

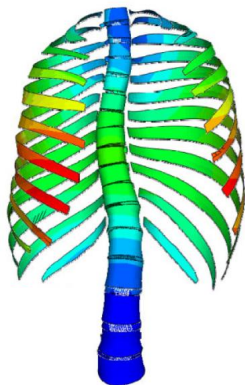


Paediatric Spine Research Group Newsletter December 2011

The QUT/Mater Hospitals Paediatric Spine Research Group (PSRG) was formed in 2002 to conduct high quality collaborative research into spinal deformities.

Mater Children's Hospital grant success

PSRG postdoctoral researcher Dr Paige Little has been awarded a \$31,500 grant in the 2011 Mater Children's Hospital Golden Casket Grants round to support the continuing development of patient specific spine computer models for analysing the biomechanics of scoliosis surgery.

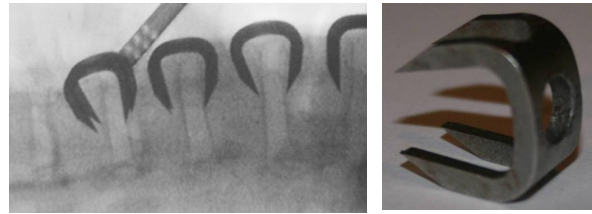


The grant will enable the PSRG to continue enhancing and refining the computer model, with efforts specifically focussed on the inclusion of realistic simulations of patient-specific muscle forces and spinal motion after surgery. With this enhancement, the spine computer models will move further toward the goal of realistic simulation of surgery outcomes and treatment optimisation for patients undergoing scoliosis surgery.

New Research Masters Candidate & Fellow

Dr Nabeel Sunni commenced his Research Masters project earlier this year titled "A biomechanical investigation of fusionless growth modulation implants for spinal scoliosis treatment". Vertebral body stapling to halt progression of spinal deformity in younger children is a technique that holds much promise but despite great interest in the procedure there is little known about how the insertion of staples affects the surrounding spinal tissues and the post-operative biomechanics.

The aim of Dr Sunni's study is to conduct moment-controlled in vitro biomechanical tests in immature bovine spines (as a model for young human spines) using an existing shape memory alloy (SMA) staple design as well as testing a proposed new staple design.



Above: Staples are inserted thoracoscopically in young patients with a progressive spinal deformity. Above Right - SMA Staple

Micro CT scans will be performed on the specimens after testing to determine the extent of damage to the surrounding tissues.

We also welcome Dr Stephen Morris, our 2011-12 Spinal Fellow. Steve trained at the University of Bristol, UK, where he also gained an honours degree in Anatomical Sciences. He has already completed two years of spinal surgical training mainly in Southwest England and Bristol.



Dr Morris (left) looks forward to continuing his spinal surgical training in Brisbane and his research project with the PSRG where he will analyse the effectiveness of the intra-pleural analgesia technique used at the Mater Hospitals after anterior thoracoscopic spinal fusion surgery.

Thanks to the outgoing Trustees of the Queensland Orthopaedic Research Trust

There has been a changing of the guard at the Queensland Orthopaedic Research Trust (QORT) this year. To honour the vision and achievements of retiring trustees, Dr Peter Boys, Dr Ian Dickinson and Dr Greg Gillett, a reception was held at Old Parliament House, Brisbane on August 5. The event honoured the enormous contribution of the trustees to the establishment and support of orthopaedic research in Brisbane during the last 10 years. Each trustee was presented with a gift of thanks by QUT Chancellor, Major General Peter Arnison, seen below, congratulating Dr Peter Boys who attended with his wife, Dr Ros Seeney.



Florence Wilson Postgraduate Scholarship

Due to the generosity of the late Florence Wilson's bequest to support Paediatric Spine Research at QUT, the PSRG has established the Florence Wilson postgraduate scholarship to support research into paediatric spinal deformities. The first recipient is Ms Bethany Keenan, who was selected after an international recruitment

process (pictured right) and commenced her postgraduate studies with the PSRG on 21st November. Beth holds an honours degree in Medical Engineering from Cardiff University in Wales.



Paris in 2012 for Clayton Adam

Our Principal Research Fellow, Clayton Adam has been awarded a prestigious European Union Marie Curie International Incoming Fellowship for senior researchers under the European Union 7th Framework program. The host for the fellowship is Laboratoire de Biomécanique at ENSAM ParisTech, a member of the IDEA league of five leading European Universities of Science & Technology.



