

# 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 slide and see further references from <https://github.com/xfetus/us-simulator>





# Who am I?



Miguel  
Xochicale



H.S.

B.Sc.

M.Sc.

T.A.

Ph.D.

R.A.

2000

2010

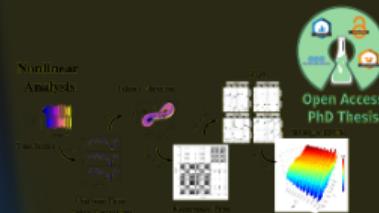
2020

2030

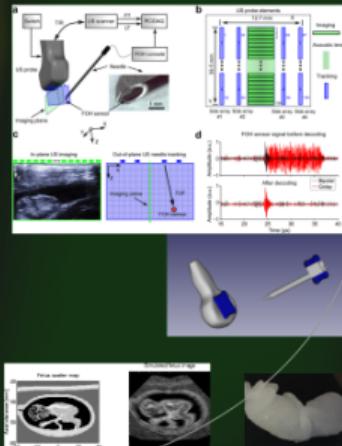
$t[\text{years}]$



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



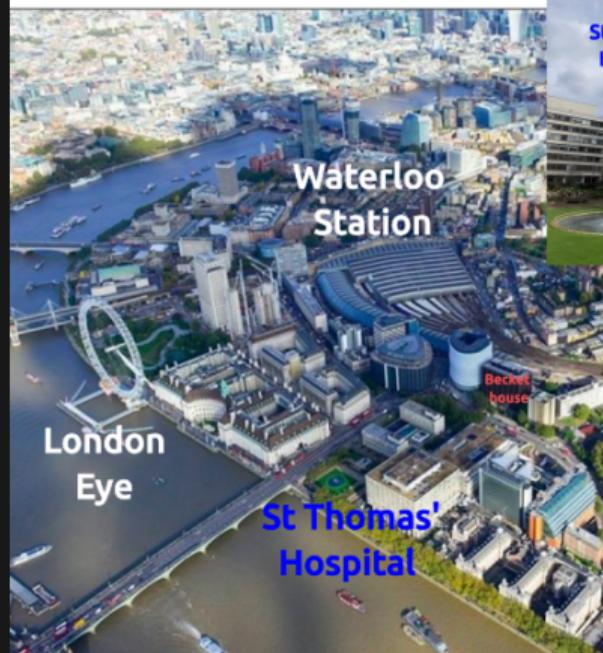
Shu  
Wang



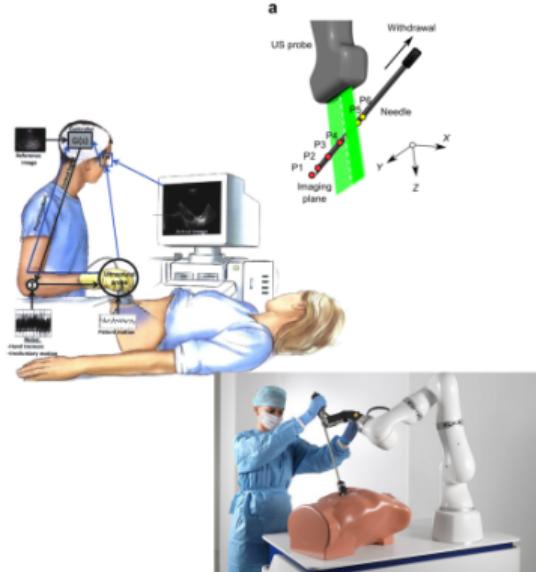
Miguel  
Xochicale



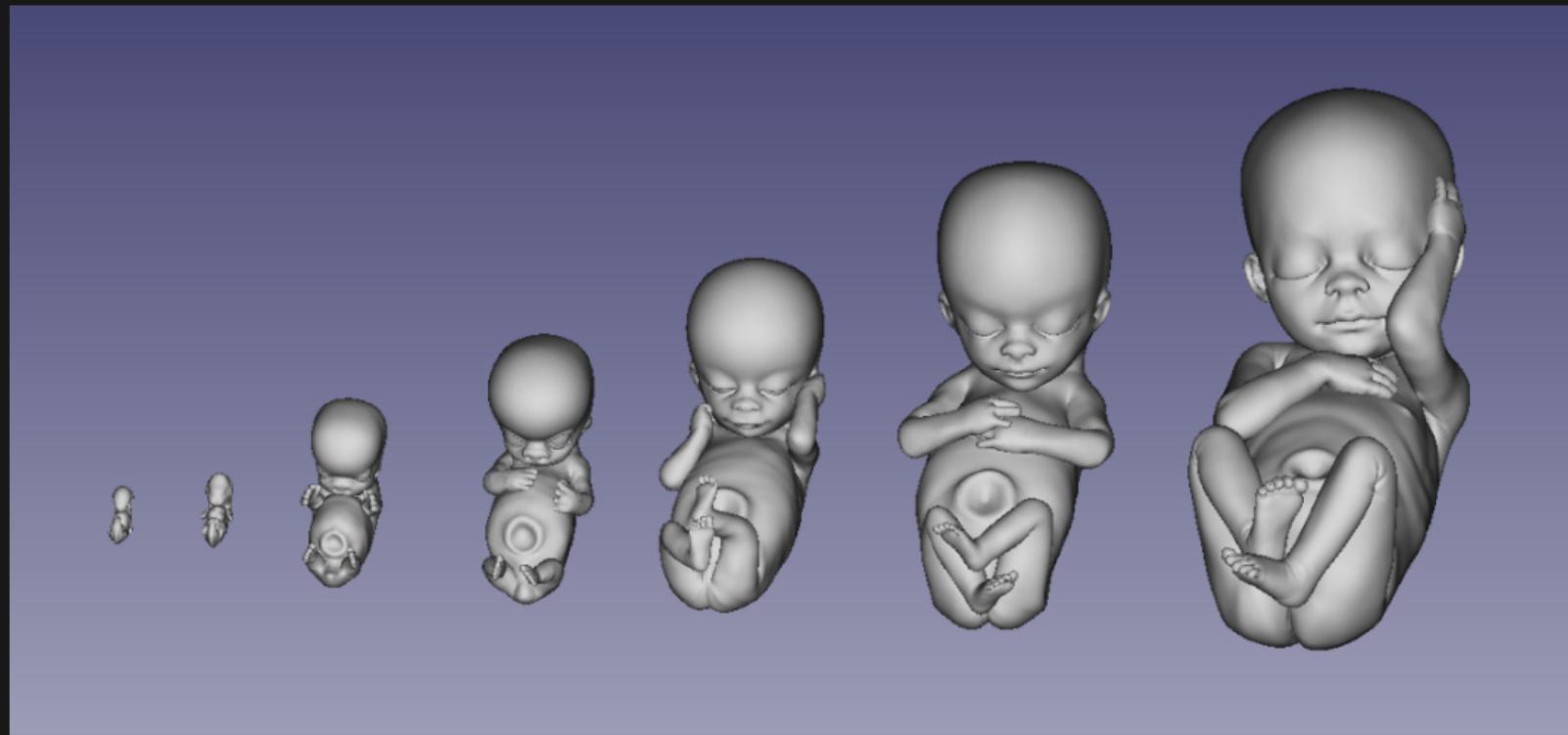
# Where we are based?



