



Center for
Immersive and
Simulation-based
Learning
STANFORD MEDICINE

2016 Accomplishments Report



Leaders in Simulation-based
Medical Education

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Letter from the Associate Dean

Once again, the Center for Immersive and Simulation-based Learning (CISL) has the opportunity to highlight what was new in the preceding academic year in immersive and simulation-based learning (ISL) in the Immersive Learning Center of the Li Ka Shing Center for Learning and Knowledge (LKSC). As is our custom, this Report describes primarily the new activities and we do not describe the extensive suite of ISL activities that have already become part of the mainstream of education, training, assessment and research.

We continue to be grateful for the founding gift of Mr. Li Ka Shing for the LKSC, and for the continuing generosity of Hon-Mai and Joseph Goodman, the primary donors for the Immersive Learning Center (ILC) for providing the opportunity to create and conduct powerful activities for teaching, learning, and scholarship in this world-class integrated center where all modalities of immersive and simulation-based learning can exist in one spot.

CISL had a number of milestone changes in our leadership team with the resignation of Sandi Feaster, MS, MBA, RN from the position of Assistant Dean for Immersive and Simulation-based Learning, and the return of Susan Eller, MSN, RN, PhD student to CISL as the new Assistant Dean. More details about these transitions as well as other CISL staff changes are included on page 21 of this report.

We are working hard to fully embed immersive learning into the curriculum of the School of Medicine for all learner populations, including fully experienced clinicians as individuals or interprofessional teams. Stanford faculty and staff continue to be world-recognized leaders in ISL techniques, applications, and technologies who are highly sought as teachers, scholars,



David M. Gaba, MD

*Associate Dean,
Immersive and Simulation-based Learning*

advisors, and collaborators. Our goal is, as ever, to improve the efficiency, quality, and safety of care for all patients, while simultaneously improving the education, training, and assessment of the caregivers. We thank the many people involved in the inception, conduct, and support of immersive and simulation-based learning at Stanford. By their efforts, we are certain that many individual lives around the world have already been saved. We are pledged to continue these efforts for the benefit of all humanity.

About Us

THE CENTER FOR IMMERSIVE AND SIMULATION-BASED LEARNING LEADERSHIP TEAM

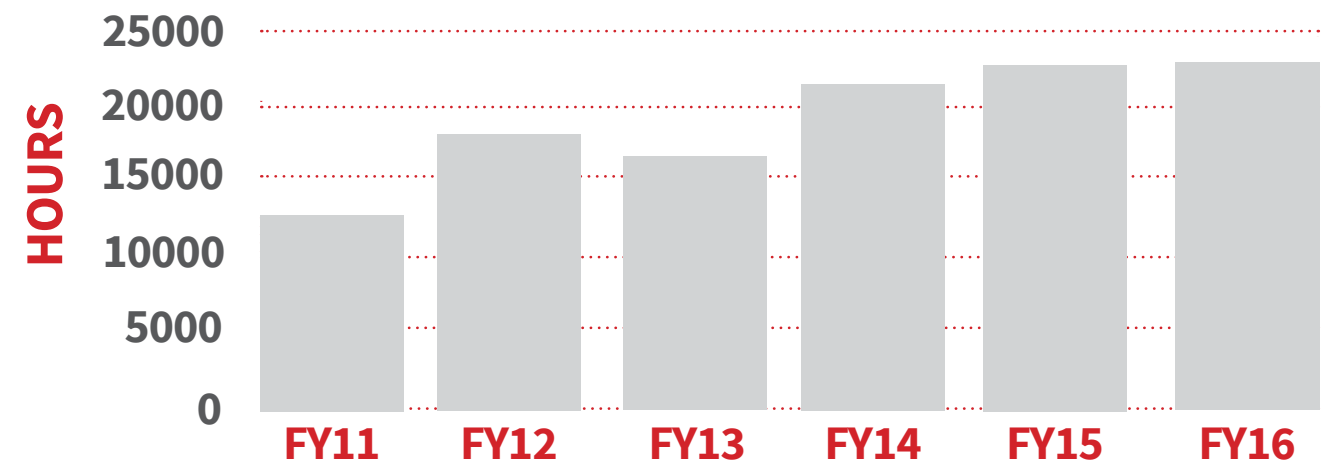
CISL is guided by a staff of knowledgeable and experienced personnel. Heading this team is the LEADERSHIP group made up of:

Associate Dean, Immersive and Simulation-based Learning	DAVID M. GABA, MD
Assistant Dean, Immersive and Simulation-based Learning	SUSAN ELLER, MSN, RN, CHSE
Medical Director, Standardized Patient Program	ANDREW NEVINS, MD
Director of Operations	MARY AYERS
Director, Simulation and Education	ALEXANDRA BUCHANAN, MD
Director, Standard Patient Program	KAREN THOMSON HALL

Our **MISSION** is to improve patient safety, patient care, education, and research through innovations in **IMMERSIVE AND SIMULATION-BASED LEARNING** techniques and tools through embedding them throughout Stanford University Medical Center's education and training programs.

FY16 ILC User Activity Data

Increase in Room Use Hours Since ILC Opened in 2010



Increase in Hours by User Group

CME (Continuing Medical Education)	3%
GME (Graduate Medical Education)	17%
Graduate / PhD student	1%
LPCH (Lucile Packard Children's Hospital)	1%
PCAP (Primary Care Associate Program)	2%
SHC (Stanford Hospital and Clinics)	7%
SoM Other	2%
UGME (Undergraduate Medical Education)	67%

Strategic Goals

Education and Training of Students and Clinical Trainees

Undergraduate Medical Education

Center for Immersive and Simulation-based Training Hosts 1st Annual Open House for New Stanford Medical Students

For many new Stanford medical students, walking into CISL for the first simulation exercise of the year brings back memories of the high stakes Multiple Mini Interview (MMI) that contributed to their admission to medical school – an encounter which is often associated with high levels of anxiety! To acclimatize the students to their new learning environment, CISL hosted the 1st Annual Open House for the incoming class of Stanford University medical students. During the event, students explored the ILC through engaging and informative presentations, they were introduced to the ILC's features and services, and had the opportunity to meet Dr. David Gaba and to ask questions and mingle with staff. CISL looks forward to hosting this event again next year.

