

# Finding a fETus with UltraSound (FETUS)

King's Health Partners Summer School

King's Health Partners Summer School #2021

6th July 2021

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Get source of this slides and see further references from <https://github.com/ofetus/us-simulator>



# Contents

Where, who, why?

Guessing Fetal Growth

Looking inside the human body

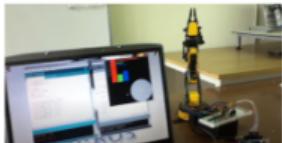
Simulating Ultrasound-Guidance Interventions

Takeaway messages / Surprises / Evaluation

# Who am I?



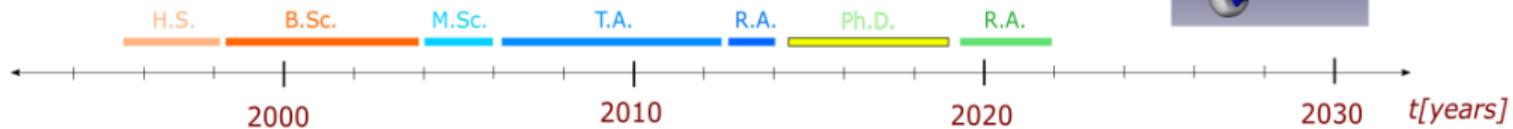
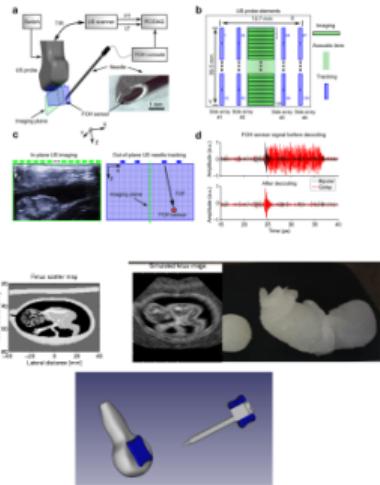
Miguel  
Xochicale



Ph.D. in Human-Robot Interaction  
University of Birmingham



Research Associate in  
Ultrasound Guidance Interventions  
King's College London



Who are we? / Where we come from? / Do we have hobbies?

**Zhanchong  
Ou**



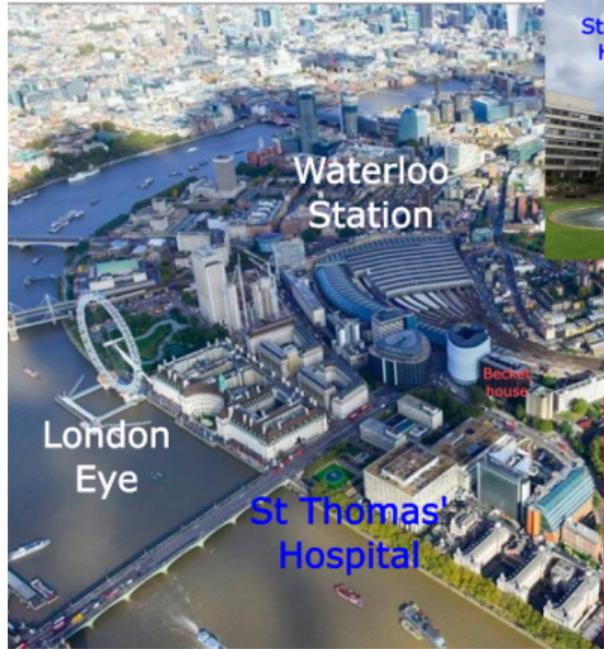
**Shu  
Wang**



**Miguel  
Xochicale**

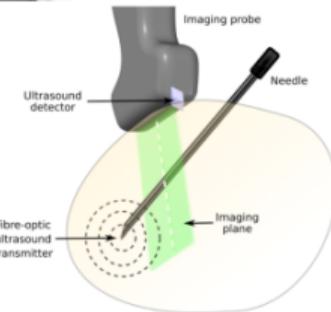
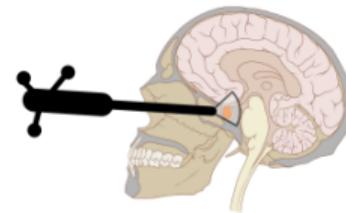