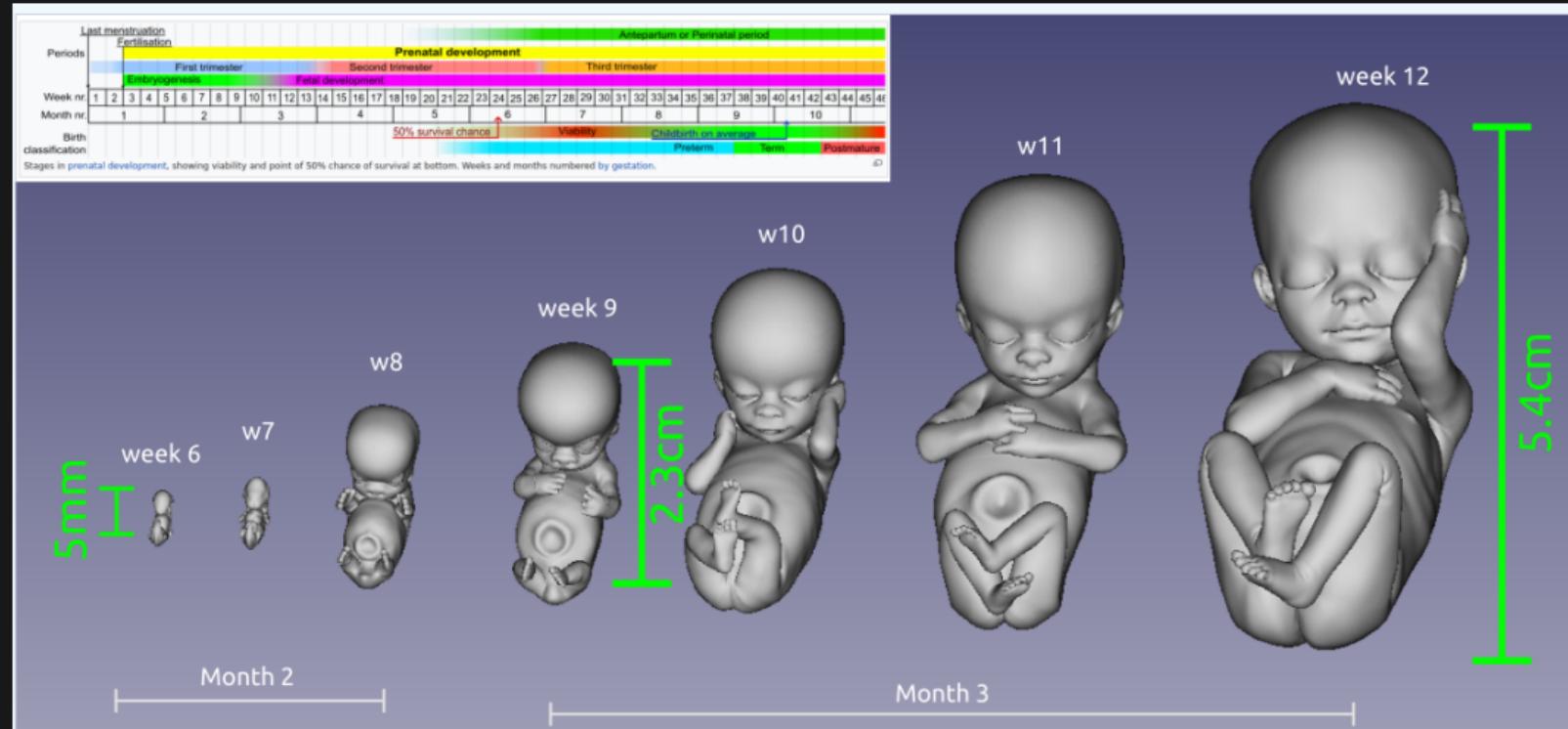
## Surgical and Interventional Engineering



