S&E
25

SURGEONS AND ENGINEERS

A Dialogue on Surgical Simulation

March 22–23 | Chicago, IL

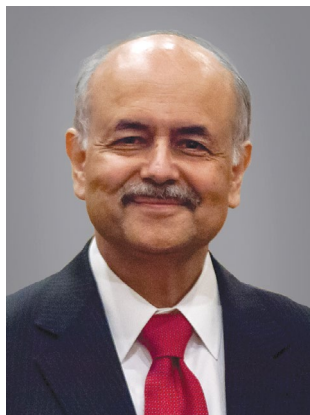## PROGRAM

ACS Education

American College of Surgeons

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This program also may be viewed online at *facs.org/surg-eng.*

WELCOME

On behalf of the American College of Surgeons (ACS) Division of Education, I would like to welcome you to the 2025 Surgeons and Engineers: A Dialogue on Surgical Simulation meeting. Given the success of this unique meeting over the past 6 years, we are pleased to offer a 1.5-day, inperson event this year. This will permit us to more fully explore synergies between surgeons, engineers, scientists, healthcare professionals, and educators to advance simulation-based surgical education and the use of state-of-the-art simulations and simulators.

Bijan Najafi, PhD, MSc, tenured professor of surgery at the University of California, Los Angeles, will deliver the Keynote Address, "Forging Partnerships, Transforming Care: Engineers and Surgeons in the Digital Health Revolution." A Special Panel on building better surgical simulators—following up on the exciting discussion from the 2024 meeting—will feature a surgeon educator, an academic engineer, and a simulator industry representative: Dmitry Nepomnayshy, MD, MSc, FACS, professor of surgery at UMass Chan-Lahey in Burlington; Doga Demirel, PhD, MSc, associate professor in the School of Computer Science at The University of Oklahoma in Norman; and Tansel Halic, PhD, senior software engineer at Intuitive Surgical. Building on the success of the inaugural Do-It-Yourself (DIY) Simulator/Model Competition last year, 18 entrants will demonstrate their DIY simulators/models in a competition designed to highlight the surgical simulation community's collaborative and innovative spirit.

From the many high-quality abstracts received, the ACS Division of Education's Surgeons and Engineers Committee selected 15 abstracts for podium presentations and 44 abstracts for poster presentations.

On behalf of the ACS Division of Education and Surgeons and Engineers Committee, thank you for attending this unique event. We look forward to continuing the productive dialogue and meaningful collaboration we have initiated between surgeons and engineers.

Ajit K. Sachdeva, MD, FACS, FRCSC, FSACME, MAMSE

Senior Vice President, Education
Division of Education, American College of Surgeons

WELCOME FROM PROGRAM CHAIRS

On behalf of the Program Committee, we welcome you to the 2025 ACS Surgeons and Engineers: A Dialogue on Surgical Simulation meeting. The previous meetings received an overwhelming number of positive responses, so we are excited to offer a 1.5-day, in-person meeting at the ACS Headquarters in Chicago, IL.

The agenda for this meeting is specifically designed to convey the exciting ideas and cutting-edge innovations of a unique collaborative community of surgeons, academic and industry engineers, scientists, and surgical education leaders. It is our hope that by attending this meeting, you will gain a better understanding of the multifaceted needs, challenges, and potential benefits that arise from this multidisciplinary partnership, and enthusiastically contribute to promoting the highest quality of surgical care through advanced knowledge and innovative education.

Through this collaboration, the Program Committee and the ACS Division of Education have three essential goals: to bridge surgical and engineering communities, advance and support expertise and excellence in surgery, and enrich surgical simulation-based training with the most current dialogue on state-of-the-art technological and engineering advancements.

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

- **Keynote Address**—*Forging Partnerships, Transforming Care: Engineers and Surgeons in the Digital Health Revolution*, Bijan Najafi, PhD, MSc, University of California, Los Angeles

- **Special Panel Discussion**—How to build better surgical simulators, a special panel including a surgeon educator, academic engineer, and industry engineer from the surgical industry

- **Oral and Poster Presentations**—Oral and poster presentations on the multifaceted collaborations between surgeons and engineers working together in research and technology development

- **Do-It-Yourself (DIY) Simulator/Model Competition**—The second DIY simulator/model competition to promote the development of DIY simulators and models and encourage the use of such simulators and models to improve simulation-based surgical education and training

- **3D Printing Debate**—Discussion on the successes and challenges of using 3D printing in surgical education

- **Speed Dating**—Rapid-fire networking session designed to connect surgeons and engineers and collaboratively address needs and challenges in surgical education

- **Cognitive Task Analysis (CTA) Session**—Introduction of the fundamentals and examples of the CTA process for surgical simulator development

We are confident that you will find this meeting to be thought-provoking and rewarding, and we look forward to welcoming you to the meeting. After attending this meeting, please provide us with your feedback to help us ensure the success of this and future meetings.

On behalf of the Program Committee, thank you for attending!

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 Department, University College London, UK

AGENDA

March 22, 8:00 am–5:45 pm, March 23, 8:00 am–12:00 pm
ACS Headquarters, Chicago, IL | Board of Regents Room (28th Floor)

All times listed are Central Time. Agenda and speakers are subject to change. The views expressed by individual speakers are their own and do not necessarily reflect those of the American College of Surgeons.