# Where we are based?

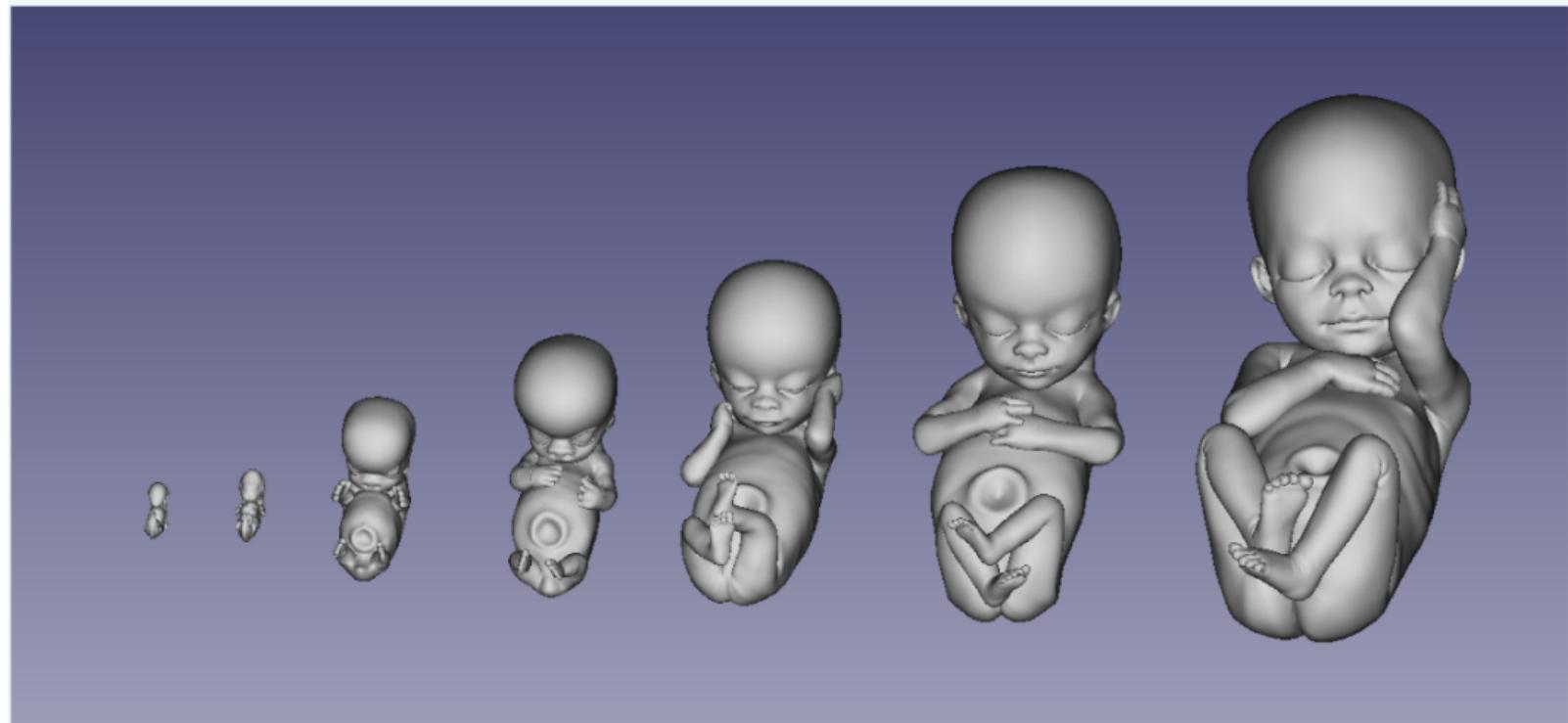


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