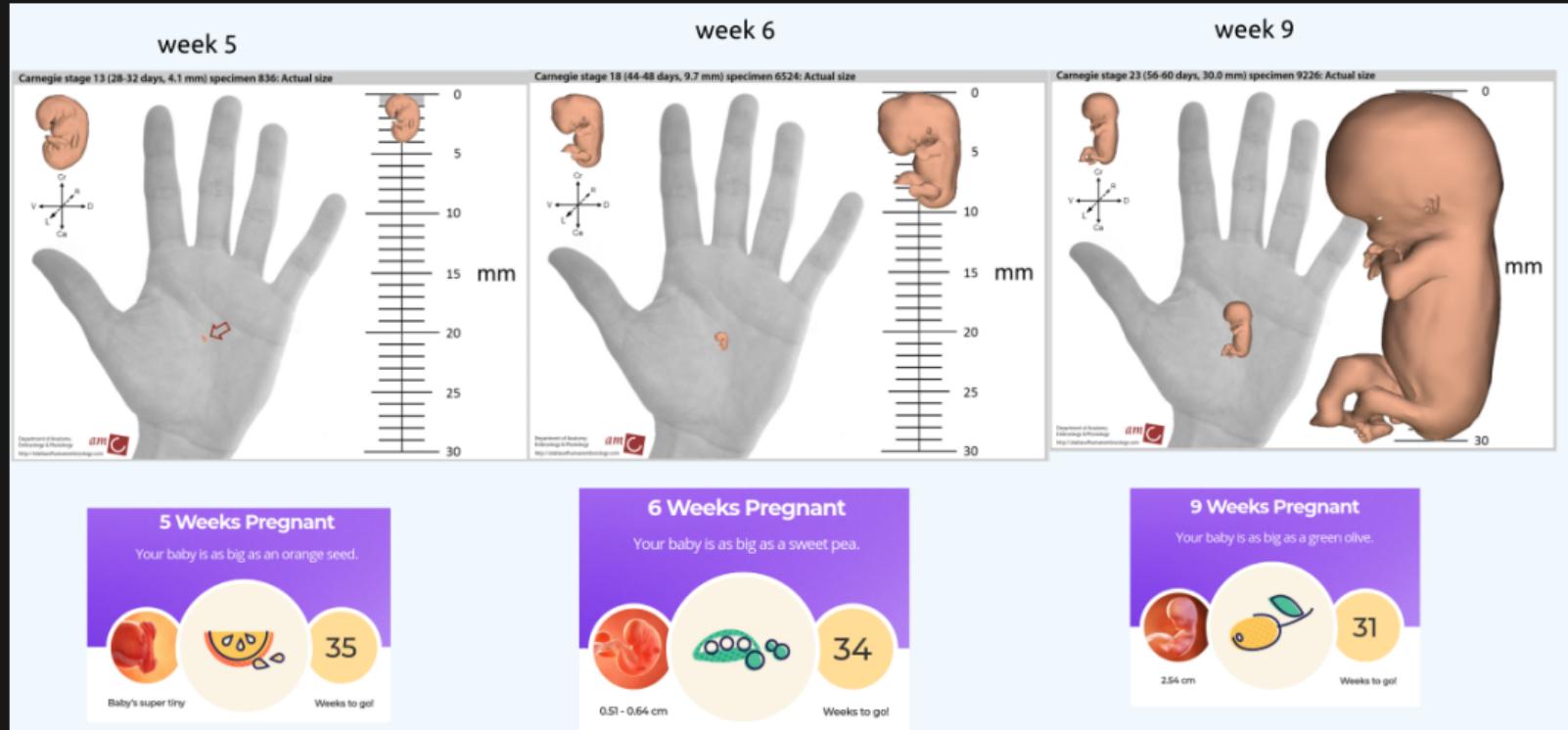
Can you guess the \*AGE\* of these fetus?



