From the Executive Director of ASTEC

No matter how much we plan and forecast, each year brings the Arizona Simulation Technology and Education Center (ASTEC) new and unexpected challenges. This year has seen ASTEC garner research funding from the National Institutes of Health, the National Science Foundation, and most recently, a Department of Defense contract to further accelerate the University of Arizona’s ranking as one of the premier medical simulation facilities in the US.

In addition, ground has broken on a new multi-disciplinary education building that will provide the UA with the most advanced simulation facility in the country. Efforts are well underway to ensure that the UA can provide coordinated clinical research and bio-industrial opportunities for simulation between the COM – Phoenix, COM – Tucson, and Banner Health. ASTEC is committed to playing a vital role in the newly designed curriculum for the medical schools and members of the ASTEC staff and faculty serve on every committee in the curriculum revision to ensure it will reflect the ever-increasing role of simulation in immersive education and training in healthcare.

Respectfully,

Allan J. Hamilton, MD, FACS
Executive Director
Arizona Simulation Technology and Education Center (ASTEC)
Annual Report: Academic Year 2015-16

Executive Overview

- ASTEC is excited to announce the construction of a new Health Sciences Innovation Building (HSIB) with 35,000 ft² designated for medical simulation training, research and development. The building is scheduled to open in 2018.
- ASTEC continues to expand its research commitments with current grants from the National Institute of Health (NIH), National Science Foundation (NSF) and contracts from the Department of Defense (DOD).
- ASTEC ranks among the highest nationally in terms of the number of unique learners and the number of unique sessions, providing a wide range of simulation activities for the full spectrum of healthcare providers.
- Of our total 2015-2016 simulation training sessions, 54% were dedicated to residents and staff of the Banner University Medical Center (BUMC), demonstrating the increasing role of simulation as the preferred method of graduate and continuing medical education.
- As a national leader in the development of artificial tissue, ASTEC has devised new methods for creating more realistic models, many of which incorporate the use of 3D modeling technologies.
- With financial support from the University of Arizona IT Student Advisory Board, ASTEC has established our own 3D Printing Laboratory for the design and production of artificial tissue models.
- ASTEC has achieved Accreditation from the Society for Simulation in Healthcare in the areas of Research, Assessment and System Integration and is now 1 of only 10 institutions nationally with accreditation in all areas of medical simulation expertise.
- For the first time this year, ASTEC hosted the annual Cardiology Fellows Endovascular Simulation Training Course that featured 11 industry partners for interventional cardiology technologies and devices.
- ASTEC has been chosen by Laerdal-SonoSim as a reference site for the testing of a new innovative ultrasoundable skin technology designed for Laerdal’s line of advanced adult computerized mannequins.
- ASTEC has been designated as 1 of 4 control sites for the national Leadership Education Advanced During Simulation (LEADS) study funded by the Agency for Healthcare Research and Quality, US Department of Health and Human Services.
- As part of the All Together Better Health VIII Conference, ASTEC conducted the first intercontinental real-time interprofessional medical simulation between Oxford University and the University of Arizona.
GROWTH

ASTEC opened on August 5, 2005, and has now begun its 12th year of operation. Over the past several years, we experienced a tremendous growth in utilization rates as demand for simulation training increased throughout the University of Arizona Health Sciences (UAHS), Banner – University Medical Center (BUMC), and numerous external first responder organizations. Over the last year, in particular, the utilization rates for residents and UAMC staff markedly increased so that they now make up a combined 54% of all training hours at ASTEC (see figure 1 for the FY16 breakdown in the four major user groups). This trend has come in part from an increased emphasis on using simulation technology for competency-based assessment as well as for systems and human factors testing.

In response to a national increase in demand for more simulation-based education in all areas of healthcare education, UAHS is devoting 35,000 sq. ft. for a new, state-of-the-art, interprofessional simulation center. It will encompass the entire seventh floor of the new Health Sciences Innovation Building (HSIB) and will incorporate the latest in simulation technology, including virtual reality and haptic training devices, game-based learning systems, realistic synthetic artificial tissues, and the latest in high fidelity human patient simulator technology. The new space will also include bio-innovation labs, a makerspace workshop, and a centralized command center that will operate a 3,000 sq. ft. fully immersive SimDeck surrounded by multidisciplinary range of patient care and operating rooms. This radical design will allow us to accommodate any request for simulation training and/or testing event, from a large-scale mass casualty or hospital-based internal disaster to multi-station competency-based procedural assessments for large learner groups.

