17th Annual Plastic Surgery Research Day
Department of Plastic Surgery
University of Pittsburgh
Friday, June 26, 2020 (Virtual)

The overall goal of the Pitt Plastic Surgery Research Day is to discuss and educate the audience on new concepts and technologies in clinical and translational research in all areas of plastic surgery.

10:00 AM – 10:05 AM	**Introduction and Opening Remarks (J. Peter Rubin, MD; Kacey Marra, PhD; Jesse Goldstein, MD)**
10:05 AM – 10:35 AM	**Visiting Professor – Lecture I** *Developing Novel Therapeutics for Lymphedema* **Babak J. Mehrara, MD** Chief, Plastic and Reconstructive Surgical Service Peter G. Cordeiro Endowed Chair in Plastic and Reconstructive Surgery Memorial Sloan Kettering Cancer Institute Professor of Surgery, Weill Cornell Medical College
10:35 AM – 11:20 AM	**Session I – Clinical Research I Presentations (Jesse Goldstein, MD)**
11:20 AM – 11:56 PM	**Session II – Basic Science Research Presentations (Asim Ejaz, PhD)**
11:56 PM – 12:45 PM	**Lunch**
12:45 PM – 1:15 PM	**Visiting Professor – Lecture II** *Using a Continuous Improvement Strategy to Increase Enhanced Outcomes of Cancer Reconstruction Surgery* **Babak J. Mehrara, MD** Chief, Plastic and Reconstructive Surgical Service Peter G. Cordeiro Endowed Chair in Plastic and Reconstructive Surgery Memorial Sloan Kettering Cancer Institute Professor of Surgery, Weill Cornell Medical College
1:15 PM – 2:00 PM	**Session III – Clinical Research II Presentations (Carolyn De La Cruz, MD)**
2:00 PM – 2:50 PM	**Session IV – Education, Quality and Innovation Presentations (Kacey Marra, PhD)**
2:54 PM – 3:00 PM	**Concluding Remarks (J. Peter Rubin, MD; Kacey Marra, PhD; Jesse Goldstein, MD)**
3:00 PM – 3:30 PM	**Break**
3:30 PM – 4:30 PM	**Virtual Cocktail Hour and Award Presentations; Open Q & A**
4:30 PM	**Adjournment**

Course Directors:

Jesse A. Goldstein, MD
Associate Professor of Plastic Surgery
University of Pittsburgh, Pittsburgh, PA

Kacey G. Marra, PhD
Professor and Vice Chair of Research
Department of Plastic Surgery
Professor of Bioengineering
University of Pittsburgh, Pittsburgh, PA

Intended Audience:

The target audience for the meeting includes plastic surgeons in practice and in training, both private and academic, and members of the plastic surgery research community.

Learning Objectives:

At the conclusion of this activity, attendees should be able to:

- Demonstrate knowledge of current concepts in plastic and reconstructive surgery;
- Access clinical data that will have a direct impact on the everyday practice of plastic surgery,
- Integrate basic science research to assist in making better clinical and operative decisions; and
- Implement techniques in the areas of patient safety, clinical/surgical outcomes, and complications that will improve their performance and patient outcomes.

In support of improving patient care, the University of Pittsburgh is jointly accredited by the Accreditation Council for Continuing Medical Education (ACCME), the Accreditation Council for Pharmacy Education (ACPE), and the American Nurses Credentialing Center (ANCC), to provide continuing education for the healthcare team.

Physician (CME)

The University of Pittsburgh designates this live activity for a maximum of 5.0 *AMA PRA Category 1 Credits™.* Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Other health care professionals will receive a certificate of attendance confirming the number of contact hours commensurate with the extent of participation in this activity.

Link to website to register for CME:
https://cce.upmc.com/17th-annual-plastic-surgery-research-day

Sponsored by:

University of Pittsburgh School of Medicine Center for Continuing Education in the Health Sciences and the Department of Plastic Surgery

The information presented at this CME program represents the views and opinions of the individual presenters, and does not constitute the opinion or endorsement of, or promotion by, the UPMC Center for Continuing Education in the Health Sciences, UPMC / University of Pittsburgh Medical Center or Affiliates and University of Pittsburgh School of Medicine. Reasonable efforts have been taken intending for educational subject matter to be presented in a balanced, unbiased fashion and in compliance with regulatory requirements. However, each program attendee must always use his/her own personal and professional judgment when considering further application of this information, particularly as it may relate to patient diagnostic or treatment decisions including, without limitation, FDA-approved uses and any off-label uses.

Visiting Professor and Keynote Speaker

Babak J. Mehrara, MD
Chief, Plastic and Reconstructive Surgical Service
Peter G. Cordeiro Endowed Chair in Plastic and Reconstructive Surgery
Memorial Sloan Kettering Cancer Institute
Professor of Surgery, Weill Cornell Medical College

Babak J. Mehrara, MD, is the Chief of the Plastic and Reconstructive Surgery Service and the William G. Cahon Endowed Chair in the Department of Surgery at Memorial Sloan Kettering Cancer Center (MSK), with a joint appointment as Professor of Surgery at Weill Cornell Medical College. Dr. Mehrara is an oncologic reconstructive surgeon with a broad background in both the clinical management and the biology of cancer. He has authored more than 200 peer-reviewed publications and serves as the Director of the National Institutes of Health-funded Lymphatic Biology Laboratory at MSK.

University of Pittsburgh School of Medicine
Department of Plastic Surgery Faculty:

J. Peter Rubin, MD
Professor & Chair

Joseph E. Losee, MD
Professor & Executive Vice Chair

Kacey G. Marra, PhD
Professor & Vice Chair of Research

T. Oguz Acarturk, MD
Visiting Clinical Associate Professor

Devra B. Becker, MD
Associate Professor

Sydney R. Coleman, MD
Clinical Assistant Professor

Gregory M. Cooper, PhD
Associate Professor

Alexander J. Davit III, MD
Assistant Professor

Carolyn De La Cruz, MD
Assistant Professor

Asim Ejaz, PhD
Research Assistant Professor

James R. Gilbert, PhD
Research Assistant Professor

Michael L. Gimbel, MD
Associate Professor

Jesse A. Goldstein, MD
Associate Professor

Lorelei J. Grunwaldt, MD
Associate Professor

Jeffrey A. Gusenoff, MD
Professor

Lauren E. Kokai, PhD
Assistant Professor

Ernest K. Manders, MD
Emeritus Professor

Vu T. Nguyen, MD
Assistant Professor

James M. Russavage, DMD, MD
Clinical Assistant Professor

Lindsay A. Schuster, DMD, MS
Clinical Assistant Professor

Kenneth C. Shestak, MD
Emeritus Professor

Mario G. Solari, MD
Assistant Professor

Alexander M. Spiess, MD
Associate Professor

Guy M. Stofman, MD
Clinical Professor

Jignesh V. Unadkat, MD
Assistant Professor

Dawn J. Wang, MD
Assistant Professor

17th Annual Plastic Surgery Research Day **Department of Plastic Surgery** **University of Pittsburgh** **Friday, June 26, 2020**	
10:00 – 10:05 AM	**Introduction and Opening Remarks** **(J. Peter Rubin, MD; Kacey Marra, PhD; Jesse Goldstein, MD)**
10:05 – 10:35 AM	**Visiting Professor – Lecture I** *Developing Novel Therapeutics for Lymphedema* **Babak J. Mehrara, MD** Chief, Plastic and Reconstructive Surgical Service Peter G. Cordeiro Endowed Chair in Plastic and Reconstructive Surgery Memorial Sloan Kettering Cancer Institute Professor of Surgery, Weill Cornell Medical College
10:35 – 11:20 AM	**Session I – Clinical Research I Presentations (Jesse Goldstein, MD)**
10:35 – 10:40 AM	*Noninvasive Quantification of Skin Pigmentation after Light Based Therapy: A Pilot Study* **David Turer, MD, MS**; Isaac B. James, MD; Barry E. DiBernardo, MD
10:40 – 10:44 AM	Discussion led by Michael Hu, MD
10:44 – 10:49 AM	*Virtual 3D Reduction of Displaced Mandible Fractures: A Validation Study Comparing Surgical Reductions with Virtual Reductions* **Justin Beiriger, BSE**; Lucas Dvoracek, MD; Erin Anstadt, MD; Joseph Losee, MD; Jesse A. Goldstein, MD
10:49 – 10:53 AM	Discussion led by Xiao Zhu, MD
10:53 – 10:58 AM	*Optimizing Fat Graft Processing: A Prospective, Controlled Clinical Trial Comparing Telfa Rolling versus Centrifugation for Fat Grafting Craniofacial Deformities* **Isaac B. James, MD**; Debra A Bourne, MD; Danielle M. Minteer, PhD; M. Asher Schusterman, MD; Sheri Wang, BS; Jacqueline Bliley, MS; Albert Donnenberg, PhD; Vera Donnenberg, PhD; Barton Branstetter, MD; Gretchen L. Haas, PhD; Patsy Simon, RN, BS; Ernest Michael Meyer, BA; Kacey G. Marra, PhD; Sydney Coleman, MD; J. Peter Rubin, MD
10:58 – 11:02 AM	Discussion led by Francesco Egro, MBChB, MSc, MRCS
11:02 – 11:07 AM	*The Impact of Autologous versus Implant Based Breast Reconstruction on BMI in Breast Cancer Patients* **Eva Roy, BS**; Jennifer A. Hall, BS; Xiao Zhu, MD; Francesco Egro, MBChB, MSc, MRCS; Carolyn De La Cruz, MD
11:07 – 11:11 AM	Discussion led by M. Asher Schusterman, MD
11:11 – 11:16 AM	*Reverse Sural Artery Flap: Anatomic Study of Peroneal Perforators and Modifications for Coverage of Medial and Distal Foot Defects* **Xiao Zhu MD**; Guilherme Barreiro, MD, PhD
11:16 – 11:20 AM	Discussion led by Elizabeth A. Moroni, MD, MHA
11:20 – 11:56 AM	**Session II – Basic Science Research Presentations (Asim Ejaz, PhD)**