EMED 250

Typically, it is challenging for medical students to gain experience managing critically ill patients and performing particular procedures in the hospital setting due to patient safety concerns and educational opportunities prioritized to more experienced clinicians. In order to rectify this gap, EMED 250: Critical Skills in Resuscitation was launched in Winter 2016. Drs. Viveta Lobo and Nikita Joshi combined their respective educational expertise in point of care ultrasound and medical simulation to develop an immersive curriculum that teaches medical students how to evaluate and manage critically ill patients, perform lifesaving procedures and diagnostics, and develop critical thinking skills that are vital to becoming successful as a physician.



Medical students become familiar with lumbar puncture and chest tube insertion landmarks.

Stanford Capstone

The Stanford Capstone course curriculum was designed to teach graduating medical students practical skills and knowledge to prepare them for practice in their intern year. Standardized Patient (SP) scenarios and mannequin-based simulations were created to give the students a week-long simulated wards experience. This year, innovations included students taking overnight “call” and having their responses to those simulated conversations reviewed with/by faculty and peers in the morning. Students also had the opportunity to use the EPIC electronic medical record in real time during simulated patient care experiences. The course was a great success in 2016 and an expanded curriculum is being designed for the 2017 iteration of the program.



Standardized Patient with a family member participates in difficult conversation with the Capstone students.

UltraFest

The Emergency Medicine Ultrasound Division teaches focused bedside ultrasound skills to medical students, residents, and physicians, and incorporates ultrasound into the students' anatomy sessions to enhance the learning of dynamic anatomical structures. The UltraFest Symposium is an annual one-day conference that receives local, regional, and national attention from high-impact medical ultrasound communities. UltraFest has had a positive impact on student learning, and this has been highlighted in a number research presentations and publications. It brings together medical students from all over the country for lectures and hands-on training and ends the day with an innovative Sono-Olympics session. To enhance this experience, the ILC's skills rooms, ultrasound systems, and ultrasound simulators are used to improve learners' image acquisition skills and procedural-guided ultrasound techniques.



Dr. Laleh Gharahbaghian explains an ultrasound technique to medical student attendees at last year's UltraFest symposium, a free, all-day educational program for medical students sponsored by Stanford's emergency medicine department.

Standardized Patient Program

The Stanford Standardized Patient Program (SPP) continued the creation and implementation of both formative exercises and summative assessments in both undergraduate and graduate medical education. In particular, both the Clinical Performance Examination (CPX) and Mini-CPX, mandatory clinical examinations for fourth- and second-year medical students, respectively, were successfully administered in 2016.

With over a decade of consistent experience, student performance data for the Mini-CPX is currently being analyzed, to investigate longitudinal trends and consistency (for example, the effects of curricular themes and innovations), as well as predictive outcomes for medical students on subsequent clinical clerkship performance. This data has been presented at the International Meeting on Simulation in Healthcare (IMSH) in San Diego, the Western Group on Educational Affairs (WGEA) in Tucson, and additional analyses of predictive longitudinal follow up was presented at the Association of American Medical Colleges (AAMC) in Seattle.

Graduate Medical Education

NorCal Simwars

February 2016 saw the launch of the first annual NorCal Simwars for Emergency Medicine (EM) residency programs in Berg Hall in the LKSC. The Stanford EM simulation team worked with residency leadership from UCSF, Highland, UC Davis, and UC Fresno to plan the four-hour event, which was a mix of short lecture didactics and high fidelity mannequin-based simulations of high risk scenarios followed by debriefings. This event was a great opportunity for experiential learning, development of critical thinking, reinforcement of critical procedural skills, and team collaboration with residents from all the NorCal EM residency programs.

Pediatric Anesthesia and Pediatric Critical Care Fellows Crisis Resource Management Simulation Course

In acute care settings (OR, ICU, ED), sudden deterioration in a patient's condition is common. When dealing with undifferentiated critical illness there is often insufficient or conflicting data available, so clinicians must make treatment decisions based on gut feeling or experience. Under these conditions, clinicians often succumb to cognitive errors. These errors are typically difficult to recover from, and can result in patient harm. Techniques to avoid making cognitive errors are not routinely taught, so Dr. Calvin Kuan developed a simulation program to prepare pediatric anesthesiology and pediatric critical care fellows to recognize and prevent cognitive errors.

The scenarios were designed to have unclear, multiple, or conflicting diagnoses, and additional confounding factors that challenge the learners to make decisions while juggling opposing clinical needs. Practicing these skills in simulation gave learners the opportunity to think for themselves, develop sound communication and negotiation skills, and practice functioning at the attending level without any risk of harm to a real patient.

Accreditation Council for Graduate Medical Education Milestones in Otolaryngology

The Otolaryngology simulation education program continues to mature from its start two years ago. Each year, two complex scenarios were designed to address the Accreditation Council for Graduate Medical Education (ACGME) milestones in communication, professionalism and system-based practice. Residents report increased confidence and retention of information -- especially relating to airway fire simulations from prior years. This past year, Dr. Jennifer Lee with Erika Shimahara, expanded the program to include hands-on airway training with multiple modalities of intubation, and simulations to train interns on the delivery of bad news. Stanford

Otolaryngology program faculty used their expertise to collaborate with UC Davis on an Otolaryngology intern simulation bootcamp for regional innovations in simulation education.

Stanford Pediatric Cardiology Fellow's Bootcamp

Pediatric cardiology trainees are tasked with rapidly acquiring knowledge of complex cardiac anatomy, fragile physiology, and potentially life-saving procedures. The Stanford Pediatric Cardiology Fellows' Bootcamp was designed to prepare residents for their transition to fellowship. Managed by Drs. David Axelrod, Scott Ceresnak, Catherine Krawczeski, Kara Motonaga, and Loren Sacks, this two-day training seminar utilized multiple simulation modalities to give trainees the opportunity to practice skills ranging from echocardiography to pacemaker programming, and from cardiac catheterization to code resuscitation in the Cardiovascular Intensive Care Unit (CVICU).

In April of 2016, 16 fellows representing eight different fellowship programs in the USA and Canada attended the bootcamp. Knowledge assessment testing was performed before and after the bootcamp. Posttest bootcamp scores were significantly increased compared to pretest scores, and remained elevated above baseline two months later when the attendees started their fellowships. The posttest scores were also significantly higher compared to scores from a control group who did not attend the bootcamp. This program proved to be a valuable educational springboard to residents pursuing fellowship in pediatric cardiology.

