

UNBORN0X9

## **Future Baby Production**

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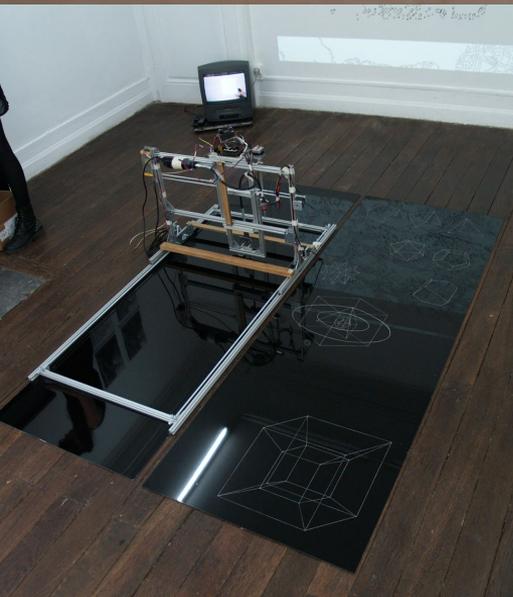
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Jérôme Dubois (echOpen - ultrasonic device engineering),

Vivien Roussel (thr34d5 - Biomaterial research & fabrication)

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UNBORN0X9 est un projet ART4MED soutenu par le medialab Makery et co-financé par le programme Creative Europe de l'Union Européenne.