11:20 – 11:25 AM	*Allogeneic Adipose-Derived Stem Cells Mitigate Acute Radiation Syndrome* **Somaiah Chinnapaka, PhD**; Michael W. Epperly, PhD; Renee L. Fisher, BS; Joel S. Greenberger, MD; J. Peter Rubin, MD; Asim Ejaz, PhD
11:25 – 11:29 AM	Discussion led by Isaac B. James, MD
11:29 – 11:34 AM	*Reconstruction of Calvarial Wounds Complicated by Infection: Effect of Varying Doses of Bone Morphogenetic Protein 2* **Lucas A. Dvoracek, MD**; Kyle Parks, PhD; F. Paul Marji, MD; Saigopalakrishna Yerneni, PhD; Phil G. Campbell, PhD; Gregory M. Cooper, PhD; James R. Gilbert, PhD; Joseph E. Losee, MD
11:34 – 11:38 AM	Discussion led by Liliana Camison, MD
11:38 – 11:43 AM	*A Novel Polysaccharide Derivative to Enhance Wound Healing in MRSA-infected Porcine Partial-thickness Burn Wound Model* **Francesco M. Egro, MD, MSc, MRCS**; Asim Ejaz, PhD; Alexander Repko, BS; Deokyeol Kim, MD; M. Asher Schusterman, MD; Ali Ayyash, MD; Allister J. Loughran, PhD; Vidya Narayanaswamy, MS; Shenda Baker, PhD; Jenny A. Ziembicki, MD, FACS; Kacey G. Marra, PhD; J. Peter Rubin, MD
11:43 – 11:47 AM	Discussion led by Shawn Loder, MD
11:47 – 11:52 AM	*Improving Functional Outcomes After Peripheral Nerve Injury: Muscle vs. Nerve Treatment* **Jocelyn S. Baker**; Benjamin K. Schilling, MS; David M. Turer, MD, MS; Chiaki Komatsu, MD; Adam R. Cottrill, BS; J. Peter Rubin, MD; Mario G. Solari, MD; Kacey G. Marra, PhD
11:52 – 11:56 AM	Discussion led by Ian Chow, MD
11:56 – 12:45 PM	**Lunch: e-posters on rotation**
12:45 – 1:15 PM	**Visiting Professor – Lecture II** *Using a Continuous Improvement Strategy to Increase Enhanced Outcomes of Cancer Reconstruction Surgery* **Babak J. Mehrara, MD** Chief, Plastic and Reconstructive Surgical Service Peter G. Cordeiro Endowed Chair in Plastic and Reconstructive Surgery Memorial Sloan Kettering Cancer Institute Professor of Surgery, Weill Cornell Medical College
1:15 – 2:00 PM	**Session III – Clinical Research II Presentations (Carolyn De La Cruz, MD)**
1:15 – 1:20 PM	*Optimizing Carpometacarpal Arthroplasty of the Thumb: A Prospective Clinical Trial Comparing Suture Suspension to Ligament Reconstruction and Tendon Interposition* **Ian Chow, MD;** Debra A. Bourne, MD; Dann Laudermilch, MD; Benjamin K. Schilling, MS; Wesley Sivak, PhD, MD; William Hagberg, MD; Marshall Balk, MD; Glenn Buterbaugh, MD; Joseph Imbriglia, MD; John Fowler, MD
1:20 – 1:24 PM	Discussion led by Justine Kim, MD
1:24 – 1:29 PM	*Autologous Fat Grafting as Primary Breast Reconstruction After Mastectomy Effects on Longitudinal BMI* **Jennifer A. Hall, BS**; Eva Roy, BS; Xiao Zhu, MD; Francesco M. Egro, MBChB, MSc, MRCS; Walter J. Joseph, MD; Carolyn De La Cruz, MD
1:29 – 1:33 PM	Discussion led by Mehmet Uluer, MD
1:33 – 1:38 PM	*Management of the Amputated Finger: Revision Rates and Predictors of Success* **Justine S. Kim, MD**; Shawn J. Loder, MD; Elizabeth A. Moroni, MD, MHA; Alexander M. Spiess, MD

1:38 – 1:42 PM	Discussion led by Samantha Maliha, MD
1:42 – 1:47 PM	*Racial Disparities in Early Evaluation in Management of Patients with Non-Syndromic Craniosynostosis* **Casey Tompkins-Rhoades, BS**; Erin Anstadt, MD; F. P. Marji, MD; Jesse A. Goldstein, MD
1:47 – 1:51 PM	Discussion led by Brodie Parent, MD
1:51 – 1:56 PM	*Pediatric Hand Trauma in Under-served Populations: A Cohort Study* **Brodie Parent, MD, MS**; Chelsey Johnson, MD; Erin Anstadt, MD; Jennifer Fantuzzo, BS; James Fisher, MD, PhD; John Fowler, MD; Alexander Davit, MD
1:56 – 2:00 PM	Discussion led by Josh David, MD
2:00 – 2:54 PM	**Session IV – Education, Quality and Innovation Presentations (Kacey Marra, PhD)**
2:00 – 2:05 PM	*Individual Biocontainment Unit for Protecting Healthcare Workers from Aerosolized Pathogens like COVID-19* **Benjamin K. Schilling, MS**; David M. Turer, MD, MS; Cameron H. Good, PhD; Heng Ban, PhD; Jason S. Chang, MD; J. Peter Rubin, MD
2:05 – 2:09 PM	Discussion led by Angela Prescott, MD
2:09 – 2:14 PM	*A Pathway to Leadership: Evaluation of Training Institutions on Developing Plastic Surgery Leadership* Francesco M. Egro, MBChB, MSc, MRCS; Carolyn P. Murphy, BA; **Brandon T. Smith, MS**; Eva Roy, BS; Alexander G. Stavros, BS; Joseph E. Losee, MD; Vu T. Nguyen, MD
2:14 – 2:18 PM	Discussion led by Walter Joseph, MD
2:18 – 2:23 PM	*Push-to-Spin Syringe (P2S™): A New Device for Autologous Fat Grafting* Xiaonan Yang, MD, PhD; **Jonathan P. Brower, MD**; Lauren E. Kokai, PhD; Beth R. Gusenoff, DPM; Jeffrey A. Gusenoff, MD
2:23 – 2:27 PM	Discussion led by David Turer, MD, MS
2:27 – 2:32 PM	*The Utility of Formal Breast & Hand Simulation and Ultrasound Courses in Plastic Surgery Education - One Institution's Experience* **Joanna Ng-Glazier, MD**; Jeffrey A. Gusenoff, MD
2:32 – 2:36 PM	Discussion led by Wendy Chen, MD
2:36 – 2:41 PM	*Teaching the Furlow Palatoplasty: A Randomized, Controlled Trial Comparing Traditional Didactics to a Low-Fidelity Model* **Erin Anstadt, MD**; Eva Roy, BS; Pooja Humar, BS; Lisa Block, MD; Jesse A. Goldstein, MD
2:41 – 2:45 PM	Discussion led by Lucas Dvoracek, MD
2:45 – 2:50 PM	*ACAPS Plastic Surgery Boot Camp: The Fifth Year Experience* **Angela Prescott, MD**; Vu T. Nguyen, MD
2:50 – 2:54 PM	Discussion led by Joanna Ng-Glazier, MD
2:54 – 3:00 PM	**Concluding Remarks (J. Peter Rubin, MD; Kacey Marra, PhD; Jesse Goldstein, MD)**
3:00 – 3:30 PM	**Break**
3:30 – 4:30 PM	**Virtual Cocktail Reception and Award Presentations; Open Q & A with Dr. Mehrara**
4:30 PM	**Adjournment**

Description of Awards (To be announced during Cocktail Reception)

Best clinical presentation
Awarded to the best oral presentation of a clinical abstract based on the assessment made by the Visiting Professor. Selection criteria include innovation, quality of approach, application to practice, and quality of presentation.

Best basic science presentation
Awarded to the best oral presentation of a basic science abstract based on the assessment made by the Visiting Professor. Selection criteria include innovation, quality of approach, application to practice, and quality of presentation.

Best innovation/education presentation
Awarded to the best oral presentation of an innovation/education abstract based on the assessment made by the Visiting Professor. Selection criteria include innovation, quality of approach, application to practice, and quality of presentation.

Best E-Poster
Awarded to the best e-poster presentation during the lunch abstract section based on the assessment made by the Visiting Professor. Selection criteria include innovation, quality of approach, application to practice, and quality of presentation.

Best discussant
Awarded to the best resident discussant during the 4 abstract sessions based on the assessment made by the Visiting Professor. Selection criteria include the discussant's summation of relevance and applicability of the abstract, and ability to lead discussion.

Best question from audience (via Zoom chat)
Awarded to the best resident/trainee question during the 4 abstract sessions based on the assessment made by the Visiting Professor. Selection criteria include the discussant's summation of relevance and applicability, and ability to lead discussion.

People's Choice Award
Awarded to the best abstract during the 4 abstract sessions based on the assessment made by the meeting participants. A SurveyMonkey Link at the end of the day during concluding remarks from which to register votes.

Best Zoom background
Awarded to the meeting participant, whether or not they are presenting, with the best Zoom background as judged by the four session moderators. In order to be judged, the winner must participate during the meeting so that their background is visible to the moderators.

Random raffles (x 2)
Twice during the conference proceedings, a random drawing will be held to select a name among the participants. The selected participant must be present for the drawing in order to win.

