Executive Overview:

- ASTEC showcased our simulation center at the 3rd Interprofessional Education Conference, Collaborating Across Borders (CAB III), held in Tucson in November 2011, where all components of medical simulation were presented in an interactive demonstration with health care providers from more than 30 states and dozens of countries.

- During 2011-12, nearly a third of all participant utilization was conducted within the actual University of Arizona Medical Center departments (in situ), for an unprecedented 2,165 LCHs.

- ASTEC continues to be a leader in the delivery of high-fidelity medical simulation, adding 7 new training modules and numerous equipment upgrades to our arsenal of training platforms.

- As a national leader in the development of artificial tissue, ASTEC has manufactured 5 new medical simulation models, including a thoracotomy model that bleeds, a cesarean-section model, and a high-fidelity extracorporeal membrane oxygenation (ECMO) model, for unlimited practice of high-risk medical procedures.

- ASTEC has entered our 6th year of developing the Computer-Assisted Surgical Trainer (CAST) system, introducing artificial intelligence-based motion planning to provide the shortest, collision-free trajectories of laparoscopic instrument movements through a 3D surgical space.

- ASTEC remains #1 in product utilization for Karl Storz Endoscopy-America and continues a 7-year partnership with that corporation, uniting state-of-the-art medical instrumentation with innovative methods of simulation training.

- ASTEC moved into a brand-new, 2,600-square-foot, state-of-the-art facility in the College of Medicine in January 2012.

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From the Executive Director of ASTEC

This past academic year, 2011-12, has been momentous for ASTEC. We have moved to a brand-new, 2,600-square-foot, state-of-the-art facility in the College of Medicine. The facility’s low-cost, high-efficiency, and flexible design was developed under Angie Saoua (assistant dean of Planning and Facilities). A video outlining its radical design and productive layout has been selected for recognition at the November 2012 meeting, in San Francisco, of the American Association of Medical Colleges (AAMC).

Our new facility includes our own Artificial Tissue Lab where, under the supervision of David Biffar (ASTEC’s chief of operations), we have manufactured an array of artificial tissue models for practicing procedures right on site. We use absolutely no animals or animal-derived tissues in our training programs, so we insist on artificial tissues to meet all the needs for surgical practice.

At ASTEC, we continue to strengthen our significant ties with the Arizona Telemedicine Program (ATP), enhancing our outreach program. And our Interprofessional Education Program (under the direction of Dr. Andy Theodorou) is bringing a new emphasis on interdisciplinary teamwork in health care delivery. Our staff set up a simulation facility on site at the El Conquistador Hotel for the Collaborating Across Borders (CAB) III conference, held here in Tucson in November 2011. Coordinated by Dr. Ron Weinstein and the ATP staff, CAB III attracted visitors and dignitaries from more than 30 states and dozens of countries.

Our high-fidelity, in-the-field simulations for first responders have received national recognition. Most recently, our exercises involved simulated car crashes with no fewer than 7 computerized mannequins, all operating simultaneously to simulate seriously injured victims. The exercises were done in collaboration with great crews and supervisors from Tucson’s Northwest Fire District (NWFD). ATP again broke new ground by being able to deliver real-time participation in the event to students located at the University of Arizona more than 20 miles away. Our research efforts (under the direction of Dr. Jerry Rozell, the Oglethorpe Endowed Chair in Electrical and Computer Engineering) continue to garner national attention: we have developed numerous “smart” surgical instruments that can correct their own trajectory during an operation if they drift too far out of the surgical field.

We are breaking new ground in a number of areas. With Dr. Robert Poston and his team in Cardiothoracic Surgery, we are working on some of the first artificial tissue simulation models for robotic cardiac surgical training. In addition, David Biffar and his team in the Artificial Tissue Lab are working on developing patient-specific silicone tissue replicas of the heart’s mitral valve: surgeons would be able to see a high-fidelity model of their own patient’s heart valve before surgery and, the night before, could practice the surgical procedure. John Jarred (a clinical educator at ASTEC) has developed a new, highly realistic mannequin-based simulation to train doctors and staff to cope with dangerous, high-risk pregnancies and deliveries. Finally, Lisa Grisham (our medical simulation specialist) and the University of Arizona Medical Center’s Quality Assurance staff are devising immersive and engaging educational computer games to reinforce methods and procedures that help safeguard our patients. Grisham’s team, with the support of Electrical and Computer Engineering, has begun to apply sophisticated data-mining techniques to find new ways to reduce medical adverse events in our hospitals.

