Since its inception in 1999, the Trauma and Orthopaedic Research Unit (TORU) has developed the capacity to undertake a range of clinical studies concerning surgical and medical treatment of musculoskeletal disease. The directors, Associate Professor Paul Smith (FRACS) and Dr Damian McMahon (FRACS) lead with clinical and research experience in trauma, emergency surgery, orthopaedics, elective surgery and a vision of excellence in clinical care stimulated by a vibrant and innovative research team.

TORU has two research arms, the clinical arm at The Canberra Hospital, and a collaborative laboratory facility based at the prestigious John Curtin School of Medical Research at the ANU. Dr Jennie Scarvell is the coordinator of the clinical research program. The Unit was initially supported by the hospital, the former Canberra Clinical School of the University of Sydney and the General surgery, Trauma and Orthopaedic communities of the ACT.

Dr Rachel Li is the coordinator of the laboratory research program. Through this collaborative laboratory TORU has an extensive capacity for broad based innovative research.

TORU operates principally on untied grant funding from major orthopaedic industry players, Stryker Howmedica, DePuy, Biomet, Synthes, Zimmer, Smith and Nephew and Device Technologies. Support has also been provided by the Private Practice Fund of The Canberra Hospital, the AO, the Physiotherapy Research Foundation, NHMRC, and the ARC.

Canberra’s carillon on Lake Burley Griffin

TORU creates clinical and laboratory nexus

Our first newsletter

This is the first TORU newsletter, bringing you current information, events and achievements of the Trauma and Orthopaedic Research Unit.

The Canberra Hospital has a dynamic research community with more than ten research units in a wide range of clinical areas. The work of these research units is presented in The Canberra Hospital Annual Research Report, as directed by the Director of Research, Prof Paul Gatenby, and the TCH Research Strategy Committee.

In the meantime, however, TORU recognized that in order to stay in touch with those companies, institutions and philanthropic bodies that support us, a newsletter would be a rapid, informal and friendly way to reach across space and communicate. This January 2008 newsletter is our first. We hope you enjoy it!
Clinical Research Directions

TORU has the capacity to undertake broad based clinical studies concerning surgical and medical treatment of musculoskeletal disease. In addition to this, specific targeted studies are welcomed and supported. Some examples are outlined below.

**MRI Knee kinematics:** Clinical studies have examined the effects of ACL-injury, surgical reconstruction and degenerative disease on knee joint kinematics. In collaboration with the Department of Medical Imaging the technique of analysis of knee kinematics using standard MRI has been refined. This research has attracted NHMRC funding, as well as funding from the Physiotherapy Research Foundation and TCH Private Practice Fund. Six published papers resulted from this work, including publications in the Journal of Bone and Joint Surgery (Br), the Journal of Biomechanics and presentation at the AAOS in San Francisco.

**Image Registration:** To link imaging technologies, the Australian Defence Force Academy’s Dr Mark Pickering is collaborating in image registration development. At present this technology is used to recognize a fighter plane’s wing tips appearing on the horizon, but the ability to recognize a 3-dimensional structure from a 2-dimensional image can also be applied to knee kinematics, to apply MRI or CT to fluoroscopy to achieve 3D motion analysis with unprecedented accuracy and capture of detail. This research has been presented at SPIE Medical Imaging conference in Vancouver. The development of RSA capability further extends our capacity to analyse joint replacement kinematics longitudinally. Smith and Nephew support the development of our RSA capacity.

**Fractures, Trauma and Arthroplasty**

**Tribology of polyethylene arthroplasty implants:** Analysis of wear in new and innovative ways is being trialled in collaboration with the Department of Materials Engineering at ADFA. Dr Laura Gladkis and Dr Heiko Timmers are working with us to develop analysis of wear using atomic force microscopy and nuclear physics on a nanometer scale.

