Message from the Deputy Dean: Dr. Sarita Verma, LLB, MD, CCFP

Diverse learning contexts have become embedded in medical education and across all health professions. In order to prepare health professionals for the realities of practice in a wide range of settings, “Faculties of Medicine must provide learning experiences throughout medical education for all students in a variety of settings, ranging from small rural communities to complex tertiary health care centres” (The Future of Medical Education in Canada (FMEC): A Collective Vision for MD Education, Association of Faculties of Medicine of Canada, Ottawa, 2010). Going further than that, the vision articulated in the Lancet Commission’s report — “Health Professionals for a New Century: Transforming Education to Strengthen Health Systems in an Interdependent World”— is global, broadening the definitions of ‘distributed’ and ‘disseminated’ to a fully ‘integrated” educational experience. In 2010, the World Health Organization (WHO) recommended that undergraduate students in all health disciplines be exposed “to rural community experiences and clinical rotations, as these can have a positive influence on attracting and recruiting health workers to rural areas” (Increasing Access to Health Workers in Remote and Rural Areas through Improved Retention: Global Policy Recommendations, World Health Organization, Geneva, 2010). Although the specialty of Family Medicine has had rural and community-based rotations for many years, the recent change in the definition for the RCPSC specialties in their B standards of accreditation of ‘electives’ and ‘selectives’ will have a major impact on the way time is counted and credentialled in residency programs (RSPSC Modification of “B” Standards, Memo to Postgraduate Deans September 16, 2013).

The number of students in first year in Undergraduate Medical Education Programs in Canada has increased over 70%. At the U of T, our entering class is now at 259. Regional and ‘DME’ or ‘IME’ campuses have played a large part in driving this growth. Between 2005 and 2012, enrolment in regional campuses saw an almost five-fold increase going from 152 enrolled medical students to over 7,500 in the country. The changes in the scope of health professionals programs and the arrival of new degree programs such as the Bachelor of Sciences, Physician Assistant BScPA at U of T have also catalyzed this effect. The expansion of all our
undergraduate Medical Academies, the renewal of existing affiliation agreements with our hospital partners, and the negotiation of new affiliations with sites across the Greater Toronto Area are also evidence of major growth trends within U of T’s Faculty of Medicine. Overall, the number of our faculty appointments in IME has increased 176% in real numbers from June 2010 to June 2013. We observed the trend of other specialties following the family medicine suit such that in pediatrics, ophthalmology, otolaryngology, psychiatry, emergency medicine, internal medicine and general surgery, there have been significant increases in preceptors and teaching sites extending to community clinics, smaller hospitals and physician offices. In this Newsletter, there is unrelenting evidence for the incredible work being done by all of you in IME. As a result, the recent postgraduate site review commended us as one of the strengths of the entire educational enterprise. This validated the investment made by our collective academic health sciences network and by the Ontario Ministry of Health and Long-Term Care.

The impact of our growth in IME has been unprecedented and immeasurable to the learning environment. Yet in our upcoming “KPI” report we will attempt to do just that – measure our impact. The emphasis on interprofessional education, ambulatory care, and the volunteerism in academic leadership have allowed us to nurture and incubate innovative models of learning across the Toronto Integrated Medical Education (T-IME) Network. E-Learning, faculty development and learner support have emerged as key priorities for our future work. Platforms that facilitate the seamless learning, value for the contributions of all of our clinical teachers are the imperative to our success and must be continually improved for us to stay competitive in the global market.

Profiling our Community-Affiliated Hospitals: Southlake Regional Health Centre

By: Dr. Zaev Wulffhart, Director of Medical Education, Dr. Paul Cantarutti, Site Director, Family Medicine Residency Program and Lorna Bain, Coordinator, Interprofessional Collaboration and Education

In recent years, Southlake Regional Health Centre has boldly pushed the envelope to undergo a stunning transformation. Its state-of-the-art buildings house leading edge technology and facilities comparable to, and in some cases exceeding, what is offered anywhere else in the province of Ontario. However, the strength of Southlake is not in its bricks and mortar or even its technology. Southlake’s strength lies in “The Southlake Way,” a commitment to interprofessional care and the role it can play in creating shockingly excellent experiences to its patients and community. That interprofessional commitment flows throughout the entire organization; from the learning approach within the Academic Family Health Team at Southlake, to unique simulation experiences, to initiatives rooted in interprofessional teamwork throughout the hospital campus.

