

Finding a fETus with UltraSound (FETUS)

King's Health Partners Summer School

King's Health Partners Summer School #**2021**
6th July 2021



Shu Wang, Ou Zhanchong, and **Miguel Xochicale**

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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.

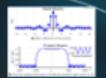
2000

2010

2020

2030

$t[\text{years}]$



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

Nonlinear
Analysis

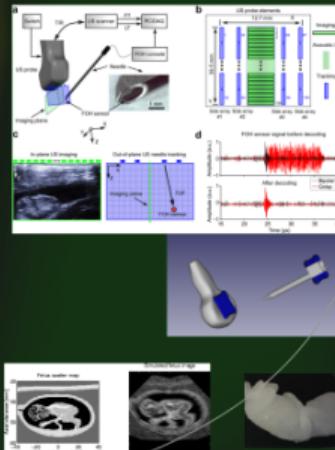
Time Series
Feature Extraction
Machine Learning

Feature
Selection

Classification



Research Associate in
Ultrasound Guidance Interventions
King's College London



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

Zhanchong
Ou



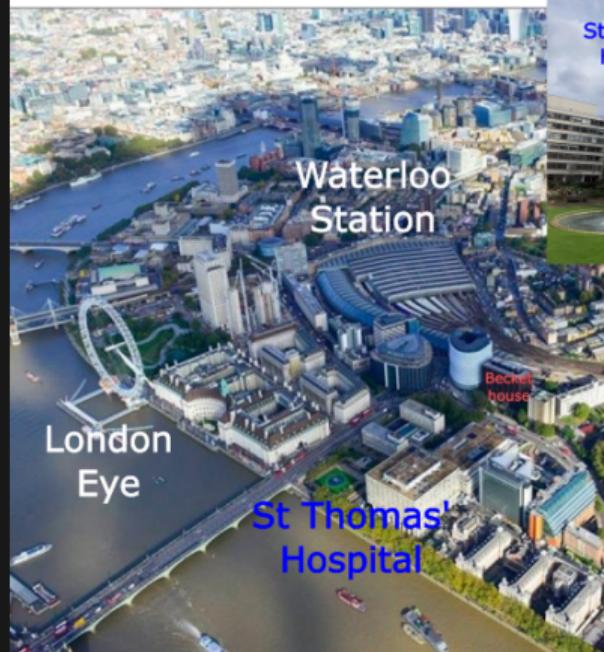
Shu
Wang



Miguel
Xochicale

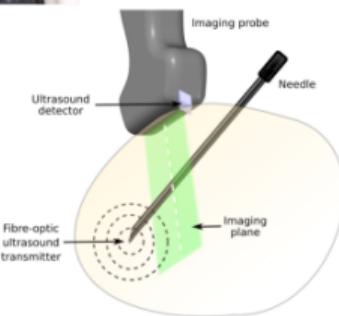
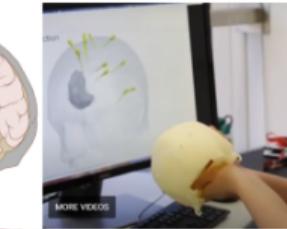
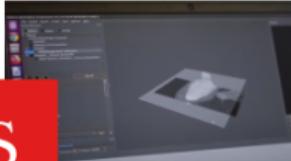
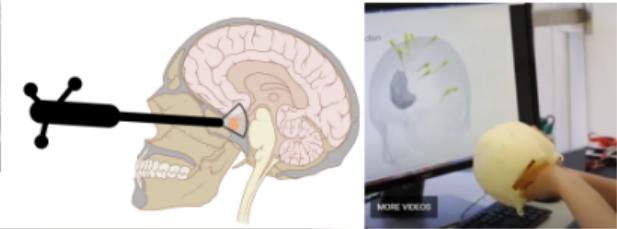


Where we are based?

