

SMBE

Adelaide
Aug 2011



SMBE AGM August Joint Meeting With EA & ACPSEM



ENGINEERS
AUSTRALIA
South Australia Division



Medicine and Engineering: A difficult marriage with beautiful children.

Dr Joesph Smith will be coming to Adelaide as part of the Engineers Australia Eminent Speaker Program. The SMBE, Engineers Australia and ACPSEM will be hosting a joint meeting for Dr Smith, after which the SMBE AGM will follow.

Please join us for this event.

Date: Monday 22nd August 2011

Time: 5.30pm for light dinner, 6.15pm for speaker, followed by AGM

Venue: Waverley House, 360 South Terrace, Eastern Adelaide

All welcome SMBE guests at no cost

Dr Joseph Smith is the chief medical and science officer for West Wireless Health Institute, WWHI, a medical research organisation in San Diego.

Dr Smith has a distinguished background in both medicine and engineering, with more than two decades evaluating emerging medical technologies as well as practicing cardiology and cardiac electrophysiology in both clinical and academic organisations. Dr Smith is a guest speaker at this years EPSM- ABEC conference in Darwin, 14-18th August.



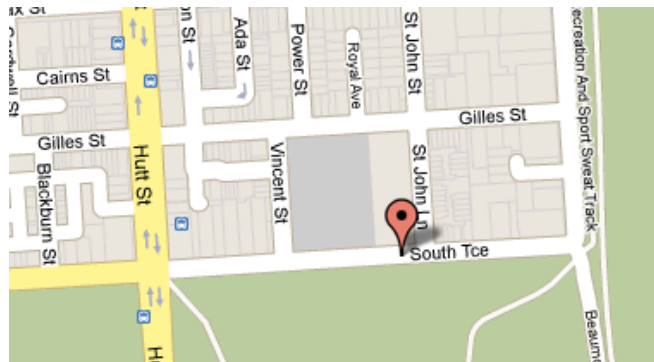
Council Vacancies

The following positions are vacant:

- President
- Vice President:
- Treasurer
- 3 Councilors positions:
- Newsletter Editor

Please email the SMBE secretary if you

wish to nominate for a position or with any other enquires secretary@smbe.asn.au



SMBE Awards



SMBE (SA) Biomedical Engineering Traveling Scholarship

The SMBE (SA) Biomedical Engineering Travel Scholarship was a once off scholarship offered to advance knowledge amongst Biomedical Engineering students in South Australia and Northern Territory. The scholarship provides financial support of up to \$1500 for a student to present their research at the 2011 EPSM/Australian Biomedical Engineering Conference in Darwin 14th -18th August 2011.

The competition was highly competitive and after much deliberation by the committee the following three scholarships were awarded based on accepted conference abstracts.

Majed Aldwehi: Biomedical Technology Management: Procurement & replacement planning

Lynne Burrow: for her two abstracts; ABSIM Abdominal Palpation Training Simulator and "e-Learning": Considerations for Online Training Course Development

Karthik Pasumarthy: A Simulator for Cardiac Catheterisation

The abstracts submitted by each winner are included at the end of the newsletter.

The SMBE committee wishes the three students all the best with their upcoming presentations at the conference.



Innovative Solutions in Medicine and Health Physics

The **EPSM-ABEC 2011 conference** is fast approaching, and this time it will be *THE* conference of the year for all medical physicists, biomedical engineers, technicians, company reps, radiation safety workers and mining workers to attend.

Join us for this first ever **Darwin** gathering which will be a unique, exciting, and invigorating event to be held at the dazzling **Darwin Convention Centre, NT**.

Keynote Speakers: **Prof David Brenner**, **Prof Wolfgang Dorr** and **Dr Joseph Smith**.

Visit www.epsmabec2011.org/ for more information.

Intuitive Surgical® daVinci® Surgical System Site Visit

On the 7th June, SMBE hosted a site visit at the Royal Adelaide Hospital with Dominic Breuker, Product and Education Manager for Device Technologies. The visit was a long awaited opportunity for Dominic to demonstrate the technology of the first surgeon controlled robotic system in South Australia, which is designed for advanced minimally invasive surgery procedures.

