

SUMMER 2017



COVER STORY

3D Modeling Helps Plastic Surgeons, Neurosurgeons Complete Cranial Reconstruction

Advancing the Science of Surgical Care

THE STITCH

THE UNIVERSITY OF FLORIDA DEPARTMENT OF SURGERY

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3D Modeling Helps Plastic Surgeons, Neurosurgeons Complete Cranial Reconstruction

Flanked by a surgery resident and a technician, surgeon **Jessica Ching, MD**, holds a 3D model of a patient's skull. She carefully turns the model over in her hands, considering just where an implant will replace a piece of missing bone.

The patient is Robert Lines, 58, of Ocala, who was seriously injured when a gun he was holding accidentally discharged. The implant will cover an area of bone originally removed to relieve pressure on Lines' brain after the injury. Ching, an assistant professor of plastic and reconstructive surgery in the University of Florida College of Medicine, will also rebuild the orbit of Lines' right eye.

Lines first had surgery and received treatment at a trauma center in northwest Pennsylvania, near where the accident occurred. When he returned home, he transferred his care to UF Health.

For this procedure, Ching and her team continue to examine the model in preparation for a surgery that she will perform the next day in collaboration with UF neurosurgeon **Gregory A. Murad, MD**, an associate professor and residency program director with the Lillian S. Wells Department of Neurosurgery.

The next day, Lines is asleep on the table in an operating room as Ching prepares to slice through the delicate layers of his scalp to reveal the missing section of bone and damaged eye socket. On another table nearby, Murad creates a custom implant that will cover the gap in Lines' skull.

Ching gently positions the implant above the opening and fastens it in place. She also removes slivers of bone from a preselected portion of the patient's skull, gingerly positioning them to reconstruct the eye socket.



Through a collaboration with the UF Department of Neurosurgery, Jessica Ching, MD, an assistant professor of plastic and reconstructive surgery, uses 3D printed models to plan for cranial and facial reconstruction procedures.

Lines' case is among numerous examples of the use of 3D printing in health care. Ching regularly collaborates with her counterparts in neurosurgery to treat patients in need of cranial and facial reconstruction. The models, based on CT scans and MRIs, are created with a special printer housed in the Evelyn F. and William L. McKnight Brain Institute of the University of Florida.

Through a National Institutes of Health grant received by **William Friedman, MD**, a professor and chair of the department of neurosurgery, and **Frank J. Bova, PhD**, a medical physicist and director of the RadioSurgery/Biology Lab, UF's department of neurosurgery purchased its first 3D printer in 2007.

Before 3D printing, surgeons would try to make repairs based on a CT scan or MRI. In the case of a patient like Lines, the prosthetic — most likely composed of titanium mesh — would be created in the operating room and continually adjusted to fit.

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Colorectal Surgery Protocol Leads to Decrease in Length of Stay, Readmissions for Ileostomy Patients



A quality improvement initiative at UF Health Shands Hospital has led to a significant drop in the length of stay and readmissions among ileostomy patients. The intervention specifically targets dehydration, a common complication experienced by this group of patients.

“From the literature, we know that colorectal surgery patients, in general, have poorer outcomes, longer length of stay, higher associated health care costs, greater morbidity and higher infection rates than general surgery patients,” said Atif Iqbal, MD, an assistant professor in the University of Florida College of Medicine’s division of general surgery. “Patients with ileostomies are at the highest risk for complications within that group.”

In ileostomy patients, dehydration occurs when the body is unable to absorb enough fluids and electrolytes through a shortened digestive tract.

Iqbal, Sanda Tan, MD, PhD, and a group of colleagues launched a project that included 180 patients who underwent ileostomy procedures between 2011 and 2016. The team sequentially implemented a three-part intervention that included a series of postoperative phone calls; enhanced

recovery after surgery, or ERAS, specialized order sets; and early discharge protocol.

“You have to reach the patient before they get to the point of dehydration,” said Tan, an associate professor in the division of general surgery. “If you can catch them early enough, you can stave off problems. Once they become dehydrated, there are numerous complications that can occur — from nausea to kidney damage.”

In 2011, 65 percent of post-surgery ileostomy patients were readmitted to the hospital due to ileostomy-related complications — dehydration was the main cause in 80 percent of the cases. The average length of stay was 17 days upon first admission and 13.7 days for readmission.