List of e-Poster Presentations (in order of display, presenter is underlined)

1. **Interaction of Articular Chondrocytes with Adipose-Derived Stem Cells: An In-vitro Co-culture Model for Knee Osteoarthritis Regeneration.** Joseph Chen[1], Lauren Kokai[2], Francesco M. Egro[2], Asim Ejaz[2], Kentaro Onishi[3,4], Mark Sakr[4], Nam Vo[4], Peter Rubin[2], Gwendolyn Sowa[3]; University of Pittsburgh School of Medicine[1], Department of Plastic Surgery[2], Department of Physical Medicine and Rehabilitation[3], Department of Orthopaedic Surgery,[4] Pittsburgh, PA

2. **Functional impact of ex vivo culture expansion of adipose stem cells.** Feng Qin[1], Benjamin Schilling[2], Alexander Stavros[3], Sarah Seman[4,5], Lauren Kokai;[6,7] Department of Plastic Surgery, Peking Union Medical College Hospital, Beijing, China[1], Department of Bioengineering, School of Engineering, University of Pittsburgh[2], University of Pittsburgh School of Medicine,[3] Department of Science and Mathematics[4] and the School of Engineering and Computer Science, Cedarville University, Cedarville, OH[5], Department of Plastic Surgery, University of Pittsburgh, Pittsburgh, PA[6] , McGowan Institute for Regenerative Medicine[7], Pittsburgh, PA

3. **Influence of Residency Training on Research Productivity and Academic Plastic Surgery Career.** Eva Roy, BS Francesco M. Egro, MBChB MSc MRCS; Adrian Zalewski, BS; Brandon T. Smith, MS; Joseph E. Losee, MD; Vu T. Nguyen, MD; Department of Plastic Surgery, University of Pittsburgh Medical Center, Pittsburgh, PA

4. **The Value of a Social Wellness Committee in Plastic Surgery Residency**. Joshua David, MD; Stephanie E. Farber, MD; Walter J. Joseph, MD; Elizabeth Moroni, MD; Joanna H. Ng-Glazier, MD; Joseph E. Losee, MD; Vu T. Nguyen, MD; Department of Plastic Surgery, University of Pittsburgh Medical Center, Pittsburgh, PA

5. **Interest and Trends in Diversity Amongst Surgical Specialties: How Does Plastic Surgery Compare?** Meera Reghunathan, MD; Jessica Blum, MD; Amanda A. Gosman, MD; Paris Butler, MD, MPH; Wendy Chen, MD, MS; Department of Plastic Surgery, University of Pittsburgh Medical Center, Pittsburgh, PA

6. **A Single Surgeon's 7 Year Experience with Abdominal Wall Reconstruction: A Retrospective Cohort Study.** Abraham A. Williams, BS; Jonathan P. Brower, MD; Jeffrey A. Gusenoff, MD, Department of Plastic Surgery, University of Pittsburgh School of Medicine, Pittsburgh, PA

7. **Neurotized Abdominal Based Free Flap Breast Reconstruction with Microsurgical Lymph Node Transfer: A Case Report and Review of Literature.** Madeleine Bruce, BA;[1] Wendy Chen, MD;[2] Shannon Masterson, PA;[3] Daniel Murariu, MD, MPH;[2,3] Drexel University College of Medicine[1], Philadelphia, PA, University of Pittsburgh Medical Center, Department of Plastic Surgery,[2] Pittsburgh, PA, Allegheny Health Network, Division of Plastic Surgery,[3] Pittsburgh, PA

8. **Impact of International Medical Graduates in Academic Plastic Surgery.** Francesco M. Egro, MD, MSc, MRCS;[1] Julia Lai;, Nallammai Muthiah;[1] Brandon Smith;[1] Edward H. Davidson, MD;[2] Vu T. Nguyen, MD;[1] Department of Plastic Surgery, University of Pittsburgh School of Medicine,[1]

Pittsburgh, PA, Department of Plastic and Reconstructive Surgery, Case Western Reserve University,[2] Cleveland, OH

9. **Quantifying the Pipeline of Ethnically Under-Represented in Medicine (UIM) Physicians in Academic Plastic Surgery Leadership.** Phoebe L. Lee, BS;[1] Wendy Chen, MD;[2] Jennifer A. Hall, BS;[2,3] Kovid Bhayana, BS;[4,5] Elizabeth A Moroni, MD, MHA;[2] Paris Butler, MD, MPH;[6] Carolyn Delacruz, MD;[2] University of Pittsburgh School of Medicine, [1] Department of Plastic Surgery, University of Pittsburgh, [2]Geisinger Commonwealth School of Medicine, [4]Howard University College of Medicine, [5]Howard University School of Business, [6]University of Pennsylvania, Division of Plastic Surgery, Philadelphia, PA

10. **Split-Thickness Skin Graft Meshing: The True Mesh Ratio.** Francesco M. Egro, MBChB, MSc, MRCS; Eva Roy, BS; Anisha Konanur, BS; Carolyn P. Murphy, BA; Garth A. Elias, MD; Alain C. Corcos, MD; Jenny A. Ziembiecki, MD; University of Pittsburgh Medical Center Mercy Burn Center, Pittsburgh, PA

11. **Transgender Top Surgery in Adolescents and Young Adults.** Sarah P. Erpenbeck; BS, Francesco M. Egro, MBChB, MSc, MRCS; Elizabeth A. Moroni, MD, MHA; Brandon T. Smith, MS; Lorelei J. Grunwaldt, MD, FACS, FAAP; University of Pittsburgh Department of Plastic Surgery, Pittsburgh, PA

12. **Rethinking cranial spring selection: A critical analysis of cranial spring biomechanics.** Sanya Yadav, BS;[1] Erin Anstadt, MD;[2] Lisa Block, MD;[2] Jesse Goldstein, MD;[2] [1]University of Pittsburgh School of Medicine, [2]Department of Plastic Surgery, Children's Hospital of Pittsburgh, UPMC, Pittsburgh, PA

13. **Racial and Ethnic Disparities Among Burn Surgery Leadership.** Caroline Kettering, BS; Francesco Egro, MBChB, MSc, MRCS; Anisha Konunar, BS; Brandon Smith, MS; Guy Stofman, MD FACS; Alain Corcos, MD FACS; Jenny Ziembicki, MA FACS; University of Pittsburgh Medical Center Mercy Burn Center, Pittsburgh, PA

14. **Prenatal Diagnosis of Pierre Robin Sequence (PRS)**. Raeesa Islam, BS; Jesse Goldstein, MD; Department of Plastic Surgery, University of Pittsburgh School of Medicine, Pittsburgh, PA

15. **Fat Grafting for the Dysesthetic Digit: A Discussion of Technique and Pilot Data.** Shawn J. Loder MD, Elizabeth A. Moroni MD MHA, Justine S. Kim MD, Alexander M. Spiess MD; Department of Plastic Surgery, University of Pittsburgh School of Medicine, Pittsburgh, PA

16. **Publication disparity in breast-cancer related lymphedema compared to lymphedema secondary to other causes: A review of current literature.** Elizabeth A Moroni, MD, MHA; Carolyn de la Cruz, MD; Department of Plastic Surgery, University of Pittsburgh Medical Center, Pittsburgh, PA

17. **Requirements for Vascularized Bone Marrow Protection of Vascularized Composite Allografts in Nonhuman Primates.** Mehmet C. Uluer, MD; Nicole Shockcor, MD; Ali Khalifeh, MD;

Jhade Woodall, MD; Philip Brazio, MD; Cynthia Drachenberg, MD; Arthur Nam, MD; Stephen T. Bartlett, MD; Rolf N. Barth, MD; Department of Surgery, University of Maryland School of Medicine, Baltimore, MD

18. **Resident Wellness: Development of Muskuloskeletal Symptoms in Residency.** Chelsey Johnson, MD; Jordan Fishman, MD; Carolyn De La Cruz, MD; Department of Plastic Surgery, University of Pittsburgh School of Medicine, Pittsburgh, PA

19. **The Satisfaction with Appearance in Patients with Cleft Lip and Palate: Patient-Reported Outcomes Using the Validated CLEFT-Q Survey.** Liliana Camison, MD; Michelle Zhang, BS; Joseph E. Losee, MD; Karen Wong, MD; Anne F. Klassen, PhD; Jesse A. Goldstein, MD; Department of Plastic Surgery, University of Pittsburgh School of Medicine, Pittsburgh, PA

Oral Presentation Abstracts (Poster Abstracts available upon request)

Abstracts – Oral Presentations	
10:35 – 11:20 AM	**Session I – Clinical Research I Presentations**
10:35 – 10:40 AM	*Noninvasive Quantification of Skin Pigmentation after Light Based Therapy: A Pilot Study* **David Turer, MD, MS**; Isaac B. James, MD; Barry E. DiBernardo, MD Discussion led by Michael Hu, MD *Background* Light-based therapies (including laser and intense pulsed light) are a mainstay in the treatment of dyspigmentation. The gold standard for quantifying pigmentation is biopsy, which is invasive and limits the number of subjects. Most noninvasive methods of quantifying pigmentation are either cumbersome or are based on skin color measurement and suffer from a lack of repeatability. These limitations drive most investigators to use subjective assessment as the primary method to quantify treatments of dyspigmentation. In this study, we present a new method of quantifying pigmentation using artificial intelligence assisted noninvasive imaging. *Methods* Subjects underwent treatment for dyspigmentation with BroadBand Light (BBL). Pre and post procedure imaging was performed with the Canfield IntelliStudio and Vectra XT systems. Specifically, high resolution cross-polarized images were captured using the IntelliStudio to allow for quantification of pigmentation. During the procedure, the treated areas were marked, and 3D images were obtained using the Vectra XT to measure the treated surface area. Pigmented lesions were then automatically identified from the pre-treatment RBX transformed red and brown images, and their area and pigment levels were quantified. A correspondence algorithm then automatically identified the treated lesion areas from the post-treatment images to quantify improvement in pigmentation. Reduction in visible, brown, and red spot number and area were then calculated. Using the calculated surface area, energy delivered per unit area could then be calculated. *Results* Nine female subjects underwent treatment with BBL. All but one had treatment of the chest. One patient had treatment of the bilateral anterior thighs. Visible spot size and area were reduced by 42.8±25.1% and 46.1±24.0% respectively. Brown spot size and area were reduced by 10.5±28%