Saturday, March 22		
6:00–7:30 am	**Exhibitor Setup**	*Foyer*
7:00–8:00 am	**Registration**	*Foyer*
8:00–8:15 am	**Welcoming Remarks** Ajit Sachdeva, MD, FACS, FRCSC, FSACME, MAMSE, *American College of Surgeons* Mandayam Srinivasan, PhD, *MIT and University College London* Gyusung Lee, PhD, *American College of Surgeons*	*BOR Room*
8:15–9:15 am	**Keynote Address** *Forging Partnerships, Transforming Care: Engineers and Surgeons in the Digital Health Revolution* Bijan Najafi, PhD, MSc, *UCLA*	*BOR Room*
9:15–10:15 am	**DIY Simulator/Model Presentation 1**	*Foyer*
10:15–10:30 am	**Morning Break, Exhibitor Visit**	*Foyer*
10:30 am–12:00 pm	**Abstract Presentation 1**	*BOR Room*
12:00–1:00 pm	**Lunch and Exhibitor Visit**	*Foyer & BOR Room*
1:00–2:00 pm	**Debate: Is 3D Printing Still Valuable in Surgical Simulation?** *Moderator:* Paul Michael Jeziorczak, MD, MPH, FACS, FAAP *Pro:* DJ Traina, *University of Washington* *Con:* Charles J. Aprahamian, MD, *OSF HealthCare*	*BOR Room*
2:00–3:00 pm	**Special Panel: How to Build Better Surgical Simulators – Part 3** *Moderator:* John Paige, MD, FACS, *Louisiana State University* *Panelists:* *Surgeon Educator:* Dmitry Nepomnayshy, MD, MSc, FACS, *UMass Chan-Lahey;* *Academic Engineer*: Doga Demirel, PhD, MSc, *The University of Oklahoma;* *Industry Engineer:* Tansel Halic, PhD, *Intuitive Surgical*	*BOR Room*
3:00–3:15 pm	**Afternoon Break and Exhibitor Visit**	*Foyer*
3:15–4:25 pm	**Poster Presentations**	*Various Designated Areas*
4:25–4:30 pm	**First-Day Wrap-Up and Preparation for Speed Dating**	*BOR Room*
4:45–5:45 pm	**Speed Dating**	*BOR Room*
4:30–5:30 pm	**Reception**	*Foyer*

| Sunday, March 23		
7:00–8:00 am	**Registration**	*Foyer*
8:00–8:15 am	**2nd Day Opening Remark** Gyusung Lee, PhD, *American College of Surgeons*	*BOR Room*
8:15–9:15 am	**Abstract Presentation II**	*BOR Room*
9:15–10:15 am	**DIY Simulator/Model Presentation 2**	*Foyer*
10:15–10:30 am	**Morning Break and Exhibitor Visit**	*Foyer*
10:30–11:30 am	**Cognitive Task Analysis Session** Victoria Roach, PhD, *University of Washington* David Hananel, BSEE, BACS, *University of Washington* Robert Sweet, MD, FACS, *University of Washington*	*BOR Room*
11:30–11:45 am	**DIY Competition Result Announcement**	*BOR Room*
11:45 am–12:00 pm	**Closing** Mandayam Srinivasan, PhD, *MIT and University College London* Gyusung Lee, PhD, *American College of Surgeons*	*BOR Room*

PROGRAM CHAIRS

Gyusung I. Lee, PhD

Assistant Director, Simulation-Based Surgical Education and Training, *ACS Division of Education*

Dr. Gyusung Lee obtained master of science and doctor of philosophy degrees from the Department of Biomedical Engineering at Texas A&M University in 1996 and 2002, respectively. After completing his postdoctoral training at Arizona State University, Dr. Lee joined the Department of Surgery at the University of Maryland School of Medicine in Baltimore as a faculty research associate. His research centered on the physical and cognitive ergonomics of minimally invasive surgeries, including laparoscopy, NOTES, and robotic surgery.

Dr. Lee later became the director of robotic education and ergonomics research at Johns Hopkins School of Medicine's Minimally Invasive Surgical Training & Innovation Center. He developed a comprehensive robotic surgery curriculum, which trained surgeons and OR staff in robotic surgery. This program enhanced skill development for various surgical specialties and promoted better teamwork between surgeons and OR staff.

He is the Co-Chair of the ACS Surgeons and Engineers Committee. He also is an Affiliate Member of the ACS Academy of Master Surgeon Educators.
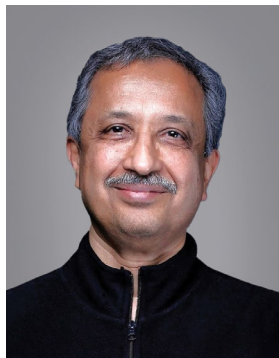
Mandayam A. Srinivasan, PhD

Founder, Laboratory for Human and Machine Haptics, *Massachusetts Institute of Technology (MIT); Professor of Haptics, Computer Science Department, University College London, UK*

Prof. Mandayam Srinivasan holds the professorial chair of haptics in the Department of Computer Science at the University College London in the UK. He also is Vajra faculty in applied mechanics at the Indian Institute of Technology Madras in India. He received a bachelor's degree in civil engineering from Bangalore University, master's degree in aeronautical engineering from the Indian Institute of Science in Bengaluru, and doctorate degree in mechanical engineering from Yale University in New Haven, CT. Following postdoctoral research in neuroscience at Yale Medical School, he moved to MIT and founded the Laboratory for Human and Machine Haptics, known world over as the MIT Touch Lab.

Prof. Srinivasan has been recognized worldwide as a founder of the field of modern haptics, the science and technology of touch in humans and machines. He has led American and European multidisciplinary teams for more than 3 decades in several scientific, as well as cutting-edge technology research projects. Based on citations of his publications, he is ranked within the top 1% of all scientists and engineers with cited research. He has been featured in print and TV news media for first demonstrations of robots directly controlled through brain neural signals, virtual reality-based simulators for training surgeons, internet-based real-time touch interactions between people across continents, wearable robotic tactile sensors for continuous blood pressure measurement, and teleoperation systems with touch feedback capable of surgery on a single cell with micron precision. Several hands-on technologies developed in his lab have been displayed in museums in the US and UK.

KEYNOTE SPEAKER

Bijan Najafi, PhD, MSc

Professor of Surgery, *University of California, Los Angeles*

Dr. Bijan Najafi is a tenured professor of surgery at the University of California, Los Angeles (UCLA), specializing in digital health and biotechnologies. He serves as the research director of the UCLA Center for Advanced Surgical and Interventional Technology and co-director of the National Science Foundation/Industry-University Cooperative Research Centers Program Center to Stream Healthcare in Place. He earned his doctorate degree in bioengineering from the Swiss Federal Institute of Technology in Switzerland and completed a postdoctoral fellowship in neuroscience at Harvard University in Cambridge, MA.