Academic Family Health Team at Southlake

It is said that to attract the best, you need to be the best. Southlake would add that you also have to train the best. The culture of learning at Southlake is bred of one simple concept – interprofessional experiences lead to healthcare professionals who understand the roles each other play and, as a result, work together to create positive patient outcomes.

In 2009, Southlake and the University of Toronto launched the Family Medicine Teaching Unit, part of the Academic Family Health Team at Southlake. The program enrolls nine physician trainees (seven Canadian and two international medicine graduates) every year for a two-year program.
Residents each have a mini-practice of about 150 patients and spend three half-days weekly working alongside family physicians, nurse practitioners, social workers, and other healthcare professionals to provide ongoing care for their patients. Housed in the modern Medical Arts Building on the Southlake campus, the unit includes a patient waiting area, examination rooms, a special procedures room (Minor OR), and a resident team room.

At the same time, residents follow a two-year rotation schedule in emergency medicine, internal medicine, mental health, musculoskeletal diseases, obstetrics, paediatrics, palliative medicine, several surgical specialties, oncology, and complex medical rehabilitation. As Southlake’s only medical residency program, residents receive unprecedented access to some of Canada’s most talented healthcare professionals in one of the most vibrant and modern facilities in the country.

### Learning by Doing

Understanding that simulation training is key to readiness and positive outcomes, Southlake healthcare professionals, students and residents have access to unique simulated learning events.

In an example of interprofessional innovation, Southlake, supported by a SIM-one research and development grant, recently welcomed 21 U of T pre-certification students including radiation therapists, radiation oncologists and medical physicists from the Department of Radiation Oncology, to participate in the first-of-its-kind Radiation Medicine-Simulated Learning in an Interprofessional Collaborative Environment (RM-SLICE). The experience provided learners with the rare opportunity to experience and react to simulated emergent events in a fully operational clinical simulation, and understand the distinct role each area of expertise plays in the outcome.

Participants worked together in teams and under the direction of educators and facilitators to develop and implement a course of action to treat four simulated clinical cases, many of which utilized the services of standardized patients. Learners had access to state-of-the-art radiation therapy equipment, including a CT scanner and three linear accelerators for delivery of radiation therapy.

### The Southlake Way - Building a Culture of Interprofessional Care

In order to foster a culture where interprofessional care becomes the standard in clinical practice, research, teaching, and learning, Southlake has established an Interprofessional Clinical and Academic Advisory Council.

Key initiatives developed and supported by this Council include:

- Interprofessional Week – this year’s theme, Celebrating an Interprofessional Approach to Safety and Quality Initiatives
- An Award of Excellence in Interprofessional Care
- The Southlake Interprofessional Faculty Development Retreat
- A commitment to teaching at the University of Toronto, Centre for Interprofessional Education
- The pilot and evaluation of a national training program for interprofessional team development
- Southlake’s Regional Cancer Program submitted an interprofessional assessment tool to the Harvard Macy Institute-Education in Health Professions. It was accepted for presentation at the 2013 Association of American Medical Colleges Conference.
- Southlake’s commitment to interprofessional care has resulted in a number of successful outcomes including The Arthritis Program (TAP) at Southlake. This nationally recognized, award-winning interprofessional model of care provides patients with comprehensive diagnosis, assessment, education, and treatment of their arthritis with the ultimate goal of self-management and empowerment.

Southlake Regional Health Centre – A Unique Learning Environment

When the first residents joined Southlake’s Family Medicine Teaching Unit, many did so because they liked the idea of joining a program based within a community. What they discovered was a learning opportunity where, as the only medical residency program residents, they receive exceptional access to talented healthcare professionals and an environment that models The Southlake Way, where healthcare professionals work side-by-side to provide exceptional patient care.

