The Center for Experiential and Applied Learning

Annual Report & Program Review

July 1, 2019 – June 30, 2020

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Executive Summary

Janae Joyner, PhD, MHA - The Center for Experiential and Applied Learning (CEAL) celebrated our third birthday this year having been formed July 1, 2017 to serve the collective Wake Forest Baptist Health (academic enterprise + clinical enterprise + community).

This year has looked different as we had to respond to the COVID-19 pandemic. Many events starting in March, 2020 had to be cancelled or postponed. For over 15 weeks at least half of our staff worked remotely while some teams/events especially in the simulation functional area were deemed “mission critical” such that even during the height of the pandemic, our team was on the front-line. Whether working events or behind the scenes to develop and execute educational resources virtually, the CEAL team rose to the challenge, delivering excellence including, but not limited to the following:

- Produced a virtual series of videos around cardiovascular health to be used by our partners to address the need for K-12 education events for our AHEC/CME, Student Affairs, and Maya Angelou Center to look different due to pandemic.
- Aided with the development of a virtual 4th year MD program elective during COVID-19 to continue ultrasound training for students as they prepared for residency.
- Moved the teaching of anatomy to an online format for graduate students.
- Prepared our facility to serve as an overflow storage facility if needed during COVID-19 and adjusted our processes to continue to accept donations during a time where there were lessened anatomy events, led by our Anatomical Resources team.
- Assisted with a COVID-19 clinical study about droplets transmitted during surgical intubation using both anatomical resources and simulation resources.
- Implemented changes to the standardized patient (SP) program, including the use of virtual software such as Web-Ex and virtual SP encounters, as a result of in-person event cancellations starting in March.
- Developed new SP guidelines to minimize COVID-19 transmission to be put in place fall, 2020.
- Acquired new skills including serving interesting character roles as team members stepped in to be standardized patients and their family members for several simulation experiences.
- Participated in many online professional development offerings while unable to travel to conferences and with lessened events.
- Navigated necessary furlough weeks successfully while maintaining all events requested by event champions.
- Huddled by phone several times per week between March-June, 2020 to continue team engagement and communication during this time of change.
We know that FY21 will continue to look different and we are continuing to adjust and adapt our hands-on training Center to meet the needs of all learners. *We are all in this together and we will all get through this together.*

CEAL achieved other milestones in 2019-2020, including training over 200 nurses in ultrasound guided IV, providing mini-fellowship opportunities to several faculty, and developing a new external ultrasound course offering in emergency medicine. The newly added Vimedix (or as we call him – Lieutenant Dan) has been an extremely important capital investment being used by medical students and residents from various departments including emergency medicine and internal medicine to teach abnormal physiology in ultrasound.

During 2019-2020, we developed and submitted accreditation portfolios to the American College of Surgeons (ACS) and the Society for Simulation in Healthcare (SSH) with pending virtual site visits occurring during the fall of 2020. During late 2019, we worked with CEAL stakeholders to complete a modified Delphi technique process to identify evaluation questions that will be used across the clinical enterprise portion of our portfolio as we continue our return on learning (ROL)/return on investment (ROI) initiative.

CEAL also partnered with Birth Center leadership and CTSI resources to develop an institutional review board (IRB) application and protocol to collect data for publication around the opening of the Birth Center. Data analysis and future interviews/focus groups will continue into FY21.

We continued our model of not charging internal departments for services as long as the participants are within the organization (i.e. have a wakehealth.edu e-mail address). CEAL had **38,155 learner encounters** and served **44 departments**. CEAL’s portfolio was **68% clinical enterprise, 26% academic enterprise, and 6% other** which included K-12 education. CEAL hosted **1521 events** based upon staff tracking, **> 5439 event hours, and > 746 teaching hours.**
Our Vision
To Train One, Train Many. To Help One, Help Many.

Our Mission
The Center for Experiential and Applied Learning (CEAL) exists to serve Wake Forest Baptist Health and the healthcare community by promoting and sustaining the delivery of superior patient care, using experiential and applied learning that is grounded in educational theory and scientific discovery.

Our Values
We seek to advance the delivery of health care by providing hands-on immersive learning for current and future clinical professionals. We are guided by a responsibility to the patients who will be treated by the health care practitioners we support. For that reason, our primary mission is to improve the care and safety of the patients who will fall under the care of the students we train.

Key Functions of CEAL
Organizational Structure

Faculty Leadership
The faculty leadership serve as clinical and content experts and have CEAL associated job descriptions. In FY20, the leadership of CEAL included:

- JaNae Joyner, PhD, MHA – Executive Director
- Tom Perrault, PhD – Director of Human Tissue Services/Human Body Donation Program
- Clancy Clark, MD – Director of Surgical Education and Innovation
- Justin Traunero, MD – Director of Simulation – Hawthorne Hill campus
- Casey Glass, MD – Director of Ultrasound
- Jim Johnson, PhD – Director of Industry Relations and Professional Education
- Kristin Henderson, CRNA – Director of Simulation – BGCME campus