LEARNER GROUPS

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 I & II Societies
- Year I Interprofessional Cardiopulmonary Resuscitation (IPCPR)
- Year III Intersessions
- Year III Transition Block
- Cardiopulmonary Resuscitation (CPR) Elective
- Surgery Club
- Family Medicine Interest Group (FMIG)
- Emergency Medicine Interest Group (EMIG)
Residency makes up our largest user group and includes utilization from the following departments:

- Surgery
- Emergency Medicine
- Internal Medicine
- Family Medicine
- Pediatrics
- Obstetrics/Gynecology (OB/GYN)
- Pulmonary
- Anesthesia
- Tucson Medical Center (TMC)
- Nephrology
- Neurosurgery
- Neurology
- Rheumatology

In-hospital programs include the following:

- BUMC RN 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 Stepdown Codes
- In Situ Labor and Delivery Codes
- In Situ Newborn Nursery Codes
- In Situ Emergency Medicine Codes
- Radiology Attending and Staff Codes

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

- Northwest Fire Department (NWFD)
- AirEvac Emergency Air Ambulance Service
- Arizona Lifeline Emergency Air Ambulance Service
- United States Border Patrol
- United States Army Combat Medics

Other groups include the following:

- Nurse Practitioner Acute Care Students
- Certified Registered Nurse Anesthetist Students
- Residency Electives
- Mariposa clinic pediatrics faculty and nursing
- University of Arizona Campus Health
- Veterinary Science Undergraduates
- Health Occupations Students of America (HOSA) Club
- Future Health Leaders Alliance (FHLA)
- Physiology Club
- Neuroscience and Cognitive Science Association
- American Medical Student Association Premedical Chapter
- Med Cats Pre-Health Club
- Bioengineering Research Rotations
- Undergraduate Internships and Independent Study
- Fostering and Achieving Cultural Equity and Sensitivity Pre-Health Club
- Undergraduate Biology Research Program (UBRP)
- International Fellowships
- A.T Still University Rotations

Dr. Hamilton provides suture skills instruction for the College of Medicine Surgery Club

Lisa Grisham, NP provides instruction for Lumbar Puncture with Year III medical students

Banner Pulmonary Fellows responding to a patient with a gastrointestinal bleed
ASTEC has enjoyed its new partnership with Banner University Medical Center (BUMC). Banner is dedicated to providing the best training for its faculty and residents and has long been committed to using medical simulation to achieve its educational objectives. We look forward to working together to advance our ongoing efforts to produce the best-trained doctors of tomorrow.

ASTEC and BUMC collaborated with Children’s Hospital of Philadelphia (CHOP) to develop an in situ simulation curriculum for management of pediatric patients with congenital heart disease. BUMC is intent on transforming the hospital into a center of excellence for congenital heart disease and has recruited ASTEC to help build a training program. With expert advice from CHOP, we have completed the framework of the curriculum and are currently in the process of developing assessment instruments to evaluate the progress of trainees over time. We are hopeful that the success of this project can highlight how a UA-BUMC collaboration can promote simulation training in the clinical environment to advance the integration of academic with clinical medicine.

This past year for the first time, ASTEC hosted the American College of Physicians (ACP) Arizona 2016 Medical Simulation Satellite Session. Working in collaboration with Kwan S. Lee, MD, Medical Director of Cardiology at BUMC and Dixie Swan, Executive Director of ACP Arizona, ASTEC hosted a 1-day conference for medical students at the University of Arizona College of Medicine. The conference featured 6 training stations including thoracentesis, lumbar puncture, central line placement, NG tube placement, endotracheal intubation and intraosseous line placement. The conference was rated very highly by participants on faculty knowledge, quality of the sessions, and faculty ability to provide constructive feedback.
Under the leadership of Kwan S. Lee, MD ASTEC was chosen along with the Mayo Clinic in Phoenix to host the semi-annual Cardiology Fellows Endovascular Simulation Training Course that featured 11 industry partners for Cardiology devices and equipment and provided simulation training for our residents, fellows and attending faculty. Fellows were able to orient themselves to new devices and practice invasive procedures including pericardiocentesis and catheter placement on simulated models and virtual reality training devices. The 1-day event was a huge success. ASTEC received positive feedback from both the vendors and the Cardiology faculty and is looking forward to hosting the event again next year.

