

Finding a fETus with UltraSound (FETUS)

Westminster Enterprise Week #2021

10th November 2021



Tareen Dawood, Guilherme Gomes De Figueiredo,
Shu Wang, and **Miguel Xochicale**

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Get source of this slide and see further references from <https://github.com/xfetus/public-engagement-project/>

Who am I?



Miguel
Xochicale



H.S.

2000

B.Sc.

M.Sc.

T.A.

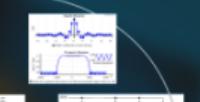
2010

Ph.D.

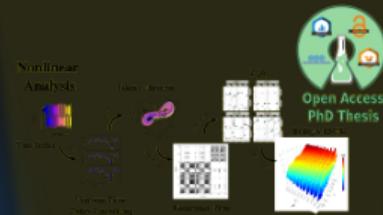
2020

2030

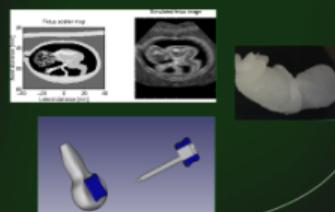
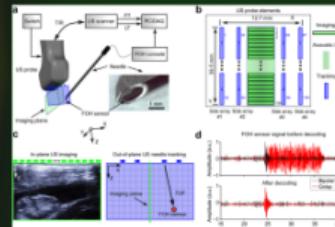
$t[\text{years}]$



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?

Tareen
Dawood



Guilherme Gomes
De Figueiredo



Shu
Wang

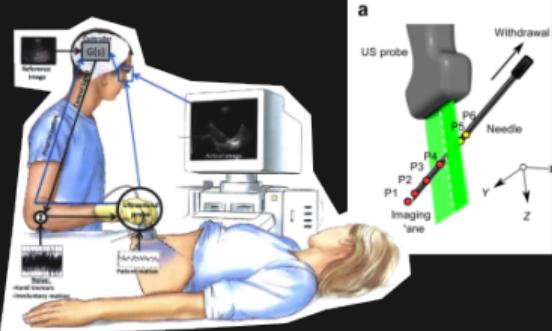


Where we are based?



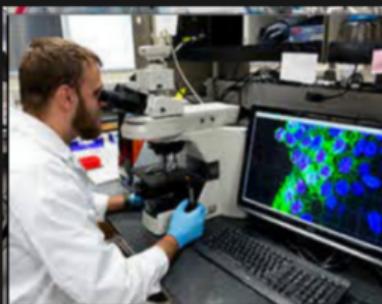
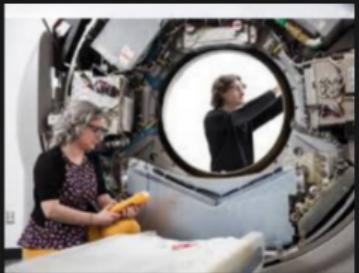
School of Biomedical and Imaging Science

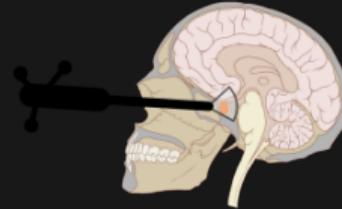
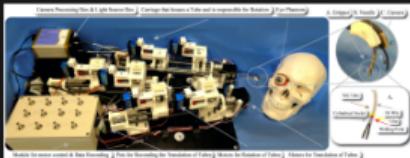
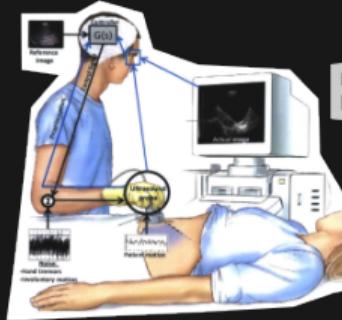
Department of Surgical and Interventional Engineering