Steering Committee
- JaNae Joyner – CEAL
- Aarti Sarwal – Neurology
- David Masneri – Emergency Medicine
- Erich Grant – PA Studies/PA Program
- Ian Saunders – CEAL
- Josh Zavitz – Emergency Physicians
- Matt Miles – Internal Medicine – Pulmonary
- Heath Thornton – Family Medicine
- Jordan Ingram – CRNA Student Rep
- Michael Lischke – Continuing Medical Education
- Rima Jarrah – Anesthesiology
- Jim Johnson – CEAL
- Heath Earley – Nursing
- Jason Halvorson – Orthopedic Surgery
- Bret Nicks – CMO/Emergency Medicine
- Kristin Henderson – CRNA/CEAL
- Terri Yates – Healthcare Education
- Casey Glass – Emergency Medicine
- Deb Harding – CNO/Nursing
- Greg Ross – Anesthesia and Patient Safety
- Josh Nitsche – OB/GYN
- Justin Traunero – Anesthesiology/CEAL
- Jennifer Roper – Family Medicine
- Mona Ketner – CME Nurse Educator
- Megan Lee – Diagnostic Radiology
- Mitch Sokolosky – GME/Emergency Medicine
- Tom Perrault – CEAL
- Daryl Henshaw – Anesthesiology
- Amy Hildreth – Surgery/Trauma
- Clancy Clark – Surgery/Oncology/CEAL
- Mary Lovegreen – Pediatric/Neonatology
- Courtney Brown – Academic Nursing/Nurse Anesthetist
CEAL Strengths and Opportunities

**Strengths**

1. Engaged CEAL team who work well together
2. Diverse portfolio of events for a variety of learner types
3. Improved processes and procedures since CEAL inception

**Opportunities for Improvement**

1. Increased multidisciplinary training across institution, including WS campus Birth Center
2. Greater need for more in-depth, hands-on departmental/professional education
3. Refined DeaconSpace scheduling system to make more user friendly for stakeholders
4. Amplified data collection and analysis per a planned return on learning/return on investment initiative

**Action Plans**

1. Developed crisis resource management (CRM) for L&D involving multidisciplinary teams (OBGYN, Nursing, Anesthesia)
2. Completed CAR-T pilot study with planning led by CEAL Nursing Simulation. Added CEAL ACOG ECO dedicated trainer. Developed sustainability plans and processes with nurse educators
3. Redesigned DeaconSpace system and created user guide
4. Developed ROL/ROI plan
CEAL Certifications and Education in the Nation/Region

CEAL is an approved provider of:

- ACS Fundamentals of Laparoscopic Surgery (FLS) & Fundamentals of Endoscopic (FES) Test Site, proctored by Mr. Vernon Williams (FLS/FES) and Mrs. Troyanne McMillan (FLS)
- American Society of Anesthesiologist (ASA) MOCA Testing Site

CEAL supports education in the nation/region by:

- Serving the American College of Obstetricians and Gynecologists (ACOG) Simulation Working Group
- Delivering training that meets over 24 Wake Forest Accreditation Council for Graduate Medical Education (ACGME) Program Requirements
- Training Wake Forest School of Medicine MD, PA, CRNA, and Graduate students
- Educating Winston Salem State (WSSU) physical therapy (PT) students in anatomy/physiology
- Providing training Resources to Operational Medicine (OMD) for military training
- Holding North Carolina Emergency Medical Services (EMS) Courses
- Maintaining partnerships with industry to provide training to WFBH faculty and residents
- Offering pipeline educational simulation and healthcare experiences for middle and high school students
ACOG ECO GOES ON THE ROAD
Troyanne McMillan, RN – ACOG ECO training mobilized to Lexington and Wilkes Medical Centers this year. The CEAL Simulation team, along with Nona Smith, CNM (course facilitator) provided numerous training sessions with five to ten learners per session. The ACOG ECO course covers normal delivery along with obstetric emergencies to include: breech birth, shoulder dystocia, and cord prolapse training with a low-fidelity task trainer, and high fidelity simulation to provide training for postpartum hemorrhage, hypertensive emergency and maternal cardiac arrest. The course was tailored to learners at each location – Labor and Delivery providers and nurses at Wilkes and Emergency Medicine providers and nurses at Lexington. High Point and Davie Medical Centers will be added to the list of remote training locations for ACOG ECO in early FY21.

FLS/FES Updates
Vernon Williams – Fundamentals of Laparoscopic Surgery and Fundamental of Endoscopic Surgery exams are 2 part assessments that consist of online multiple choice test and a skills assessment. The online assessment for both exams cover cognitive skills, clinical judgement, and fundamental knowledge. FLS has a manual skills assessment that evaluates efficiency and precision that must be documented. The FES skill assessment uses a GI simulator that tests technical and psychomotor skills that is documented online from the simulator. Both exams must be completed to apply for ABS certification. Wake Forest is 1 of 2 centers in the state that proctors both FLS and FES. Last year we helped our surgical academy coordinate times to ensure our residents were scheduled for exams and proctored 20 FLS and 10 FES exams. We are currently collaborating with our residents about additional future training opportunities.
CEAL Team Updates
Janae Joyner, PhD, MHA - Team engagement, team collaboration, and team fun were key values for our CEAL staff in FY20. We traveled together to eat lunch at a Mexican restaurant before successfully conquering an escape room at Kersey Valley attractions. We varied the structure of our CEAL hangouts from an afternoon/evening work outing model to also include breakfast and lunch offerings meeting at Krankies and Cugina Forno Pizzeria, which allowed more opportunities for team members to participate. We have had birthday celebrations with cupcakes from a variety of local bakeries. We enjoyed a Holiday Lunch at Milner’s Restaurant again, participating for the second time in a White Elephant Gift exchange. In FY20, we added a program coordinator of administration to our CEAL team which was filled by Maria Crawford and ended the year with an open position in the role of ultrasound project coordinator. We have pulled together as a team to cover that open role when it was “frozen” due to COVID-19 hiring restrictions.
CEAL Administrative Updates
JaNae Joyner, PhD, MHA - During FY20, we formed an Administrative functional area of CEAL which has been the driving force for several new initiatives that will enhance the educational training that was already ongoing in the Center. This administrative team has met for most of the year on Mondays and Fridays for two to three hour long meetings. Out of the work of this team has come the submission of two accreditation portfolios to ACS and SSH, the implementation of a return on learning (ROL)/return on investment (ROI) model, updating website language, design, and sustainability processes, Deacon Space/EMS scheduling system process improvements for better stakeholder experience and alignment with accreditation needs, onboarding, debriefing, and other educator tools, abstract development, and research around the Birth Center opening.