To advance the simulation training experience for our General Surgery residents, ASTEC has partnered with Applied Medical, a medical device company that provides cholecystectomy simulation training models. We have begun to integrate these models into our quarterly intensive laparoscopic training day to supplement the Fundamentals of Laparoscopic Surgery (FLS) curriculum. Supported by funding from the George C. Marshall foundation and under the leadership of Kathleen Piotrowski, DNP, CRNA, Certified Registered Nurse Anesthetists (CRNA) from the University of Arizona have begun to use ASTEC as their primary teaching lab for learning procedural skills in airway management including cricothyrotomy, endotracheal intubation as well as lumbar puncture, arterial line placement, and central line placement. Likewise, stimulated by financial support from a Federal Demonstration Partnership, Acute Care Nurse Practitioners (ACNP) have partnered with ASTEC to launch a Simulation Training Program to promote the acquisition of procedural skills.

ASTEC continues its commitment to training Southern Arizona’s Air Evac flight nurses and flight paramedics in quarterly full-day simulation sessions. These trainings are comprised of 2-3 competency-based clinical scenarios and several procedures, including chest tube insertion, intubation and cricothyrotomy. They make use of the full complement of task trainers and high-fidelity computerized mannequins available in the ASTEC lab and

ASTEC continues to host Pulmonary and ED simulation fellowships, a year-long advanced airway curriculum organized by Jarrod Mosier, MD Assistant Professor of Emergency Medicine.

This past year, ASTEC celebrated the 10-year anniversary of the interprofessional cardiopulmonary resuscitation (IPCPR) simulation exercise. Hosted in collaboration with the University of Arizona Colleges of Nursing, Pharmacy and Public Health, this exercise marks the first interprofessional experience of our students training in various healthcare professions and is always regarded as a great opportunity to meet and work with future colleagues. Given the increasing role of telemedicine in healthcare, we designated 4 training sessions this year to introduce our students to remote learning technologies with great success. Sally Reel, PhD, Vice President for Interprofessional Education, was invited to present at the All Together Better Health Conference held in Oxford, England where ASTEC was able to demonstrate how to incorporate remote learning opportunities with high fidelity medical simulations. We look forward to future collaboration and are proud of the role we have been able to play to promote interprofessional learning and practice.

In a joint effort with the Department Interprofessional Education, Collaborative Practice & Community Engagement, the Arizona Telemedicine Program, ASTEC conducts a multidisciplinary simulation training that included remote learner participation while broadcasted to an audience at an international conference in Oxford, England.
A member of ASTEC’s College of Engineering Senior Design Team works on development of a soft tissue 3D printer

provide an example of ASTEC’s ability to create highly structured healthcare environments for competency-based assessment. We are proud to serve our pre-hospital care providers and thereby to provide a link between the pre-hospital and the in-patient care setting.

As part of the effort to become a center of innovation for the advancement of technology in healthcare, ASTEC continues to make strides by partnering with faculty and undergraduate students from the University of Arizona Colleges of Engineering. This past year, ASTEC sponsored 6 students from the College of Engineering to complete their senior design project, a semester-long project that culminated in the development of a 3D printer with soft tissue printing capabilities.

ASTEC’s popularity continues to be demonstrated by the positive data generated from feedback and satisfaction surveys. We have consistently scored in the 98th percentile on anonymous feedback questionnaires and are clearly considered a favorable educational experience by all learner groups. 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 UAHS community outreach effort, ASTEC is making simulation technology available to students of all ages who have an interest in healthcare. We provide internship opportunities for numerous high schools throughout Tucson for students who are planning to transition to college with an emphasis in pre-health. One of the main objectives of our outreach activities is to raise health care literacy among young and underserved populations in Tucson. To achieve this goal, we work closely with the Office of Diversity Inclusion at the College of Medicine and accommodate groups of students in our lab to engage in hands-on simulation activities.