	and 9.1±35% respectively. Red spot size and area were reduced by 8.6±12.3 and 2.5±20.2% respectively. Average energy delivered per unit area for the 515nm and 560nm filters were 10.6±2.6 J/cm^2 and 10.4±3.6 J/cm^2. There were no adverse events during the study. *Conclusion* This study demonstrates the feasibility of quantify improvement in dyspigmentation using artificial intelligence based algorithms. In future studies, we hope to compare the results of this algorithm to blinded human raters. Additionally, this technique could be used to precisely fine-tune treatment settings, leading to improved outcomes and patient safety.
10:44 – 10:49 AM	*Virtual 3D Reduction of Displaced Mandible Fractures: A Validation Study Comparing Surgical Reductions with Virtual Reductions* **Justin Beiriger, BSE**; Lucas Dvoracek, MD; Erin Anstadt, MD; Joseph Losee, MD; Jesse A. Goldstein, MD Discussion led by Xiao Zhu, MD *Background* Successful open reduction and internal fixation (ORIF) of displaced mandible fractures requires maximally aligning the bony fragments to restore occlusion while maintaining centric relation. This process, performed manually in the operating room, leaves room for error such as inadequate reduction and requires time while fixation plates are intraoperatively contoured. Virtual computer-based reduction of 3D reconstructed mandible fragments and 3D printed models offers a paradigm-shifting approach to these problems by enabling plate contouring preoperatively which may guide optimal reduction. The purpose of this study was to assess the feasibility and characteristics of virtual mandible fracture reduction compared to surgical reduction. *Methods* Pediatric patients with displaced, noncomminuted mandible fractures who underwent ORIF and had both a pre-operative and post- operative CT scan were included. At our institution, ORIF patients are routinely evaluated with a post-operative CT scan. 3D meshes of the mandible were segmented from pre-operative and post-operative CT scans and virtual reduction of the fracture fragments was performed. Next, the virtually reduced and surgically reduced mandibles were optimally overlayed with evaluation of qualitative and quantitative differences. *Results* Ten patients matched inclusion criteria (8:2 male:female, mean age 14 years). Fracture types included parasymphyseal (80%), angle (20%), body (10%), ramus (10%), condylar (30%) and number of major fragments was two (80%) or three (20%). All underwent ORIF with or without mandibulomaxillary fixation (MMF). All comparisons demonstrated extremely similar configuration of the virtually reduced mandibles to the surgically reduced mandibles. The range of the distance between any two paired surface vertices was 0.28 to 0.94mm. The root mean square for the average distance difference was 0.61mm (0.42-0.79, 95% CI). *Conclusion* Virtual mandible reduction is not only technically feasible but can yield mandibular models which are remarkably similar to surgically reduced mandibles, with the advantage of being able to manipulate the fragments freely, maximizing contact and alignment. Furthermore, virtual reduction allows for improved condylar position, possibly resulting in lower rates of long-term TMJ pathology. Models based on this technique may enable precontouring fixation plates which may guide intraoperative reduction and decrease operative time.

10:53 – 10:58 AM	*Optimizing Fat Graft Processing: A Prospective, Controlled Clinical Trial Comparing Telfa Rolling versus Centrifugation for Fat Grafting Craniofacial Deformities* **Isaac B. James, MD**; Debra A Bourne, MD; Danielle M. Minteer, PhD; M. Asher Schusterman, MD; Sheri Wang, BS; Jacqueline Bliley, MS; Albert Donnenberg, PhD; Vera Donnenberg, PhD; Barton Branstetter, MD; Gretchen L. Haas, PhD; Patsy Simon, RN, BS; Ernest Michael Meyer, BA; Kacey G. Marra, PhD; Sydney Coleman, MD; J. Peter Rubin, MD Discussion led by Francesco Egro, MBChB, MSc, MRCS *Background* Fat grafting is a versatile and powerful tool for soft tissue reconstruction. However, its utility remains tempered by variable retention. The aim of this prospective, controlled clinical trial is to compare two commonly used small-volume fat graft processing techniques (Telfa rolling and centrifugation). *Methods* Twenty-nine patients underwent fat grafting procedures to treat craniofacial deformities. Lipoaspirate was processed by either centrifugation (n=19) or Telfa rolling (n=10). Patients were followed for nine months. Volume retention was assessed by 3D CT and by subjective assessment. The cellular composition of stromal vascular fraction (SVF) was measured by flow cytometry. Patient reported outcome measures were also collected. *Results* Average age was 40 (SD 14). Average BMI was 27.5 (SD 6.1) and was stable throughout the study. Sixty-three percent of participants were male. Average volume injected was 26.1cc and 22.2cc in centrifugation and Telfa groups, respectively. Average volume retention was similar between groups at nine months (63.2% vs 64.2% in centrifugation and Telfa groups, respectively; p=0.89). However, the centrifugation group had a higher proportion of CD34+ adipose stem cells (ASCs) in SVF isolates (81.7% vs 56.5%; p=0.036). Subjective volume assessments and patient-reported outcomes were similar between the groups at nine months. *Conclusion* Fat grafts processed by either method resulted in significant improvement in facial appearance with no major complications and with high patient satisfaction. Processing method did not impact nine-month volume retention. Centrifugation may create grafts with a higher proportion of CD34+ ASCs. Whether this difference has implications for regenerative rather than volume-focused applications remains to be determined.
11:02 – 11:07 AM	*The Impact of Autologous versus Implant Based Breast Reconstruction on BMI in Breast Cancer Patients* **Eva Roy, BS**; Jennifer A. Hall, BS; Xiao Zhu, MD; Francesco Egro, MBChB, MSc, MRCS; Carolyn De La Cruz, MD Discussion led by M. Asher Schusterman, MD *Background* Weight gain is a common occurrence among breast cancer patients. Previous studies have shown an increase in weight is correlated with a greater risk of recurrence. Treatment options such as chemotherapy have been shown to increase weight. However, the impact of autologous breast reconstruction versus implant-based reconstruction on longitudinal BMI has not previously been analyzed. *Methods* This was a single-center retrospective review of 725 patients who received breast reconstruction following mastectomy by a single surgeon between 2008-2017. Patients

	were categorized by autologous versus implant-based reconstruction versus autologous plus implant (latissimus flap + implant). Follow-up data were reviewed for BMI, and weight at diagnosis, and each year up to 10 years post- op. Other variables such as medical comorbidities, cancer pathology, chemotherapy, radiation, and hormone therapy were also noted. Statistical analysis was performed to determine the effects of different types of breast reconstruction on change in BMI overtime. Further subgroup analysis was performed based on WHO BMI classification. *Results* For autologous reconstruction, the average percent BMI change from diagnosis BMI at 6 months,1 year, 2 years, 3 years, 4 years, 5 years, and 10 years were found to be 0.55%, 1.69%, 2.61%, 2.85%, 3.36%, 4.30%, and 5.07%, respectively. For implant-based reconstruction, the average percent BMI change from diagnosis BMI at 6 months,1 year, 2 years, 3 years, 4 years, 5 years, and 10 years were found to be 1.39%, 2.03%, 3.27%. 3.46%, 3.21%, 4.08%, and 7.81%. For autologous plus implant based reconstruction, the average percent BMI change from diagnosis BMI at 6 months,1 year, 2 years, 3 years, 4 years, 5 years, and 10 years were found to be 0.23%, 1.75%, 3.00%, 2.59%, 2.22%, 4.63%, and 3.71%, respectively. Among all three groups at every time interval, there was no statistical significance for percent BMI change or weight change. Further analysis within groups, showed that implant and autologous reconstruction trend toward increasing BMI over ten years ($p<0.001$), whereas the latissimus dorsi flap reconstruction with an implant group showed no significant trend. *Conclusion* All groups trended on weight gain over time and BMI over time which can increase the patient's risk of breast cancer recurrence. There was no significant difference at subsequent years for both percent BMI change and weight change when comparing autologous, implant, and autologous with implant based breast reconstruction. Patients should be counselled that breast reconstruction is associated with long-term weight gain, but is not dependent on type of breast reconstruction.
11:11 – 11:16 AM	*Reverse Sural Artery Flap: Anatomic Study of Peroneal Perforators and Modifications for Coverage of Medial and Distal Foot Defects* **Xiao Zhu MD**; Guilherme Barreiro, MD, PhD Discussion led by Elizabeth A. Moroni, MD, MHA *Background* The Reverse Sural Artery Flap (RSAF) is a powerful local flap option for coverage of ankle, heel, and foot defects. We describe in detail peroneal perforator distribution in cadaveric lower extremities, and our clinical experience with four novel modifications (perforator skeletonization, Achilles tendon release, tunneling under the Achilles tendon, proximal peroneal artery ligation) to allow greater reach for the RSAF, especially for medial and distal forefoot defects. *Methods* 38 cadaveric lower extremities were dissected to identify peroneal perforators along the length of the fibula. Details regarding fibula length, total number of perforators, and perforator location/diameter/length were obtained for every leg. 12 patients between the ages of 5-73 years-old underwent the RSAF and the described modifications for a variety of defects, including those along the medial distal forefoot. Patient demographics, cause and location of defect, flap dimensions, perforator location/length, pivot point, modifications, and complications were reported. *Results* There were on average 3.63 ± 1.04 perforators per cadaveric leg. The cadaveric terminal

