

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.

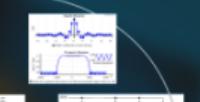
2010

Ph.D.

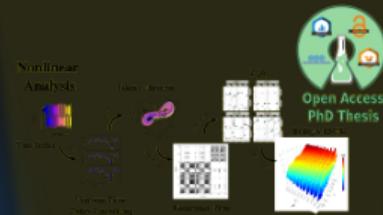
2020

2030

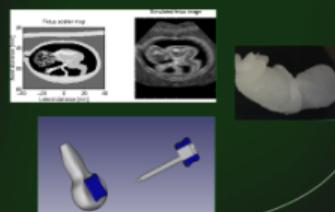
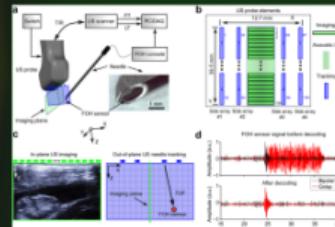
$t[\text{years}]$



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?



KING'S
College
LONDON

School of Biomedical and
Imaging Science



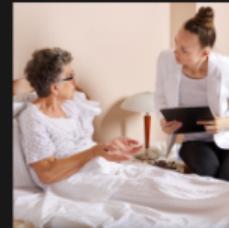
Sonographers



Radiologists



Social workers



Healthcare Professions

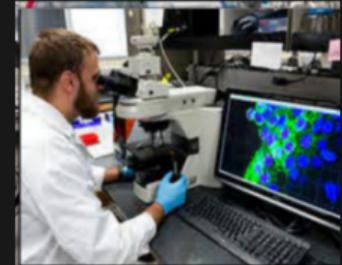
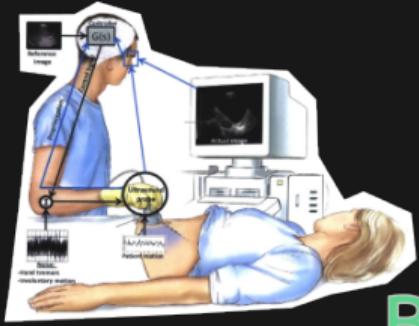


