

The Department of Anesthesiology, Perioperative and Pain Medicine

ANNUAL RESEARCH REPORT



2024

CONTENTS

1	A Message from Drs. DeMaria and Levin
3	Investigator Spotlight
6	Meet the Research Office Staff
10	New and Notable Publications 2024

A Year of Continued Excellence in Anesthesiology Research

As we reflect on the achievements of the past year, we are filled with pride and excitement for the department's continued research success. 2024 has been another year of significant progress, characterized by impactful publications, competitive grant funding, and a thriving research community dedicated to advancing perioperative care.

Our faculty, trainees, and research staff have consistently demonstrated a dedication to scientific inquiry. This commitment has resulted in a robust publication record, with numerous articles appearing in high-impact journals. These publications have explored a wide range of critical topics, including pain management and addiction, investigating novel approaches to pain control and addressing the opioid crisis; health equity, examining the impact of healthcare disparities on perioperative outcomes; and perioperative optimization, developing strategies to improve patient safety and optimize surgical outcomes.

Building on our strong research foundation, we have successfully secured significant external funding in 2024. These competitive grants will support innovative projects, such as investigating the role of Artificial Intelligence/Machine Learning in preventing postoperative delirium, evaluating the clinical impact of novel medications and anesthetic techniques, and improving the efficiency and effectiveness of perioperative care delivery.

Our success is not solely measured by publications and grants. A vibrant research ecosystem fuels our progress. Over 40 active research projects are currently underway, spanning a diverse range of subspecialties within anesthesiology. We are actively fostering collaborations with colleagues across disciplines, and are also dedicated to mentoring the next generation of researchers, providing them with the necessary skills and resources to succeed.

As we enter 2025, we are optimistic about the future of anesthesiology research within our department. We are committed to providing the necessary resources and infrastructure to facilitate groundbreaking research, fostering a collaborative environment that encourages interdisciplinary research and mentorship, and ensuring that our research discoveries translate into improved patient care.

We extend our sincere gratitude to all members of our research community for their hard work, dedication, and commitment to excellence. Together, we will continue to advance the field of anesthesiology and improve the perioperative experience for patients worldwide.

With pride and excitement for a new year,



Sam DeMaria, MD
Vice Chair for Research



Matt Levin, MD
Assoc. Director for Research

INVESTIGATOR SPOTLIGHT

Daniel Katz, MD

Ryan Wang, MD



Daniel Katz, MD

I have always had an interest in research. Examining clinical questions, testing new technology, and investigating educational interventions are some of the main areas where I have focused my projects. In the clinical realm I have had a keen interest in maternal health, specifically reducing morbidity and mortality from obstetric hemorrhage. In this realm we have designed an invitro model of coagulopathy that we have used to test a variety of interventions, created a viscoelastic testing pipeline, as well as implemented and validated new AI technology to monitor blood loss during labor and delivery. In doing so we have laid the groundwork for preventatively managing obstetric coagulopathy earlier in less critical stages in an effort to minimize bleeding and consequent red blood cell transfusion requirements. These activities have been the foundation of our obstetrical patient blood management program and provide evidence of ample experience with successfully completing clinical trials in the obstetric patient population.

In the realm of technology I have worked with several partners to investigate novel devices for diagnosis and treatment including a new biosensor for glucose and electrolyte checks, a non-invasive therapy to decrease bleeding in the perioperative period, and new cartridge based technology to measure heparin in the blood. By partnering with other institutions and industry, our department is at the forefront of integrating new technology into our practice.

Finally, in the realm of education, I have been involved in leveraging virtual reality technology to teach both technical and non-technical skills in a variety of environments. Our department has been the testing ground for AI based voice recognition software in some of the educational environments, allowing for a user experience that was only possible with human actors. In addition, our team continues to push the envelope in the realm of high fidelity simulation, examining the best strategies to get the most learning out of simulation sessions.

