WEDNESDA ,
MARCH 01, 2023

2023 ACS SURGEONS AND ENGINEERS:

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PROGRAM BOOK

ACS Education

American College of Surgeons

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On behalf of the American College of Surgeons (ACS) Division of Education, I would like to welcome you to the 2023 Annual Surgeons and Engineers: A Dialogue on Surgical Simulation Meeting. Given the success of past meetings for the last four years, including virtual meetings during the last two years due to the pandemic, we are very pleased to offer a full-day, in-person event this year. This will permit us to fully explore synergies between engineers, surgeons, scientists, healthcare professionals, and educators, to advance simulation-based surgical education and the use of state-of-the-art simulations and simulators.

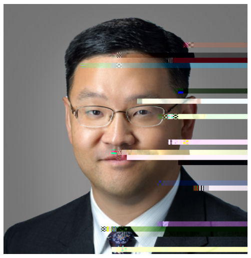
Pierre E. Dupont, PhD, Edward P. Marram Chair and Chie5 0 0fPadvan-9 (t simulations and simul

With these goals in mind, the Program Committee has planned a premiere program to foster dialogue, enhance knowledge, build relationships, and spark ingenuity:

- **Keynote Address:** *Therapeutic Principles for Bridging the Surgeon / Engineer Culture Gap in Med Tech*, Pierre E. Dupont, PhD, Boston Children's Hospital, Harvard CIDelhD)32 m/P <y5 (alou at(, P)8eet/P . Please

- **Special Panel Discussion:** *How to Build Better Surgical Simulators*,5S/Lang 3nMeet a special panel of a surgeon educator, an academic engineer, and an expert from the surgical simulator industry.

- **Oral and Poster Presentations:** Our oral and poster presentations will shed light on the multifaceted3.r44.0001 Tm[(, P)8 (ierr)18 (e E. Dupont, Ph



Gyusung Lee, PhD
Program Co-Chair
Assistant Director, Simulation-Based Surgical and Education Training, Division of Education
American College of Surgeons

Mandayam A. Srinivasan, PhD
Program Co-Chair
Founder, Laboratory for Human and Machine Haptics
Massachusetts Institute of Technology
Professor of Haptics, Computer Science Dept.
University College London, UK

Wednesday, March 1

8:00–8:15 am	**Welcoming Remarks** Ajit K. Sachdeva, MD, FACS, FRCSC, FSACME, MAMSE, *American College of Surgeons* Gyusung Lee, PhD, *American College of Surgeons* Mandayam Srinivasan, PhD, *MIT and University College London*, *UK*
8:15–9:25 am	**Keynote Address** **Therapeutic Principles for Bridging the Surgeon / Engineer Culture Gap in MedTech** Pierre E. Dupont, PhD, *Boston Children's Hospital, Harvard*
9:25–10:35 am	**Special Panel: How to Build Better Surgical Simulators** Ahmed Ghazi, MD, FEBU, MHPE, *University of Rochester Medical Center* Kesh Kesavadas, MS, PhD, *VP for Research and Economic Development, University of Albany* John Lenihan, MD, *MultiCare Tacoma General Hospital* Gladys Fernandez, MD, *Baystate Simulation Center*
10:35–10:50 am	Morning Break and Exhibitor Visit
10:50 am–12:00 pm	Abstract Presentation 1
12:00–1:00 pm	Lunch and Exhibitor Visit
1:00–2:30 pm	**Cognitive Task Analysis Workshop, An Important Step for Simulator Development—What, Why, and How?** David Hananel, BSEE, BACS, *University of Washington* Victoria Roach, PhD, *University of Washington*

Program Chairs

Gyusung I. Lee, PhD

Assistant Director, Simulation-Based Surgical Education and Training, American College of Surgeons Division of Education

Gyusung Lee, PhD is the Assistant Director of Simulation-Based Surgical Education and Training in the Division of Education at American College of Surgeons. Dr. Lee obtained his training in academic laboratories as well as in clinical environments. Throughout his career, he has performed sponsored research studies both independently and within teams and championed the development and execution of various surgical education programs.

