

WITH EVERY CHALLENGE
AND OPPORTUNITY COMES

INNOVATION

2023 SURGICAL CARE REPORT



Department of Surgery
UNIVERSITY OF COLORADO ANSCHUTZ MEDICAL CAMPUS



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LETTER FROM THE CHAIR

The past three years have presented many challenges for the University of Colorado Department of Surgery. However, we found the silver lining in the challenges we faced, and they have given us an opportunity to innovate and to use our voice for change. It is from this perspective, and with great pleasure and pride, that I present to you our University of Colorado Department of Surgery Report.

The events of 2020 illuminated the need for change. With racial disparities underscored by the COVID-19 pandemic, as well as multiple injustices to members of underrepresented groups around the country, critical awareness and movement with diversity, equity, and inclusion has become one of our top priorities. We established a DEI annual lectureship, created video content for recruitment, and are working toward the goal of becoming the most diverse, equitable, and inclusive department of surgery in the country by 2030.

Our research programs have grown, and we are proud to be highly ranked in funding from the National Institutes of Health (NIH). We continue to relentlessly search for new treatments, medicines, and technologies to improve patient outcomes. Grant funding from the NIH P30, RM1, T32, R01, K08, and Department of Defense, as well as industry, private, and philanthropic investments, supports the critical work of our researchers and their programs. We continue to be on the leading edge of advancing new protocols, devices, and procedures.

Innovation, however, is not limited to our research laboratories. During the pandemic, our faculty and staff shifted focus to providing critical care for our patients. We implemented new processes, created new technologies, and improved infrastructure to evolve with the many twists and turns of the pandemic.

Additionally, our department has taken a novel approach to education. Our Office of Education oversees all resident and fellow training programs for our department. We strive to build a network of inclusivity, from our medical students to our faculty, that provides a structure of support to handle all aspects of being a surgeon. By embracing the diversity of ideas from our program coordinators, leadership, and faculty, we can develop and provide unique program experiences for our trainees.

Although the pandemic forced us into many unprecedented situations, our innovation and adaptability have proven that we are resilient. As we move forward, our team will integrate what we have learned about remote work, mental health, and DEI into the core of our work. We remain steadfast and focused on our vision to Improve Every Life.

I hope you have the opportunity to visit our campus and enjoy all that Colorado has to offer.



Richard D. Schulick, MD, MBA, FACS
The Aragón/Gonzalez-Gústí Endowed Chair of Surgery
Professor, University of Colorado School of Medicine

ONE FOR ALL IN OVERCOMING AORTIC-VALVE DISEASE.

Don and Amy Lovell, recipients of his-and-hers minimally invasive aortic-valve replacements, sat side by side in a UCHealth University of Colorado Hospital exam room. Eight days earlier, Don, 89, had received his new valve, an Edwards Lifesciences Sapien 3. Amy, 85, had gotten hers, a Medtronic CoreValve Evolut, about nine months before.

As tends to be the case for couples married 68 years, they had developed their own simpler names for the artificial valves that had returned color to their faces and energy to their bodies. For the Lovells, transcatheter valve replacement (TAVR) was the culmination of deliberation and late-breaking urgency, which the Division of Cardiothoracic Surgery team knows better than most.

"She's a 'moo,'" Don quipped, "and I'm an 'oink.'"

As the first facility in Colorado to perform TAVRs, this has catalyzed the discovery of a number of new technologies to treat other conditions. It is these new developments—matched with the experience and passion of our team—that has resulted in our clinic handling some of the largest volumes of advanced interventional treatments for heart-valve disease in the region, with outcomes better than national averages.



CARDIOTHORACIC

DISCOVERY

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DIVISION HIGHLIGHTS

Clinical:

- February 6, 2022, marked the 30th anniversary of the first lung transplant performed at the University of Colorado School of Medicine. Since that time, the program has performed 854 lung transplants. The program was recently awarded an Extraordinary Patient Experience Award from UCHHealth.
- The Structural Heart Program recently reached another milestone with 1,000 transcatheter aortic valve replacement procedures performed.
- Simran Randhawa, MD, and Jessica A. Y. Rove, MD, gained national recognition via social media as female cardiothoracic surgeons active in heart and lung transplantation.
- The General Thoracic Surgery Program gained national recognition for its expertise in the use of robotics for thoracic surgical operations.
- The Congenital Cardiac Surgical Program celebrated the milestone of having performed 500 pediatric heart transplants since the program began more than 30 years ago.

Educational:

- Thoracic surgery fellow Yihan Lin, MD, served on the executive committee of the Thoracic Surgery Residents Association.
- Both thoracic surgery fellows were highly recruited by other health care systems:
 - Brandon Wojcik, MD, was recruited to Munson Medical Center.
 - Yihan Lin, MD, was recruited to Stanford University.
- The congenital cardiac surgery fellow, Emily Downs, MD, was recruited to the University of Virginia Health System.

Research:

- Muhammad Aftab, MD, coordinated a multi-centered clinical study of the use of extracorporeal membrane oxygenation for the support of patients with COVID-19.

Patent Applications:

- US 11,123,542: Axial Compression Apical Cuff Attachment Assembly, System, and Method. Inventors: Max B. Mitchell, MD, and Jeremy Morgan. Assignee: Regents of the University of Colorado. Filed: February 11, 2021. Issued: September 21, 2021.
- US 17/351,082: Synchronous Drive System and Method of Using Same. Inventors: Max B. Mitchell, MD, and Jeremy Morgan. Filed: June 17, 2021.
- Therapeutic Agent Delivery Systems and Methods of Forming and Uses Thereof. Inventors: Jessica A. Y. Rove, MD, Dae Won Park, and Adam J. Rocker. Submitted to the United States Patent and Trademark Office in June 2020. Published: December 2021.

SERVICE

- Yihan Lin, MD, travels annually to Rwanda, where she performs cardiac surgical operations. She also helped to establish the first cardiothoracic surgery training program in the country, one of only a few in Africa. Lin sponsored the first cardiothoracic surgery resident in this program to visit the University of Colorado School of Medicine for training in complex cardiac surgery cases and critical care.
- T. Brett Reece, MD; Robert A. Meguid, MD, MPH; Joseph C. Cleveland Jr., MD; and David A. Fullerton, MD, are all actively engaged in mentoring students (high school, college, and medical school) with an interest in a medical career. Their activities include guiding students through research projects and simulation of surgical procedures.
- Simran Randhawa, MD, was invited by the Thoracic Surgery Program Directors Association to lead an educational program advocating for the training of international medical graduates in the United States.
- Frederick L. Grover, MD, helped to establish the first cardiac surgical center in Nepal. He continues to provide financial support, guidance, and other resources to support the care of patients in Nepal with cardiovascular disease.
- John D. Mitchell, MD, serves on the University of Colorado School of Medicine Admissions Committee.

FACULTY AWARDS AND RECOGNITION

- Joseph C. Cleveland Jr., MD, was elected president of the Western Thoracic Surgical Association.
- John D. Mitchell, MD, was named chair of the Workforce on the Annual Program for the 58th Annual Meeting of the Society of Thoracic Surgeons. He was also named to serve on the Board of Directors of the Society of Thoracic Surgeons.
- T. Brett Reece, MD, was named chair of the Program Committee for the 48th Annual Meeting of the Western Thoracic Surgery Program.
- 5280 Magazine's Top Doctors:
 - James Jagers, MD
 - Max Mitchell, MD
 - David Campbell, MD
 - John Mitchell, MD
 - Joseph C. Cleveland Jr., MD

ENDOWMENTS

- T. Brett Reece, MD: Joseph C. Cleveland Sr. and David N. Campbell Endowed Chair in Cardiothoracic Surgery.
- John D. Mitchell, MD: Courtenay C. and Lucy Patten Davis Endowed Chair in Thoracic Surgery.
- David A. Fullerton, MD: John T. M. Wright Endowed Chair in Heart Valve Surgery.
- Joseph C. Cleveland Jr., MD: Frederick and Carol Grover Endowed Chair in Cardiothoracic Surgery.
- James Jagers, MD: Barton-Elliman Endowed Chair.
- Max B. Mitchell, MD: Meg F. Rady Endowed Chair in Congenital Cardiac Surgery.

GRANTS

- Xianzhong Meng, MD, PhD
Downregulation of Inflamm-aging for Protection Against Organ Damage in Sepsis.
Amount: \$1,236,714
Sponsor: VA Health Administration
- Robert A. Meguid, MD, MPH, and Kathryn Colborn, PhD, MPH/MS
Automated Surveillance of Postoperative Infections (ASPIN) R01.
Amount: \$1,982,881
Sponsor: Agency for Healthcare Research and Quality
- T. Brett Reece, MD
Amelioration of Spinal-cord Injury.
Amount: \$450,000
Sponsor: Gates Foundation Grubstake



EXTRAORDINARY COMMITMENT TO PATIENTS, AT ANY TIME AND IN ANY CIRCUMSTANCE.

If the pandemic has highlighted anything, it's that anyone—from any social, economic, or racial stratum—can be hit by debilitating illness or trauma at any time. In the Division of GI, Trauma, and Endocrine Surgery, we believe that everyone, no matter their circumstance, deserves equal access to the care they need. In fact, we are actively working toward equity in the life-saving care that we provide.

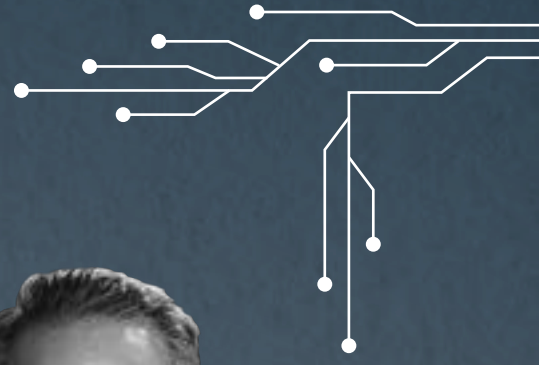
To address health care disparities, we advocate at the local, state, and national levels to reduce the impact of social determinants on health outcomes, as demonstrated by our care for surgical patients who represent the most vulnerable people in our region.

This allows us to identify and treat earlier disease stages, which means better outcomes, both for the patient and the doctor. That, in turn, helps increase our surgeons' job satisfaction and decrease burnout, ultimately making for better overall quality of service to all.

GI, TRAUMA, AND ENDOCRINE SURGERY



EQUITY



DIVISION HIGHLIGHTS

Clinical:

- UCHealth Burn and Frostbite Center received reverification from the American Burn Association.
- UCHealth Surgical Weight Loss Center was redesignated as an Accredited Comprehensive Center with Adolescent Qualifications, recognized by the Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program of the American College of Surgeons.
- Endocrine surgery initiated a new Thyroid Neoplasm Multidisciplinary Program with endocrinology, radiology, pathology, and nuclear medicine.
- Colorectal surgery increased robotic case volumes by 50%—from 80 to 120 cases—in the past year, and pelvic-floor disease case volume increased from 100 to 210 cases per year.
- The UCHealth Trauma Program has increased patient volume by 42% since 2017, and 8% within the past year. The Burn Program volume has increased by 230% since 2017, and admissions are up 24% since 2017, with a 7.5% increase in the past year.

Educational:

- Elizabeth Kovacs, PhD, sponsored/co-sponsored a total of six NIH NRSA Fellowship and NIH Career Development K Awardees. In addition, she provides research mentorship for three graduate students, two postdoctoral trainees/surgical residents, three junior faculty in the University of Colorado Department of Surgery, and seven faculty and trainees off campus.
- Mitch Cohen, MD, has mentored five NIH Career Development K Awardees, including two who have successfully moved to the Research Project Grants Program. In addition, he has mentored two graduate students who successfully defended PhDs in the past year and serves on the committee for three additional PhD candidates.
- The Division initiated the Education Time Out and Debrief, by Maria Albuja Cruz, MD, for general surgery residents.

- GI, Trauma, and Endocrine Surgery has fellowship training in trauma acute care surgery, burn surgery, and minimally invasive/robotic surgery.
- The NIH T32 Institutional National Research Service Award Trauma Research Training Grant was successfully renewed for the 31st year of funding.

Research:

- Ernest E. Moore, MD, was recognized by information analyst company Elsevier as being among the top five most-cited surgeon-scientists worldwide. His 1,229 manuscripts from 1976-2020 have been cited 36,557 unique times. Other Division authors listed among top-cited scientists include Anirban Banerjee, PhD; Mitch Cohen, MD; Elizabeth Kovacs, PhD; Robert McIntyre Jr., MD; Thomas Robinson, MD; and Gregory Stiegmann, MD.
- Research by Jon Vogel, MD, Short vs. Long Interval to Ileostomy Reversal after Pouch Surgery Trial, a Crohn's and Colitis Foundation-funded, University of Colorado School of Medicine-led, multi-center prospective study, has concluded and was orally presented at a plenary session of the 2022 American Society of Colon & Rectal Surgeons annual meeting.
- The Colorectal Surgery Section had six paper presentations at the 2022 meeting of the American Society of Colon & Rectal Surgeons.
- Elizabeth Kovacs, PhD, was the keynote speaker at the 2021 Barrier Function of Mammalian Skin - Gordon Research Conference, where she presented The Effects of Aging and Environment on the Skin Barrier.
- Catherine Garrison Velopulos, MD, was awarded R01 funding from the NIH for her research Modifiable Factors in Emergent Presentation of Potentially Elective General Surgical Disease for Patients Who Are Insured or Insurance-eligible.
- Arek Wiktor, MD, was awarded a Department of Defense grant for the project Randomized Trial of Fresh Frozen Plasma Versus Albumin in Acute Burn Resuscitation.

SECTION HIGHLIGHTS

Bariatric Surgery

- The UCHealth Surgical Weight Loss Center - Anschutz Medical Campus received designation as a Center of Excellence from Anthem, Optum, Aetna, and Cigna.
- The program initiated an outpatient sleeve gastrectomy program.
- Jonathan Schoen, MD, worked as a consultant to UCHealth Longs Peak Hospital and Children's Hospital Colorado to launch bariatric surgery programs.

Burn Surgery

- Arek Wiktor, MD, was hired as medical director for the UCHealth Burn and Frostbite Center - Anschutz Medical Campus.

Colorectal Surgery

Clinical Trials:

- Effect of Ultrasound-Guided Transversus Abdominis Plane (TAP) Block on Opioid Consumption Using Dual-Adjunct Therapy with Dexamethasone and Dexmedetomidine Following Minimally Invasive Colorectal Surgery: A Single-Blinded Randomized Clinical Trial (University of Colorado Department of Surgery Academic Enrichment Fund Seed Grant).
- A Randomized, Double-Blind, Placebo-Controlled, Phase Two Dose Ranging Study to Evaluate the Efficacy and Safety of Two-Dose Regimens of Intravenous TAK-954 for the Prophylaxis and Treatment of Postoperative Gastrointestinal Dysfunction in Patients Undergoing Large- and Small-Bowel Resection.
- Efficacy and Safety of the CG-100 Intraluminal Bypass Device in Colorectal and Coloanal Anastomoses: Prospective, Open-Label, Randomized Trial (Industry Funded).
- Protocol for the Comparison of Surgery and Medicine on the Impact of Diverticulitis (COSMID) Trial. (Grant funded by the Agency for Healthcare Research and Quality).