Year after year at ASTEC, we lead the way in immersive simulation education. Our administration is fiercely committed to bringing the very best educational methodology and the highest-quality training to students, residents, and clinicians. Throughout the University of Arizona, faculty and staff are passionate about education, research, and patient care. We are driven to harness all that simulation can offer, in order to ensure that the people of Arizona have the best-trained physicians, nurses, allied health workers, and first responders in the country.

Allan J. Hamilton, MD, FACS
Executive Director, Arizona Simulation Technology and Education Center (ASTEC)
ARIZONA SIMULATION TECHNOLOGY AND EDUCATION CENTER

GROWTH

ASTEC opened on August 5, 2005, and has now begun its 7th year of operation. Over the past several years, we experienced an exponential growth in utilization rates as demand for simulation training increased, both at the University of Arizona Health Network and from external first-responder organizations. Chronic overcrowding became the norm in our heavily used facility.

To accommodate our burgeoning training commitments, ASTEC relocated into a new facility in the College of Medicine in January 2012. By increasing the size of our available training space to 2,600 square feet, we are now able to provide simultaneous training sessions with different training groups. We can process an entire class of medical students in one day. Using collapsible room partitions, we can change the landscape of our training space to simulate any environment, a particularly effective option for first-responder organizations. A video outlining our facility’s radical design and productive layout has been selected for recognition at the November 2012 meeting, in San Francisco, of the American Association of Medical Colleges (AAMC). The video’s title is “Future Trends in Design of Clinical Simulation Facilities – Maximum Utilization through Minimalist Design.”

Since 2005, our laboratory has provided a consistently high volume of simulation technology and education services for numerous University of Arizona Health Network departments as well as external first-responder organizations. ASTEC increased its utilization rates for all categories of participants during 2011-12, resulting in a cumulative total of 7,926 learner contact hours (LCHs) in a single year, as compared with 6,706 LCHs during 2010-11.

Even with our outstanding new facility, our available training space is 2,500 square feet below the national average for a college of medicine simulation center.1 Yet our education and training utilization rates are on par with some of the largest medical simulation centers in the nation. Overall annual participant utilization has increased by 9% from the academic year 2010-11. This rate of increase is keeping us on pace for an annual rate of 10,000 LCHs by academic year 2013-14, which qualifies us in the accreditation category of large simulation centers.

Since 2006-07, ASTEC has experienced an overall 9% increase in utilization since AY 2010-11.

We also continue to be among the most multidisciplinary medical simulation centers in the nation, providing medical simulation training throughout all of the University of Arizona Medical Center. In an effort to provide more immersive interprofessional training opportunities, 38% of these teaching activities are now provided for multidisciplinary teams while on shift (in situ) within the departments of Emergency Medicine, Pediatrics, Surgery, and Labor and Delivery. We also provide simulation training to medical flight crews, fire departments, military and federal rescue personnel, community outreach workers, and students in precollege programs. Through innovations in mobile and interprofessional simulation education, we continue to exercise every strategy possible to avoid turning away anyone in the Arizona health care community.

CHART 1: Total learner contact hours (LCH) for each academic year by category of participants during 2011-12, resulting in a cumulative total of 7,926 learner contact hours (LCHs) in a single year, as compared with 6,706 LCHs during 2010-11.

CHART 2: ASTEC in situ training (conducting simulation within the clinical environments) consists of 30% of all ASTEC training compared to 22% in the previous year.

CHART 3: Utilization percentage breakdown for all users of ASTEC for AY 2011-12.

TEACHING ACTIVITIES

More than 80% of our available weekly schedule is devoted directly to medical simulation training. Much of this time is filled by the following College of Medicine programs:

- Emergency Medicine Elective
- Surgery Clerkship
- Internal Medicine Clerkship
- Pediatric Clerkship
- Obstetrics/Gynecology (OB/GYN) Clerkship
- Year 1 & 2 Societies
- Year 3 Interseessions
- Year 3 Transition Block
- Year 1 Interprofessional Cardiopulmonary Resuscitation (IPCPR)

- Cardiopulmonary Resuscitation (CPR) Elective
- Emergency Medicine Club
- Surgery Club