Dr. Lee completed his graduate studies in Biomechanics and obtained MS and PhD degrees in the Department of Biomedical Engineering at Texas A&M University in 1996 and 2002. His dissertation research was an investigation of the mechanism of secondary injuries. After graduation, he completed his postdoctoral training in the motor control laboratory at Arizona State University, where he researched how joint coordination and control strategies are affected by the aging process and by Parkinson's disease. After his two years of postdoctoral training, Dr. Lee joined the Department of Surgery at the University of Maryland, School of Medicine (UMSOM) as a Faculty Research Associate. His primary research interest at the Dr. Lee then served as the Director of Robotic Education and Ergonomics Research at the Minimally Invasive Surgical Training & Innovation Center (MISTIC) in the Department of Surgery at Johns Hopkins School of Medicine (JHSOM). One of his primary responsibilities in MISTIC was to develop the comprehensive robotic surgery training curriculum. This program provided surgical trainees with basic robotic skill training in preparation for the Fundamentals of Robotic Surgery (FRS), and advanced skill training for the immediate application of the learned skills in the trainees' actual case involvement. Using this curriculum, Dr. Lee offered robotic training to Hopkins residents, fellows and attending surgeons, from the specialties of general surgery, gynecology, surgical oncology, urology, and cardiac surgery. In addition, he also created a didactic and hands-on training program for OR staff members assisting robotic surgery cases. Through this program, Hopkins OR staff members receive skills training on a regular basis for establishing better teamwork between surgeons and OR staff members.

As the Assistant Director of Simulation-Based Surgical Education and Training, Dr. Lee provides leadership for a broad range of innovative simulation-based education and training programs of the Division of Education. He is responsible for designing simulation-based programs, providing leadership for the simulation research and development activities, especially those of the Consortium of ACS Accredited Education Institutes, and building and strengthening collaborative relationships with national organizations and the federal government, including the Department of Defense.

Pierre E. Dupont, PhD

Staff Scientist, Cardiovascular Surgery; and Chief, Pediatric Cardiac Bioengineering, at Boston Children's Hospital; Boston, MA

Pierre E. Dupont is Chief of Pediatric Cardiac Bioengineering and holder of the Edward P. Marram Chair at Boston Children's Hospital. He is also a professor of surgery at Harvard Medical School. His research group develops medical robots, implants, and imaging technology. He received the BS, MS and PhD degrees in Mechanical Engineering from Rensselaer Polytechnic Institute, Troy, NY, USA. After graduation, he was a Postdoctoral Fellow in the School of Engineering and Applied Sciences at Harvard University. He subsequently moved to Boston University, where he was a Professor of Mechanical Engineering and Biomedical Engineering. He is an IEEE Fellow, a former Senior Editor for *IEEE TransactionP ≮Lang (US)TJETE,*

John Lenihan, MD

MultiCare Tacoma General Hospital

John Lenihan, MD, is an OB-GYN physician who has specialized in minimally invasive Gynecologic surgeries for over 40 years. He was a very early adopter of laparoscopic hysterectomies, performing his first cases in 1991, and he performed one of the first robotic hysterectomies in the USA in June 2005. He has lectured at many professional society and international meetings on robotic surgery and was an original Intuitive Surgical GYN Epicenter Surgeon. He also has a strong background in aviation and simulation, having graduated from the U.S. Air Force Academy and serving 23 years in the U.S. Air Force. He was on faculty at the University of Washington School of Medicine as a Clinical Associate Professor and has published many peer-reviewed journal articles as well as authored several book chapters on robotic surgery.

Dr. Lenihan left his clinical practice in 2018 to join Mimic Simulation in Seattle, WA, which was acquired by Surgical Science in January 2021. His current role is a Clinical Consultant to Surgical Science and other surgical robotic companies, and he is helping them to develop the next generation of robotic and minimally invasive proficiency-based surgery simulation training curriculums.