- Jon Vogel, MD, is a member of the American Society of Colon and Rectal Surgeons Clinical Practice Guidelines Committee.
- Elise Birnbaum, MD, serves on the American Society of Colon and Rectal Surgeons Pelvic-Floor Disorders Consortium and is an American Board of Colon & Rectal Surgery oral board examiner.

Trauma Acute Care Surgery

- Michael Cripps, MD, was hired as Trauma Acute Care Surgery Section Chief and UCHealth Trauma Medical Director.
- Catherine Garrison Velopulos, MD, initiated the At-Risk Intervention and Mentoring Program (AIMS) at UCHealth University of Colorado Hospital as part of the national workgroup of the Hospital Alliance for Violence Intervention.
- Zachary Asher, PA-C, was awarded a research award from the Society of Critical Care Medicine for his work Direct Peritoneal Resuscitation Prior to Liver Retransplantation for Primary Graft Nonfunction.
- The NIH/NIGMS RM1 GM131968 Collaborative Program grant for multidisciplinary teams is in its third year of funding Resuscitation Strategies for Achieving Thrombo-inflammatory Homeostasis.

SERVICE

- Robert McIntyre Jr., MD, served as president of the Western Trauma Association (WTA) 2020-2022. Mitch Cohen, MD, is on the WTA Board of Directors.
- Catherine Garrison Velopulos, MD, and Michael Cripps, MD, served on the NIH Study Section - Special Emphasis Panels in 2021 and 2022.
- Christopher Raeburn, MD, serves on the National Comprehensive Cancer Network Guideline Panel for Thyroid Carcinoma.
- Jon Vogel, MD, is an American Board of Colon & Rectal Surgery written exam question writer.

- Elizabeth Kovacs, PhD, served on the following:
 - AA1 Study Section, National Institute on Alcohol Abuse and Alcoholism, NIH charter member, 2018-2022.
 - Alcohol and Immunity Research Interest Group
 - Co-Chair, Program Committee, Alcohol and Immunology Mechanisms of Alcohol Responses. November 2020.
 - Co-Chair, Program Committee, Organ-specific Immune Responses After Alcohol Consumption. Loyola University Chicago, Maywood, Illinois, November 2021.
 - Co-Vice Chair, Gordon Conference on Alcohol-Induced End Organ Diseases, Ventura, California, April 2022.
 - Shock Society, Past President, Chair, Nominating Committee, 2019-2021.
 - 2021 member of the grant-writing workshop at the annual meeting of Society for Black American Surgeons, started in 2019.
 - 2021 member of the board of directors of the Federation of American Societies for Experimental Biology, four-year appointment.

FACULTY AWARDS AND RECOGNITION:

- 5280 Magazine's Top Doctors:
 - Robert McIntyre Jr., MD
 - Jon Vogel, MD
- Maria Albuja Cruz, MD: Inworks Research and Creative Activities Awards Certificate of Special Recognition.
- Elise Birnbaum, MD: 2021 UCHHealth Medical Staff Pioneer/Clinical Innovation Award for leadership in systemwide efforts to successfully reduce the colorectal surgery surgical site infection rate at UCHHealth.
- Franklin Wright, MD: 2021 Bartle Faculty Teaching Award, University of Colorado Department of Surgery, and 2021 Partners in Care Award UCHHealth Annual Medical Staff Award.
- Robert McIntyre Jr., MD: Partners in Care Award UCHHealth Annual Medical Staff Award in 2022.
- Elizabeth Kovacs, PhD: Founder's Basic Science Lecturer, Western Trauma Association.

ENDOWMENTS

- Robert McIntyre Jr., MD: John H. and Cynthia H. Schultz Endowed Chair in Surgery.

GRANTS

- Elizabeth Kovacs, PhD
 - Aging, Macrophage Mediators, and Burn Trauma. September 2020-May 2025
Amount: \$2,838,034
Sponsor: NIH R01 AG018859-16A1
 - Support for the 2021 and 2023 Gordon Research Conferences.
Amount: \$76,431
Sponsor: NIH R13 meetings grant
- Brandon Chapman, MD
Protocol for the Comparison of Surgery and Medicine on the Impact of Diverticulitis Trial.
Amount: \$20,000
Sponsor: Funding Patient-Centered Outcomes Research Institute (PCORI) (PCS-2018C1-10949)
- Catherine Garrison Velopulos, MD
Modifiable Factors in Emergent Presentation of Potentially Elective General Surgical Disease for Patients Who Are Insured or Insurance-eligible.
Amount: \$1,575,000
Sponsor: NIH R01 funding
- Arek Wiktor, MD
Randomized Trial of Fresh Frozen Plasma Versus Albumin in Acute Burn Resuscitation.
Amount: \$1,500,000
Sponsor: Department of Defense Grant



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BREAKTHROUGH

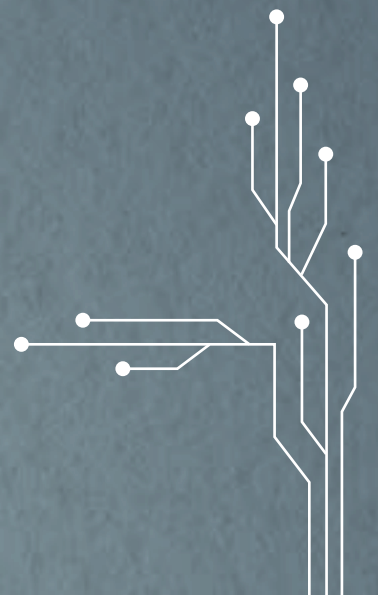
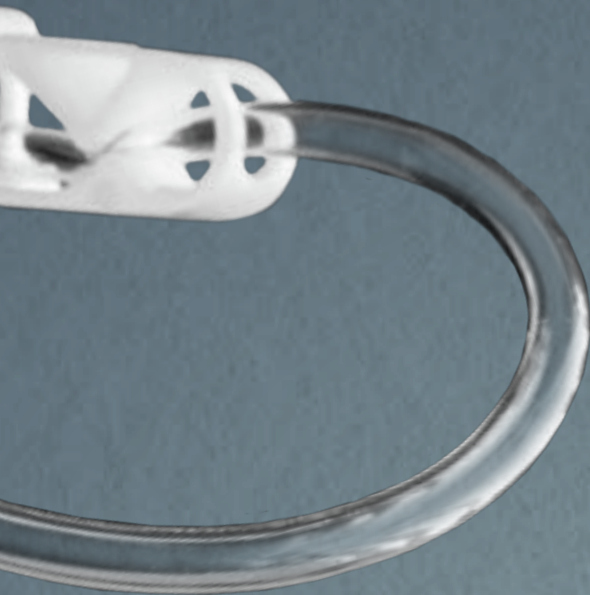


BRINGING LABORATORY INNOVATIONS TO THE PEDIATRIC OR.

Infants, toddlers, and older children can face numerous health challenges—many due to developmental issues—that are hard to address because of the child’s size, developmental stage, or the issue itself. Innovations that reduce these challenges can be life-changing for both these young patients and their parents.

In the Division of Pediatric Surgery, our doctors are well-versed in breakthrough innovations, big and small, including the Button Huggie, a precision-designed medical device that secures gastrostomy buttons onto the abdominal wall of children who need supplemental enteral nutrition. Researchers have also developed, refined, and disseminated to other surgeons a new technique to treat the common complication of rectal prolapse in patients. And they’ve defined the role of the long, non-coding RNA GAS5 in the progression of diabetic wounds, which is also defining a potential target for molecular wound therapy.

While each might be just a piece of the larger puzzle, these breakthroughs represent huge steps for pediatric patients and their families. And our pediatric research is leading the way.



DIVISION HIGHLIGHTS

Clinical:

- The Division's efforts are included within the number-one hospital ranking in *U.S. News & World Report* for gastrointestinal surgery.
- For all locations combined, pediatric surgery performed 4,548 surgeries (case volume with 10-minute OR charge) in 2021. This is a 4.29% increase from 2020 and a 13.98% increase from 2019.
- The Pediatric Colorectal Section initiated a spinal defects clinic in late 2020 and had more than 300 completed appointments during the calendar year 2021.
- David Partrick, MD, and Jose Diaz-Miron, MD, oversaw the randomized trial Postoperative Pain Management Pectus Excavatum to assess different pain-control modalities.
- Jose Diaz-Miron, MD, began a bilingual clinic for pediatric surgery.

Educational:

- Lea Wehrli, MD, is a fully trained pediatric surgeon from Children's Hospital in Lucerne, Switzerland. Wehrli is observing and working alongside our team and will return to Switzerland in 2023 to establish and build a pediatric colorectal surgery program.
- Sarkis Derderian, MD, accepted an assistant professor of pediatric surgery position after his graduation from our Pediatric Surgery Fellowship.
- Ann Kulungowski, MD, associate professor of pediatric surgery, became program director of the Pediatric Surgical Critical Care Fellowship.
- David Partrick, MD, professor of pediatric surgery, became program director of the Pediatric Surgery Fellowship.

Research:

- Pediatric surgery faculty published 64 peer-reviewed journal publications in the fiscal year 2021.
- Steven Moulton, MD, received Canadian Patent No. CA 2,871,608 Hemodynamic Reserve Monitor and Hemodialysis Control. Inventors: Gregory Grudic, Steven Moulton, MD, and Isobel Mulligan.

- Ken Liechty, MD, received U.S. Patent No. 20210187128, Color-Changing Silk Patch for Visible ROS Detection.

SECTION HIGHLIGHTS

Colorectal Surgery:

- Andrea Bischoff, MD, assumed directorship of the Colorectal Surgery Section from Alberto Pena, MD, effective February 2021.
- Three very successful virtual courses were hosted by the section:
 - The Surgical Treatment of Colorectal Problems in Children: March 25-26, 2021; 3,000 participants from 112 different countries.
 - Pena Course for Advanced Practice Providers and Nurses: April 8, 2021; 579 participants.
 - Hirschsprung Course: August 12-13, 2021; 2,436 participants.
- Monthly international colorectal web meetings with attendance from 23 different countries.
- Monthly web meeting "Club Ibero-Americano de Cirugía Colorrectal Pediátrica," presented in Spanish.

Fetal Surgery – Colorado Fetal Care Center:

- The Colorado Fetal Care Center (CFCC) celebrated its 10th year with outpatient clinic volume and referral volumes steadily increasing since its establishment. Referral volume has grown by 35% from 2020, and outpatient clinic volume has increased by 2.1% since 2019.
- CFCC's research portfolio continues to grow. Currently, there are 28 active research studies.
- Implemented internal seed grants for multicenter study/research with two awards for \$16,500. One for Fetal MRI Pre- and Post-laser for TTTS, and the other for Cesarean Delivery Desensitization.
- Continued participation in numerous multicenter studies.
- Sarkis Derderian, MD, joined the CFCC on September 1, 2021.
- Telemedicine continues to expand, and we now cover six locations including the Yampa Valley, Sterling, Grand Junction, Alamosa, Gunnison, and Aspen.

- Precision medicine continues to evolve with the development of the Multidisciplinary Precision Medicine Board. To date, we have performed 17 whole exomes on fetal patients.
- Fetal surgery volume has increased by 53% from 2019 and has remained steady.

SERVICE

- Frederick Karrer, MD, continued with his military service in the U.S. Army Reserves and was deployed for 30 days in 2021.
- Ken Liechty, MD, is president-elect of the Wound Healing Society.
- David Partrick, MD, is treasurer of the Pacific Association of Pediatric Surgeons.

FACULTY AWARDS AND RECOGNITION:

- 2021 Colorado Springs Top Doctors:
 - John Bealer, MD
 - David Bliss, MD
- 5280 Magazine's Top Doctors:
 - Frederick Karrer, MD
 - Ann Kulungowski, MD
 - David Partrick, MD
- Andrea Bischoff, MD, was inducted into the Gold Humanism Honor Society on November 19, 2021.
- Alberto Pena, MD, received the first-ever Alberto Pena Medal from the Mexican Society of Pediatric Surgery, which created the award to honor Pena's great academic and scientific merits as well as his contributions to pediatric surgery worldwide.

ENDOWMENTS

- Thomas Inge, MD, held the Akers Endowed Chair in Pediatric Surgery until his departure in October 2021.

GRANTS

- Steven Moulton, MD
Business-development grant.
Amount: \$108,000
Sponsor: State of Colorado, Office of Economic Development and International Trade
- Steven Moulton, MD
The Compensatory Reserve Index: Next Steps in Evolving a New Vital Sign to Meet Warfighter Needs.
Amount: \$4,800
Sponsor: The Medical Technology Enterprise Consortium with the U.S. Army Medical Research and Development Command
- Ken Liechty, MD
A Novel Anti-inflammatory and Antioxidant Therapy for Treating Non-healing Diabetic Foot Ulcers. COVID-19/ARDS therapeutics co-investigator.
Amount: \$261,098
Sponsor: NIH SBIR Awards
- Ken Liechty, MD
Economic grant.
Amount: \$250,000
Sponsor: State of Colorado, Office of Economic Development and International Trade
- Carlos Zgheib, PhD
Inhibition of Pressure Ulcers Development With Nanosilk.
Amount: \$30,000
Sponsor: 2021 Wound Healing Foundation – Medline Corius Innovations Grant

A VISION FOR THE FUTURE OF EYE TRANSPLANTATION.

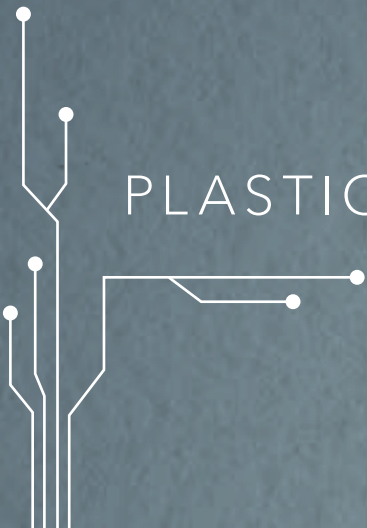
Around the world, 250 million people are visually impaired, including a multitude of veterans here in the United States. Currently, a prosthetic is the main option for treating people who lose an eye. Within the Division of Plastic and Reconstructive Surgery, Kia M. Washington, MD, and her lab have been studying whole-eye transplantation as an alternative.