A few of my most recent studies are:

- Correlation of Biosensor Sweat, Blood, and Fingerstick Glucose in Pregnant Patients with Gestational Diabetes
- Impact of intraoperative cell salvage on pregnant patients with anemia
- Severe Post Partum Hemorrhage Profiles utilizing TEG6S
- Auricular Neuromodulation to reduce bleeding in functional endoscopic sinus surgery.
- The Use of Kcentra and RiaSTAP to correct dilutional coagulopathy in obstetric patients using rotational thromboelastometry
- Assessing the role of Inflammation and Iron Deficiency in Non-Anemic Pregnant Patients
- Examining the role of civility in operating room and clinical performance
- Utilizing virtual reality for fire safety training
- Advanced Cardiac Life Support refresher training with virtual reality
- Use of augmented reality vs screen based training for technical skills



Ryan Wang, MD

I currently serve as Associate Director of and Director of Research for, the Division of Liver Transplant Anesthesiology.

To highlight a few of my research activities, I published a study titled, “Serious Gaming for Orthotopic Liver Transplant Anesthesiology: A Randomized Control Trial” alongside Dr. Katz and study team to measure the impact of a screen-based training application named, OLT anesthesia trainer, for resident education in liver transplantation. I assisted in testing and refining the app, which is used as part of the liver transplant rotation curriculum. In addition, in 2022, I investigated the risk factors for intracardiac thrombus and postreperfusion syndrome in liver transplantation, allowing anesthesiologists to better predict, which patients will likely experience hemodynamic instability during liver transplantation. Published findings thus far are the titles, “Postreperfusion syndrome in liver transplantation: Outcomes, predictors, and application for recipient selection” and “Intraoperative intracardiac thrombus in liver transplantation: A 9-year retrospective review focusing on treatment and outcomes.”

I am currently studying complications associated with massive transfusion, including the impact of the standardized irradiation of packed red blood cells. Prior studies have shown that there is an increase in potassium concentration of packed red blood cells after irradiation. Our investigation investigates whether this effect is clinically significant. Additionally, large doses of insulin may be given for hyperkalemia intraoperatively. Another study seeks to understand risk factors for iatrogenic hypoglycemia in this setting. These results should lead to improved identification of patients at risk for the complications associated with rapid intraoperative blood transfusion.

Most recently, I have been involved in several multi-center clinical trials. One was a randomized clinical trial, which has completed enrollment. We investigated the impact of the anesthetic drug type (i.e., volatile anesthetic vs propofol) used in cancer resection surgery on cancer recurrence. Another is a randomized trial investigating Angiotensin-2, a relatively new vasopressor, in liver transplantation. The results of this study may support the use of a new medication in maintaining safe blood pressure ranges during liver transplantation.



THE RESEARCH OFFICE

Research Administration Team

Jim Leader, MPA

Jamie Kwan-Gorelick

Jacqueline Crittendon

Research Clinical Team

Jessenia Lopez, MS

Andrew Morales

Amir Malik, MD

Kelsey Desmond, MD

Spencer Perry, MD

For over 19 years, I have been a part of the Mount Sinai Hospital community with eight of them being in the Department of Anesthesiology, Perioperative and Pain Medicine as Administrative Director, Academic Programs. In addition to directing the department's research activities and daily operations, I also oversee the Residency and Fellowship Programs administratively.

I enjoy traveling and attending Broadway Theatre.



JIM LEADER, MPA
Administrative Director

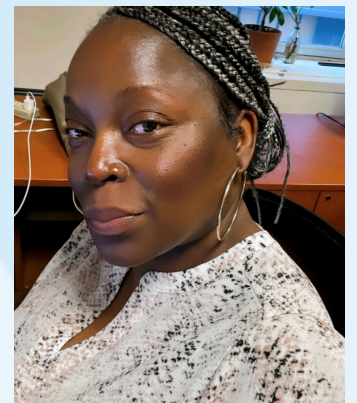


Hi, this is Jamie, Grants Manager for the Department of Anesthesiology. I joined the Grants Team in the beginning of the year. I have enjoyed collaborating with the team to streamline our department's grant process while using my background knowledge to assist with grants management.

As a recent resident of the suburban life in Long Island, I have been cherishing the moments exploring new places and sharing new experiences with my husband and daughter.