**Tendinopathy – The research Angie Fearon is doing in greater trochanteric pain syndrome brings together the strengths of the research capacity: from clinical assessment, tendon histology and immunohistochemistry, to imaging sensitivity and specificity for diagnosis with surgical correlates. The lab and clinical arms of TORU enable this study.**

**Fractures, Trauma and Arthroplasty**

**Daily demands on total knee replacements – an electrogoniometry study:** This prospective longitudinal study is funded by Stryker Howmedica.

**Outcomes of surgery:** Major projects include the outcomes after management of infection in hip and knee arthroplasty, and improvements in management of osteoporotic fractures, particularly fractures of the neck of femur in the elderly. The pelvic fractures database records continuous outcomes for patients requiring internal fixation of fractured pelvis. The fractured neck of femur database is used to monitor clinical pathways, clinical management and quality assurance in a model of continuous quality improvement. This research has been presented at the Australian Orthopaedic Association national meeting, as well as the Australian Health Outcomes Conference.

**Long bone fracture and fat embolism:** Management of severe trauma and prevention of complications in this particular group are also a special interest. We have developed a large animal model (sheep) of fat embolism in order to more closely study this phenomenon and develop a treatment strategy. The animal model knowledge we have achieved can be translated into predictions and decision criteria for humans.

**Management of thoracic spine kyphosis in people with stroke:** This research investigates measurement of thoracic spine kyphosis using CAD of x-rays, electrogoniometry and flexicurve and clinical assessment and its potential for treatment. It utilises collaboration with neurology, medical imaging and orthopaedics teams.

**Defence technology in image registration applied to knee kinematics, takes us into the next century**
Laboratory Sciences under the JCSMR roof

TORU has established a collaborative laboratory facility, with the ANU Medical School located within the John Curtin School of Medical Research. Dr Rachel Li coordinates TORU lab bringing together clinical practice and laboratory research thereby pioneering orthopaedic research in the ACT area. TORU lab is collaborating with Professor Chris Parish and Dr Craig Freeman at the Department of Immunology and Genetics, JCSMR. This collaborative environment is a key to ensuring that better ways of bridging the gap between basic research and clinical practices. This unique translational medicine approach is a major strength of the TORU structure. TORU lab became operational on July 26, 2006 and has attracted research funding from Australian Orthopaedic Association Research Foundation, The Canberra Hospital Private Practice Fund and the Royal Australian College of Surgeons. TORU lab has completed a number of research and industry-contract research projects, as well as in-house research. Through the clinical/laboratory collaboration, TORU lab has an extensive capacity to undertake broad based clinical and basic scientific studies concerning surgical and medical treatment of musculoskeletal diseases. TORU lab has established research areas in bone and tendon healing, inflammatory arthritis and in the interactions with the osteogenic cell population of the skeleton and immunological modulation and metabolic disease.

TORU lab provides a range of laboratory capabilities and has the facilities to determine the influence of surgical, therapeutic and physiotherapeutic treatment and on numerous physiological markers. This includes measuring the effects on osteogenesis, angiogenesis, chondrogenesis, osteo-immune function, cytokine response and cell cycling by western blotting, real-time quantitative polymerase chain reaction (RT-qPCR), and flow cytometric techniques using both fresh human osteoblasts, osteoclasts, chondrocytes and tenocytes, and multiple cultured cell lines; or by measuring the effects of bioactive agents, equipment and medical devices in vivo on small (rodent) and large animals (sheep).

Cellular responses to heparanase

TORU lab is developing new methods of analysis including anti-inflammatory and antioxidant markers, adipokines, and lipid and glucose metabolism, as well as determination of the cytotoxicity of bioactive agents.

