

Warm congratulations Dr Steve Pas!

Dr Steven Pas, an ARC APD Fellow in the Department of Materials Engineering, Monash University working with ACES and CSIRO Materials Science and Engineering was last night awarded a prestigious Victoria Fellowship at Government House.

The fellowship provides Steve with funds to further his research in areas relating to biomedical imaging using positrons. It recognises both the high quality of his research to date, and the innovative and strategic nature of his proposal.

### **New imaging modality based on the measurement of positron annihilation processes with position sensitivity**

There is an unexploited synergy between the laboratory techniques that detect subtle changes in the nanostructure of materials and the clinical techniques used to image tissue as it transitions from the healthy to the diseased state. Concepts that underpin positron annihilation experiments in both materials science and medical imaging can be exploited to take advantage of the sensitivity of positrons to subtle changes in molecular structure and packing and the positron's ability to pinpoint, spatially, the location of these subtle changes.

Processes occurring at the positron-electron annihilation site which result from changes in electron density and electron momentum are routinely measured in the materials science laboratory with no position sensitivity. In medical imaging, however, a positron emitter is incorporated into a metabolically active molecule, which concentrates in the targeted tissue and only information on the annihilation location is obtained i.e. no information on the annihilation processes recorded.

The objective of this study mission is to use start-of-the-art equipment, not available in Australia, to determine if it is possible to obtain information on positron annihilation processes with position sensitivity. This proof-of-concept research will cross boundaries between physics, chemistry and biology to create novel imaging technology allowing early warning detection of the structural health of tissue and industrial materials.