Gladys Fernandez, MD

Baystate Simulation Center

Gladys Fernandez, MD, completed undergraduate Bachelor's degrees in Chemistry, Anthropology, and Sociology at Florida International University in Miami, Florida and then received her Medical Doctorate from Tufts University School of Medicine in Boston, Massachusetts. She completed surgical residency at Baystate Medical Center in Springfield, Massachusetts where she has remained in several roles dedicated to undergraduate, graduate and continuing medical education. At present, in the Department of Surgery, she is Assistant Program Director in Surgery at UMMS-Chan-Baystate Medical Center and Clerkship Director for

O-1 Research in Progress

Eye-Tracking and Artificial Intelligence Technology for Enhanced Surgical Training: Assessing the Role of Joint Visual Attention in Resident Competency for Minimally Invasive Surgery

Noor Alesawy; Taylor Kantor, MD; and Vitaliy Popov, PhD
University of Michigan, Ann Arbor, MI

Introduction: The highly symbiotic relationship between attending and trainee surgeons is crucial for minimally invasive laparoscopic and robotic surgery training because it requires residents to find a delicate balance between managing the high cognitive load of the surgical operation coupled with visuo-spatial coordination with the attending surgeon. We draw on previous efforts examining eye-tracking affordance for assessment and training, known as Joint Visual Attention (JVA - when individuals are looking at a common target jointly). Our hypothesis is that higher levels of JVA can be detected in residents with higher assessment competencies, thus, JVA

O-3 Research Abstracts

Justification of Shoulder and Back Support Exoskeletons for Minimally Invasive Surgeons and Operating Room Nurses to Reduce Musculoskeletal Symptoms

Alec J. Gonzales; Dechristian Barbieri, PhD; Alfredo M. Carbonell, II, DO FACS; Anjali Joseph, PhD, EDAC; Divya Srinivasan, PhD; and Jackie Cha, PhD

Clemson University, Clemson, SC; Prisma Health-Upstate, Greenville, SC

Introduction: Due to the physical demands of their daily duties, many surgical care team members, especially surgeons and nurses, experience musculoskeletal symptoms (MS). Subsequently, technological interventions such as exoskeletons have been evaluated to help mitigate the development of MS. In order to identify where exoskeleton support may be the most beneficial, it is important to understand the varying work demands of these surgical team members. Considering these dynamic work demands, the goal of this study was to identify

O-5 Research Abstracts

O-9 Research Abstracts

Novel Method for Obtaining Clinical Measurements in a Virtual Environment

Olivia A. Perham, BS; Paul M. Jeziorczak, MD, MPH; Emil Maric, BA, MS; Charles Jason Aprahamian, MD FACS, and Matthew T. Bramlet, MD
University of Illinois College of Medicine at Peoria, IL;
OSF Healthcare Children's Hospital of Illinois, Peoria, IL

Introduction: 3D modeling and virtual reality (VR) are useful in pre-surgical planning of complex cases. As VR use cases increase, need for more detailed analysis, including measurements, increases. We deployed a novel measurement method that allowed scaling in digital environments while preserving user confidence of measurement accuracy. Comparative values were Haller index measurements for ease of measurement and bone segmentation. We compare accuracy and precision of measurements made in VR to those in the medical record.

Methods: Pre-operative CT scans of 26 pediatric patients requiring Nuss procedure had; radiologist recorded Haller indices, then rendered into 3D models, and scaled to a scanned and 3D segmented 12 inch ruler DICOM model (control measuring tool) as well as a Solidworks created 3D ruler and yardstick (higher resolution for detailed measurements). All digital models were equally scaled and placed in the same VR environment. [FIGURE 1] The DICOM source of both the clinical model and physical ruler transferred confidence to the digital ruler. As scaling was applied to the clinical model in the digital environment, the same scaling applied to the digital ruler. The transverse and anterior-posterior values were measured in virtual reality using the ruler, and Haller indices were calculated and recorded. [FIGURE 2].