The following is a full list of regular outreach activities conducted by ASTEC:
- High School Pre-Health Fellowships
- Med-Start Summer Program
- UA Pre-Med Camp
- Camp Scrubs
- BASIS Summer AZ Telemedicine Program
- Summer Institute on Medical Ignorance
- Volunteer for Intercultural and Definitive Adventure educational series
- Summer Youth Institute
- High School Tech Educators
- Passport to High School
- Undergraduate Biology Research Program (UBRP)
- Area Health Education FHL Summer Camp
- Tohono O’odham Future Healthcare Leaders Summer Camp
- Boy Scouts of America

ASTEC continues to work closely with the Arizona Telemedicine Program (ATP) under the leadership of Ronald S. Weinstein, MD to provide educational opportunities to members of the Arizona Area Health Education Centers (AHEC) Program throughout Arizona. In the past year, ASTEC travelled to Apache Junction, AZ to lend our simulation expertise to the Greater Valley Area Health Education Center (GVAHEC). Using our low-fidelity MamaNatalie birthing mannequin and our wireless pediatric mannequin SimJunior, we conducted a birthing scenario and a pediatric cardiac arrest scenario with students from Medicine, Nursing and Public Health. GVAHEC is the Greater Valley branch of five health education centers in Arizona dedicated to recruiting and training competent health professionals to meet the growing needs in urban, underserved and rural areas. To demonstrate the potential of telemedicine in connecting rural sites with larger training centers, our training was streamed live to the Northern- and Western Arizona Area Health Education Centers (NAHEC & WAHEC), where remote attendees were able to assist with interventions and participate in the debriefing.
Additionally, ASTEC provides independent research opportunities for undergraduate and pre-medical students, including international student research rotations. In the past year, four former independent study students were accepted to medical school at the University of Arizona. We are proud to offer undergraduates the opportunity to conduct research and participate in creating medical simulation environments that help 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 computerized mannequins and individual task trainers for unlimited practice of routine and highly advanced medical procedures.

We acquired Laerdal’s Premature Ann™ simulator, a 25-week preterm neonate mannequin, to better serve the training needs of the Acute Care Nurse Practitioner (ACNP) Simulation Training Program. We also upgraded our adult mannequin to Laerdal’s SimMan® 3G Advanced Patient Simulator, the most technologically advanced simulator ideally suited for training rapid assessment of trauma emergencies. We have also replaced our birthing simulator with Lucina® from CAE Healthcare, which is capable of functioning as both an advanced birthing mannequin as well as a non-gravid adult female mannequin.

ASTEC has been chosen by Laerdal and SonoSim as a reference site for the Laerdal-SonoSim Ultrasound Solution, a new innovative line of “wearable skins” with ultrasound capabilities that is used with Laerdal’s SimMan® 3G. This technology will now allow us to include diagnostic ultrasound with pathological findings, such as a FAST exam, into full-scale simulations.

In an effort to enhance ultrasound training for medical students, ASTEC was awarded a grant from the University of Arizona IT Student Advisory Board to purchase the SonoSim® Ultrasound Training solution. This system is an ultrasound simulator with a laptop computer-based platform that allows a learner to scan and recognize real patient pathology. The machine can be used with real patients as well as with computerized mannequins. As such, it can be easily integrated into a clinical training scenario in which imaging is required to establish a medical diagnosis. We plan on using this technology to train medical students and residents to improve their diagnostic skills and clinical decision-making.

Funding was also provided by the University of Arizona IT Student Advisory Board to purchase a Simulab Paracentesis task trainer. This trainer is ultrasoundable and allows users to perform the procedure from diagnosis to draining simulated ascetic fluid from the peritoneal cavity.

Finally, ASTEC has upgraded its Fundamentals of Laparoscopic training stations by purchasing the latest trainer box model along with an individualized mobile cart for each. This will enhance our capabilities for preparing general surgery residents for their standardized testing with the Society of American Gastrointestinal and Endoscopic Surgeons (SAGES).
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. The lab was designed to efficiently integrate development and production, furthering our mission of creating cost-effective, highly realistic training models. This mission has been strengthened in the last year by the opening of ASTEC’s 3D Printing Laboratory. We are now able to streamline our approach from computer-aided design (CAD) of anatomic models to the printing of tissue molds and finally to the production of models using silicones.

ASTEC displayed its use of 3D printing technologies for creating artificial tissue models at the annual STEAMworks Showcase. STEAMworks is a one-day event hosted by the University of Arizona that showcases Science, Technology, Engineering, Arts and Math in action. High school students and UA undergraduates get hands-on experience with real-world science applications. ASTEC demonstrated how 3D printing technologies could be used in innovative ways to create medical training devices that allow trainees to practice medical procedures in a risk-free environment.

In the past academic year, we have developed several new artificial tissue models and upgraded existing ones for human factors research and for regular use in medical simulation training.