Southlake is proud to boast that it has some of the highest patient, physician and staff satisfaction scores in the province. This is an excellent achievement for a busy, modern 400-bed hospital providing community care in all basic birthing, medical and surgical services, plus a sophisticated tertiary regional referral centre for Cardiac Care, Cancer Treatment, Child & Adolescent Mental Health, Maternal and Perinatal care, and Thoracic Surgery, and a busy emergency department which sees almost 94,000 visits per year.

Southlake is a dynamic place to work, learn and heal, highly motivated to provide an exceptional interprofessional learning experience for its residents.

Community, Diversity & Leadership: A Snapshot of the Family Medicine Residency Program at Southlake

After completing medical school in Ireland, Dr. Nick Clarridge began his residency in the fall of 2012 at Southlake Regional Health Centre’s Family Medicine Teaching Unit. The program is a partnership with the University of Toronto’s Family and Community Medicine department, and each resident operates a mini-practice under the direct supervision of physicians.

During his time at Southlake, Dr. Clarridge gained a wide range of hands-on experiences in medical specialties not limited to family medicine. “Our preceptors are great teachers,” he says. “The residency program emphasized one-on-one instruction and you adopt a greater patient care role. This is not as common with other hospitals and this experience has been invaluable.”

When Dr. Clarridge was looking for a residency program to complete his family medicine training, the idea of joining a program based within a community with a diverse patient population was very appealing. He knows he made the right decision. At Southlake, he has been empowered to develop his leadership skills, which have included spearheading a simulation lab training project in Advanced Cardiac Life Support and an appointment to Chief Resident by his peers. For Dr. Clarridge, Southlake’s Family Medicine Teaching Unit
has illuminated the holistic nature of family medicine. “Southlake has taught me that family medicine is about lifelong relationships with your patients,” he says. “I’m glad for the chance to follow my patients throughout my residency.”

As he looks to the next step in his career, Dr. Clarridge plans to pursue his interest and specialize in emergency medicine. His goal is to open a split practice in family and emergency medicine in Newmarket. “Southlake has provided me with a firm foundation for the rest of my medical career,” he says. “I am excited for what the future holds.”

Understanding the Interprofessional Environment: Clerkship Experience at Southlake

Joanne Boots, a third year medical student, is completing her two-month rotation as a clinical clerk in rheumatology under the supervision of Dr. Carter Thorne and The Arthritis Program (TAP) at Southlake. “Working at Southlake has been an amazing experience,” she says. “Everyone was extremely welcoming and keen to teach me as much as possible.” One of Southlake’s core goals is to provide learners with plenty of hands-on opportunities and feedback so they become comfortable with performing procedures and making clinical decisions.

Southlake’s TAP team showed Joanne how The Southlake Way can make all the difference in enriching a student’s education. “During most of my rotation,” says Joanne, “I was working in an interprofessional environment with physicians, physiotherapists, occupational therapists, pharmacists and nurses.” Boots shares an opportunity she was given outside of TAP where she spent a day with a respiratory therapist. Joanne says it provided her with a much better understanding of the role. As well, equally important, she engaged in case-based interprofessional learning events where she gained perspective on other healthcare roles and issues.

As Joanne reflects on her Southlake experience, she is grateful for the opportunity to be involved in clinical trials, clinical rounds and quality projects. She believes that the collaboration between Southlake professionals leads to exceptional patient care. It didn't hurt that she really enjoyed her experience. “I saw how fun medicine can be and the endless opportunities that it offers,” adds Joanne.

Educational Information Technology Project Summaries & Innovations

“*It was not long before I realized this was going to be an incredible summer. The challenges and opportunities laid the foundation for a group of innovative thinkers and doers (my students) to transform the way we look at the future of our medical education and profession.*”

*Dr. Chi-Ming Chow, MD MSC FRCPC* [http://www.utorontoeit.com](http://www.utorontoeit.com)

The Educational Informational Technology (EIT) summer student program is funded by the Office of Integrated Medical Education at the University of Toronto. It aims to provide students from the Biomedical Communications Program at the UofT (BMC) with the opportunity to put their design and development skills into practice by partnering them with content experts (faculty from the Faculty of Medicine) to develop medical educational modules and websites.
The broad goals of the program are to combine our faculty content experts with medical and/or graduate students at University of Toronto who have technical know-how to develop the next-generation medical educational modules and websites. The EIT Program fosters a community of faculty members and students who will lead the future of medical educational software development at the Faculty of Medicine; provides a framework of educational software design and evaluation through a series of weekly seminars during the summer program; and, provides a portal for our website to feature the educational software projects that have been created. Ultimately, the projects are made available online for use by the University of Toronto, Faculty of Medicine, as well as by other medical schools around the world.