Results: Data was collected, and a t-tailed independent sample t-test compared the similarity of the two groups of indices measured. The average radiologist-measured Haller index (3.97) was compared to VR-measured Haller index (4.20). Statistical analysis demonstrated a p-value of 0.56, indicating that there was no significant difference between the measurements obtained via virtual reality from those measured by radiologist.

Conclusions: This novel method provides guidance for how to develop and deploy digital methodologies for measurement in a digital 3D space. Similar to the benefit of improved mental representations of 3D models in VR, adding the ability to acquire measurements in 3D may allow for more relevant measurements unencumbered by 2D formats. Further research can be conducted to analyze whether this capability decreases operative time, or decreases complication rates.

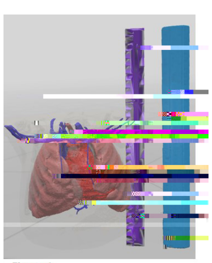


Figure 1

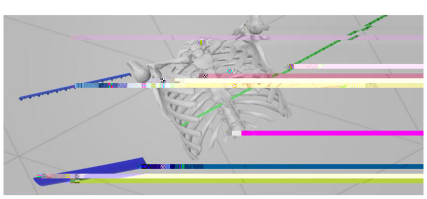


Figure 2

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P-02 Challenges in Surgical Education

Leveraging Eye-Gaze Data to Augment Surgical Faculty-Resident Postoperative Case Video Analysis

Vitaliy Popov, PhD; Jingying Wang, MS, PhD; and Xu Wang, PhD
University of Michigan, Ann Arbor, MI

Background: Learning how to do minimally invasive surgeries is a cognitively demanding task that requires a high degree of visuo-spatial coordination between attending (trainer) and resident (trainee) surgeons. There is a well-documented body of literature that shows the ability of eye-tracking to produce robust quantitative data and serve as an objective measurement method, with possible applications in surgical training and skill assessment.

Current Challenges: Evidence-based guidance for trainee skills assessment and high-quality feedback based on operative case video analysis is surprisingly limited, given the foundational role of this activity in surgical education. Importantly, it remains an open question how instructors can best leverage operative case video analysis, including artificial intelligence approaches, to help trainees develop professional vision and reflect on their own performance.

Need of Innovation: In this study we aim to develop a multimodal dashboard that enables attending surgeons to easily provide verbal feedback to residents. Additionally, we will combine video feed, conversation transcript, and eye-gaze data to help surgeons easily navigate a surgery recording and provide analytics to help residents reflect on their performance. The PI team has done substantial prior work including a series of operating room observations with eye tracking data collection, and an interview study understanding both surgeons' needs and challenges with intra- and post-operative coordination, teaching and learning. The research study so far includes cholecystectomy surgeries with further extension to extra-peritoneal inguinal hernia and appendicitis surgeries. Our long-term goal is to develop human-AI collaborative techniques that enable expert surgeons to create scalable training modules and enable resident surgeons to monitor their own progress from novice to expert. This concept (offering trainee-specific, data-driven assessment and feedback) has a strong path forward to not only impact the way laparoscopic resident training is carried out across institutions, but also be translated to develop data-informed training programs for other surgical procedures and approaches as well as other domains such as operating room resuscitation, emergency medical services (EMS), and ICU-based emergencies.

P-03 Research Abstracts

Effects of Optical See-Through Head-Mounted Display Use on Performance and Situation Awareness During Simulated Laparoscopic Surgery Tasks

Yaoyu Fu, PhD, MS; and Lora Cavuoto, MS, PhD
University at Buffalo, Buffalo, NY

Introduction: This study investigated the influence of using optical see-through (OST) head- mounted displays (HMDs) as a replacement of the conventional monitors for an extended duration, as required for laparoscopic surgery, on performance and situation awareness.

Methods: Twenty-four first- and second-year medical students (15 female and 9 male) completed three experimental sessions for the three different display combinations. The experiment scenario included two displays (surgical field and patient vitals) in three different combinations (both displays in the HMD, mixed displays (one on HMD and one on a conventional monitor), and both on conventional monitors). Participants were asked to monitor patient vitals for two adverse events, hemorrhage and tension pneumothorax, while performing a 1-hour laparoscopic suturing task, and select intervention accordingly.