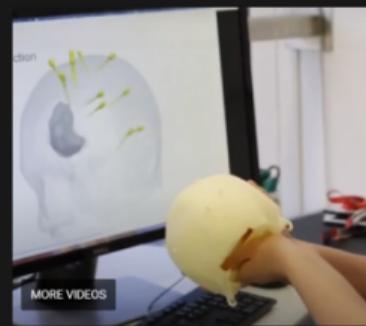
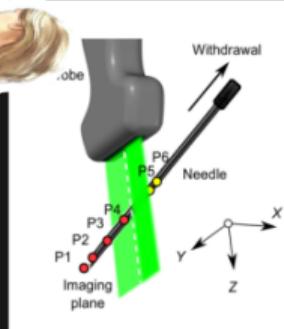


Healthcare Professions



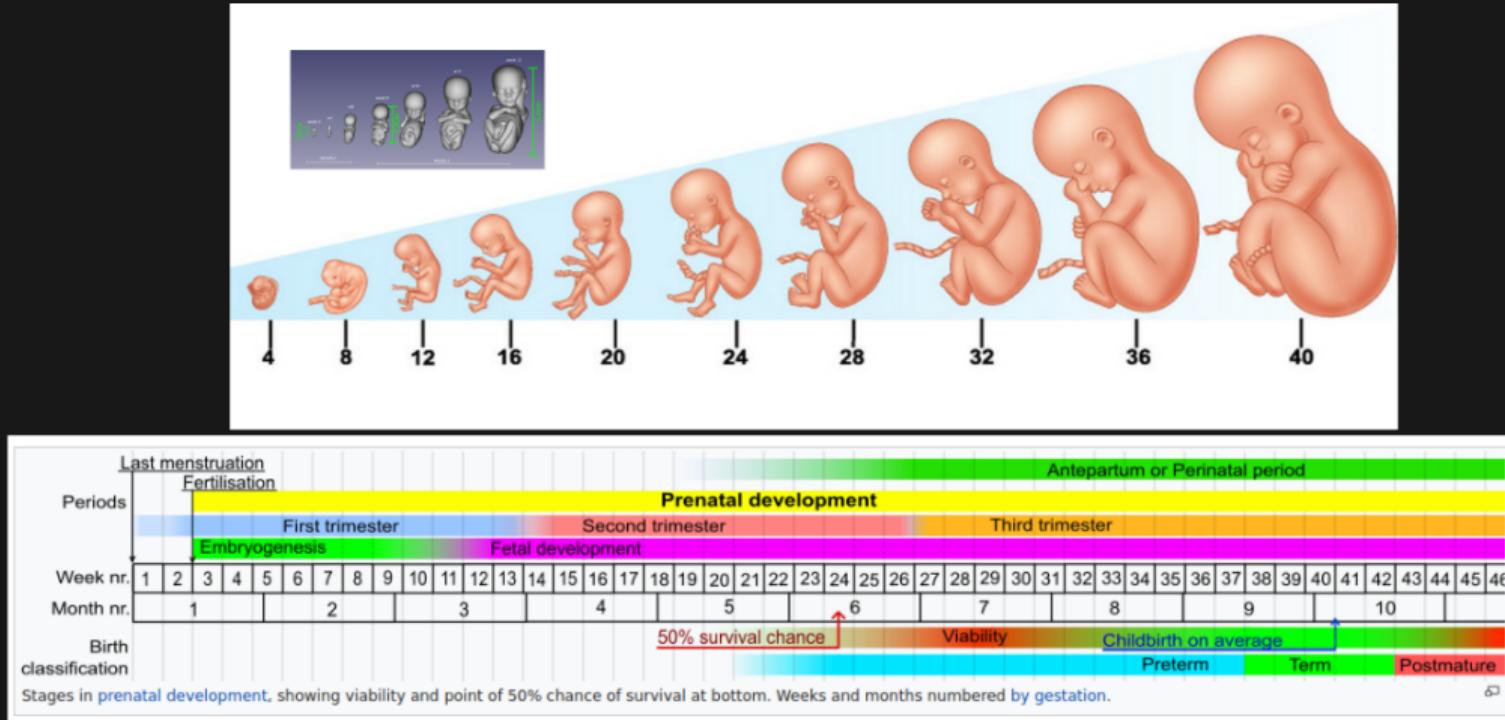