1. Primary Cell Culture and Cell Lines
   - TORU lab has established primary cell cultures of human osteoblast cells, tenocytes, chondrocytes and adipocytes

2. ELISA and Western Blot: 3. Pathway Focused Gene Expression
   - RT-PCR, focusing on FGF, IGf, MMP, BMP, SMAD families
   - RT-PCR Array, focusing on osteogenesis, angiogenesis, chondrogenesis, common cytokines, inflammatory cytokines

4. Osteoimmunology Research in Arthritis and Musculoskeletal Diseases: Using flow cytometry, we have developed non-specific and specific immune response measurements:
   - Lymphocyte activation (CD4, CD8)
   - Natural killer cell cytotoxicity
   - Phagocytosis of granulocytes and monocytes
   - Dendritic cells
   - Common cytokines

5. Linkage between Bone Disease and Lipid Metabolism
   - Recent observations suggest that molecules known to influence the development of adipose tissue can have important effects on bone cells. In part, this may reflect the fact that fat-storing adipocytes and bone-forming osteoblasts arise from the same type of progenitor cell. There are also potentially significant parallels between bone loss and the development of cardiovascular disease. To understand the interplay of bone and lipid metabolism, we are focusing on developing:
     - Interactions between bone cells, vascular cells and adipocytes
     - Biomarkers in lipid metabolism, such as leptin and adiponectin

- Proxisome proliferator activated factor (PPAR)

6. Inflammation
   - A broad range of diseases, such as rheumatoid arthritis osteoarthritis, diabetes, insulin resistance etc, are inflammatory processes. The inflammatory markers allow assessment of the progress of the inflammatory process and the efficacy of anti-inflammatory agents. These include:
     - Cyclooxygenase 1 (COX-1) and Cyclooxygenase 2 (COX-2)
     - Prostaglandin E2 (PGE2)
     - Inflammatory cytokines
     - High sensitivity C-Reactive Protein
     - Matrix metalloproteinases

- TORU lab has established primary cell cultures of human osteoblast cells, tenocytes, chondrocytes and adipocytes
**Assoc Prof Paul Smith, BMBS FRACS (Ortho), Director**

Assoc. Prof Smith is an orthopaedic surgeon at The Canberra Hospital and at Calvary John James Hospital in Canberra. He is also Co-Director of the Trauma and Orthopaedic Research Unit at The Canberra Hospital. Assoc. Prof Smith is also president of the Arthroplasty Society of Australia, and Clinical Director of Orthopaedic surgery at The Canberra Hospital.

Assoc. Prof Smith received his medical and surgical training in Adelaide before specialising in hip and knee joint reconstructive and replacement surgery. He was a Royal Australasian College of Surgeons Travelling Fellow in 1996 and 1997 with Fellowships in joint replacement surgery at the University of Western Ontario in Canada and at The Princess Elizabeth Orthopaedic Hospital in England. He has recently been honoured by The Knee Society, receiving the inaugural John N Insall Travelling Fellowship in knee surgery and has been appointed as Associate Professor in Orthopaedic Surgery at the ANU Medical School. Assoc. Prof Smith’s particular clinical interests are in reconstruction and replacement surgery of the hip and knee, complex revision joint replacement surgery and management of pelvic and acetabular injuries.

Contact: smithadmin@co.net.au

**Dr Damian McMahon, MB BS FRACS, Director**

Dr McMahon is the Director of the Shock Trauma Service, Senior Staff Specialist in surgery and Co-Director of the Trauma and Orthopaedic Research Unit at The Canberra Hospital. In addition, Dr McMahon is the Director of the Clinical Skills Centre and Senior Lecturer in surgery at the Australian National University Medical School.

Dr McMahon received his medical and surgical training in Melbourne where he specialised in Trauma Surgery. He became Trauma Service Coordinator at Preston and Northcote Community Hospital in 1993 and from 1994 until 1997 he worked as Trauma and Surgical Critical Care Fellow and Attending Traumatology surgeon at the Hospital of the University of Pennsylvania, Philadelphia PA. In 1997 Dr McMahon took up his position as co-joint academic/senior staff specialist at The Canberra Hospital.

Dr McMahon was instrumental in establishing the Snowy SouthCare Helicopter retrieval service to service the region with medical and specialist support. He achieved recognition for the hospital as the first accredited Trauma Centre in Australia.

