

Finding a fETus with UltraSound (FETUS)

Westminster Enterprise Week #2021

10th November 2021



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

✉ miguel.xochicale@kcl.ac.uk
😺 @mxochicale 🐦 @_mxochicale



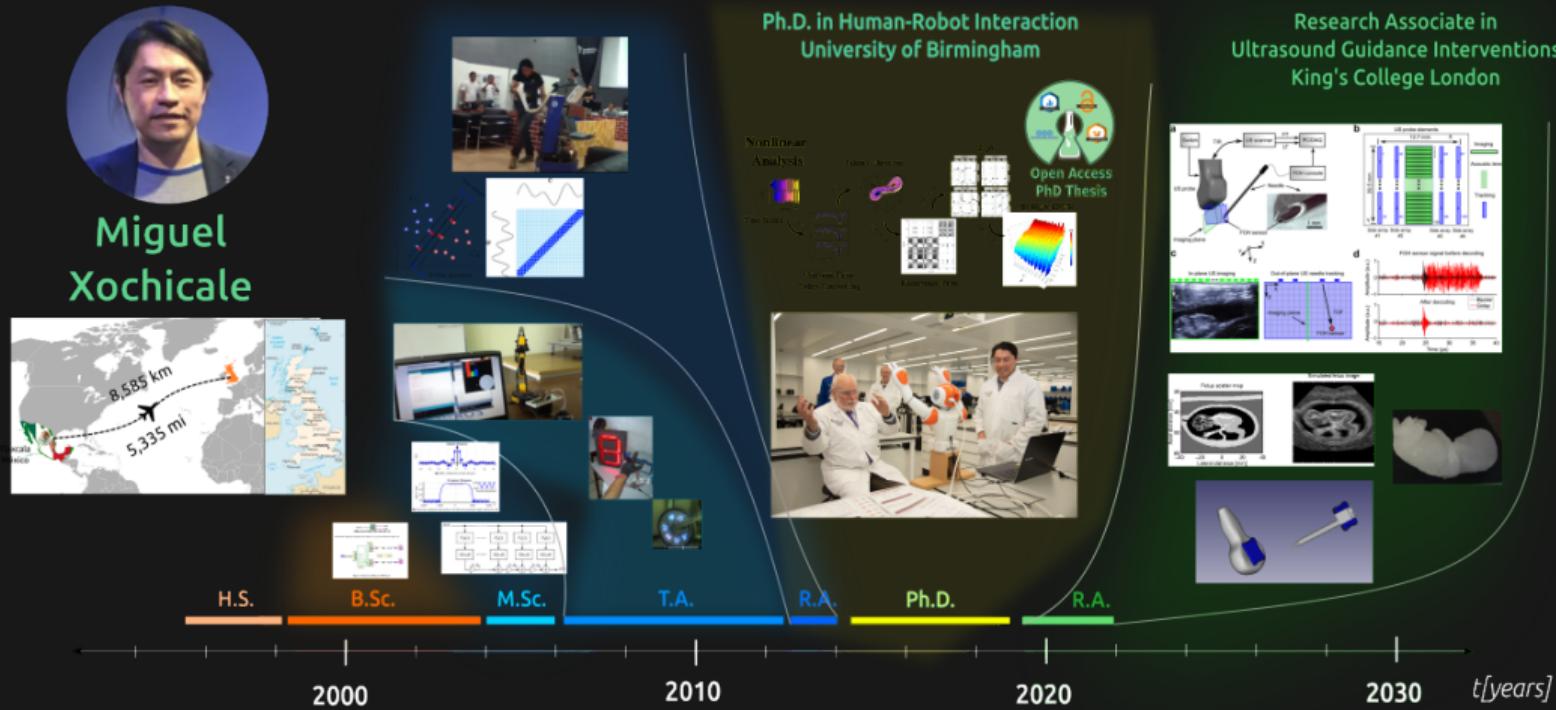
This slide is licensed under a Creative Commons "Attribution 4.0 International" license.

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

Contents

1. Who?, Why? Where?
2. Guessing Fetal Growth
3. Looking inside the human body
4. Applications of Biomedical Engineering
5. Takeaway messages, pop quiz, and few surprises

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



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



Tareen Dawood



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

**Shu
Wang**



**Zhanchong
Ou**



Guangdong
China

**Guilherme Gomes
De Figueiredo**



Where we are based?