Biomedical Engineering



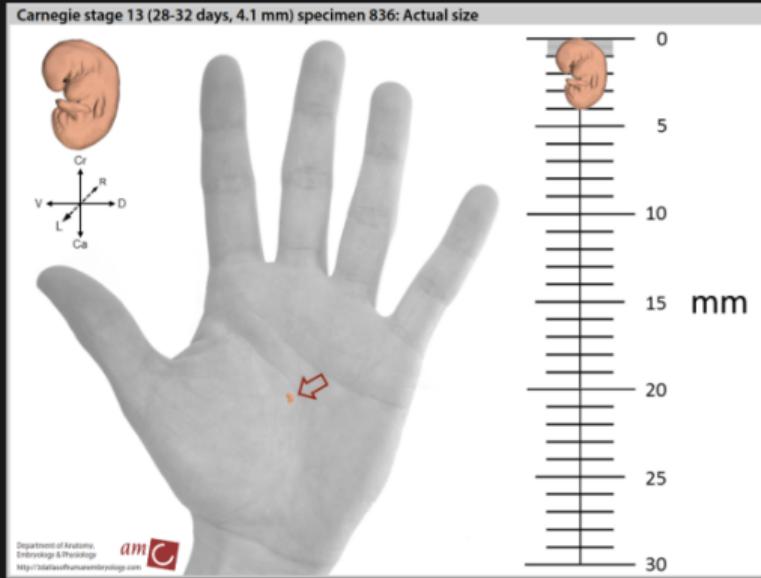
Understanding Fetal Growth

Understanding Fetal Growth

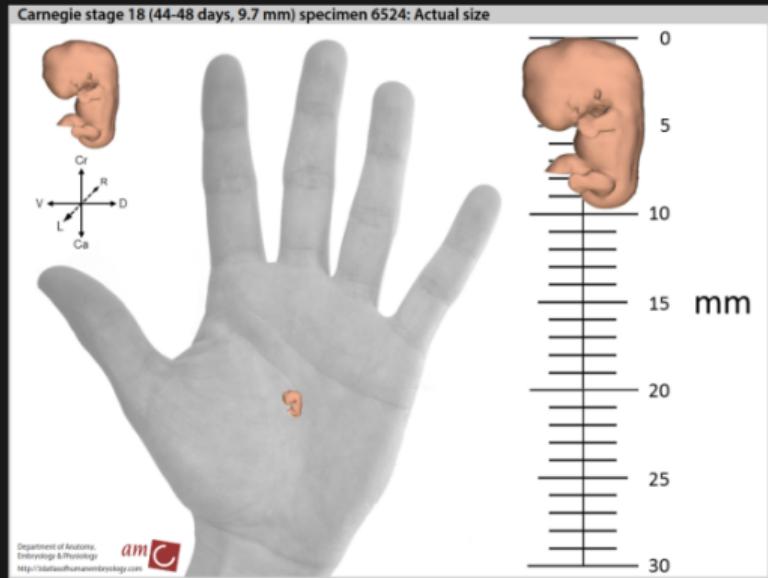