Dr. Najafi has published more than 250 articles, garnering more than 17,000 citations. In 2022, he was ranked in the top 1% by Expertscape in his field of research, which includes digital health, diabetic foot care, and wound care. In recognition of his significant contributions to digital health technologies aimed at preventing falls and limb gangrene, he was inducted into the American Institute for Medical and Biological Engineering College of Fellows in 2023. Throughout his career, he has mentored more than 500 individuals.

SPECIAL PANEL DISCUSSION SPEAKERS

Moderator

John T. Paige, MD, FACS

Louisiana State University (LSU)

Dr. Paige is a professor of clinical surgery, with appointments in anesthesiology and radiology at the LSU Health New Orleans School of Medicine. He has dedicated his academic career to simulation-based training, research, and education in both surgical and health professional education. Dr. Paige serves as surgical director of the ACS Accredited Education Institute at the LSU School of Medicine. He is a member of the ACS Academy of Master Surgeon Educators. He has held several leadership positions on national societal committees related to simulation and surgical education and has conducted research for federal and national grants related to simulation-based team training and assessment. Dr. Paige has published, and co-edited three books, and presented extensively on simulation-based training, interprofessional education, surgical skills acquisition, debriefing, teamwork, human factors, and surgical education.

Panelists

Dmitry Nepomnayshy MD, MSc, FACS

Surgeon Educator
UMass Chan-Lahey in Burlington

Dr. Nepomnayshy is a professor of surgery at the University of Massachusetts Chan Medical School and Lahey Hospital & Medical Center, in Burlington. He is the director of simulation and professional development, and vice-chair of education in the Department of Surgery at Lahey Hospital. His clinical specialty includes bariatric and minimally invasive surgery, and his research interests focus on surgical education, emphasizing teaching and assessment of surgical skill.

Dr. Nepomnayshy is actively involved in surgical societies, including leadership roles as Past President of the ACS Massachusetts Chapter, president-elect of the Boston Surgical Society, and ACS Governor representing Massachusetts and serving as Chair of the Surgical Care Delivery Workgroup. He also is chair of the development committee for the Association of Surgical Education, Chair of Faculty Development Committee for the ACS Accredited Education Institutes Consortium, and co-chair of the FLS committee for the Society of American Gastrointestinal and Endoscopic Surgeons.

Dr. Nepomnayshy obtained his medical degree at The Ohio State University College of Medicine in Columbus, and completed his surgical training at Lahey Hospital. He also earned a master of science degree at McGill University in Montreal, Quebec, with an emphasis on surgical education.

Panelists (continued)

Doga Demirel, PhD, MSc

Academic Engineer
Associate Professor, School of Computer Science, The University of Oklahoma

Dr. Doga Demirel is an associate professor and director of the Virtual Reality (VR), Interactive Simulation, and Biomedical Lab in the School of Computer Science at The University of Oklahoma in Norman. He earned his doctorate degree in computer science from the University of Arkansas at Little Rock in 2018, master of science degree in applied computing from the University of Central Arkansas in 2015, and bachelor of science degree in computer science from the University of Arkansas at Little Rock in 2013.

Dr. Demirel's research focuses on the design, development, and validation of real-time medical and interactive simulations. His work utilizes technologies, including extended reality, artificial intelligence, machine learning, software engineering, and human-computer interaction with a particular emphasis on haptics, to enhance medical simulation and interactive experiences.

His research currently is supported by four National Institutes of Health R01 grants, with total funding of approximately $10 million. In recognition of his contributions, Dr. Demirel received the Excellence in Research award from Florida Polytechnic University in 2022. Additionally, he has received Best Paper awards at the 2023 Institute of Electrical and Electronics Engineers (IEEE) International Conference on Bioinformatics and Bioengineering and the 2024 IEEE VR International Workshop on eXtended Reality for Industrial and Occupational Support.

Tansel Halic, PhD

Industry Engineer
Senior Software Engineer, Intuitive Surgical

Dr. Tansel Halic is a distinguished academic researcher and engineer specializing in computer science and medical simulation technologies. He currently is a senior software engineer at Intuitive Surgical, contributing to the design and development of advanced simulation technologies for robotic surgery training. Previously, he served as an associate professor in the Department of Computer Science at the University of Central Arkansas in Conway.

Dr. Halic earned his doctorate degree in mechanical engineering from Rensselaer Polytechnic Institute in Troy, NY. His research focused on surgical simulation and computational techniques. With more than 2 decades of experience, he has cultivated expertise in virtual and augmented reality-based simulations, image processing, machine learning, and human-computer interaction. He has secured more than $4 million in research funding from the National Institutes of Health and other agencies, supporting transformative projects that span virtual simulation training for bariatric, colorectal, and orthopaedic surgeries, as well as solo and team-based operating room training.

Dr. Halic is a prolific author with more than 90 publications, including high impact journal articles, book chapters, and peer-reviewed conference papers, demonstrating his extensive contributions to the fields of medical simulation and computational science. Dr. Halic's work bridges academic research and simulation-training product development, driving innovation in medical training and technologies.

ORAL PRESENTATION ABSTRACTS

O-01

Promoting Technology and Collaboration

BRAETH: A Low-Cost Tool to Assist the Performance of Cricothyroidotomies

<u>Varun Gopal</u>; Hailey Warman; Claudia Agustin; Serena Chiasson; Isabella MacNaughton; and Tovy H. Kamine, MD, MBA, FACS

Carle Illinois College of Medicine, Urbana, IL; University of Massachusetts, Amherst, MA; University of Massachusetts Chan Medical School, Baystate, Springfield, MA

O-02

Research Abstracts

Machine Learning for Resident Learning: FLS PEG Transfer with Real-Time Evaluation Comparable to Faculty Evaluators

<u>Vin Hudson, MD</u>; Andrew Hu, MD; Joelle Getrajdman, MD, FACS; Nell Maloney Patel, MD, FACS; Issam Koleilat, MD, FACS; Divya Kewalramani; Yunzhe Xue; Usman Roshan; Mayur Narayan, MD, MPH, MBA, MHPE, FACS; and Advaith Bongu, MD, FACS

Robert Wood Johnson University Hospital, New Brunswick, NJ; University of Pittsburgh Medical Center, Pittsburgh, PA; New Jersey Institute of Technology, Newark, NJ