Results: The suturing task performance was significantly worse when using the mixed displays compared to conventional monitors ($p = 0.021$). The performance when both displays were on the HMD was not statistically different compared to the other two display combinations. The reaction time to respond to the occurrence of tension pneumothorax was significantly faster when both displays were on the HMD compared to mixed displays ($p = 0.008$) and conventional monitors ($p = 0.024$). The level 1 situation awareness for the presence of the tension pneumothorax event was significantly worse when both displays were on the conventional monitors compared to both on the HMD ($p = 0.016$) and mixed displays ($p = 0.011$). Both reaction time and situation awareness showed no statistically significant difference when participants were presented with the hemorrhage event.

Conclusions: For this study, the OST HMD did not have a negative effect on the task performance, it also improved the reaction time to adverse events and situation awareness in some conditions compared to conventional monitors. Further research is needed to determine the optimal conditions that could improve the situation awareness.

P-04 **Promoting Technology and Collaboration**

The Use of Extended Reality Technologies to Enhance Engineering Medicine (EnMED) Training and Education

Shourya Kumar, Charles Foster, and Stuart James Corr, BEng, MEng, MA, PhD
Houston Methodist Institute for Technology, Innovation and Education, TX; Texas A&M School of Engineering Medicine, TX; Duke University, TX

Background: EnMed is an innovative engineering medical school created by Texas A&M University (TAMU) and Houston Methodist Hospital (HMH) to be physicians and engineering based medical problem solvers, or “physicianeers.” Students receive a Medical Doctorate and Master of Engineering in a fully integrated four-year curriculum. Given the unique nature of this course, there is an emphasis placed on exploring cutting-edge

P-06 Research Abstracts

They want Clinical Context and Protocols: Analysis of Engineers' Feedback from a National Segmentation Boot Camp Experience

Michael Fiore Amendola, MD, FACS; Dmitry Levine; and Beth Ripley, MD, PhD
Central Virginia VA Health Care Systems, Richmond, VA; Puget Sound VA Medical Center, Seattle, WA

Introduction: Segmentation is a key step in the creation of patient centered pre-surgical models. As part of our system wide efforts to provide broad exposure to this critical step, we undertook a national segmentation boot camp (SBC) in April 2022. We surveyed learners as it pertains to the quality of design, conceptual framework, quality of instructors and quality of course experience. We sought to understand differences in reaction to this training event as it pertains to engineers (E) and non-engineers (non-E).

Methods: An anonymous program survey was distributed to all participants of a national two- day SBC. Key questions utilizing a 5-point Likert scale (5=strongly agree) as it pertains to quality of design (stated learning objectives, guidelines for daily activities, aligned activities, delivery methods and technology support), conceptual framework (clinical areas presented and potential future content), quality of instructors and quality of course experience (challenging the learner, appropriate workload, cadaveric lab time, presentation evaluation, software hand- on sessions, safe /effective practice and over all course rating) were asked. Of note, minimal content addressed clinical scenario linked to the segmentation task nor ideal protocol workflow. All participants self-designated if they were engineers (E) in the organization or not (NE). Student's t-test was utilized.

Results: A total of 31 participants (79.9 % of total attendees) responded to the SBC survey. Of these, seventeen (54.8%) self-identified as engineers. There was no statistically significantly difference as it pertains to the quality of the course design, quality of instructors and quality of course experience. E compared to non-E were more likely to react negatively to a lack of clinical scenario (mean Likert score of 3.6 ± 1.4 vs. 4.5 ± 0.8 $p=0.03$) and minimal segmentation protocols presented (3.8 ± 1.0 vs. 4.6 ± 0.6;$p=0.01$) respectively.

Conclusions: Our analysis of learners attending a national SBC, self-identified engineer attendees seem to desire clinical context and segmentation protocols when training on segmentation cases. This data should inform educators at the point of care within the 3D Printing space to modify future curricula.