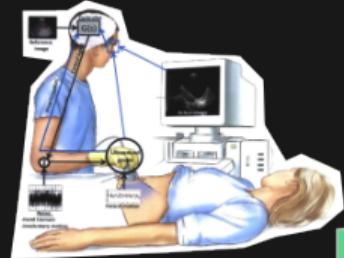


School of Biomedical and Imaging Science



KING'S
College
LONDON

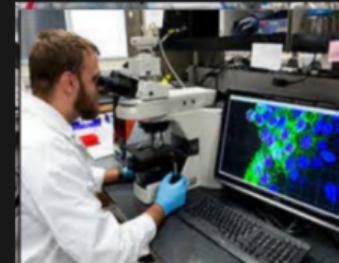
Ultrasound Imaging



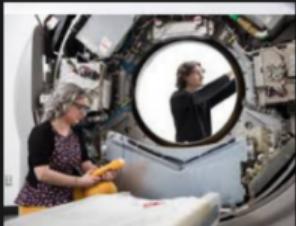
Machine Learning and Deep Learning with Medical Imaging



Biomedical Imaging



Biomedical Engineering



**PET and MR Acquisition
and Reconstruction**

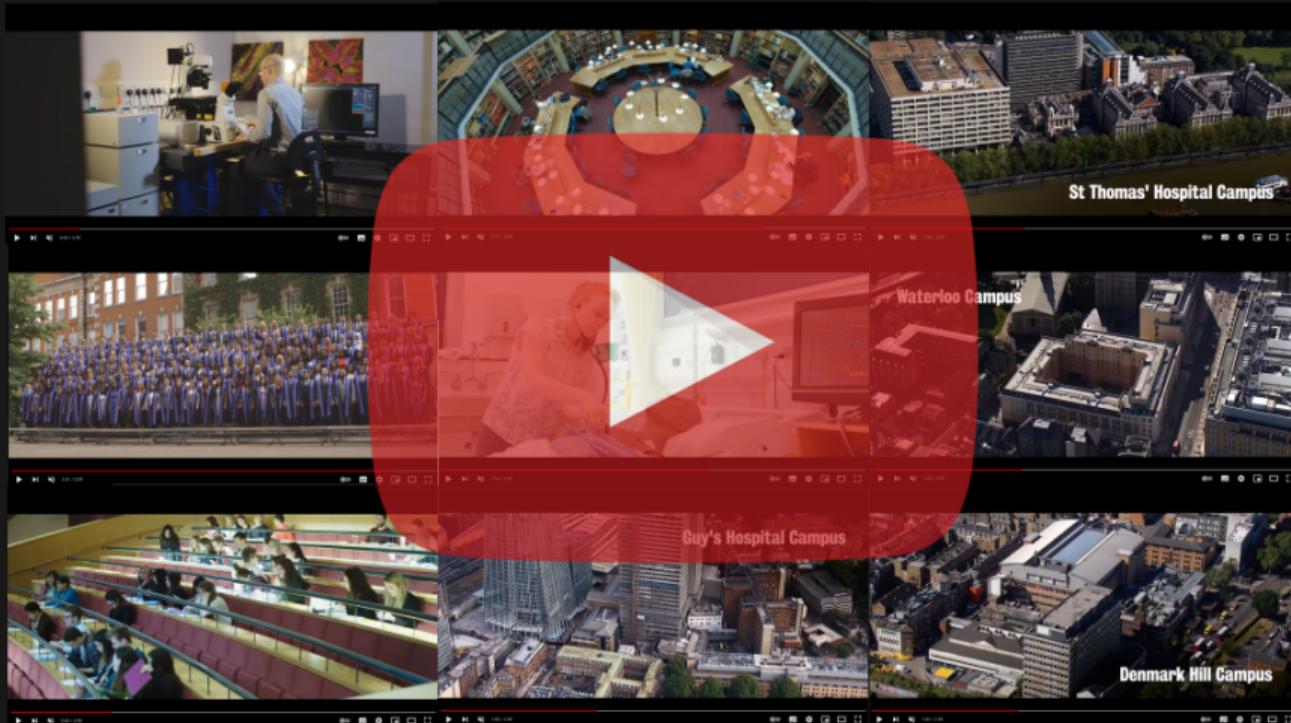


Image Computing, Analysis and Robotics



Image-guided navigation

Faculty of Life Sciences & Medicine: video