O-03

Research Abstracts

SynISS - A Public Challenge and Dataset of Simulated Synthetic Images for Instrument Segmentation in Surgery

<u>Anand Malpani, PhD</u> and Kimberly M. Glock

Surgical Science, Seattle, WA

O-04

Research In-Progress

AI-Driven Hand Motion Analysis for Distinguishing Novice and Expert Skills in Medical Education

<u>Jafar Arash Mehr, PhD</u>; Eric S. Hungness, MD, FACS; Amy L. Halverson, MD, FACS; and Jeffrey H. Barsuk, MD

Northwestern Simulation - Northwestern University, Chicago, IL; Northwestern Medicine - Northwestern University, Chicago, IL

O-05

Promoting Technology and Collaboration

Virtual Reality Simulators for Endoscopic Skills Acquisition: Evaluation of a Low-cost Plug-in Serious Game

Elisa Reitano; <u>Maria Vannucci</u>; Deborah Susan Keller, MD; Chiara Airoldi; Pietro Riva; Didier Mutter, MD, FACS; Stefano Stramigioli; and Silvana Perretta

University Hospital Strasbourg, Strasbourg, France; University of Torino, Torino, Italy; University of Strasbourg, Strasbourg, France; University of Eastern Piedmont, Novara, Italy; University of Twente, Enschede, Netherlands

O-06

Research In-Progress

The Michigan Elbow: Design and Preliminary Evaluation of a Pulled Elbow Task Trainer

<u>Jack Darbonne</u>; Mohamed Yassin; Clifford Lindley Craig, MD, FACS; and Deb Rooney, PhD

University of Michigan, Ann Arbor, MI

O-07

Promoting Technology and Collaboration

A Leap Forward in Mitral Valve Simulation: Developing Functional Models for Accurate Repair Testing

<u>Francesco Bertelli</u>; Brandon Peel; Shi-Joon Yoo; Osami Honjo; Christoph Halle; Vladimiro Vida; and Israel Valverde

The Hospital for Sick Children, Toronto, ON, Canada; University of Padua, Padua, Italy

O-08

Research Abstracts

Foundational Model for Cataract Surgical Scene Understanding

<u>Nisarg Anish Shah</u>; Chaminda Bandara; Shameema Sikder, MD, FACS; S. Swaroop Vedula, MBBS, PhD, MPH; and Vishal Patel

Johns Hopkins University, Baltimore, MD

O-09

Research Abstracts

Massive Abdominal Hemorrhage Simulator for a Crisis Management Curriculum

<u>Brandon Ellis Cowan, MD</u>; Scott Brigham Drapeau, MA; Mandeep Kaur, BS; Jacquelyn Alexandra Knox, MD; Patricia O'Sullivan, EdD, MS; Hueylan Chern, MD, FACS; and Clara Gomez-Sanchez, MD

University of California San Francisco, San Francisco, CA

O-10

Research In-Progress

Towards a Robotic Minimally Invasive Surgery Assessment and Augmentation Platform for Visual-Haptic Acuity Development

Sergio Machaca; S. Swaroop Vedula, MBBS, PhD, MPH; Gina L. Adrales, MD, MPH, FACS; and Jeremy DeLaine Brown, PhD

Johns Hopkins University, Baltimore, MD

O-11

Promoting Technology and Collaboration

AI-Empowered Anticipation of Surgical Triplets in Laparoscopic Videos for Enhanced Educational Support

Xintao Axel Hu; Daochang Liu; Tovmassian David; Tony Chun Yeung Pang, MBBS, FACS; and Chang Xu

The University of Sydney, Sydney, Australia; Western Sydney LHD, Sydney, Australia

O-12

Research Abstracts

Assessing the Impact of Hands-on Anatomical Model Construction on Medical Students' Procedural Skills: A Randomized Controlled Trial

Denesh Peramakumar; Rebecca Hisey; Vanessa Wiseman; Elizabeth Klosa; Aden Wong, Farah Zaza; Gabor Fichtinger and Boris Zevin

Queen's University, Kingston, ON, Canada

O-13

Research In-Progress

Intraoperative Lens Cleaning Cannula for Laparoscopic Surgery

Hau Le; Devashish Joshi; Dan Zinger; and Anvesha Mukherjee

University of Wisconsin - Madison, Madison, WI

O-14

Research Abstracts

Linking Feedback Quality to Procedural Skill Improvement: An (Artificial Intelligence) AI-Driven Approach

Divya Kewalramani, MD; Diego Sanhueza Roman; Sofía Abedrapo Lagos; María Elena Vial Brizzi; Advaith Bongu, MD, FACS; Cristian Jarry Trujillo; Mayur Narayan, MD, MPH, MBA, MHPE, FACS; and Julian Varas Cohen, MD

Rutgers Robert Wood Johnson Medical School, New Brunswick, NJ; Pontificia Universidad Católica de Chile, Santiago, Chile

O-15

Research In-Progress

A Hierarchical Learning Framework for Designing Robotic Surgical Simulation Content

Henry Lin, PhD; I-Fan Shih; Aditya Reddy Ashammagari; and Gladys Fernandez, MD

Intuitive Surgical, Sunnyvale, CA; Baystate Medical Center, Springfield, MA

VIEW FULL ABSTRACTS

ACS/Clinical Congress 2025

October 4–7 | Chicago, IL

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Saturday–Tuesday Program

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ACS/ AMERICAN COLLEGE OF SURGEONS

POSTERS PRESENTATION ABSTRACTS

Group A

P-A-01
Promoting Technology and Collaboration

Navigating Bariatric Surgery in the Age of Artificial Intelligence

Tara Ranjbar, MD; Jeffrey Robles, BS; Dillon Rogando, BS; Halley Yung, BS; Sourodip Mukharjee, MBBS; Indraneil Mukherjee, MD; and Olivia Haney, MD
Northwell Health Staten Island University Hospital, Staten Island, NY; CUNY School of Medicine, New York, NY; Northwell Health Staten Island University Hospital, Staten Island, NY

P-A-02
Research Abstracts

Tele-mentorship Versus In-person Mentorship for Trainee Procedural Coaching of Cricothyroidotomy

