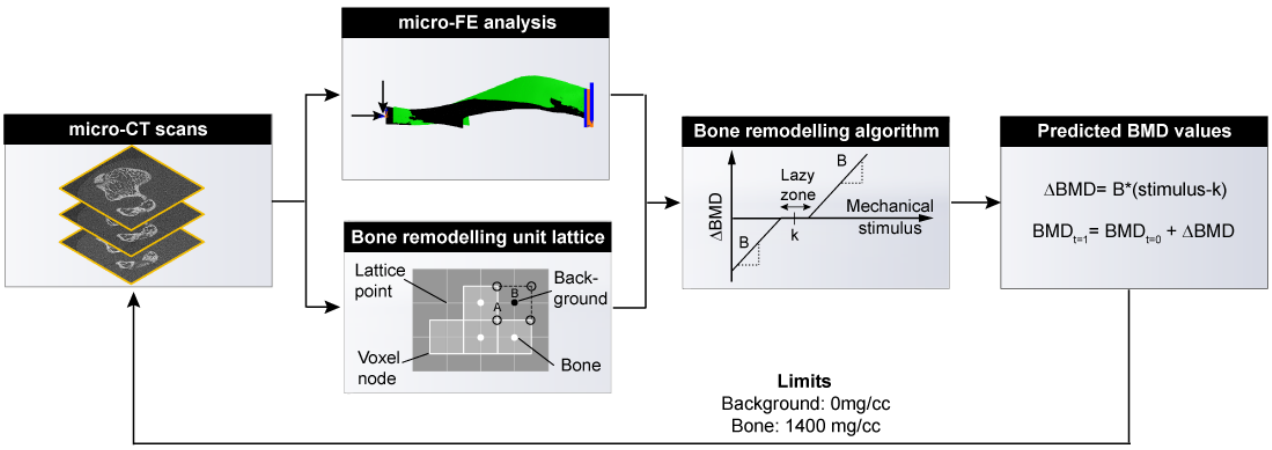
# Vee San Cheong

**Vee San Cheong** completed her PhD at Imperial College London, where she studied the structural failure and fracture of immature bones in bending and torsion at various strain rates. She won a travel grant to the World Congress of Biomechanics to present her research in 2014, and the runners' up prize for the JRI Best Medical Engineering PhD by the IMechE in 2015. She then moved to University College London where she developed a novel algorithm that predicted extracortical bone formation in patients with segmental prosthesis and analysed implant designs. She joined the MultiSIM project in May 2018 to develop and validate bone remodelling algorithms with *in vivo* longitudinal data. She has recently developed the first bone remodelling algorithm to model bone changes in mouse tibia for micro-FEA, which is also the first model that is calibrated to physiological loading. The quality of her work led her to be awarded the Insigneo Post Doc Bridging Fund this year. Her research interests include understanding how bone fails at the structural level, modelling the process of bone remodelling, and improving the design of orthopaedic implants to delay and hopefully one day prevent the failure of implants in patients. She can be reached at v.cheong@sheffield.ac.uk

## Development of bone remodelling framework




1. Development of bone remodelling framework
   - Evaluation of effect of lazy zone without remodelling
   - Calibration of algorithm parameters

2. Evaluation of different FEA outputs (mechanical stimuli) as the driver for bone remodelling
   - Strain energy density
   - Maximum principal strain

3. Validation of predicted images with *in vivo* longitudinal dataset
   - Physiological loading
   - Mechanical loading
   - Parathyroid growth hormone (PTH)

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## Publications

Cheong, V. S., Fromme, P., Mumith, A., Coathup, M. J., & Blunn, G. W. (2018). Novel algorithms in Adaptive Finite Element Analysis to Predict Bone Ingrowth in Porous Implants Made by Additive Manufacturing. *Journal of the Mechanical Behavior of Biomedical Materials,* 87: 230-239

Cheong, V. S., Coathup, M. J., Blunn, G. W., & Fromme, P. (2018). Adaptive 3D Finite Element Analysis Model to Simulate Extracortical Bone Growth. *Computer Methods in Biomechanics and Biomedical Engineering,* 21: 129-138

Cheong, V. S., Karunaratne, A., Amis, A. A., Bull, A. M. J. (2017). Strain Rate Dependency of Fractures of Immature Bone. *Journal of the Mechanical Behavior of Biomedical Materials,* 66: 68-76

Cheong, V. S., Bull, A. M. J. (2015). A Novel Methodology to Optimise the Alignment of Long Bones for Experimental Testing. *Journal of Biomechanics*, 48(16), 4317-4321

Cheong, V. S., Poh, C. L., Yew, K. S. A., Lie, D. T. T., Sheah, K., & Goh, K. L. (2012). Magnetic Resonance Imaging of the Human Anterior Cruciate Ligament: Three-Dimensional Computer Reconstruction and Structural Analysis. *Journal of Medical Imaging and Health Informatics*, 2(4), 378-385

## Selected conference presentations

Cheong, V. S., Campos Marin A., Lacroix, D. & Dall'Ara E. (2019). Predicting cortical bone adaptation to physiological load in the mouse tibia. *Paper to be presented at 25th Congress of the European Society of Biomechanics, Vienna, Austria*

Cheong, V. S., Campos Marin A., Lacroix, D. & Dall'Ara E. (2019). A novel algorithm to predict bone changes based on physiological loading in a preclinical murine model. *Commented poster presented at 46th European Calcified Society, Budapest, Hungary*

Cheong, V. S., Fromme, P., Mumith, A., Coathup, M. J. & Blunn, G. W. (2018). Optimisation of 3D Printed Porous Structures for Bone Ingrowth. *Paper presented at 31st Annual Congress of the International Society for Technology in Arthroplasty, London, UK*

Cheong, V. S., Fromme, P., Mumith, A., Coathup, M. J., & Blunn, G. W. (2018). Improving Bone Ingrowth in Additive Manufactured Porous Implants using Osteoconductive Coating: An Experimental and Finite Element Study. *Paper presented at the 8th World Congress of Biomechanics, Dublin, Ireland*

Cheong, V. S., Coathup, M. J., Blunn, G. W. & Fromme, P. (2017). Adaptive 3D Finite Element Model to Simulate Extracortical Bone Growth. *Paper presented at the XXVI Congress of the International Society of Biomechanics, Brisbane, Australia*

Cheong, V. S., Coathup, M. J., Blunn, G. W. & Fromme, P. (2016). Development of an Adaptive Bone Remodelling Model Driven by Mechanical and Biological Stimuli for Implant Analysis. *Paper presented at the 14th International Symposium for Computer Methods in Biomechanics and Biomedical Engineering, Tel Aviv, Israel*

Cheong, V. S. & Bull, A. M. J. (2014). Long Bone Alignment for Mechanical Testing: Optimisation From Geometrical Properties. *Poster presented at the 7th World Congress of Biomechanics, Boston, USA*