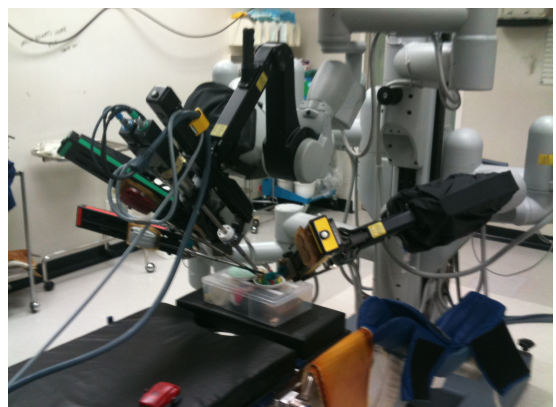
Members and guests firstly had an opportunity to enjoy some refreshments while watching a product video for the daVinci® Surgical System before Dominic started his excellent presentation in the RAH Biomedical Engineering Department. Dominic covered the advancements made in surgery procedures before covering the origins of robotic assisted surgery. He offered an interesting and informative insight to the evolution of the Intuitive Surgical® daVinci® Surgical System and provided video clips of what the surgeon can see when using the daVinci® system. Dominic also spoke about the advantages of minimally invasive surgery such as quicker recovery times leading to shorter hospital stays. However, he used clinical examples with great effect to highlight the benefits of robotic surgery over other minimally invasive surgery techniques such as arthroscopy. After a short question time, everyone was invited to change into theatre attire for a close look at the Royal Adelaide Hospital owned daVinci® Surgical System.



Members and guests had an opportunity to witness Dominic demonstrating the daVinci® system while explaining the technical functionality of the two main system components; the controller and robot (pictured on the left). Later, Dominic invited everyone to sit at the console of the daVinci® system and experience it for themselves. Guests were challenged to manipulate small rubber bands around a silicone training tool that had various protrusions and cavities. This was a very rare opportunity for everyone present and a great gesture from Dominic.

Dominic (centre) assisting a guest at the controller

The evening proved to be overwhelmingly popular amongst SMBE, EA and ACPSEM members alike. The size of the visit was unfortunately limited for safety and convenience and the attendance quota was reached within two days of it being advertised. Due to the large interest, Dominic has gratefully accepted to participate in an already booked out second site visit in mid August.



The daVinci robotic arm

Thanks and appreciation goes to the theatre management and staff of the Royal Adelaide Hospital. We wish to also acknowledge the help received from RAH biomedical staff to help prepare for the visit and for their assistance during the evening. Finally, a big special thanks goes to Dominic for his offer, time, professional presentation and demonstration of the daVinci® Surgical System. We are confident that the second visit will be just as well received by everyone attending and are excited about the future of minimally invasive surgery.

Lachlan Eberhard

Membership Certificates



Are you a SMBE member without a Membership certificate?

Would you like to update your email or contact details?

If so please email the SMBE secretary:

secretary@smbe.asn.au

A membership certificate will be made for you and formally presented at our next technical meeting.

SMBE (SA) Biomedical Engineering Traveling Scholarship Winners' Abstracts

Biomedical Technology Management: Procurement & replacement planning

Majed Aldwehi, Prof. Karen Reynolds & Mr. David Hobbs

Objectives

This project aims to understand medical technology management systems and to describe the current medical technology procurement and replacement planning practice in hospitals in Adelaide and the NT. The project aims to understand biomedical engineering management opinions on practices that could improve medical technology management, such as medical technology procurement centralisation and electronic procurement.

Methods

This project used existing institutional guidelines, a review of the literature and a custom survey questionnaire to achieve its objectives. Documentation and a literature review of government and non-government publications was used to understand the current procedure and the planning process for medical technology management. The survey was divided into seven sections: The first part asked general information about the health facility. Subsequent parts focused on medical technology procurement procedures, medical technology procurement funding, medical technology procurement centralisation, electronic procurement of medical technology, medical technology replacement planning, and priorities for medical technology procurement.

Results

Ten hospitals accepted the invitation to participate in this project. To date four major hospitals in Adelaide have replied. The results divided into seven main parts. The results show involvement of biomedical engineers during the procurement process and the need for planning to manage it. Biomedical engineering management opinions were varied on issues of centralisation and electronic procurement.

Conclusion

This project highlighted the importance of medical technology planning and the management of funds over a number of years. Preliminary results indicate that centralisation could improve the current medical technology procurement practice, but it isn't appropriate for all types of medical technology.