Meagan Rosenberg, MD; Mathew Goebel, MD, MAS; Mackenzie Laporte, MD; Cassidy Carpenter, DO; Ryan Clark; Seth Kelly, MD, MBA; Yamuna Talavane Carey, MD; Edward Kelly, MD, FACS; and Tovy Haber Kamine, MD, FACS
UMass Chan Medical School - Baystate, Springfield, MA

P-A-03
Research Abstracts

A Simple Engineering Alteration to IO Access Device Electronics Can Lead to Improved Placement Accuracy Confirmation

Rohan Vemu, BS; Tshepo Yane, BS; Patrick Paglia, BS; Gregory Glova, BS; Kaiser Okyan, BS; Mateo J. Pascual; David Meaney, PhD; Kristen Chreiman, MSN, CCRN; Lewis J. Kaplan, MD, FACS; and Jose Luis Pascual-Lopez, MD, PhD, FACS
University of Pennsylvania, Philadelphia, PA; University of Pennsylvania School of Engineering, Philadelphia, PA; Drexel University School of Engineering, Philadelphia, PA; University of Pennsylvania Perelman School of Medicine, Philadelphia, PA

P-A-04
Promoting Technology and Collaboration

Improving Education and Safety in Neonatal and Infant Surgery through Development of a Neonatal Minimally Invasive Surgery Model

Cristian D. Puerta, MD; Charbel Chidiac, MD; Samuel Matthew Alaish, MD, FACS; Shaun M. Kunisaki, MD FACS; Mollie Rose Freedman-Weiss, MD; Stephen Niemiec, MD; and Daniel Rhee, MD, FACS
University of California San Diego, Chula Vista, CA; The Johns Hopkins Hospital, Baltimore, MD

P-A-05
Promoting Technology and Collaboration

Using Video-Based Assessment to Maximize Operative Learning in Pediatric Surgery

Charbel Chidiac, MD; Cristian D. Puerta, MD; Mitchell Bryski, MD; Mollie Rose Freedman-Weiss, MD; Stephen Niemiec, MD; Samuel Matthew Alaish, MD, FACS; Shaun M. Kunisaki, MD, FACS; Alejandro Garcia, MD, FACS; Clint Daniel Cappiello, MD, FACS; and Daniel Rhee, MD, FACS
The Johns Hopkins Hospital, Baltimore, MD; University of California San Diego, Chula Vista, CA

P-A-06
Research In-Progress

Smart VB: A Pressure Monitoring and Automatic Suction Telemedicine System for the Vacuum Bell Therapy for Treating Pectus Excavatum

Defu Cui, PhD; Yuzhong Shen, PhD; and Robert John Obermeyer, MD, FACS, FAAP
University of Wisconsin - Platteville, Platteville, WI; Old Dominion University, Norfolk, VA; Children's Hospital of the King's Daughters, Virginia Beach, VA

P-A-07
Research Abstracts

Using Motion Capture to Analyze Surgeon Upper Extremity Kinematics

Gary Sutkin, MD; Carsen M. Steele, BS; An-Lin Cheng, PhD; Antonis Stylianou, PhD; and Gregory W. King, PhD
University of Missouri Kansas City School of Medicine, Kansas City, MO; University of Missouri Kansas City School of Computing and Engineering, Kansas City, MO

P-A-08
Research In-Progress

Implementation of a Curriculum to Enhance Proficiency for Bedside Procedures in Pediatric Surgery

Patricia Adele Lange, MD, FACS; and Megan Elizabeth Kolbe
Children's Hospital of Richmond at VCU, Richmond, VA; Virginia Commonwealth University, Richmond, VA

P-A-09
Research Abstracts

A Proof of Concept Large Language Model (LLM) Assistant for Clinical Trial Screening in Surgical Oncology and Beyond

Samantha Lai; Alysala Malik; Tejas Sathe, MD; Caitlin Silvestri, MD; Gulam A. Manji, MD, PhD; and Michael D. Kluger, MD, MPH, FACS
Columbia University Vagelos College of Physicians and Surgeons, New York, NY; Columbia University Irving Medical Center, New York, NY

Group B

P-B-01
Research In-Progress

Evolving Ergonomics: Musculoskeletal Complaints Begin During Surgical Training, Continue into Practice

Pujita Munnangi; Paulamy Ganguly; Vy Dang; Christine Lannon; Rebecca Fabian, MD; and Nicole Tapia, MD

Texas A&M University School of Engineering Medicine, Houston, TX; Texas A&M University School of Medicine, Houston, TX; Houston Methodist Hospital, Houston, TX

P-B-02
Research Abstracts

Augmented Reality in Plastic Surgery: A Systematic Review

William Makana Lee; Naser Salem; Jhobani Torres-Gomez; Ramzy Ahmed; Tarun Bhadri; Jessica Anne Bigner, MD; and Richard Tyrell, MD

Eastern Virginia Medical School, Norfolk, VA

P-B-03
Research In-Progress

Virtual Reality Surgical Learning Environment Immersion

Farrell Adkins, MD, FACS; Toru Oyama, BS; Cameron Moore, MS; Wallace Lages, PhD; and Jennifer Wayne, PhD, FAIMBE

Virginia Tech Carilion School of Medicine, Roanoke, VA; Virginia Tech, Blacksburg, VA; Northeastern University, Boston, MA

P-B-04
Promoting Technology and Collaboration

The History and Evolution of Ergonomic Risk Assessments for Musculoskeletal Disorders

Rick Barker and Arielle West

VelocityEHS, Chicago, IL

P-B-05
Promoting Technology and Collaboration

Cost Friendly 3D-Printed Surgical Guide for Orbital Floor Fractures

Varun Gopal; Rand Kittani; Ian Ray; Kyung Seol, BS; Vignesh Chennupati; David Cartier, DMD; Erik Quintana, DMD; and Benjamin Schaefer, DMD, FACS

Carle Illinois College of Medicine, Urbana, IL; Carle Foundation Hospital, Urbana, IL

P-B-06
Promoting Technology and Collaboration

Breaking Barriers of SDOH in Breast Reconstruction Surgery: Point of Care 3D Printed Implants for Post-Mastectomy Patients

Rand Kittani; Ayse Ozkan; Vignesh Chennupati; and Victor Stams, MD

Carle Illinois College of Medicine, Urbana, IL; Carle Foundation Hospital, Urbana, IL

P-B-07
Research Abstracts

Virtual Reality Anatomical Simulation for Skull Based Surgery

Tony D. Satroplus, MD; Steven Goicoechea, MD; Jer W. Ang, MS; Jeremiah J. Wilt; Wesley A. Fisher; Dheeraj Varandani; and Christie Barnes, MD

University of Nebraska Medical Center, Omaha, NE

P-B-08
Challenges in Surgical Education

When are Artificial Intelligence Technologies for Surgery Worth It?