By 2016, patients spent an average of five days in the hospital and 3.8 days per readmission, and the readmission rate dropped to 20 percent. Additionally, the main cause of readmission is no longer dehydration — that number dropped to 12 percent.

At the start of the project, patients received daily phone calls from a provider for 21 days after discharge, including counseling and medication adjustments for high ileostomy output. Patients answered a series of health-related questions, providing information about their weight, fluid intake and output and medication use.

“The first phone call protocol was aimed to decrease the readmission rate after ileostomy by identifying and treating those having trouble earlier,” Iqbal said. “We then wanted to address quality of care issues beyond just the readmission rate.”

The ERAS protocol established standardized pre-, intra- and postoperative order sets. “Previously there were none,” Iqbal said.

Additionally, under the early discharge protocol, all patients with ileostomies receive a PICC line for IV infusion — 1,000 milliliters of fluid per night — upon discharge. Those orders are discontinued once the patient achieves a positive fluid balance.

The team is working on an app that will help ileostomy patients keep track of their fluid intake and output, providing real-time feedback and automatically sending updates to the appropriate physicians.

“The patient will get feedback from the app with a warning that they’re headed for dehydration and instructions to avoid that complication,” Iqbal said. “We hope this application will help us, as providers, communicate with our patients more effectively and identify folks who may fall off the grid sooner.”

Department of Surgery Research Day Awards Announced

The University of Florida College of Medicine's department of surgery recently held its 13th annual Research Day.

This year's Lester R. Dragstedt Visiting Professor and keynote speaker was **Scott A. LeMaire, MD**, a professor of surgery and of molecular physiology and biophysics; vice chair for research, Michael E. DeBakey Department of Surgery; and director of research, division of cardiothoracic surgery at Baylor College of Medicine.

The following surgeons and residents received the Mentored Resident Research Award (\$25,000):

- "Evaluating National Quality and Outcomes Reporting for Elective AAA Repair"; faculty mentor, **Kristina Giles, MD**, department of surgery, division of vascular surgery and endovascular therapy; house officer, **Suniah Ayub, MD, MPH**.
- "Integration of Multi-Omics Data Using Machine Learning Models for Prediction of AKI and Sepsis"; faculty mentor, **Azra Bihorac, MD**, department of medicine, division of nephrology, hypertension and renal transplantation; house officer, **Nicholas Lysak, MD**.
- "Novel Mechanisms and Approaches to Treat Neonatal Sepsis"; faculty mentor, **Shawn Larson, MD**, department of surgery, division of pediatric surgery; house officer, **Russell Hawkins, MD**.

The following participants received abstract awards (\$500):

- Basic science abstract presentation — **Marna List**, "ACOMYS: Unlocking a New Pathway to Recognition."
- Clinical/translation abstract presentation — **Anne-Marie Carpenter**, "Diversity in General Surgery Residency Leadership: More Work is Needed."
- Ardelle B. McGray Pancreatic Cancer Research Fund — **Michael Gerber, MD**, "Molecular Diagnosis of Pancreatic Cancer Using Soluble Protein Signatures from the Tumor Microenvironment."

Continued From The Cover:

"The 3D model makes everything crystal clear. You know exactly what you're going to address before the surgery," Ching said.

In the case of a more in-depth cranial or facial reconstruction, Ching can use the 3D model to select where to harvest bone and place the grafts.

"It can take a couple of hours just to figure out how to best place the grafts. I can measure how much bone I will need and make sure all of those sites are appropriately planned," Ching said.

"Otherwise, all of that has to be done while the patient is under anesthesia, which adds time to the operative procedure. Now, they spend less time in the operating room under anesthesia, often with less blood loss."

The summer marks a transition time at UF, when one academic year ends and another begins.



Such a time brings many new faces throughout the medical center and within our department. Several new faculty surgeons have arrived over the past few months.

They include two transplant surgeons, two acute care/trauma surgeons, two vascular surgeons, one cardiac surgeon and two thoracic surgeons. We are very excited about the ability to expand our care programs while maintaining a patient-centric focus and excellent service to our referring providers.

In addition to new faculty, our physical campus will soon have a new feel as well. Construction on the new University of Florida Health Heart & Vascular Hospital and a sister facility, the UF Health Neuromedicine Hospital, are nearing completion, with an on-target occupancy in December.

As the interior construction continues, the exterior touches are being added, including landscaping. It is certainly shaping up to be a beautiful addition. The new hospitals, combined with the existing facilities, will certainly assure UF Health Shands Hospital as a health care destination of the highest caliber.