ASTEC Training Allocation by Group

Fiscal Year 2011 -12

- The University of Arizona Medical Center: 29%
- Med Student: 34%
- Resident: 27%
- Pre-Hospital: 10%

In-hospital programs include the following:

- Emergency Medicine Competency Codes
- In-Situ Critical Decision Unit Codes
- In-Situ Diamond Children’s Pediatric Intensive Care Unit (PICU) Codes
- In-Situ Diamond Children’s Neonatal Intensive Care Unit (NICU) Codes
- In-Situ Diamond Children’s Pediatric Step-down Codes
- In-Situ Labor and Delivery Codes
- In-Situ Newborn Nursery Codes
- In-Situ Radiology Code Review
- In-Situ Cardiothoracic Surgery Codes
- In-Situ Emergency Medicine Codes
- Radiology Attending and Staff Codes

Other groups include the following:

- University of Arizona Campus Health
- Nurse Practitioner Acute Care Students
- Physiology Club
- Residency Electives
- American Medical Student Association Premedical Chapter
- Med Cats Pre-Health Club
- International Fellowships
- Bioengineering Research Rotations
- Undergraduate Internships and Independent Study
- Eller College of Management Technology Commercialization Course
- American Medical School Association (AMSA), Camp Scrubs, Med-Start, and FACES (Fostering and Achieving Cultural Equity and Sensitivity)

ASTEC continues to be a primary resource for first-responder simulation training:

- Tucson Fire Department Recertification
- Northwest Fire Department (NWFD)
- LifeNet Helicopter Program
- Air Evac Helicopter Program
- Arizona Lifeline Helicopter Program
- United States Air Force Paramedics
- United States Border Patrol
- Pima County SWAT (Special Weapons and Tactics) Team
- Rural Metro Fire
- Eastern Arizona College

ASTEC played a leading role in the development of the new Interprofessional Education and Practice (IPEP) Program at the Arizona Health Sciences Center (AHSC). The program is designed to foster collaboration between students from the colleges of Medicine, Nursing, Pharmacy, and Public Health. In recognizing the importance of learning to work together early on in their training, we provide interprofessional cardiopulmonary resuscitation (CPR) training for all first-year AHSC students. Conducted with teams of nurses, pharmacy, and medical students, the training sessions consist of simple resuscitation exercises that focus on team communication. Roles are rotated so that each team member gains perspective on the responsibilities that others carry in an emergency scenario.

In November 2011, we featured our lab at the 3rd Interprofessional Education Conference, Collaborating Across Borders (CAB III), held in Tucson. More than 200 medical professionals of diverse medical backgrounds from across the country and the world came to tour our lab and to actively engage in medical simulation. With the help of the audience, we staged a medical emergency scenario to illustrate the many potential breakdowns in patient care that can occur when members of the health care team fail to collaborate effectively. The event was a huge success. Immediate feedback indicated great interest in using ASTEC as a model for providing interprofessional education and practice through medical simulation.

With the University of Arizona Medical Center’s Extracorporeal Life Support (ECLS) Program, we conducted our first extracorporeal membrane oxygenation (ECMO) transport training. Using our wireless adult mannequin, we simulated the transfer of a patient on ECMO from the intensive care unit to the Department of Radiology for a computed tomography (CT) scan. The transfer team monitored the “patient” throughout and maneuvered the mannequin into and out of the elevator with the entire team of ECLS providers.

For this first time this past year, ASTEC hosted the national Transport Nurse Advanced Trauma Course (TNATC) for Arizona’s Lifeline Helicopter Program. That 3-day, advanced trauma care course is required of all personnel who provide direct patient care during transport by ground or air.

ASTEC also hosted the first Emergency Pediatric Interprofessional Care Conference (EPICC) with residents from Emergency Medicine and Pediatrics, in conjunction with Air Evac emergency rescue crew members from Southern Arizona. Simulation exercises were divided into 2 phases: assessment and critical care intervention on scene, and continuation of care by physicians in the hospital. The objective of the conference was to improve
interprofessional collaboration and continuity of care between the various medical staff in our health care community.