School of Biomedical Engineering & Imaging Sciences

School of Immunology & Microbial Sciences



School of Basic & Medical Biosciences



Faculty of Life Sciences & Medicine



School of Cancer & Pharmaceutical Sciences

School of Cardiovascular Medicine & Sciences

School of Life Course Sciences

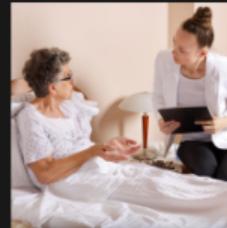
Sonographers



Radiologists



Social workers



Healthcare Professions



General Doctor
and Surgeons



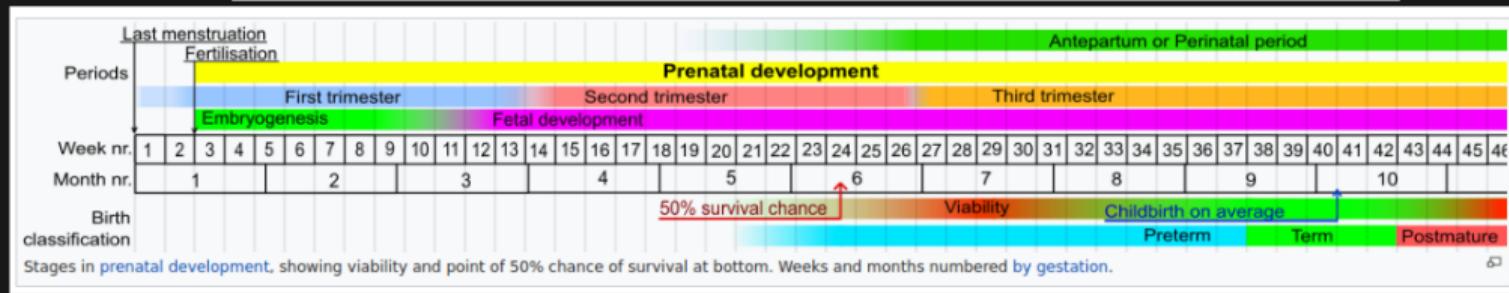
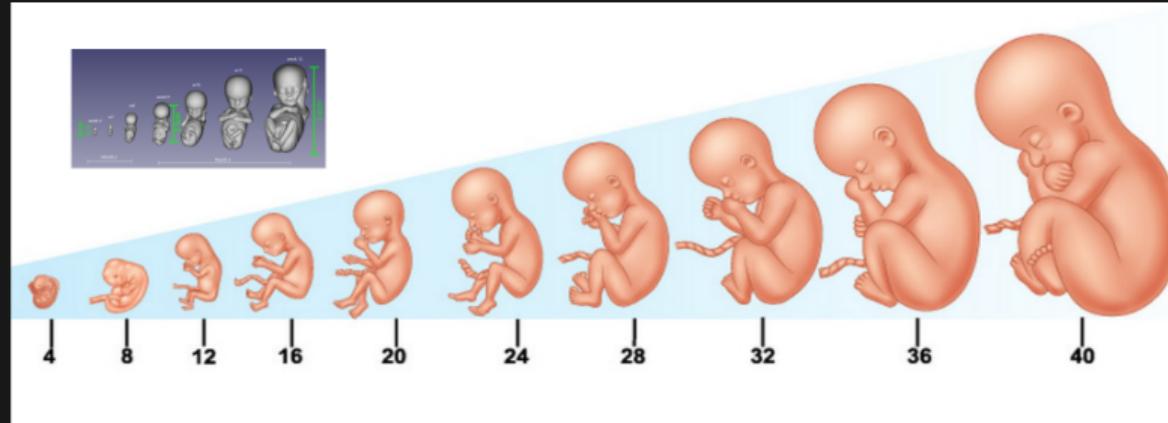
Nurses and Midwives



