Contribution ID: **63** Type: **Oral presentations**

Clinical and Pre-clinical applications spectral x-ray detectors

Wednesday, 3 February 2010 15:00 (15 minutes)

Photon counting detectors are of growing importance in medical imaging because they enable routine measurement of photon energy. Detectors, such as Medipix2 and Medipix3, record the energy of incident photons with minimal loss of spatial resolution. This is being investigated for both pre-clinical and clinical applications.Early investigations and clinical guidance suggest that computed tomography (CT) is an appropriate modality. For CT, detectors need only cover a thin arc. With Medipix this can be achieved using a 2 X n array. Also, CT can be performed with dead spaces and inhomogeneity across the active area. This is important because high quantum efficiency sensor, such as CdTe or GaAs, are difficult to produce. Medipix detectors achieve the necessary count rates for full body CT by having small pixels each counting at near megahertz rates. Clinical experience with dual energy systems (using kV switching) have shown that CT provides the most clinically relevant data. Applications under investigation by the Medipix3 and partners include:
K-edge imaging: Using spectral information to measure heavy elements (eg. preparations of iodine, barium, and gadolinium).
Atomic substitution: Replacing potassium or calcium with chemical analogues such as strontium or rubidium.
Nano-particles: Particles containing heavy atom are currently being manufacturing to measure the porosity of liver sinusoids.
Improved soft tissue contrast: Using dual energy system it has been shown that image contrast for soft tissue can be improved. e.g. iron and calcium within vascular plaques.
Results of biological specimens from a Medipix based MARS scanner (Medipix All Resolution System) will be presented.

Please submit a short bio (max 1500 characters)

MBChB - Medicine - University of Otago 1998
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Dr Anthony Butler is a radiologist with formal training in physics and computing. He has academic affiliations with the University of Otago Christchurch, the University of Canterbury, and CERN (European Centre for Nuclear Research). He works as a clinical radiologist at Canterbury District Health Board and is the director of the Centre for Bioengineering at the University of Otago Christchurch. He has won 10 awards for his research including awards from the Royal Society of NZ and the Royal Australian College of Radiologists. He is a named investigator on over $6m of NZ government research grants.

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