Anisha Paul-Ledesma, DMD, MPH, MHS-HEOR; S. Swaroop Vedula, MBBS, PhD, MPH; K. Davina Frick, PhD; and Shameema Sikder, MD, FACS

Johns Hopkins University, Baltimore, MD; The Wilmer Eye Institute, Johns Hopkins University School of Medicine, Bethesda, MD

P-B-09
Research Abstracts

Towards Automated Assessment: Evaluating Phase Segmentation Accuracy of an AI Model in Advanced Training for Laparoscopic Suturing (ATLAS) Simulator

Huu Phong Nguyen, PhD; Sai Abhinav Pydimarry; Diana Sofia Garces Palacios, MD; Darian L. Hoagland, MD; Kailen Wong, BS; Arianna Jieqi Zhang, MS; Sharanya Vunnava; Dmitry Nepomnayshy, MD, FACS; and Ganesh Sankaranarayana, PHD

The University of Texas Southwestern Medical Center, Dallas, TX; The University of Texas Southwestern Medical Center, Plano, TX; Lahey Hospital and Medical Center, Burlington, MA

Group C

P-C-01
Promoting Technology and Collaboration

Precision in Sight: Improving Visual Clarity in Laparoscopic Surgery for Surgical Trainees

Sanskruthi Priya Guduri; Anthony Wong; Annie Tigranyan; Debora Nya; Asaiah Irvin Rock; Prakhar Gupta; Urvshi Thapar; and Blair M. Rowitz, MD, FACS
Carle Illinois College of Medicine, Urbana, IL; University of Illinois Urbana-Champaign, Champaign, IL; Carle Foundation Hospital, Urbana, IL

P-C-02
Research In-Progress

Effectiveness of 3D Box Model Trainers in Kidney Transplantation Training: A Controlled Study

John Cabrera; Sharad Patel; Makenna Myrick; Claudia Klejc; Ania Kelegama; and Anne Titus
University of Florida, Gainesville, FL

P-C-03
Promoting Technology and Collaboration

A Mixed Reality Trainer for Simulating Intravenous Infusion into the Long Saphenous Vein of Infants

Alexander Simes; Alexander Kim; Grace Matthews; and John Cabrera
University of Florida, Gainesville, FL

P-C-04
Promoting Technology and Collaboration

The Potential Utility of 3D Modeling as a Novel Pre-surgical Imaging Technique for Liver Surgery

Daniel Cheah, MSE; Fumihiro Kawano, MD, PhD; Aaron Anderson, PhD; Kathryn Tsai; Helen Kemprecos; Annie Tigranyan, MS; Matthew Bramlet, MD; Brad Sutton, PhD; Mark S. Cohen, MD; and Claudius H. Conrad, MD, PhD
Carle Illinois College of Medicine, Urbana, IL; University of Illinois Urbana Champaign, Urbana, IL; OSF Healthcare, Peoria, IL

P-C-05
Promoting Technology and Collaboration

Dharma Chari-Letts; Kent K. Yamamoto, BS; Olufemi Oladokun, MD; Danyi Chen, BS; Layla Triplett; Louise Jackson, MD, FACS; Patrick James Codd, MD, FAANS; and Sabino Zani, MD, FACS
East Chapel Hill High School, Chapel Hill, NC; Duke University, Durham, NC; Duke University School of Medicine, Durham, NC

P-C-06
Research Abstracts

Fundamentals of Microsurgery Skills: Preliminary Evaluation of Five Microsurgery Tasks

Daniel Rzeppa; Sonali Biswas, MD; Noah Saad, MD; and Deb Rooney, PhD
University of Michigan, Ann Arbor, MI; Michigan Medicine, Ann Arbor, MI

P-C-07
Research In-Progress

Simulation and Visualization of Left Ventricular Outflow Tract Obstruction

Rabin Gerrah; Danielle Niemann; and Maycee Gielow
Stanford University, Palo Alto, CA; Good Samaritan Regional Medical Center, Corvallis, OR

P-C-08
Challenges in Surgical Education

A Dynamic Pericardiocentesis Model for Resident Training

Keerthana Balaji; Elaina Conklin; Matthew Greenen; Adam Leverant; Jason Szoja; David Shreiber, PhD; and Colleen M. Donovan, MD, CHSE, FACEP
Rutgers University School of Engineering, Piscataway, NJ; Rutgers Robert Wood Johnson Medical School, Piscataway, NJ

P-C-09
Research In-Progress

Revolutionizing Medical Training: Sustainable and Cost-Effective 3D-Printed Training Simulators Using Plant-Based Biodegradable PLA

Iliana Sorotou; Filippos Savvas Chelmis; Martin Daskalov; Abhishek Anil; and Paraskevas Pakataridis, MD
Sofia University St. Kliment Ohridski, Sofia, Bulgaria; University of Stuttgart, Stuttgart, Germany

Group D

P-D-01
Challenges in Surgical Education

Transforming Neurosurgical Education and Planning with AI-Powered Augmented Reality

Pablo Adrián Salmon; Lucciano Elian Mannelli; and Tiago Sarthou
Instituto Tecnológico de Buenos Aires, Ciudad Autónoma de Buenos Aires, Argentina

P-D-02

Research Abstracts

Chat-GPT Powered eXtended Reality for Surgical Education

Panagiotis E. Antoniou; Konstantinos Tagaras; Irene Asouhidou; Alkinoos Athanasiou; Panagiotis D. Bamidis; and Georgios Tsoulfas, MD, PhD, FACS
Aristotle University School of Medicine, Thessaloniki, Greece