Physiotherapists

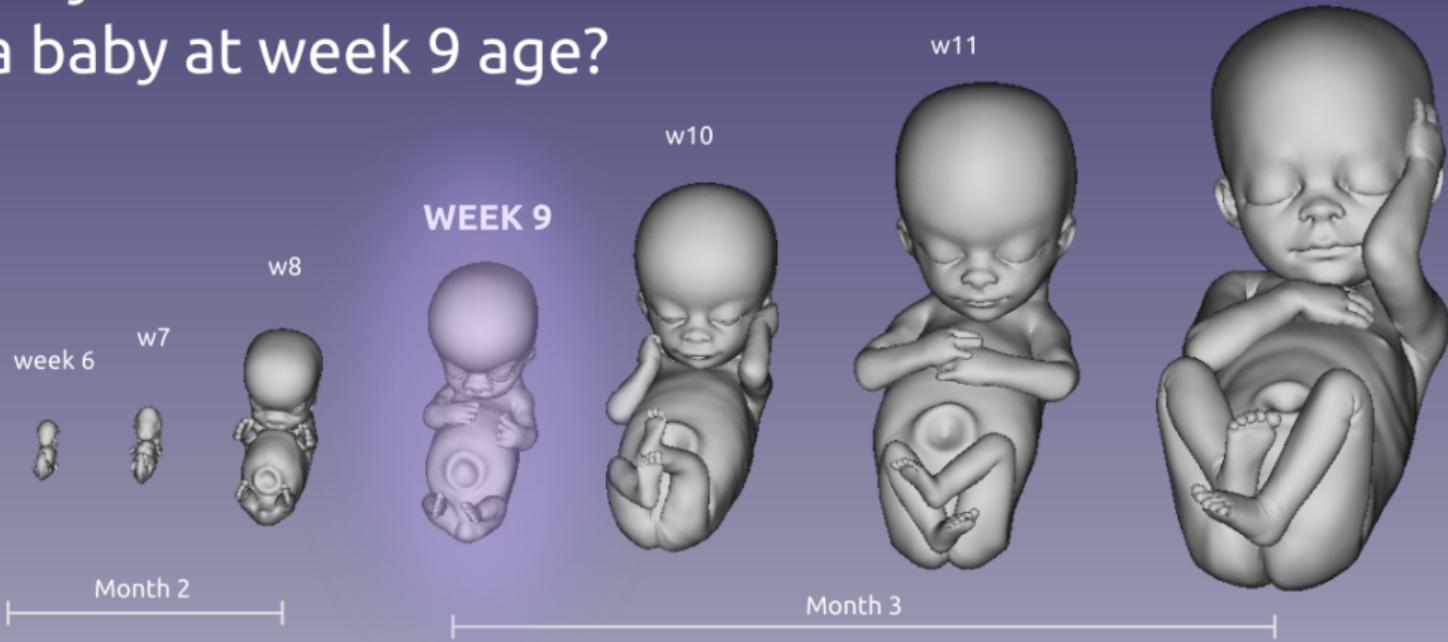
Understanding Fetal Growth

Understanding Fetal Growth



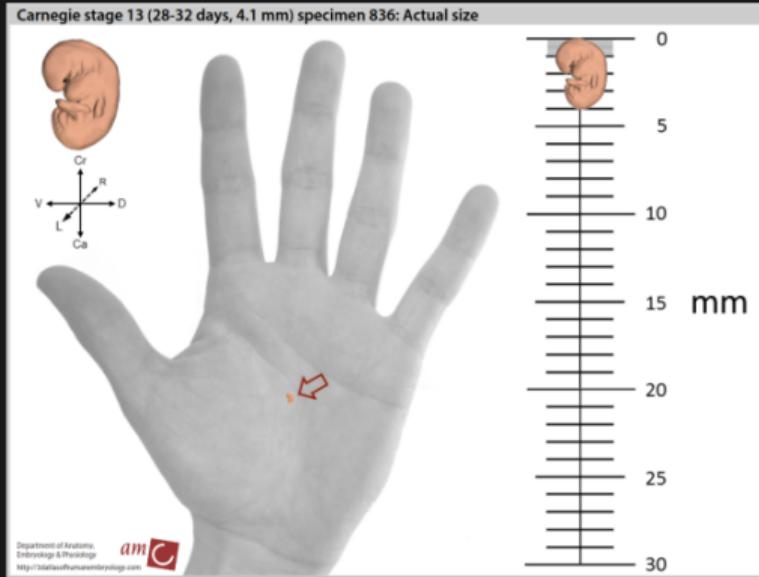
[ACTIVITY]: Guessing Fetal Growth