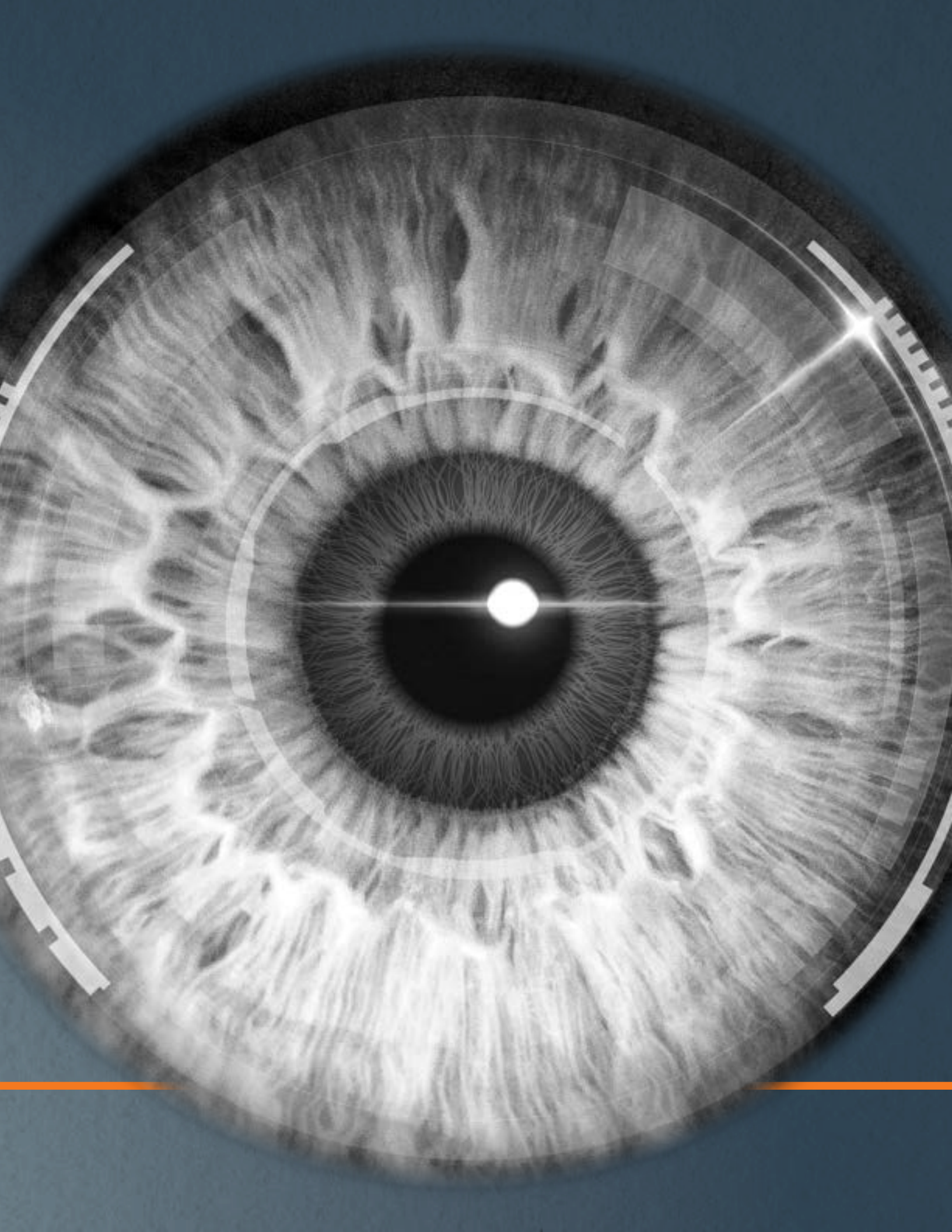
Challenged by tissue viability, neurodegeneration, and tissue rejection, whole-eye transplantation has previously seemed elusive, but our comprehensive research strategy has resulted in great insights and promising results. In tandem with recent advances in regenerative medicine, our work is close to making whole-eye transplantation a reality.

Through whole-eye transplantation, numerous patients can receive a full optical system to restore their vision, as well as having an alternative to a prosthetic. But our scope transcends even that, because the technologies and techniques that grow from our research can have far-ranging benefits to the greater transplant and regenerative-medicine fields, as well as to ophthalmologists and neurologists in other arenas, making other advances mere heartbeats away.

VISIONARY

PLASTIC AND RECONSTRUCTIVE SURGERY





DIVISION HIGHLIGHTS

Clinical:

- Justin Cohen, MD, performed the first immediate lymphatic reconstruction for a breast cancer patient on our campus.
- Established the Adult Craniomaxillofacial Surgery Program with the recruitment of Jason Yu, MD. The program is designed to provide a modern approach to craniofacial care by offering services to the evolving needs of an adult craniofacial population, including pathology, reconstruction, facial pain, and dental rehabilitation services.

Educational:

- The Plastic Surgery Residency has reached a full resident complement for both ACGME-accredited programs, with three residents in the independent program and 12 residents in the integrated program.
- Best Poster Presentation Award at the 36th Annual Student Research Forum, School of Medicine. Macromastia and Reduction Mammoplasty: Analysis of Total Cost of Care and Opioid Consumption at 10 Years Post-Operatively was presented by medical student Kayvon Jabbari with support from mentors Matt Iorio, MD, and Christodoulos Kaoutzanis, MD.

Research:

- Plastic and Reconstructive Surgery faculty published 17 peer-reviewed journal publications in 2021.
- Zhirui Wang, PhD, established a service center that provides a resource for expression and purification of recombinant immunotoxins and proteins necessary for pre-clinical and basic scientific studies. This unique core uses a yeast *Pichia Pastoris* expression system to develop diphtheria toxin-based recombinant immunotoxins/fusion toxins for specifically depleting targeted cell population in vivo.
- Christodoulos Kaoutzanis, MD, started a randomized controlled study evaluating the impact of same-day discharge on patients undergoing mastectomy with immediate implant-based breast reconstruction. He specifically compares the outcomes of patients who are discharged the day of surgery vs. patients who are on postoperative day one, aiming to identify differences in complications, as well as differences in patient satisfaction, quality of life, and discharge perceptions.

- Brooke French, MD, is conducting research on Le Ver, a silk-based skin care line created by University of Colorado School of Medicine faculty member Kenneth Liechty, MD. With the use of a 3-D cosmetic camera system, the team evaluates patients before and after one month of use to provide objective data related to product effectiveness.
- Kia M. Washington, MD, is engaged in basic science and translational projects investigating whole-eye transplantation within the setting of vascularized composite allotransplantation. Her goal is to restore vision following disease, ocular trauma, and ischemic or degenerative damage with clinical whole-eye transplantation. Her team has developed the world's first orthotopic vascularized whole-eye transplant small animal model. The next phase of research will involve a comprehensive approach to addressing the challenges of whole-eye transplantation, including immunotherapeutic, retinal ganglion cell preservation, cadaveric surgical approaches, and optic-nerve regenerative strategies.

SECTIONS

Transgender Program

The Plastic and Reconstructive Surgery Division now offers the full breadth of cosmetic and reconstructive gender-affirmation surgeries for our transgender community. We have recruited Julian Winocour, MD, to join Christodoulos Kaoutzanis, MD, and partner with urologist Ty Higuchi, MD, PhD.

Pediatric Craniofacial Program

The Pediatric Craniofacial Program at Children's Hospital Colorado has launched a biorepository that will house patient blood and tissue samples to be used for research. The team is now able to access these newly available samples that are critical to advancing the understanding of various conditions affecting craniofacial development and facial biology.

Wound and Ostomy Program

Under co-directors Matt Iorio, MD, and Garrett Moore, DPM, the wound care program is addressing acute and chronic wounds with expert clinical and surgical management. The focus is on continued growth and expert care for our patients throughout inpatient and outpatient care at the University of Colorado

Anschutz Medical Campus, with the potential for dedicated space and elevation of care with our own hyperbaric oxygen chambers.

- **Extremity Microsurgery and Targeted Muscle Reinnervation (TMR)**

We have continued to build and advance the national reputation of the Extremity Microsurgery and TMR Program, resulting in multiple peer-reviewed publications and editorial board memberships. We have recruited Mark Greyson, MD, to join Matt Iorio, MD. They have both received fellowship training in hand and microsurgery.

We have established a regional and national network in combination with the limb-salvage program to offer nerve surgery for chronic pain, phantom-limb syndrome, or functional losses following nerve injuries. This includes nerve repair, nerve transfers, and targeted muscle reinnervation for treatment of complex nerve injuries and pain. Through this program, we have been successful at improving quality of life for patients, with increased function and decreased pain.

In collaboration with the VA Eastern Colorado Health Care System, we are establishing a third location in the United States VA Health System for nerve surgery and TMR in combination with osseointegration. This program provides care for amputees to improve function and decrease chronic pain.

SERVICE

- Christodoulos Kaoutzanis, MD, was appointed to serve as the Young Fellows Association Liaison Representative to the American College of Surgeons Advisory Council for Plastic and Maxillofacial Surgery.
- Kia M. Washington, MD, serves as chair of the Diversity, Equity, and Inclusion (DEI) Committee and is working to develop the DEI curriculum for the Department of Surgery.

FACULTY AWARDS AND RECOGNITION

- Mark Greyson, MD, received the Young Leader Award from the American Society for Surgery of the Hand.

- University of Colorado Plastic Surgery has been awarded two patents through CU Innovations:
 - Compositions and Methods for Inducing Immune Tolerance in Transplantation Recipients. Inventors: Christene A. Huang, PhD; David M. Neville Jr., MD; Elizabeth Anne Pomfret, MD, PhD; Raimon Duran-Struuck, DVM, PhD; Zhirui Wang, PhD.
 - Compositions, Methods, and Kits for Analyzing and Treating Virally Infected Patients Using Galectin-3 as a Biomarker. Inventors: Christene A. Huang, PhD, and Nalu Navarro-Alvarez, MD, PhD.

GRANTS

- Kia M. Washington, MD, and Christene Huang, PhD
Developing a Novel Preservation Solution for Vascularized Composite Allograft Transplantation.
Amount: \$1,298,882
Sponsor: U.S. Army Medical Research Acquisition Activity
- David Mathes, MD
Antioxidant Carbon Nanoparticles for T-cell Modulation in the Vascularized Composite Allograft.
Amount: \$10,000
Sponsor: Plastic Surgery Foundation
- David Mathes, MD, and Christodoulos Kaoutzanis, MD
Benefits of 3D Voxel Printing for Surgical Planning and Operative Decision-making.
Amount: \$150,000
Sponsor: Colorado Office of Economic Development and International Trade
- Kristen Lowe, DDS, MS
Digital Workflow for Pre-surgical Orthodontic Preparation for Patients with Cleft Lip and Palate.
Amount: \$275,000
Sponsor: Align Technology, Inc.
- Zhirui Wang, PhD
CCR4-IL2 Bispecific Immunotoxin for Targeted Therapy of Cutaneous T-cell Lymphoma.
Amount: \$400,000
Sponsor: Rock Immune LLC; National Institutes of Health
- Nalu Navarro-Alvarez, MD, PhD, and Christodoulos Kaoutzanis, MD
Pilot grant awards.
Amount: \$46,650
Sponsor: Colorado Clinical and Translational Sciences Institute

THE DOCTOR-PATIENT BOND THAT HELPED BEAT CANCER.

When Gerry Turner was 74, doctors discovered something was blocking his bile duct, so they sent him to UCHealth University of Colorado Hospital, a National Pancreas Foundation Academic Center of Excellence. "It was an early discovery, fast diagnosis, and good doctoring," said Gerry, who was particularly confident because of the multidisciplinary review process led by the Division of Surgical Oncology. But he was even more confident in his surgeon, Richard Schulick, MD, with whom Gerry quickly bonded over shared backgrounds and a shared love of cars.

Before Schulick performed the seven-hour surgery on Gerry in January 2018, he gave Gerry a choice: Remove the entire pancreas, which greatly reduces the risk of forming another cancer but definitely results in diabetes, or take out just half of the pancreas, which increases the risk that Gerry could develop another new cancer but results in a better overall quality of life.

After discussing the options with Schulick, Gerry elected to keep half of his pancreas. It's a decision he doesn't regret. "If you're a doctor, there's a lot of responsibility," noted Gerry regarding his interactions with Schulick. "There's the lasting bond there, and it's a two-way street. It shows his compassion. It's more than a job for him. It's a life."

CONFIDENCE



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DIVISION HIGHLIGHTS

Clinical:

- The Division's clinical programs are characterized by a multidisciplinary approach. Our patients are discussed in an "organ dedicated" multidisciplinary conference that involves several experts of interest from different disciplines to guarantee the best care. Over the past year, we discussed 2,475 patients in our multidisciplinary conferences. The multidisciplinary conference is accessible via video link for our faculty working at other hospital sites in Colorado and for external providers who want to discuss their patients' care with us.
- We have vast expertise in every type of surgery. From the minimally invasive approach (laparoscopy and robotic surgery) to more advanced open procedures, including resection and reconstruction of blood vessels involved by tumors, our providers can offer the most advanced treatments for all kinds of tumors.
- Our providers are focused on specific disease treatment with high expertise and high-volume activity with a consequent improvement of outcome.
- Our faculty members provide patient care across four different UHealth hospitals in Colorado and collaborate with Children's Hospital Colorado and the Rocky Mountain Regional VA Medical Center on the University of Colorado Anschutz Medical Campus. In the past year, we expanded our surgical oncology program at UHealth Highlands Ranch Hospital, bringing state-of-the-art surgical care to cancer patients in south Metro Denver. Patients can take advantage of our expertise and unique treatment options in a facility that is easy to navigate and offers the convenience of being closer to home.
- Several of our faculty are also members of the NCI-designated University of Colorado Cancer Center, allowing our patients access to innovative clinical trials.

Educational:

- We continue to expand the Department of Surgery Medical Student Summer Research Program, now in its third year. The program is a six-week,

mentored research experience for first-year medical students. Students are paired with a surgeon mentor and participate in a structured curriculum. The University of Colorado School of Medicine has approved the program as a 12-credit elective beginning in 2022.

- We have implemented a new curriculum for residents participating in two dedicated years of research. The curriculum was designed based on feedback from residents and faculty. Residents participate in a series of seminars to allow them to seamlessly transition from the clinical years to the research years and back into the clinical years of their residency. Content includes didactics around performing and publishing research, career development training, and skills labs to prepare residents returning to the clinical years.
- Our Division leads the robotic curriculum program for our general surgery residents.

Research:

- Our academic mission is demonstrated by a large body of research activity. Our providers are focused on clinical and translational research:
 - Overall, we produced 56 publications in peer-reviewed journals in 2021.
 - Our faculty members are consistently invited as speakers at national and international meetings.
 - Our residents and fellows present abstracts at the most important national and international meetings.
 - We lead industry-sponsored international multicenter studies (e.g., use of intraoperative pancreatoscopy in IPMN patients).
 - We lead and participate in several international research projects and collaborations.
- The Division of Surgical Oncology has an extremely productive tumor immunology lab. Our research focuses on the discovery of novel immunosuppressive pathways and their applications in cancer therapy. We are actively characterizing novel immune checkpoints for T cells. So far, our research team has identified CD112R (also called PVRIG) and GPR171 as two potential immune checkpoints important for cancer immunotherapy. The other main research direction in the lab is to determine pathways

that limit effector T-cell infiltration in the tumor microenvironment. The CD93/IGFBP7 axis is a key pathway we identified that contributes to tumor vascular dysfunction and thereby T-cell exclusion. The most recent work in the lab has led to the finding of GPR182, a lymphatic chemokine scavenger that acts as a brake to limit effector T-cell infiltration in melanoma. By developing therapeutic agents against these novel targets, we are interested in various clinical applications of cancer immunotherapy.

SECTIONS

- **Breast Program**

The Multidisciplinary Breast Program has expanded to UHealth Highlands Ranch Hospital and UHealth Cherry Creek Medical Center. Our regional nurse navigators provide one-on-one consultations with new cancer patients to tailor their visits based on the preferred site of service and providers. Similar to our multidisciplinary program at University of Colorado Anschutz Medical Campus, patients meet with breast surgery specialists, medical and radiation oncology, and when indicated, plastic surgery, genetic counselors, and oncology support services. Breast imaging and pathology are reviewed by our expert breast radiologists and pathologists to develop an optimal treatment plan.

The expansion of our breast cancer program to Highlands Ranch and Cherry Creek enables patients to receive world-class, cutting-edge care closer to home in a community setting. Expansion of our breast cancer clinical trials to these locations is ongoing. Exciting clinical developments include Enhanced Recovery After Surgery (ERAS) protocols for breast surgery patients to optimize and standardize peri-operative pain management and minimize opioid use. Implementation of de-escalation protocols to tailor treatment based on patient and tumor factors means some breast cancer patients no longer require axillary surgery or radiation and can potentially omit chemotherapy or undergo shorter courses of radiation.