	perforator was found a mean distance of 10.96 ± 3.67 cm above the lateral malleolus, with an average perforator length of 4.10 ± 3.42 cm. Only 2.8% of all perforators and 10.6% of terminal perforators were found within the last 20% of the fibular length (6.76 cm from the lateral malleolus). The majority (70.1%) of terminal perforators were found between 6.76-13.52 cm. These results were comparable to those found in our clinical series, where the terminal perforator in adults was identified on average 9.31 ± 1.80cm from the lateral malleolus, and average perforator length was 3.53 ± 0.56 cm. However, the pivot point was invariably lower at a mean distance of 6.67 ± 1.59 cm from the lateral malleolus owing to improved perforator/pedicle mobility provided by the described modifications. Of the 12 patients that underwent RSAF, all received perforator skeletonization and Achilles tendon release. Four were tunneled under the Achilles tendon for medial foot defects, and one received proximal peroneal artery ligation for further reach. Two had subsequent <10% distal tip necrosis and one with 50% superficial epidermolysis, all of which healed with local wound care. *Conclusion* This study highlights the effectiveness of four novel modifications to the RSAF: perforator skeletonization, Achilles tendon release, tunneling under the Achilles tendon, and proximal peroneal artery ligation. Furthermore, anatomic studies demonstrate that the terminal peroneal perforator may lie significantly higher than the recommended 5 cm pivot point above the lateral malleolus, making these modifications crucial in some cases. While may other modifications to the RSAF exist, very few document methods to safely increase reach of the RSAF. With proper technique and careful preservation of the perforator and pedicle, these four modifications can allow the RSAP to cover defects along the medial and distal forefoot, making the RSAF an even more versatile local reconstructive option for distal lower limb defects.
11:20 – 11:56 AM	**Session II – Basic Science Research Presentations**
11:20 – 11:25 AM	*Allogeneic Adipose-Derived Stem Cells Mitigate Acute Radiation Syndrome* **Somaiah Chinnapaka, PhD**; Michael W. Epperly, PhD; Renee L. Fisher, BS; Joel S. Greenberger, MD; J. Peter Rubin, MD; Asim Ejaz, PhD Discussion led by Isaac B. James, MD *Background* Acute radiation syndrome (ARS) is the radiation toxicity which damage hematopoietic, gastrointestinal, and nervous system having life- threatening consequences. ARS can be caused as a result of accidents such as nuclear explosions, terrorist attacks, and industrial/medical accidents. Current therapy approaches are mainly hematopoietic stem cell transplantation, granulocyte-macrophage colony-stimulating factor (GM-CSF) and granulocyte stimulating factor (G-CSF) having either a limited application for mass application or insufficient efficacy. There is an urgent need to add effective therapies to the national stockpile, which can be applied to the mass population with minimal supervision. Adipose-derived stem cells (ASCs) have a very potential immunomodulatory and regenerative properties, which are mainly due to a plethora of secretory factors released by these cells. Based on the regenerative properties of ASCs, we hypothesized that allogeneic ASCs could be a potential candidate for the mitigation of ARS, and due to ease of harvesting and propagation in cell culture can be produced at large scale for the national stockpile. *Methods* To test our hypothesis, we used 9.25 Gy total body irradiated (TBI) C57BL/6 mice for the ARS model and studied the effect of allogeneic FVB ASCs on the survival of TBI mice. Next, we determined the fate of the transplanted ASCs and tracked intraperitoneally injected GFP-positive transplanted ASCs in C57BL/6 host bone marrow. We performed invitro transwell studies to analyze the migration of ASCs towards irradiated bone marrow in a more

	controlled setting. Additionally, the ability of ASCs to rescue irradiation damaged bone marrow cells was analyzed by transwell and contact culture. To delineate the mitigation mechanism, Luminex analysis was performed to identify the pro-survival and hematopoietic factors released by ASCs upon interaction with irradiated bone marrow. *Results* Our results demonstrate that a single dose of 5×106 allogeneic ASCs mitigate TBI induced ARS. The mitigation efficiency of allogenic ASCs was comparable to autologous ASCs. Intraperitoneally injected migrated to irradiated bone marrow. Transwell migration experiment confirmed the strong migration capability of ASCs toward irradiated cells. Our transwell coculture results revealed that ASCs coculture improved the survival of irradiated cells. The survival of irradiated cells was positively correlated to the number of ASCs migrating across the transwell membranes. Moreover, contact coculture of ASCs improved the survival and hematopoiesis of irradiated bone marrow in vitro. Investigating the mechanism of mitigation, Luminex results showed that FVB ASCs triggered by irradiated bone marrow secretes significantly higher quantities of cytokines such as GM-CSF, MIP1α, MIP1β, LIX, KC,1P-10, Rantes, IL-17, MCSF, TNFα, Eotaxin, and IP-10 involved in the pro-survival, proliferation and maintenance of hematopoietic stem and progenitor cells. *Conclusion* Our findings suggest that allogeneic ASC therapy is as effective as autologous ASC therapy to mitigate ARS. Further studies to optimize the time and dose of the therapy will be a big step forward to add this universally applicable ARS mitigator to national stockpile
11:29 – 11:34 AM	*Reconstruction of Calvarial Wounds Complicated by Infection: Effect of Varying Doses of Bone Morphogenetic Protein 2* **Lucas A. Dvoracek, MD**; Kyle Parks, PhD; F. Paul Marji, MD; Saigopalakrishna Yerneni, PhD; Phil G. Campbell, PhD; Gregory M. Cooper, PhD; James R. Gilbert, PhD; Joseph E. Losee, MD Discussion led by Liliana Camison, MD *Background* Calvarial defects complicated by infection and scarring are a reconstructive challenge. BMP-2 bioprinted on acellular dermal matrix (ADM) has shown promise in stimulating osseous regeneration in these calvarial defects in rabbits. The optimal dose has yet to be determined. *Methods* Thirty New Zealand white rabbits underwent subtotal calvariectomy wherein a 15mm x 15mm flap of bone was excised and incubated in a planktonic solution of S. aureus before reimplantation. After subsequent infection the flap was removed and the surgical wound debrided, followed by antibiotic treatment. On postoperative week 6, the scarred calvarial defects were treated with acellular dermal matrix bioprinted with 11ug, 55ug, or 110ug of BMP-2. Bone regeneration was analyzed with serial CT at days 1 and 21 and 2, 4, and 6 months. *Results* All groups demonstrated progressive healing of the defects during the follow-up period. One-way ANOVA showed no difference among groups at any time points. The 110ug group trended toward more healing than other doses, with 82% (±5.8% S.E.) bone regeneration, compared to 60% (±9.1%) and 67% (±15.4%) healing in the 11ug and 55ug groups. No formation of heterotopic bone was noted in animals treated with higher doses. *Conclusion* Higher doses of BMP-2 biopatterned ADM led to greater amounts of healing, while still requiring orders of magnitude less than the doses administered in commercially available

	clinical products. An off-the-shelf implantable product based on this technique may be an alternative to existing methods for stimulating bony regeneration in scarred calvarial defects.
11:38 – 11:43 AM	*A Novel Polysaccharide Derivative to Enhance Wound Healing in MRSA-infected Porcine Partial-thickness Burn Wound Model* **Francesco M. Egro, MD, MSc, MRCS**; Asim Ejaz, PhD; Alexander Repko, BS; Deokyeol Kim, MD; M. Asher Schusterman, MD; Ali Ayyash, MD; Allister J. Loughran, PhD; Vidya Narayanaswamy, MS; Shenda Baker, PhD; Jenny A. Ziembicki, MD, FACS; Kacey G. Marra, PhD; J. Peter Rubin, MD Discussion led by Shawn Loder, MD *Background* Methicillin-resistant Staphylococcus aureus (MRSA) is the most common etiology of wound infection in the US, leading to considerable morbidity and mortality. SYN01 is a non-toxic, polycationic polysaccharide which disrupts biofilms and prevents bacterial colonization in vitro. It is low cost, stable at room-temperature, and not associated with bacterial resistance. The aim of this study was to investigate the therapeutic potential of SYN01 in MRSA-infected porcine partial-thickness wounds(PTBWs). *Methods* A total of 4x4cm 30 PTBWs were created on two female Yorkshire pigs and were infected with approximately 108 CFU of MRSA (ATCC® BAA-1717™) on Day 2. Wounds were given 3 days for infection to develop. Starting post-burn day 5, each wound was assigned to one of three treatment groups (n=10 each): no treatment, silvadene (silver sulfadiazine, standard of care), SYN01 rinse and gel. Dressing changes were performed 3 times a week and punch biopsies were taken at each dressing change for bacterial counts using blood-agar plates. Pigs were sacrificed on post-burn day 28. Measured outcomes included percentage of wound closure, bacterial counts and histology. *Results* SYN01 topical application lead to a statistically significant wound healing improvement in MRSA-infected partial thickness burn wounds compared to silvadene treatment and no treatment after day 5. Application of SYN01 reduced the bacterial count however no statistical significance was reached. Histological wound examination of POD28 demonstrates that wounds treated with SYN01 have healed markedly and are comparable to the healing quality of non-infected burn wounds. *Conclusion* SYN01 significantly enhances wound healing in MRSA-infected PTBWs and leads to optimal histological morphology. SYN01 significantly enhances wound healing in MRSA-infected PTBWs and leads to optimal histological morphology. SYN01 enhances wound healing in PTBWs and is a promising therapeutic option for treating and preventing PTBW infections.
11:47 – 11:52 AM	*Improving Functional Outcomes After Peripheral Nerve Injury: Muscle vs. Nerve Treatment* **Jocelyn S. Baker**; Benjamin K. Schilling, MS; David M. Turer, MD, MS; Chiaki Komatsu, MD; Adam R. Cottrill, BS; J. Peter Rubin, MD; Mario G. Solari, MD; Kacey G. Marra, PhD Discussion led by Ian Chow, MD *Background* A major limitation of current peripheral nerve injury (PNI) treatments is the failure to adequately prevent muscle atrophy that begins affecting the denervated muscle tissue immediately after the nerve is injured. Without stimulation from the nerve, muscle atrophy progresses until the nerve injury has healed which can lead to poor return of function in the affected limb or extremity and therefore unsatisfactory recovery outcomes [1]. To