Maria Crawford - One of our FY20 program goals was to pursue accreditation (ACS & SSH) submissions including updated processes, procedures, and materials per standards that also meet the needs of our institutional partners. In conjunction with the Society for Simulation in Healthcare (SSH) application process, we developed a comprehensive fifty-four page policies and procedures document, encompassing all areas covered by the Center for Experiential and Applied Learning (CEAL).

This document is located in the CEAL spaces, including BGCME 2nd floor office suite, BGCME 4th floor front desk, WFBMC ultrasound suite, and WFBMC patient simulation lab.

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Accreditations Applied for in FY20

Clancy Clark, MD - In 2019, CEAL completed its application to become an Accredited Education Institute (AEI) by the American College of Surgeons. This application required a comprehensive review and analysis of surgical education activities by CEAL and the Department of Surgery. This is an exciting program that will enable WFBH to join the ACS AEI Consortium. This accreditation process demonstrates the high level of academic excellence provided by CEAL and sets WFBH above many academic medical centers. Membership in the ACS AEI Consortium will enable key advancements in simulation-based curriculum at WFBH and create new education and research opportunities for learners at WFBH. The final steps to become an ACS AEI requires a site visit which was delayed due to COVID-19. We anticipate completion of our site visit and AEI membership by fall 2020.

Maria Crawford - Several key team members attended the 2020 IMSH conference in San Diego, CA in January, where they learned more details concerning the requirements for provisional accreditation into the Society for Simulation in Healthcare. They returned to North Carolina with a renewed determination to peruse this goal and submitted their application before the May deadline, seven months ahead of their original plan. Accreditation is important for our institution because it recognizes excellence in our simulation program's processes and outcomes in assessment, research, teaching/education, and systems integration among our peers. Provisional accreditation allows for programs with established structure and processes, and demonstrated compliance with SSH Core Standards and Teaching/Education Standards, but less data collected on achieved outcomes. Upon review of our application, we were informed that we qualified and would be considered for full accreditation.

As of FY20 year-end, our application is in review with the SSH Accreditation Program Committee and we are preparing for a virtual site visit and meeting with our program’s leadership and key staff, which will take place in Fall 2020.
CEAL Future Plans - Return on Learning (ROL) Journey

Today, more than ever, there is a call in all areas of business to connect investments in people, programs, and projects to improve organizational outcomes and show IMPACT. The ROI Methodology is a scalable and systematic approach to program evaluation. We will use ROI Methodology to show the IMPACT of LEARNING in a process we call Return on Learning (ROL).

CEAL ROL Journey

ROI Readiness Assessment
Fall 2019
Survey of CEAL Stakeholders
to determine level of readiness to measure ROI

Obtain Buy-in
Summer 2019
CEAL and Senior Leadership

Determine Modality of Execution
Early 2020
Piloting on paper. Electronic options include EvalNet, RODECap,
SurveyMethod, PowerBI

Standardize Evaluations
Late 2019
Kirkpatrick and ROI guidelines, and accreditation standards; Modified Delphi method to focus questions to 5-6 most important/valuable.

Determine ROI of Mission-critical events/projects
Summer/Fall 2020
Determine CEAL projects that are candidates for Levels 4/5 analysis. Determine value from CEAL perspective.

Pilot of Levels 1-3 in 10 CEAL events
Spring 2020
Currently underway.
DeaconSpace Update
Louise Nixon - CEAL’s scheduling system, DeaconSpace, is accessible through the “Request CEAL Services” link on the CEAL website: [https://school.wakehealth.edu/ceal](https://school.wakehealth.edu/ceal).
Ongoing development of the customized form has streamlined the request process significantly with the following enhancements:
- A Quick Guide posted on the website for users to better navigate the system.
- Full simulation and ultrasound equipment inventory is available for user selection and item names clarified for efficiency.
- An external pricing option is available when warranted.
- The billing component is utilized to post external payments.
- User defined fields are updated for extracting applicable data.

CEAL Simulation Updates
Ian Saunders – When Covid-19 hit, forcing most CEAL employees to work remotely, the Sim team continued to provide essential training for our clinicians. The team participated in many Covid-19 related simulations and helped create event content relevant to the pandemic. There was a reduction in events related to the academic enterprise; what little downtime they had was spent on manikin maintenance and attending webinars from the nation’s top simulation educators on changes in the simulation landscape brought on by the global health crisis.
Davie Codes
Ian Saunders - At Davie Medical Center over the past 12 months, we have used simulation in areas such as radiology to determine response times with a patient having a possible contrast reaction/Code in the CT scanner. The simulations also incorporated protocol for determining when a patient should be transferred to WFBMC and procedures on how to transport. The learners involved were from Emergency Medicine and comprised of ED attending faculty and ED nurses which included 24 learners. These simulation events were performed over 2 training sessions in the 1st quarter FY20.