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

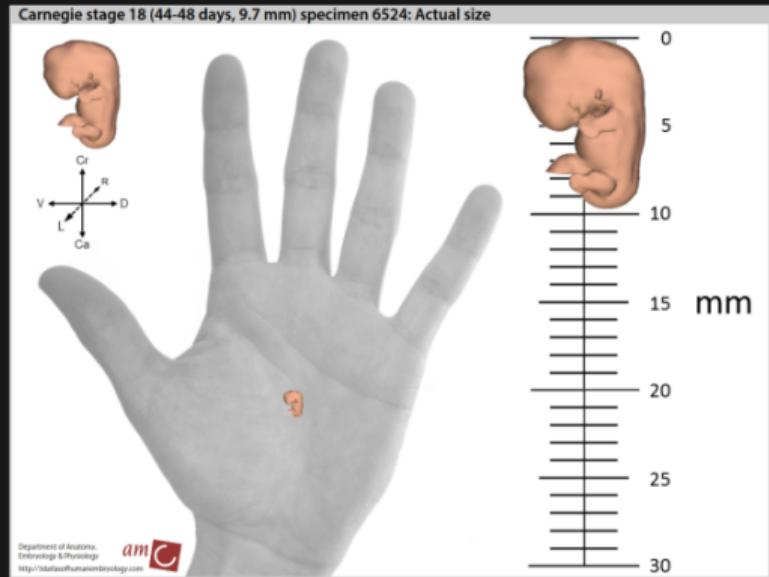


[ACTIVITY]: Understanding Fetal Growth

week 5

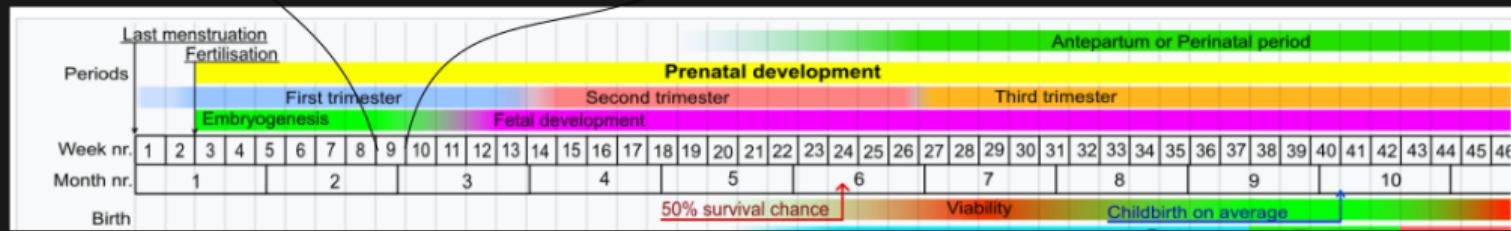
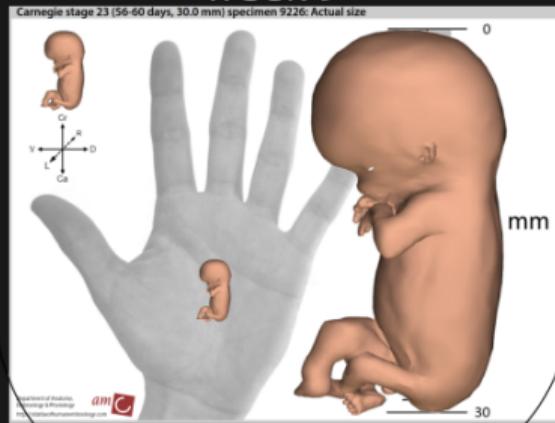