artist \_ maker \_ biohacker

thr34d5

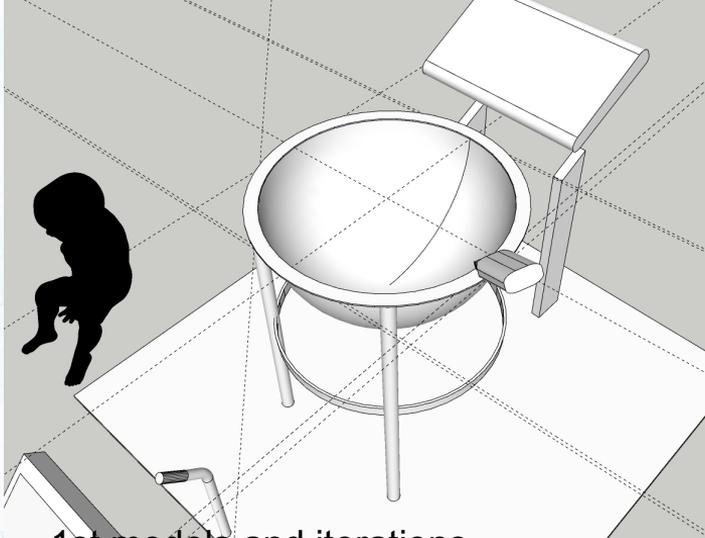
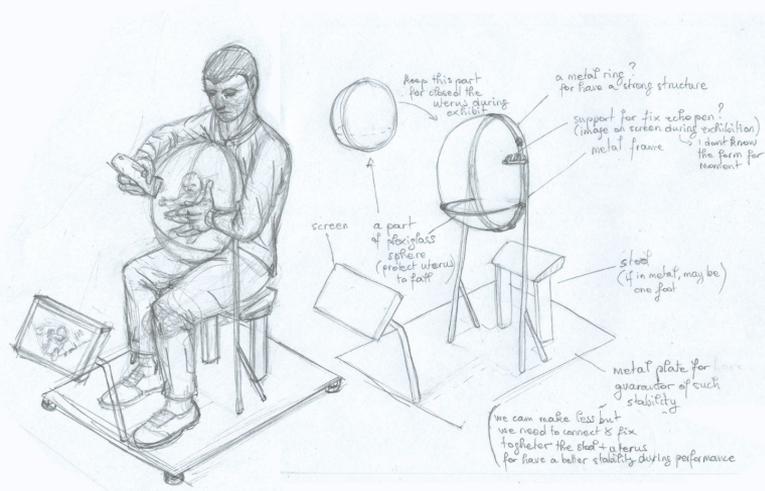
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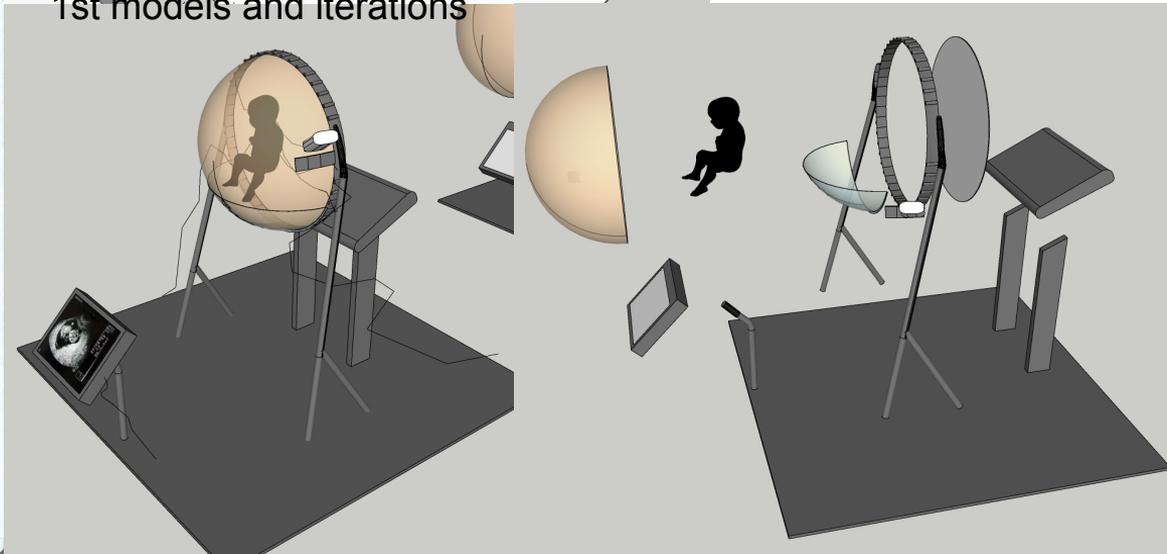
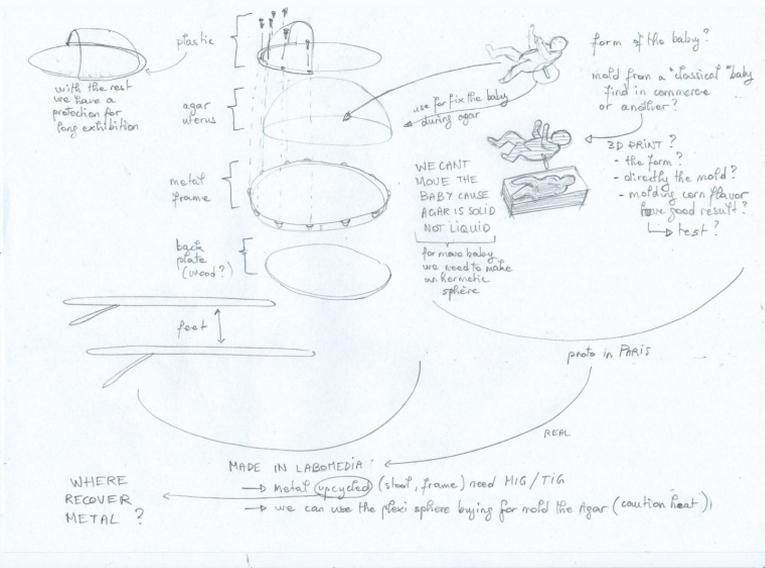
thr34d5.org

## Goals

- Make an echogenic cheap method with bio-plastic / or silicone
- Easy to use and replicable
- Easy to mold and form
- Flex but strong
- Can be used in water milieu (method use for Unborn0x9 prototype)