P-14 Challenges in Surgical Education

Task Trainer Development for Realistic Simulated Penetrating Neck Trauma in Team Trauma Training

Orrin Chambers, OMS IV; Thomas Edward Jackson III, BA; and Susan Davis Carter, MD, FACOG, FACS
Rocky Vista University, Parker, CO

P-16 Research Abstracts

Democratizing Access to Realistic Surgical Simulation with Augmented Reality - a Health Economics Review

David Rawaf, MBBS, MSc; Elliot Street, MBChB, BSc; Jordan Van Flute; and Luqman Tenang
Inovus Medical, United Kingdom

Introduction: Surgical training is traditionally learned by surgeons through repeated practice on patients 3. This is a time-consuming, costly and potentially ineffective process. During COVID this situation has worsened not only due to a lack of ability to operate due to redeployment, but also there has been less opportunities for trainees. This coupled with the emergence of a litigious world 4,5, we cannot afford to be practicing on patients, and neither can we rely on studying for from a book, a video, or even a one-off course 6. Simulation centres were also closed during the pandemic, and any access to it were highly limited due to costs and lack of comparison to alternatives 7.

Methods: We implemented this strategy by providing each trainee with a "lap box trainer" which allowed them - once requested by their faculty member - to perform a set of tasks ranging from learning modules all the way to full operations such as appendectomies & hysterectomies. Objective metrics were provided to trainees, and the faculty member provided subjective comments either in real-time on live courses, or remotely and in retrospect. The overarching aim of training in this manner is to reduce operative time, reduce risk of complications and to save the money.

Results: Combining this data from Needham et al8 with health services indices, and hospital stay 9,10, we estimate a £79pp cost savings. Extrapolated across 150 acute trusts 11 undertaking 10,000 lap appendectomies per day, the total cost saving would be £777.579 in one particular operation, for one surgical speciality.

Conclusions: The pandemic allowed us to utilise technology to remain productive and to see and hear loved ones. This allowed us to incorporate video-linked supervised operative training sessions using a new Mixed-Reality (real & augmented) platform involving hardware, a native application and a cloud-based server. This solution meant that we were able to increase accessibility by keeping costs down whilst maintaining fidelity to improve surgeon ability and to save hospital money.

P-17 Research In-Progress

The Effect of Augmented Reality Training in Simulated Laparoscopic Appendectomies

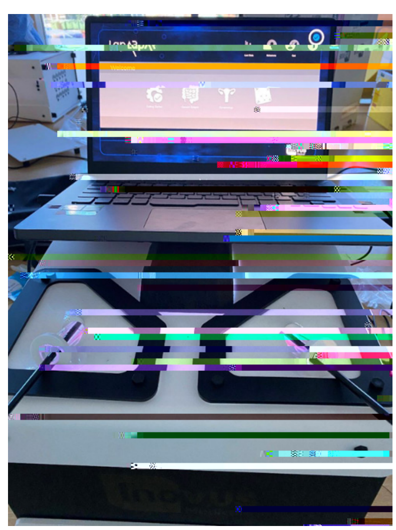
Mohammed El-Bahnasawi, BSc (Hons), MBBS, MRCS; and David Rawaf, MBBS (MD), MSc (T+O), MRCS
Manchester University NHS Foundation Trust, Manchester, United Kingdom; ESTH NHS Trust, London, United Kingdom

Introduction: The role of surgical innovations in training has been highlighted before, but the importance of its implementation in a timely manner was emphasised during the COVID-19 pandemic, during which many surgical trainees at all levels lacked theatre exposure due to cancellations of elective lists.

Methods: Utilising the LapAR™ by Inovus Medical Ltd (UK), we asked surgical trainees in a number of London and Manchester University NHS Trusts to perform several Augmented Reality simulated appendectomies interspersed with LapPass tasks. Objective metrics measured include time to completion, distance travelled, smoothness, acceleration, handedness and time in view. A comparison was made with a benchmark score set by an experienced minimally invasive surgery (MIS) surgeon. Subjective performance feedback was also provided by experienced surgeons using the work-based assessment (WBA) framework.