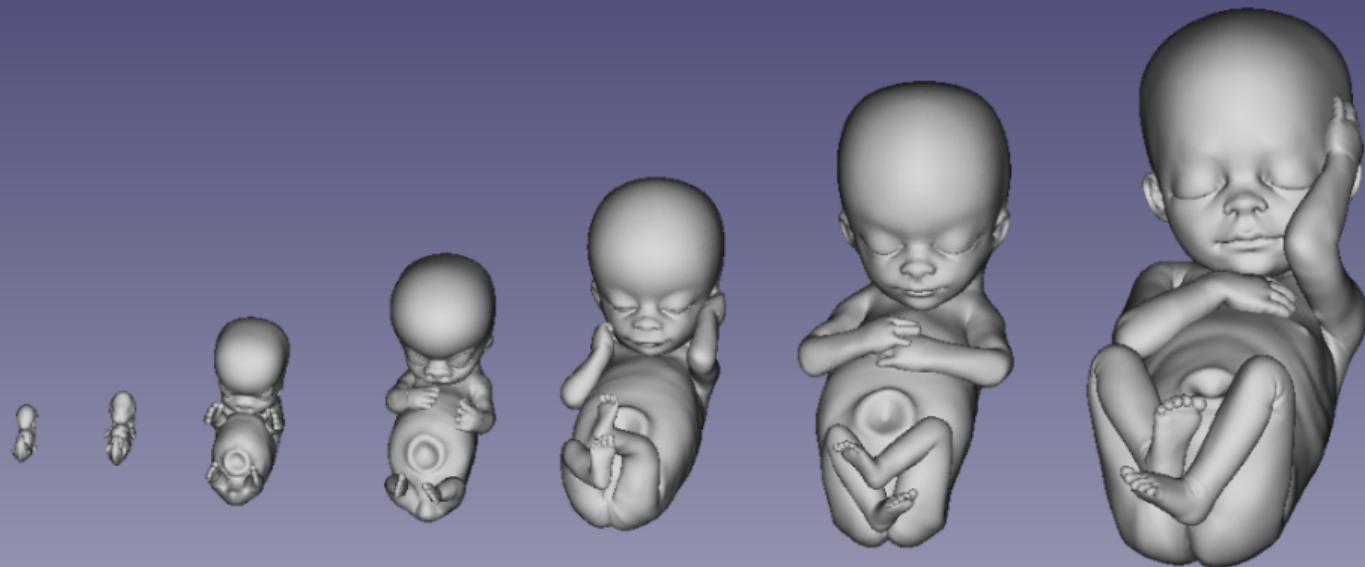


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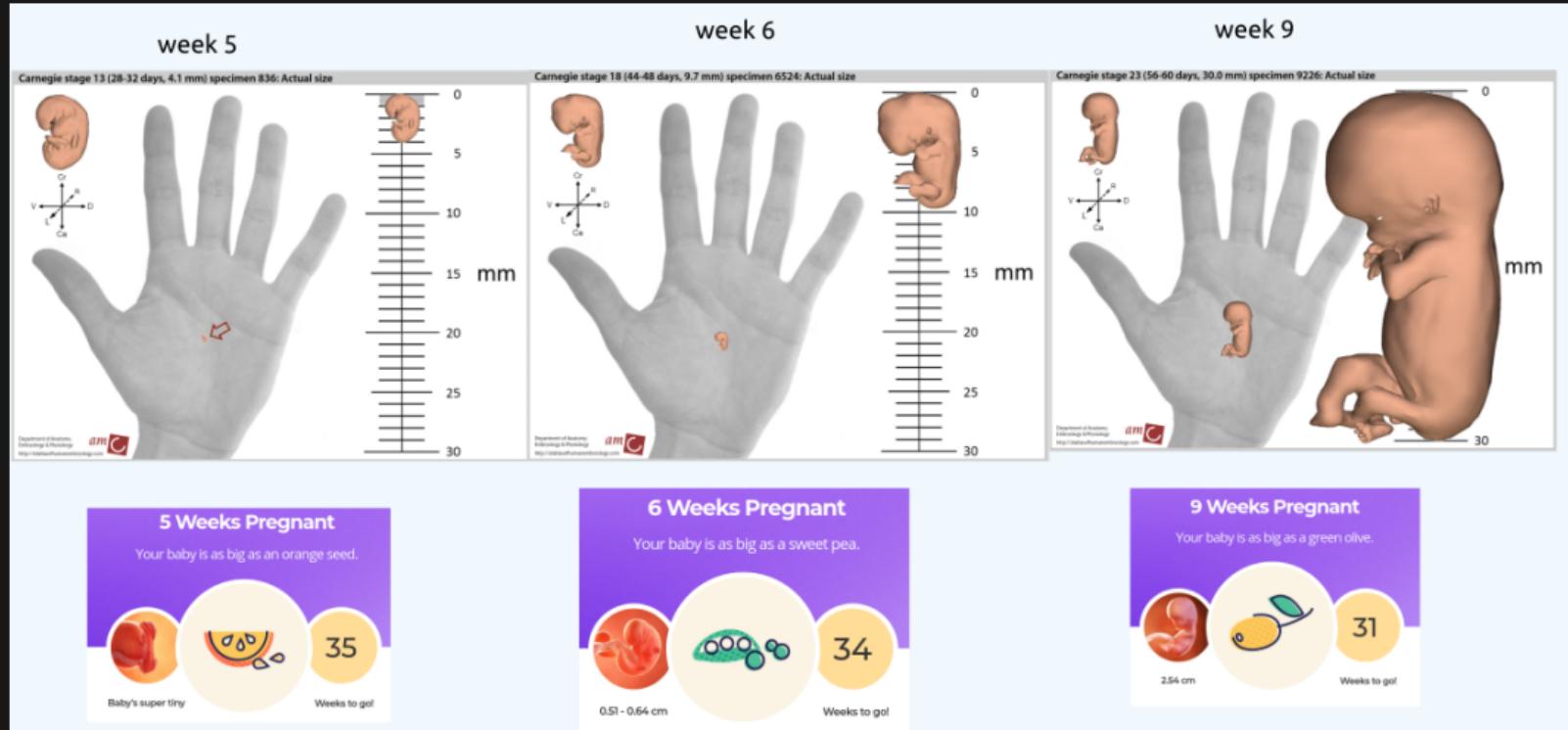
Surgical and Interventional Engineering