The new operating rooms in the heart and vascular hospital will have hybrid capabilities for radiographic intervention, as well as other state of the art equipment. Along with this construction comes opportunities and efforts for renovation of our established facilities.

We are looking forward to the very positive impact new faculty, new leadership and new facilities will have on the care of our patients.

Bruce Mast, MD
Interim Chair

UF College of Medicine Approves Designated Sepsis and Critical Illness Research Center

The University of Florida College of Medicine has approved a designated Sepsis and Critical Illness Research Center. The center stems from a UF department of surgery-led initiative established in 2014 through a \$12 million grant from the National Institutes of Health, and builds on clinical and translational research that began with the original sepsis research program.

“Designation as an official center allows us to more easily and more broadly collaborate with other centers and institutes at the University of Florida,” said **Lyle Moldawer, PhD**, a professor and vice chair of research in the department of surgery. “We are seeing immediate benefits in our research efforts through many projects. For instance, a collaboration with the McKnight Brain Institute allows us access to imaging resources to study cognitive decline in people who survive sepsis.”

Sepsis, which can be deadly, is an illness or complication in which the body has a severe and overwhelming response to infection. That response can induce tissue damage, organ failure and death. What differentiates sepsis from infection is the significant host response to an infectious virus, bacteria, fungus or parasite. It is currently the most expensive condition treated in U.S. hospitals, with annual costs exceeding \$20 billion, according to the Agency for Healthcare Research and Quality.

“The early care of sepsis has improved dramatically, and in-hospital mortality has decreased substantially. Unfortunately, the majority of sepsis survivors progress into chronic critical illness, or CCI, characterized by prolonged stays on intensive care units, cognitive and functional disabilities, sepsis relapse, discharge to long-term health care or rehabilitation facilities, and death,” said **Frederick A. Moore, MD, FACS, MCCM**, a professor and chief of the division of acute care surgery.



Specifically, UF Health clinical and basic science researchers recognized a new predominant type of CCI that is occurring with an increased frequency in surgical ICUs — persistent inflammation, immunosuppression and catabolism syndrome, or PICS — for which there are no effective interventions and clinical outcomes are poor.

“We are the first team science program in the nation to study CCI and PICS after sepsis. It provides the vital infrastructure to seriously pursue research of this currently insurmountable problem,” Moore said. “Despite the massive increase in its occurrence, little — if anything — is known regarding the natural history, etiology, costs, potential therapeutic modalities and long-term outcomes.”

The sepsis center plans to expand the scope of research into other critically ill populations (including severe trauma, cancer, premature infants and patients undergoing complex surgical procedures); extend collaboration within UF Health and the greater university faculty; promote education of health care professionals and the lay community on the sepsis epidemic; improve patient care; and foster external fundraising, philanthropy and advocacy initiatives.

The sepsis center includes faculty from the UF College of Medicine (emergency medicine, pulmonary medicine, aging, surgery, anesthesiology, infectious disease and health outcomes and policy); the UF College of Nursing; the UF College of Pharmacy; the UF College of Engineering; and the UF College of Public Health and Health Professions.

Grant Will Help Researchers Create a Better Test for Pancreatic Cancer

Up to one-third of pancreatic cancer cases go undiagnosed through standard means of testing. A University of Florida Health surgeon hopes a new project and alternative testing method can more accurately detect the presence of the disease — reducing the number of false negatives to as low as one in 20.

Steven J. Hughes, MD, a professor and chief of the division of general surgery in the UF College of Medicine, and his colleagues believe that measuring levels of protein signals called cytokines and chemokines that are secreted by scar tissue surrounding a pancreatic cancer tumor might lead to a less invasive, more sensitive way to test for the disease. Hughes has received a two-year, \$300,000 translational research grant from the Pancreatic Cancer Action Network, or PanCAN.