Understanding Fetal Growth

week 5

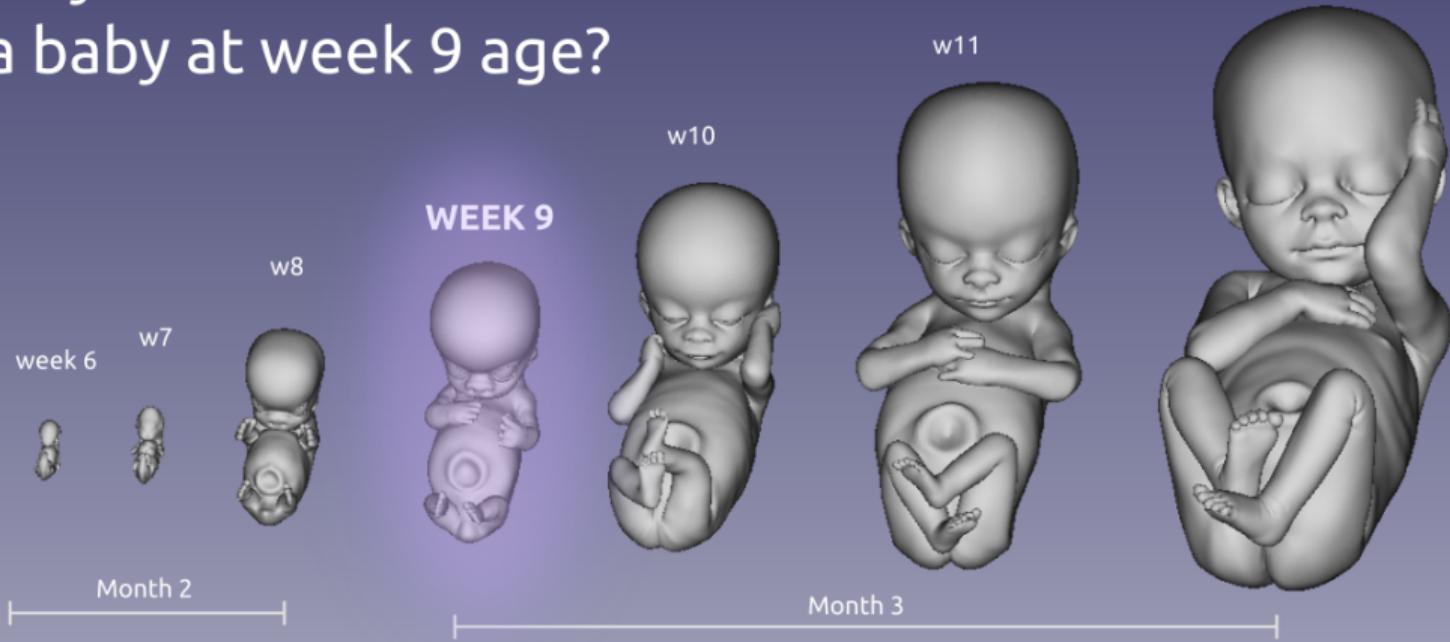


week 6

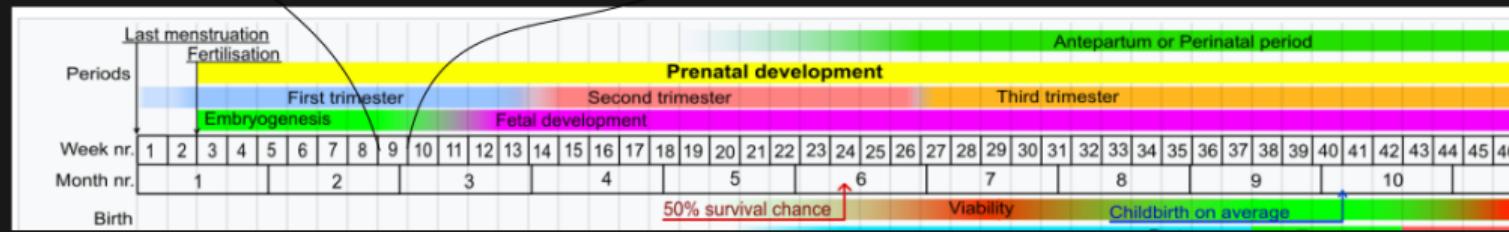
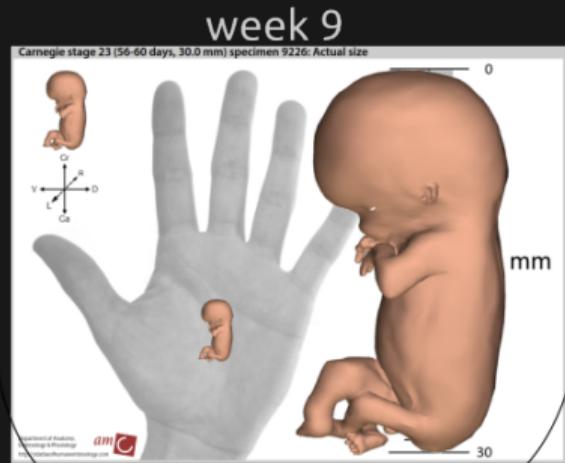