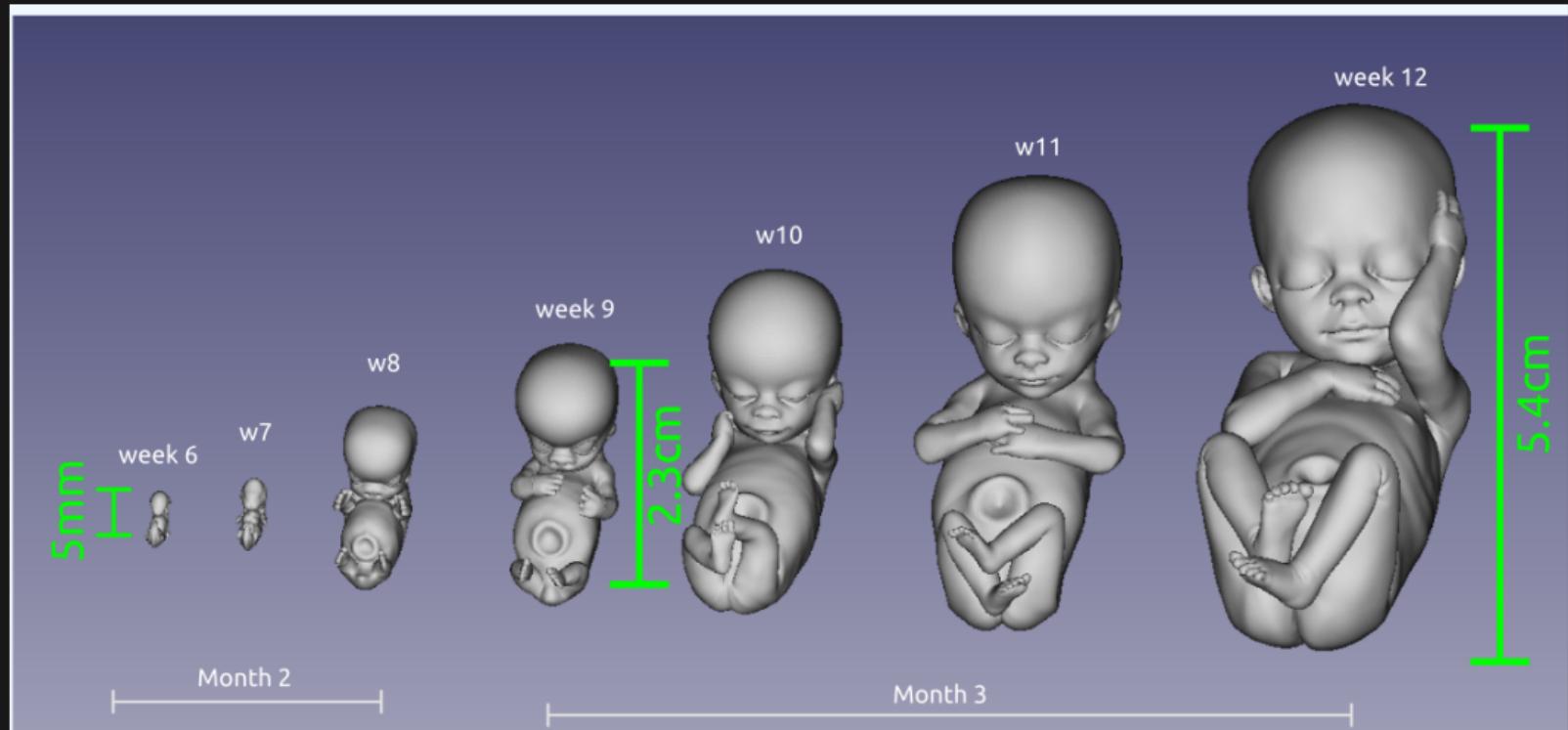
Can you guess the *AGE* of these fetus?