ASTEC continues to play an integral part in the Department of Surgery’s Intensive Laparoscopic Training Course for general surgery residents. Under the direction of trauma surgeon Carlos Galvani, MD, each resident undergoes 5 hours of simulation training in ASTEC before moving on to 4 days of training in the operating room. First-year through fourth-year residents practice minimally invasive surgery techniques using ASTEC’s artificial tissue models and the latest surgical technology, thanks to grants and equipment donations from industry partners Covidien, Karl Storz Endoscopy-America, and Berchtold. The aim of the course, held every other month, is to provide the highest-quality advanced training in minimally invasive procedures, resulting in fewer surgical errors and faster healing for patients. For the third consecutive year, ASTEC has served as the Fundamentals of Laparoscopic Surgery (FLS) testing center for surgery residents.

ASTEC’s popularity continues to be demonstrated by the enthusiastic and positive data generated from feedback and satisfaction surveys. On standardized, anonymous feedback questionnaires, we have consistently scored in the 98th percentile and are clearly considered a favorable educational experience by medical student and resident respondents. In fact, the most consistent comment is that all current users of ASTEC would like more designated time for medical simulation education.

OUTREACH

As part of the College of Medicine’s community outreach effort, ASTEC is making simulation technology available to health care professionals in outlying communities. In the fall semester of 2011, we began facilitating a medical simulation internship for members of FACES (Fostering and Achieving Cultural Equity and Sensitivity) in the Health Professions Program. Two students became immersed in medical simulation, chose a health care topic of interest, and conducted a hands-on training session for all other FACES members at the end of the semester. We also provide internship opportunities for the Med-Start Summer Program, Camp Scrubs, the Tucson Urban League, and the Arizona Assurance Program.

Working with medical students from the University of Arizona and the Sociedad Estudiantil de Medicina of the Universidad de Sonora in Mexico, ASTEC participated in the “Bridging the Gap” Bilateral Medical Education Conference. We conducted a clinical training seminar to illustrate the application of telemedicine in rural hospitals along the U.S.-Mexico border.

Additionally, ASTEC provides independent research opportunities for undergraduate and pre-medical students. In the past year, 4 undergraduate students from the University of Arizona participated in research as part of their semester-long independent study at ASTEC. Students examined the impact of 3D laparoscopic monitor displays on the performance, by novice learners, of standard laparoscopic training tasks. Two former independent study students have now gone on to attend medical school at the University of Arizona. We are proud to offer undergraduates the opportunity to conduct research and participate in medical training, thus helping prepare them for medical school.

TEACHING MODULES

ASTEC continues to upgrade equipment where necessary to meet the rising demand of simulation training in medical education. This past academic year, we added several new
To better serve the needs of our diverse training groups, we also upgraded, this past academic year, our Simbionix (Cleveland, OH) LAP Mentor™ to include FLS Essential Tasks, Essential GYN, Gastric Bypass, and Hysterectomy Procedure Modules.

individual task trainers for unlimited practice of routine and highly advanced medical procedures: both adult and baby lumbar puncture trainers, as well as a new knee aspirator and pelvic trainer. We also added SimJunior® (Laerdal Medical, Wappingers Falls, NY), a high-fidelity school-aged patient simulator. With the addition of the new SimPad® (Laerdal), we are better able to remotely deploy, for in situ training, the SimJunior® simulator (and our existing neonatal simulator). We are also using the SimPad® in our outreach efforts and in prehospital training exercises.

To enhance our simulation training and provide immediate, directed feedback to trainees, we developed a customized mobile simulation cart. Working with B-Line Medical (Washington, DC) and Level 3 Audio Visual (Mesa, AZ), we designed a cart consisting of a mounted camera that can be deployed anywhere in the hospital. The video capture software allows facilitators to annotate and evaluate a live training exercise to provide a high-quality debriefing. The cart is already proving to be essential for gathering more objective training data during research activities.

ASTEC’s full range of medical simulation equipment is listed below:

- 4 adult patient simulators
- 2 birthing simulator (1 NEW)
- 2 school-aged mega code simulators (1 NEW)
- 1 infant simulator
- 2 newborn simulators
- 1 ultrasound simulator
- 1 virtual-reality laparoscopic trainer
- 6 laparoscopic training stations (NEW 3D display upgrade)
- Full line of Karl Storz videoscopes and surgical instrumentation
- 1 neurosurgical microscope
- 35 specialized task trainers (7 NEW)

ARTIFICIAL TISSUE DESIGN

Ongoing is ASTEC’s research to develop and perfect synthetic materials for surgical dissection, intravenous therapy, high-risk invasive medical procedures, and microsurgery simulation. With the expansion into our new facility in the College of Medicine, we now enjoy a larger designated lab for developing new artificial tissue models. The lab was designed to efficiently integrate development and production, furthering our mission of creating cost-effective, high-fidelity training models. As a leader in the field of artificial tissue design, we have been invited to...
deliver a podium presentation in January 2013 at the 13th Annual International Meeting on Simulation in Healthcare (INHS) in Orlando, FL.