Cardiovascular Intensive Care Unit Collaborative Healthcare Immersive Learning Dynamic Training

In the CVICU, favorable team dynamics are vital for successful code resuscitation. To that end, Dr. Loren Sacks, Jeanmaire Kangean, RN, and Stacie Brown RN, MSN have developed the CVICU Collaborative Healthcare Immersive Learning Dynamic (CHILD) simulation program. This program gives a multidisciplinary team of RN's, RT's, pharmacists, cardiology fellows, NP's, PA's

team, every RN in the CVICU has gone through the program and the evaluations of the sessions have been uniformly positive. Participants at all levels rate the scenarios as highly realistic and endorse the belief that this training improves team members' ability to recognize pathologic changes in pediatric patients and to work together to improve outcomes.

25th Anniversary of the First Anesthesia Crisis Resources Management Course

September 22, 2015 marked the 25th anniversary of the first Anesthesia Crisis Resource Management (ACRM) course conducted by Drs. David Gaba, Steven Howard, Kevin Fish, and Frank Sarnquist. ACRM is the pioneering simulation-based curriculum that addresses both the medical and technical skills of managing specific critical events as well as the non-technical skills of dynamic decision making, teamwork, and team management. The first ACRM was held for anesthesiology residents but the curriculum has long been adapted to all levels of anesthesia professionals including highly experienced and board certified anesthesiologists. ACRM-like courses have also been adapted to nearly every highly dynamic arena of healthcare and ACRM and its variants have spread nearly all over the world. ACRM for anesthesiology residents continues to be conducted at Stanford approximately 18 times per year, with founding instructors Drs. Gaba and Howard still heavily involved in its teaching. After its opening, the ILC became the primary site for the conduct of ACRM and related courses at Stanford.

Anesthesia Informatics and Media Lab Anesthesia Procedure Tutorial Video Project

Over the last five years, the Stanford Anesthesia Informatics and Media (AIM) Lab has conducted research into the evolving learning preferences and styles of residents, to guide the development of new educational tools. Their findings have shown that anesthesiology residents who seek to learn a new clinical procedure rank watching a video almost as highly as intraoperative teaching, so the AIM Lab developed an initiative to create video-based procedure tutorials.

In collaboration with CISL, they incorporated immersive learning environments into the production of instructional videos to enhance the sense of realism and fidelity by situating the instructional content in the environment of clinical practice. The videos are being edited to include medical diagrams, procedural animations, and step-by-step explanations by Stanford Anesthesia faculty. Upon completion, they will be accessible on computers or mobile devices in educational and clinical settings by anesthesia residents.

SURG300 Central Venous Catheter Verification of Proficiency Curriculum

Many of the complications associated with Central Venous Catheter (CVC) insertion are preventable. The Goodman Surgical Education Center created a CVC Verification of Proficiency curriculum to meet the need of general surgery residents who lacked the knowledge and skills to perform this procedure. Residents were required to demonstrate proficiency in central line placement on a task trainer prior to being allowed to perform this procedure in the clinical setting. Using a review of the literature, a checklist tool was modified and validated to assess the proficiency of the training. The program is unique in that the assessment is high-fidelity (learners performed the procedure in a simulated ICU room with a confederate nurse), and video-based, which allowed for high-level objective assessment of the learners' performance. Data on CVC complication rates is currently being collected to determine the impact of this educational intervention on clinical outcomes.

Communication Skills Workshop

Clinical fellows often lead pivotal discussions in high-stakes, life-limiting or life-threatening situations. These discussions are frequently difficult for both patients and physicians. The ability to communicate medical information with professionalism, respect and empathy is a behavioral skill that is fundamental to good patient care. A series of Communication Skills Workshops were developed to educate and empower fellows from critical care medicine, geriatrics, hospice and palliative medicine, neuro-oncology, and neuro-critical care. Common techniques for effective communication were taught via a combination of didactic teaching and immersive SP simulation scenarios. Sessions are ongoing, and so far, the subjective feedback has been predominantly positive.

Interprofessional Education and Team Training

Team-based Trauma Resuscitation

Each spring, the incoming Trauma Chief Residents and incoming senior EM residents come together for a joint session in which all members review key principles of team based trauma resuscitation. In the fall, the new EM attending physicians attend a simulation session as part of their orientation to trauma resuscitations at Stanford.

The simulation participants include residents, attendings, and nurses and the objective of the scenarios, which are led by Dr. Kristan Staudenmayer from Trauma Surgery and Dr. Peter D'Souza from EM, are to demonstrate to learners how common problems can disrupt the resuscitation process. The formal debriefing of these simulation scenarios provide reflective discussion on how to manage some of these problems.

Interdisciplinary Simulation-based Crisis Resource Management Training in the Operating Room

Training in Crisis Resource Management (CRM) can improve team performance and reduce medical errors, yet very few residency programs incorporate this type of training. In 2016, the Departments of Anesthesia, Surgery, and the operating room educators for Stanford Health Care (SHC) implemented an interdisciplinary simulation-based CRM curriculum.

Two scenarios were run in each session. Every scenario had inter-professional participants (anesthesia resident, surgery resident, surgery intern, scrub technician, and circulating nurse) in the team to deal with the operating room crisis. Teams were observed by anesthesia, surgery, and nursing faculty/staff who co-facilitated a comprehensive multidisciplinary debriefing session following the simulations. The discussion focused on teamwork and communication.

Healthcare Systems Improvement

Empathy Research

In design thinking methodology, empathy research is recognized as a critical component of generating insights into the problem of inquiry. In healthcare, empathy would ideally be achieved by "walking in your patients' shoes" and interviewing patients. However, direct observation and patient interaction in the emergency department is not always feasible. A novel d.school exercise utilized the ILC to create a high-fidelity emergency department (ED) experience. Learners had the opportunity to experience various aspects of the ED environment such as doctor-patient interactions, noise levels, and waiting to be seen. Course participants reported a high sense of empathy achieved through the simulation. The insights generated in this phase were used to accelerate progress through the subsequent stages of the design thinking process. As part of their workshop, learners presented their observations to the hospital Vice President, EM Chairman, nursing



Interdisciplinary Simulation-based Crisis Resource Management Training in the Operating Room.