Can you guess the *SIZE* of these fetus?



Fetal Growth



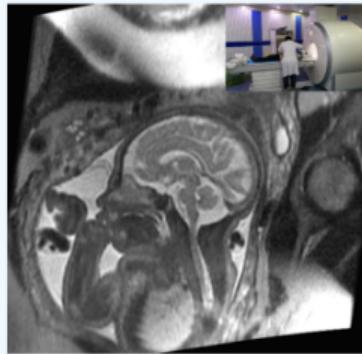
Medical Imaging in Pregnancy

CT



+ high image quality
- non-real-time

MRI



+ high image quality
- non-real-time

US



+real-time
- poor-image quality

Ultrasound

Ultrasound



Modelling US imaging

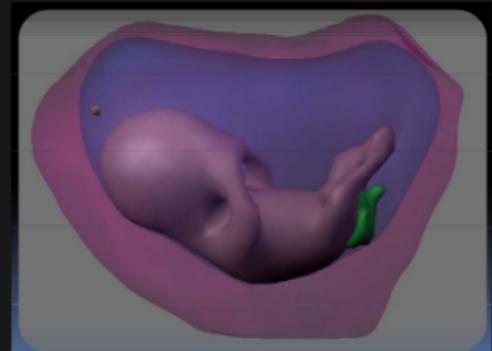
Segmentation on 3D US data



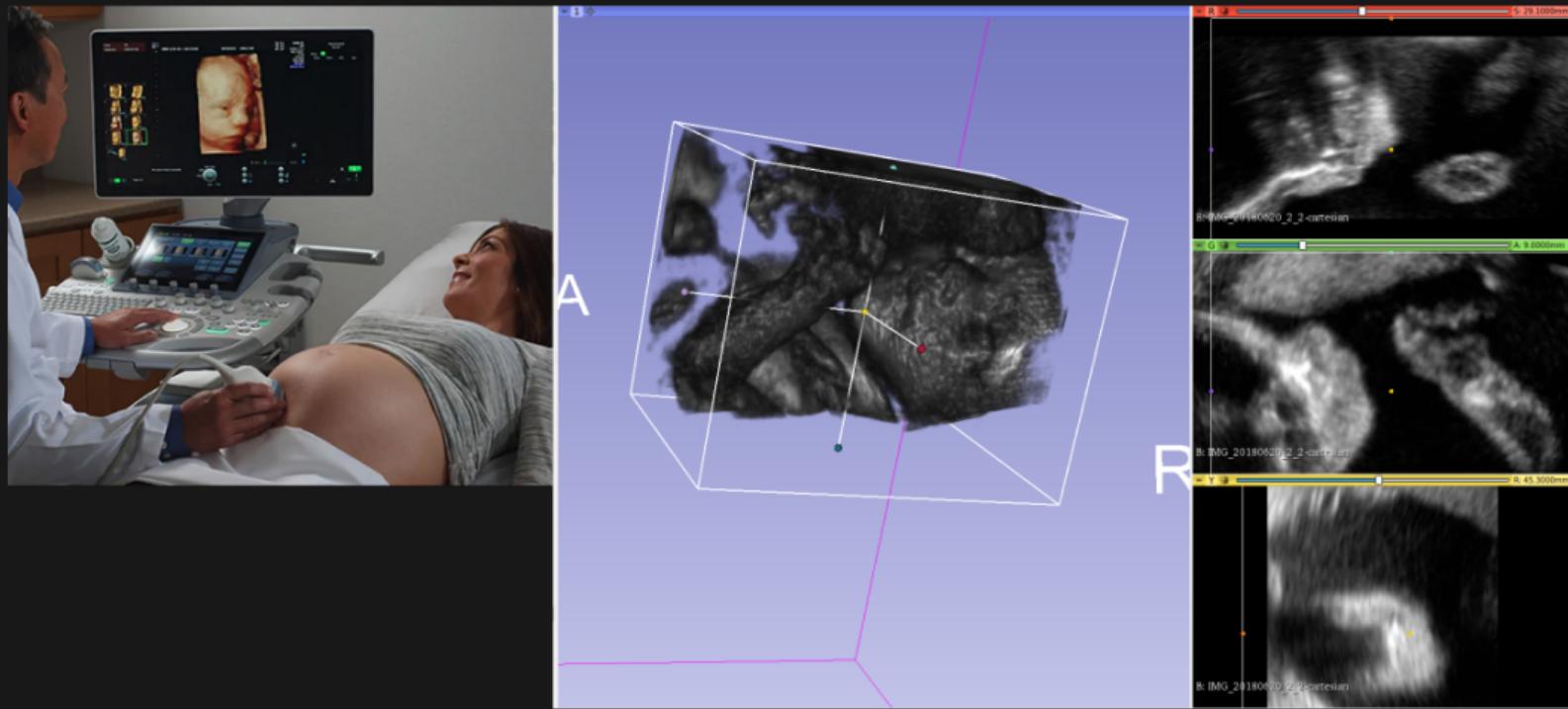
Tissue Labelling



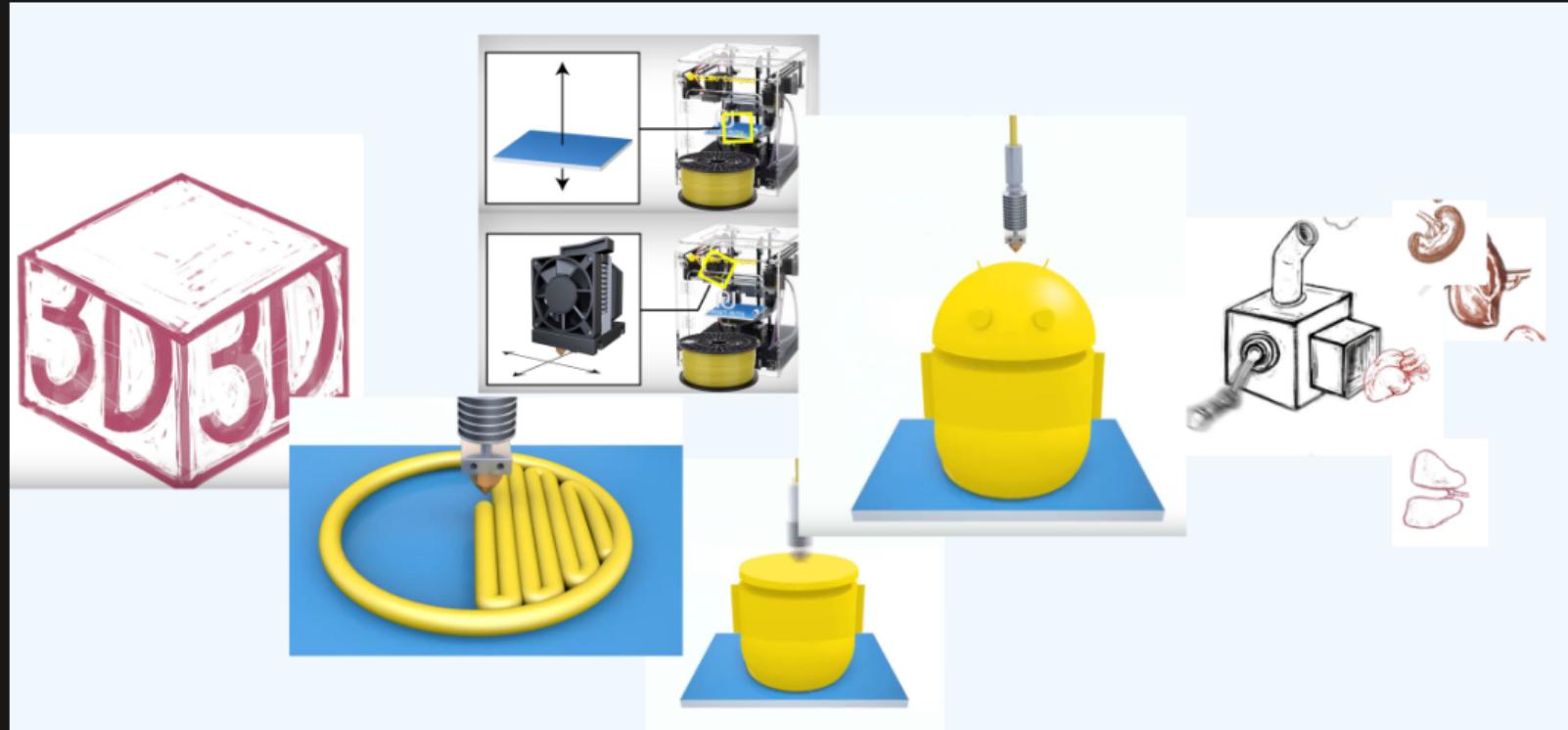