week 6



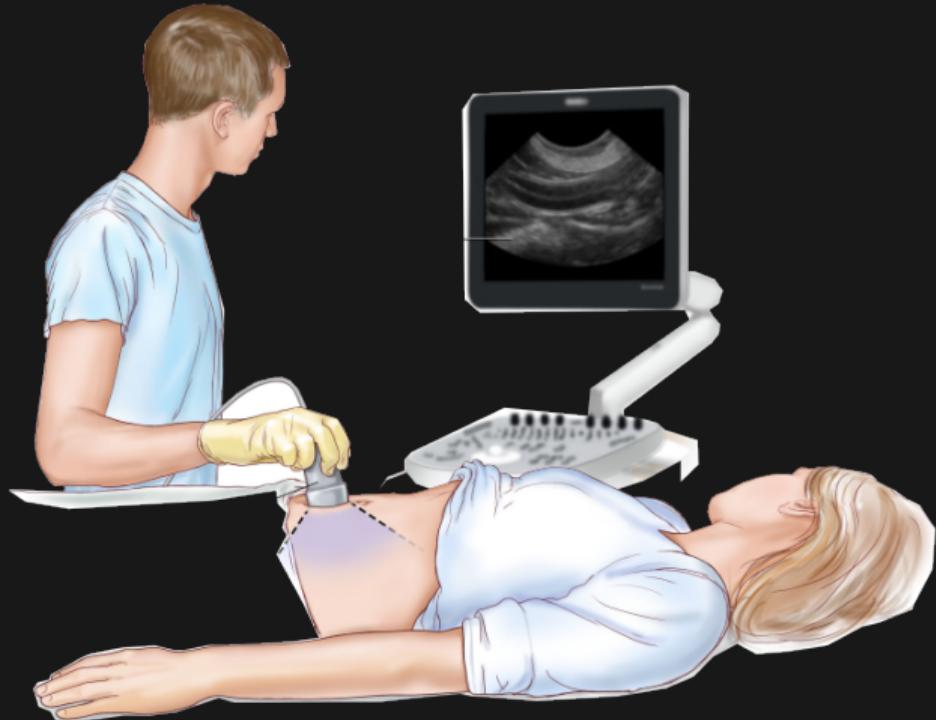
[ACTIVITY]: Understanding Fetal Growth

week 9



Do you know what type of healthcare professional helps to monitor fetal development?

The role of a Sonographer



Prepare Exam Room & Equipment



Use Sonography Equipment



Friendly Disposition & Good Patient Care



Maintain Confidence

Do you know
how clinicians can actually see fetal
development?

Computational Tomography

CT

+ high image quality



- non-real-time

Computational Tomography



Magnetic Resonance Imaging

MRI

+ high image quality



- non-real-time

Magnetic Resonance Imaging



US

Ultrasound

+real-time  - poor-image quality

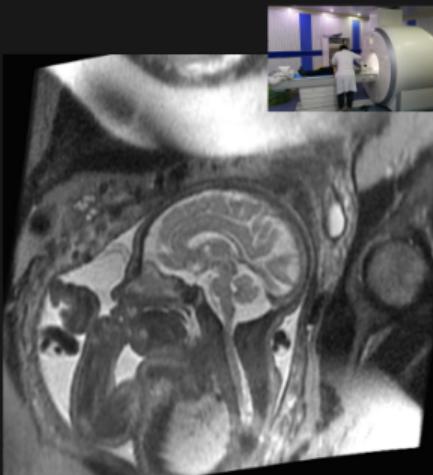


Medical Imaging in Pregnancy

CT



MRI



US



+ high image quality - non-real-time

+ high image quality - non-real-time

+ real-time - poor-image quality

How a Biomedical Engineer(s) would help Sonographers?