	investigate solutions to this limitation of PNI treatment, two different approaches were investigated for treatment of sciatic nerve injuries in Lewis rats; a local treatment was delivered directly to the denervated muscle in the form of Nanofat injections and a nerve treatment was delivered systemically in the form of FK 506 (Tacrolimus) injections. At the time of sacrifice, gastrocnemius functionality was assessed with electrophysiology methods to compare the local muscle and systemic nerve treatments as well as control injury models. By utilizing the different treatments in identical animal models, the effects that treating the nerve injury versus treating the muscle have on muscle atrophy and post-PNI muscle health have been compared. [1] Ruven C, Li W, Li H, Wong WM, Wu W. Transplantation of Embryonic Spinal Cord Derived Cells Helps to Prevent Muscle Atrophy after Peripheral Nerve Injury. Int J Mol Sci. 2017;18(3):511. Published 2017 Feb 27. doi:10.3390/ijms18030511 *Methods* The sciatic nerves of Lewis rats were severed and the defect was immediately repaired by suturing the nerve endings together. Respective group treatment began at the time of injury resulting in three groups; Group A received 0.5 CC prepared Nanofat to the gastrocnemius on the injured limb (n = 4), Group B began a daily injection regimen of FK 506 in the dosage of 2 mg/kg according to the rat's weight (n = 3) and Group C received no treatment as a control group (n = 3). Group B received FK 506 injections daily until time of sacrifice. Groups A and C were sacrificed 9 weeks post-operative and Group B was sacrificed 7 weeks post-operative*. At the time of sacrifice, muscle functionality was assessed using electrophysiology methods. *FK 506 studies were terminated early due to COVID-19 lab safety guidance implementation. *Results* The experiment timeline discrepancy between Groups A/C and Group B is acknowledge, however under the circumstances analysis was done assuming any animals sacrificed 6 weeks or more post-operatively had fully recovered from the acute sciatic nerve injury. Therefore, titanic force data collected at the time of sacrifice was compared between all groups at the sampling frequency of 75 Hz. From this analysis, it was found that treatment with FK 506 ($M = 9.52$ N, $SD = 2.73$ for titanic force) did not result in significantly better gastrocnemius functionality than no treatment ($M = 7.79$ N, $SD = 5.05$) ($p = 0.22$). Further, treatment of the gastrocnemius with Nanofat ($M = 14.36$ N, $SD = 5.30$) resulted in significantly better functionality than no treatment ($p < 0.001$) as well as significantly better functionality than nerve treatment with FK 506 ($p < 0.001$). *Conclusion* In the combined study detailed here, two different PNI treatments were compared in order the gauge their effect on the resulting muscle health and functionality of the injured limb. FK 506 was used to treat the nerve injury through systemic injections and prepared Nanofat was used to directly treat the effected muscle. Through analysis with electrophysiology methods, it was found that direct Nanofat injections resulted in better functionality of the effected muscle after nerve healing as compared to no treatment or treatment of the nerve injury with FK 506. In practice, Nanofat injections have great potential to prevent debilitating muscle atrophy and also have the potential to be used with other technologies which improve PNI healing. Such a combined treatment effort would not only prevent muscle atrophy by directly treating the muscle during the time of denervation, but also allow for stimulation from the healed nerve to occur sooner after injury and further stem the associated negative effects on muscle that PNI has. By preventing the extent of muscle atrophy experienced after PNI, patient outcomes can be greatly improved.
1:15 – 2:00 PM	**Session III – Clinical Research II Presentations**

1:15 – 1:20 PM	*Optimizing Carpometacarpal Arthroplasty of the Thumb: A Prospective Clinical Trial Comparing Suture Suspension to Ligament Reconstruction and Tendon Interposition* **Ian Chow, MD;** Debra A. Bourne, MD; Dann Laudermilch, MD; Benjamin K. Schilling, MS; Wesley Sivak, PhD, MD; William Hagberg, MD; Marshall Balk, MD; Glenn Buterbaugh, MD; Joseph Imbriglia, MD; John Fowler, MD Discussion led by Justine Kim, MD *Background* Thumb carpometacarpal (CMC) arthritis is the most common arthritis of the hand and thumb CMC arthroplasty is the most commonly performed surgical reconstruction for arthritis in the upper extremity. The most common technique is the ligament reconstruction and tendon interposition (LRTI) where, following trapeziectomy, the flexor carpi radialis (FCR) tendon is passed through a bone tunnel at the base of the first metacarpal to reconstruct the palmar oblique ligament and prevent collapse, with the remaining tendon used to fill the space vacated by the trapezium. In 2009 DelSignore published the suture suspension technique in which, after trapeziectomy, the FCR is sutured to the abductor pollicis longus to create a sling under the first metacarpal to correct subluxation and maintain the joint space. The purpose of this study is to compare outcomes between to the two techniques and determine if one is superior. *Methods* Following IRB approval, 38 consecutive patients undergoing CMC arthroplasty for basilar thumb osteoarthritis were enrolled by four senior, fellowship trained surgeons; two of whom prefer the LRTI technique and two who routinely perform suture suspension arthroplasty. Outcome measures were recorded including: first metacarpal subsidence measured on radiographs, thumb range of motion, pinch and grip strength, functionality assessed through the Disability of Arm, Shoulder and Hand (DASH) and Michigan Hand Questionnaires (MHQ), and pain measured on a 10-point Visual Analog Scale (VAS). *Results* Both techniques are effective at reducing pain with a decrease from baseline to 6-weeks post-procedure of 5.5±1.8 to 3.1±1.9 ($p=0.030$) in the LRTI group and 5.8±2.1 to 2.2±2.8 ($p<0.001$) in the suture suspension group. The suture suspension technique resulted in greater thumb abduction at 6-weeks compared to LRTI (61.3°±12.7° versus 39.5°±16.9°, $p=0.018$). LRTI resulted in more limited opposition at 6-weeks post-procedure ($p=0.002$). There was no significant difference in thumb extension, grip or pinch strength. Both techniques improved functionality from baseline to 6-weeks post-operative based on the MHQ (LRTI 47.3±8.2 to 53.8±9.9, $p=0.037$; suture suspension 46.9±6.9 to 57.0±11.7, $p=0.012$). There was significant radiographic subsidence in both groups with 32.4%±3.9% for suture suspension and 55.3%±6.0% for LRTI at 2-weeks post-operative ($p<0.001$), however, subsidence was significantly less for suture suspension compared to LRTI ($p=0.005$). *Conclusion* LRTI and suture suspension arthroplasty techniques are equally effective for improving pain and functionality. Both techniques are subject to some subsidence of the first metacarpal. The suture suspension technique has less restriction of abduction and opposition in the early post-operative period as well as less radiographic subsidence of the first metacarpal.
1:24 – 1:29 PM	*Autologous Fat Grafting as Primary Breast Reconstruction After Mastectomy Effects on Longitudinal BMI* **Jennifer A. Hall, BS**; Eva Roy, BS; Xiao Zhu, MD; Francesco M. Egro, MBChB, MSc, MRCS; Walter J. Joseph, MD; Carolyn De La Cruz, MD Discussion led by Mehmet Uluer, MD

	Background Free autologous fat grafting is a newer technique for breast reconstruction after mastectomy that can achieve positive results in the right patient. This technique typically requires two to five lipoaugmentation procedures to fully reconstruct the breast. Weight gain in breast cancer patients is associated with a higher risk of recurrence, and currently no literature characterizes weight changes after total autologous fat grafting-based reconstruction. *Methods* Single center retrospective review of total mastectomy followed by autologous breast reconstruction from one surgeon from 2008-2017. 127 patients were included, 12 of which underwent reconstruction using only fat grafting. T-test analysis was performed to analyze changes in BMI between fat grafting and autologous flap-based reconstruction. Statistical analysis was performed to determine if the volume of injected fat or number of injections correlated with the percent changes in BMI. *Results* For autologous fat grafting-based reconstruction, the average percent change in BMI at 6 months,1 year, 2 years, 3 years, 4 years, 5 years, and 6 years were found to be 1.41%, -1.31%, -1.68%. -4.39%, -2.15%, -6.74%, and -10.82%, respectively. For autologous reconstruction, the average percent changes in BMI were found to be 0.55%, 1.69%, 2.61%, 2.85%, 3.36%, 4.30%, and 3.32%, respectively. For autologous fat grafting-based reconstruction, the average change in weight at 6 months, 1 year, 2 years, 3 years, 4 years, 5 years, and 6 years were found to be 2.05, -2.27, -2.39, -2.68, -3.13, -9.27, and -14.9 pounds, respectively. For autologous reconstruction, the average weight changes were found to be 0.22, 2.37, 3.20, 4.13, 5.17, 6.31, and 4.63 pounds, respectively. There was not a significant correlation between changes in BMI and volume of fat injected or number of fat grafting procedures *Conclusion* Weight gain in breast cancer patients is associated with an increase in recurrence and on average there was a 3.32% increase in BMI six years after autologous reconstruction. Initially autologous fat grafting as primary breast reconstruction and autologous flap reconstruction had similar changes in BMI following reconstruction, but the fat grafting group trended on weight loss and the autologous group trended on weight gain. The fat grafting group was associated with significant weight loss compared to the autologous group at three years (-4.39% vs 2.85%, $p<0.05$). Though potential weight gain should not be the primary factor in deciding reconstruction technique, this data demonstrate a possible long-term benefit of fat grafting on weight loss.
1:33 – 1:38 PM	*Management of the Amputated Finger: Revision Rates and Predictors of Success* **Justine S. Kim, MD**; Shawn J. Loder, MD; Elizabeth A. Moroni, MD, MHA; Alexander M. Spiess, MD Discussion led by Samantha Maliha, MD *Background* Digit injuries represent a common trauma managed in the emergency setting with over 200,000 emergency department (ED) visits for finger amputation between 2002 and 2010. Appropriate initial management is critical to ensure the best functional outcome, recognizing that revision surgery is common. In this study, we identified characteristics of initial surgical triage associated with operative revision and/or more proximal phalangeal/joint resection. *Methods* This is a retrospective analysis of 177 amputated digits across 113 patients, managed by plastic surgery at our institution between 2010-2019. We assessed the mechanism, digit,