Preliminary Results: We found that the performance metrics improved when comparing initial & final benchmarks. In addition, the final benchmark metrics of the trainees were compared to that of the experienced MIS surgeon. Notably, time to completion and distance travelled were both markedly reduced following the intervention period. WBA based review of performance demonstrated a marked improvement in surgical skills.

Next Steps: Augmented Reality task training using a high-fidelity Laparoscopic box trainer such as the LapAR™ improves objective and subjective performance in appendectomies. It can be inferred that this technique improves the technical skills acquisition and refinement for surgical trainees. Further work needed with larger numbers of trainee volunteers for further validation and potential implementation. We aim to publish this data and recruit surgical residents from other health systems in addition.

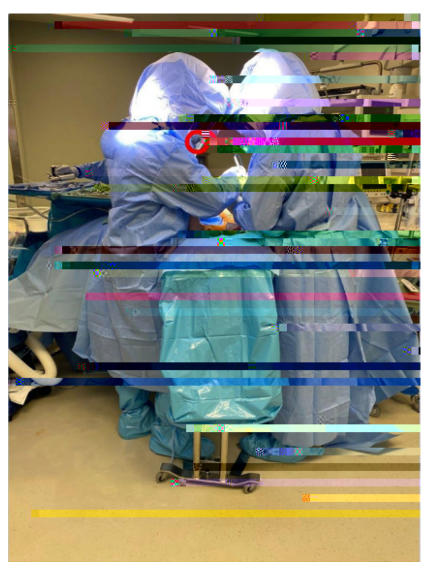


P-18 Research Abstracts

Establishing Expert Benchmarks for Simulation Training on New Robotic Platforms: The Medtronic Hugo RAS Experience

Mark Brentnall, MS; John P. Lenihan, MD; Christopher Simmonds; Anand Malpani, PhD; Antonio R. Gargiulo, MD; and Jeffrey Levy, MD
Surgical Science, Seattle, WA; MultiCare Tacoma General Hospital, Tacoma, WA; Brigham and Women's Hospital, Brookline, MA

Introduction: All new robot-assisted surgery platforms being developed will be required to have proficiency-based simulation training available either as an embedded feature or as a stand-alone product. Previous benchmarks for vior irtheSl Hey Limulation



P-20 **Research In-Progress**

Simple Tools for Efficient Artificial Intelligence Assisted Laparoscopic Training

Apollon N. Zygomalas, MD, MSc, PhD, FACS; Dimitris Kalles, PhD; and George Skroubis, MD
Hellenic Open University, Patras, Greece; University of Patras, Patras, Greece

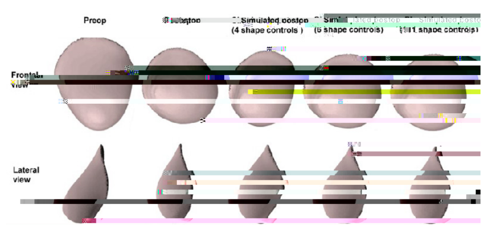
Introduction: Artificial intelligence nowadays can be

P-22 Challenges in Surgical Education

Interprofessional Curriculum for Emergency Undocking as a Part of Residency Training - Simulation Models and a Protocol

Mary Oh, MD; Haydee Del Calvo, MD; Benjamin Adan Benavides; Ray Chihara, MD, PhD; Min Peter Kim, MD; and Edward Y. H. Chan, MD
Houston Methodist Hospital, Houston, TX; University of Houston, Houston, TX

Background: General surgery residents areTm[(Maasng ly e9 (yxpec)4.1 (oe)]TJETEMC /P <</Lang (en-US)/MCID 19893BDC BT9 0 0 9 54 59644