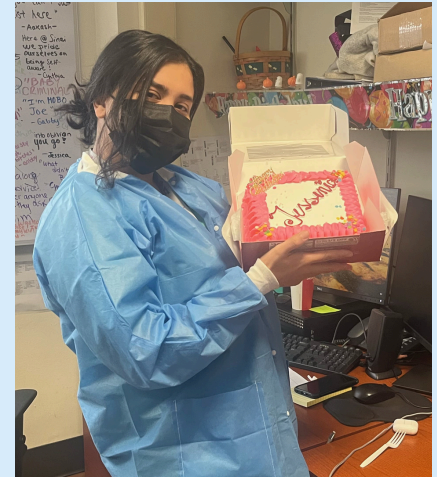
JAMIE KWAN-GORELICK
Grants Manager

I am Jacqueline, a Program Manager at the Department of Anesthesiology. With a strong background in Administration, through hands-on experience and a commitment to continuous learning. Over the years, I have worked with clinical teams, to manage administrative faucets for timely and successful outcomes, which has fueled my enthusiasm for learning even more about management. Currently my focus is on research administration, and helping our team to run smoothly. I believe in the power of teamwork, creativity and thrive on tackling challenges with solutions. I enjoy, traveling, spending time with my family, spoiling my granddaughter as much as possible, and taking care of my indoor garden.



JACQUELINE CRITTENDON
Program Manager

Hey there! My name is Jess and I have been working in various research settings since 2014, while pursuing my undergraduate degree, and started at Mount Sinai last year. I have a varied experience working on projects in different departments including pediatrics, genetics, public health, medical cannabis, and now anesthesiology. The variety and progress is what I like about working in research!



JESSENIA LOPEZ, MS

Clinical Research Manager



Hello! My name is Andrew X Morales Cabrera and I have a strong background in clinical research, working on NIH-funded studies and coordinating data collection and analysis. My experience spans multiple medical fields, and I'm passionate about advancing care through research and collaboration.

ANDREW MORALES

Clinical Research Coordinator

I am a recent transplant to Manhattan, but I am originally from Northern Virginia. I received my BAs in Anthropology and Biology from Cornell University in 2015 and my MD from Virginia Commonwealth University School of Medicine in 2021. I completed my surgical intern year at University of North Carolina Chapel Hill prior to completing some anesthesia training at Rush Medical Center in Chicago. Here at Mount Sinai I am heavily involved in research within the obstetric anesthesia division and have thoroughly enjoyed working with this patient population. Outside of the hospital you can find me at the nearest bar rooting for my Baltimore Ravens or trying out any and every restaurant as humanly possible. Although I am a new addition, I already feel incredibly at home amongst everyone that works here and I am excited to continue contributing to such a great department!



AMIR MALIK, MD

Clinical Research Coordinator

Raised in Louisiana, I spent the decade after high school living in France where I obtained my medical degree in 2024. Proud to be back in the states and in the field of anesthesiology, my research interests lie in the interworkings of psychiatric and somatic health and how psychiatric and neurologic comorbidities affect anesthetic care. A mother of two, I'm passionate about pediatrics as well as women's health. I'm a creative at heart, and if I wasn't in medicine I probably would have become a singer or novelist.



KELSEY DESMOND, MD

Clinical Research Coordinator



I am a former general surgery resident transitioning to anesthesiology residency. I obtained my engineering degree at the Rochester Institute of Technology and my MD from Albany Medical College and have several patents and numerous publications. My interests are in medical devices, cardiac anesthesia, and critical care medicine. I also love cycling and bike racing.

SPENCER PERRY, MD

Clinical Research Coordinator

NEW &
NOTABLE
PUBLICATIONS
FOR 2024

Levin MA, Kia A, Timsina P, Cheng FY, Nguyen KA, Kohli-Seth R, Lin HM, Ouyang Y, Freeman R, Reich DL. Real-Time Machine Learning Alerts to Prevent Escalation of Care: A Nonrandomized Clustered Pragmatic Clinical Trial. *Crit Care Med*. 2024 Jul 1;52(7):1007-1020

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Happy New Year!