Contact: damian.mcmahon@act.gov.au

**Dr Rachel Wei Li, MD. PhD, Laboratory Research Co-ordinator**

Dr Li obtained a Bachelor of Medicine from China Medical University in 1982 and worked as a surgeon and senior infectious diseases specialist at China Medical University from 1982-1996. Dr Li’s Master project was on immune responses to viral infection. She led a number of clinical trials in anti-viral and anti-inflammatory drugs and successfully transferred an intellectual property to pharmaceutical industry. Dr Li completed her PhD in pharmacology at Southern Cross University in 2002 and gained her postdoctoral research experiences in molecular pharmacology in the University of Hawaii School of Medicine. Dr Li returned to Australia in 2006 joining the Trauma and Orthopaedic Research Unit (TORU) and has established TORU laboratory with a focus on osteoimmunology. She has developed a range of laboratory capabilities to determine the effects of therapeutic, surgical and physio-therapeutic treatments on biomedical markers using human primary cell culture and large animal models.

Contact: rachel.li@anu.edu.au
Dr Jennie Scarvell, PhD, Clinical Research Co-ordinator

B(App)Sc Physiotherapy, Grad Cert Higher Ed, Cert Health Economics, PhD

Dr Scarvell took up the position of Clinical Research Coordinator in November. Dr Scarvell’s research interests include many aspects of Orthopaedics and Rheumatology, particularly knee kinematics and the development of osteoarthritis in the injured knee. Dr Scarvell began her involvement with the Trauma and Orthopaedic Research Unit in 2000 when she commenced a PhD on the kinematics of the knee using Magnetic Resonance Imaging and the process of degeneration using anterior cruciate ligament injured knees as a model. Dr Scarvell has spent the past four years teaching the inaugural Master of Physiotherapy program at the University of Canberra.

Dr Scarvell graduated with a Bachelor of Applied Science in Physiotherapy from the University of Sydney in 1985. She has been a clinical physiotherapist since then, working in Sydney, Alberta Canada and Canberra.

Dr Scarvell’s career highlights include
• being one of the only women, and one of the only non-orthopaedic surgeons to present a paper at AAOS in San Francisco
• teaching the first four intakes of physiotherapy students for the University of Canberra, and seeing them graduate.

Contact: jennie.scarvell@act.gov.au

Dr Laura Gladkis, PhD, Post doc Fellow

Dr Gladkis graduated with a Master in Physics from the Universidad de Buenos Aires (Argentine) in 2002. She completed her PhD degree at the Department of Nuclear Physics, Australian National University. As part of her PhD project, Dr Gladkis developed accelerator mass spectrometry techniques to measure the radioisotope manganese-53 as a geological dating tool. Based on her work, manganese-53 dating now promises new insights into the origin of the aridity of the Australian landscape. In parallel, she designed and constructed a new type of time-of-flight particle detector in order to detect and identify uranium-236 using accelerator mass spectrometry. This new radioisotope tracing tool will make an important contribution to nuclear proliferation monitoring.

Dr Gladkis will apply her expertise and skills in radioisotope tracing techniques to study the tribology of knee implants and to ultimately extend their survivorship in the patient. Dr Gladkis will carry out this research on prosthesis wear as a post-doctoral fellow; as part of the Advance Materials Group at UNSW@ADFA.

Read more about Laura’s ARC grant on page 6.

Contact: L.Gladkis@adfa.edu.au

TORU’s people

Ms Roxanne Sample, B.Human Mvt Sc. (Hons).

Roxanne gained her degree from Southern Cross University in 2003. Her research was an investigation into colostrum supplementation in the elderly. Roxanne has been managing administration and events coordination for the unit, including the Australian Orthopaedic Association ACT Branch meeting each November. Roxanne manages the pelvic fractures database and joint implant retrievals.