Please read on to learn more about the innovative projects that were created this summer!

Cognitive Connections: Biochemistry With a Medical Perspective


Supervisors: Dr. Nikki Woods, Dr. Mark Hanson, Dr. Sian Patterson, Dr. Stavroula Andreopoulos

The Future of Medical Education in Canada report (AFMC) stresses that continuing emphasis must be given to science during medical training. Basic science education has been shown to complement and aid development of clinical knowledge. Currently, the most basic science taught in the undergraduate medical curriculum is separated from clinical teaching, even when both domains are presented in the same teaching session. For example, the basic science of a system of an organ is presented first followed by specific pathologies including signs and symptoms. In contrast to this format, research suggests that students learn best when basic science information is presented as causal explanations for clinical signs and symptoms.

Cognitive Connections, an online instructional tool, was built on this learning concept and specifically modeled after the instructional materials for research in clinical reasoning. In collaboration with Dr. Mark Hanson (Associate Dean, UME, Admissions and Student Finance at the University of Toronto), Dr. Nikki Woods (Director of Education Evaluation, Department of Surgery, UHN) and Dr. Sian Patterson (Lecturer for the Department of Biochemistry and Faculty of Medicine at University of Toronto), we designed a learning module to teach entering medical students the underlying biochemistry of diabetes in an integrated and engaging way.

Storyline, an e-learning software application from Articulate, was used to build the module and it is planned to be made available to students entering their first year of medical school, serving as an accessible primer for students with science backgrounds and offering fundamental instruction for those without. It is also planned to be included in an experimental study to test the effectiveness of an integrated model in medical education. With the growing interest in integrated learning, it is hoped that the module can evolve and grow to encompass more disease topics in the near future.
Comprehensive Ophthalmology Website

By: Melanie Burger (melanie.burger@mail.utoronto.ca), Jeremy Goldfarb (jeremy.goldfarb@mail.utoronto.ca)

Supervisors: Dr. Ike Ahmed, Dr. Daniel Weisbrod, Dr. Devesh Varma

With the 21st century of medical education shifting from traditional classrooms to inverted, online, and interactive learning, the incredibly visual specialty of Ophthalmology is well suited to be at the forefront of this innovation. This unique position was the genesis for our EIT project. Our team is developing a full service ophthalmology website for 3rd year clinical clerks during their ophthalmology rotation. The website houses interactive ophthalmology cases, built on the U of T developed Virtual Interactive Case System.

The cases serve as a conduit for accessing the department developed course material through embedded links to relevant syllabus sections, clinical skills videos, and an image atlas. All the material is housed within the online course environment, which also provides an element for social interactivity.

Students can comment on cases, post questions, and connect with a course twitter account. This allows real-time feedback and interaction between course faculty and students. The website builds on the current case-driven education style utilized in many ophthalmology e-Learning centres across North America but it provides unprecedented integration, an intuitive, user-friendly interface, and connectivity.

Web-based Adult Cardiology: In Training Examination

By: Cheryl Song (heeyeon.song@mail.utoronto.ca)

Supervisors: Dr. Eric Yu and Dr. Jeremy Edwards

The University of Toronto Adult Cardiology training program has been conducting annual in-training examinations for a number of years. The primary goals of the in-training examination are to provide individual formative feedback and to serve as one measure of the program’s evaluation. In the past, the examination was delivered on site over the course of a single day to the U of T cardiology trainees. This method of evaluation has certain inherent limitations, and so Dr. Yu and Dr. Edwards have been piloting an online version of the examination for two years. Overall, the early experience with the online examination has generally been favorable.