Anesthesia Boot Camps
Ian Saunders - Anesthesia Boot Camp for our incoming PGY-2 residents was a little different this year due to COVID-19. Simulation played a huge part on the learner rotations in the OR due to minimal exposure because of COVID, but we still did the usual curriculum with two 8-hour days involving CVC placement, A-Line insertion, and patient transport from the ICU, Alaris pump, and Omnicell training. An additional component was added – PPE Don/Doff procedures with the use of PAPR which is a personal respirator to use when intubating patients with a positive test for COVID-19. The rest of the month’s rotation still consisted of room set up, machine checkouts plus intubating patients using RSI, with the learner running through a complete case at the end of the rotation. We had 14 learners over a 3 month period from April-June 2020.
CAR-T Training

Joel Ferris - The CAR-T cell therapy simulation was a new event for CEAL in FY20. The CAR-T (Chimeric Antigen Receptor T) sim was designed for RNs who administer this outpatient therapy to go through the correct steps for infusion and to recognize/respond to an adverse reaction known as CRS (Cytokine Release Syndrome) to the therapy. The sim covers specific days over a 29-day scenario.

The event is performed with a Laerdal SimMan 3G. The scenario starts with infusion of Cart-T therapy [immunotherapy] on day 0 and ends after recovery and discharge on day 29. Critical points for learners are signed consents, meds confirmation, completion of CRS flowsheet, administering ICE assessment. The simulation operator adjusts vital signs according to learners’ actions and communicates as the patient simultaneously.

Michelle Payne, clinical educator, has done a wonderful job making this both educational, fun and engaging. The feedback from learners has been positive. Below are just a few comments from past participants.

“This training was educational and helpful. It was good to have everybody at the bedside together, including providers, to help it all come together.” Rebecca Stopsky, RN

“It was super detailed and had a lot of really good information on what to expect from the nurses and what to look for in patients going through CRS and other toxicity related to Car-T. The simulation was also really good because it worked through all of the processes - step by step what you would do with the patients. It just makes you feel a little more confident in the situation if it does happen.” Karina Saunders, RN

“I thought this was super valuable, informative, and I loved how constructive the facilitators and everyone was in this team oriented environment.” Mitchell Davidsz, RN
Wake Forest Baptist Health Now Offering CAR T-Cell Therapy

August 13, 2020

Wake Forest Baptist Health’s Comprehensive Cancer Center is now offering Chimeric Antigen Receptor (CAR) T-Cell therapy, a personalized immunotherapy used to treat advanced lymphomas.

To administer the therapy, T cells, a type of white blood cells, are removed from a patient’s blood. These T cells are then genetically modified in a specialized lab to produce chimeric antigen receptors (CAR). CAR T cells are then given back to patients by infusion. Once infused back into the body, the CAR T cells bind to a specific target on the cancer cells and kill them. On Monday, Aug. 10, the first Wake Forest Baptist patient received CAR T-Cell therapy. “It’s a multi-step process,” said Rakhee Vaidya, M.D., an assistant professor of hematology and oncology at Wake Forest Baptist. “The therapy supercharges your immune cells to more effectively identify and destroy cancer cells.”

Wake Forest Baptist is the first center in the region to offer CAR T-Cell therapy. Wake Forest Baptist’s Comprehensive Cancer Center is one of only three NCI-designated Comprehensive Cancer Centers in North Carolina and is accredited to provide cellular therapy by the Foundation for Accreditation for Cellular Therapy.

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CRM Update

Justin Traunero, MD - For FY20, CEAL continued to produce and conduct monthly Multidisciplinary Surgical Services Crisis Resource Management (CRM) activities. Building on our existing CRM program, for FY20 we intentionally focused on the “themes” of perioperative sentinel events that have recurred over the prior year at Wake Forest Baptist Health. We consider it more crucial than ever to learn from past errors/omissions/misunderstandings, particularly when we have already simulated those events previously as part of this program. Therefore, last year, we developed new scenarios with the intent of approaching some of these sentinel events from different, new angles in order to promote new discussion and learning opportunities for all participants. The monthly Surgical Services CRM program continues to provide rich discussions that open opportunities for each member of the surgical care team to learn from other members of the team. This program is truly one of the shining stars of CEAL and Wake Forest – the monthly participation by anesthesiology, surgery, and OR nursing teams in these educational events continues to be something that few other academic institutions can claim.
L&D CRM
Justin Traunero, MD – In FY19, CEAL developed and administered a novel unit-based in-situ multidisciplinary simulation curriculum for Wake Forest’s new Birth Center in order to support development of care processes, familiarize providers with the new care unit and each other, and delineate any issues on the new unit. For FY20, we desired to continue this positive momentum through the development of a new Multidisciplinary Birth Center Crisis Resource Management (CRM) series. We leveraged our experience with the continued successes of the Surgical Services CRM program to plan, develop, and roll out a new CRM program that is specific to the needs of the Birth Center at Wake Forest. CEAL was instrumental in bringing together all of the stakeholders in this space – obstetrics, obstetric anesthesiology, neonatal ICU, midwifery, Labor and Delivery nursing, and Birth Center OR nursing – in order to plan the goals of the simulation program, the frequency of simulations, and the structure. CEAL’s experience in running high-fidelity simulation and debriefing permitted a rapid startup of a monthly high-fidelity multidisciplinary CRM simulation program that focuses on practicing both known crises situations in the Labor and Delivery field as well as re-simulation of events that have actually occurred in the Birth Center at Wake Forest. This program has already been extremely beneficial in practicing and fine-tuning care processes on the unit, identifying areas for continuous improvement, and improving communication between providers and staff. CEAL will be continuing to support, grow, and refine this new CRM program over the coming fiscal year.
Surgical Training