	anatomic level, intervention performed, post-operative course and follow-up. Patients were followed through their terminal clinic visits. *Results* 64 patients underwent immediate revision amputation in the ED for an average shortening of 0.46 anatomic levels. 24 patients (47 digits) progressed directly to the operating room (OR). 77 patients required at least one operative intervention with 28 requiring 2 or more trips to the OR. The most common indication for early revision was compromised soft tissue closure. Delayed revisions were secondary to pain/hypersensitivity (10.2%) or delayed graft/tissue necrosis (9.1%). On average, patients were revised 0.56 anatomic units by terminal intervention. *Conclusion* The most common indication for early operative revision was compromise of soft tissue closure. This correlated with need for either additional osseous resection and/or flap advancement/skin grafting in the OR. Reasons for compromise include exposure of the osseous stump and/or skin edge necrosis secondary to tight closure. These data suggest potential need for more aggressive initial osseous resection in the ED.
1:42 – 1:47 PM	*Racial Disparities in Early Evaluation in Management of Patients with Non-Syndromic Craniosynostosis* **Casey Tompkins-Rhoades, BS**; Erin Anstadt, MD; F. P. Marji, MD; Jesse A. Goldstein, MD Discussion led by Brodie Parent, MD *Background* Craniosynstosis is a congenital skull deformity that results from the premature fusion of the bony plates of an infant's skull. This condition exists as a sporadic mutation or along with other craniofacial abnormalities as one of several genetic syndromes. Surgical intervention is an option for treating patients with this condition and often deemed necessary, especially for patients with signs and symptoms of increased intracranial pressure. Untreated, this condition can lead to intracranial hypertension, cognitive impairment, vision problems, and abnormal speech and hearing. These sequelae can be abated or avoided with early recognition of symptoms and referral for intervention. This project aims to analyze the evaluation and management of patients with suspected craniosynostosis in order to address any disparities that may exist between patients that identify as white orAfrican-American/Black. *Methods* A retrospective chart review of patients with suspected craniosynostosis who were evaluated between 2012 and 2017 within the Division of Pediatric Plastic Surgery at the University of Pittsburgh Pediatric Cleft-Craniofacial Center was completed. Demographic, radiologic, and surgical intervention data were recorded. Outcomes assessed include age at computed tomography (CT) imaging and age at definitive treatment. Descriptive statistics were performed to analyze differences observed in Black or African-American patients compared to their white counterparts. *Results* A total of n=277 patients were evaluated by a plastic surgeon. N=31 patients were excluded after evaluation or genetic testing confirmed a syndromic form of the condition. Of the patients who received a head CT, n=132 (67%) patients were white and n=65 (33%) identified as Black or African-American. There was a statistically significant difference in mean age at first head CT between white and Black or African-American patients, 2.279 years versus 3.854 years respectively (p=0.0013). For the Black or African-American patients that went on to receive surgical intervention (n=22, 28%), the mean age at the time of surgery was 2.514 years and mean age at time of first head CT was 2.636 years. For Caucasian patients that went

	on to receive surgery (N=57, 72%), mean age at first head CT was 1.719 years and mean age at first surgery was 1.622 years. No significant difference was detected in average age at surgical intervention between the two cohorts (p=0.1340). *Conclusion* Black or African-American patients experience a delay in diagnostic imaging with the average age at the time of first head CT being almost double that of their white counterparts. For patients that did go on to receive surgery, age at CT and treatment was similar for both groups. The data suggest that black patients may experience this delay in diagnosis because they suffer from a phenotypically milder form of the condition that does not require surgical intervention. A disparity exists because this population still requires close follow up for the development of serious complications, whereas white children are being detected, referred, and monitored at earlier ages. Further studies analyzing the differences in severity of symptoms, co-morbidities, outcomes, and rates of surgical intervention are necessary to understand why this population experiences delayed diagnosis.
1:51 – 1:56 PM	*Pediatric Hand Trauma in Under-served Populations: A Cohort Study* **Brodie Parent, MD, MS**; Chelsey Johnson, MD; Erin Anstadt, MD; Jennifer Fantuzzo, BS; James Fisher, MD, PhD; John Fowler, MD; Alexander Davit, MD Discussion led by Josh David, MD *Background* Under-served populations are disproportionately affected by trauma, and include racial minority, low-income, and rural patients. This study describes pediatric hand injuries in these groups, and assesses their risk of injury and subsequent operations. *Methods* This retrospective cohort study included all pediatric patients with hand injuries who were referred to our hand clinic from 2014-2019. Patients were stratified by race, household income, and geography. Charts were abstracted, and Poisson regression was used to compute relative risks (RR) with 95% confidence intervals (CI). *Results* 850 patients were referred for hand trauma. The median age was 11.4 years. 299 patients (35%) were female, 250 (29%) were a minority race, 119 (14%) lived in rural locations, and 207 (24%) had a median annual household income < $43,000. Compared to urban children, rural children were more likely to have open fractures (19% vs 11%, RR 1.1, CI 1.0-1.2, p=0.01) and tendon injuries (9% vs 4%, RR 2.5, CI 1.3-4.9, p=0.01). Compared to Caucasians, children of minority race were less likely to undergo an operation for hand trauma (11% vs 17%, RR 0.7, CI 0.4-0.9, p=0.04). No differences were found when comparing children from different income levels. *Conclusion* Relative to urban children, rural children were more likely to have severe injuries which require operative management, highlighting the ongoing need for rural hand surgeons. Minority race children were less likely to receive an operation compared to their Caucasian counterparts, despite no apparent differences in their hand injury characteristics. This may represent systemic barriers to health-care access.
2:00 – 2:54 PM	**Session IV – Education, Quality and Innovation Presentations**
2:00 – 2:05 PM	*Individual Biocontainment Unit for Protecting Healthcare Workers from Aerosolized Pathogens like COVID-19* **Benjamin K. Schilling, MS**; David M. Turer, MD, MS; Cameron H. Good, PhD; Heng Ban, PhD; Jason S. Chang, MD; J. Peter Rubin, MD

	Discussion led by Angela Prescott, MD *Background* During the COVID-19 pandemic many emergency departments have implemented procedures and devices with untested efficacy. An example of this are passive enclosures, or "intubation boxes", which are to be used during orotracheal intubation. An innovative, negative pressure, individual containment unit (IBU) is designed specifically for evacuating aerosolized particulates during endotracheal intubation. The objective of this study was to examine the effectiveness of these two types of enclosures using standard procedures. *Methods* A commercially-available passive protective enclosure representing the most common design was tested and compared against an active air filtration-based IBU during simulated endotracheal intubations. Both systems were evaluated with standardized testing used to certify Class I Biological Safety Cabinets (ISO 14644-3). Tests included visual smoke pattern analysis, filter leak testing, and air velocity measurements. Aerosols of biologically-relevant sizes, mimicking virus-containing particulates, were used throughout. IRB-approved ergonomics testing was performed with 15 critical care doctors and anesthesiologists to assess intubation time when using the IBU deployed over a patient versus using only traditional PPE. *Results* Qualitative evaluation revealed smoke escaping from all passive enclosure openings. Leak leak testing demonstrated aerosol concentrations outside the enclosure and near the head and face of the healthcare worker during simulated intubations. In contrast, the IBU fully contained the visible smoke, and test aerosol was reduced by at least 99.99% at the exhaust. These results were consistent both with Class I Biological Safety Cabinet standards, and met new guidance put forth by FDA for Emergency Use devices. Ergonomics testing revealed a modest increase in intubation time when using the IBU versus not using any additional protective measures (18.8 seconds versus 12.4 seconds) over repeated intubations. *Conclusion* Passive enclosures for intubation failed to contain potentially infectious aerosols. The IBU with active air filtration effectively eliminated aerosol spread, meeting Class I Biological Safety Cabinet standards, during simulated orotracheal intubation and patient isolation.
2:09 – 2:14 PM	*A Pathway to Leadership: Evaluation of Training Institutions on Developing Plastic Surgery Leadership* Francesco M. Egro, MBChB, MSc, MRCS; Carolyn P. Murphy, BA; **Brandon T. Smith, MS**; Eva Roy, BS; Alexander G. Stavros, BS; Joseph E. Losee, MD; Vu T. Nguyen, MD Discussion led by Chelsey Johnson, MD *Background* The pathway to leadership in plastic surgery remains uncertain. While certain residency programs are more represented among academic plastic surgeons, the impact of training on leadership has never been established. The aim of this study was to determine the impact of plastic surgery training on leadership. *Methods* First, a cross-sectional study examined the demographics and training of plastic surgery faculty within ACGME-accredited programs. Second, a retrospective review examined similar parameters among past presidents of plastic surgery societies (American Association of Plastic Surgeons, American Society of Plastic Surgeons, Plastic Surgery Foundation, and Plastic Surgery Research Council). Data was gathered from institutional websites and society websites. Frequencies of leaders who trained at each institution during plastic