My task in this project was three-fold: to create a new website for the Training Program,
to create a new template for the Division of Cardiology that integrates the Training Program’s website nicely, and to create a template for the online quiz which Dr. Yu and Dr. Edwards will use as a foundation for future quizzes. Some features that this new quiz has are: user-friendly interface, tracking individual trainee performance and examination time, and the ability to restrict examination time on certain sections of the examination.

Future steps that could enhance this project are the creation of another program to visualize the students’ performance, and the implementation of log-ins for staff physicians to easily submit cases and video files.

Cardiac Physiology e-Learning Module

By: Yi-Min Chun, (yimin.chun@mail.utoronto.ca)
Supervisor: Dr. Lisa Bahrey

Dr. Lisa Bahrey is a staff anesthesiologist at the Toronto General Hospital and assistant professor conducting weekly half-day seminars as part of the anesthesia postgraduate curriculum. Currently, anesthesia residents have to choose to forsake other learning opportunities in order to attend these weekly seminars. If a resident is unable to attend the standard seminar, they have no other means to repeat the learning opportunity. To ensure equal accessibility and learning opportunities to all residents, Dr. Bahrey proposed an e-Learning module first using the cardiac physiology content of the seminar. Anesthesia residents can acquire the necessary knowledge at a more convenient time, regardless of their clinical duties and obligations. An e-Learning module is not only portable and self-paced, it also allows for a unique learning experience by incorporating multiple levels of interactivity, videos, and additional academic resources.

After evaluating various e-Learning software packages on the market, I decided that Adobe Captivate 7 was the best platform to meet the needs of the curriculum. In Captivate 7, I built and designed a consistent aesthetic that allows for different interactive components to be incorporated. It allows for interactive widgets where content can be easily manipulated, links to other educational resources (such as recent journal publications), voice-overs, different quiz formats, and embedding video clips such as TEE. I added extra elements into the e-Learning module by creating original illustrations as well as using the VideoScribe software to create dynamic white-board animations timed with voice-over. It is a particularly effective tool when explaining complicated concepts and graphs and can captivate residents in a dynamic and engaging way.

The e-Learning module will be piloted with PGY4 anesthesia residents to validate the learning impact of this media. A randomized cross-study with pre- and post-assessments will provide comparative data to determine if the seminar learning objectives are achieved using e-Learning modules versus traditional seminars. And, to determine whether the residents prefer to learn
important aspects of anesthesia in an e-Learning environment. This pilot project will hopefully serve as a template for other contents of the curriculum to provide an enhanced and meaningful educational opportunity for anesthesia residents.

**National Paediatric Haematology/Oncology Laboratory Medicine Education Resource**

*By: Mitchell Fox (mitchell.fox@mail.utoronto.ca)*  
*Supervisor: Dr. Angela Punnett*

Paediatric Haematology/Oncology (PHO) specialists provide diagnostic service and specialist care for children with cancer, non-malignant blood diseases, and those requiring blood and bone marrow stem-cell transplantation. The use and interpretation of lab testing is a core component of training in this subspecialty, and the Royal College of Physicians and Surgeons of Canada (RCPSC) mandates at least six months out of the total of three years of fellowship to diagnostic testing training. However, because of the varying structures and resources of the ten training sites across Canada, trainees do not receive a consistent curriculum in laboratory diagnostics.

The primary aim of our project is to create a collection of education modules drawn from typical scenarios and from across Canada that allow trainees to learn how lab investigations are performed and interpreted, and the advantages/disadvantages of each test. In July of 2013, we began the creation of nine pilot modules: CBC Basics, Red Cell Morphology, Microcytic Anemia, Red Cell Membranopathies, Sickle Cell Disease, Approach to Bone Marrow Aspirate & Biopsy Assessment, Leukemia, Flow Cytometry, and Introduction to Cytogenetics. We chose to use Articulate Storyline to create the e-modules, due to its ease of use and fast learning curve. Each case begins with defined learning objectives, consisting of CanMEDS competencies and RCPSC objectives. A clinical vignette is then presented, followed by technical and clinically oriented questions, such as how laboratory investigations are used/perform, how to interpret these tests, and their diagnostic and management utility.

