

Australian Institute of Physics NSW Branch (July News)

The July meeting of the NSW AIP branch was held at the University of Sydney on Tuesday the 27th of July 2010 and featured a public talk by Chris Garvey on the topic of "Beyond the Gingerbread House – Engineering with Sugar Based Materials".

Dr Garvey completed his PhD in Chemical Engineering at Monash University and has worked as an instrument scientist at ANSTO for the past six years. Dr Garvey makes use of the new small angle neutron scattering instrument (SANS) at ANSTO for his research in an area called 'soft matter'.



From left to right, Mr Paul Stenhouse, Dr Chris Garvey and Dr Graeme Melville (AIP Branch Chair)

Chris began the talk by drawing the audience into a review of how plants use sunlight and carbon dioxide to produce sugars in the familiar photosynthesis cycle. These environmentally friendly sugars can be engineered. Chris is researching into learning how plants control the texture of cellulose by making use of SANS in the 5 nm to 100 nm size range. It was explained that there are 3 types of fibre – cellulose (polymer of two glucose units); hemicellulose (various polysaccharides) and lignin (cross link polymer). By analyzing the cellulose material from the mouth of a Diprotodon, Dr Garvey's research has helped determine what they ate. The two ton extinct Diprotodon, was the largest marsupial to have lived and which may have been as recent as 40000 years ago in Australia.

Dr Garvey's research has also involved helping understand the evolution of the cell wall in plants, gather data on cell wall stress/strain, seeing how different polymers behave under deformation and developing tools for seeing how water interacts with different polymers thus explaining how the hydrogen bonding in cellulose makes them resistant to degradation.



Photo: Further discussions continuing later during dinner at the Buon Gusto Italian restaurant.

Dr Chris Garvey's informative talk showed the clear link between biology (biological materials science) and physics and the fact that we have much to learn from nature especially since it has been operating for countless millions of years.

The talk was very well done and The NSW Branch of the Australian Institute of Physics thoroughly thanks Chris for this public lecture!

Dr Graeme Melville – AIP NSW Branch Chair