- **Gastroesophageal Program**

Our Division leads a large-volume gastroesophageal program. The majority of our patients can be surgically treated for gastric and esophageal neoplasms with a minimally invasive approach (laparoscopic/thoracoscopic or robotic-assisted). Our team of experts recently developed a gastric preconditioning protocol linked to the ERAS program to reduce post-operative gastroesophageal leaks and improve outcomes following minimally invasive esophagectomy.

- **HIPEC Program**

The Division of Surgical Oncology hosts one of the largest peritoneal cytoreductive surgery programs in the country. Some of the tumors that spread to the peritoneum, including cancers of the colon, appendix, ovary, and stomach, as well as mesothelioma, neuroendocrine cancer, sarcomas, and other less-common tumors, can be evaluated by a team of dedicated experts to assess the opportunity of a surgical peritoneal cytoreduction with the use of intraperitoneal and systemic chemotherapy.

- **Liver Program**

Our liver program offers a multidisciplinary approach to patients with benign and malignant liver lesions with unique treatment options, including the hepatic artery infusion pump for unresectable liver metastasis. In addition, we are the only program in Colorado to have expanded the minimally invasive approach to complex liver resections, improving our patients' postoperative experience.

- **Pancreas Program**

- With approximately 200 operations per year, the Division of Surgical Oncology hosts one of the largest pancreatic programs in the country. We offer our patients a variety of surgical approaches to pancreatic diseases, from minimally invasive procedures (laparoscopic and robotic) to complex pancreatic resections associated with vascular resection and reconstruction for locally advanced diseases.
- Because of our multidisciplinary approach, the five-year survival rate for all stages of pancreatic cancer is 13.9% in our program, vs. a state average of 9%.

- Our program offers a dedicated clinic for patients at increased risk for pancreatic cancer and a cystic-lesion clinic.
- We are one of the few centers that offer a personalized approach to the surgical treatment of precancerous lesions through the use of intra-operative pancreatoscopy.
- We offer a comprehensive approach to chronic pancreatitis patients in collaboration with our GI colleagues.
- In collaboration with Children's Hospital Colorado, we developed one of the few pediatric pancreas centers in the country dedicated to the treatment of pediatric pancreatic diseases, from pancreatitis to pediatric pancreatic neoplasms.
- Our program has been recognized as a National Academic Center of Excellence for Pancreatic Cancer by the National Pancreas Foundation.

SERVICE

- Marco Del Chiaro, MD, PhD, FACS, served as a member of the Pancreatic Cancer Expert Panel of the National Comprehensive Cancer Network. He also was elected vice-chair of the fellows sub-committee of the International Relation Committee of the American College of Surgeons and served as council member of the International Association of Pancreatology.
- Martin McCarter, MD, served on the NCI Clinical Trials and Translational Research Advisory Committee, Gastric and Esophageal Cancer Working Group, and the NCCN Sarcoma Panel.
- Richard D. Schulick, MD, MBA, FACS, is director of the NCI-designated University of Colorado Cancer Center. He is a member of the National Comprehensive Cancer Network Board of Directors and a member of the American Surgical Association Program Committee.
- Camille Stewart, MD, served as a member of the Melanoma Subcommittee of the Scientific Program Committee for the Society of Surgical Oncology.

FACULTY AWARDS AND RECOGNITION

- 5280 Magazine's Top Doctors:
 - Martin McCarter, MD
- Expertscape: World Experts in Pancreatic Neoplasms:
 - Richard D. Schulick, MD, MBA, FACS
 - Marco Del Chiaro, MD, PhD, FACS

GRANTS

- Richard D. Schulick, MD, MBA, FACS
University of Colorado Cancer Center Support Grant 2022-2027.
Amount: \$22,759,827
Sponsor: NIH
- Martin McCarter, MD
Oral Decitabine/Cedazuridine (Invoqi) in Combination with Nivolumab as a Strategy to Enhance the Efficacy of Immune Checkpoint Blockade in Unresectable or Metastatic Mucosal Melanoma, 2021-2023.
Amount: \$352,678
Sponsor: NCCN
- Martin McCarter, MD
Improving Immunotherapies to Melanoma Through Modulation of MAIT Cell Activation by the Microbiome, 2020-2022.
Amount: \$399,830
Support: NIH
- Yuwen Zhu, PhD
The CD93 Pathway and Melanoma Therapy, 2021-2026.
Amount: \$1,250,000
Sponsor: NIH 1R01 CA269644-01A1
- Yuwen Zhu, PhD
Predictive Biomarkers for the Therapy of Vascular Normalization, 2021-2023.
Amount: \$812,884
Sponsor: DynamiCure Biotechnology



GIVING TO SAVE OTHERS. RARE, BUT EXTRAORDINARY.

Brandi Thornton doesn't wear a superhero's cape, but, having saved two people's lives directly (and two more indirectly), we think she should. She's done something very few people have. She's been a living organ donor—twice.

Because her young neighbor years ago died in need of a lung transplant, Brandi was particularly attuned to the need for viable organs. So, in 2017, she donated a kidney to a man in Ohio, and in 2019, she gave part of her liver to a patient at Children's Hospital Colorado. Both donations she made through UCHealth.

The Division of Transplant Surgery is uniquely situated to make life-changing impacts: It's the only transplant program in Colorado that will perform living liver donations, and one of only a few in the country that will perform a second transplant surgery on the same donor. And we've got an altruistic demographic: at UCHealth, 20% of liver transplants are from living donors, vs. only 5% nationwide.

Our goal is to continue to grow and lead in the areas of innovative transplant surgery, research, and educating the next generation of transplant surgeons. To date, the Division of Transplant Surgery has performed more than 7,500 solid organ transplants, with more than 1,300 of these involving living donors. With more people like Brandi Thornton out there, we hope to see that number increase.



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DIVISION HIGHLIGHTS

Clinical:

- On November 17, 2021, Thomas J. Pshak, MD, and Trevor Nydam, MD, successfully performed the first robotic kidney transplant in a patient with a BMI of 43. This surgical accomplishment was a first in Colorado, and we are the only transplant center west of the Mississippi River to perform this operation. This new capability has opened the door for many patients previously denied a life-saving transplant. This surgical approach has the added benefit of much smaller incisions, as well as faster and narcotic-free post-operative recovery. This novel approach to kidney transplantation in Colorado gives us the unique opportunity to become a regional center of excellence in transplanting morbidly obese patients.
- UHealth University of Colorado Hospital's Colorado Center for Transplantation Care, Research and Education (CCTCARE) is proud to be the longest-running liver-transplant program in the world. It was started by Tom Starzl, MD, who in 1962 performed the first kidney transplant in Colorado and in 1963 performed the first liver transplant in the world.
- We are one of the largest transplant programs in the United States offering liver, kidney, pancreas, heart, and lung transplantation with more than 7,500 total solid organ transplants. More than 1,300 of these were living donor transplants.
- In 2021, University of Colorado School of Medicine transplant surgeons gave the gift of life to 460 patients by performing 129 liver, 272 kidney, five pancreas, 27 heart, and 27 lung transplants.
- In 2021, living donors provided 119 total organs (97 kidney and 22 liver donors). Of the 97 kidney donors, 50 were from individuals willing to donate to people they had never met (Nondirected Donor, or NDD). Our NDD living-donor liver-transplant program is the largest in the U.S. and has allowed us to eliminate the waiting list for children waiting for a liver at Children's Hospital Colorado.
- Our commitment to being responsive to the needs of individuals of all backgrounds has led to our robust Hispanic Kidney Transplant Program. The program's entire staff is bilingual in Spanish and English and is trained to understand not

only the medical needs of their patients, but also how cultural differences affect patient care. Since the inception of the Hispanic Kidney Transplant Program, there has been an 80% and 20% increase in Hispanic patients listed and transplanted, respectively. This success led to the expansion of the Hispanic Transplant Program to include liver transplant candidates.

- Children's Hospital Colorado's liver-transplant program has a 100% one-year survival and a >1.8-month median transplant wait time.

Educational:

- The Division of Transplant Surgery has two American Society of Transplant Surgeons-approved fellowship positions.
- We have produced 112 patient education videos that are hosted on the Department of Surgery YouTube channel.

Research:

- Bruce Kaplan, MD, joined our team as medical and scientific director of CCTCARE. Kaplan is an internationally known researcher and clinician in organ transplantation. He has close to 400 peer-reviewed papers and more than \$20 million in extramural grants. He also has written the definitive textbook on immune pharmacology and has held three endowed chairs. Kaplan and Elizabeth Pomfret, MD, PhD, FACS, have built an infrastructure for research with several high-quality recruits in the areas of bioinformatics, grant writing, and database architecture.
- Our transplant team has been invited to present lectures at all the major liver and kidney transplant meetings nationally and internationally (12 regional, 57 national, and 14 international in 2021). We continue to contribute to scientific and clinical literature with more than 110 manuscripts published this year.
- Hunter Moore, MD, completed training with concurrent NIH funding and has joined our transplant surgery staff. Moore was awarded a K99 during fellowship training and recently received an NIH R00 award. His research is focused on fibrin deposition driving graft dysfunction following organ transplantation.

- **Trevor Nydam, MD, and Hunter Moore, MD,** are working on novel solutions to improve organ preservation and graft function while also investigating ways to manage deceased donors to increase availability and improve organ function and long-term survival. They are evaluating the mechanisms that drive fibrinolysis dysfunction in both the recipient and donor organs. At the same time, they are developing clinical expertise in advanced organ recovery strategies. These include normothermic regional perfusion of the donor (extracorporeal perfusion of abdominal organs) and machine perfusion of the liver after it has been removed from the donor prior to implant in the donor. These research efforts will not only lead to increased graft survival, but will also increase the number of organs used for transplantation. Overall, these efforts have the potential to make a large impact on reducing the demand for organs in patients awaiting life-saving transplants in the setting of end-stage liver disease.
 - **James Pomposelli, MD, PhD, FACS,** is co-author of the Region 8 split-liver variance that allows transplant programs to split a deceased donor liver into two parts to be shared by an adult and child or two adults at the same program. He has also furthered the development of the updated Model for End-stage Liver Disease (MELD 3.0) score that reduces allocation disparities experienced by women, a problem that has existed for more than 20 years.
- Foundation. In addition, she is the former executive editor of Transplantation and currently serves on the Editors' Advisory Council for Transplantation.
- **James Pomposelli, MD, PhD, FACS,** is chair of the United Network for Organ Sharing (UNOS) Liver and Intestinal Transplantation Committee, responsible for national liver and intestine allocation policy. He serves as chair of the ASTS Legislative, Regulatory, and Reimbursement Committee and is a member of the ASTS Living Donor Committee. Pomposelli continues to serve on the UNOS Status 1a/1b and MELD/PELD subcommittees and is a member of the Medical Advisory Board of Donor Alliance.
 - **Peter Kennealey, MD,** is vice president, regent, and chair of the Transplant Specialty Group for the International College of Surgeons, United States section. He is chair of the Graduate Medical Committee of the Southwestern Surgical Congress and chair of the UNOS kidney paired donation workgroup. Kennealey also serves on the UNOS Kidney Committee, the Scientific Studies Committee for the American Society of Transplant Surgeons, and the advisory boards of Donor Alliance and the National Kidney Foundation.
 - **Thomas J. Pshak, MD, FACS,** is a member of the Fellowship Education Committee for the ASTS.
 - **Megan Adams, MD,** is a member of the National Liver Review Board and serves on the OPTN/ UNOS Pancreas Committee. She is a member of the ASTS Vanguard Committee and the Outreach Committee for the International Pediatric Transplant Association and serves on the International Liver Transplantation Society Living Donor Liver Transplant Work Group.
 - **Katherine Klingenberg, PA-C,** is a member of the ASTS Advanced Transplant Provider Committee.
 - **Katie Moller, PA-C,** is a member of the Quality Advisory Committee for the Department of Surgery.

SERVICE

- **Elizabeth Pomfret, MD, PhD, FACS,** is president-elect of the American Society of Transplant Surgeons (ASTS), chair of the ASTS Wellness and Peer-to-Peer Support Committee, and chair of the International Liver Transplant Society Development Committee. She serves on the American Board of Surgery (ABS) Transplant Advisory Council and is an examiner for the ABS. She serves on the University of Colorado School of Medicine Executive Committee of the Board of Directors and the University of Colorado School of Medicine Governance Committee. Pomfret is a board member of the Donor Alliance, CU Medicine, and the American Transplant

FACULTY AWARDS AND RECOGNITION

- Elizabeth A. Pomfret, MD, PhD, FACS:
 - 2021 International Liver Transplant Society – Recipient of International Women’s Day Recognition.
 - 2021 University of Cincinnati Heekin Family Visiting Professor.
- Megan Adams, MD: Enrichment Fund for Women in Surgery.
- Katherine Klingenberg, PA-C: Allied Health Provider of the Year.

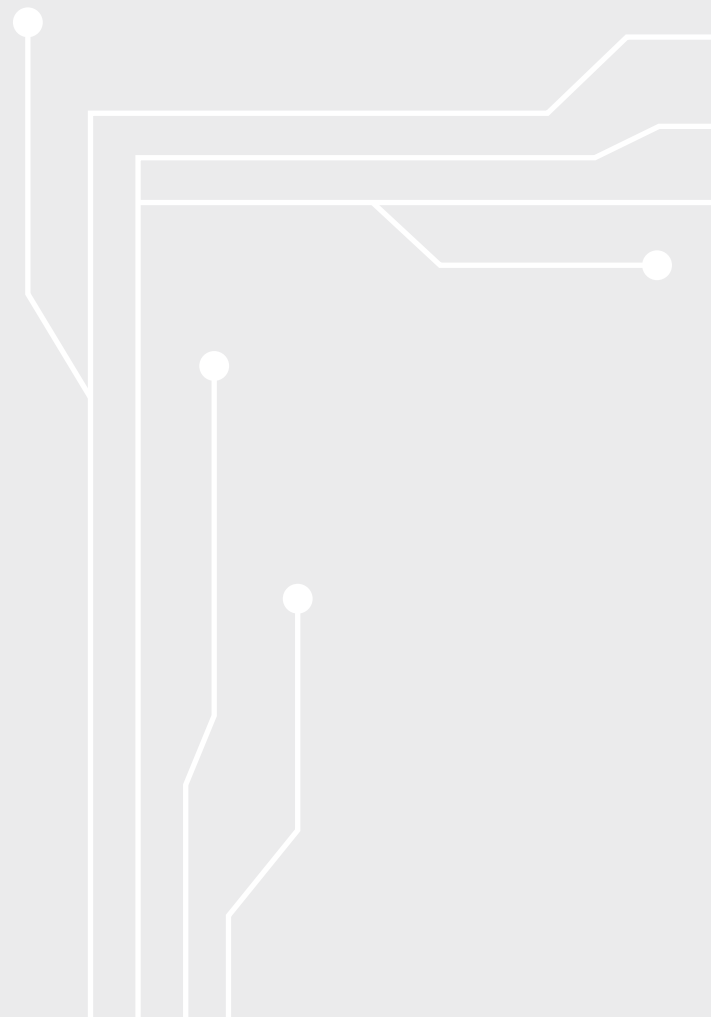
ENDOWMENTS

- Elizabeth A. Pomfret, MD, PhD, FACS: Igal Kam, MD, Endowed Chair in Transplantation Surgery.