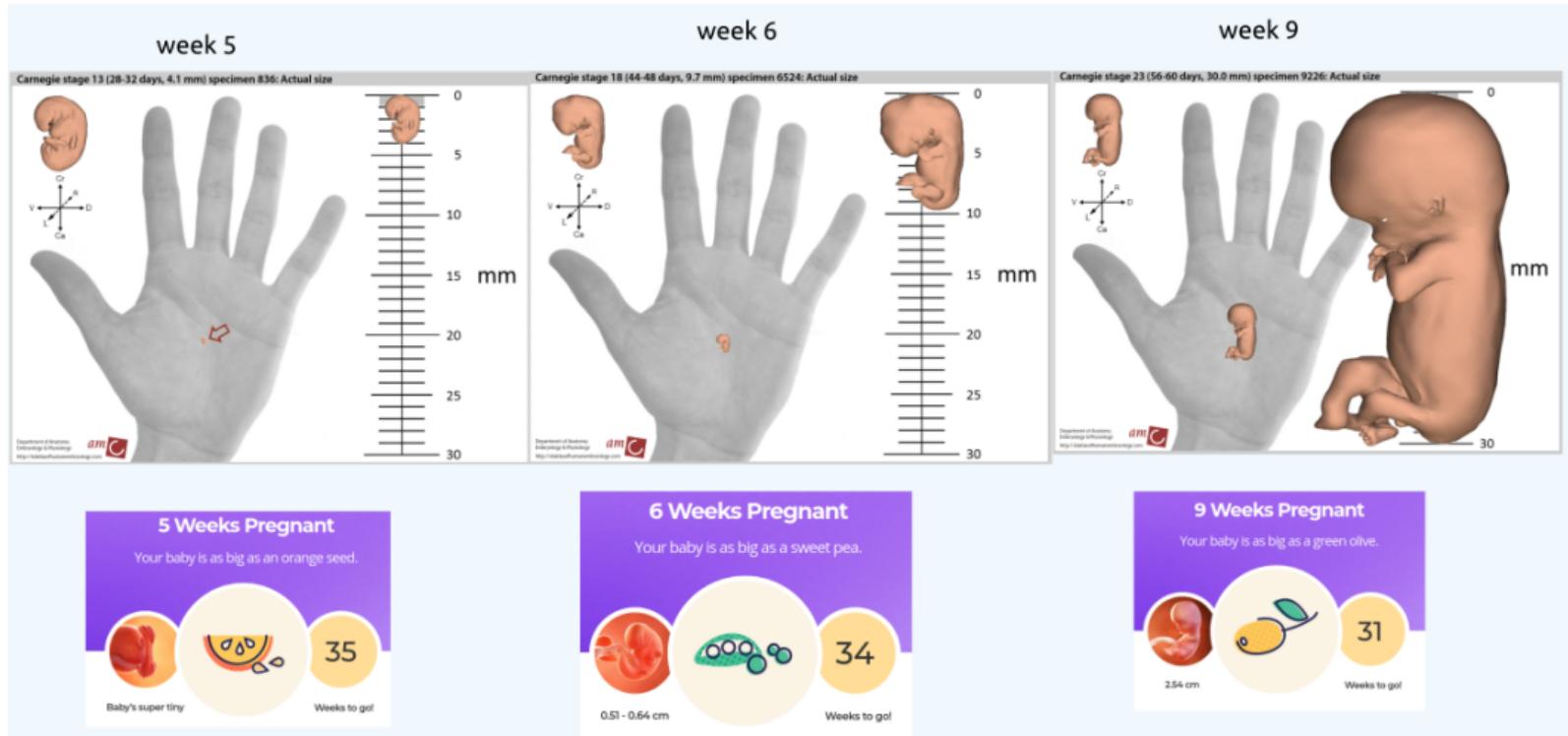
## Surgical and Interventional Engineering



