

University of Waterloo Department of Chemical Engineering

Department of Chemical Engineering

Seminar

Friday, June 21, 2013

11:30AM – E6 2024

**“3D Scaffolds Beyond Structural Templates in Tissue Engineering and Regenerative Medicine:
Who is Talking to Whom?”**

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As its central tenet, tissue engineering and regenerative medicine involves the *in vitro* seeding and cultivation of cells onto three-dimensional (3D) biodegradable scaffolds that are capable of providing both mechanical and biological cues. Once seeded, cells are expected to attach, migrate, proliferate, and differentiate into the intended tissue while secreting extracellular matrix components required for support and tissue morphogenesis. It is evident, therefore, that the choice of scaffold material is crucial to enable cells to behave in the required manner for producing tissues of the desired shape and size. Despite rapid advances made in this field, success is hampered by significant knowledge gaps in our ability to regulate and accelerate tissue formation. Recent data from our laboratory suggested that cell-scaffold interaction in 3D space to be mediated by intricate signaling pathways that are governed by scaffold pliability, topography, and sufficient oxygen transport. In view of this, the presentation will highlight our current understanding of this rapidly growing field.

Short Biography

Kibret Mequanint obtained a PhD from The University of Stellenbosch (South Africa). He was then awarded a German Research Centres Postdoctoral Fellowship at the Technical University of Darmstadt (Germany) and the Medtronic Inc Postdoctoral Award at the Department of Cardiothoracic Surgery, University of Cape Town (South Africa) to conduct hyperelastic polyurethane biomaterials research for cardiovascular interventions. Following a third Postdoctoral Fellowship at McMaster University (Canada), he joined the University of Western Ontario in 2003 and was promoted to Associate Professor in 2009. He has authored and co-authored 65 peer-reviewed research publications, 45 conference proceedings, and 4 issued US and international patents. His core expertise lies in the design of novel polymer biomaterials for medical devices, tissue engineering, and regenerative medicine applications. His contributions to regenerative medicine research and engineering education have been recognized by a number of prestigious awards such as the Ministry of Research and Innovation Early Researcher Award (2007), NSERC Discovery Accelerator Award (2012), and R. Mohan Mathur Award for Excellence in Teaching (UWO, 2011). He is an Associate Editor and Editorial Board member for a number of peer-reviewed international Journals.