Clancy Clark, MD – CEAL continues to be a key partner with the Department of Surgery providing multiple simulation activities throughout the year. These activities include team-based simulations such as crisis resource management and joint trauma sim, basic surgical skills lab called “Science of Series”, and high-fidelity surgical procedure pig labs. CEAL has facilitated key partnerships with industry leaders such as Ethicon.
CEAL Ultrasound Updates

Ultrasound-Guided IV
Bridget Francis, RDMS - We have offered 13 Ultrasound-Guided IV classes to our WF nursing staff since July, 2019. The classes have been held at the main campus, High Point, Wilkes, and Lexington hospitals. CEAL Ultrasound trained almost 150 nurses in the last year. The class provides pre-learning modules for the nurses and a 2-hour hands-on session to practice techniques on task trainers. Each nurse is required to complete 10 successful sticks prior to receiving a certificate of completion for the class. When asked in a post survey what the greatest strength of the class was, nurses replied with some of the comments below:

“Great learning atmosphere and great instructors”
“Hand on training”
“Improving outcomes/patient care”
“Feedback if I was performing the procedure correctly?”
“Teaching was great and small class sizes”

Since July of 2019, the 3rd year medical students have been trained to do Ultrasound-Guided IVs. I have had the privilege of helping Dr. Pariyadath with 8 different 2-hour sessions. The students are scheduled 16 at a time and are broken into 3 groups with an instructor at each. The students are taught 2 different techniques and given the opportunity to practice sticking on phantoms.
NICU Point-of-Care Ultrasound (POCUS)

Bridget Francis, RDMS - With the rise in popularity in POCUS the NICU has reached out to CEAL for help on training some of the staff and helping pick out the appropriate equipment for them to purchase. CEAL has helped with training and bringing in companies over the last year. The NICU staff got the opportunity to demo GE and Sonosite ultrasound machines with us aiding in bedside scanning for comparison. We helped with a half day training event dedicated to cardiac, lung, and some abdominal ultrasounds that included lectures, hands-on scanning, and bedside practice.

Vimedix

Bridget Francis, RDMS - The ultrasound simulator has given many medical professionals from different departments the opportunity to learn ultrasound in a low risk setting. Due to the life-like appearance of organs, beating heart, and pathologies it is capable of loading, departments like Cardiology, Anesthesiology, and Internal Medicine are relying on it to help with training. This CAE product has helped aid in training over 100 individuals in the past year.

4th Year MD POCUS Elective

Bridget Francis, RDMS - As part of the medical students’ POCUS rotation, they spend 2-3 hours training on an ultrasound simulator (Vimedix). Since July 1, 2019, we have had 9 sessions where 18 students received the opportunity to attend and advance their ultrasound skills. The session starts with an overview of normal anatomy and how it appears on ultrasound. The focus is primarily on the gallbladder, kidneys, aorta, and bladder. The students receive a demonstration of the best sonographic windows for each organ and tricks to better visualize them by using different body positions and breathing techniques. The students are then given the opportunity to practice scanning each of these normal organs on the simulator. After the students demonstrate the normal anatomy, time is spent going over the most common pathologies they could encounter like gallstones, biliary sludge, and hydronephrosis. During the last part of the session the students are given time to free scan and ask questions.
Greensboro POCUS

Bridget Francis, RDMS - CEAL ultrasound has teamed up with instructors from Moses Cone to offer POCUS training in Greensboro. It continues to be a success with 8-16 new learners each session. The sessions consist of an open 2.5-hour lab for Medical and PA students, residents, fellows, and other physicians to attend and learn about ultrasound. We helped with 7 sessions throughout FY19. The labs focus on cardiac, lung, abdomen, OB, and MSK ultrasound and the learners are given time to do hands-on scanning after a brief lecture.

Ultrasound in Critical Care and Emergency Medicine

Casey Glass, MD - In FY20 we developed a new external CME course on the ultrasound space directed at providers in critical care settings. This 2 day course includes extensive hands-on ultrasound experience and an orientation to core bedside US exams as well as information on US program development and maintenance. We hope to further develop this offering into two courses for both critical care providers and those working in emergency medicine. Last year we have also developed additional content for the MS4 elective utilizing our CAE ultrasound simulator and additional content for emergency medicine utilizing our OB pelvic US phantoms. We now have faculty from the departments of Anesthesia, Surgery, and Family and Community Medicine participate in our US mini-fellowship. We have also begun work with the NICU faculty and staff as they begin to build a POCUS program to care for our smallest patients.
External Ultrasound Courses
Janae Joyner, PhD, MHA - In FY20, CEAL continued a robust portfolio of ultrasound courses for external learners from around the nation and world. Historical courses that continued included neurovascular ultrasound, neurovascular ultrasound interpretation, and OBGYN ultrasound offerings. New courses added to the portfolio included the return of a critical care POCUS course. In the past this critical care course had been held in partnership with an external organization. This year we hosted it exclusively by and at Wake Forest Baptist Health. We had also planned a new emergency medicine ultrasound workshop in June, 2020. Due to COVID-19 concerns, we postponed the new emergency medicine workshop offering to September, 2020. We also postponed a second OBGYN ultrasound course, moving it from March 2020 to October 2020. We cancelled the FY20 neuromuscular ultrasound course with its next offering scheduled in May 2021.