General Doctor
and Surgeons



Nurses and Midwives

Physiotherapists

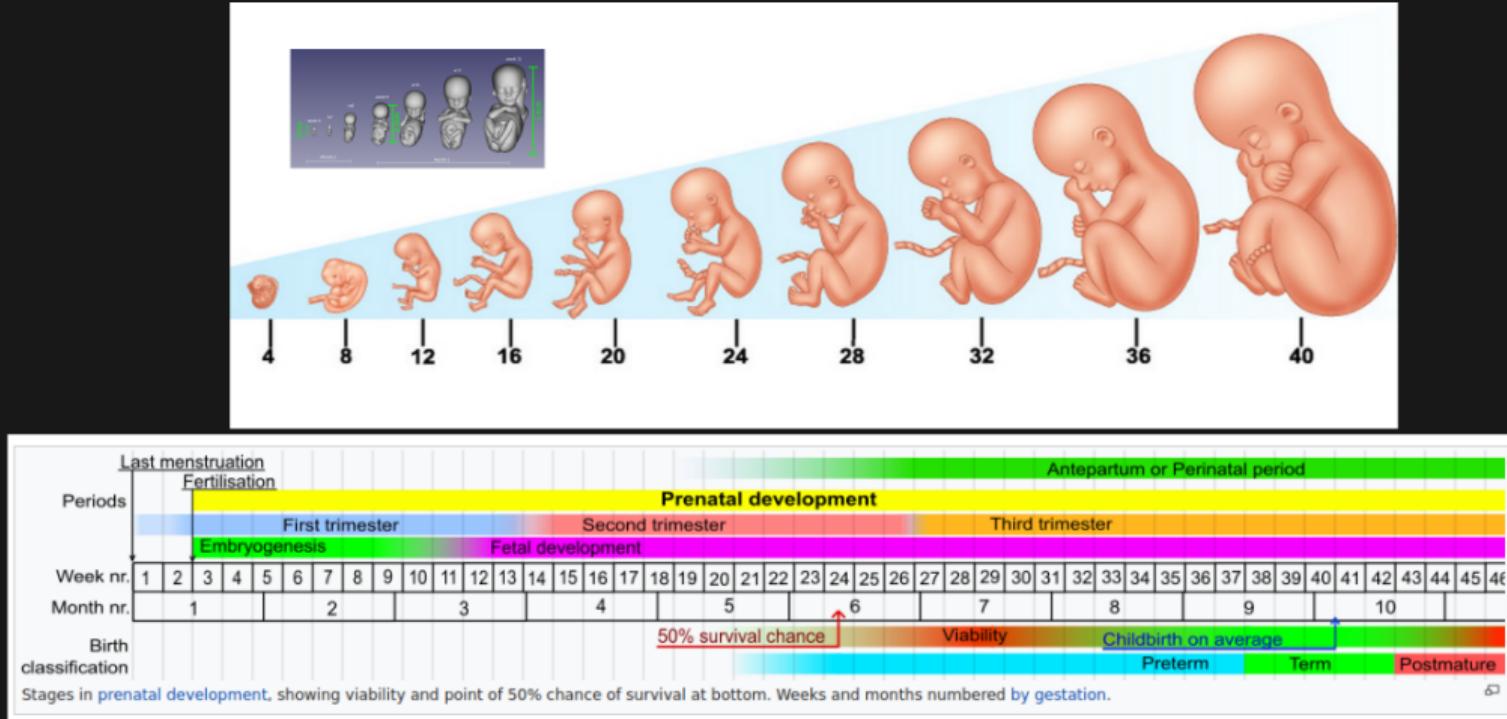


Biomedical Engineering