'This is extremely effective for improving OR communication. It is very difficult to assess/improve communication/systems issues in a normal OR working environment due to time/production pressure. However, these sessions help provide the tools that CAN be implemented in the normal work environment.' - Participant

leadership, ED administrators, and physician leaders from EM and elsewhere in the hospital. The d.school also presented to members of the Stanford patient advisory committees, who are equally committed to improving empathy training.

OBSim

OBSim, thanks to the vision and support of Risk Management, had its most productive year yet of its in situ multidisciplinary team training for obstetric emergencies. They added new clinical team members and simulation experts, expanded their course offerings, and provided observation experiences for multiple international visitors. This past year, OBSim also started to include private practice attending obstetricians and attending obstetric anesthesiologists into their training teams. The team was granted provisional approval to have an OBSim fellow; this individual can come from either the obstetric or anesthesia discipline.

Global Health: Beyond Diseases and International Organizations

This two-week intensive course provides students with a macro perspective on global health topics, and has now been offered for five years to residents and fellows across the campus ranging from internal medicine to anesthesia to pediatrics and pathology. The course exposes learners to the systemic issues affecting healthcare

around the world, and provides insight into multidisciplinary approaches to current global health concerns. Physicians in the course also learn clinical, laboratory, and diagnostic skills to provide patient care in overseas setting. The significant rise of road injuries across the planet means that doctors in international settings will be exposed to trauma, so the course used high-fidelity simulation to prepare physicians to care for a trauma patient in a low-resource setting.

Assessment and Testing

Stanford Flexible Endoscopic Evaluation of Swallowing

Flexible Endoscopic Evaluation of Swallowing (FEES) is a procedure that allows instrumental, objective assessment of swallow function. A two-day course was designed for Speech Language Pathologists (SLPs) to advance FEES knowledge and skills and to prepare for new implementation of FEES at a hospital facility. The inaugural instance was run in April 2016. Participants were assigned complex case studies in a simulated acute care hospital setting, and allowed to practice planning, setting up, controlling the environment, and scoping. Stanford course faculty includes attending Radiologist, Otolaryngologists, and Speech Language Pathologists. The overriding differentiator of this FEES course compared to other FEES courses was the simulation-based learning component.



Course participants practicing FEES and experiencing the procedure from the patient's perspective.

Multiple Mini Interview Admission Process

In 2010, Stanford Medicine became one of the first US medical schools to use the MMI in the medical student selection process. The MMI is a circuit of seven to ten mini interviews of eight minutes each. It is a closed interview where the interviewers have no information about the applicants prior to the interview. The questions aim to evaluate various non-cognitive attributes of applicants such as ethical reasoning, self-awareness, and communication skills.

Stanford MD Admissions has been fortunate to have access the ILC to conduct the MMI. In the 2015-16 application season, about 500 interviews were conducted over about 18 days. Due to the flexibility of the ILC space configuration, two new elements were introduced to the MMI: a short traditional open file interview, and a dual circuit MMI's where two circuits occur concurrently. This second initiative allowed for a larger number of applicants to be interviewed during the same time-period. The improved efficiency of our processes resulted in interviews being completed several weeks prior to previous years.

Research

Controlled Trial of New Communication Curriculum

Dr. Sarah Hilgenberg, received a \$5,000 Novice Research Grant from the Society for Simulation in Healthcare (SSH) for her proposal entitled: *De-escalating Angry Caregivers: RCT for Pediatric Trainees using an SP Curriculum*. Dr. Hilgenberg led a randomized controlled trial of a new communication curriculum designed for pediatric residents. Eighty-six residents participated in either the control group, or the intervention curriculum involving two SP exercises that were designed to simulate a trainee's encounter with an angry parent of a hospitalized pediatric patient. Residents and SPs measured their behavior change over time using a novel assessment tool that was designed from previously validated tools. The hope is to disseminate the curricular materials and results nationally over this upcoming year.



Sarah Hilgenberg, MD

This program was supported by grants from the SSH and the Association of Pediatric Program Directors. It also serves as Dr. Hilgenberg's primary project for the three-year Academic Pediatric Association's Educational Scholars Program that she was selected to participate in last spring.

Reflection on Sim Experience in Immersive Learning Center Sarah Hilgenberg, MD

"In my roles as clinical educator and pediatric residency associate program director, I heard repeatedly from residents about their struggles communicating with angry parents. A literature review revealed little about how to teach this topic to trainees though it highlighted difficult encounters as a frequent issue facing physicians. Recognizing an opportunity to help our local learners and contribute to the larger world of medical education, I led the development of a novel curriculum that teaches our residents how to de-escalate angry parents. We received two grants that funded the Standardized Patients who played angry parents in our randomized controlled trial of our curriculum. Preliminary results show that our interns benefited most from the curriculum. We are presenting our work at two upcoming national conferences. Personally, I greatly enjoyed working with all of the staff, SPs and Dr. David Gaba in the Immersive Learning Center and leading my first research effort as Principal Investigator in this area."

Center for Immersive and Simulation-based Learning Grant Project Summary

CISL was delighted to be able provide a small grant to support a simulation research project, led by Dr. Homan Cheng.

Cleft palate repair is a challenging procedure for cleft surgeons to teach. A novel high-fidelity cleft palate simulator has been developed that is realistic and functional, and this study was designed to evaluate this simulator as a teaching tool. Plastic surgery trainees attended a palatoplasty workshop consisting of a didactic session on cleft palate anatomy and repair followed by a simulation session. All participants reported significantly higher procedural confidence following the workshop. Those with cleft palate surgery experience had higher procedural confidence before and after

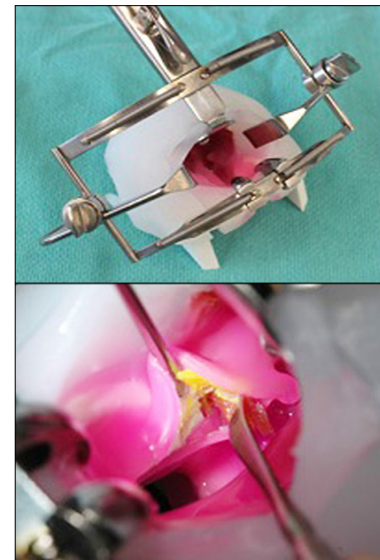
the session. Palatoplasty knowledge test scores increased in 90% of participants. The mean baseline test score was 28% and increased to 43% following the workshop. Those with prior cleft palate experience did not have higher mean baseline test scores than those with no experience, but did have significantly higher scores after the workshop. Feedback was strongly positive for both the didactic and simulation sessions. All trainees “strongly agreed” or “agreed” that the simulator should be integrated into training and they would use it again.