Guessing Fetal Growth

Can you draw the size of
a baby at week 9 age?

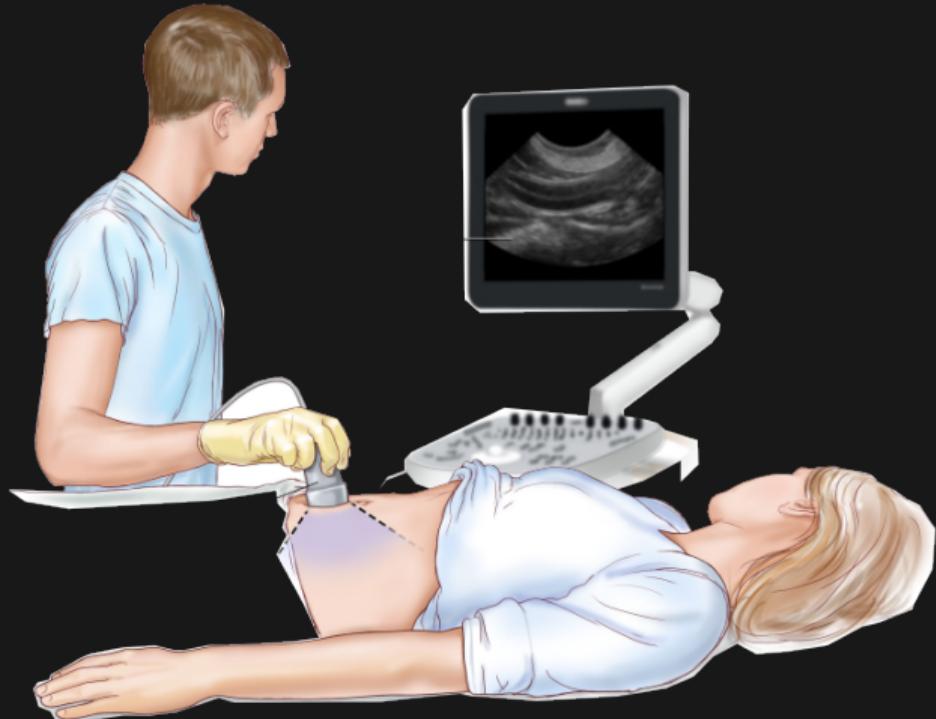


Understanding Fetal Growth



Do you know what is the role of a
Sonographer?

The role of a Sonographer



 Prepare Exam Room & Equipment

 Use Sonography Equipment

 Friendly Disposition & Good Patient Care

 Maintain Confidence

Do you know how we can actually see a fetus?

Computational Tomography

CT

+ high image quality



- non-real-time

Computational Tomography



Magnetic Resonance Imaging

MRI

+ high image quality



- non-real-time

Magnetic Resonance Imaging



Ultrasound

US

Ultrasound

+real-time  - poor-image quality



Medical Imaging in Pregnancy

CT



MRI



US



+ high image quality - non-real-time

+ high image quality - non-real-time

+ real-time - poor-image quality

How a Biomedical Engineer would help
a Sonographer?