Following revisions from faculty feedback in October, these cases will be trialed by small groups of trainees at SickKids. Pilot cases will be available for all Canadian trainees by December, and evaluations for each module will be examined three months later in March. The completion of six new modules is anticipated for trainee use by mid-March. Our goal is for each site to create e-modules and contribute them for use across Canada. We also hope that the authoring trainees and PHO centres learn from each other’s expertise, in order to create an evolving, self-sustainable, and collaborative educational resource.
How Can Learners In Health Professional Education Programs Manage Test Anxiety? – Whiteboard Animation

By: Megan Kirkland (kirklan9@mail.utoronto.ca) (http://www.sparkol.com?aid=71639)

Supervisors: Dr. Cathy Evans, Dr. Sharon Switzer-McIntyre

Drs. Cathy Evans and Sharon Switzer-McIntyre are Professors in the Department of Physical Therapy at the University of Toronto. Through interactions with students, they have found that anxiety or stress can interfere with a student's ability to reach their full potential in exams and tests. This project is an accumulation synthesis of evidence found in the literature concerning causes and symptoms of anxiety in test taking situations, as well as strategies to reduce anxious reactions.

For this project, VideoScribe (a whiteboard style animation) was utilized in order to make it accessible and engaging to a student audience. We aimed for a lighthearted, humorous style while still conveying all of the facts necessary to help reduce test anxiety in the target population. Since this style of animation has risen in popularity lately I had many visual references to use as inspiration, such as videos created by Dr. Mike Evans and RSA Animate.

VideoScribe imports scalable vector graphic files and uses pre-loaded hand images to simulate the pictures being drawn on a whiteboard. This software eliminates the need for the extensive planning, filming and editing required while doing a traditional whiteboard animation, and it facilitates a dynamic, flexible workflow. In August, students in the physical therapy program provided us with feedback and we were able to freely change details of the animation to better suit the audience, which is not feasible with a more traditional process.

Virtual Lung Ultrasound: The Online Resource For Understanding and Learning Lung Ultrasound

By: Jean Lin (jean.lin@mail.utoronto.ca)

Supervisors: Dr. Massimiliano Meineri, Dr. Gordon Tait, Dr. Alberto Gaffi, and Dr. Catherine Nix

Lung ultrasound has been successfully used in diagnosing the cause of respiratory failure in the Emergency Department and has been shown to have higher sensitivity and specificity than chest X ray and physical examination in detecting pleural effusions and pneumothorax. Point of Care Lung Ultrasound is gaining popularity across many different medical specialties and is becoming part of the modern physicians clinical armamentarium.

This online interactive module is aimed to assist with teaching and learning the use of ultrasound in the assessment of the lung. A 3D model of the lung, spleen and the diaphragm were created using CT scan images as references. Accompanied with the heart, liver and ribcage models that were previously created for other modules, so users can learn the structure of the lung and surrounding organs. Important patterns and artifacts are visualized as 2D animation in correspondence with the...
ultrasound recordings, so the viewers can easily compare and understand the structure and the lung movements. Users can view the ultrasound recordings for each of six probe positions and see a corresponding 3D model of the probe, ultrasound plane, and torso for each view. Different types of probes may be selected that are appropriate for the view. The user can choose 2D and M Mode imaging modalities for the former views. This module provides clear explanations for signs and artifacts in the normal lung.

Visual Elements for Virtual Interactive Cases (VIC)

By: Man-San Ma (mansan.ma@mail.utoronto.ca)
Supervisors: Dr. Gordan Tait (gtait@uhnresearch.ca), Tabby Rose (t.lulham@utoronto.ca)

The Virtual Interactive Case (VIC) System is a tool for creating interactive online clinical reasoning problems. Simulated clinical cases provide a bridge to patient care where students can practice clinical reasoning skills without the burden of the other aspects of patient interaction.

VIC cases begin with the presenting complaint, and then users must assess the patient by determining the pertinent history and physical findings and results of diagnostic tests. They then select the diagnosis and management options and feedback is provided, along with a debriefing of their assessment showing their total score, time and cost compared to the optimal score time and cost for this case.