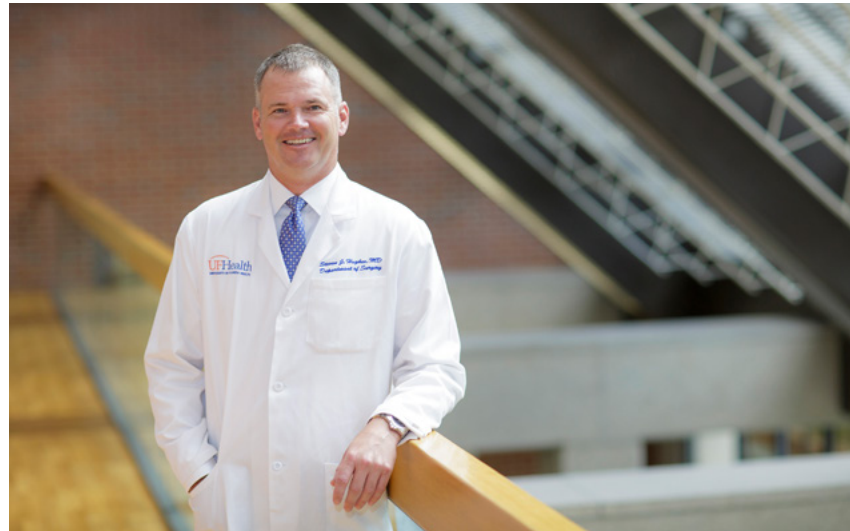
The current standard of care is a procedure performed under general anesthesia called an endoscopic ultrasound-guided fine-needle biopsy. This test, however, can miss the diagnosis of cancer in up to 32 percent of cases of operable disease in patients where the tumor is confined to the pancreas, Hughes said. The research team proposes that testing for those proteins secreted by scar tissue might decrease the risk of these “false negatives” to as little as 5 percent.

“The pancreas is difficult to biopsy because you can’t take a large chunk of tissue,” said Hughes, who is also the vice chair of quality in the department of surgery. “The organ is located in the back of the abdomen, surrounded by vital structures, and it produces digestive enzymes that can leak — even from a needle stick — causing injury to adjacent tissues.”

This comes with significant consequences to these patients, including repeat attempts at biopsy, ineligibility for clinical trials and having to decide whether to proceed with surgery without proof they have cancer, he noted.

About 15 percent of patients with the most common form of pancreatic cancer, adenocarcinoma, are candidates for surgery. Chemotherapy or other medications are used in patients not eligible for surgery. Clinical trials, however, are the preferred treatment option.

“If successful, this research offers a profound advancement from a pancreatic cancer survivor and family perspective. It offers a more accurate way to obtain a definitive diagnosis



using the same technologies that are already standardized in the clinic, ultimately saving time and money, and opening more doors to new treatments through clinical trials,” Hughes said.

This year, PanCAN estimates that more than 53,000 people in the United States will be diagnosed with pancreatic cancer, and approximately 43,000 will die from the disease. It is currently the third-leading cause of cancer-related deaths, and it is expected to rise to the second around 2020.

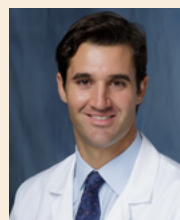
PanCAN, in collaboration with donors, awarded 17 grants through a competitive peer-reviewed Research Grants Program to 21 researchers at 12 institutions this year, investing an estimated \$4.9 million in vital pancreatic cancer research across the country.

“Our competitive Research Grants Program and the brilliant scientists we continue to support are critical to moving us closer to our goal of doubling survival rates by 2020,” said Lynn Matrisian, PhD, MBA, chief science officer at PanCAN. “Dr. Hughes is no exception. His proven track record in the field will no doubt strengthen the pancreatic cancer medical community and help spur meaningful research discoveries.”

“His (Dr. Hughes’) proven track record in the field will no doubt strengthen the pancreatic cancer medical community and help spur meaningful research discoveries.”

— LYNN MATRISIAN, PHD, MBA

New Faculty Join UF College of Medicine's Department of Surgery



Dean J. Arnaoutakis, MD, MBA, an assistant professor in the division of vascular surgery and endovascular therapy, earned his undergraduate degree from Columbia University in New York City, and his medical and business administration degrees from Cornell University in Ithaca, New York. He completed his general

surgery residency at The Johns Hopkins Hospital in Baltimore, where he also served as chief resident.

Subsequently, he completed fellowships in vascular surgery at Brigham and Women's Hospital/Harvard University in Boston and complex endovascular aortic surgery at Hôpital Cardiologique in Lille, France.

Arnaoutakis' clinical interests include open and endovascular treatment of aortic aneurysms and dissections, peripheral occlusive disease (arterial and venous), renal and mesenteric ischemia, cerebrovascular disease and hemodialysis access.

His research interests relate to improving outcomes following lower extremity arterial interventions and hemodialysis access procedures as well as minimizing complications after complex endovascular aortic procedures, namely graft occlusion/migration, spinal cord ischemia and renal failure.