The duration of the Fellowship is 2 years, commencing in early April 2012 and we offer Clayton our best wishes as he builds on his international research profile and gains valuable experience at a leading European Science & Technology University. His appointment will open up additional collaborative opportunities for the PSRG with European partners and he assures us he will maintain a close involvement with PSRG activities and research projects.

German Research Internship

In June this year, Mr Markus Mehnert, an undergraduate Mechanical Engineering student from Erlangen, Germany joined us as part of the German Academic Exchange Service (DAAD) Research Internships in Science & Engineering (RISE) Worldwide Program. For three months, Markus contributed to PSRG research, spending much of his time in the lab working under the able supervision of Ms Victoria Toal to help improve experimental techniques and prepare bone tissue samples for nanoindentation testing as part of Victoria's PhD project. Markus has now returned to Germany and we wish him all the best in the final stages of his undergraduate studies.

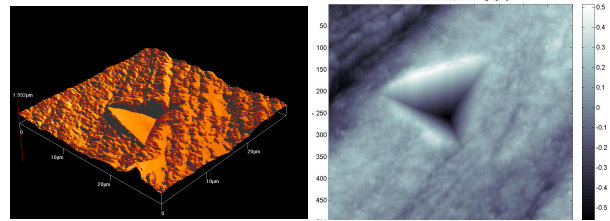


Step away from that scalpel Markus!

Successful ARC LIEF grant

A team of QUT researchers including lead chief investigator A/Prof Cheng Yan and A/Prof Clayton Adam were recently awarded a \$270,000 Australian Research Council Linkage Infrastructure, Equipment, and Facilities

(LIEF) grant to purchase a new nano-indentation system which will be housed in a PC2 facility to allow the indentation of non-fixed biological specimens, as well as other materials characterisation research. This was the only QUT-led LIEF grant in the most recent ARC round, and is an important step in the development of world class research facilities for QUT biomedical researchers.



Above: Nano-sized indentation tests can be used to probe the material properties of bone to see how bone stiffness, strength and fracture resistance are affected by disease or ageing. These indents were generated on bovine bone as part of a collaborative investigation being performed by PSRG PhD student Victoria Toal, and PhD student Jenny Lin from the University of Queensland.

Thanks to those who have supported us in 2011 & we look forward to working with our partners and research collaborators in 2012 and beyond.

PSRG Publications in 2011

We are pleased to announce that for 2011 we have had eight journal papers, two book chapters and a Letter to the Editor published, along with a further 5 journal papers submitted for peer review in 2011.

1. Shaw M, Adam CJ, Izatt MT, Licina P, Askin GN. Use of the iPhone for Cobb angle measurement in scoliosis. *European Spine Journal* (in Press)
 2. Adam CJ, 2011. Endogenous musculoskeletal tissue engineering - a focussed perspective. *Cell and Tissue Research* (in Press)
 3. Little JP, Adam CJ, 2011. Effects of surgical joint destabilisation on load sharing between ligamentous structures in the thoracic spine; a finite element investigation. *Clinical Biomechanics* 26(9): 895-903.
 4. Adam CJ, Swain MV. 2011. The effect of friction on indenter force and pile-up in numerical simulations of bone nanoindentation. *Journal of the Mechanical Behavior of Biomedical Materials* 4 (7): 1554-8.
 5. Shillington MP, Labrom RD, Askin GN, Adam CJ, 2011. A biomechanical investigation of vertebral staples for fusion-less scoliosis correction. *Clinical Biomechanics* 26(5): 445-51.
 6. Hellier D, Albermani F, Adam CJ, et al, 2011. Flexural and torsional rigidity of colonoscopies at room and body temperature. *Proc Institute of Mech Eng, Part H: Journal of Engineering in Medicine*. 225:389-99.
 7. Little JP, Adam CJ, Askin GN 2011. Patient-specific computational biomechanics for simulating adolescent scoliosis surgery. *Int Journal for Numerical Methods in Biomedical Engineering* 27:347-56.
 8. De Visser H, Adam CJ, et al, 2011. Interactive image manipulation for surgical planning. *Med J Australia* 194(4): S41.
- *Adam CJ, Izatt MT, 2011. Letter to the Editor. *Spine* 36(25): 2232.
- * Little JP, Adam CJ, 2011. Patient-specific modeling of scoliosis. Book chapter in *Studies in mechanobiology tissue engineering and biomaterials* Springer (In Press)
- *Adam CJ, Dougherty G, 2011. Applications of medical image processing in the diagnosis and treatment of spinal deformity. Book chapter in *Medical Image Processing*, Springer, Dougherty (ed).

Any questions or want to know more?
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