Contact: Roxanne.sample@act.gov.au

Ben Serpell. BOccThy (Hons), B(App)Sc(Human Movement)(Hons)

Ben completed his Occupational Therapy degree at Deakin University in Victoria in 2006 where his research was an investigation into the degree to which skills learnt in a clinical environment are transferred to the home environment. In early 2007 he completed his Human Movement degree at the University of Ballarat, also in Victoria. His research involved determining the effectiveness of perceptual skills training for improving decision making for changes of direction whilst running in elite football. Ben is employed as a research officer and is currently working on several knee kinematics studies.

Career highlights include sitting in a Stone Brother’s V8 supercar to do an ergonomic assessment.

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TORU’s people: Post graduate students

Ms. Angela Fearon, BAppSc(Physio), MPhysio
Ms Fearon graduated from the Lincoln Institute of Health Sciences in 1986 and gained her Master’s degree in 2001. She has been a clinical Physiotherapist since 1986 and currently has her own practice in Canberra. She is a PhD candidate at the ANU.

Ms Fearon’s previous research interests include interdisciplinary perspectives on arthritis. Her current research interests involve the examination of tendinosis, enthesopathy and Greater Trochanteric Pain Syndrome. She also has a general interest in orthopaedic research into the pelvis and lower limb.
Contact: angie.fearon@anu.edu.au

Ms Diana Perriman, BAppSc(Physio), MSc.
Diana attained her undergraduate degree from Sydney University in 1982 and her Master’s degree at the University of East London (UK) in 1995. Her Masters research investigated the effect of orthotics on the hemiplegic ankle using electrogoniometry. Diana is currently enrolled as a PhD candidate at the ANU.

Diana’s research involves an investigation of kyphotic thoracic posture in normal adults and people with stroke. Diana is supported by an NHMRC Dora Lush Biomedical scholarship.
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Ms Jenny Cahill, B(App)Sc, Speech Pathology, MPhil
Jenny completed her Master’s Degree in the Trauma and Orthopaedic Research Unit. Her research investigated the health outcomes and health related quality of life after infection in total joint replacement.

Jenny attained her undergraduate degree from Cumberland College of Health Sciences (Sydney University) in 1986 and her master’s degree at the ANU. Jenny’s association with TORU continues now she is located in the Division of Aged Care and Rehabilitation.

Florina Lo, BSc, MPhil.
Florina has just completed her MPhil at the ANU Medical School. Florina investigated the effect of heparanase on the stimulation of human osteoblasts. Florina presented this work at the AOA in Auckland. Congratulations!

Susannah Littleton
M/Public Health, Cert.Critical care nursing, RN.
Susannah has been a member of TORU through her work on the Accident Care Evaluation study, sponsored by the NRMA ACT Road Safety Trust. This year Susannah commences her PhD program, on the clinical pathways for people with musculoskeletal injuries following road accidents.
Contact: susannah.littleton@acec.biz

Mingming Chen
Mingming has commenced this year as a lab assistant working with Dr Rachel Li in tissue culture at JCSMR. Welcome Mingming.

ARC grant support funds $326 000 over 3 years

The incidence of knee replacement surgery in Australia is 30,000 per year. Limited by wear debris, the lifespan of knee implants is only 10-15 years and can be much shorter. Due to increasing life expectancy, many patients need several surgical procedures. As a multi-disciplinary team of materials-, isotope-tracing- and medical-experts, we aim to understand and monitor wear debris in prostheses. Knee replacement surgery alone imposes a high burden of annually half a billion dollars on the Australian health budget. Controlling and reducing wear debris in prosthesis joints would reduce these costs and improve patients’ quality of life. Applying rare isotope tracers and the ultra-sensitive nuclear technique of accelerator mass spectrometry we aim to understand wear debris formation in prosthesis joints and plan to establish a new approach to debris monitoring. UHMW polyethylene tibial parts of knee prostheses will be doped with tracer isotopes and studied in laboratory simulations of wear. Debris and wear progression will be detected via gamma-ray emission and accelerator mass spectrometry. Results will reliably correlate tribological parameters and isotope release, preparing the ground for in-vivo work with patients. The new approach will be applicable to wear studies of other macroscopic engineering systems and nano-machines.

