

Title: Application of diffusion tensor imaging to study skeletal muscle structure in health and disease

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Abstract: Diffusion tensor imaging (DTI) is a magnetic resonance imaging protocol that is sensitive to the amount and direction of diffusion of water molecules in tissues. This information can then be used to quantify both micro- and macrostructural features of human tissues. While well-established in human brain studies, the application of DTI to human skeletal muscle is still emerging. This seminar will present the underlying principles of DTI and the practical challenges of using DTI in human skeletal muscle. A range of applications of DTI in skeletal muscle research will then be presented, including studies of muscle development in children with and without cerebral palsy, and studies in which DTI is used to improve the biofidelity of computational muscle models.

Biography: Dr Bart Bolsterlee is a mechanical and biomedical engineer with specific expertise in imaging and modelling of the human musculoskeletal system. As a Research Fellow at Neuroscience Research Australia (NeuRA) and Conjoint Lecturer at UNSW Graduate School of Biomedical Engineering, he develops and applies cutting-edge magnetic resonance imaging methods and analysis tools to investigate the structure and function of human muscles in health and disease. His specific area of expertise is the application of diffusion tensor imaging (DTI) to reconstruct the three-dimensional architecture of whole human muscles in vivo. These DTI techniques are now used to investigate muscle growth in typically developing children and children with cerebral palsy, and to develop novel computational models to help understand the interaction between muscle architecture, mechanical properties and neural drive in human muscles.