	surgery residency or fellowships were calculated. *Results* Among the 287 institutional leaders (98 chairs or chiefs, 96 residency directors, and 68 fellowship directors), 97 separate training programs were identified that contributed to their training. However, the top ten training programs accounted for 40% of the residencies and fellowships individuals received. The top five programs included University of Pittsburgh, New York University, University of Pennsylvania, Harvard Medical School, and Johns Hopkins University. Similarly, the 230 past presidents across societies trained in 51 programs, but the top ten accounted for 51% of their training. The top five institutions were Johns Hopkins University, Duke University, Harvard Medical School, Washington University-St. Louis, and University of Pennsylvania, respectively. Across datasets, the top eight leadership producing institutions remained constant. *Conclusion* This study suggests that an elite cohort of institutions has consistently produced a large portion of the leaders in plastic surgery, suggesting that they have consistently fostered an aptitude for leadership among their trainees.
2:18 – 2:23 PM	*Push-to-Spin Syringe (P2S™): A New Device for Autologous Fat Grafting* Xiaonan Yang, MD, PhD; **Jonathan P. Brower, MD**; Lauren E. Kokai, PhD; Beth R. Gusenoff, DPM; Jeffrey A. Gusenoff, MD Discussion led by David Turer, MD, MS *Background* Many techniques and devices have been developed to improve fat grafting efficacy, safety and consistency, however most processing methods require tissue handling that is too cumbersome or messy for office based procedures. As small volume fat grafting procedures become more frequent outside of the operating room, new devices are needed that effectively remove excess oil and fluid from adipose grafts and are efficient, convenient, and cost-effective. The aim of this study was to compare fat processing efficiency of a novel hand- held device, the Push-to-Spin (P2S™) system, to other common processing techniques and verify tissue quality after lipoaspirate harvest and processing. *Methods* Lipoaspirate was harvested from six human adipose samples. The lipoaspirate was then processed using one of three experimental methods, including cotton gauze (Telfa) rolling, centrifugation (the Coleman technique), or using the P2S™ system. Unprocessed lipoaspirate served as the control. Efficiency of fat processing was evaluated by total processing time, fat harvest ratio, and fat processed ratio. Histological examination with hematoxylin and eosin (H&E) staining was used to examine graft morphology. Immunohistochemical presence of perilipin was used to quantify adipocyte viability. Whole tissue viability was quantified with glycerol-3- phosphate dehydrogenase 1 (GPDH) expression. *Results* Lipoaspirate processing was significantly faster using the P2S™ device compared with other techniques (35±0.58 seconds versus 61.5±3.69 secs for Telfa and 200.83±1.46 secs for Coleman). The P2S™ device achieved a similar fat harvest and fat processing ratio to the other techniques, which were all greater than the unprocessed control samples. Additionally, the P2S™, Telfa, and Coleman techniques yielded grafts with similar cellularity, all of which were significantly higher than the control. Adipose tissue harvested with all techniques had similar expression of perilipin and GPDH to controls.

	Conclusion The P2S™ device is an easy, efficient, and cost-effective handheld device that can be used for lipoaspirate harvest, processing, and grafting in both the operating room and office procedure room settings. The resulting adipocytes have similar morphology, viability, and function to those yielded by techniques in common practice today, including Telfa rolling and Coleman centrifugation. This handheld technology decreases procedure time, thereby improving surgeon efficiency and patient experience.
2:27 – 2:32 PM	*The Utility of Formal Breast & Hand Simulation and Ultrasound Courses in Plastic Surgery Education - One Institution's Experience* **Joanna Ng-Glazier, MD**; Jeffrey A. Gusenoff, MD Discussion led by Wendy Chen, MD *Background* Studies suggest that simulation is beneficial to surgical trainees, but its role has not been well defined in plastic surgery. Here, we present our experience and one-year follow-up data on the development and integration of a low-cost, formal simulation curriculum at our institution. *Methods* Residents identified several topics of technical deficiency in their current educational structure including preoperative breast markings, use of ultrasound for bedside procedures, and percutaneous pinning. A multi-session curriculum was developed in 2018 to address these topics, supplemented by electronic material and low-cost models to target these skills. Improvement in knowledge, technical skill, comfort, and overall satisfaction, model quality, and course value were measured before and after each session, compared via paired t- test, alpha=0.05. Repeat sessions were held one year after, noting similar variables, skill retention, and value of each of these sessions. *Results* 24 residents (100%) participated in sessions targeting preoperative breast markings, use of ultrasound for bedside procedures, and fracture pinning. On a Likert scale of 1-10, average post-simulation knowledge and skill comfort doubled for all sessions, including breast markings ($p<0.01$), ultrasound-guided procedures including aspiration of abscess, seroma, upper extremity nerve blocks, ($p<0.01$), and drilling/pinning across hand and joint fractures ($p<0.01$). Session satisfaction ratings were 8.64, 9.13, and 9.25, respectively. Stratification by training year indicated different impact based on clinical year (R1-6) and pathway (traditional or integrated). Repeat sessions one year later revealed > 50% skill retention and higher baseline comfort level for all participants. *Conclusion* Our results suggest that a formal simulation curriculum can successfully enhance resident education and serve as an adjunct to clinical experience, which can be valuable in times of sparse clinical education (ie: recent pandemic, duty hour restrictions). Retention improves with repetition, and certain ultrasound skills can benefit faculty as well.
2:36 – 2:41 PM	*Teaching the Furlow Palatoplasty: A Randomized, Controlled Trial Comparing Traditional Didactics to a Low-Fidelity Model* **Erin Anstadt, MD**; Eva Roy, BS; Pooja Humar, BS; Lisa Block, MD; Jesse A. Goldstein, MD Discussion led by Lucas Dvoracek, MD *Background* Simulation-based education has proven efficacy in building clinical and surgical skills. This

	study evaluates the effectiveness of a low- fidelity simulation for teaching medical students the Furlow Double-Opposing Z-Plasty technique, a complex procedure used for cleft palate repair. *Methods* Novice medical students enrolled in a Plastic Surgery elective were randomly assigned to receive a traditional lecture on the Furlow palatoplasty technique alone (control group), or to receive the lecture plus participate in a low-fidelity simulation providing instruction on the technique (intervention group). The low-fidelity model uses a blue surgical towel folded into two layers representing the oral and nasal mucosal layers of the velum. Students are taught to draw relevant anatomical and surgical landmarks, perform surgical markings, and to cut out and transpose the flaps appropriately, creating a physical demonstration of the layered palatal closure and lengthening accomplished using this technique. To evaluate their knowledge of cleft palate pathology and the Furlow palatoplasty technique, all students took a 13-question test at three timepoints. Test 1 was taken prior to the course. The control group repeated the test after the lecture alone, and the intervention group repeated the test after the lecture and simulation (test 2). Knowledge retention was assessed on a third test three weeks later (test 3). Statistical analysis using Student's t-tests was performed to compare test performance between cohorts using a significance level of 0.05. *Results* A total of 21 students enrolled in the course. Ten were randomized to the control group and 11 to the intervention group. Test 1 showed no significant difference in the mean overall score between the groups (defined as total percent correct; control=54.6%, intervention=51.0%). While both groups showed improvement in overall score on test 2, the intervention group scored significantly higher than the control group (67.8% vs 59.2% respectively, $p=0.046$) on this test. On test 3, the mean overall score for all students was 60.23%, still significantly higher than the average score on test 1 ($p=0.019$). Compared to the control group, significantly more students in the intervention group agreed that the educational session increased their understanding of cleft palate anatomy and repair techniques ($p<0.01$). Total materials cost per student for the simulation is $9.12, including non-disposable materials. *Conclusion* This low-fidelity Furlow Palatoplasty model is an effective educational adjunct. It is an inexpensive teaching tool that could also be applied to first-year resident education, with high learner satisfaction rates expected.
2:45 – 2:50 PM	*ACAPS Plastic Surgery Boot Camp: The Fifth Year Experience* **Angela Prescott, MD**; Vu T. Nguyen, MD Discussion led by Joanna Ng-Glazier, MD *Background* Over the past two decades, surgical residency programs have found success with instituting "boot camp" models of education to augment surgical education. With the enforcement of ACGME work hour limitations and proposed acceleration of the plastic surgery integrated residency timeline, the boot camp model allows for rapid delivery of standardized high-yield curriculum into a condensed period of time. In plastic surgery training, the boot camp model provides a baseline of knowledge for trainees pursuing integrated and independent pathways. The inaugural American Council of Academic Plastic Surgeons (ACAPS) Plastic Surgery Boot Camp was held at the University of Pittsburgh in 2015 and hosted 43 residents (35 integrated/8 independent). Now after five years of growth, the University of Pittsburgh site has hosted 162 residents (138 integrated/24 independent). The ACAPS Boot Camp has met one of its fundamental goals and expanded to

	five regional sites: Pittsburgh, Tampa, Kansas City, San Diego and New York City. We present in this study our five-year multi-site experience. *Methods* The ACAPS Boot Camp consists of a two and half day standardized curriculum of lectures, small group sessions, and simulation training. In July of 2019, 70 residents (58 integrated/12 independent) participated in five regional course locations. Under IRB approval, participants were asked to complete pre and post course online surveys. This data was collected and analyzed from all five regional sites. *Results* Integrated plastic surgery participants reported more comfort/ knowledge with preoperative and post-operative patient management (72% and 74%, respectively). An overwhelming 97% of integrated and independent residents alike reported improvement in understanding the field of plastic surgery. Following the boot camp course, the highest scores of improved knowledge were reflected in the areas of facial trauma (90%), facial fracture plating (93%) and cleft lip and palate (88%). Residents reported improvement in knowledge of hand anatomy (77%) as well as increased confidence in management of hand trauma/call (87%) and hand exam (87%). In general, residents reported lower rates of improvement of understanding of cosmetic procedures (such as facelift/rhinoplasty) with an average reported score of 74%. The lowest evaluations were reflected in the area of medical photography with 40% reported improvement in understanding. *Conclusion* The annual ACAPS Plastic Surgery Boot Camp has been successfully implemented in the past five years, as evident by the overwhelming positive reviews by integrated and independent resident participants alike. In two and a half days of the boot camp, topics such as management of face/hand trauma are extremely well-received, where as aesthetic surgery and medical photography may not be as beneficial as other high-yield topics. The ACAPS Plastic Surgery Boot Camp program has grown to include five sites across the country. We acknowledge that limitations exist in this study, as survey questions have been modified over the years and therefore not all the data is standardized for analysis. As we move forward in this interesting era of virtual meetings, we discuss a future direction to include a cost analysis of the boot camp, so that maximal participant benefit is balanced by sustainable and cost-effective delivery of education.

Financial disclosures

All individuals in a position to control the content of this education activity including members of the planning committee, speakers, presenters, authors, and/or content reviewers have disclosed all relevant financial relationships with any entity producing, marketing, re-selling, or distributing health care goods or services, used on, or consumed by, patients.

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