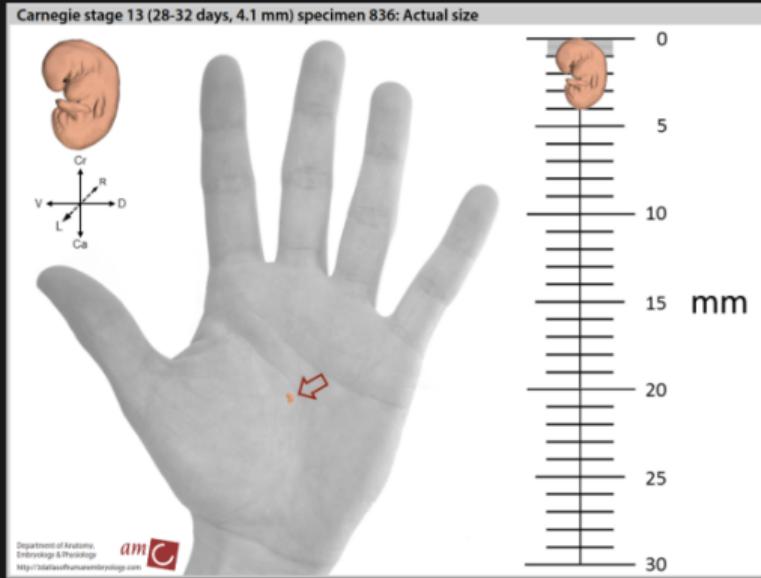
Understanding Fetal Growth

Understanding Fetal Growth

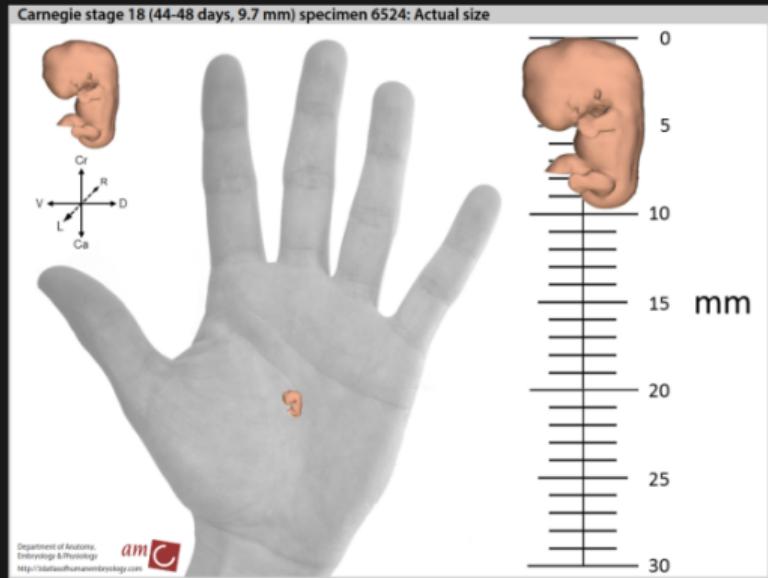


Understanding Fetal Growth

week 5