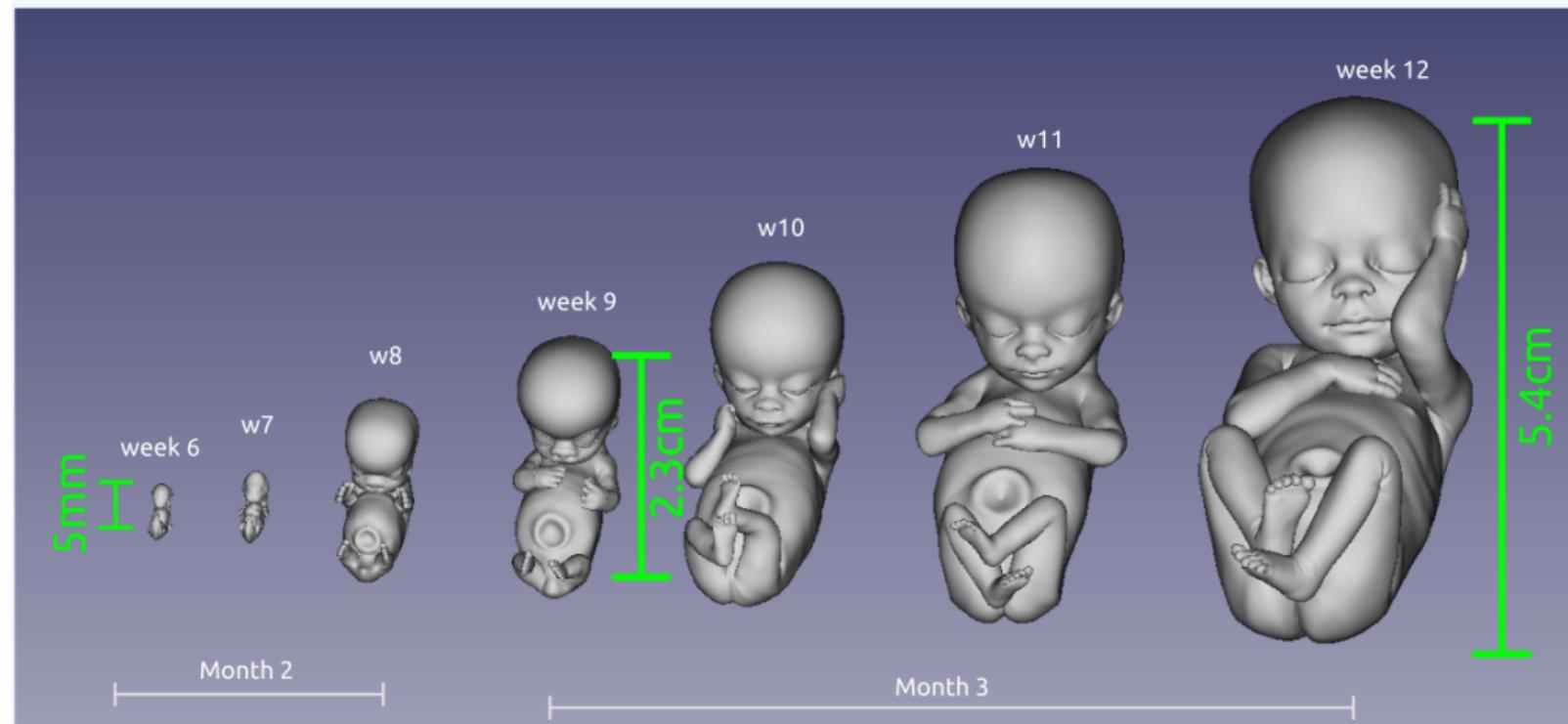
Can you guess the \*AGE\* of these fetus?