Team: Dr Heiko Timmers
Dr Laura Gladkis
Dr Jennie Scarvell
Assoc. Prof Paul Smith

….To attract first quality higher degree students, and to provide an environment where they can study, explore and shine.
Journal Articles


Published Proceedings


8. Cahill J, Smith PN, Butler J, Shadbolt B. Quality of life after post-operative infection in total joint replacement, Australian Health Outcomes Conference, Canberra 2005


Conference papers

Gladkis L, Timmers H, Scarvell JM, Smith PN. Development of a constant load knee simulator to study wear in knee prostheses. AOA, ACT Branch Meeting, Canberra, Nov 2007

Fearon A, Scarvell JM, Cormick W, Smith PN. Identifying the site of pathology in greater trochanter pain syndrome via imaging and surgery. A pilot study. AOA, ACT Branch Meeting, Canberra, 2007


Lo PH, Smith PN, Freeman C, Li RW, Heparanase (HPSE) Stimulates Osteoblasts Proliferation and Differentiation. AOA, ACT Branch Meeting, Canberra, Nov 2007


Smith PN Lo PH, Sample RR, Freeman C, Li RW, Heparanase (HPSE) is expressed in human osteoblasts and associated with bone diseases. AOA, ACT Branch Meeting. Canberra, Nov 2007

Alfredson M, Kao M, Ussher S, Smith PN. Femoral component rotation in a low contact stress total knee replacement. AOA, ACT Branch meeting, Canberra 2006

Arogundade IO, Smith PN, Duggan S. Effect of admission haemoglobin on #NOF outcomes. ACT Branch AOA meeting, Canberra 2005

Gross, M, Smith PN, Duggan S. Elderly #NOF cases 80 and over: The best management? ACT Branch AOA meeting, Canberra Nov 2005

Scarvell JM, Smith, PN, Refshauge, KM, Galloway HR, Woods KR. Does knee reconstruction restore knee kinematics? An in vivo MRI study over two years AOA, ACT Branch Meeting Canberra, Jan 2005

Cahill J, Smith PN, Butler J, Shadbolt B. Quality of life after post-operative infection in total joint replacement, AOA, ACT Branch Meeting. Canberra, Dec 2004

TORU enters a multicentre study with Bo Nivbrant at UWA

TORU is excited to be participating in a multicentre clinical trial comparing two knee prostheses from Smith and Nephew – the Genesis II and the Journey knee systems.

To participate in this study TORU has been equipped to perform RSA of biplanar x-ray films and several radiography staff from the medical imaging department have traveled interstate for training in the radiographic technique.

As part of the multicentre study being chaired by Prof. Nivbrant from the University of Western Australia, subjects are followed post operatively using RSA to record prosthesis alignment, wear, and subsidence of the prosthesis. Functional outcomes including knee flexion and rotation, speed of gait and lower limb power are measured using the IDEEA device for energy expenditure. In addition to measures being carried out for the multicentre study, TORU researchers, Dr. Thomas Ward and Ben Serpell, are conducting a sub study measuring differences in patella tendon angles pre and post surgery from the same sample.

This study will recruit 450 participants nation wide. Four Orthopaedic surgeons in the ACT are currently enrolled in the study - more than any other state or territory in Australia. Participating surgeons are operating over 3 sites and are recruiting both private and public patients for random assignment to the knee groups.

TORU’s involvement in the multicentre study will highlight the unit’s capacity to conduct quality research and open the door for more opportunities to become involved in multicentre studies. It also gives TORU the capacity to use high tech medical imaging systems which can also be used for future research projects.