VIC allows rapid development of online simulations by modifying the VIC template (http://pie.med.utoronto.ca/vic). My role was to produce drawings that can be implemented in building new VIC cases. I completed illustrations for various environments, genders and age groups, utilizing Adobe Photoshop CS6 and Adobe Dreamweaver CS6. A total of eleven sets of six illustrations were completed. Developers of VIC cases can choose from a library of illustrations made available in a PDF and website gallery.

Consequently, a study of the construct validity of the VIC assessment score will be carried out by Marcus Law with five Family Medicine VIC cases in three groups: medical students, first year and final year Family Medicine residents.
Web-Based Teaching of Real-Time Ultrasound

By: Amanda Montañez (amanda.montanez@mail.utoronto.ca)

Supervisor: Dr. Mostafa Atri

Dr. Mostafa Atri and his team have been working to build a series of eLearning modules teaching real-time ultrasound, with a particular focus on normal anatomy and scanning technique as the essential foundations for diagnosing pathologies. One of the key strengths of the modules is the inclusion of video clips showing the ultrasound operator scanning the patient, juxtaposed with real-time imaging footage. This allows the viewer to understand how to manipulate the transducer in order to get an optimal image. Meanwhile, the relevant anatomical structures are identified and described in detail (in both text and audio formats) while images and video footage provide clear visualizations of the structures as they appear in cross-section. Dr. Atri’s team has initiated what will eventually be a complete series of these modules, each one focusing on a particular anatomical region.

My task for this project was three-fold: to create a template in which to build additional modules; to add some level of interactivity for more effective learning; and to make recommendations with respect to the design of the modules, as well as the process by which they are created in the future. After evaluating various eLearning software packages, we concluded that Adobe Captivate was the best tool for our needs. I built a template file in Captivate that follows a deliberate design aesthetic and incorporates quiz questions to test the user as s/he navigates through the module. I also created a sample project with examples of visual techniques to support effective learning. Finally, I wrote up detailed instructions for using Captivate so Dr. Atri’s team can use this robust program to build these modules easily and efficiently in the future.

The finished modules are aimed towards multiple outcomes. First, they will be used to help educate local radiology trainees. Abdominal Imaging Fellow Dr. Andre Pereira will conduct a study to determine how effective the modules are as supplements to the existing curriculum at Toronto General Hospital (TGH). Meanwhile, Carole Leduc, who heads the development of the teaching modules at TGH, will seek funding to use them in a humanitarian effort: she hopes to bring ultrasound technology to developing countries and train health professionals to use it as a diagnostic tool.
Development of an Open-Source 3D Virtual Simulator as a Teaching Tool for Pedicle Screw Insertion

By: Brendan Polley (brendan.polley@mail.utoronto.ca)
Supervisors: Dr. Cari Whyne, and Dr. Stewart McLachlin

Pedicle screws are often used in spinal fusion surgery as a means of gripping a spinal segment. However, pedicle screw insertion is a challenging procedure, with complication rates ranging from 1% to 54%. Although preoperative planning can be carried out by measuring distances and angles using computed tomography (CT) and magnetic resonance imaging (MRI), when in the operating room, surgeons insert screws based on feel and alignment with spatial landmarks. Surgical residents receive hands-on training using cadaveric specimens, however these opportunities are largely dependent on the availability of time and lab space.

Surgical simulators offer residents the chance to practice pedicle screw insertion in a virtual operating room. However, most of these simulators run on expensive commercial platforms with single-seat licenses. Described here, is the development of a free, open-source 3D virtual simulator intended to provide surgeons and residents with an accessible means to plan and practice pedicle screw insertion.

The simulator was built as a Python-scripted module for the open-source image analysis software package, 3D Slicer. The simulator allows users to import patient specific CT or MRI scans as DICOM data sets, and can be fully integrated with Picture Archiving and Communication Servers (PACS). Users can then use 2D orthographic views along with 3D renderings of a patient’s spine to make measurements in preparation for surgery. Using Maxon Cinema 4D and Adobe After Effects, instructional videos were made to assist residents with finding key anatomical landmarks. These videos are accessible directly within the simulator. Users are then immersed in an interactive environment, in which they can manipulate 3D models of pedicle screws and insert them into the model of the patient’s spine. Screw placement can then be evaluated by calculating the percentage of cortical and cancellous bone in contact with the surface of each screw, and displayed graphically. Additionally, the position of each screw model is compared with the patient’s CT data to map Hounsfield unit pixel intensities directly onto the surface of the screw model. This effectively allows users to easily identify areas of screws that have breached the bone surface.

