

Upcoming Events & Seminars

8th International Conference for Cellular Engineering ICCE

Trinity College Dublin
June 10-12th 2010

Postgraduate Summer School

Trinity College Dublin
June 21st – 22nd 2010

Recent Seminars

Medical imaging at the University of Cape Town - addressing public health threats in South Africa

Speaker: Tania Douglas,
Associate Professor of
Biomedical Engineering,
University of Cape Town

Flagellar Swimming and Medical Applications

Speaker: Dr Gabor KOSA,
Computer Vision Laboratory,
Electrical Engineering, ETH,
Zurich

For next edition:

If you have any submissions you would like to make to the next edition please email to tcbe@tcd.ie. We welcome all news including journal publications, presentations at conferences, industrial or clinical collaborations, awards and research grants and new members to the teams.



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Message from the Director

Basic Engineering for Medics and Biologists, an ESEM Primer, edited by Prof T.C. Lee and Peter Niederer is now published and can be purchased [online](#).

This Primer covers the basic engineering principles underpinning: biomechanics, bioelectronics, medical informatics, biomaterials, tissue engineering, bioimaging and rehabilitation engineering. It also includes clinically relevant examples.

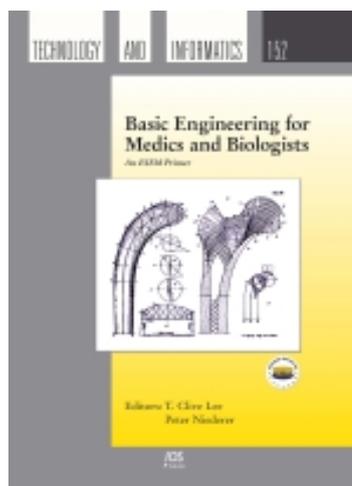
A number of TCBE PIs wrote chapters covering introductions to their areas of expertise, including Veronica Campbell, Fergal O'Brien, Brian O'Connell, and myself as well as research fellows Niamh Plunkett, Sonia Partap, Frank Lyons.

There were two TCBE seminars this month. The first seminar was on Medical Imaging in South Africa. Professor Tania Douglas from University of Capetown detailed the recent outcomes from her research on medical image processing targeting diagnosis of tuberculosis and foetal alcohol syndrome. We are in the process of putting an exchange program together with the University of Capetown to allow postgrads, research fellows and academic staff to spend time in South Africa researching on collaborative projects.

The second seminar was on Flagellar Swimming and Medical Applications. Dr Gabor Kosa, Computer Vision Laboratory, Electrical Engineering, ETH, Zurich gave a talk on the importance of miniaturization of sensors and actuators in the medical field.

The next TCBE News will be circulated in August. Enjoy the summer!

Prof Richard Reilly
Director,
Trinity Centre for Bioengineering



TCBE PEOPLE & ACTIVITIES

This is a recent photo of a fresh human knee being tested on the Multiaxial Instron fatigue machine. Peter O'Reilly, Brendan O' Daly and Eric Meyer are working on this very interesting project with an immediate clinical application.



Peter O'Reilly explains 'we are looking at the effect on knee motion of using a new type of Anterior Cruciate ligament graft. The picture shows the knee upside down so that the tibia is uppermost and the femur below. The tibia is being displaced relative to the femur via a pulley arrangement using the third axis of the machine which is out of view. We are doing this at various angles of flexion which are set on the Universal vise which is gripping the femur.

At the same time the linear axis of the machine is maintaining a small compressive load and we are also applying a torque.

In short we are using the three axes of the machine to test the effect on knee motion of using a novel ACL graft on a fresh human knee at various angles of flexion'.

Prof. Patrick Prendergast was invited to give a talk at the Alchemist Cafe in the Mercantile Bar, Dame Street on Friday 15th May 2010. This event was held in association with Biomedical Engineering Division of Engineers Ireland. Aimed at a general audience, under the title "Computations and virtual worlds for mechanobiology research", Prof Prendergast spoke about how the combined use of the principles of engineering with biology can lead to the development of new treatments for diseases and movement disorders. The crucial role of computer modelling in achieving this was explored. The talk was followed by an open audience discussion. For further information, see www.alchemistcafedublin.com.

Dr Sonja Hermann was awarded a two year postdoctoral fellowship under the IRCSET EMPOWER enterprise partnership scheme with enterprise partner "Centre of Excellence in Universal Design" for researching universal product design and development. A dedicated case study in the medical device sector integrating research into and describing the development of an "Intelligent Automated Pressure Relief Mattress System" will be used to inform the development and integration of curricula on the principles and processes of Universal Design.

Dr. Conor Buckley gave an invited seminar at Sheffield University on the 26th May entitled "Articular Cartilage Repair- Biophysical and Biochemical Environments for Mesenchymal Stem Cell Based Therapies".

Meyer, E.G., Buckley, C.T., Thorpe, S. D., Kelly, D. J. Low oxygen tension is a more potent promoter of chondrogenic differentiation than dynamic compression. *Journal of Biomechanics* (in press).

Thorpe, S. D., Buckley, C. T., Vinardel, T., O'Brien, F. J., Campbell, V. A., Kelly, D. J. The response of bone marrow derived mesenchymal stem cells to dynamic compression following TGF- β 3 induced chondrogenic differentiation. *Annals of Biomedical Engineering* (in press).

Buckley C.T. and O'Kelly K.U. (2010): Maintaining cell depth viability: On the efficacy of a trimodal scaffold pore architecture and dynamic rotational culturing. *Journal of Materials Science: Materials in Medicine*, 21(5):1731-38.

Buckley C.T., Vinardell T., Thorpe S., Haugh M., Jones E., McGonagle D. and Kelly D.J. (2010): Functional properties of cartilaginous tissues engineered from infrapatellar fat pad derived mesenchymal stem cells. *Journal of Biomechanics*, 43(5): 920-926

Buckley C.T. and O'Kelly K.U. (2010): Fabrication and characterisation of a porous multi-domain hydroxyapatite scaffold for bone tissue engineering. *Journal of Biomedical Materials Research: Applied Biomaterials*, 93B(2): 459 – 467

McAlinden A.B., Buckley C.T., and Kirby B.M. (2010): Biomechanical evaluation of different numbers, sizes and placement configurations of ligaclips required to secure cellophane bands. *Veterinary Surgery*, 39(1): 59-64

Bioreactors in Tissue Engineering S. Partap^{1,2}, N. A. Plunkett^{1,2} and F. J. O'Brien^{1,2} ¹Department of Anatomy, Royal College of Surgeons in Ireland, 123 St. Stephen's Green, Dublin 2 ²Trinity Centre for Bioengineering, Department of Mechanical Engineering, Trinity College Dublin, Dublin 2. Book Chapter in *Tissue Engineering*, Edited by Daniel Eberli MD PhD