John James Memorial Foundation supports purchase of a knee simulator

The John James company was known as The John James Memorial Hospital Ltd until 20 June 2007, when it changed its name to John James Memorial Foundation Ltd, in order to better reflect its future activities. John James also adopted a new company Constitution with effect from 12 June 2007, which gives it a broad charter to undertake charitable activities within the health care area.

The John James Memorial Foundation aims to improve availability of specialist and surgical services in remote areas, particularly to Indigenous Australians. It also aims to provide education opportunities to training medical practitioners and surgeons by providing visiting traineeships.

In the case of TORU, John James Memorial Foundation is providing opportunities for medical research to improve outcomes in surgical interventions, namely knee replacement, by funding purchase of a state-of-the-art knee simulator.

The knee simulator is to be constructed by Simulation Solutions in the UK and will arrive to be commissioned in 2008.

This research links with the ARC grant on polyethylene bearing wear characteristics.

TORU lab marks the achievements of 2007

Since TORU lab established, it has attracted research grants from funding agents and industries with a total amount of $360,000.

TORU lab has provided opportunities for the postgraduates to complete their research projects and for registrars to develop their clinical research skills during their training at TCH.

A number of publications have been published/presented nationally and internationally. TORU lab has established collaborative projects with

- the Department of Immunology and Genetics at JCSMR,
- University of Canberra,
- University of Western Australia and
- University of Newcastle.

TORU lab is located within the John Curtin School of Medical Research at the Australian National University

TORU lab marks the achievements of 2007
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The capital's centre for musculoskeletal research


TORU adds to a growing collection of theses!

The first thesis to be placed on the bookcase in TORU in 2002 was the honours thesis of medical student from the University of Tasmania, Dr Emma Terweil. Her thesis was entitled “A cost analysis of infection in total joint replacement.”

In 2004 Dr Jennie Scarvell added to the collection with her thesis “Kinematics and degenerative change in ligament injured knees”. This thesis resulted in seven published papers, including a piece in “Further opinion” in the Journal of Bone and Joint Surgery (2006;88-B:324-3-, Further Opinion pp1-2).

The lucky third thesis was the Masters of Philosophy of Ms Jenny Cahill through the ANU Centre for Epidemiology and Population Health. It was entitled “Health related quality of life outcomes in infected total joint replacement.”

In the last 24 hours Florina Lo has submitted her Master of Science thesis on her work at TORU lab on the action of heparanase on osteoblasts.

TORU currently hosts 3 PhD students, Diana Perriman, Angie Fearon and Susannah Littleton, each enrolled at the ANU Medical School. Two orthopaedic registrars at the Canberra Hospital have also enrolled in the Master of Philosophy (Surgery) at ANU. Dr Sivashankar Chandrasekaran will explore MRI kinematics of PCL-injured knees, and Dr Anil Nair will look at internal fixation of tibial plafond fractures.

If you are interested in exploring opportunities for higher degrees please contact Jennie Scarvell 6244 3701 or Anna Cowan 6125 8506.

How is your posture?

Spinal posture is an area which quickly captures the imagination of the public. Diana Perriman at TORU is examining thoracic kyphosis in people aged between 40 and 80 years in order to determine whether current conservative treatment approaches are effective.

The measurement of kyphosis involves the use of a flexible electrogoniometer which will enable the collection of thoracic spine angular data over time. In this way functional posture is captured, rather than “best behaviour” that may be recorded when being watched, or being x-rayed!

A survey of the current treatment approaches used by physiotherapy practitioners has already received 190 completed surveys from hospital, community and private practice physiotherapists.

Next, a randomised controlled trial will compare resisted exercise with “postural re-education” techniques commonly employed by health professionals.

If you are aged between 40 and 80 you may be eligible to enter, but you must be prepared to be randomised into one of the treatment groups.

Contact diana.perriman@act.gov.au

Waiting for William. John George Brown, 1879
Chrysler Museum of Art, Norfolk Virginia