Simulation session setup with simulator and real surgical instruments.



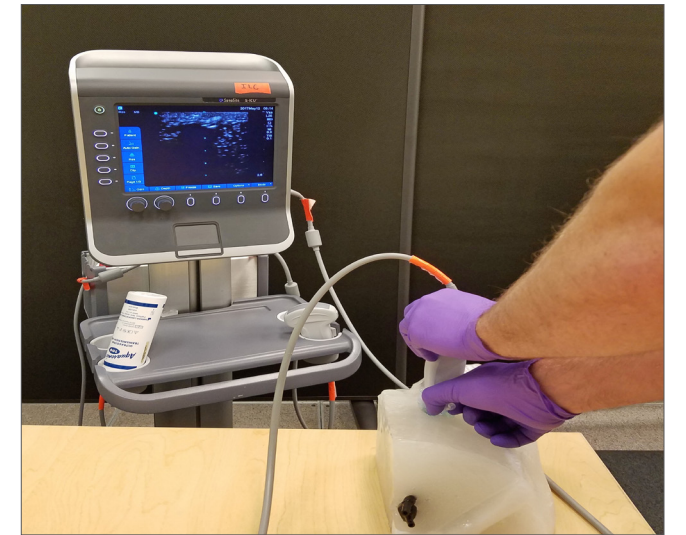
Trainees performing a cleft palate repair on the simulator during the simulation session of the palatoplasty workshop.



Novel cleft palate simulator.
Top: Perspective view of the cleft palate simulator with Dingman retractor inserted.
Bottom: Intra-oral view of the simulator during muscular dissection.

3D Printing and 3DQ Lab Collaboration

CISL simulationists have recently been working on a collaborative 3D printing project. The Stanford 3DQ Lab has expertise in 3D modeling and printing, which opened a range of exciting projects for the Innovation Foundry to partner with faculty. Data from de-identified patient CT scans was used to create 3D printed models of organs and vessels. This collaboration expanded to include a group of interventional radiologists; who are working with the CISL team towards developing validated patient specific femoral line trainers.



3D printed and molded model to be used to train Radiology residents to insert lines on patients with challenging anatomy.

Provide Immersive Learning to External Experienced Clinicians

Hospital for Special Surgery Simulation Instructor Course

After twelve months of planning, a group of eight anesthesiologists led by Dr. Mandip Kalsi from the Hospital for Special Surgery (HSS) traveled from New York City to Stanford to participate in a two-and-a-half-day Simulation Instructor Course. The HSS is America's longest standing orthopedic hospital and tertiary care medical center and is also the official hospital for 20 professional sports and collegiate organizations. The Department of Anesthesiology at HSS offers a fellowship in regional anesthesiology and the group's goal in coming to Stanford was to explore ways in which simulation could be embedded into their existing training program.

Stanford's anesthesia simulation faculty for this course included Drs. Steven Howard, David Gaba, Kyle Harrison and Alexandra Buchanan, and Elias Escobedo from the SPP. The course is designed to “jump start” participants' ability to design and debrief scenarios - the crux of simulation-based learning. The sessions were very lively as both learners and teachers were actively engaged in the process of using simulation as a teaching aid. By the end of the course, the HSS group

had developed action lists to pursue in order to achieve their goal of integrating simulation into their fellowship training program. Stanford faculty committed to assist them in their new ventures going forward.

Pediatric-focused Maintenance of Certification in Anesthesia

The second annual pediatric-focused Maintenance of Certification in Anesthesia (MOCA) simulation session was held this year. Drs. Calvin Kuan, Ruth Fanning, David Gaba and Anita Honkanen combined forces to lead participants through scenarios that challenged them with infants, young children, teens, and young adults. Potentially difficult situations often encountered in pediatric care were included, such as simultaneous management of an anxious parent while caring for a child in extreme medical distress. To help represent the wide range of areas in which pediatric anesthesiologists are often tasked to care for their young patients, the simulations were set in various environments including intraoperative care, recovery room, and emergency department. Participants remained deeply engaged in the scenarios and debriefs, and the positive program feedback reflected the fun and learning that occurred.

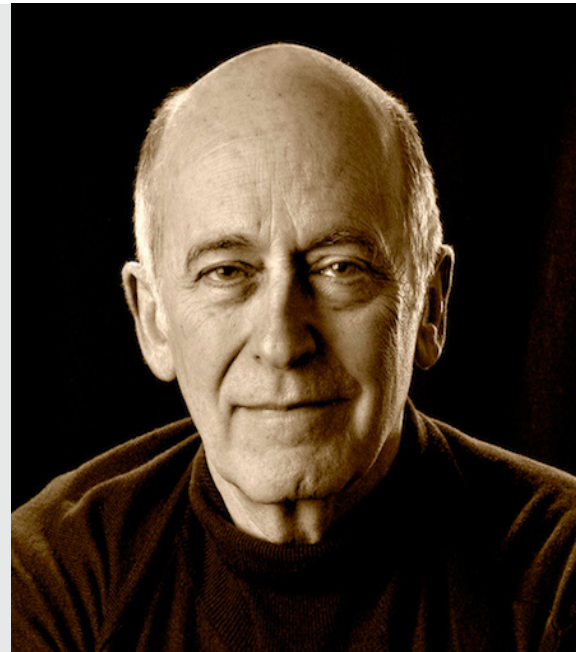
Community Outreach

9th Annual Center for Immersive and Simulation-based Learning Symposium

The CISL Symposium is designed to bring the Stanford community together to highlight the work in ISL among colleagues both at Stanford and the wider simulation community. Through panels, keynote speakers, and breakout sessions, simulation-based educators exchange ideas and share insights regarding simulation in healthcare. It is CISL's hope that this gathering will also help develop the partnerships and collaborations needed to put these ideas to work.

This year, the 9th Annual CISL Symposium was titled "Patient Safety: Is Simulation the Answer?" and was held on April 20, 2016 at the LKSC.

CISL was delighted to welcome Dr. Jeffrey B. Cooper as the keynote speaker. His address was entitled: The Fruits of Collaboration: Patient Safety, Simulation, Teachers, Relationships. Dr. Cooper shared personal reflections on a fruitful 44 years in patient safety, the generative 25-year alliance between simulation faculty at Stanford and Harvard Medical Schools, and the critical role of teachers and faculty development in using simulation to address patient safety challenges, particularly for speaking up about patient safety.