GRANTS

- Hunter Moore, MD
Persistent Microvasculature Thrombosis Caused by Fibrinolysis Shutdown Driving Delayed Graft Function in Liver Transplant Recipients, June 2020–July 2021.
Amount: \$256,564
Sponsor: National Heart, Lung, and Blood Institute
- Hunter Moore, MD
Fibrinolysis Dysfunction Impact on Graft Function in Liver Transplantation, August 2021–July 2024.
Amount: \$750,000
Sponsor: National Heart, Lung, and Blood Institute
- Monica Grafals, MD
Use of Acthar in CKD Stage V or ESRD Patients in Preparation for a Kidney Transplant, January 2018–January 2023.
Amount: \$613,500
Sponsor: Mallinckrodt Inc. Transplant Content

- Elizabeth Pomfret, MD, PhD, FACS
A 12-month, Open-label, Multicenter, Randomized, Safety, Efficacy, Pharmacokinetic (PK), and Pharmacodynamic (PD) Study of Two Regimens of Anti-CD40 Monoclonal Antibody, CFZ533 vs. Standard of Care Control, in Adult de novo Liver Transplant Recipients with a 12-month Additional Follow-up (CONTRAIL I), March 2019–August 2023.
Amount: \$143,340
Sponsor: Novartis Pharmaceuticals
- Trevor Nydam, MD
Continued Access Protocol Study for the Use of the ORganOx Metra Normothermic Machine Perfusion Device in Human Liver Transplantation, August 2021–August 2026.
Amount: \$113,536
Sponsor: Organ Recovery Systems







UROLOGY

ENDAVOR



GOING WHERE OTHERS HAVE YET TO GO IN UROLOGIC RECONSTRUCTION.

Lifesaving cancer treatments are necessary, but they can sometimes lead to additional complications. Such was the case for Pamela Jacobsen, who underwent several bowel cancer surgeries followed by numerous corrective surgeries. Eventually saddled with a nephrostomy tube, which mimicked the job of the ureter but inconveniently and uncomfortably exited out her back, Pamela questioned her doctors about alternatives. She was told she'd have the tube for the rest of her life.

A nurse suggested Pamela speak with the UHealth Urology Clinic to see if there were other options, and, it turns out, there were. Ty Higuchi, MD, PhD, offered Pamela the first good news in a while: a complex reconstructive surgery could result in removing the tube.

This and other endeavors are possible with the Division of Urology because we have multidisciplinary teams that can anticipate the challenges caused by lifesaving cancer treatments. Also, we have been recognized as one of the most dynamic and productive urology programs in the country, offering state-of-the-art care to patients in the Rocky Mountain region and nationwide.

This is why, six weeks after recovering from the two-and-a-half-hour surgery, Pamela was tube-free. It all goes to show that complex urologic conditions don't have to mean living with uncomfortable results—the right second opinion can bring about a second way to live life.

DIVISION HIGHLIGHTS

Clinical:

- Our pediatric urology facility at Children’s Hospital Colorado remains one of the top practices in the nation according to *U.S. News & World Report*, ranking number six in the country and number one in the region. UCHealth University of Colorado Hospital was named one of the top 50 hospitals in the U.S. for adult urology, at number 44.
- Expanded the area of transitional urology at Children’s Hospital Colorado and UCHealth University of Colorado Hospital with the recruitment of **Dan Wood, MD, PhD, MBBS, FRCS**, who specializes in the creation of successful multidisciplinary transitional care management practices.
- Added a clinical site at UCHealth Cherry Creek Medical Center.
- Expanded services for kidney transplant recipients seen at the UCHealth transplant clinic by providing specialized pre- and postoperative care from providers specializing in urologic care.

Educational:

- The Division of Urology provides a unique opportunity for medical students and those not immediately entering residency. The Pediatric and Reconstructive Medical Student Research Fellowship provides the opportunity for a one-year research fellowship to one candidate in their third or fourth year of medical school.
- Developed an innovative opportunity for a urology-focused preliminary year recommended for unmatched urology applicants. This program was pioneered by the University of Colorado School of Medicine’s general surgery and urology residency programs. This position offers training opportunities, mentorship, and valuable competencies to those re-applying to the next urology residency match. Of the three PGY-1 residents recruited into this program, two have successfully matched into urology residency programs.

- The Division of Urology received approval from the Society of Genitourinary Reconstructive Surgery for the addition of a second fellow to the program, making the Division one of only two programs in the U.S. offering a two-year track. We have successfully recruited our first research fellows for the two-year track program, both female.
- According to the American Urological Association (AUA) 2020 census, females account for only 10.3% of practicing urologists in the nation. For the first time in our Division’s history, both pediatric and reconstructive urology fellowship programs matched with females.
- Established the Urology Acting-Intern Scholarship, available to visiting students who are from an underrepresented group in medicine. The scholarship was created by the Division of Urology’s DEI committee, which was established in 2018.
- The Pediatric Urology Research Enterprise (PURE) will participate in the CU School of Medicine Research Track Program for the first time during the 2022-2023 academic year, providing research mentorship to an incoming medical school student through their fourth year of medical school. Participation reflects a first for the Division as well.

Research:

- In 2021, Division of Urology faculty published 84 peer-reviewed journal publications and eight book chapters and presented their work at 80 national and international meetings.
- The Division currently has 22 funded research grants, eight of which are from the National Institutes of Health.
- The Division of Urology has \$2,522,961 in current research funding.
- Between 2020 and 2021, the Division received two additional grants funded by the National Institute of Diabetes and Digestive and Kidney Diseases of the National Institutes of Health:
 - Impact of Chemotherapy on Bladder Function in Children, awarded to **Nicholas Cost, MD**, with the Career Development Award.
 - Mechanisms of Mechanotransduction in the Overactive Urinary Bladder, awarded to **Anna Malykhina, PhD**.

- Between 2020 and 2021, the Division of Urology received two additional non-NIH grants:
 - Artificial Intelligence in Prostate Cancer, awarded to **Simon Kim, MPH, MD**, and funded by the Schramm Foundation.
 - Development of a Urinary Diversion Decision Aid in Patients Undergoing Radical Cystectomy, awarded to **Janet Kukreja, MD, MPH**, as the Career Development Award funded by the AUA's Urology Care Foundation.
- PURE received special recognition for clinical research focused on shared decision-making and the potential benefit of decision aids to facilitate parents'/guardians' participation in health care decisions. The team has developed and integrated video decision aids into routine clinical care for common conditions including undescended testicles and dysfunctional voiding. Validated questionnaires are used to measure parents'/guardians' understanding of medical options and perceptions about the shared decision-making process. Our work on the use of video decision aids in patients with undescended testis was presented at the Pediatric Urology Fall Congress in December and was chosen as a clinical prize finalist. A similar study focused on dysfunctional voiding was accepted for presentation at the AUA's 2022 Annual Conference.

SECTIONS

Urologic Oncology:

- The multidisciplinary clinic increased new patient visits by 49.2% in 2021.
- Providers saw 27% more patients and 34% more new patients in 2021.
- In 2021, a reorganization of clinical responsibilities for the residency program allowed residents dedicated time to attend tumor boards.
- **Paul Maroni, MD**, spoke on the Urology Care podcast published by the AUA regarding racial disparities in the care of prostate cancer.
- **Paul Maroni, MD**, participated as medical director for a prostate cancer screening event with the Denver-based Center for African American Health in September 2021.

General Urology:

- Developed ongoing execution of the Extension for Community Health Outcomes (ECHO) Colorado Urology Project, the first ECHO series to focus on urology and surgical health care.
- Through a collaborative effort with Sarah Billups, MD, of the Department of Clinical Pharmacy, **Janine Oliver, MD**, is co-investigator for a quality initiative project aiming to evaluate the use of home-based management intervention, including a home urinary tract infection (UTI) test kit and educational material, to improve the efficiency of treatment for uncomplicated UTI. The study population includes female patients with Medicaid insurance, with a history of uncomplicated UTI within the previous 12 months, and without a history of renal transplant, stage IV CKD, HIV, or cancer. The researchers hypothesize that the intervention may increase the likelihood patients will contact their primary care provider initially for management and will decrease the inappropriate use of emergency services, while not increasing the rate of UTI-related complications. Mailing of the kits to patients began in February 2021, and data collection and analysis are in progress.

Pediatric Urology:

- Pediatric Urology has spearheaded a first-of-its-kind pediatric surgical oncology program (SOP), co-directed by **Nicholas Cost, MD**. In the past year, the program has hired a PA to help coordinate multidisciplinary surgical oncology care across the Center for Children's Surgery. Clinical growth in the SOP has included launching a multidisciplinary surgical oncology clinic in January 2022. In addition, in the past year, the SOP has hired a dedicated professional research assistant and is leading a broad portfolio of research endeavors ranging from local, surgeon-led clinical trials to NIH-funded translational research.
- The Congenital Anomalies of the Kidney and Urinary Tract (CAKUT) Program at Children's Hospital Colorado, led by **Vijaya Vemulakonda, MD, JD**, and **Margret Bock, MD, MS**, is a multidisciplinary program that leverages the strengths of our nationally recognized fetal care and pediatric solid-organ transplantation

programs to offer state-of-the-art holistic care from 20 weeks to 20 years. This program offers a comprehensive model of care for complex urologic patients across the spectrum of chronic kidney disease (spanning dialysis and transplantation). Our multidisciplinary program includes urology, nephrology, psychology, maternal-fetal medicine, transplant surgery, radiology, nutrition, social work, neonatology, and medical ethics. We have built partnerships with local pediatricians and obstetricians across the mountain west region and beyond to maintain high-quality multidisciplinary care for patients with prenatally diagnosed CAKUT anomalies. In addition, we have integrated a patient-centered approach to care that informs research and clinical care in these patients. We offer clinics weekly at the University of Colorado Anschutz Medical Campus, with monthly clinics offered in Colorado Springs and Children's Hospital Colorado North Campus locations.

- Children's Hospital Colorado and the Department of Pediatric Urology have led the way with the Enhanced Recovery After Surgery (ERAS) protocol led by experts like pediatric urologist Kyle Rove, MD, and pediatric anesthesiologist Megan Brockel, MD. The protocol standardizes perioperative care, minimizing the need for opioids while decreasing time in the hospital and minimizing the risk of postoperative complications. We published the first prospective study of ERAS in patients undergoing complex lower urinary tract reconstruction in 2018 and currently lead two large multicenter prospective studies of ERAS in patients undergoing reconstructive operations and oncologic resections with hopes to wrap them up in 2022 and 2023.
- Our specialists, Duncan Wilcox, MD; Dan Wood, PhD, MBBS, FRCS; and Kyle Rove, MD, work hand-in-hand with Andrea Bischoff, MD, Luis De La Torre, MD, and other multidisciplinary specialists at the International Center for Colorectal and Urogenital Care to treat patients with complex colorectal malformations that affect the urinary tract. The center cares for patients from around the world and publishes world-class research with the help of the largest database of patients

with congenital colorectal conditions. With the recent addition of Dan Wood, PhD, MBBS, FRCS, a world-renowned expert in transitional urology, we care for patients from prenatal diagnosis through adolescence and into adulthood.

Reconstructive Urology

- Reconstructive Urology continues to grow by adding providers, patient volume, and a spectrum of surgical cases. In addition to the common areas of genitourinary open and abdominal reconstruction including urethra, bladder, and ureteral reconstruction for dysfunction and disease following trauma and radiation injury, we have expanded the program significantly in the area of robotic reconstructive urology. We have gone from performing fewer than 5% of our ureteral reconstructions robotically in 2016 to 72% in 2021. We have seen significant growth in our multidisciplinary gender-affirming surgery program under the leadership of Ty Higuchi, MD, PhD.
- The Reconstructive Urology fellowship continues to excel under the leadership of Brian Flynn, MD. The fellowship has expanded to a two-year track with the first year in research and the second year being clinical.
- Brian Flynn, MD, and Ty Higuchi, MD, PhD, continue to grow the Robotic Reconstructive Urology Program with a focus on ureteral and bladder reconstruction. We now perform cases identified as least complex in reconstruction all robotically. Complex reconstructive procedures in urologic oncology are being developed in collaboration with Janet Kukreja, MD, MPH, who specializes in urologic oncology.
- Ty Higuchi, MD, PhD, has expanded the gender-affirming program by implementing the use of robotics to lessen convalescence, thereby allowing same-day surgery.
- Expanded the area of transitional urology at Children's Hospital Colorado and UHealth University of Colorado Hospital with the faculty recruit of Dan Wood, MD, PhD, MBBS, who specializes in the creation of successful multidisciplinary transitional care management practices.

SERVICE

- Nicholas Cost, MD, serves as co-director for the Surgical Oncology Program at Children's Hospital Colorado.
- Kyle Rove, MD, serves as medical director of Surgical Informatics at Children's Hospital Colorado.
- Ty Higuchi, MD, PhD, was named University of Colorado Medical Board member-at-large.
- Duncan Wilcox, MD, serves as surgeon-in-chief at Children's Hospital Colorado.
- David Sobel, MD, was appointed as chief medical officer at UCHealth Highlands Ranch Hospital.
- Randall Meacham, MD, was named president-elect of the American Urological Association. He continues to serve as chair of the UCHealth Credentials and Privileges Committee.
- Austin DeRosa, MD, serves as surgeon-in-chief at UCHealth Highlands Ranch Hospital.
- Paul Maroni, MD, serves as president of the Rocky Mountain Urological Society, Urology Content.
- Vijaya Vemulakonda, MD, JD, serves in multiple roles regarding diversity, equity, inclusion, and underrepresented groups in medicine. Vemulakonda is co-chair of the Committee on Recruitment and Retention of Women and Underrepresented Minorities, Society for Academic Urology, and a member of the AUA Task Force for Diversity, Equity, and Inclusion and the research subcommittee. This role works with the AUA to promote and advocate for policies through NIH and Congress that foster diverse researchers and research focused on addressing health disparities. This work has led to policy development within the AUA to foster the principles of diversity, equity, and inclusion both within leadership and within the profession.

FACULTY AWARDS AND RECOGNITION

- 5280 Magazine's Top Doctors:
 - Fernando Kim, MD
 - Duncan Wilcox, MD
 - Nicholas Cost, MD
 - Rodrigo Donalisio da Silva, MD
 - Ty Higuchi, MD, PhD
 - Paul Maroni, MD
- Janet Kukreja, MD, MPH: Medical Staff Award for Quality and Safety; UCHealth University of Colorado Hospital.
- Kyle Rove, MD: Second most-cited article: Journal of Pediatric Urology. Title: Prospective Study of Enhanced Recovery After Surgery Protocol in Children Undergoing Reconstructive Operations.
- Rodrigo Donalisio da Silva, MD: Best Abstract, 37th Congress of Society Internationale D'urologie. Title: Transvesical Ventral Buccal Mucosa Graft Inlay Cystoplasty for Reconstruction of Refractory Bladder Neck Contractures After Benign Prostatic Hyperplasia Surgery.
- Brian Flynn, MD: Best Poster, 37th Congress of Societe Internationale D' Urologie. Title: Acceptable Outcomes Utilizing Dorsal Onlay Urethroplasty for Radiation-induced Urethral Stenosis: A Multi-institutional Experience.
- Breana Mitchell, PA-C: Medical Staff Clinician of the Year; UCHealth University of Colorado Hospital.