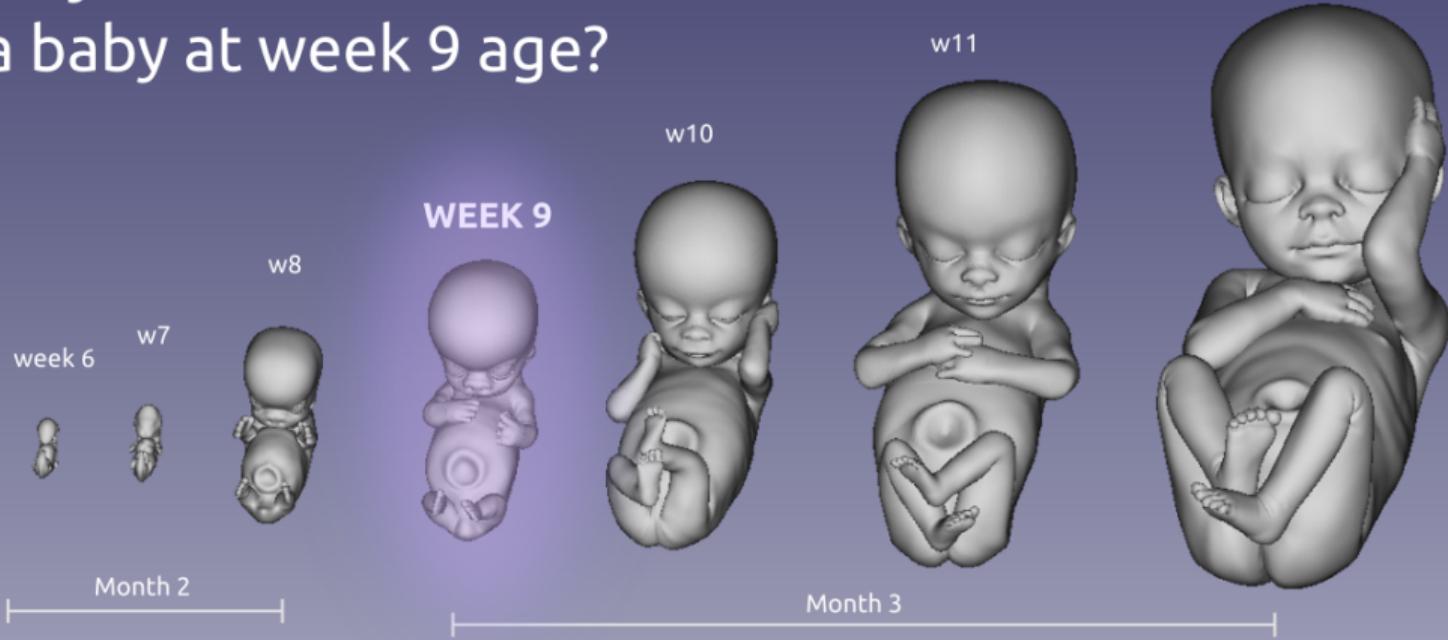


week 6



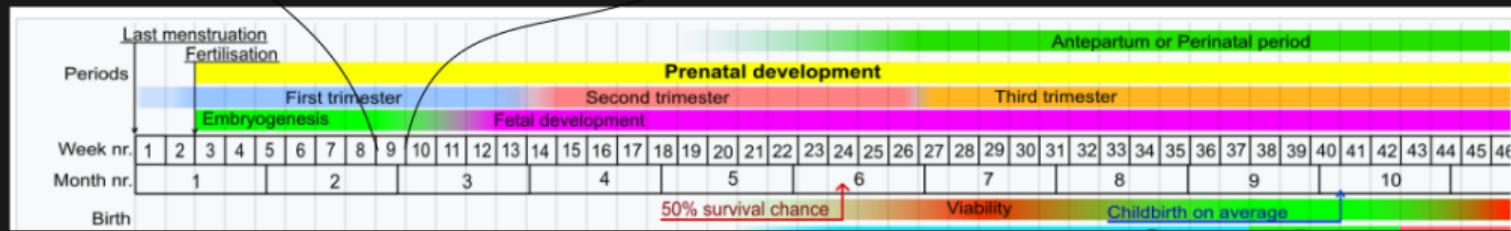
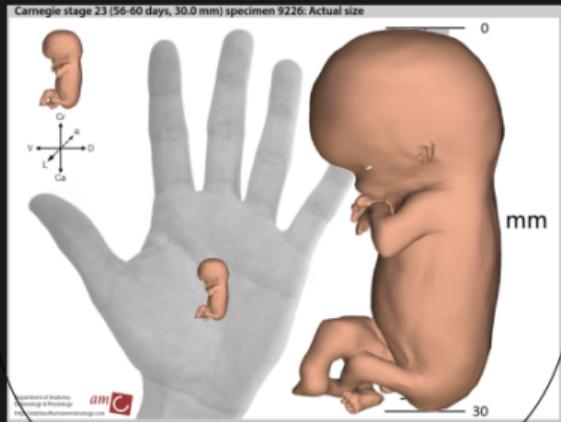
Guessing Fetal Growth