Jeffrey B. Cooper, MD

CISL would also like to extend our appreciation to our Ignite presenters:

Multidisciplinary in situ OBSim: Ten Years of Patient Safety Efforts
NAOLA AUSTIN, MD

Pediatric Cardiology Bootcamp
SCOTT CERESNAK, MD

Patient Safety for High School Students in the Wilderness
HENRY CURTIS, MD
REBECCA SMITH-COGGINS, MD

Simulation Lab to Operating Room Use: Learning from the Clinical Implementation of Emergency Manuals
SARAH GOLDHABER-FIEBERT, MD

Running the Board: Assessment of Handoff Communication Skills
KIM HARNEY, MD

Otolaryngology Emergencies
JENNIFER Y. LEE, MD

NorCal Simwars
LARRY MO, MD

Use of Simulation to Enhance Opioid Safety
JORDAN L. NEWMARK, MD

Critical Communication, Safety and Human-Centered Services of the Future
HELI RUOKAMO, PhD

Health Matters

Health Matters is a free community event that explores the latest advancements in medicine and health at Stanford Medicine. CISL team members Dr. Lexi Buchanan and Teresa Roman-Micek, along with SP Pamela Nemecek, presented at the Med School Morning portion of the Health Matters program. Med School Morning aims to teach interested high school students about medical school and careers in medicine. The CISL team led a session titled: *Lights, Camera, Simulation!: Educational Techniques that Help Turn Med Students into Doctors*, which introduced the students to simulation-based education and how it is used to teach medical students. Volunteers from the audience had the opportunity to take a patient history from an SP, and demonstrated how SPs can help learners improve their communication skills by providing thoughtful feedback.

Stanford Clinical Summer Internship

Stanford Clinical Summer Internship (CSI) is an innovative program bringing together a diverse group of highly motivated, curious, bright upper level high school students and undergrads to collaborate in the exploration of the art and science of being a doctor. Successfully piloted by Drs. Sarita Khemani and Eva Weinlander in 2015 and expanded in 2016, Stanford CSI involved both local community outreach and international students who partook in immersive simulations, hands on activities, and interactive lectures. Participants were introduced to history and physical exam through standardized patients, learned and practiced injection techniques, ultrasound skills, knot tying and suturing. They

The Immersive Learning Center in Film

Choosing the most appropriate filming location is an important aspect of film and video production. The location sets the tone and contributes significantly to the telling of the story at hand. The ILC is a unique environment because it looks like a real clinical environment, but it does not have the same demands of patient care and privacy that must be considered if filming in a hospital environment. The CISL team was happy to be able to support several educational filming projects this year:

"Stanford Sharps Safety Video"	https://www.youtube.com/watch?v=505E1ANotDs
"Obselete Necessity"	https://www.youtube.com/watch?v=TYuz_8HtZVw
"Hemorrhagic Shock"	https://www.youtu.be/-cMGUHwik6I
"Shortness of Breath"	https://www.youtu.be/xylbFe58Yz8
"Placental Rupture"	https://www.youtu.be/-CApoyQ5aiM
"Aspirin Toxicity"	https://www.youtu.be/F9iNjVied-s
"Dear Future Doctor"	https://www.youtube.com/watch?v=Reo_pnl1A64

came away with practical knowledge and were empowered with the ability to provide preliminary treatment for musculoskeletal injuries, hemorrhage, choking, drowning and cardiac arrest. Data has been collected on participant enthusiasm for continuing to pursue a healthcare related career, their perceived ability to bring back knowledge and skills to their community, and their sense of capability. Medical students, residents, junior and senior faculty were involved as session leads and lecturers, with an emphasis on cascading mentorship.



Med School Morning instructors and students.

Social Media

In recent years, CISL has harnessed social media as a tool to share stories and reach new audiences. Since its launch in October 2015, CISL's Twitter account has allowed us to strengthen communication efforts to audiences about courses, workshops and the annual symposium. CISL's media team's efforts yielded a total follower number that has grown by nearly 75%. As Twitter continues to demonstrate its power for propagating information, CISL will continue to create hashtags tailored to specific events and programs. Follow CISL on Twitter: @StanfordCISL.

Leadership and Advocacy

David Gaba, MD, Steps Down as Society for Simulation Healthcare Editor-in-Chief

After nearly 11 years of service as founding Editor-in-Chief of the only indexed, peer-reviewed journal on simulation, *Simulation in Healthcare*, published by the SSH, Dr. David Gaba stepped down from this role.

Dr. Gaba's pioneering leadership helped found the journal; or, by overseeing its growth as well as creating and maintaining its high editorial standards. *Simulation in Healthcare* is currently the premier multidisciplinary journal on the topic in the field, published six times annually.

As Associate Dean for Immersive and Simulation-based Learning at Stanford School of Medicine, Dr. Gaba will continue to oversee and operate the 28,000-square foot simulation center at Stanford and also as founder and co-director of the Simulation Center at VA Palo Alto. As a leading simulation educator, Dr. Gaba teaches simulation instructor courses as well as MOCA courses for experienced anesthesiologists and ACRM courses for anesthesiology residents. Other endeavors include simulation research projects, mentoring junior colleagues from all disciplines and domains in pursuit of their own simulation-based research as well as scholarly writing about patient safety and simulation.

The SSH has appointed Dr. Mark Scerbo, an Associate Editor for the journal over the last 11 years and Dr. Gaba's friend and colleague, as the new Editor-in-Chief for *Simulation in Healthcare*. Dr. Gaba will remain on the Editorial Board and he will occupy a new honorary position as Founding Editor-in-Chief.

Official announcements from the SSH may be accessed here: <http://www.ssih.org/News/ArticleType/ArticleView/ArticleID/1845>. Separate editorials by Dr. Gaba and Dr. Scerbo marking the transition are published in the August 2016 issue of the journal (Volume 11, issue number 4).

John Fell Presents at SimOps 2016

CISL simulationist John Fell presented a low-cost 3D printed trachea project at the SSH SimOps 2016 conference in Greenville, SC. The presentation demonstrated how the 3D printed trachea can be affixed to a 3G mannequin for cases which require a cricothyrotomy, an emergency airway procedure, to be performed. This augmentation allows users to stay immersed in the simulation while reducing the risk of costly damage to the mannequin. The modification is currently used in scenarios conducted at the ILC.