ABSIM: Abdominal Palpation Training Simulator

Lynne M Burrow¹, Harry Owen² and Karen J Reynolds¹

1. School of Computer Science, Engineering & Mathematics, Flinders University, Adelaide, South Australia

2. School of Medicine, Flinders University, Adelaide, South Australia

Introduction

Abdominal palpation is a routine but critical diagnostic procedure performed in many clinical situations. It provides an initial diagnosis of a patient's condition and determines next steps for treatment and the relative urgency. This procedure requires a tactile sensitivity to gather information by applying pressure to the abdomen. It is a difficult technique to teach and assess and a previous study has shown great variation between examiners¹.

Objective

The objective of this project was to develop an educational tool for teaching, practising and assessing the skill of abdominal palpation.

Methods

A simulator was developed based on abdominal palpation force data from a previous study¹. The abdominal palpation training simulator (ABSIM) consists of a platform able to measure the magnitude and location of applied force, a model of an "average" male, and an interface to a PC with custom software which records and displays the simulation session. The model was developed by incorporating the force platform with a physical mould of a male torso, comprising of moulded dragon skin and foam.

Results

The platform, torso model and software was constructed and developed. Mechanical testing of the loading response of the ABSIM platform validated location and magnitude of force.

Conclusion

ABSIM, an abdominal palpation simulator, was constructed and developed. The next steps are to validate this as a method of training and assessment, by completing a trial with medical educators and students.

¹ BURROW, L. B., OWEN, H. & REYNOLDS, K. J. (2008) Developing an Abdominal Palpation Simulator: Quantifying Forces Applied During Examination. *Conference Handbook EPSM-ABEC*. Christchurch, New Zealand.

“e-learning”: Considerations for Online Training Course Development

Lynne M Burrow, Anne-Louise Smith

Biomedical Engineering Department, Flinders Medical Centre, Adelaide, South Australia

Introduction

“e-learning” is generally considered to be a training and educational format using computer-based training. It utilises information and communication technology, and is conducted using electronic based media that is typically web-based.

Objective

To investigate the e-learning strategies, stages and tools needed for development of online training suitable for a Biomedical Technician and Engineering context.

Methods

Three areas of developing an online training course were investigated:

1. Strategic Planning and Management
2. Course Development
3. Learning Tools

Results

1. Strategic planning and management involves decisions regarding the business strategy, overall design and look of the course, choice of learning management system, sets guidelines for copyright, identifies the target learners, and determines the learning objectives and outcomes.
2. The learning objectives and outcomes define the content to be included, and what is “essential” information versus “nice to know”. A storyboard can assist developers in planning the course, with activities to achieve learning outcomes. It is important to develop a teacher “voice” to establish connection with the students and facilitate the online “classroom”.
3. There are many learning tools (see Fig. 1) that can be used in an online course, and utilisation of “desire paths” increase engagement. Efficient use of tools is key, as simple illustrations or activities can be just as effective in achieving a learning outcome as a tool that requires investment of much time and money.



Figure 1. Examples of Learning Tools

Conclusion

e-learning course planning and learning tools were considered and appropriate strategies selected for the next stage of implementation in Biomedical online training modules.

A Simulator for Cardiac Catheterisation

Pasumarthi K, Wates H, Selimovic A, Chapman D, Reynolds KJ.

Objective

Cardiac catheterisation is used to identify and diagnose different cardiac arrhythmias. The procedure involves insertion of a catheter through the veins into the chambers of the heart to measure the electric potentials across the walls of the heart. Continuous guiding and monitoring of the catheter location is done by taking X-Ray images. A recent development in this field is the EnSite System by St. Jude Medical; this eliminates the use of X-Rays by use of a multi-electrode array catheter.

The objective of this project was to develop a simulator capable of mimicking the conduction of the heart in five different arrhythmias as well as during normal conduction, to be used for demonstrating and practising cardiac catheterisation.

Methods

A model heart was developed in which the SA, AV nodes and the conducting tracts in the right atrium and ventricle are represented by current-conducting pins in the model. Two different methods of signal generation have been employed; one using microcontrollers, the other using Labview.

The pins are excited in set sequences in order to reproduce conduction pathways and patterns seen in various arrhythmias. A standard saline solution is used as the conducting medium.

Experiments were performed to validate the conduction system and use of saline.

Results

Conduction pathways and sequences for normal conduction and five arrhythmias (atrial flutter, focal atrial tachycardia, focal ventricular tachycardia, atrioventricular nodal tachycardia, re-entry ventricular tachycardia) have been established, simulated and validated.

Conclusion

The simulator provides a basis for demonstrating and practising cardiac catheterisation.