Arnaoutakis is certified through the American Board of Surgery. He has authored numerous articles in peer-reviewed and professional publications, as well as several textbook chapters. He also serves as a peer reviewer for the *Journal of Vascular Surgery*, *Annals of Vascular Surgery*, and *Annals of Thoracic Surgery*.



Narendra R. Battula, MBBS, MRCS, MD (research), FRCS, an assistant professor in the division of transplantation surgery, received his medical degree from Manipal Medical University in India and a doctorate in medical research from King's College London, where he studied disseminated hepatocellular carcinoma.

He completed an internship at Kasturba Medical College Hospitals in India, as well as general surgery residency training in Leicester and Birmingham, United Kingdom.

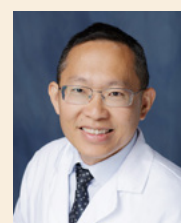
Battula also completed fellowships in hepato-pancreatic-biliary surgery and adult/pediatric liver transplantation in the well-known liver unit at University Hospitals Birmingham, followed by a second at Ochsner Health System, New Orleans. He has received his American Society for Transplant Surgery training certificate in multiorgan transplant (liver, kidney and pancreas transplantation).

Battula is certified through the Royal College of Surgeons of Edinburgh and the Royal College of Surgeons in England. He is also certified to use the da Vinci Robotic Surgical System.

He is a member of the Royal College of Surgeons, the European Society for Organ Transplantation, the International

Hepato-Pancreato-Biliary Association and the American Society of Transplant Surgeons. Battula has authored several articles in peer-reviewed and professional journals and given numerous presentations nationally and internationally.

Battula's clinical interests are living donor and pediatric liver transplant surgery, and his research interests center on organ preservation and reconditioning using normothermic liver allograft machine perfusion.



Harvey W. Chim, MD, FACS, an associate professor in the division of plastic and reconstructive surgery, completed a plastic surgery residency at Case Western Reserve University in Cleveland and a fellowship in hand and microsurgery at the Mayo Clinic in Rochester, Minnesota. He received his medical degree from the National

University of Singapore.

Chim is certified through the American Board of Plastic Surgery with a Certificate of Added Qualification in Surgery of the Hand. He is also a fellow of the American College of Surgeons. He has served as a scientific peer reviewer for the Department of Defense. He also serves on committees for the American Society for Surgery of the Hand and Plastic Surgery Research Council. He has received grant funding from the Plastic Surgery Foundation, as well as the American Society of Maxillofacial Surgeons.

Chim has published more than 90 papers in peer-reviewed journals. He is on the editorial board of the *Nature* journal *Scientific Reports*.

Chim's clinical interests include hand and peripheral nerve surgery, brachial plexus reconstruction, lower extremity reconstruction and limb salvage, vascularized bone grafts, complex reconstruction of the trunk, head and neck and breast, surgical treatment of migraine headaches, and endoscopic hand and plastic surgery.

His research interests include tissue engineering and regenerative medicine, optimizing outcomes in peripheral nerve and brachial plexus surgery, and migraine surgery.



Olusola Oduntan, MD, FACS, FCCP, an associate professor in the division of thoracic and cardiovascular surgery, completed an advanced general thoracic surgery fellowship at Brigham and Women's Hospital of Harvard Medical School in Boston.

Oduntan received his medical degree at the College of Medicine, University of Ibadan, Nigeria. He completed an internship as well as a general surgery residency at University College Hospital, also in Ibadan. He also completed a general surgery residency at Yale University/Hospital of St. Raphael, New Haven, Connecticut,

and a cardiothoracic surgery residency at the Medical College of Georgia in Augusta.

Additionally, Oduntan has received specialty training in robotics in thoracic surgery and video-assisted thoracoscopic surgery lobectomy.

Oduntan is certified in general surgery through the American Board of Surgery; cardiothoracic surgery through the American Board of Thoracic Surgery; principles of general surgery through the Royal College of Physicians and Surgeons of Canada; and general surgery through the West African College of Surgeons.

Oduntan has spoken at several presentations and invited lectures, and he has authored numerous papers in peer-reviewed and professional journals. He is also a co-author of the *Esophagus and Stomach* chapter of the *Step-Up to Surgery* textbook, second edition.

Oduntan's clinical and research interests include general thoracic surgery (lung cancer, esophageal cancer and benign diseases of the esophagus).



