

# Future Industries Institute Seminars

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## New Measurement Techniques Improve Understanding of Biogeochemical and Contaminant Processes

**Abstract:** Natural environments can be highly variable over time or heterogeneous over distance. Some are both. This makes it challenging for monitoring and research studies to obtain data that is representative and accurate, which are both required to understand environmental processes and manage contaminants. My research has focussed on use of passive sampler devices (PSD) and other techniques to address these challenges. PSDs of interest are the related DET (diffusive equilibrium in thin films) and DGT (diffusive gradients in thin films) techniques.

DET and DGT methods have been developed to allow measurement of two-dimensional, mm-resolution and highly representative measurements of distributions of key sediment porewater solutes (Fe(II), sulfide, phosphate, alkalinity). The Fe(II) and sulfide measurements generally represent the sub-oxic and the anoxic biogeochemical zones, respectively. Use of these techniques has confirmed that many coastal sediments exhibit a high degree of heterogeneity, which has particular implications for the use of conventional sampling methods that often cause unstable porewater solutes to react and form precipitates.

DGT methods have also been developed to measure nitrate, ammonium and phosphate in surface waters. Concentrations of dissolved inorganic nutrients change considerably during high flow events and can even vary over diurnal cycles in productive waters, especially for nitrogen species. The DGT techniques were demonstrated to provide time-weighted average (TWA) concentrations that were highly representative of the changing nutrient concentrations and thereby should be considered for use with investigative monitoring. A TWA sampler for particulate substances is also being developed for which I will present preliminary results.

I will also outline some of the future research directions I am considering, including those in collaboration with FII staff.

**Wednesday 31st May 2017 at 2 pm – MM1-05, MM Building, Mawson Lakes Campus**

**All welcome!**