ENDOWMENTS

- Duncan Wilcox, MD: The Ponzio Family Endowed Chair in Pediatric Urology.

GRANTS

- **Nicholas Cost, MD**
Impact of Chemotherapy on Bladder Function in Children, 2020-2024.
Amount: \$163,306
Sponsor: National Institute of Diabetes and Digestive and Kidney Diseases of the National Institutes of Health
- **Anna Malykhina, PhD**
Mechanisms of Mechanotransduction in the Overactive Urinary Bladder, 2022-2027.
Amount: \$387,000
Sponsor: National Institute of Diabetes and Digestive and Kidney Diseases of the National Institutes of Health
- **Anna Malykhina, PhD**
Regulation of Pelvic Pain and Micturition Reflex by VEGF in Urological Chronic Pelvic Pain Syndrome, 2019-2022.
Amount: \$233,250
Sponsor: National Institute of Diabetes and Digestive and Kidney Diseases of the National Institutes of Health
- **Anna Malykhina, PhD**
Mechanisms of Neurogenic Voiding Dysfunction in a Viral Murine Model of Multiple Sclerosis, 2020-2023.
Amount: \$342,100
Support: National Institute of Diabetes and Digestive and Kidney Diseases of the National Institutes of Health
- **Alison Xie, PhD**
Activating Peripheral Glia to Relieve Visceral Pain in Animal Models of Urological Chronic Pelvic Pain Syndrome (UCPPS), 2021-2026.
Amount: \$342,100
Support: National Institute of Diabetes and Digestive and Kidney Diseases of the National Institutes of Health



GROWING THE STRONGEST TEAM TO LEAD THE WAY IN TREATING COMPLEX AORTIC DISEASE.

The Advanced Aortic Program is one of the preeminent clinical programs at UCHHealth, with a fully integrated team of vascular and cardiac surgeons to treat complex aortic disease. Long considered the state's and region's leader in endovascular techniques, we wanted to become something new and even better.

We developed the initial vision for the Division of Vascular Surgery by assessing the clinical, educational, and research potential of our group. The challenge then became how to maintain our strong foundation while identifying the resources and talent we would need to grow.

The most important step was recruiting the right staff to carry out the plan. We found five new faculty members who were all within three to six years of their fellowship and who had all been trained in modern endovascular techniques. We have reached our initial goals and have now expanded our vision for further growth.

By expanding our clinical footprint, we're meeting the needs of patients in Colorado and beyond while maintaining excellent clinical outcomes. This is the blueprint for building an academic division of vascular surgery from the ground up.

FOUNDATION



VASCULAR SURGERY



DIVISION HIGHLIGHTS

Clinical:

- University of Colorado Vascular Surgery-Aurora, an office-based laboratory, opened in 2021 offering low-cost care focused on our patients and conveniently located adjacent to UHealth University of Colorado Hospital.
- Our vascular surgeons continue to perform physician-modified endograft repairs for complex aortic aneurysm patients. As of December 2021, 57 patients have received Physician-Modified Endovascular Grafts.
- Our new University of Colorado Thoracic Outlet Syndrome Institute brings together vascular surgery and interventional radiology while creating collaborations with community physiotherapists.
- Our Transcarotid Artery Revascularization (TCAR) program provides a novel and cutting-edge surgical option for the prevention of stroke in patients with cerebrovascular disease. TCAR is the safest way to revascularize the carotid artery. Our providers have performed more than 80 TCAR procedures, more than double any other vascular group in the metro region.
- Patients continue to travel from across the nation to receive care in our clinics. In 2021, our providers cared for patients from 39 states.

Educational:

- Our new Integrated Vascular Surgery Residency Program received accreditation in April 2021 from the Accreditation Council for Graduate Medical Education and welcomed its first residents in July 2021.
- Integrated vascular surgery resident **Nick Govsyeyev, MD**, presented his research, Efficacy of Rivaroxaban and Aspirin in PAD Patients with Venous and Prosthetic Surgical Bypass Conduits: Insights from the VOYAGER PAD Trial, at the 2021 Vascular Annual Meeting as the most highlighted presentation at the opening plenary session. In addition, Govsyeyev earned his master's in clinical science and is the first trainee ever to complete a clinical trial research fellowship through CPC Clinical Research.

- **Ryan Gupta, MD**, earned his master's of business administration (MBA) and is the first Department of Surgery resident at the University of Colorado to earn his MBA during residency.
- **Quy Tat**, a medical student mentored by **Jeniann Yi, MD**, won the Achievement Reward for College Scientists scholarship to the University of Colorado School of Medicine for a research project on which Tat and Yi collaborated.
- Three active Vascular Surgery Interest Group medical students presented their vascular surgery-focused research at national conferences.

Research:

- **Mark Nehler, MD**, was a successful site PI for the NIH Assessing Safety, Hospitalization and Efficacy of rNAPc2 in COVID-19 (ASPEN) trial, a phase 2 study of a novel anti-tissue factor anticoagulant with anti-inflammatory properties to prevent thrombosis in hospitalized patients. **Ryan Gupta, MD**, a research resident, was pivotal in the site's success. The site was by far the top enroller in this randomized multicenter international study, recruiting more than 40% of the 160 overall patients in the trial. Some novel techniques using electronic medical record communication were a big part of the success. Colorado-based ARCA Biopharma Inc. provided sponsorship, while the Colorado Research Center ran the trial located on the University of Colorado Anschutz Medical Campus.
- **Max Wohlaue, MD**, and **Robert Cuff, MD**, from Michigan State University, founded the Vascular Surgery COVID-19 Collaborative (VASCC) in March 2020 in response to concerns about the impact of the COVID-19 pandemic's disruption to clinical routine. As vascular patients are particularly vulnerable to both COVID-19 and the effects of delayed surgical care, a need for collaboration, data, and practice changes emerged. VASCC has expanded from the two founding organizations to include 238 sites across 48 countries and 300 participating vascular surgeons. This robust registry captures the impacts of COVID-19 on the care and outcomes of patients with complex vascular disease, with the goal of continuing as a lasting registry in vascular disease. Wohlaue presented early research findings during the 2021

Rutherford Lecture on Global Vascular Disease at the World Federation of Vascular Societies Symposium and during the Australian and New Zealand Society for Vascular Surgery Annual Scientific Conference on October 10, 2021.

- Jeniann Yi, MD, continues to lead a number of projects focused on continuous improvement in quality and safety for our patients, including the development and implementation of novel perioperative surgical pathways to decrease preoperative delays and improve postoperative medication compliance. She has also collaborated on the design and implementation of multiple system-level quality improvement initiatives.
- There are currently 11 clinical trials and 18 investigator-initiated research projects underway.
- Faculty published 36 peer-reviewed journal articles in 2021, representing a 38% increase in publications compared to 2020.

SERVICE

- Vascular Surgery faculty serve on the following committees:
 - Society for Vascular Surgery: Diversity, Equity, and Inclusion Committee; Quality and Performance Measures Committee; Health and Information Technology Committee.
 - American Venous Forum: National Guidelines Committee; National Research Committee.
 - American College of Surgeons: Young Fellows Association Communications Committee; Young Fellows Association Education Committee.
 - Vascular & Endovascular Surgery Society: Communications Committee; Spring Program Committee; Website Committee; Student Education Committee; Annual Program Committee.
- Rafael Malgor, MD, serves on the board of directors for the Outpatient Endovascular and Interventional Society. In addition, he serves on the international editorial board of Brazilian Vascular Surgery, the editorial board for Annals of Vascular Surgery, and the editorial board for the Journal of Cardiovascular Surgery.

- Jeniann Yi, MD, serves as EPIC surgical informaticist and subject matter expert for UCHealth, providing medical leadership specific to perioperative services and the development of EPIC. She also serves as chair of the Vascular and Endovascular Surgical Society Website Committee.
- Max Wohlauser, MD, serves as a certified surgical coach for the Society of Vascular Surgery Surgical Coaching Program in partnership with the Academy for Surgical Coaching. He also serves as a member of the Society for Vascular Surgery Wellness Task Force and is chair for the Ergonomics Section of the Society for Vascular Surgery Wellness Subcommittee. In addition, Wohlauser serves on the editorial board for the Journal of Graduate Medical Education and served as a guest editor for the July and August 2021 editions of Seminars in Vascular Surgery.

GRANTS

- Jeniann Yi, MD
 - Identifying User/Non-user Priorities to Develop and Implement Effective Surgical Electronic Health Records-Based Clinical Pathways.
Amount: \$24,375
Sponsor: University of Colorado Hospital Clinical Effectiveness and Patient Safety Small Grants Program Vascular Content
 - Best Case/Worst Case: A Multisite Randomized Clinical Trial of Scenario Planning for Patients with End-Stage Kidney Disease Identifying User/Non-user Priorities.
Amount: \$64,847
Sponsor: National Institute on Aging with the National Institutes of Health
- Ryan Gupta, MD
 - Improving Antithrombotic Adherence and Patient Education Following Lower-extremity Revascularization.
Amount: \$9,763
Sponsor: University of Colorado Hospital Clinical Effectiveness and Patient Safety Small Grants Program

SURGICAL EDUCATION

Cardiothoracic:

- The **Cardiothoracic Surgery Fellowship** has two trainees per year and is a three-year program. The fellows experience a spectrum of tertiary cardiac and thoracic case volume, including an active lung and cardiac transplant program, ventricular-assist devices, transfemoral aortic-valve replacement, and adult ECMO. Senior fellows are given flexibility in training toward a cardiac or thoracic career of choice. There is also a one-year **Congenital Cardiac Surgery Fellowship** at Children's Hospital Colorado that includes transplant and ventricular assist programs.

GI, Trauma, and Endocrine:

- The **General Surgery Residency** currently trains 11 residents each year and is tied for the fourth-largest program in the United States. It is the only program on the National Resident Matching Program with all positions designated for two years of academic time after the resident's second or third year of training. Current academic opportunities for research residents range from translational research in trauma, pediatric surgery, cardiac surgery, surgical oncology, thoracic surgery, endocrine surgery, and transplant to clinical research opportunities in trauma, surgical oncology, general surgery, plastic surgery, and vascular surgery. The program has added a robust clinical practice site at UHealth Memorial Hospital Central in Colorado Springs, which offers a wide variety of general surgery cases in a high-volume center that is complementary with the existing tertiary Denver sites.
- The **Burn Surgery Fellowship** is a one-year, non-ACGME-accredited training program that provides fellows with a range of care for burn, frostbite, and complex wounds. The University of Colorado Burn and Frostbite Center is the Rocky Mountain region's only American Burn Association-verified burn center. Graduates go on to pursue careers in burn, trauma, and complex-wound surgery.

- The Division of GI, Trauma, and Endocrine Surgery developed a **Minimally Invasive Surgery Fellowship** and recruited its first fellow for the 2020–2021 academic year. This is a one-year advanced training opportunity for a fully trained general surgeon to focus and expand their operative experience in robotic surgery.
- The **Surgical Critical Care Fellowship** is a one-year ACGME-accredited program with two positions. The fellows share their time between UHealth University of Colorado Hospital and Denver Health Medical Center. Rotational experience includes trauma, cardiac, burn, pediatric, and general surgical critical care. All Surgical Critical Care fellows matriculate into the Trauma and Acute Care Fellowship Program.
- The **Trauma Acute Care Surgery Fellowship (TACS)** is accredited by the American Association for the Surgery of Trauma and has expanded to two fellows per year. Each TACS fellow acquires comprehensive knowledge of critical care, trauma, emergency general surgery, advanced operative skills, and procedural techniques in thoracic and vascular surgery. The broad experience gained through diverse faculty and programmatic elements prepares the fellows for board examinations and a career in academic practice.

Pediatric:

- The **Pediatric Surgery Fellowship** graduates one fellow per year.
- The **Pediatric Colorectal Surgery Fellowship** has been a great success, graduating four fellows to date, and has committed fellows through 2023.
- The ACGME-accredited program, **Surgical Critical Care Pediatrics Fellowship**, has graduated three fellows to date, with all fellows passing their boards. The **Pediatric Bariatric Minimally Invasive Surgery Fellowship** has graduated two fellows and continues to produce many publications.

Plastic and Reconstructive:

- The Plastic and Reconstructive Surgery Division has increased to 14 residents between its two ACGME-approved programs: integrated and independent. The programs have developed additional affiliations with volunteer faculty in community practices to gain exposure to unique cosmetic cases. The program has also expanded education opportunities in hand reconstruction and plastic surgery programs at Children's Hospital Colorado. The most recent graduates went on to private practice and microsurgery fellowships.

Surgical Oncology:

- The Division of Surgical Oncology has created the **Hepatopancreatobiliary International Surgery Fellowship**. This one-year advanced training program is open to international candidates who have completed their general surgery training. The first fellow began the program in 2021.

Transplant:

- The two-year **Transplant Fellowship** is accredited by the American Society of Transplant Surgeons. The program provides comprehensive training in deceased-donor, multi-organ recovery, and liver, kidney, and pancreas transplantation. Trainees gain considerable experience in living-donor nephrectomy and hepatectomy, laparoscopic hepatectomy, and advanced hepato-biliary surgery. We continue to train fellows who become leaders in transplant surgery in the U.S. and throughout the world.

Urology:

- The **Urology Residency** successfully expanded to three categorical residents per year and has transitioned to a one- and four-year program that now has 15 residents.
- We also have highly competitive fellowships in **Pediatric Urology and Reconstructive Urology**.

Vascular:

- The Division of Vascular Surgery has a two-year **Vascular Surgery Fellowship** with a focus on advanced endovascular aortic care that includes fenestration cases for thoraco-abdominal aneurysms.
- In addition, in 2021, the Division received approval to begin a five-year Integrated **Vascular Surgery Residency**, accepting one resident per year; our first residents started in July 2021. The training program encompasses all aspects of vascular and endovascular surgery techniques and patient care.

DIVERSITY, EQUITY, AND INCLUSION

Over the past three years, the need for change in our society has been amplified by the horrific killings of George Floyd, Ahmaud Arbery, Elijah McClain, and too many others. Health care disparities and inequities facing communities of color have forced us to acknowledge some uncomfortable truths and commit to taking action.

As a department, we are committed to the work of dismantling racism that affects our profession, our patients, and our society. To this end, we have developed the Diversity, Equity, and Inclusion committee with the goal of becoming the most diverse, equitable, and inclusive department of surgery in the country by 2030. Kia M. Washington, MD, the country's first Black female professor in plastic and reconstructive surgery, leads the committee. Under her direction, the department created a DEI lectureship series and hosted its first speaker, Robert Higgins, MD, MSHA, director of the Department of Surgery and surgeon-in-chief at the Johns Hopkins School of Medicine.