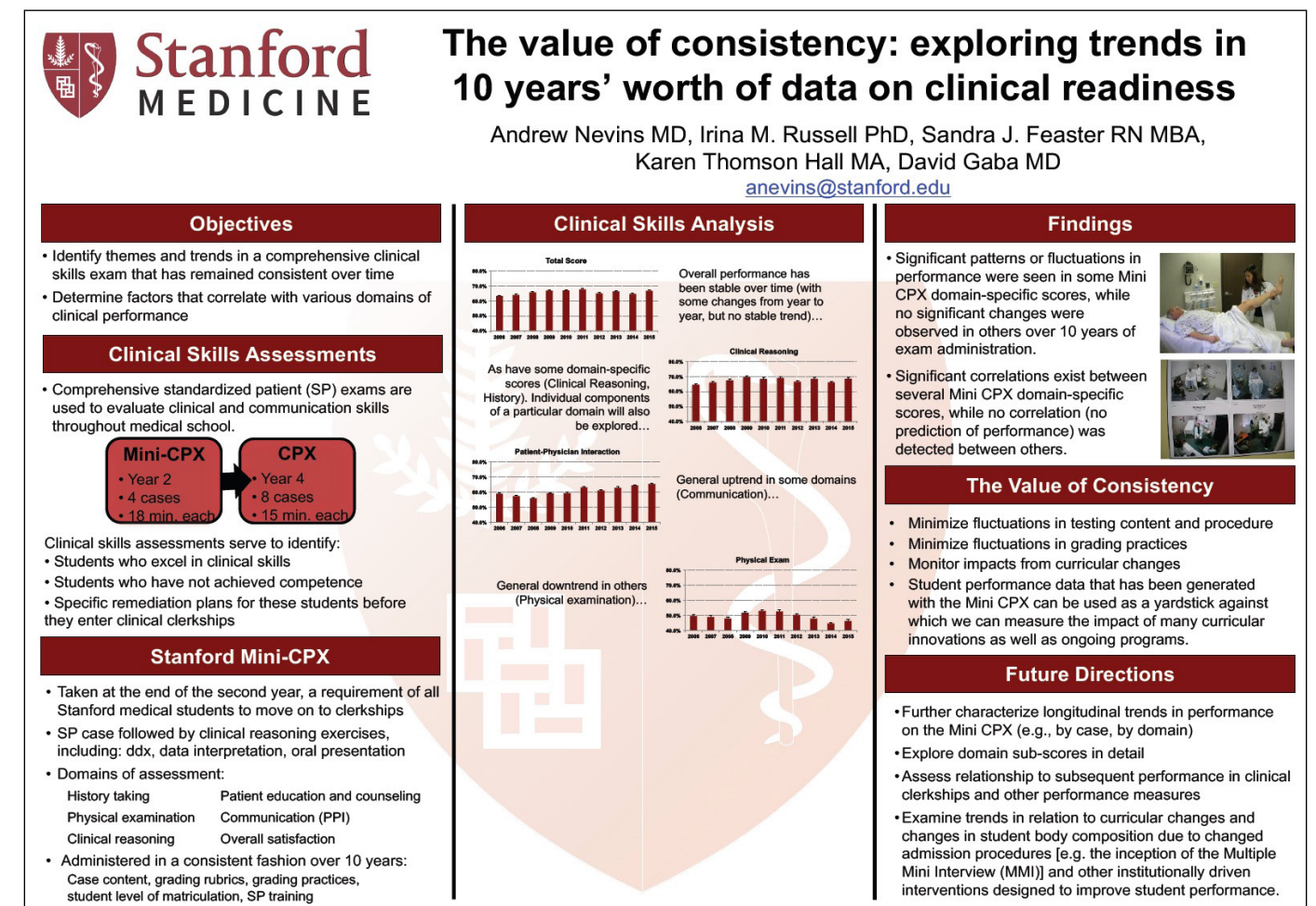
3D printed trachea affixed to computerized mannequin.

Standardized Patient Program at the California Consortium for the Assessment of Clinical Competence

Dr. Andrew Nevins, Medical Director of the SPP, was named Chair of the California Consortium for the Assessment of Clinical Competence (CCACC), a statewide group of clinicians and medical educators from all medical schools in California. This is Dr. Nevins' second term as CCACC chair, having previously served this role 2012-2014. Among other projects, the CCACC creates and coordinates the annual CPX. Recent CCACC initiatives include the ongoing development and assessment of the clinical reasoning component of the CPX, the creation and approval of updated bylaws, and ongoing new CPX case development. While at the Asia Pacific Meeting on Simulation in Healthcare (APMSH) in Singapore, Dr. Nevins also presented a workshop entitled: Opportunities and Challenges for Multi-Institutional Collaboration about the benefits and challenges of over 20 years' experience of CCACC collaborative efforts.

Standardized Patient Program Presentations on the Mini-CPX Analysis and Trends

With over a decade of consistent experience with the Mini-CPX, student performance data for this high-stakes examination has been analyzed to investigate both longitudinal trends over time, as well as regarding predictive outcomes for students on subsequent clinical clerkship performance. In 2016, this data was presented at the IMSH in San Diego, the WGEA in Tucson, and the AAMC in Seattle. In addition to these regional and national conferences, Dr. Andrew Nevins presented this work at the 3rd APMSH in Singapore in November 2016, where he received the 1st place research abstract award for this work.



Faculty Development

Society for Hospital Medicine: Point-of-Care Faculty Development

The development of pocket-sized Point-of-Care UltraSound (POCUS) machines has greatly expanded the potential for hospital physicians to perform POCUS examinations. The Bay Area Chapter of the Society for Hospital Medicine (SHM) sponsored an afternoon faculty development for clinician educators to begin to learn POCUS. The course brought together teaching faculty from UCSF, Kaiser San Francisco, Highland Hospital and SHC. It quickly filled with clinical educators from around the Bay Area, and afforded them the opportunity to learn comprehensive volume assessment and limited cardiac echo; both high-yield studies for the teaching hospitalist. The course was a great success with plenty of time and space for the learners to practice ultrasound on standardized patients.