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



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



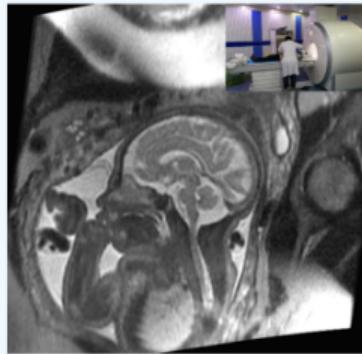
# Medical Imaging in Pregnancy

CT



+ high image quality  
- non-real-time

MRI



+ high image quality  
- non-real-time

US



+ real-time  
- poor image quality

# Ultrasound

# Ultrasound



# Modelling US imaging

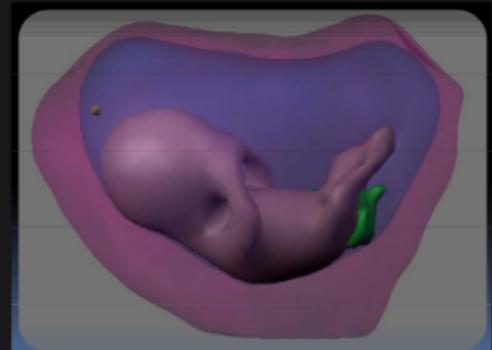
## Segmentation on 3D US data



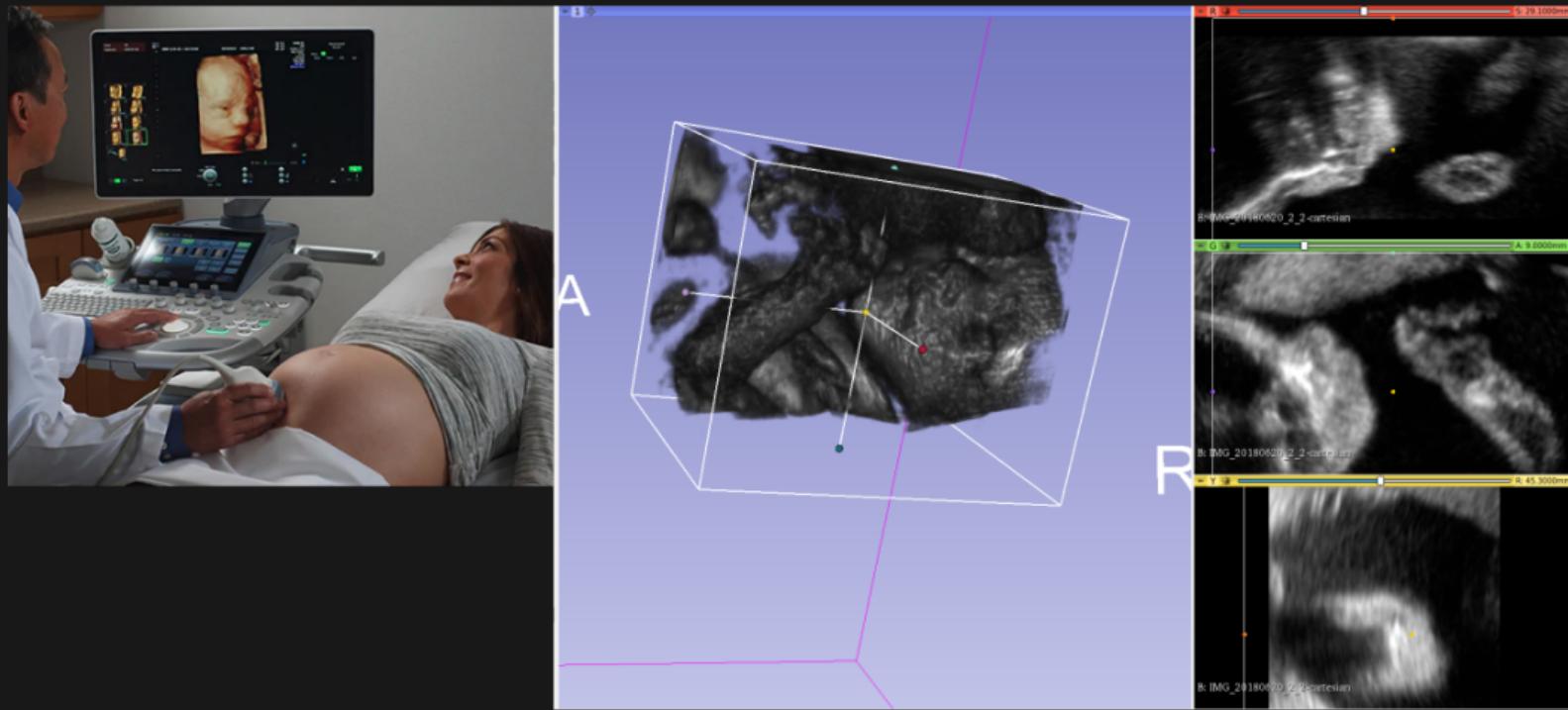