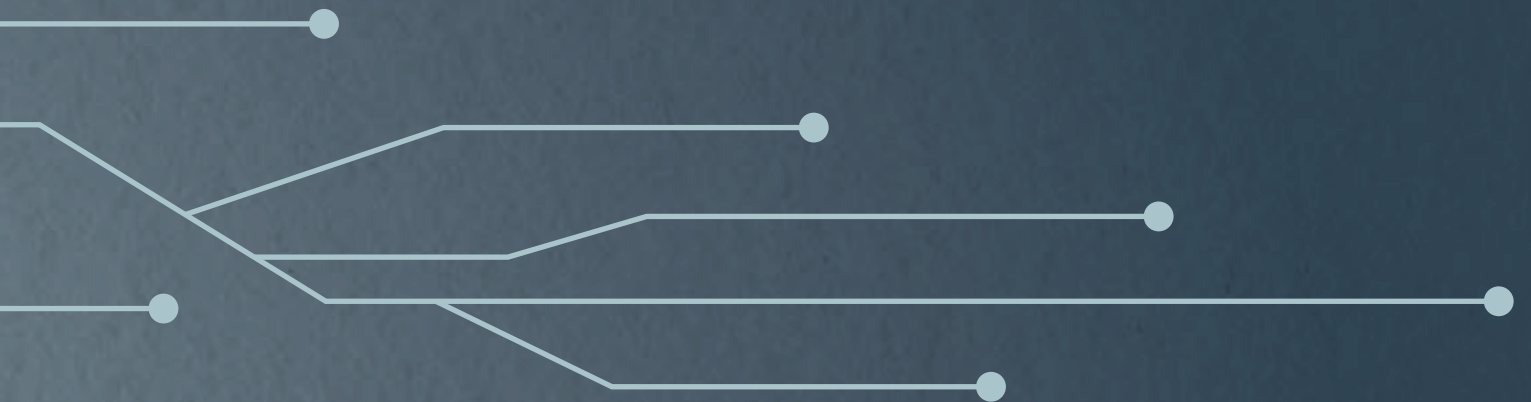
While we have made strides to reach our goals, bringing female leadership to 40% within the department, only 10% of our faculty identify as people of color—so we have more work to do. Over the next few years, the department plans to increase the number of people from backgrounds that are historically underrepresented in medicine—women, people who identify as LGBTQ, people of color, people with disabilities, veterans, and those actively serving in the military.

Policies are being updated, mentorship opportunities for faculty of color are being expanded, and curricula are being developed to create a long-lasting legacy of equity and inclusion within the department.

We are living in an increasingly diverse world, and our department should reflect the patients we serve.

“ A lot of studies have been done in the business world showing that diversity increases overall productivity. More importantly, in medicine, it increases your outcomes for your patients when you have a workforce that reflects your community. Our vision as a department is ‘Improve Every Life,’ and in order to do that, patients need to see their faces reflected in the people who serve them and the people who take care of them. ”

–Kia M. Washington, MD



BY THE NUMBERS

Clinical Activity:

Division	OR Cases	Visits	wRVUs
Cardiothoracic Surgery	1,942	4,514	79,236
GI, Trauma, and Endocrine Surgery	4,595	15,898	115,243
Surgical Oncology	1,212	7,176	52,163
Pediatric Surgery	3,838	10,924	69,214
Plastic and Reconstructive Surgery	2,451	18,769	99,536
Transplant Surgery	1,017	4,498	55,932
Urology	3,564	32,985	152,329
Vascular Surgery	801	3,860	21,867

Faculty and Staff:

	FY20	FY21	FY22
Faculty	129	134	145
Research Staff	42	39	58
Instructors/APPs	117	137	152
Admin Staff	102	110	109
Total Employees	409	443	489

Research Activity:

	2022
Total Grant Funding	\$16,603,287
Federal Funding	\$10,489,987
Active Grants	32
Active Clinical Trials	57
Peer-Reviewed Publications	196

Resident/Fellow Educational Activity:

Program	Count
Cardiothoracic Surgery	6
Congenital Cardiac Fellowship	1
General Surgery	89
Hepatopancreatobiliary Fellowship	1
Minimally Invasive Surgery Fellowship	1
Pediatric Surgery	2
Pediatric Surgery Research	2
Pediatric Surgical Critical Care	1
Pediatric Urology	2
Plastic and Reconstructive Surgery	15
Reconstructive Urology	2
Surgical Critical Care	2
Transplant Surgery	2
Trauma and Acute Care	2
Urology	15
Vascular Surgery	6

5 Years of Growth:

	Growth
wRVUs	18%
Patient Income	16%
Grant Awards (total)	34%
Faculty	37%
Instructors/APPs	95%
Research Staff	11%
Admin Staff	30%
Total Employees	45%

PHILANTHROPY

At the University of Colorado Department of Surgery, our mission is to Improve Every Life. That is made possible through our benefactors' generous investments. By supporting the next generation of treatments and cures for our patients, our benefactors play a crucial role in our success. We are grateful to the many donors who have made bequests through their estate or have made gifts and pledges to support the Department over the years to transform lives.

Department of Surgery benefactors support:

- **People:** Through scholarships that help medical students better afford their medical education regardless of background and circumstances, as well as faculty endowed chairs and professorships that help us recruit and retain top talent.
- **Places:** Through capital initiatives that help us provide clinical and learning environments in which patients and students benefit from the latest technology and environments that promote healing.
- **Programs:** Including research initiatives that help our outstanding faculty accelerate new treatment from labs to bedside and back again.

Often, the initial funding from benefactors helps researchers develop their work to garner more interest—and additional funding—from the larger scientific community.

Yuwen Zhu, PhD, associate professor of surgery, recently received funding from the National Institutes of Health in the form of an R01 project grant. However, only through earlier philanthropic investments was his groundbreaking immunology research into finding ways to normalize tumor vasculature able to attain this level of recognition and funding.

This is just one of many examples that demonstrate how philanthropic investments provide valuable resources for faculty to advance innovative ideas, develop new techniques, and bring lifesaving care into reach.



ADMINISTRATION

Richard Schulick, MD, MBA, FACS

Professor and Chair

Jennie Almeida

Academic Services

Senior Professional

Silvia Amaro

Administrative Assistant III

Blaire Balstad

Research Services

Entry Professional

Kyle Bata

Quality Data Analyst

Amy Bohrer

Surgery Scheduling Manager

Jaimielyn Burke

Research Services

Program Manager

Jesse Burris

Laboratory Technology II

Amelia Corl

Research Services Professional

Eirin Cox

Academic Services Professional

Selena Day

Academic Services Professional

Moriah Denler

Academic Services Professional

Jaymie Donner

Academic Services

Entry Professional

Deekshita Dontamsetti

Business Services

Principal Professional

Sarah Engel

HR Principal Professional

Diego Escobar-Garcia

Research Services Professional

Stephanie Farmer

Vice Chair of Administration

Meredith Funke

Business Services

Principal Professional

Rylee Funkhouser

Research Services

Entry Professional

Amanda Garza

Academic Services Professional

Sophia Gordon

Laboratory Technology I

Alexandra Hay

Research Services Manager

Jacob Jesielowski

Academic Services Professional

Adam Jimenez

Finance/Accounting

Principal Professional

Danielle Koffenberger

Quality Initiatives Manager

Julie LeBlanc

Laboratory Coordinator I

Suriyan Lewis

IT Senior Professional

Dayana Leyva

Research Services Professional

Alejandro Lleras

Director of Human Resources

Leah Lleras

Director of Finance

Tracey MacDermott

Research Services Manager

Claire Maday Travis

Education Manager

Sarah Massena

CSI Executive Director

Jasmine Matthews

Human Resources Professional

Anthony Mick

Human Resources

Senior Professional

Sarah Miller

Business Services

Program Manager

Jennifer Nevener

Human Resources Professional

Luis Pacheco

IT Technician II

Jacqueline Pelle

Business Services Professional

Monica Pina Limones

Research Services

Entry Professional

Ashleigh Prout

Human Resources

Senior Professional

Jonathan Radin

Director of Strategy and Innovation

Brittney Reyes

Academic Services Professional

Celeste Robledo

Office Supervisor

Thelma Shive

Accounting Technician II

Trina Smidt

Academic Services

Senior Professional

Julie Solem

Research Services

Senior Professional

Kathleen Tuthill

Director of the Office of Education

Colleen Warren

IT Program Manager

Heidi Wendt

Revenue Cycle Manager

Sarah Williams

Research Services Professional

DIVISION ROSTERS

Cardiothoracic Surgery

Academic Clinical Faculty:

David Fullerton, MD
Professor and Division Chief

Muhammad Aftab, MD
Assistant Professor

Laura Archambeau, NP
Instructor

Alison Barker, PA-C
Instructor

Lisa Bauers, NP
Instructor

Caitlin Blaine, PA-C
Instructor

Ralph Bolman, MD
Professor

Terra Busse, PA-C
Instructor

David Campbell, MD
Professor

David Clarke, MD
Professor

Joseph Cleveland Jr., MD
Professor

Daniel Connolly, PA-C
Instructor

Elizabeth David, MD
Associate Professor

Kelly Dever, NP, MSN
Instructor

Elizabeth Devine, PA-C, MS
Instructor

Kathryn Eckert, NP, MSN, BSN
Instructor

Mitchell Erickson, PA-C, MS
Instructor

Margaret Forbes, NP
Instructor

Sarah France, PA-C
Instructor

Lauren Funk, PA
Instructor

Frederick Grover, MD
Professor

Marisa Harris, PA-C, MMSc
Instructor

Kelsey Heil, RN
Instructor

Jordan Hoffman, MD
Associate Professor

Alexandra Huechteman, PA-C
Instructor

James Jaggars, MD
Professor

Barbara Jones, FNP, MSN
Instructor

Alexis Keyworth, PA-C, MS
Instructor

Philip Logan, PA-C
Instructor

Sarah Longyhore, PA-C
Instructor

Danica Martin, PA-C
Instructor

Courtney Matter, MPA
Instructor

Katherine McCabe, NP, MSN
Senior Instructor

Erin McIntyre, PA-C
Instructor

Robert Meguid, MD, MPH
Associate Professor

Nora Metz, NP
Instructor

John Mitchell, MD
Professor

Max Mitchell, MD
Professor

Shanna Newman, RN
Senior Instructor

Simran Randhawa, MBBS
Assistant Professor

T. Brett Reece, MD
Professor

Jessica Rove, MD
Assistant Professor

Stephanie Schneider, PA
Instructor

Meredith Stasi, PA-C
Instructor

Matthew Stone, MD
Assistant Professor

Michael Wells, PA
Senior Instructor

Amanda Young, NP, MSN
Instructor

Qui Peng James Zhan, MD, PhD
Assistant Professor

Cardiothoracic Surgery (cont.)

Clinical Faculty Support:

Christian Scott
Division Administrative Director

Tisha Allen
Administrative Assistant III

Michelle Bedell
Business Services Professional

Kylea Depottyondy
Patient Affairs Coordinator II

Shantel Hardy
Administrative Assistant III

Jennifer Luzania
Patient Affairs Coordinator II

Erin Messamore
Administrative Assistant III

Brenda Murillo
Business Support Specialist

Heather Tye
Patient Affairs Coordinator II

Lindsey Webster
Patient Affairs Coordinator III

Pornpenn Younger
Administrative Assistant III

Research Faculty:

Mohammed Al-Musawi, MD
Research Instructor

Lihua Ao
Senior Professional
Research Assistant

Linling Cheng
Senior Professional
Research Assistant

Kathryn Colborn, PhD, MPH/MSPH
Associate Professor

Anne Lambert-Kerzner, PhD
Senior Professional
Research Assistant

Anqi Li, MA
Professional Research Assistant

Xianzhong Meng, MD, PhD
Professor

Ernest Moore, MD
Principal Investigator

Yufeng Zhai
Senior Professional
Research Assistant

Research Support:

Xin-Sheng Deng, MD
Research Associate

Erlinda The
Post-Doctoral Fellow

Yasuto Yamamoto
Post-Doctoral Fellow

Qingzhou Yao, PhD
Research Associate

GI, Trauma, and Endocrine Surgery

Academic Clinical Faculty:

Robert McIntyre Jr., MD
Professor and Division Chief

Maria Albuja Cruz, MD
Associate Professor

Zachary Asher, PA-C
Assistant Professor

Paulus Bauling, MD
Assistant Professor

Typhanie Beasley, DNP, APRN, FNP
Instructor

Elisa Birnbaum, MD
Professor

Brittany Blass, PA-C
Instructor

Brandon Chapman, MD
Assistant Professor

Akshay Chauhan, MD
Associate Professor

Mitchell Cohen, MD
Professor

Michael Cripps, MD
Associate Professor

Lyndsay Deeter, MD
Assistant Professor

Veronica DeMary, PA-C
Instructor

Adam DeMey, PA-C
Instructor

Julie Dunn, MD
Associate Professor

Linda Fernekes, PA-C, MS
Instructor

John Frerichs, MD, FACS
Associate Professor

Lauren Fukuhara, PA
Instructor

Cameron Gibson, MD
Assistant Professor

Andrea Gordon, PA-C
Instructor

Julie Henderson, NP
Instructor

Madison Hexter, PA-C
Instructor

Brittany Hicks, PA
Instructor

Craig Hornbarger, MD
Senior Instructor

Bridget Hovendon, PA
Instructor

Jeffrey Huber, PA
Instructor

Juan Idrovo, MD
Assistant Professor

Kirsten Jacobson, PA-C
Instructor

Whitney Jenson, MD
Assistant Professor

Casey Johnson, NP
Instructor

Taryn Ketels, NP
Instructor

Amber Kohler, NP
Instructor

Kate Laramie, PA-C
Instructor

Caitlyn Lesh, MD, FACS
Senior Instructor

Jay MacGregor, MD, FACS
Assistant Professor

Jordan Macri, PA-C
Instructor

Steffen Meiler, PA
Instructor

Paul Montero, MD
Associate Professor

Samuel Phinney, MD
Senior Instructor

Christopher Raeburn, MD
Associate Professor

Amanda Raube-Miceli, PA-C
Instructor

Amy Reppert, MD
Senior Clinical Instructor

Thomas Robinson, MD
Professor

Kevin Rothchild, MD
Associate Professor

Cristianna Ruple, PA-C
Instructor

Jonathan Schoen, MD
Associate Professor

Thomas Schroepfel, MD
Visiting Clinical Professor

Jennifer Stalilonis, PA
Instructor

Lauren Steward, MD
Assistant Professor

Katie Thompson, NP
Instructor

Maggie Thompson, NP, MS
Instructor

Shelley Trinh, PA-C
Instructor

Catherine Velopulos, MD
Professor

Jon Vogel, MD
Professor

Arek Wiktor, MD
Associate Professor

Tiffany Willard, MD
Assistant Professor

Alyssa Wolf, PA-C
Instructor

Kasey Wood, PA-C
Instructor

Franklin Wright, MD
Assistant Professor

Shanna Zwick, PA-C, MS
Instructor

GI, Trauma, and Endocrine Surgery (cont.)

Clinical Faculty Support:

Marta O'Grady, OD
Division Administrative Director

Alicia Baker
Business Services Professional II

Laurinda Campbell
Patient Affairs Coordinator I

Susan Ficca
Executive Assistant

Siyab Khan
Marketing & Web
Content Specialist

Patricia Knox
Patient Affairs Coordinator

Tanya Obernyer
Patient Affairs Coordinator

Sandra Wiseley-Carr
Health Care Professional

Research Faculty:

Anirban Banerjee, PhD, MS
Professor

James Chandler
Professional Research Assistant

Crisoforo Fragoso, DVM
Research Instructor

Lauren Giesy
Professional Research Assistant

Edward Jones, MD
Associate Professor

Teresa Jones, MD
Assistant Professor

Marguerite Kelher, MS
Research Instructor

Elizabeth Kovacs, PhD
Professor

Patrick Lutz, BS
Professional Research Assistant

Rachel McMahan, PhD
Assistant Professor

Sanchayita Mitra, MS
Research Instructor

William Myers, PhD
Research Instructor

Kevin Najarro, MS
Senior Professional Research
Assistant

Madison Paul, BS
Professional Research Assistant

Andrea Qualman, BS
Professional Research Assistant

Preston Stafford, MS, BS
Senior Professional
Research Assistant

Research Support:

Patrick Hom
Program Assistant I

Pediatric Surgery

Academic Clinical Faculty:

David Partrick, MD
Professor and Interim
Division Chief

Shannon Acker, MD
Assistant Professor

Justin Alldredge, PA-C
Instructor

Rachel Anthony, CPNP
Instructor

Danielle Aquila, PNP-AC
Instructor

John Bealer, MD
Professor

Denis Bensard, MD
Professor

Andrea Bischoff, MD
Professor

David Bliss, MD, MBA
Associate Professor

Caroline Credille, MSN
Instructor

Teren Culbertson, PA-C
Instructor

Colton Davies, PA-C
Instructor

Luis De La Torre, MD
Associate Professor

S. Christopher Derderian, MD
Assistant Professor

Jose Diaz-Miron, MD
Assistant Professor

Angela Drelles, MSN
Instructor

Starla Eubanks, NP
Instructor

Stephanie Fingland, NP
Instructor

Pediatric Surgery (cont.)