P-D-03

Promoting Technology and Collaboration

Large Language Models for Surgical Simulation and Education

Peiran Liu; Haozhi Chen; Xingjian Ma; and Denny Yu
Purdue University, West Lafayette, IN; University of Wisconsin-Madison, Madison, WI

P-D-04

Challenges in Surgical Education

Efficacy of Midlevel Fidelity Arteriovenous Fistula Complication Simulator: Development of a Hybrid Synthetic and Biologic Material Based Simulator for AV Fistula Procedure and AV Fistulaplasty

Shawn Moore, EdD; Matthew Black, MD; Margaret Romine, MD; David Black Leeser, MD, FACS; Carlos Marroquin, MD, FACS; and Carl Eugene Haisch, MD, FACS
East Carolina University: Brody School of Medicine, Greenville, NC

P-D-05

Challenges in Surgical Education

Advancing Congenital Cardiac Surgery Training: Overcoming Material Hurdles in Simulation Development

Francesco Bertelli; Alvise Guariento; Francesco Galliotto; Claudia Cattapan; Fabio Gaccione; and Vladimiro Vida
University of Padua, Padua, Italy

P-D-06

Research In-Progress

Towards the Continuous Learning Loop for Mastering Robotic Surgical Technical Skills

Tansel Halic, PhD; Aditya Reddy Ashammagari; I-Fan Shih; and Henry Lin, PhD
Intuitive Surgical, Sunnyvale, CA

P-D-07

Research Abstracts

S-SAM: SVD-based Fine-Tuning of Segment Anything Model for Medical Image Segmentation

Jay Nitin Paranjape; Shameema Sikder, MD, FACS; S. Swaroop Vedula, MBBS, PhD, MPH; and Vishal M. Patel
Johns Hopkins University, Baltimore, MD; Johns Hopkins University School of Medicine, Baltimore, MD

P-D-08

Black-Box Adaptation for Medical Image Segmentation

Jay Nitin Paranjape; Shameema Sikder, MD, FACS; S. Swaroop Vedula, MBBS, PhD, MPH; and Vishal M. Patel
Johns Hopkins University, Baltimore, MD; Johns Hopkins University School of Medicine, Baltimore, MD

P-D-09

Investigating the Impact of Extended Reality on the Robot-Assisted Surgery Training

Michael Scott Bickford; Fayez Alruwaili; Sara Ragab; and Mohammad H. Abedin-Nasab
Rowan-Virtua School of Osteopathic Medicine, Stratford, NJ; Rowan University, Glassboro, NJ

Group E

P-E-01

Research In-Progress

Personality-Driven Non-Verbal Communication in Surgical Teams: A Pilot Study of Robotic-Assisted Urology Cases

Jingkun Wang; Yuyuan Cao; Sohye Lee; Felicia Roberts; Marian Obuseh; Nicholas Anton; and Denny Yu
Purdue University, West Lafayette, IN

P-E-02

Research In-Progress

Developing Surgical Simulation using a Rainforest Design: Balancing Resource Investment with Educational Impact

Henry Lin, PhD; Aditya Reddy Ashammagari; Tansel Halic, PhD; and I-Fan Shih
Intuitive Surgical, Sunnyvale, CA

P-E-03

Research In-Progress

A Framework for Evaluating Surgical Simulation Performance

Aditya Reddy Ashammagari; I-Fan Shih; and Henry Lin, PhD
Intuitive Surgical, Sunnyvale, CA

P-E-04

Research Abstracts

Does Implicit Bias in Raters Affect their Assessment of Skill in Surgery Videos?

Divyasree Sasi Kumar; Nanthini Narayanan; S. Swaroop Vedula, MBBS, PhD, MPH; and Shameema Sikder, MD, FACS
Johns Hopkins University, Baltimore, MD

P-E-05

Research Abstracts

Correcting for Rater Effects in the Assessment of Operative Difficulty and Surgical Skill in the Operating Room

Ryan Chou; Hajira Naz, BDS; Kofi D. O. Boahene, MD; Jessica H. Maxwell, MD; John R. Wanamaker, MD; Patrick J Bryne, MD; Ira D. Papel, MD; Theda C. Kontis, MD; Gregory D. Hager, PhD; Lisa E. Ishii, MD; Sonya Malekzadeh, MD, Masaru Ishii, MD, PhD; and S. Swaroop Vedula, MBBS, PhD, MPH
Whiting School of Engineering, Johns Hopkins University, Baltimore, MD; Dugoni School of Dentistry, University of Pacific, San Francisco, CA; Johns Hopkins University School of Medicine, Baltimore, Baltimore, MD; MedStar Georgetown University Hospital, Washington, DC; Veterans Affair Medical Center, Washington, DC; Cleveland Clinic, OH, USA

P-E-06

Research Abstracts

Comparison of YOLOv5 and YOLOv8 in Detection and Classification of Needle and Needle Driver States in Suturing Training

Stevan Craig Fairburn
University of Alabama Birmingham, Birmingham, AL

P-E-07

Research In-Progress

Opportunity for Innovation: Prehospital Needle Decompression in Tension Pneumothorax Lacks Standardization, Accuracy, and has High Failure Rates

Jaden Thomas Aland, BS; Deeksha Sarda, BS; Rebecca Fabian, MD; Rebecca Lee, MD; and Nicole Tapia, MD
Texas A&M School of Engineering Medicine, Houston, TX; Houston Methodist Hospital, Houston, TX

P-E-08

Research Abstracts

Quantifying the Effect of Implicit Bias on Performance of Unbiased Deep Learning Models for Surgical Skill Assessment

Nanthini Narayanan, MSE; Divyasree Sasi Kumar, MSE; Vishal Patel, PhD; Shameema Sikder, MD, FACS; and S. Swaroop Vedula, MBBS, PhD, MPH
Johns Hopkins University, Baltimore, MD; Wilmer Eye Institute, Johns Hopkins University, Baltimore, MD; Malone Center for Engineering in Healthcare, Johns Hopkins University, Baltimore, MD

P-E-09

Challenges in Surgical Education

Standardization of Simulation and Feedback in Surgical Training and Education

Prithi L. Chakrapani
SUNY Upstate Medical University, Syracuse, NY

DO-IT-YOURSELF (DIY) COMPETITION ENTRIES

The aim of the Do-It-Yourself (DIY) Simulator/Model Competition is to promote the development of DIY simulators and models to improve simulation-based surgical education and training. The DIY theme reflects the strong spirit of innovation and drive for improving educational outcomes championed by the surgical simulation-based education community. The competition received great interest and will feature 18 DIY entrants demonstrating innovative and cost-effective surgical simulation solutions they have developed.