### 1st models and iterations



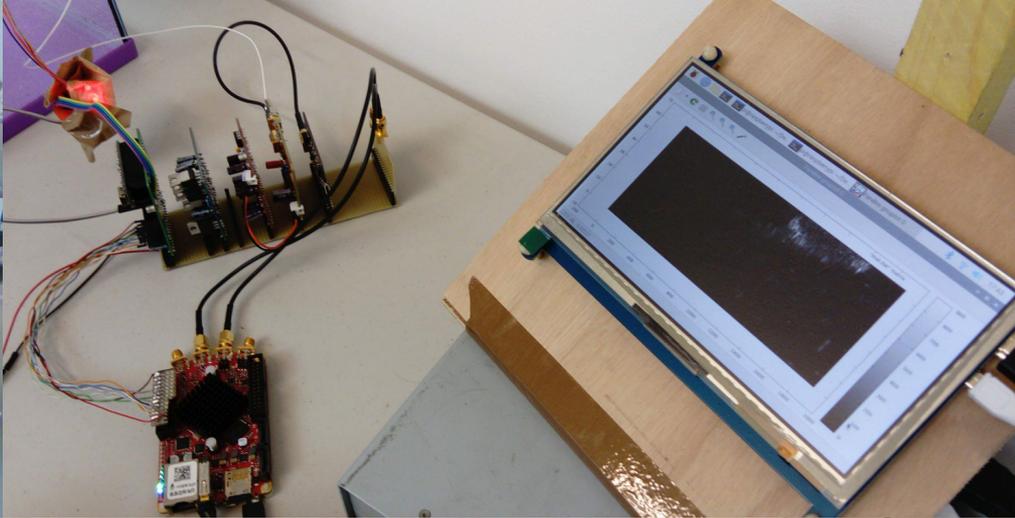
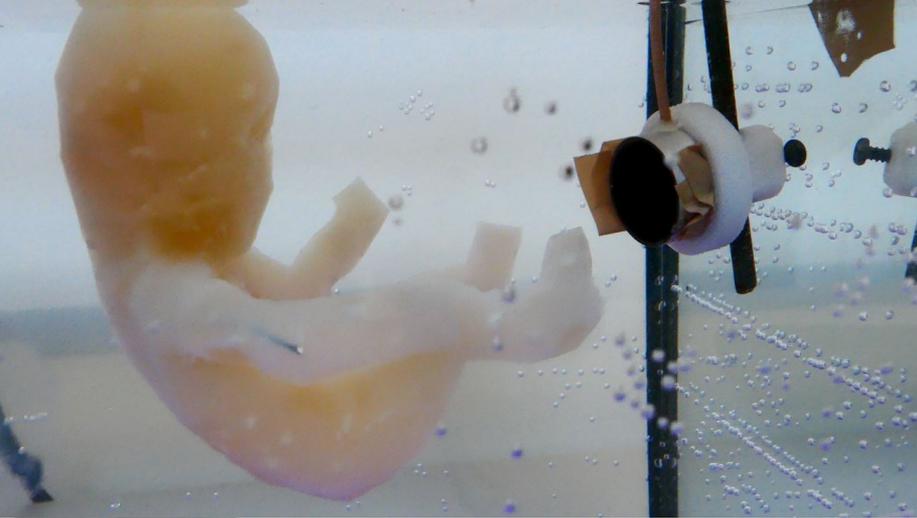
Test basic mold with 3d printing method and see if it's compatible



## Start

- Bioplastic Echopen research based on academic papers
- Tests and mix
- Addition of others biomaterials for better properties

Table 1 The optimal recipe and steps needed to make one 5% agar phantom.	
Materials	<ul style="list-style-type: none"><li>● Water* (750 mL)</li><li>● Agar 900 g/cm<sup>2</sup> (38 g)</li><li>● Latex tube/Analogues</li><li>● Flour (1 teaspoon)</li><li>● Stove/Microwave</li></ul>
Steps	<ul style="list-style-type: none"><li>● Mix 750 mL of cold water with 38 g of 900 g/cm<sup>2</sup> agar gel</li><li>● Stir until agar is suspended in water without clumps</li><li>● Briefly bring mixture to boil, stirring periodically</li><li>● Sprinkle 1 teaspoon of flour into mix, trying to avoid clumping</li><li>● Stir flour into mix until homogenised</li><li>● Using about half of the prepared mix, pour the base layer into mold</li><li>● Let set at room temperature for 20 min</li><li>● Prepare vessel analogues (tie ends and fill with water)</li><li>● Place analogues on base and pour remaining mix over them as the cap layer</li><li>● Let set at room temperature for 20 min (add glove layer if desired)</li></ul>
* Water cannot be boiled before addition of agar or the powder will irreversibly clump.	





5%.



10%.



15%  
+ 20% oil



20%  
+ 20% oil



30%  
+ 20% oil

## Problems

- what is Echogenic mix?
- Mold technics and materials resistance?
- Bioplastic don't like water, how isolate a biodegradable material from water?