Douglas Haase, PA-C
Instructor

Christianna Kaczmarek, MPH/MSPH
Instructor

Frederick Karrer, MD
Professor

Richele Koehler, PA-C
Senior Instructor

Ann Kulungowski, MD
Associate Professor

Ken Liechty, MD
Professor

Anna Linton, PA-C
Instructor

Ashley Ludden, PA-C
Instructor

Clinical Faculty Support:

Kevin Koffenberger
Division Administrative Director

Veronica Faiffer
Business Operations Professional

Research Faculty:

Tanner Lehmann, BS
Professional Research Assistant

Research Support:

James Bardill
Post Doctoral Fellow

Jennifer Black
Research Services
Senior Professional

Caitlin McCarthy, CPNP
Instructor

Robyn Moore, PA-C, MPH
Instructor

Steven Moulton, MD
Professor

Jessica Outten, PNP-AC
Instructor

Alberto Pena, MD
Professor

Brandy Ramos, NP
Instructor

Karisa Reynolds, PA
Instructor

Jonathan Roach, MD
Associate Professor

Jill Ketzer
Program Manager

Victor Rodriguez
IT Principal Professional

Carlos Zgheib, PhD
Assistant Professor

Junyi Hu, MD
Research Associate

Margo Nolan
Research Services
Entry Professional

Amanda Rutherford, PA
Instructor

AnnaMaria Salas, PA-C
Instructor

Lauren Schneider, MSN
Instructor

Hope Simmons, CPNP
Instructor

Stig Somme, MD
Associate Professor

Elise Van Etten, PA-C
Instructor

Katherine Wagenman Flynn, CPNP
Instructor

Connor Prendergast
Research Services
Entry Professional

Plastic and Reconstructive Surgery

Academic Clinical Faculty:

David Mathes, MD, FACS
Professor and Division Chief

Marian Brinkman, PA-C, MPAS
Instructor

Justin Cohen, MD, MHS
Assistant Professor

Leahthan Domeshek, MD
Assistant Professor

Sara Douglass, PA-C, MPAS
Instructor

Lindsay Dyer-Kindy, PA-C, MS
Senior Instructor

Brooke French, MD
Associate Professor

Michael J.V. Gordon, MD
Associate Professor

Mark Greyson, MD
Assistant Professor

Matt Iorio, MD
Associate Professor

Christodoulos Kaoutzanis, MD
Assistant Professor

Amy Kelso, PA-C, MMS
Instructor

David Khechoyan, MD
Associate Professor

Ashley Leestma, PA-C, MPAS, MS
Instructor

Kristen Lowe, DDS, MS
Assistant Professor

Stephanie Malliaris, MD
Assistant Professor

Amy Miller, FNP-C, MSN, CWOCN
Instructor

Benjamin Nigg, PA-C
Instructor

Jordan Paley, PA-C
Instructor

Peggy Walsh Sheryka, PA-C
Instructor

Kia M. Washington, MD, FACS
Professor

Julian Winocour, MD
Associate Professor

Corrine Wong, MD
Assistant Professor

Jason W. Yu, MD, DMD
Assistant Professor

Clinical Faculty Support:

Alina Rich
Division Administrative Director

Devri Beckett
Administrative Assistant II

Grace Irvine
Patient Service Representative

LaKeisha M. Keith
Patient Affairs Coordinator II

Nancy La
Patient Affairs Coordinator II

Alexandria Lane
Surgical Scheduler

Felicia Martinez
Health Care Operations

Sara Mattsen
Administrative Assistant II

Loriann Quintana
Patient Affairs Coordinator

Catherine Ruff, RN
Clinical Supervisor

Jessica Slattery
Website & Digital
Content Specialist

Christin Tye
Patient Affairs Coordinator II

Research Faculty:

Christene Huang, PhD
Professor

Bing Li, MD
Research Associate

Yuhuan Luo
Research Associate

Nalu Navarro Alvarez, MD, PhD
Assistant Professor

An-Jey Su, PhD
Assistant Professor

Yong Wang, MD
Research Associate

Zhaohui Wang, DVM, MA
Assistant Professor

Zhirui Wang, PhD
Associate Professor

Research Support:

Cristan Carter
Research Services
Senior Professional

Connor Elkhill
Pre-Doctorate Trainee

Nargis Kalia, MPH
Research Services Professional

Scott LeBeau, BA
Research Services
Senior Professional

Nathaly Limon de la Rosa, BS
Research Services
Entry Professional

Kristen McFadden
Grants Coordinator

Niyati Nakra, MS
Research Services Senior
Professional

Charles Owens, BS
Research Services
Senior Professional

Rashmi Ramakrishna
Post Doctoral Fellow

Huiping Zhang, MD
Professional Research Assistant

Surgical Oncology

Academic Clinical Faculty:

Marco Del Chiaro, MD
Professor and Division Chief

Gretchen Ahrendt, MD
Professor

Steven Ahrendt, MD
Professor

Carlton Barnett, MD
Professor

Christan Bartsch, PA-C
Assistant Professor

Kelly Calero, PA-C
Instructor

Nicole Christian, MD
Assistant Professor

Christina Finlayson, MD
Professor

Nicole Garduno, PA-C
Instructor

Ana Gleisner, MD, PhD
Associate Professor

Jennifer Goode, PA-C
Instructor

Mona Hamermesh, PA-C
Instructor

John Hamner, MD
Assistant Professor

Whitney Herter, PA-C, BS
Senior Instructor

Katherine Knott, PA-C
Instructor

Megan Marsh, PA-C, MPAS
Senior Instructor

Martin McCarter, MD
Professor

Cheryl Meguid, NP
Associate Professor

Benedetto Mungo, MD
Assistant Professor

Cassandra Murphy, AGACNP-BC
Instructor

Colleen Murphy, MD
Assistant Professor

Richard Schulick, MD, MBA, FACS
Professor, Chair

Camille Stewart, MD
Assistant Professor

Yi Sun, PhD
Visiting Assistant Professor

Sarah Tevis, MD
Assistant Professor

Reed Weiss, DNP, APRN
Senior Instructor

Jodi Widner, MD
Assistant Professor

Yuwen Zhu, PhD
Associate Professor

Clinical Faculty Support:

Marta O'Grady, OD
Division Administrative Director

Bailey Byrd
Patient Affairs Coordinator II

Pei Foong, MS
Finance & Operations Manager

Jocelyn Johnson
Health Care Professional

Judith Morales Kim
Patient Affairs Coordinator

Anna Ludwig
Administrative Assistant III

Elexis Pierre
HR Operations Specialist

Renee Pullara, MA, MBA
Executive Assistant Manager

Cathy Richter
Patient Affairs Coordinator III

Debra Sartain
Business Services Professional

Research Faculty:

Salvador Rodriguez Franco, MD
Research Associate
Clinical Database Manager

Oskar Franklin, MD, PhD
Visiting Researcher

Toshitaka Sugawara, MD, PhD
Visiting Researcher

Yi Sun, MD
Research Instructor

Chang Sup Lim, MD, PhD
Visiting Researcher

Richard Tobin, PhD
Assistant Research Professor

Research Support:

Ian Lenk
Professional Research Assistant

Transplant Surgery

Academic Clinical Faculty:

Elizabeth Pomfret, MD, PhD
Professor and Division Chief

Megan Adams, MD
Assistant Professor

Thomas Bak, MD
Associate Professor

Marisa Baldassano, PA-C
Instructor

Robert Clower, PA
Instructor

Kendra Conzen, MD
Assistant Professor

Brian Erdmann, PA-C
Instructor

Christina Glenn, PA-C
Instructor

Hani Grewal, MD, MBA, FACS
Associate Professor

Elhum Karimkhani, MSN
Instructor

Peter Kennealey, MD, FACS
Associate Professor

Katherine Klingenberg, PA-C
Senior Instructor

Melford Lazarte, DNP, AFACNP-BC
Instructor

Katie Moller, PA-C
Instructor

Hunter Moore, MD, PhD
Assistant Professor

Trevor Nydam, MD
Associate Professor

Lindsay Orcholski, PA-C
Instructor

James Pomposelli, MD, PhD
Professor

Thomas Pshak, MD
Assistant Professor

Melissa Quist, PA-C
Instructor

JoLynn Reed, PA-C, MS
Instructor

Jennifer Skenta, PA-C
Instructor

Miranda Strom, AGACNP-BC
Instructor

Kristen Struble, PA-C
Instructor

Michael Wachs, MD
Professor

Kristen Way, PA-C
Instructor

Allison Zurawski, PA-C
Instructor

Clinical Faculty Support:

Jody Robertson
Division Administrative Director

Ronda Adams
Patient Affairs Coordinator III

Khushnuma Damkevala
Communication Specialist

Kristin Garnett
Business Services Program Manager

Kathryn Giron
Patient Affairs Coordinator II

Julianna Linton
Business Support Specialist

Research Faculty:

**Marilyne Coulombe-Mansfield
PhD, MS**
Research Associate

Ronald Gill, PhD
Professor

Bruce Kaplan, MD
Professor

John Malamon, PhD
Assistant Research Professor

Jessica Saben, PhD
Assistant Research Professor

Research Support:

Kristen Brown, PhD
Research Services
Senior Professional

Tanner Ferrell, BA
Research Services Professional

Jiayi Liew, BS
Research Services Professional

Ivan Rodriguez, MD
Research Services Professional

Anna Sater, BS
Research Services Professional

Samuel Scott, BS
Research Services Professional

Grant Uba, BA
Research Services Professional

Arthur Yule, MD
Research Services Professional

Urology

Academic Clinical Faculty:

Randall Meacham, MD
Professor and Division Chief

Jessica Asherin, PA-C
Instructor

Eric Ballon-Landa, MD
Assistant Professor

Albaha Barqawi, MD
Professor

Adriana Behr, CPNP
Instructor

Brian Caldwell, MD
Assistant Professor

Jeffrey Campbell, MD
Professor

Nina Casanova, MD
Senior Instructor

Shannon Chevront, PA-C, MS, MPAS
Instructor

John Colby III, PA-C
Instructor

Nicholas Cost, MD
Associate Professor

Austin DeRosa, MD
Senior Instructor

John Dodge, PA-C, MPAS
Instructor

Rodrigo Donalisio Da Silva, MD
Associate Professor

Brian Flynn, MD
Professor

Holly Harges, PA-C, MPAS
Instructor

Ty Higuchi, MD, PhD
Associate Professor

Jessica Hughes, FNP-BC
Instructor

Fernando Kim, MD, MBA, FACS
Professor

Simon Kim, MD, MPH
Professor

Marguerite Korber, CPNP
Senior Instructor

Kerri Krenowicz, PA-C
Instructor

Janet Kukreja, MD, MPH
Associate Professor

Granville Lloyd, MD
Associate Professor

Yanique Madonna, PA-C
Instructor

Paul Maroni, MD
Associate Professor

Brian Miller, PA-C, MPAS
Senior Instructor

Breana Mitchell, ANP, MS
Instructor

Janine Oliver, MD
Assistant Professor

Kyle Rove, MD
Professor

Mark Sawyer, MD
Associate Professor

Vera Sekula, FNP-C
Instructor

David Sobel, MD
Senior Instructor

Steven Steinberg, MD
Senior Instructor

Kerri Thurmon, MD
Associate Professor

Amanda Valdez, PA-C, MS
Senior Instructor

Vijaya Vemulakonda, MD, JD
Professor

Abigail Webb, PA-C, MHS
Instructor

Brooke Weiland, FNP
Instructor

Duncan Wilcox, MD
Professor

Dan Wood, MBBS, PhD
Professor

Clinical Faculty Support:

Jillian Quinn, MBA
Division Administrative Director

Victoria Curreri, MS
Business Services Principal
Professional

Amanda L. Garza, BS
Urology Residency Program Coordinator

Amy Jarvis, BA
Administrative Assistant III

Shannon Lamoree, BA
Fellowship Program Coordinator

Anna Massey, BS, AAS
Executive Assistant

Noelle Musgrave, BS
Business Services Senior
Professional

Research Faculty:

Naoko Iguchi, PhD
Research Associate

Anna Malykhina, PhD
Professor

Alison Xiaoqiao Xie, PhD
Assistant Professor

Sathish Kumar Yesupatham, PhD
Post-Doctoral Research Fellow

Urology (cont.)

Research Support Staff:

Gemma Beltran, BS
Research Services Professional

Jin Cha, BS
Research Services
Intermediate Professional

Taylor Clarkson, BS
Research Services Professional

Rylee Funkhouser, BA
Research Services
Entry Professional

Colin O'Donnell, BS
Research Services
Senior Professional

Jennifer Pyrganowski, MSPH
Senior Professional
Research Assistant and
Program Manager,
Pediatric Urology Research

Vascular Surgery

Academic Clinical Faculty:

Donald Jacobs, MD
Professor and Division Chief

Steffanie Durkin, PA-C, MS
Instructor

Cheryl English, NP
Instructor

John Eun, MD
Assistant Professor

Emily Malgor, MD
Assistant Professor

Rafael Malgor, MD
Associate Professor

Rachel McPherson, PA-C
Instructor

Mark Nehler, MD
Professor

Kelly Radtke, NP
Instructor

Christian Wheelock, PA-C
Instructor

Max Wohlauer, MD
Assistant Professor

Jeniann Yi, MD
Assistant Professor

Clinical Faculty Support:

Jillian Quinn, MBA
Division Administrative Director

Derrick Andrews
Health Care Principal Professional

Chandra Beard
Patient Affairs Coordinator

Jacky Bonds
Administrative Assistant

Megan Boudra
Patient Affairs Coordinator

Kristin Devine
Health Care Manager

Stephanie Freeburg
Diagnostic Procedure Tech III

Alexandra Ivar
Business Services
Program Manager

Lauren Mainero
Health Care Principal Professional

Stephanie Mayoral-Sanchez
Patient Affairs Coordinator

Yesenia Melendez
Administrative Assistant III

Michael Moore
Diagnostic Procedure Tech III

Vincent Pauda
Diagnostic Procedure Tech II

John Rondash
Diagnostic Procedure Tech III

Lorena Valenzuela
Health Care Tech III

Vanessa Vasquez
Health Care Tech III

Research Support:

Shelbi Boggs
Research Assistant

Mahmood Kabeil
Research Assistant

Ethan Moore
Research Assistant



School of Medicine

UNIVERSITY OF COLORADO
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