Technical Visit to the Centre for Innovation in Medical Engineering (CIME), Prosthetics and Orthotics as well as the Bio Instrumentation Laboratories at University of Malaya

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On 24 April 2018, the Healthcare and Biomedical Engineering Working Group under the Electrical Engineering Technical Division jointly organized a technical visit together with the Centre for Innovation in Medical Engineering (CIME). Members from the Institution of Engineers Malaysia (IEM) started arriving at 9:30 a.m. The program commenced at 10:00 a.m. with an introduction from Ir. Dr. Ahmad Khairi Abdul Wahab, the Head of Biomedical Engineering, Faculty of Engineering, University of Malaya. He then led a discussion on industry requirements to enable him and his team to better prepare the students to face the real working world. Professor Ir. Dr. Fatimah Ibrahim, the Director of CIME then briefly went through all the past and current research and development projects undertaken.

Ensuing are CIME's objectives.

1. To provide center of excellence in healthcare and medical engineering innovation in the areas of research and development, consultancy, education, training and community service.
2. To promote medical healthcare engineering applications through publications in journals, research, education and training.
3. To serve as a focal point for industry, government, academia and the various disciplines of medicine seeking to integrate research technology with healthcare.
4.

Some of CIME's services includes but not limited to:-

1. Conducting research in healthcare and medical engineering innovation.
2. Providing training for research assistants who need knowledge on specific research fields.
3. Providing a wide range of research facilities: electrospinning system, UV mask aligner,
4. Organizing workshops, seminars and inter-national conferences.
5. Offering consultancy (Antiaging, Electroencephalogram analysis, Malaysia Standards).
6. Providing holistic healthcare clinic for public.
7. Providing Salat auditing and Science Salat Therapy Clinic

The tour started at 11:00 a.m. and we visited the Medical Informatics and Biological Micro-Electro-Mechanical System (BioMEMS) Laboratory which was established in 2008 as a result of technology transfer from University of California Irvine, United States to Department of Biomedical Engineering, University of Malaya. It is the very first specialized BioMEMS laboratory in Malaysia. In 2013, this laboratory was upgraded to the Centre for Innovation in Medical Engineering (CIME), Faculty of Engineering, University of Malaya. At present the main focus is on the use of Microfluidic Compact Disc as a plat-form that utilizes centrifugal forces to propel fluids within microfluidic chambers and channels. Then we visited the Biosensor and Embedded System Laboratory. Dr. Mohd Yazed Bin Ahmad filled us in on the research on wireless capsule endoscope.

The studies involved in performance evaluation of power transmission coils for powering endoscopic wireless capsules and tuning methods for wireless power transfer in biomedical devices. Further exploration was also conducted on using Smart Antenna System Design for localization of wireless capsule.

Next we visited the Prosthetics and Orthotics Laboratory. Mr Waqas Mehmood, a Certified Prosthetist Orthotist gave us a comprehensive explanation from the very beginning of assessing a patient until the final prosthetic or orthotic device is manufactured. Orthotic are external supports and braces for people with weakened or deformed body parts. The goal is to enable individuals to function to the best of their ability. Prosthetic are artificial limbs to help people with limb loss function more fully. They assess the patient's history, test muscle strength and range of motion, and evaluate the devices for comfort, stability, and proper fit. Both fields combine knowledge of medicine, engineering and materials science to enhance the lives of people. Ultimately, orthotics and prosthetics combines art, science, engineering, problem-solving and patient care in unique and interesting ways. We even had a chance to witness first hand two students moulding a prosthetic limb.

On our way to the final laboratory we also had the opportunity to view the "Rumah Contoh (Penyelidikan)", the first Model Low Cost House incorporating green technology. The Green Low Cost House design was based on masonry structure system, focusing on the application of load-bearing interlocking brick system. Waste materials such as Palm Oil Clinker (POC), slag, POC ash and quarry wastes were introduced in the brick system as well as the foundation of the Green Low Cost House. At the Bioinstrumentation Laboratory, we were intrigued by the many devices developed using medical Informatics which deals with the devices and methods required to optimize the acquisition, storage, retrieval, as well as analyzing and quantitating the extracting information of bio signals. The use of Carbon Micro Electro-Mechanical System/Nano Electro-Mechanical System as a powerful approach to building three dimensional carbon microelectrode arrays for various biomedical applications as well as design and fabrication of medical diagnostic platforms and wearable physiological measurement devices.

Finally, the list of services provided by the Science Salat Therapy Clinic which is open to the general public was shared with us. Following are some of the services provided.

1. Cholesterol test, Heart Disease Risk and Overall Health test
2. Auditing Salat's posture and the effect of salat movements toward body composition
3. Men and Women Weight Loss Weight Program
4. Low back pain therapy
5. Measurement of masculine and feminine floor muscles
6. Brain signal analysis test while performing salat
7. Men's health therapy

The technical visit ended with lunch at 1:30 p.m. courtesy of our host.

Figure 1: Participants listening attentively as Professor Ir. Dr. Fatimah Ibrahim explains the function of the Microfluidic Compact Disc

Figure 2: Dr. Mohd Yazed Bin Ahmad showing participants a wireless capsule endoscope

Figure 3: A group photo taken with Mr Waqas Mehmood surrounded by different types of prostheses and orthoses