Dedicated time for the DIY Competition in the Surgeons and Engineers Meeting program will ensure that all attendees are able to explore the creative and impactful innovations from the community. A panel of expert judges will evaluate the entries, and the top three entries will be recognized. Additionally, we encourage all attendees to vote for their top DIY simulator/model for the notable Popular Vote Award.

DIY-A-01
Endoscopic Laryngeal Model
Caitlin Fiorillo, MD
University of Kentucky, Lexington, KY

DIY-A-02
Cricothyroidotomy Model
Meagan Rosenberg, MD
UMass Chan Medical School – Baystate, Springfield, MA

DIY-A-03
Abdominal Hemorrhage Simulator
Brandon Cowan, MD
University of California San Francisco, San Francisco, CA

DIY-A-04
Balloon Appendectomy Model
Carly Celebrezze, MD, MSc
Stanford University, Palo Alto, CA

DIY-A-05
ThoracoSim
Jehangir Diyani, MBBS, FCPS, FACS
Sindh Institute of Urology and Transplantation, Karachi, Pakistan

DIY-A-06
VR Cricothyrotomy Module
Sebastian Leon, MD
Penn Medicine, Department of Surgery, Philadelphia, PA

DIY-A-07
Open Spina Bifida Fetoscopic Repair Simulator
Jeremiah Egolf, BSBME
Boston Children's Hospital, Boston, MA

DIY-A-08
Hydrogel Phantom Transanal Surgical Simulator
Patricia Marcolin, MD
Beth Israel Deaconess Medical Center, Boston, MA

DIY-A-09
Low-cost Pediatric Laparoscopic Inguinal Hernia Repair Simulator
Sara Lee, MD
Boston Children's Hospital, Boston, MA

DIY-B-01
Inguinal Hernia Simulator
Layla Triplett, M.Ed
Duke University SEAL, Durham, NC

DIY-B-02
Kidney Transplant Anastomosis Simulator
Dennis Sonnier, MD
Ochsner Health, New Orleans, LA

DIY-B-03
"Do It Yourself" Sentinel Node Biopsy Simulator
Scott Lind, MD, FACS
Nova Southeastern University, Fort Lauderdale, FL

DIY-B-04
Priapism Simulator
Nicole Wise, MD
Lahey Medical Center, Burlington, MA

DIY-B-05
Open Surgery Tutor
Denesh Peramakumar
Queen's University, Kingston, Canada

DIY-B-06
Major Vessel Injury Simulation
Alison Fitzgerald, MD
Brigham and Women's Hospital, Boston, MA

DIY-B-07
DIY Laparoscopic Training Box – that will last!
Jeffrey Baum, MD
Mount Sinai South Nassau, Icahn School of Medicine at Mount Sinai, Oceanside, NY

DIY-B-08
Fundamentals of Microsurgery Skills Training Kit
Daniel Rzeppa, BSE
University of Michigan, Ann Arbor, MI

DIY-B-09
Insufflation Simulator
Jafar Hasan, MD, MBA, FACS
Cook County Health, Chicago, IL

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

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Professor of Haptics, Computer Science Department, University College London, London, United Kingdom

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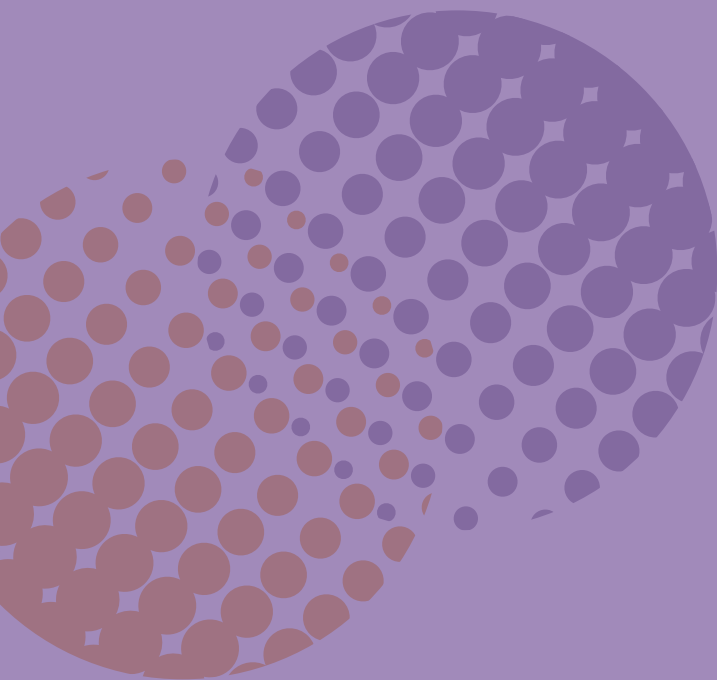
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Professor; Vice-Chair for Education; Assistant Designated Institutional Official;Director, UCLA-CASIT Accredited Education Institute, UCLA School of Medicine, Department of General Surgery, Los Angeles, CA

INDUSTRY RECOGNITION

Exhibitors

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Various levels of sponsorship opportunities are available.

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Meeting participants have asked for exhibitor involvement. Exhibitors are invited to participate in this meeting.

Please visit *facs.org/surg-eng* for more information about 2026 meeting opportunities.

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Call for Abstracts in May 2025
Registration will open late fall.

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2025 MEETING SURVEY

Thank you for attending
the 2025 ACS 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 the meeting's content and changes or additions that would be impactful in the future.

NAVIGATE TO
https://redcap.link/2025SurgEngFeedback

OR SCAN THE QR CODE
with your smartphone camera to access the survey

ACS / Education

American College of Surgeons

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.

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