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



Understanding Fetal Growth

week 9



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



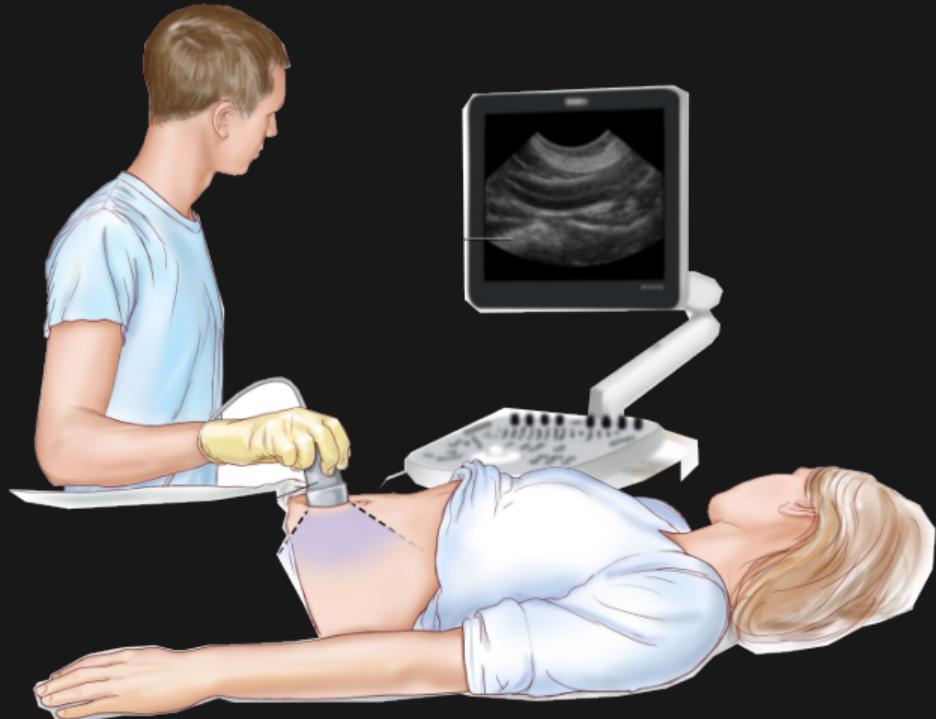
+ high image quality - non-real-time

+ high image quality - non-real-time

+ real-time - poor-image quality

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

How a Biomedical Engineer would help
a Sonographer?