The following is a complete list of artificial tissue models developed by ASTEC since our opening in 2005:
- Adult and pediatric peripheral intravenous access
- Umbilical cord venous access [UPGRADED]
- Adult and pediatric chest tube [UPGRADED]
- Tibia compound fracture with arterial bleeding
- Uterus with ectopic pregnancy
- Various wounds and lacerations
- Bifurcation of common carotid artery
- External carotid to internal carotid bypass
- End-to-side anastomosis
- Bowel anastomosis [UPGRADED]
- Silicone wound models with pressurized blood perfusion [UPGRADED]
- Adult silicone trachea
- Pediatric silicone trachea
- Extracorporeal membrane oxygenation (ECMO) model
- Cesarean section (C-section) model
- Intravenous (IV) access tissue pad [UPGRADED]
- Abscess model
- Burned skin model [UPGRADED]
- Congenital adrenal dysplasia model
- Adult intraosseous placement model
- Jugular vein distention model
- Ultrasoundable pericardiocentesis model [NEW]
- Pericentesis model [NEW]
- Ultrasoundable peritonsillar abscess model [NEW]

RESEARCH

This past year, ASTEC achieved accreditation from the Society for Simulation in Healthcare (SSIH) in the areas of Research, Assessment, Systems and Integration. We have continued to develop our research facilities while creating new partnerships with internal academic partners at the University of Arizona and partners from the private sector invested in advancing medical education and training through simulation. ASTEC has initiated a number of new research initiatives while continuing to pursue ongoing projects.
**SURGERY**

**Foveated Endoscope**

Working with Hong Hua, PhD from the College of Optical Sciences on an NIH-funded project, ASTEC is testing a new foveated endoscope, a camera used in minimally invasive surgery to visualize the surgical working space. The camera has the ability, via a high-magnification fovea, to preferentially zoom on specific anatomical structures while maintaining the overall panoramic view of the working space. This allows surgeons to obtain high visual magnification while still maintaining their peripheral vision. We hypothesize that this will both reduce the number of camera manipulations required during a procedure and also prevent inadvertent collisions of instruments with structures in the peripheral field not visible with current cameras on high magnification. ASTEC is working with graduate students from the University of Arizona College of Electrical Engineering to design a simulated surgical platform with obstacles that will test the ergonomic advantages of the foveated endoscope.

**Computer Assisted Surgical Trainer (CAST)**

Jerzy Rozenblit, PhD, head of the Model Based Design Laboratory at the College of Electrical and Computer Engineering has secured a National Science Foundation (NSF) grant to continue our collaborative work to design a Computer-Assisted Surgical Trainer. The objective of the next phase of development will be to design and implement an intelligent, adaptive guidance controller for surgical space navigation and to implement visual guidance techniques through augmented reality. The ultimate vision of our team is to create a smart training environment that will promote surgical training through haptics-based guidance of optimal instrument movement.

**Expert Laparoscopic Surgery Project**

Working with Iman Ghaderi, MD, MSc, ASTEC has begun to assist with the design and validation testing of six new advanced laparoscopic tasks to be implemented alongside of the existing Fundamentals of Laparoscopic training curriculum for general surgery residents. The curriculum is composed of more complex laparoscopic tasks that require a higher level of skill to raise the standard of simulation training in the General Surgery residency.

**Artificial Tissue 3D Printing Laboratory**

With financial support from the University of Arizona IT Student Advisory Board, ASTEC has opened a designated space in the College of Medicine for a 3D printing laboratory equipped with a LulzBot TAZ 5 printer and a NextEngine 3D Laser Scanner. The lab was opened as an effort to promote collaborative work between the Colleges of Engineering and Medicine. Along with our fully-equipped artificial tissue lab, the addition of the 3D printing lab now allows us to centralize our design process from computer-aided design (CAD) of new training models, to 3D printing of tissue molds, and lastly to creation of soft-tissue silicone anatomic models. In its first 3 months of operation, undergraduate engineering students have worked with medical students, residents and ASTEC staff to create a collection of new training models for research and training purposes that are now being regularly used in our lab. These include a heart model designed for US-guided pericardiocentesis, an umbilical venous catheter model, a pediatric chest tube chassis, a microsurgery tool kit for practicing microsurgical techniques, and a suturing jig that accommodates our customized bleeding suturing pad.
The suturing jig is part of the design efforts of 2 undergraduate Engineering students from the University of Arizona to develop a portable suture evaluator for training medical students. The objective of the project is to create a portable, low-cost trainer that will provide objective feedback to students on their suturing technique, including the spacing and alignment of their stitches in both interrupted and uninterrupted sutures. This project demonstrates the integration of computer hardware and software design with artificial tissue models that has become to embody the research mission of ASTEC. It will provide us with measurable outcomes and give us further insight on how to best train our medical students.