Our external ultrasound courses continued to have consistent participant counts from the past and were well-received on post-evaluations. For example, 100% of critical care POCUS attendees stated that the course met their education need and 100% agreed that the activity reinforced and improved their current skills. Suggestions for quality improvement for the critical care POCUS course included 1) consider adding a case-based format to reinforce skills on resuscitative ultrasound; 2) having anatomical models to work with would be helpful for ultrasound orientation; and 3) the addition of airway management, first trimester ultrasound and rapid response and cardiac arrest as course topics.
Dr. Kremkau Publishes 10th Edition Textbook
Maria Crawford - Frederick Kremkau, PhD has published the 10th edition of his textbook “Sonography: Principles and Instruments”, which is the only textbook in the entire field of sonography to be in the 10th edition. In addition to his latest textbook, Dr. Kremkau has authored two peer-reviewed publications, one other publication, and has contributed content for three medical textbooks during the past year.

Dr. Kremkau is widely recognized for his contributions to medical ultrasound training and education and is a leader in both industry-specific as well as student and professional continuing medical educational programs worldwide. He was a guest lecturer at seven national conferences last year and was invited to speak at twelve other ones that were cancelled due to COVID-19. He just completed 35 years as Co-Director of the annual American Institute of Ultrasound in Medicine [AIUM] OB/GYN Ultrasound Conference in Orlando. We celebrate and congratulate Dr. Kremkau on his continued success.
CEAL Standardized Patients (SP) Updates
Erin Haynes - In FY20, the standardized patient program trained several new members to bring our total number of patient actors to 91. We serviced 246 events last year across both the clinical and academic enterprises and learned new skills as COVID-19 brought in-person encounters to a temporary halt. We quickly adapted to be able to hold events virtually and by fiscal year end, was once again in a position to meet the new school year head on and in-person.

Virtual SP Encounters
Erin Haynes - Due to the COVID-19 pandemic, both the MD and PA departments reached out to CEAL and the SP Program to request virtual encounters, rather than in person events. During 4th quarter, CEAL SPs participated in 7 virtual encounter events. These events include remediation testing sessions, training sessions, and testing events. We looked into several different platforms and ultimately decided to use WebEx. This decision was made based on its availability to WFBH employees- most employees are already comfortable with using it, and its ease of use for inside/outside participants. Barbara Gamberini, a veteran SP of 27 years, was instrumental in helping us get the WebEx virtual encounters started. She was the first SP to work with us on these sessions and provided valuable feedback on what worked and what didn’t work. We have been told that additional departments are interested in integrating more virtual encounters into their curriculum since telehealth visits are becoming more popular.

- Pros
  - Able to meet during un-safe times
  - Ease of use
  - Opportunity to debrief with faculty, staff, students, and SPs immediately following event completion
  - Ability to record sessions for review

- Cons:
  - For participants outside of WFBH (SPs) WebEx installation was more difficult for some devices. Computer with a camera and microphone was preferred but some SPs were able to use tablets and phones.
  - Sessions can be impacted by Wi-Fi/internet connection issues
  - Students aren’t able to get the typical one-on-one, in-person experience
SP Recruitment for OB/GYN Ultrasound Course

Erin Haynes - In early March of 2020, the CEAL team decided to cancel the OB/GYN Ultrasound Conference due to the COVID-19 pandemic. The event was cancelled just two weeks prior to the scheduled course, so all Transvaginal and Transabdominal Ultrasound Models had been secured. At the time of the cancellation, we had “goodie” bags that contained baby formula samples with a limited shelf life. We donated the formula samples to Salem Pregnancy Center, where Dr. Fred Kremkau is a board member. We were able to make a connection with Dottie Powers, Client Services Director, to discuss our needs for OB models, and the possibility of placing information about future events in their center. Thankfully, we were able to set a new course date for a fall event, which will be held the week of October 5-9, 2020. Recruitment for the upcoming event will begin early August.
CEAL Human Tissue Services Update
Heather Chansen - In the transition to remote staffing under the conditions created by COVID-19, the program did not miss any deadlines or progress with respect to the ongoing awareness effort in conjunction with Wake Forest Marketing. The Whole Body Donation has generated a new logo and tagline, a core promotional document and boilerplate language, with colors and visual elements and bare-frame templates to populate the planned awareness effort. That campaign is in planning stages and the remaining print elements and boilerplate documents and responses will schedule into the upcoming fiscal year, along with planned outreach under revised conditions created by the global healthcare crisis.