Modelling US imaging

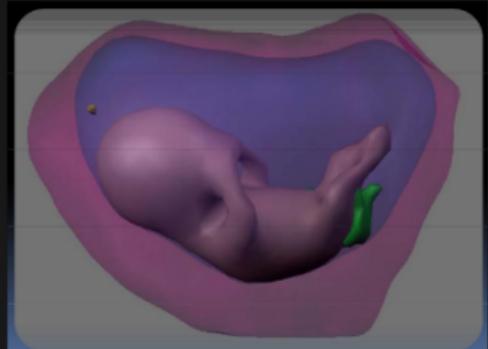
Segmentation on 3D US data



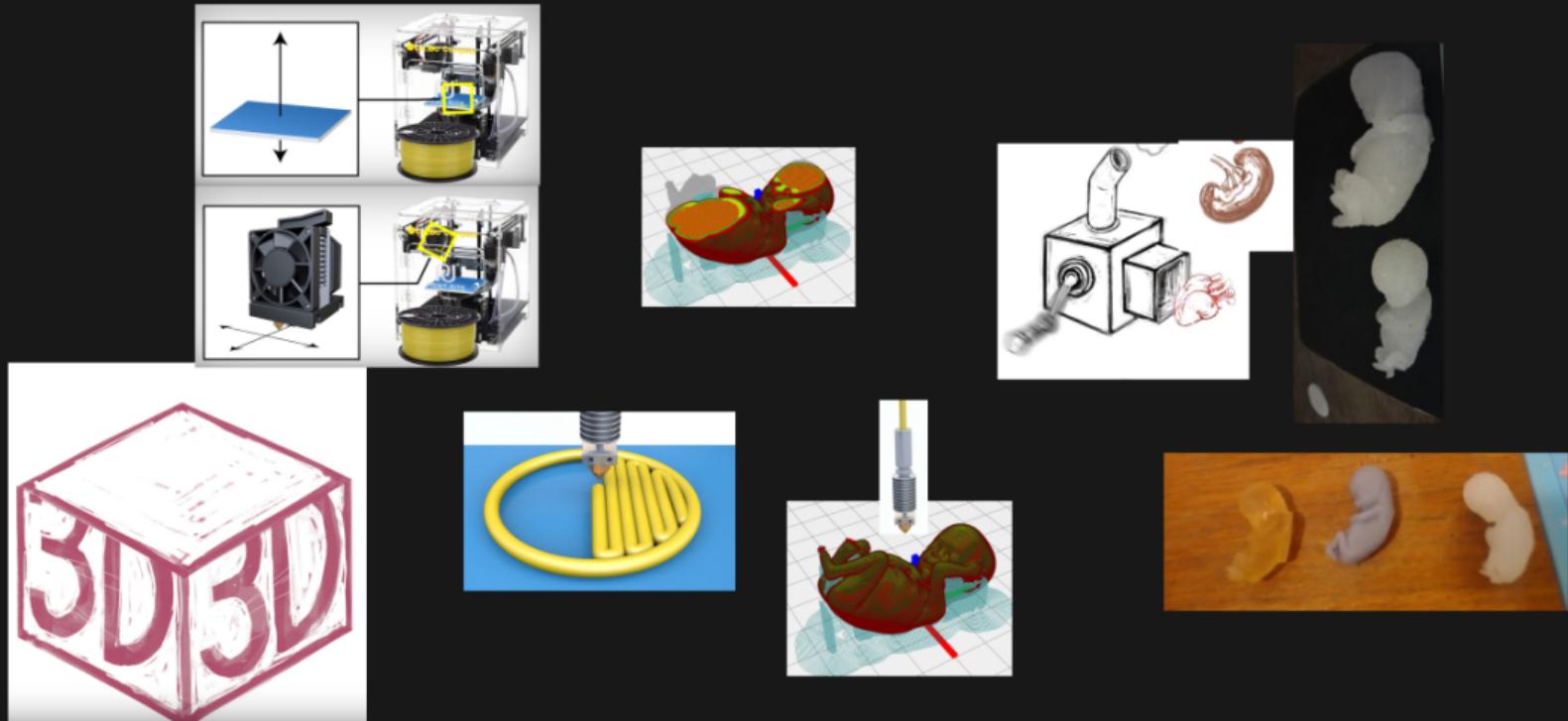
Tissue Labelling



Surface Reconstruction

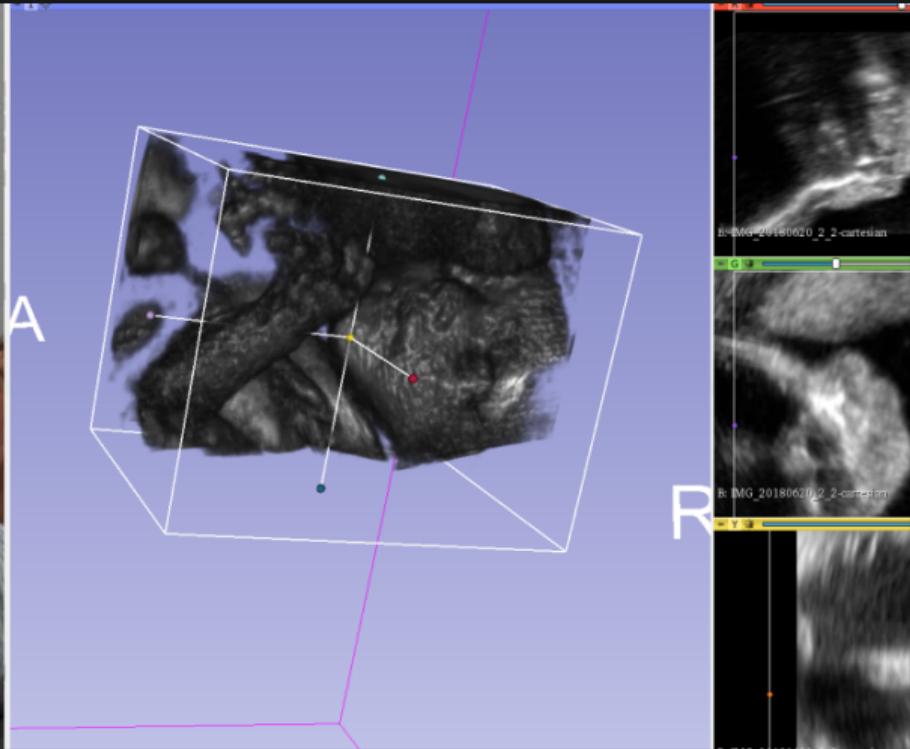


3D printing Fetuses

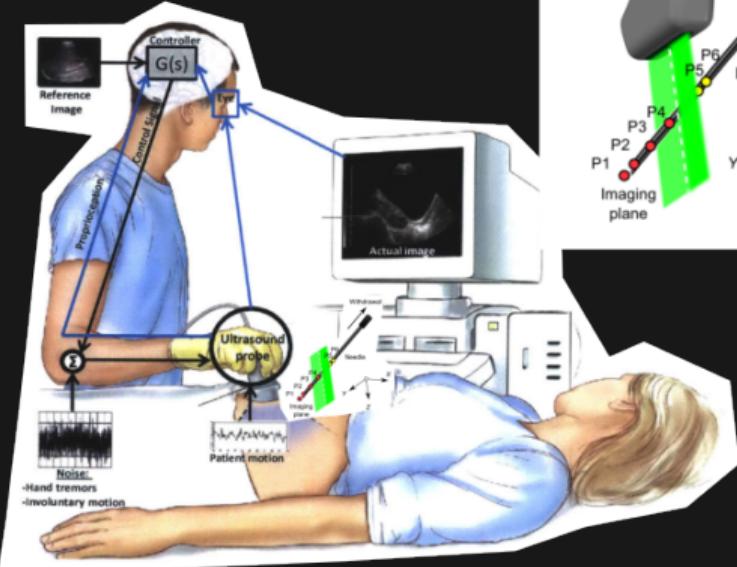


Can you identify body parts of a fetus
with Ultrasound?

DEMO: Interactive Ultrasound Imaging



Ultrasound-guided intervention



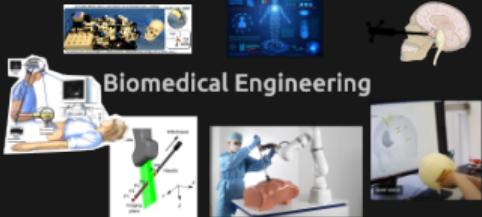
Challenges:

- Skillfullness of sonographers
- Anatomical view changes
- Tracking needles

Takeaway messages

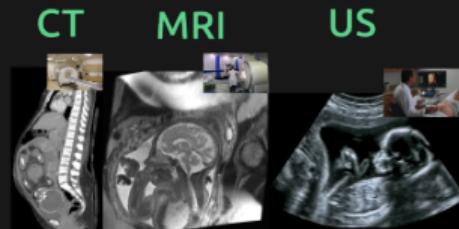
- Biomedical Engineers

- Maths and Physics
- Biology and Chemistry
- Computer Science



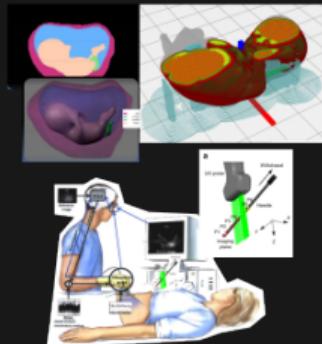
- Medical Imaging

- Computational Tomography
- Magnetide Resonance
- Ultrasound imaging



- Applications of US

- Modelling US
- 3D printing
- US-guided Interventions



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

Research Students

Shu Wang	Ou Zhanhong	Tareen Dawood	Guilherme Gomes De Figueiredo	Amal Hussein	Miguel Xochicale	Christian Baker	Francois Joubert	Sunish Mathews	Fang-Yu Lin	Richard Miles	Dzhoshkun Shakir

Public Engagement Officers



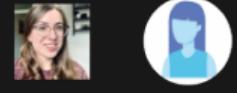
Bella
Spencer Melissa
Bovis

Clinical Fellows



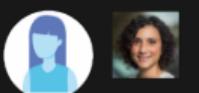
Yada
Kunpalin Brian
Dromey

Quality Management



Jacqueline
Beddoe-Rosendo Clare
Heaysman

Operations Managers



Alima
Rahman Valentina
Vitiello

Investigators



Anna
David Vercauteren Tom
Wenfeng
Xia Sebastien
Ourselin

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