

Placental imaging and computational modelling satellite

8:30 - 6pm, Monday 4th September 2023,

Te Puia, Rotorua, NZ

8:30am Session opening – Jo James

8:40am Using computational modelling and imaging to better understand the pathogenesis of pregnancy disorders (Chair: Jo James)

8:40 – 9:05am: Prof. Rohan Lewis (University of Southampton, UK) - Multimodal correlative imaging as the basis for multiscale placental modelling

9:05 – 9:30am: Dr Hanna Allerkamp (Medical University of Graz, Austria) - Integrated Approaches for Understanding Uterine Vascular Adaptation in Pregnancy: Advancing Study Design, Interpretation, and Inter-Species Comparability'

9:30 – 9:55am: Prof. Igor Chernyavsky (University of Manchester, UK) - Structural determinants of solute exchange in the human placenta and umbilical cord: a story with a twist

9:55 – 10:10am: Dr Adrienne Scott (Washington University in St. Louis, USA) - Image-based modeling workflow to relate changes of villous structure to changes in function.

10:10 – 10:25am: Dr Nirav Barapatre (LMU Munich, Germany) - From a Single Villous Tree to Whole Placentome – Quantitative Imaging of the Placental Villous Architecture by Micro-CT.

10:25 – 10:40am: Panel discussion

10:40am Morning tea

11am How can imaging and modelling improve clinical translation? (Chair: Alys Clark)

11 – 11:25am: A/Prof. Alys Clark (University of Auckland, New Zealand) - Computational models as a tool to bridge the translation gap in pre-clinical studies of the placenta

11:25 – 11:50am: Dr Janna Hutter (Kings College London, UK)

11:50 – 12:15pm: Dr Matthias Schabel (OHSU, USA) - Perturbation of maternal blood oxygen level as a tool for interrogating placental function.

12:15 – 12:30pm: George Hutchinson (University of Nottingham, UK) – Effects of maternal blood supply on IVIM parameters in Diffusion Weighted MRI.

12:30 – 12:45pm: Dr Junshen He (Nanfeng Hospital, Southern Medical University, China) - Diffusion-derived vessel density computed from a simplified IVIM imaging protocol: A novel biomarker of placental dysfunction

12:45 – 1pm: Panel discussion

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1pm Lunch

1:45pm **How can computational modelling help improve the use of imaging in predicting/detecting pregnancy pathologies? (Chair: TBC)**

1:45 – 2:10pm: **Dr Andrew Melbourne** (University College London, UK) - Placental oxygenation measurement and validation.

2:10 – 2:35pm: **Prof. Sally Collins** (University of Oxford, UK) - The OxNNet Toolkit: an AI-driven fully automated image analysis tool

2:35 – 3pm: **Prof. John Sled** (University of Toronto, Canada) - Wave reflection ultrasound for the detection of placental disease.

3 – 3:25pm: **Prof. Penny Gowland** (University of Nottingham, UK) – What do we need from imaging and modelling in the placenta?

3:25 – 3:45pm: Panel discussion

3:45pm Afternoon tea

4:10pm **The future of placental modelling (Chair: Alys Clark)**

Prof. Peter Hunter (Auckland Bioengineering Institute, University of Auckland, New Zealand) - Clinically focused modelling with digital twins: Is it time to model the body's physiological systems (including pregnancy) with comprehensive multi-scale physics-based approaches?

5-6:30pm Drinks and networking overlooking the Te Puia geothermal landscape