Also of note in the year just closing, the Whole Body Donation Program office was relocated and returned to its former position adjacent to the lab and storage area(s) on the fourth floor of Gray. All paper files have been reviewed and consolidated and will be assessed for retention/destruction as advised by WF legal staff in the upcoming fiscal year(s), in conjunction with a request regarding scan-and-shred for most incoming program documentation. The entire program history is available in paper form, and before this reaches greater mass, WBD and Legal will consult on the best steps forward. Upcoming accreditation site visits present a similar opportunity with review of physical space and inventory, with a reorganization of the storage area(s) in process at 4141/4141A and in the lab and prep room (4138/4139). It has been a good period of housekeeping and that effort will enthusiastically continue as staff resumes a predictable if altered schedule of physical work in the facility.
CEAL Anatomical Resources Updates

Graduate School Anatomy Teaching and Testing Goes Online

Chris York - COVID-19 challenged both students and teachers. We made it to spring break with a normal schedule, but the second half of class was anything but normal. We were very happy with how well the students responded to the challenges presented by learning difficult material at home on more of a self-driven curriculum. We were able to provide online lectures for the students, but office hours, of course, were eliminated. Lab also had to be eliminated due to social distancing. These limitations made a course overhaul a necessity. That’s never enjoyable when you are half-way through a semester and need to make major course changes. However, everyone adapted as well as possible and it is assured this was a semester to remember for quite a while!
Clinical Anatomy Elective for MD Students

Thomas Perrault, PhD - Last year we had roughly 50 4th year medical students participate in the 4th year Clinical Anatomy Elective. It is designed for 4th year students wishing to advance their careers in residencies that require surgical and/or procedural expertise. They use this block of time to identify weaknesses in their anatomical knowledge and are required to design an anatomy “related” project that fits with their future focus of study. It is also expected from these senior students that they mentor other students who are learning anatomy. The goal is to have senior level students get the opportunity to develop and implement activities as an educator. Last year 8 students in this Clinical Anatomy Elective participated in CEAL events designed for anatomical education outreach in both the Rolling Bones initiative and Catawba educational events. We also had participation in middle school events arranged through CEAL that were held at BGCME. They helped with both preparation and set up for the events and served as guided instructors both on and off campus.
American College of Surgery Trauma Event

Jim Johnson, PhD – Last year, we developed, prepared and delivered for the American College of Surgery Trauma Quality Improvement Program (ACS TQIP) a live interactive trauma resuscitation simulation for their National Meeting in Dallas Texas, held on November 17, 2019. The goal of this comprehensive 2-hour presentation was to demonstrate the value of a strategic multidisciplinary simulation using current clinical practitioners in order to improve the team performance of a trauma care service line and enhance measures of patient care outcomes. Wake Forest was invited to provide this trauma simulation at the TQIP national meeting on the basis of 9 years of innovation and practical refinement - first through the Center for Applied Learning and now through the Center for Experiential and Applied Learning (CEAL). Ian Saunders from CEAL played a vital role in leading the delivery of the physiological parameters during the clinical scenario. Over 15 physicians and hospital staff participated in the scenario. This comprehensive simulation was executed in the presence of about 2000 folks.
The Art of Moulage in Simulation

Maria Crawford – Patient moulage is the art of creating both the appearance and the palpable characteristics of patient pathology or trauma during a clinical scenario. It is an essential step in creating an immersive environment for practitioners during a simulation event. Dr. Johnson has collaborated over the last decade with faculty at the University of North Carolina School of the Arts to develop innovative new methods to enhance the application of moulage in medical and surgical scenarios. He is our resident expert in this area and continues to develop new applications for moulage using patient actors, biomimetic synthetic simulators and instrumented human tissue. From creating a realistic abscess infection in a patient following a recent surgical procedure, a 60% total body surface area burn in the ICU, a massive hemorrhage from penetrating trauma, or a femur fracture in a pregnant patient actor in the trauma bay – Dr. Johnson has it covered. Scenarios marry patient moulage with our advanced simulation technical capabilities to manipulate dynamic change in patient instrument status and patient imaging or test results. Practitioner immersion during a team scenario is critical to providing an environment that challenges a multidisciplinary clinical service line to improve optimal team performance. This includes the collective challenges of patient assessment, team communication, decision making, resource management and therapeutic care. Creating these realistic scenarios has had a direct impact on enhancing team performance with clinical scenarios made more realistic by Dr. Johnson – part scientist, part artist, all heart.
CEAL Community Outreach Updates

CodeMed: Experiential Learning for Teens

Dorothy Parnian, MS - CEAL embraces pipeline K-12 education as part of its portfolio. Historically, local schools sent ad hoc requests for visits or events. The Open House model used in 2018 and 2019 provided specific event dates to K-12 schools which showed an interest or were referred to CEAL.

In 2019, the CEAL Open House Program, which built on the success of a 2018 pilot, engaged both middle and high school students in the discovery of human body systems in a way that was both relatable and appealing. The idea was to follow the model used by medical professionals of a case based on reality. As a result, we used “Sam” as a real person who experienced all the heart attack symptoms the teens would see in the simulation environment, discuss in the anatomy lab, and scan in the ultrasound suite. This extremely successful model was used again for the 2020 event which was rebranded “CodeMed: Experiential Learning for Teens.”

Along with the name change, CEAL made some necessary changes to how schools were selected for the event. The goal was for a wider range of schools and students to visit BGCME and take part in this experiential learning opportunity. In an effort to be both transparent and fair, we took the following steps:

- Sent out a flyer inviting teachers/groups leaders/champions to apply for the program by October 1, 2019.
- Developed an application that included class demographic information for pipeline and a letter
- Developed a rubric against which the selection committee would “rate” the applicants
- Invited a diverse group of colleagues from a variety of academic departments to participate in the CodeMed selection committee.