# Can you guess the \*SIZE\* of these fetus?



# Fetal Growth



# Medical Imaging in Pregnancy

CT

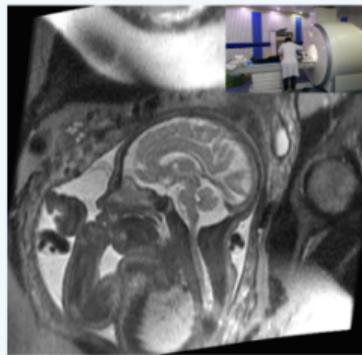


+ high image quality



- non-real-time

MRI



+ high image quality



- non-real-time

US



+ real-time



- poor image quality

# Ultrasound

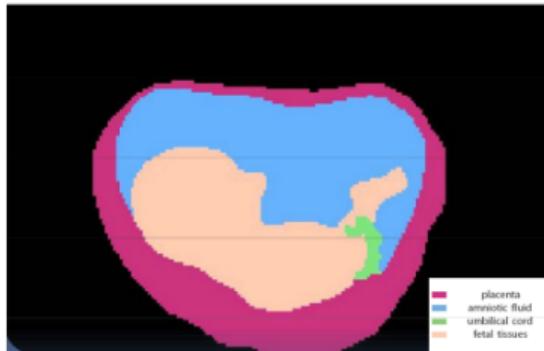


# Modelling US imaging

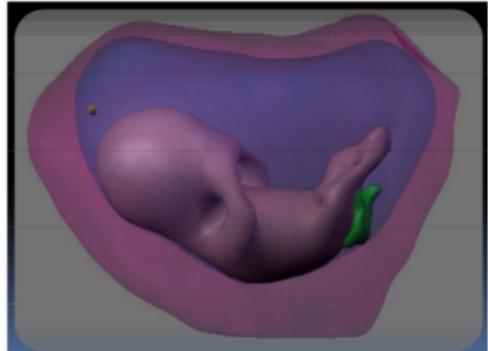
## Segmentation on 3D US data



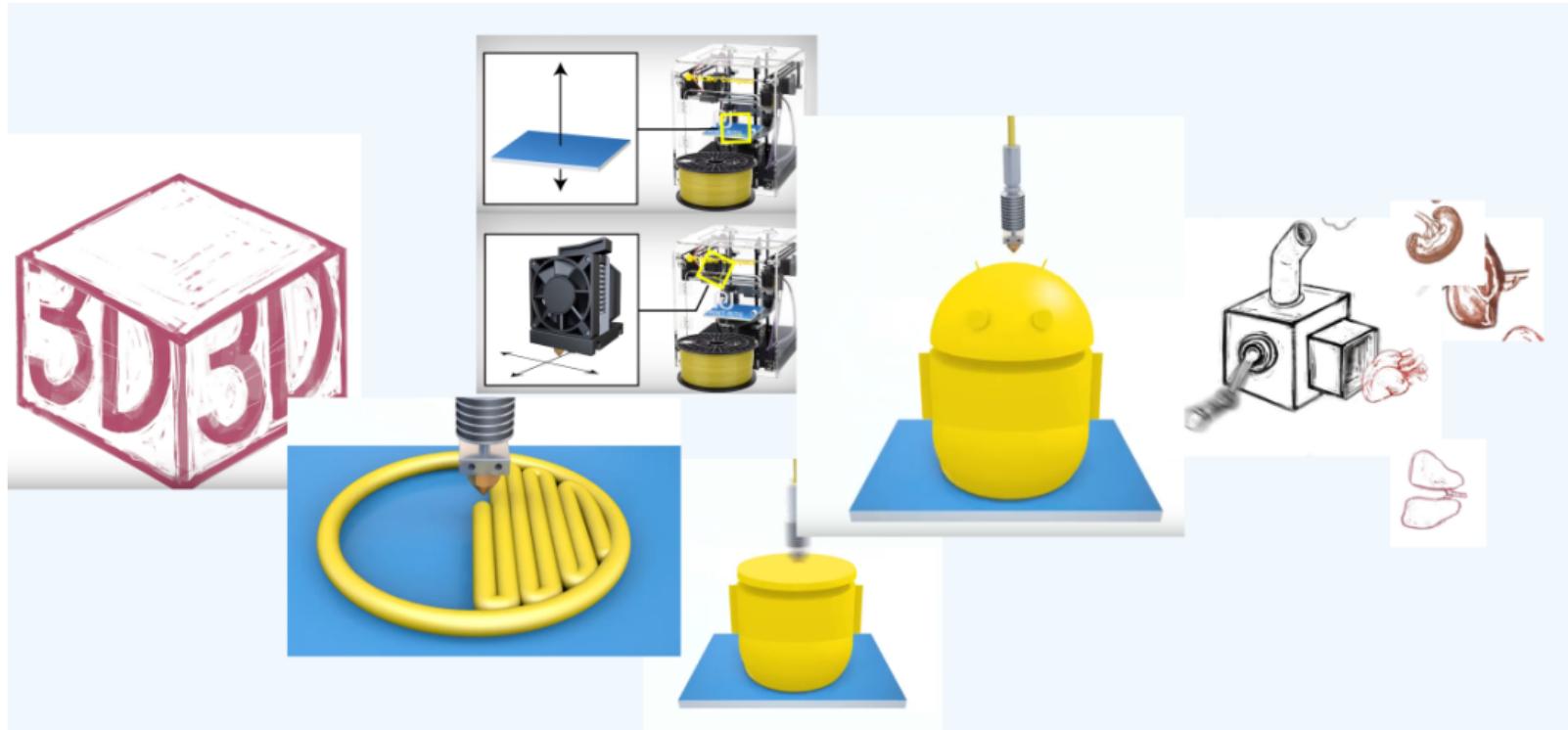
## Tissue Labelling



## Surface Reconstruction



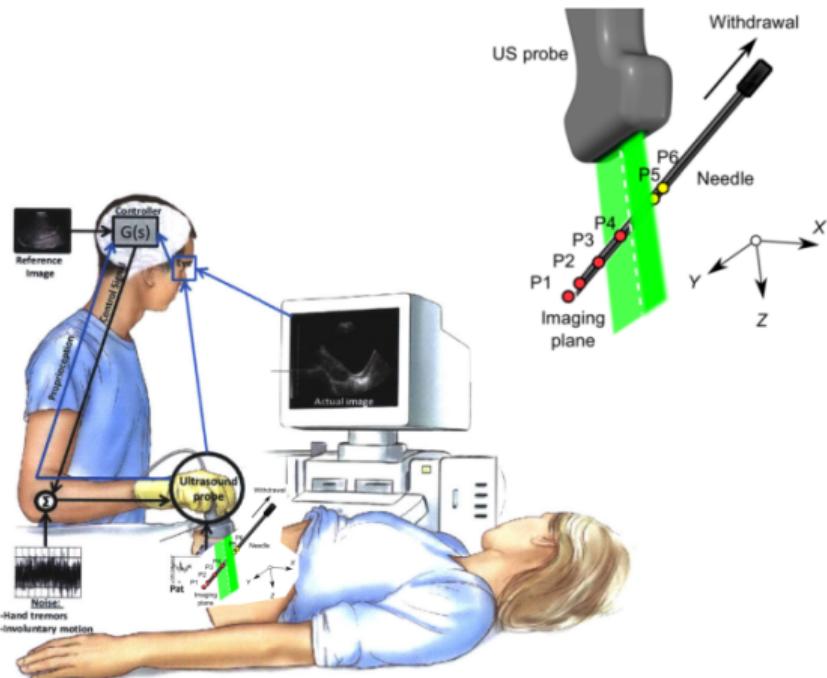
# How to do and Why to do 3D printing?



# 3D printing Fetus



# The sonographer-probe-patient control system



## Challenges:

- Tracking needles
- Skillfullness of sonographers
- Anatomical view changes

# Simulator for Ultrasound-Guidance Interventions

Training in-plane/out-plane needle tracking



# Takeaway messages / Surprises / Evaluation

## Takeaways

- Fetal development
- Ultrasound imaging
- 3D printing
- US needle tracking

## Souvenirs



## Evaluation



## Acknowledgements



Miguel  
Xochicale



Shu  
Wang



Ou  
Zhanchong



Fang-Yu Lin

...



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Surname



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Anna  
David



Tom  
Vercauteren



Wenfeng  
Xia

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