Modelling US imaging

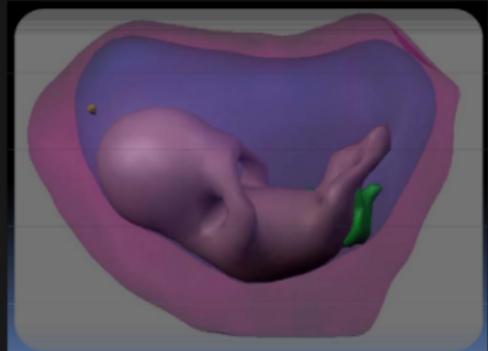
Segmentation on 3D US data



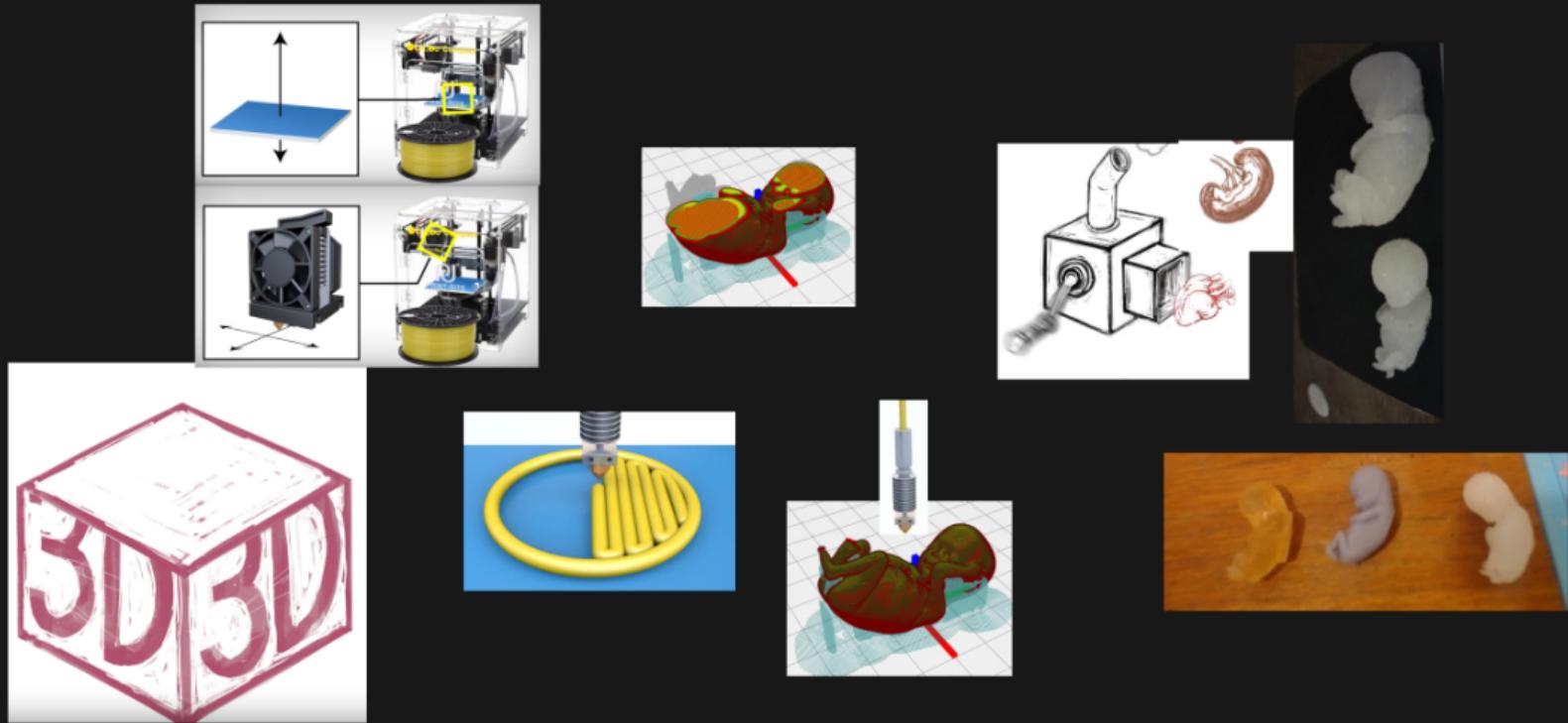
Tissue Labelling



Surface Reconstruction

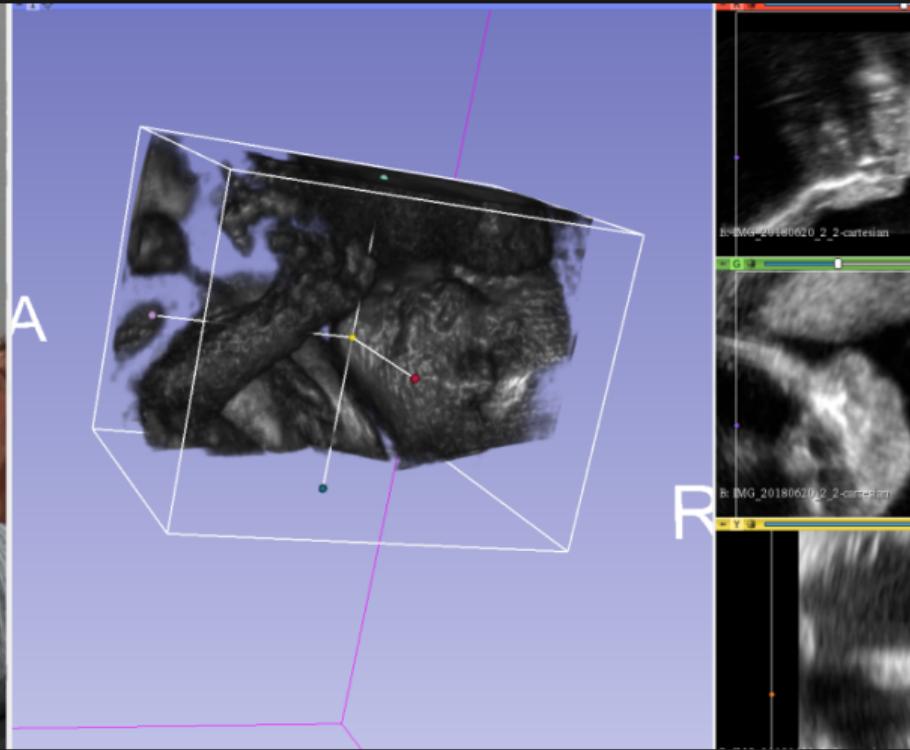


3D printing Fetuses

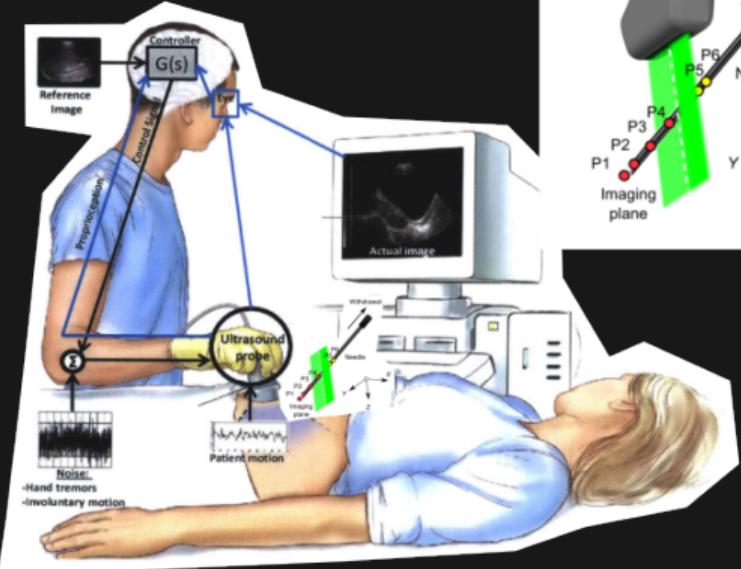


Can you identify body parts of a fetus
with Ultrasound?

[ACTIVITY]: Interactive Ultrasound Imaging



Ultrasound-guided intervention



Challenges:

- Skillfullness of sonographers
- Anatomical view changes
- Tracking needles

Takeaway messages

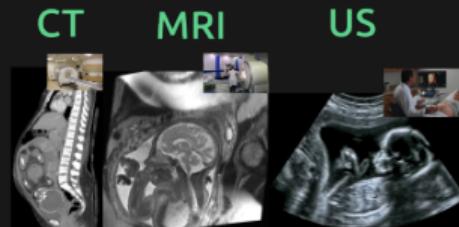
- Biomedical Engineers

- Maths and Physics
- Biology and Chemistry
- Computer Science



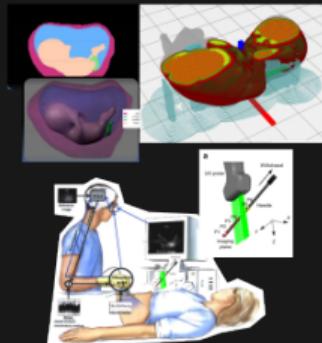
- Medical Imaging

- Computational Tomography
- Magnetide Resonance
- Ultrasound imaging



- Applications of US

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



[人群] ACTIVITY]: Pop Quiz and Souvenirs

Souvenirs



[ACTIVITY]: 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

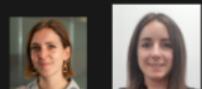
- * Share an emoji that reflects how you feel about this workshop
- * What was your favourite part of the workshop?
- * What was your least favourite part of the workshop?
- * What would you change about today's workshop?

Acknowledgements

Research Students

| | | | | | | | | | | | |
|-------------|-----------------|------------------|-------------------------------------|-----------------|---------------------|--------------------|---------------------|-------------------|----------------|------------------|---------------------|
| | | | | | | | | | | | |
| Shu Wang | Ou Zhanchong | 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



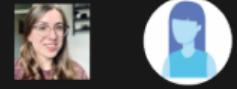
Bella
Spencer Melissa
Bovis

Clinical Fellows



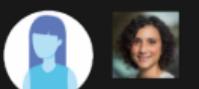
Yada
Kunpalin Brian
Dromey

Quality Management



Jacqueline
Beddoe-Rosendo Clare
Heaysman

Operations Managers



Alima
Rahman Valentina
Vitiello

Investigators



Anna
David Vercauteren Tom
Wenfeng
Xia Sebastien
Ourselin

Finding a fETus with UltraSound (FETUS)

Westminster Enterprise Week #2021

10th November 2021



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

✉ miguel.xochicale@kcl.ac.uk
😺 @mxochicale 🐦 @_mxochicale



This slide is licensed under a Creative Commons "Attribution 4.0 International" license.

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