Future work includes collecting feedback from residents and surgeons to improve the current simulator, and adapting the module to create simulators for other surgeries (ex. pelvic screw insertion). Furthermore, the potential for integrating haptic feedback devices with the simulator is being explored.
Alumni Awards

Nominations for the 2013 Alumni Awards of Excellence are now open to any member of the University of Toronto community. There are seven awards available and the Faculty strongly encourages our staff, students and faculty members to nominate colleagues for these awards. View awards website here.

The Faculty of Medicine will run an internal competition for four of these awards which require Decanal support. These awards recognize faculty members who have achieved excellence in leadership or both teaching and research.

The awards are:

**Faculty Award:** A $1,000 prize recognizing excellence in teaching, research, and professional endeavors. View the Award Guidelines and the Faculty Award nomination form here.

**Carolyn Tuohy Impact on Public Policy Award:** A $1,500 prize recognizing excellence in teaching, research, and the impact of scholarship on public policy. View the Award Guidelines and the Tuohy Award nomination form here.

**Northrop Frye Award (2):** A $2,000 award given to a faculty member and a $6,000 award given to a Department or Division, recognizing distinguished achievements in linking teaching and research. View the Award Guidelines and the Frye Award nomination form here.

**Vivek Goel Faculty Citizenship Award:** An award of up to $2,500 given to a faculty member who has served the university with distinction in multiple leadership capacities, including committees, governance bodies and external organizations complementary to the university’s academic mission. View the Award Guidelines and the Goel Award nomination form here.

- Nominations for these awards are due by **Monday, November 11, 2013** via email to the Faculty Council c/o Todd Coomber (todd.coomber@utoronto.ca). Nominations must include a description of why the nominee fits the selection criteria and, with the exception of the Northrop Frye Departmental award, all nominations must be accompanied by an up to date CV. For the Northrop Frye Departmental award, the nomination must also include supporting material. The Faculty will then assist in the coordination of the complete nomination package.

- Nominations for the following three awards are strongly encouraged. Please see award guidelines for the nomination process.

  **Chancellor's Award:** Two $1,000 prizes for outstanding contributions by an administrative staff member. View the Award Guidelines here (nomination deadline TBA).

  **Joan E. Foley Quality of Student Experience Award:** A $1,000 award given to a student, alumnum/a, administrative staff or faculty member who has made significant contribution to improving the quality of academic or extra-curricular student life on campus. View the Award Guidelines and the Foley Award nomination form here nomination due (December 6, 2013).

  **Ludwik and Estelle Jus Memorial Human Rights Prize:** A $1,500 prize recognizing positive and lasting contributions to education and action in the fight against discrimination. Faculty, staff, and students may be nominated for this award. View the Award Guidelines here (nomination deadline TBA).
Upcoming Events: Continuing Education and Professional Development

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<td>Minimally Invasive Surgery 2013</td>
<td>November 22-23, 2013</td>
<td>Facilitating Group in Interprofessional Education</td>
<td>November 12th, 2013 8:30am-12:30pm</td>
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<td>Everyday Gynaecology</td>
<td>November 22, 2013</td>
<td>Teaching 101: Part 2</td>
<td>November 15th, 2013 8:30am-12:30pm</td>
</tr>
<tr>
<td>Practice Skills in Primary Care-Challenging Communication</td>
<td>November 23, 2013</td>
<td>The Healthy Teacher</td>
<td>November 25th, 2013 8:30am-12:30pm</td>
</tr>
<tr>
<td>Otolaryngology Update for the General Practitioner</td>
<td>November 23, 2013</td>
<td>Re-Imaging PowerPoint</td>
<td>December 16th, 2013 1:00am-4:00pm</td>
</tr>
</tbody>
</table>

Contact Us

*Faculty, Learners, Alumni and Staff – send your news, updates, articles and photos to share!*

**OFFICE OF INTEGRATED MEDICAL EDUCATION**

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