Modelling US imaging

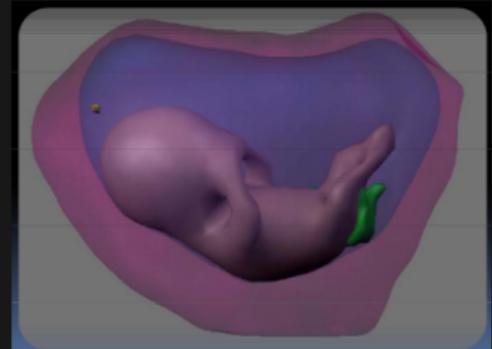
Segmentation on 3D US data



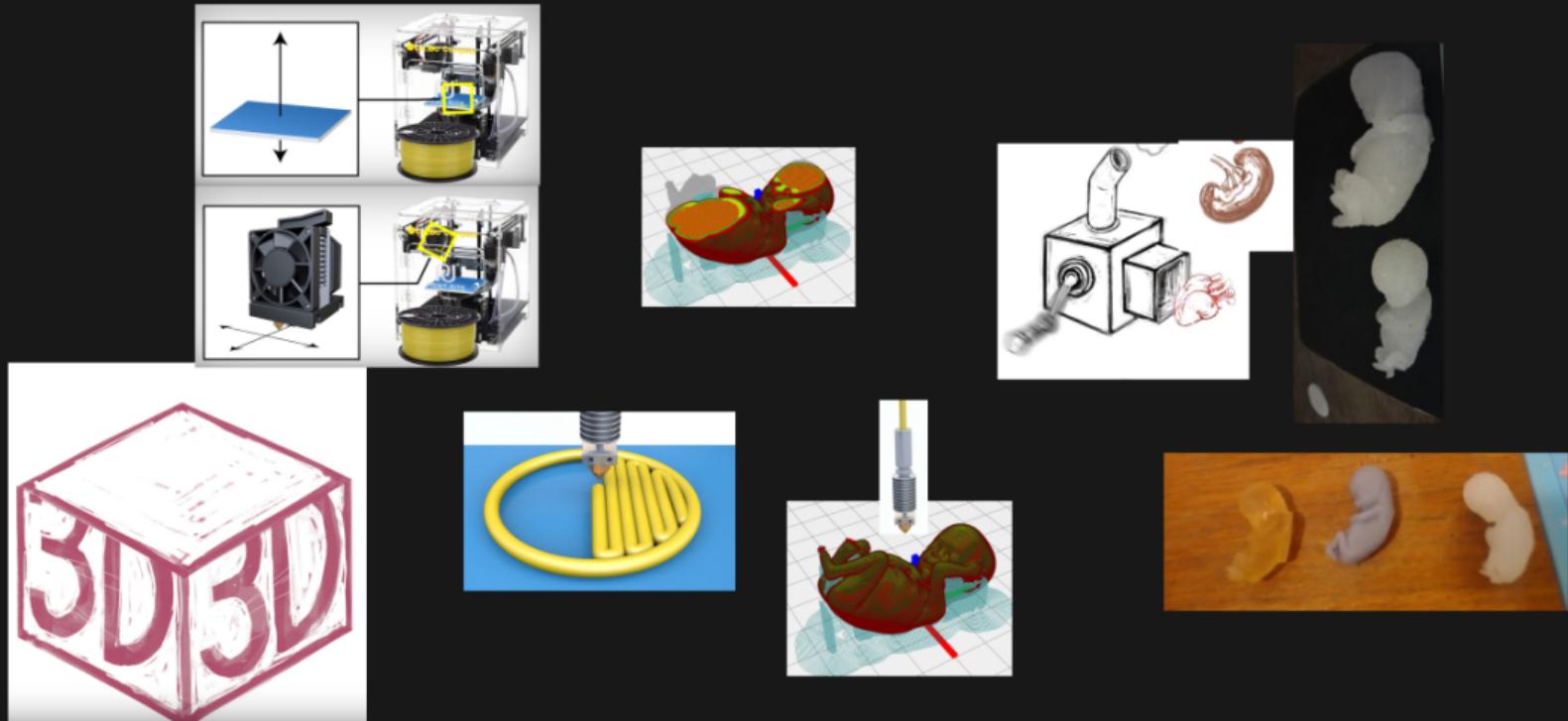
Tissue Labelling



Surface Reconstruction



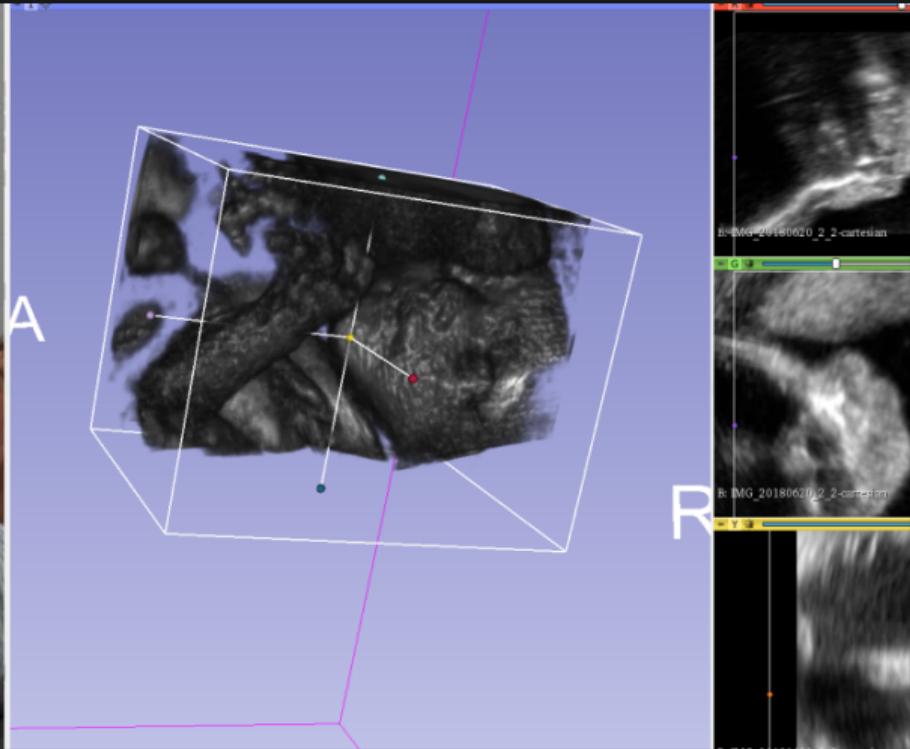
3D printing Fetuses



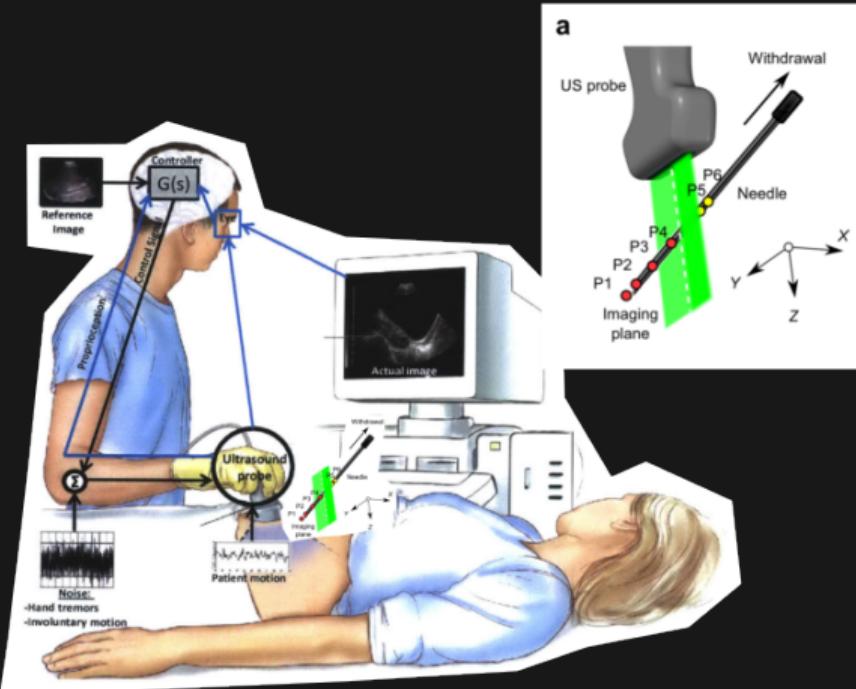
Interactive Ultrasound Imaging DEMO

Can you identify body parts of a fetus with Ultrasound?

Interactive Ultrasound Imaging DEMO



Ultrasound Needle-Tracking



Challenges:

- Tracking needles
- Skillfullness of sonographers
- Anatomical view changes

Takeaway messages

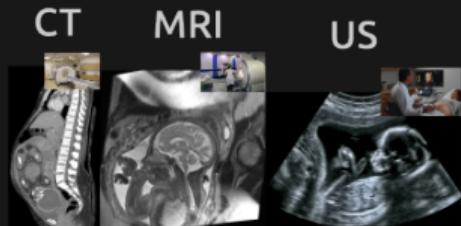
- Biomedical Engineers

- Electronics
- Mechanics
- Computer Science
- Medical Imaging



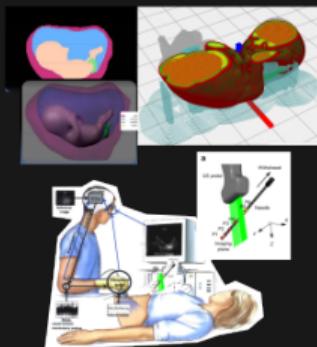
- Medical Imaging

- Computational Tomography