Emergency Medicine Faculty Development

Dr. Calvin Kuan, a pediatric anesthesiologist from Stanford Children's Health (SCH), ran a faculty development program for EM physicians. The program focused on managing the difficult pediatric airway. Five pediatric anesthesia faculty instructed approximately 25 EM faculty, and the session was divided into four different work stations: use of the video laryngoscope; use of laryngeal mask airway; congenital heart disease cases; and cases studies of the difficult airway. This training allowed EM faculty to become familiar with new protocols and to refine their skills in pediatric anesthesia procedures.

Continuing Medical Education Project

Continuing Medical Education (CME) and the Education Technology Instructional Design and Production group created several innovative, online case-based courses. They worked with the CISL team to hire SP actors and produced interactive videos that put the learner in the "physician's shoes" with a first-person point of view as they enter the patient exam rooms. The learner navigates through a "choose your

own adventure" approach to decision-making around patient care topics, including: outpatient antibiotic prescribing practices, e-cigarettes, and common musculoskeletal injuries related to workplace ergonomics.

The first six CME courses produced by the summer of 2016 have been very well-received. The average learner feedback ratings on course effectiveness and engagement range 4.3-4.5 on a 5-point scale. Numerous feedback comments highlighted the learners' value of a case-based approach and role play videos that are reflective of real-life scenarios.

Emerging Infectious Disease Training

Planning for emerging infectious diseases has become an essential component of a robust emergency management program. In the wake of the Ebola crisis, SHC, and Stanford University created an interdisciplinary team to maintain a posture of continued readiness for any new emerging infectious illness. The interdisciplinary team members are educated bi-annually to safely don and doff the Personal Protective Equipment (PPE); perform safe patient care in PPE including IV placement, safe transfer of highly infectious specimens, utilizing teleconference systems, waste management procedures; and manage safe patient transfers. This training allowed staff to practice in a safe environment, become familiar with team members, and refine the patient care protocols in preparation for care for a patient with a highly infectious disease.

Management

Farewell to Sandra Feaster

After many years in the medical field, Sandra Feaster, RN, MS, MBA, came to Stanford University on February 2003 to work as a Project Director for Operations Excellence at LPCH. Almost immediately, she met Dr. David Gaba at an anesthesia luncheon meeting and struck up a conversation about simulation. In 2006, she accepted the invitation to join him in forming and operating CISL and in planning for and opening the ILC in the LKSC. In July 2011, she became Assistant Dean.

As Dr. Gaba noted, "Sandi was a linchpin of the formation of CISL and its successful growth for more than a decade. We hope to recruit an outstanding individual to serve as the new Assistant Dean but she left some mighty big shoes to fill! Her presence will be sorely missed throughout CISL and the entire Stanford community and we wish her the best of luck in her future endeavors."

Sandi stepped down as Assistant Dean of Immersive and Simulation-based Learning on April 5, 2016. She now resides with her husband in Southern California.



Sandra Feaster



Sandra Feaster and friends at retirement party, April 2016.

Susan Eller, MSN, RN, CHSE appointed Assistant Dean for Immersive and Simulation-based Learning

On November 14, 2016, Susan Eller, MSN, RN, CHSE was appointed as the new Assistant Dean for Immersive and Simulation-Based Learning.

Susan was previously the Director of the ILC in the LKSC from 2012 to 2014. She has extensive experience in simulation in healthcare from her time as Director of Interprofessional Education, Simulation Technology and Immersive Learning at the Northwestern University School of Medicine.

Susan's background makes her ideal to serve as the Assistant Dean, where she will oversee the operations and staff of CISL and the ILC and will work closely with Dr. David Gaba to determining the future course of immersive learning at Stanford Medical School and in Stanford Medicine. Susan represents CISL at important School of Medicine committees, where she provides guidance on immersive learning pedagogy and coordination of the learning resources of the ILC.

Susan is currently completing her PhD in nursing, with a focus on researching Interprofessional Education using immersive learning techniques. She is participating on the research committee of the California Consortium for Assessment of Clinical Competence and is working within the SSH on a concept map for simulation knowledge and research.



Karen Thomson Hall appointed Director, Standardized Patient Program, Center for Immersive and Simulation-based Learning

Karen Thomson Hall has been a part of the Stanford SPP since 2008 when she started as an SP. With her degrees in theater and music, acting as a patient to help medical students with their clinical skills seemed a natural fit. When the staff trainer retired, she took on that role in 2010 and played a vital part in the move to the SPP's new home in the ILC.

In January 2014, Karen became Manager of the SPP and in April 2016 was promoted to Director. Under her guidance, the program has grown and become a robust partner in many areas of clinical skills education from early learners practicing basic skills to residents delivering bad news. Working collaboratively with faculty, Karen has contributed to the development and revision of many cases and simulation scenarios, at times restructuring their execution and improving their efficiency and effectiveness while limiting or reducing cost.

Karen brings an incredible talent for organization, a calm way of making sure all SP events run smoothly, and a keen sense for the business of our activities. She is the core spirit and driver of the SPP.



Mary Ayers appointed Director of Operations, Center for Immersive and Simulation-based Learning

Mary Ayers is a California native with a rich and diverse history with the School of Medicine. Intrigued by Stanford Tuition Assistance Program for her children, she began her career at Stanford in 1993 as an executive secretary in the Office of the Dean for the School of Medicine, which eventually developed into an interest in project and course management.

Through her ambition, efforts and training, she was propelled into variety of roles including Clerkship Program Manager, Technical Project Manager and later as Manager for Learning Facilities and Scheduling at EdTech in the department of Information Resources & Technology (IRT).

In January 2015, she joined CISL as Associate Director of Operations for Learning Spaces at the ILC. Later in May 2016, she was promoted to Director of Operations where she expertly navigates the diverse and challenging aspects of scheduling and operational logistics for the School for Medicine's educational endeavors.

Mary is known for her tremendous breadth of knowledge and experience of School of Medicine operations as well as her accommodating style. She is an invaluable asset to our team and key to CISL's success.



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CISL Affiliates

A special mention and thank you to our Stanford affiliates who continue their work in patient safety, education, research and innovation:

Cardiac Surgery Simulation at the Stanford Cardiovascular Institute
<http://med.stanford.edu/cssec/resident-training-program.html>

Center for Advanced Pediatric and Perinatal Education (CAPE)
cape.stanford.edu

Goodman Surgical Education Center
goodmancenter.stanford.edu

VA Palo Alto Health Care System Simulation Center
www.paloalto.va.gov/anes_sim.asp