(Because the scanning method choose in the project is water immersion)



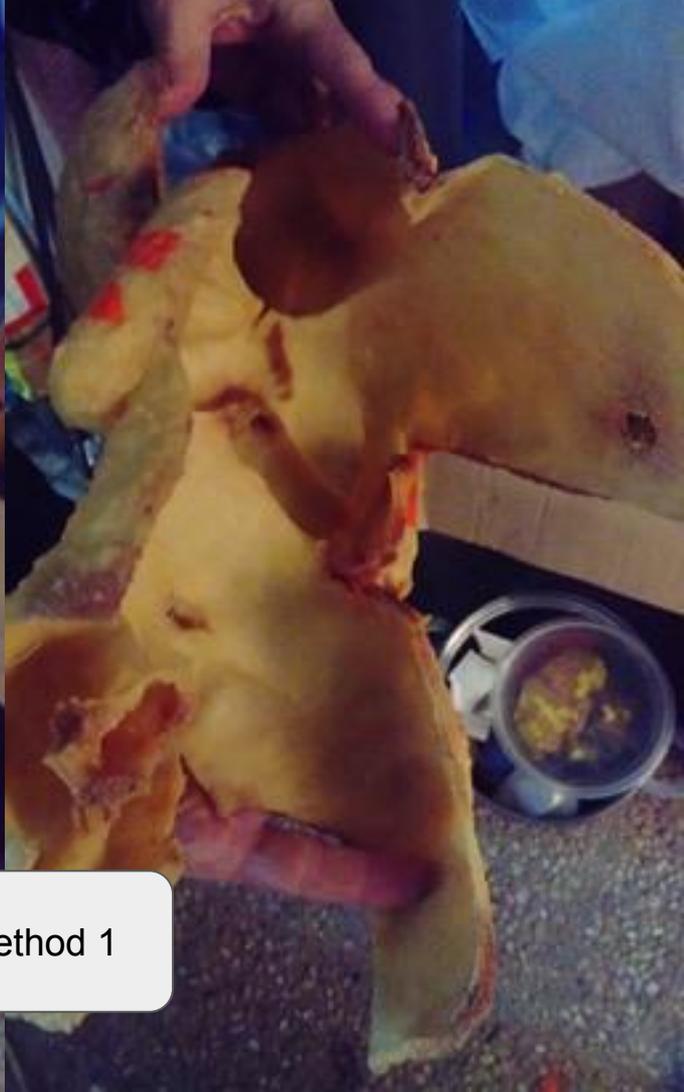
Echogenic





Echogenic





Mold method 1



Mold method 1



Problems

## How we fix ?

- Other researches from academic papers
- New tests and mixes with others biomaterials
- Gelatine test base and Bioplastics
- How to fix this problem of material in water? Spherization form molecular kitchen?
- We can use bioplastic to make great phantoms / but will need to use silicon/ cellulose for long exhibitions because the constraints are too important

Adding to agar other bioplastic for try to add new properties

Glycerine

Corn

Gelatine

Alginate  
+ calcium  
chloride

Chitosan  
+ vinegar

Use in  
plastification  
with cooking  
and bioplastic

Use for cool  
ceramic and  
glucosic  
chain

Use for  
ballistic test  
and for  
flexible  
bioplastic

Use for  
spherization  
effect in  
molecular  
food

Use for  
strongness  
and bioplastic  
mix

TEST 1

TEST 5



Gelatine  
1:1.5



Gelatine  
1:1.5 +  
Corn



Gelatine  
1:1.5 +  
Alginate



Gelatine  
3:2 +



Gelatine  
1:1.5 +  
Corn



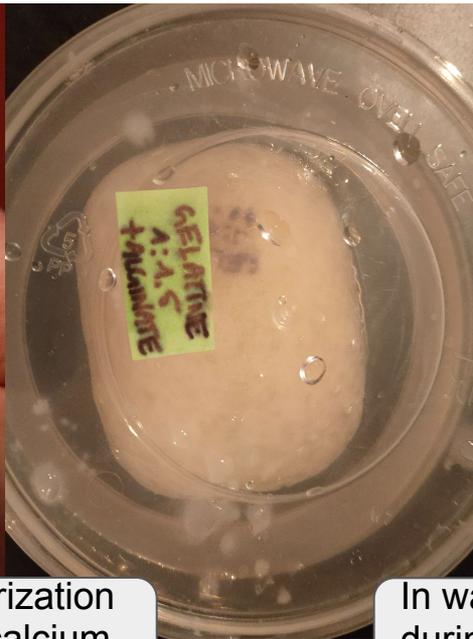
Gelatine  
1:1.5



Gelatine  
1:1.5 +  
Alginate



Spherization  
with calcium  
chloride



In water  
during 1  
week