In the past academic year, we have expanded our development of new artificial tissue models by using advanced molding and casting of silicone materials. We have applied this new technique to upgrade older models and give them higher anatomical and functional fidelity. In addition, we have developed several new artificial tissue models for human factors research and for regular use in medical simulation training, including a thoracotomy tissue model (in which plastic ribs are embedded in a layer of artificial tissue that provides a realistic bleeding response on incision). The expansion of our Artificial Tissue Lab has allowed us to become more effective in integrating our models into medical training. For instance, we now provide ultrasound workshops for emergency medicine attendings using ballistic gelatin models.

The following is a complete list of artificial tissue models developed by ASTEC since our opening in 2005:

- Adult and pediatric peripheral intravenous access
- Arterial line placement
- Intravenous access
- Umbilical cord access
- Adult and pediatric chest tube
- Adult and pediatric pericardiocentesis
- Tibia compound fracture with arterial bleeding
- Uterus with ectopic pregnancy
- Various wounds for suturing
- Ultrasound-guided line placement
- Bilateralization of common carotid artery
- External carotid to internal carotid bypass
- End-to-side anastomosis
- Bowel anastomosis

- Silicone wound models with pressurized blood perfusion
- Adult silicone trachea
- Pediatric silicone trachea
- Capillary refill model
- Extracorporeal membrane oxygenation (ECMO) model (NEW)
- Cesarean section (C-section) (NEW)
- Intravenous (IV) access tissue pad (NEW)
- Thoracotomy tissue (NEW)
- Chest tube (NEW)

RESEARCH

ASTEC has formed a number of new industry partnerships this past year to collaborate on a variety of research initiatives. We are currently working with Xerideum, Ephbin, Mechnyde, and Raytheon.

Medication Errors: Virtual-Reality Game

With the support of a Caduceus Risk Management Process Improvement grant, ASTEC has begun looking into patterns and trends in patient errors, in order to target future simulation training and to develop new training models. A review of patient safety network reports revealed that the rate of incident reports related to medication errors was 2 to 3 times higher than in any other category. To combat this problem, we are collaborating with Raytheon to develop a virtual-reality training game that reviews proper administration of patient medication. The game puts trainees on the actual patient floor and guides them through the “Five Rights” (the right patient, the right route, the right dose, the right time, the right medication), while presenting a number of common distractions. The game will be launched in the Department of Pediatrics in the spring 2012.

Computer-Assisted Surgical Trainer (CAST)

ASTEC continues its close relationship with Jerzy Rozenblit, PhD (and his team in the Department of Electrical and Computer Engineering) in refining the Computer-Assisted Surgical Trainer (CAST) system. The most recent version of the CAST system integrates, into surgical training, developments in artificial intelligence-based motion planning. The key component is the ability to provide the shortest, collision-free trajectories of laparoscopic instrument movements through a 3D surgical space. The system can be used with the full line of Karl Storz laparoscopic instruments.

This new version of the CAST system provides surgical trainees with a virtual supervisor to guide them through a series of training tasks. It teaches them to follow optimal motion trajectories through continuous auto-correction of erroneous movements. The latest CAST system addresses 2 of the most basic, but most difficult, skills for new surgeons to master: hand-eye coordination and manipulation of laparoscopic instruments in a 3D space. Our primary goal, as always, is to raise trainees to a higher level of proficiency without putting patients at risk in the operating room. The new CAST system provides trainees with more autonomy in their learning process and reduces their reliance on the direct presence of, and feedback from, an attending surgeon. To support this ongoing project, we recently submitted a National Institutes of Health (NIH) grant proposal entitled “Advances in Patient Safety through Simulation Research.”

Arizona Border Simulation (ABS) Project

The ABS Project has now moved into a new phase: we are combining sophisticated data-mining software with some of the latest technology from the military for GEO Satellite localization of first-responder resources. The most recent efforts involve collaboration between the U.S. Border
Patrol, the Pima County Sheriff’s Office, and Mechdyne to develop new technologies that integrate telecommunication and medical simulation.