P-24 Research Abstracts

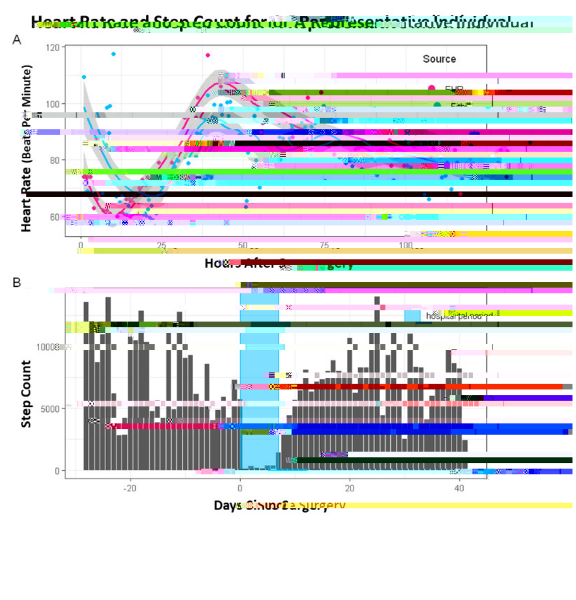
Development of an Affordable Abdominal Fascia Closure Model to Train Surgical Residents

Joseph Vito Vyskocil, MS; Anastasiya Shchatsko, MD; Christina L. Maser, MD, FACS; and Cristina M. Nituica, MD, FACS
Central Michigan University, Saginaw, MI

Introduction: Proper surgical technique of midline laparotomy closure is crucial to prevent fascial dehiscence, evisceration, and incisional hernia. Formal simulation training of residents in fascia closure is lacking. To address this training gap, we are developing an abdominal wall closure simulation course for our residency program. This pilot study was designed with the goal to develop a realistic, low-cost model of the abdominal wall for use in our surgical simulation center.

Methods: We created a low-cost ($54) multilayer abdominal wall model based on commercially ava d.40o9 0 0 9 54 3 1 TfmP 2I-USaldsha095 BDC B9a(or use in our)]TJETEMwith the gforP<n®n cliercnoal t

Poster Presentation Abstracts



P-28 Research In-Progress

Multi-Sensor Analysis of Surgeon's Moves and Conduct to Improve Surgical Efficiency

Rabin Gerrah, MD; Bunraj Grewal, BSc; and Ardeshir Kianercy, PhD
Stanford University, Stanford, CA; Western University, Lebanon, OR; University of Arkansas, Little Rock, AR

Introduction: Analysis of the surgeons' kinetics and actions is often used for the assessment of surgical skills. Video analysis and electromagnetic tracking are the most used techniques for this purpose. These techniques only track the movements, are non-specific and their interpretation is time consuming. We designed a multisensorial detection system to automatically quantify the specific actions taken during a simulated procedure as a teaching tool to improve surgical efficiency.

Methods: A simulated surgical field was everove surectipIng (en-US)/MCID 2286 BDC BT9 0 0 9 54 922.4002 Tm[(as a t)4 48s of the suron se ETE

CO-CHAIRS

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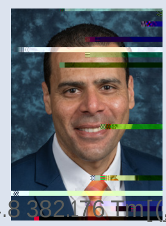

We would like to thank our Platinum Sponsor,
Intuitive Surgical.

Exhibitors

The Annual ACS Surgeons and Engineers: A Dialogue on Surgical Simulation meeting is growing. This meeting both welcomes and encourages sponsorship and

2024 ACS SURGEONS AND ENGINEERS

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*facs.org/**surg-eng***

Thank you for attending

the 2023 ACS Annual Surgeons and Engineers:

A Dialogue on Surgical Simulation Meeting.

In order to better serve the surgical and engineering communities, we ask that you complete a brief survey. Please share what you found valuable about today's content, and changes or additions that would be impactful in the future.

We offer you our sincere thanks for attending this meeting and we hope you have gained beneficial insights and inspiration from this dialogue and activity.

We welcome your input.

Please contact **Gyusung Lee, PhD**, at glee@facs.org or 312-202-5782 with any questions, comments, and suggestions to benefit the planning of future meetings.

Notes