- Magnetide Resonance
- Ultrasound imaging



- Applications of US

- Modelling US
- 3D printing
- US needle tracking



Pop Quiz and Souvenirs

Souvenirs



Pop Quiz and Souvenirs

Q1. What is the most common imaging technique to see a fetus in a mother's womb?

Q2. Can you name the person's job who performs the imaging of fetus?

Q3. Can you name one of the other imaging techniques to diagnose and to monitor fetus in a mother's womb?

Extra Questions (EQ)

EQ1:

Share an emoji that reflects how you feel about this workshop

EQ2/3:

What was your favourite part of the workshop? /

What was least favourite part of the workshop?

EQ4:

What do would you change about today's workshop?

Acknowledgements



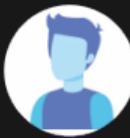
Shu
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Ou
Zhanchong



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Guilherme
Gomes De Figueiredo



Amal
Hussein



Miguel
Xochicale



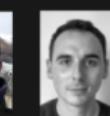
Christian
Baker



Francois
Joubert



Sunish
Mathews



Fang-Yu
Lin



Richard
Miles

Research Students

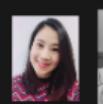
Research Scientists



Bella
Spencer



Melissa
Bovis



Yada
Kunpalin



Brian
Dromey



Jacqueline
Beddoe-Rosendo



Clare
Heaysman



Alima
Rahman



Valentina
Vitiello



Anna
David Vercauteren



Tom
Wenfeng
Xia



Sebastien
Ourselin

Public Engagement Officers

Clinical Fellows

Quality Management

Operations Managers

Investigators

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