**Partnerships**

ASTEC has continued its research partnerships with SynDaver Labs in our mutual dedication to developing real-life artificial tissue models to replace the use of cadaveric models. Last year, in collaboration with Dr. Vivienne Ng, Assistant Professor and Director of Emergency Medicine Simulation, ASTEC tested a new lateral canthotomy model in a direct comparison with traditional porcine models. ASTEC and SynDaver were also awarded a Department of Defense (DOD) Simulation and Training Engineering Services (STES) grant in collaboration with Cole Engineering Services, Inc. to design and test a novel chest tube model for training military personnel in management of acute combat-related chest injuries.

ASTEC has been designated as 1 of 4 control sites for the national Leadership Education Advanced During Simulation (LEADS) study funded by the Agency for Healthcare Research and Quality, US Dept. of Health and Human Services. The study, designed by Oregon Health Sciences University in Portland, Oregon and facilitated at ASTEC by Vivienne Ng, MD examines the potential role of medical simulation in promoting leadership skills in resident physicians in Advanced Cardiovascular Life Support (ACLS) resuscitation scenarios.
FUTURE INITIATIVES

ASTEC is excited to announce the construction of a new Health Sciences Innovation Building (HSIB) with over 35,000 ft$^2$ designated for simulation training, research and development. The building is scheduled to open in 2018-2019 and will feature innovative learning spaces including newest developments in virtual reality simulation to create the most realistic learning environment for our healthcare trainees. We have witnessed an exponential growth in training commitments especially in post-graduate medical education as Banner Health has made it a priority to use simulation to teach its residents and faculty. It is our mission to provide the best training opportunities to all members of the University of Arizona Health Sciences.

In light of the national trend towards a more compact medical school curriculum, ASTEC is being tasked with providing recommendations how best to incorporate simulation training into the student curriculum to prepare them for their clinical clerkships. We are exploring ways in which a longitudinal simulation curriculum consisting of practical training can be aligned with classroom learning to both enhance student understanding of basic science concepts and facilitate their transition to a clinical setting in a shorter period of time.

Likewise adding to our educational mission, ASTEC will be hosting simulation fellowship positions in Emergency Medicine and Pulmonology this coming year. We are excited to train future educators in our field.

ASTEC is looking to expand its use of 3D technologies in medical simulation training through the construction of a 3D Visualization Bioinnovation Lab that may, in the near future, serve to provide more realistic virtual reality environments for training our medical students and residents.

Responding to student requests for certification classes in Basic Life Support (BLS), Advanced Cardiovascular Life Support (ACLS), and Pediatric Advanced Life Support (PALS), ASTEC is in the process of acquiring certification as a teaching facility and will begin offering courses to students starting in 2017.

Utilizing virtual reality technology with Oculus Rift to explore human anatomy
PUBLICATIONS


ORAL PRESENTATIONS


Hamilton AJ (Keynote Speaker), “The Mystery of Memory: A Personal Perspective from the Cellular to the Corporate,” Annual Meeting of the Medical Institute for Innovation (MI2), Hyatt Hotel, Bethesda, Maryland, Oct. 12, 2014


**POSTERS AND ABSTRACTS**

Prescher H, Ng V, Biffar D, Barbosa A, Hamilton AJ. "Development of an Ultrasound Pericardiocentesis Model for Simulation Training." 17th International Meeting on Simulation in Healthcare, Jan. 18-31, 2017


Prescher H, Biffar D, Tomasa L, Berg M, Grisham L, Mathesen Y, Theodorou A, Hamilton AJ. "A seven-year collaboration between 3 Colleges to learn interprofessional skills during a CPR team behavior simulation." 14th International Meeting on Simulation in Healthcare, Jan 25-29, 2014

Grove E, Mosier J, Sakles J, Prescher H, Biffar D, Stolz U. "Telepresent intubation instruction is as effective as in-person when instructing naïve intubators." 14th International Meeting on Simulation in Healthcare, Jan. 25-29, 2014


