actually come from pain. And at the same time, it is calming and should be put in the playlist of the spotify "calm" music.
All the connections in the baby brain! The study about how mothers brains effect their babies brains was fascinating.
Really really proud of you Bella! Xx
Bella is amazing!!!
MRI can tell you about placenta health as well as the baby itself!\(and that babies sneeze0
The exhibition is something for me beyond this platform!\women's heart stories
So much movement!
The medical research is as challenging as any other field of research.\Most of the research does not make it to the clinic for years or ever.
[drawing of an ECG trace in a heart] Meeting Elizabeth the "heart" artist is amazing.
We are all one.\One with the universe.\There is no separation. There is no duality.\Just wholeness.
how much its developed over the years
The level of detail possible \ Also Grace Millett's music [smiley] (The one playing in the heart corner)
Hola cool museum \ lol
What was your main takeaway from the exhibition?
I understand that the body was is a very complicated thing to study
I realised that we know so little about the topic and felt very emotional about the importance of care for pregnant women fort the future. Thank you xxx
My main focus of the exeption was the womb one [drawings]
My takeaway was that if talented people put their efforts together thay can achieve amazing things
A cool way to get everyone interested in their health [heart]. Thank you for all your effort and time
Pleased to have attended this exhibition. It is a very lovely project - one that connects with the heart. Kudos to the artistes and scientists that put this together [heart] [drawing]
Hats off to Mama Fi [star]\Reminded me of my uncle Dr Fauz Ullah who's doing a great job in the cardiovascular field.
[pictures of stars, a moon and a tortoise]
had no idea that a mother's mental health during pregnancy can impact the baby's health as it grows. Saddened by the lack of support + research on the impact of a mother's mental health opn a growing baby [sad face]\Joey xx
That in the 19th Century their're was an unqualified doc. \When I grow up I will be a Qualified doctor and not con my patients
Elizabeth Falashade's exhibition really opened my eyes to how the human heart transforms as a result of Emotional Abuse
[drawing of a tooth with labels:] Tooth\Enamel\Crown\Nerves\Root Canal\Pulp Chamber
It is very decorative and amazing

Araya
[picture of stereotypical scientist with a lightbulb thinks bubble, next to a flower saying "hello", and a caterpillar saying "chomp"] Once upon a time, there was an old scientist who lived in an old rusty hut. One day he had an idea of making a art and science gallery place to put all of his old inventions. The place grew and grew until it turned into the SCIENCE museum.
New understanding of the strains on the condition of the heart.
It was great to learn about what research is being conducted in a "public friendly" way.\The exhibitions were food for thought without knowing specifics for the research.\Also all staff were knowledgeable about and friendly!
The exhibition showing the effect of emotional abuse on the heart was an elightening experience for me. \Well done to Mrs Elizabeth and her team!!!
Art can held people engage and be emersed in science in fun and enjoyable way
We all benefit from knowing more about health in pregnancy [heart]
Elizabeth Falashode's exhibition opened my eyes to how the human heart transforms due to emotional Abuse
The body keeps the score \ The plight of women \ The power of women \ Women are amazing. What a brilliant exhibition.\ Thanks for centering women and mothers \ -mother baby activist