Surface Reconstruction



Interactive US imaging



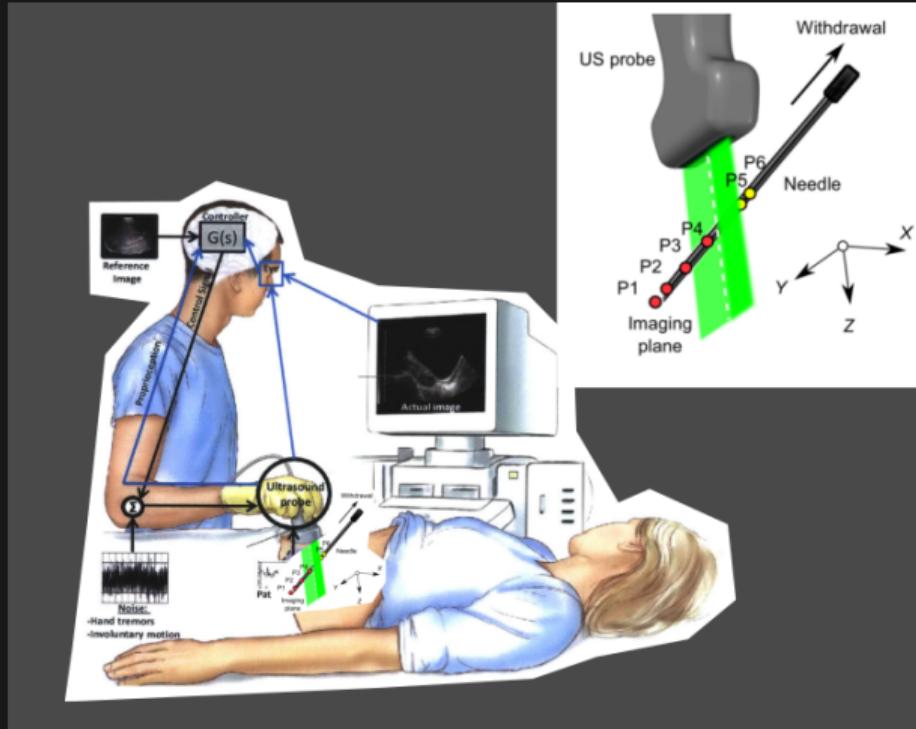
How to do and Why to do 3D printing?



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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