Cardiothoracic Surgery Robotics
Working in collaboration with Dr. Robert Poston (chief of Cardiothoracic Surgery) and Angela Muzzy (a clinical nurse specialist), we deployed our new Cardiothoracic Surgery trainer in our intensive care unit for a series of in situ training exercises. The trainer was designed to simulate emergency thoracotomies after robotic coronary artery bypass graft (r-CABG) surgery. Trainees were evaluated on the basis of the time they required to identify cardiac tamponade, initiate therapy, complete the technical tasks of the thoracotomy, communicate effectively with the anesthesia staff and other team members, and resolve problems. All metrics showed significant improvement with the new trainer (as compared with consecutive training exercises that did not use simulation): both technical and teamwork skills improved.

We are now beginning to use the new Cardiothoracic Surgery trainer with the daVinci robot in the operating room, in order to practice intraoperative conversions from totally endoscopic CABG to open thoracotomy.

3D Laparoscopic Surgery
We conducted a study (sponsored by Karl Storz Endoscopy-America) to compare the impact of stereoscopic 3D versus 2D laparoscopic display monitors in inexperienced learners performing a standard Fundamentals of Laparoscopic Surgery (FLS) task. We found that the 3D display monitor allows for significantly faster completion of the task, with fewer errors committed. We have been invited to present our results in January 2013 at the 13th Annual International Meeting on Simulation in Healthcare (IMSH) in Orlando, FL.

Extracorporeal Membrane Oxygenation (ECMO)
We developed a new high-fidelity simulation model to perform in situ ECMO cannulation. In collaboration with Dr. Jess Thompson (assistant professor of surgery), Jeanne Scott (an advanced ECMO specialist), and the University of Arizona Artificial Heart Program, we staged a highly realistic, real-time in situ cannulation, reflecting the stress level in an actual emergent pediatric case. The training involved 18 participants, 7 of whom were new Extracorporeal Life Support (ECLS) specialist trainees who unanimously agreed that the training was an excellent supplement to their traditional didactic training. We described our model at the annual conference of the Congenital Heart Surgeons’ Society in Chicago in September 2012.

We hope to show that interprofessional simulation training can prepare teams to better perform emergent thoracotomy conversions.

Debriefing on iPads
ASTEC is working with Dr. Joe Livingston (assistant professor in the Department of Pediatrics) to develop a novel method of debriefing after in situ simulation. Using a simple video camera and iPad computer tablets, we provide video feedback to trainees, enabling a more objective review of their performance on the exercise. A self-assessment tool helps trainees identify skills they inadequately performed and encourages them to actively participate in the ensuing team debriefing. This research is being supported by a Vernon and Virginia Furrow Academy of Medical Education Scholars (AMES) grant.

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FUTURE INITIATIVES

Currently, we are involved in a number of long-term research projects aimed at medical error prevention. We have identified catheter-associated urinary tract infections and medication administration as 2 high-incidence hospital errors. By targeting training to emphasize the sources of these 2 errors, we hope to demonstrate that simulation training can reduce error rates and improve clinical care. To further our efforts, we hope to use innovative data-mining software developed by the Department of Electrical and Computer Engineering, as highlighted in the Medical Asymmetric Threat Response and Analysis Project (MATRAP).

Working with Dr. Zain Khalpey (assistant professor of cardiac surgery), we are conducting exciting new research in augmented-reality vascular surgery. We hope to show that preoperative 3D surgical simulation for mitral valve repair, using patient-specific images, can better prepare a surgeon to perform the procedure. Moreover, we are working on developing a method to produce 3D artificial tissue models through a 3D printing process, that are based on actual x-ray computed tomography scans. Such models could then be used in a surgical robot to simulate surgery and practice performing it. This project coincides with our plans of expanding the utility of our Artificial Tissue Lab.

Given the expanding use of simulation in health care education (as documented, for example, in the 2011 survey by the Association of American Medical Colleges) and the increasing focus on interprofessional care, we are developing plans for a new, integrated, multidisciplinary medical simulation facility. We are in the process of applying for accreditation as an educational simulation center with the Society of Simulation in Healthcare (SSIH).

We are looking forward to hosting TEDx Tucson 2012: City of Healing & Innovation at the University of Arizona on December 8, 2012.

ORAL PRESENTATIONS


POSTERS AND ABSTRACTS