We received ten (10) applications for four (4) CodeMed sessions. The CodeMed Selection Committee was comprised of seven (7) representatives from Medical Education, Diversity and Inclusion, Academic Affairs, Simulation (CEAL), Standardized Patients (CEAL), Program for Medical Ultrasound (CEAL). The committee was chaired by one of the representatives from Medical Education. Ultimately, five (5) schools were selected based upon the quality of their applications—completeness, letters of support, and statement of interest by teacher. Two of the schools were middle schools with smaller groups so they attended on the same day. Two of the high schools
also were able to attend before the COVID-19 pandemic closed down the building. Unfortunately, Statesville High School was unable to attend this year, so we have guaranteed them a slot next year.

Lessons learned based on the application and selection process:

- Require teachers to write a letter rather than a statement expressing their interest and the characteristics that make their class a good fit for the program.
- Require letters/papers from students expressing their desire to attend the program OR ask teacher to submit de-identified papers of students that exemplify the work in class.
- Make sure teacher understands the need for adequate number of chaperones.

CEAL K-12 Online Education

Dorothy Parnian, MS - Although CEAL was moving toward placing some of our educational opportunities in an online format, the COVID-19 pandemic forced a re-evaluation of our plans. Fortunately, the CEAL team is nothing if not flexible and innovative so each area of CEAL—simulation, anatomy, and ultrasound—stepped up to develop videos that depict as closely as possible the in-person K-12 experience. Coupled with curriculum design developing interactive modules and worksheets, the result is a robust set of learning materials focused on cardiovascular health for the K-12 audience that will stand the test of time including:

- The Structure and Function of the Heart
- The Anatomy of the Heart
- Heart Disease
- Auscultation of the Heart
- Hands-only CPR
- Code STEMI in the ED
- Code in Progress – Mr. Sam Smith
- Ultrasound Simulation: Cardiac Views
Rolling Bones

Chris York - Rolling Bones is a traveling anatomy demonstration that gives high school students who are underrepresented in today’s medical climate the opportunity to be exposed to hands-on, health care related topics. We were very excited to create the Rolling Bones program in fall of 2019 and travel to 13 area high schools where we were always greeted with open arms from both students and teachers. During the presentations, the CEAL team demonstrated some of the bony framework of the body (vertebrae and skull). We also demonstrated brains (both full and sliced) from donors that died of natural causes compared to stroke and aneurysm. There was also a heart and lung station that highlighted the anatomy of both organs as well as the dangers of smoking and vaping. We were able to showcase a “healthy” porcine lung versus a diseased smoker’s lung that died from COPD. We were able to connect the issues of plaque development in the brain and the cardiovascular issues of the heart and lung in an effort to show how living a healthy lifestyle will assist in avoiding these potential fatal issues. At the end of the hands-on portion, we divide the class into two groups for a team quiz. The goal was to have 10 take home points from the presentation. The quiz was a fun way to demonstrate how much the class had retained from the presentation. Surveys were taken at the end of the quiz. The data showed that students were more interested in the health care field after the presentation than before and also shows that students were more apt to live a healthy lifestyle after the presentation as well. COVID-19 has thrown everyone’s plans into uncertainty, but we are hopeful to continue the Rolling Bones program in 2020/2021 and branch out to at least 20 area high schools. An abstract and poster on the program were presented at the 2020 Health Professions Education Institute conference.
Rolling Bones Media Coverage

- Handling hearts, brains and lungs gives Forsyth students a chance to study the human body By Fran Daniel Winston-Salem Journal Nov 18, 2019
  

- “Rolling Bones” Teaches High School Students About Healthcare By Chelsea Floyd Triad Nov. 14, 2019
  

Rolling Bones Photos by Allison Lee Isley, Nov 18, 2019, Winston-Salem Journal
Emergency Medical Services (EMS) Advanced Skills Workshop

Louise Nixon – CEAL hosts an annual one day weekend workshop for up to 30 state certified EMS providers per 4-hour hands-on session. This is offered as a pre-conference workshop to the annual NC EMS Expo. Jeff Hinshaw, Chief PA of Emergency Medicine and Deputy Medical Director of Forsyth County Emergency Services, guides a team of WFBH EMS faculty instructors. Learners are taught high-risk EMS procedures and perform them in a simulation setting to gain a better understanding of the anatomic and procedural considerations of the skills. These skills include, but are not limited to: intubation/emergency airway management, surgical airway management, needle decompression and finger thoracotomy, emergency tourniquet application, emergency venous access, and IO line placement. 4 hours of CE credit is offered from the Wake Forest Center for Experiential and Applied Learning. CEAL staff member, Ms. Louise Nixon, is instrumental to the coordination of marketing, registration, and participant communications annually. CEAL resources required for hosting the workshop are personnel, space, teaching expertise, and equipment. The fee for participants is $145 per person and only partially covers the cost with the remainder being an investment by the Center.
Abstracts:

Joyner J, Perrault T, York C, Parnian D, Crawford M. Rolling Bones mobile healthcare training program launched in high schools to educate and drive interest in science and healthcare fields. Health Professions Educational Institute, Wake Forest School of Medicine. May 2020.


Publications:

https://journals.sagepub.com/doi/full/10.1177/8756479319842078


https://www.ardms.org/dr-kremkau/

Textbooks:

Book Chapters:


Awards:
W. Burkette Raper Leadership Award University of Mount Olive – Alumni Affairs 11/2019 Presented to JaNae Joyner, PhD, MHA
https://umo.edu/umo-alumna-janae-joyner-receives-w-burkette-raper-leadership-award/