## Tissue Labelling



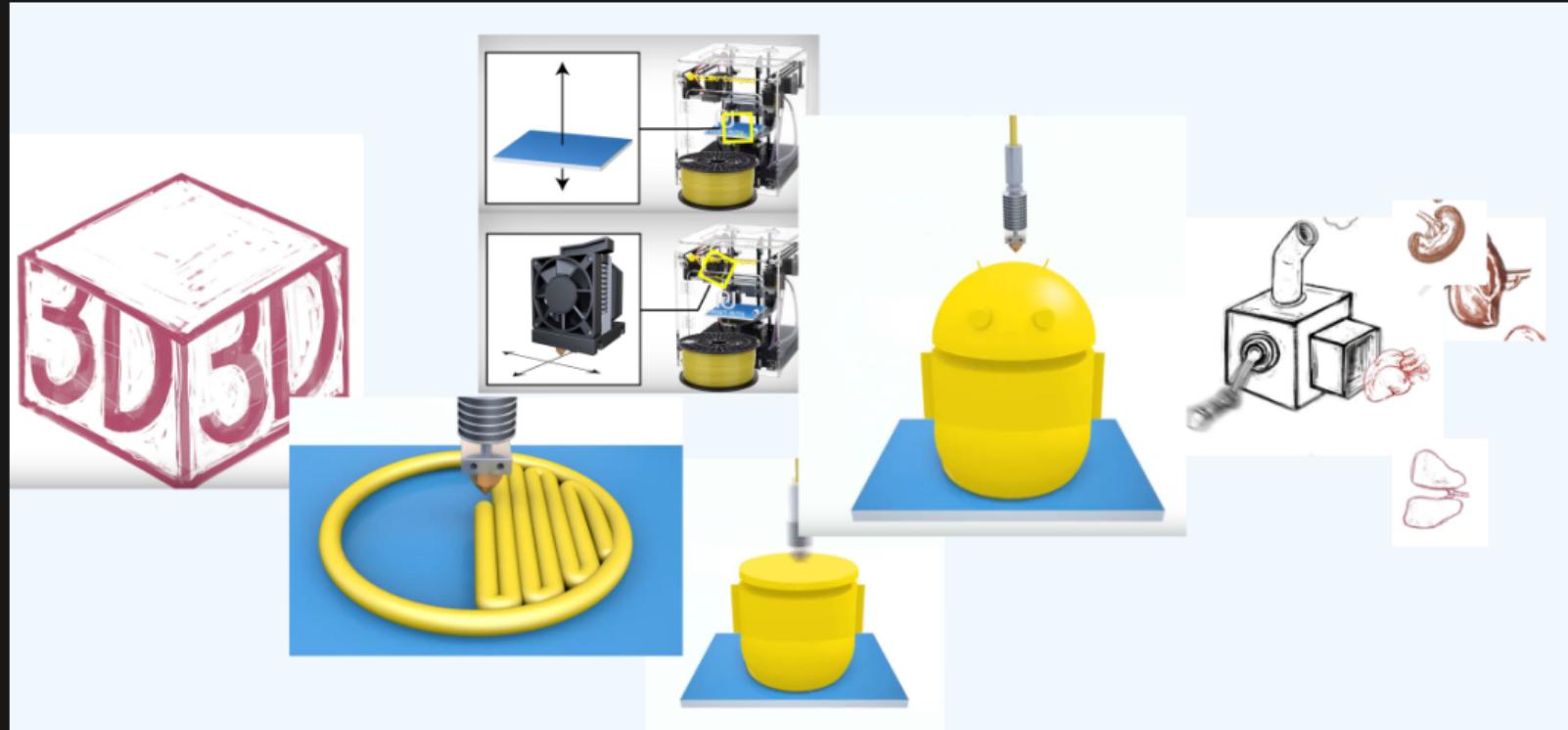
## Surface Reconstruction



# Interactive US imaging



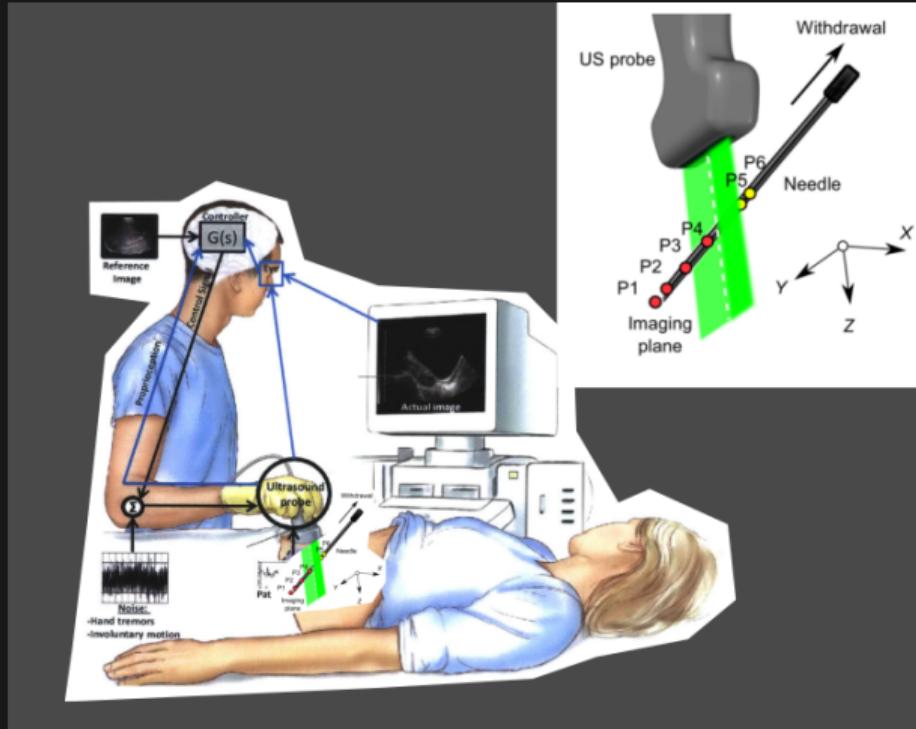
# How to do and Why to do 3D printing?



# 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

# GIFT UNT team Surg



Miguel  
Xochicale



Shu  
Wang



Ou  
Zhanchong Fang-Yu Lin

...



Name  
Surname Name  
Surname Name  
Surname ...



Anna  
David



Tom  
Vercauteren



Wenfeng  
Xia

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