Mauricio Pipkin, MD, an assistant professor in the division of thoracic and cardiovascular surgery, earned his medical degree from Lutheran University of Brazil, where he also completed a general surgery residency. He completed a thoracic surgery residency at Pontifical Catholic University of Rio Grande do Sul, as well as fellowships

in thoracic surgery and lung transplantation at Toronto General Hospital/University Health Network through the University of Toronto.

Pipkin's clinical interests include thoracic oncology, minimally invasive thoracic surgery, lung transplantation, extracorporeal life support, ex vivo lung perfusion, in vivo isolated lung perfusion and robotic surgery.

He has authored several articles in peer-reviewed journals and chapters in medical textbooks.

Martin Rosenthal, MD, an assistant professor in the division of acute care surgery, earned his medical degree from Mercer University School of Medicine in Macon, Georgia. He completed a general surgery residency and a fellowship in critical care medicine at UF. His post-graduate surgical training also includes nutrition fellowships at Louisville University and Oregon Health and Science University. Rosenthal is also board-certified in surgical critical care.

He is a member of several professional and medical organizations, including the Florida Chapter of American Society of Enteral and Parenteral Nutrition, the American Society of Enteral and Parenteral Nutrition, the Society of Critical Care Medicine, the Florida Chapter of American College of Surgeons, the Florida Committee on Trauma and the American College of Surgeons.

Rosenthal also served as an ad hoc reviewer for the journal *PLOS One*. He has authored numerous articles in peer-reviewed journals and chapters in medical textbooks.

Michael J. Walters, MD, an assistant professor in the division of acute care surgery, earned his medical degree from the Medical College of Wisconsin in Milwaukee. He completed

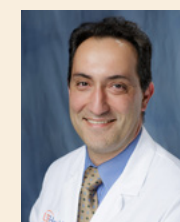
general surgery residencies at Dartmouth-Hitchcock Medical Center, Lebanon, New Hampshire, and the Medical College of Wisconsin.

Walters is currently a lieutenant colonel in the U.S. Army Reserve Medical Corps. His active duty service in Afghanistan includes deployments with the 909th, 1980th and 915th Forward Surgical Teams and the 94th Combat Support Hospital.

His military honors include National Defense Service Medals, the Army Reserve Component Achievement Medal with Oak Leaf Cluster, the Global War on Terrorism Service Medal, the Afghanistan Campaign Medal with Campaign Star, NATO Afghanistan Service Medals, Army Service Ribbons, the Armed Forces Reserve Medal with M Device, and the Afghanistan Campaign Medal with two stars.

Walters is a member of the Association of Military Surgeons of the United States and the American College of Surgeons.

His clinical interests include surgical and critical care of trauma patients, delivering surgical care in austere environments and complex abdominal wall reconstruction surgery with care of enterocutaneous fistulae.



Ali Zarrinpar, MD, PhD, an associate professor in the division of transplantation surgery, earned his medical degree from the University of California, San Francisco, where he also obtained a doctoral degree in biochemistry. He completed a general surgery residency and a fellowship in multivisceral transplant and hepatobiliary

surgery from the University of California, Los Angeles.

Zarrinpar is a diplomate in general surgery through the American Board of Surgery and a fellow of the American College of Surgeons. He is also certified in multivisceral transplantation through the American Society of Transplant Surgeons.

Additionally, Zarrinpar is a member of several professional associations, including the Americas Hepato-Pancreato-Biliary Association, the American Association for Cancer Research, the Academy of Persian American Physicians, the International Liver Cancer Association, the American Association for the Study of Liver Diseases, the American Society of Transplantation, the Association for Academic Surgery, the Society for Laboratory Automation and Screening, and the Biomedical Engineering Society.

Zarrinpar has served as an editorial board member and a reviewer for numerous medical publications. He has also authored numerous articles in peer-reviewed journals and chapters in medical textbooks.

He has won a number of awards, including the American College of Surgeons Faculty Research Fellowship, the American Society of Transplant Surgeons/Astellas Faculty Development Grant and the American Society of Transplant Surgeons/Veloxis Vanguard Prize.

In addition to his clinical hepatobiliary and transplantation practice, Zarrinpar has an active clinical research program in liver cancer, liver failure and liver transplantation. He also has a basic/translational science research lab working on hepatocellular carcinoma, ischemia/reperfusion injury and transplant immunology.

THE STITCH

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