EMORY
UNIVERSITY
SCHOOL OF
MEDICINE

Department of Radiology
and Imaging Sciences

Image 2020

RISING TOGETHER FOR HEALTH AND HOPE

ANNUAL REPORT 2018-2020

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MISSION

Emory Radiology and Imaging Sciences will be a destination for those who seek excellence and continuous innovation in medical imaging.

VISION

The Emory Department of Radiology and Imaging Sciences is a community dedicated to the promotion of health, discovery and innovation, and to educating the future health care workforce. We embrace and celebrate a collaborative culture, adaptive approaches to continuous innovation, and aligned partnerships in patient-centered care.

ABOUT THIS REPORT

Excitement over the progress and productivity of 2019 fed anticipation for 2020. Few imagined the year would quickly turn tumultuous and tragic. The foundations of the nation and even the world continue to tremble from the seismic shocks of both a deadly virus and virulent hate. 2020 has challenged us to cast aside self-interest in pursuit of the common good. Emory Radiology's 1,100 faculty, staff, and trainees are meeting the challenge, ***rising together for health and hope***.

This report details the department's substantial efforts across its tripartite mission of clinical care, education, and research from September 2018 through September 2020. A special section shines a spotlight on the department's response to the COVID-19 pandemic while stories throughout the report illustrate the department's longstanding commitment to diversity, equity, and inclusion.

This report is the product of the Emory Radiology Communications and Creative Services Team. Photos were taken outdoors at Lullwater Park and other locations on the Emory campus, as well as at Ardmore Park and Old 4th Ward Park in Atlanta with social distancing and mask-wearing required to protect the health of all involved. Project Manager: **Camille Dingle**. Photography: **Kevin Makowski**. Graphic Design: **Nadia Vance**. Social Media and Website: **Mohsina Yusuf**. Scheduling and Logistics: **Denise Fennell**. Writing and Editing: **Sam Marie Engle**.

Cover photo: Director of Nursing Pamela Stanley and Radiologic Technologist III Aurora Marinescu

LETTER FROM CHAIR

This report marks a watershed moment for Emory Radiology. We have been challenged personally and professionally in 2020, and have emerged stronger. Every day I am grateful and proud to be part of the community we have built together.

In 2019, we grew across our missions. The COVID-19 pandemic changed everything. It is difficult to think of anyone unaffected by this new and insidious disease.

Rising together, we adapted rapidly using the backbone of our EmPower framework and accelerated communication strategies. An Emory COVID Community Collaborative formed to better serve under-resourced communities. Diagnostic, therapeutic, and vaccine work commenced, and we adjusted to care for both COVID and non-COVID patients as safely as possible. As a result, Emory Healthcare's COVID-19 inpatient survival rate is a global best.

COVID-19 took a disproportionate toll on Black and Latinx families while we simultaneously witnessed the tragic deaths of George Floyd, Ahmaud Arbery, Breonna Taylor, and Rayshard Brooks, yet more victims of pernicious, systemic racism. We rose together, determined to march toward change. Record numbers of citizens cast ballots in the 2020 election, electrified by the late Honorable John Lewis' proclamation: "The vote is the most powerful nonviolent tool we have." As One Emory, we recommitted to racial justice and to promoting diversity, equity, and inclusion in all our endeavors.

Much work remains but there is nothing we can't overcome when we work together with purpose.

Carolyn Cidis Meltzer, MD
Chair, Department of Radiology and Imaging Sciences

EMORY RADIOLOGY CLINICAL DIVISIONS

- ABDOMINAL IMAGING
- BREAST IMAGING
- CARDIOTHORACIC IMAGING
- COMMUNITY RADIOLOGY SPECIALISTS
- EMERGENCY AND TRAUMA IMAGING
- INTERVENTIONAL RADIOLOGY AND IMAGE-GUIDED MEDICINE
- INTERVENTIONAL NEURORADIOLOGY
- MUSCULOSKELETAL IMAGING
- NEURORADIOLOGY
- NUCLEAR MEDICINE AND MOLECULAR IMAGING
- PEDIATRIC IMAGING

Scan this QR code for more online about Clinical Care.

Photo at left: Director of Emergency and Trauma Imaging Jamlik-Omari Johnson

Vice Chair of Clinical Affairs **Amit Saindane, MD, MBA**, oversees 11 clinical divisions that serve the Emory Healthcare network of hospitals, clinics, and specialty care centers.

Providing 1.4 million imaging studies in FY 2019 and 1.3 million in 2020, Emory Radiology contributes to the care of the vast majority of Emory Healthcare patients. As Emory Healthcare grows, so, too, does the capacity of Emory Radiology to care for more patients in more places across Georgia. That increased capacity has proven invaluable as the COVID-19 pandemic continues its deadly assault. Hundreds of Emory Radiology team members give their best on the front lines every day, rising together for health and hope.

EMERGENCY AND TRAUMA IMAGING EXTENDS CARE FOR GRADY PATIENTS

The Division of Emergency and Trauma Imaging, led by **Jamlik-Omari Johnson, MD**, associate professor, provides round-the-clock imaging services for the emergency departments of Emory University Hospital, Emory University Hospital Midtown, Emory St. Joseph's Hospital, and Emory Johns Creek Hospital. Since 2011, the division has increased its role in providing imaging services for Grady Hospital's emergency and trauma patients, completing 275,197 imaging studies in FY 2019. In September 2019, the division aligned its supervision and care models at Grady with those of Emory Healthcare, resulting in an expansion of service hours at Grady to 7:00 AM to 1:00 AM on weekdays and 10:00 AM to 6:00 PM on weekends. As a result, the division completed 239,903 imaging studies in FY 2020 despite the COVID shutdown.

"This expansion of coverage will ensure more consistent, time-sensitive service for emergency and trauma patients no matter when they arrive and how long they stay," explains Dr. Johnson.

The division has become more tightly integrated with Grady's Marcus Trauma Center, Atlanta's only Level 1 trauma center verified by the American College of Surgeons. As Dr. Johnson notes, "It's essential that we have a strong and close working relationship with trauma specialists. Our team consults with the emergency and trauma teams so that we can discuss imaging findings that are key to developing a rapid and effective treatment plan in real time to maximize positive patient outcomes."

Residents are integral members of the care team. What they learn here as they work alongside the division's world-class emergency and trauma imaging faculty not only enables them to provide high-quality care for Grady's patients 24/7, it also prepares them to become tomorrow's emergency and trauma imaging specialists.

The division is committed to ensuring Grady cost-effectively provides the best quality of emergency and trauma care. As demand for care grows, the division is poised to grow, too.

THE COMMUNITY APPROACH TO CANCER TREATMENT IN MIDTOWN

The Division of Interventional Radiology (IR) provides image-guided diagnostic and therapeutic procedures for cancer patients in collaboration with Winship Cancer Institute at Emory University Hospital and Emory University Hospital Midtown. The IR team takes a community approach at Emory Midtown, where patients from Kaiser Permanente

> ***"Our whole team works to ensure a seamless, safe experience for the patient."***
>
> ***Zachary Bercu, MD***

Photo at left: APP Joy Summers, interventional radiologist Zachary Bercu, and APP Kelda Kemp

and Atlanta Veterans Administration Hospital come for procedures like Y-90 radioembolization to treat inoperable liver cancer.

"We work closely with our referring community doctors to ensure the highest quality continuity of care," explains **Zachary Bercu, MD**, assistant professor and assistant division director for innovation and strategy of Emory Interventional Radiology.

Teamwork is vital given the COVID-19 pandemic. What once took several visits now must occur in one day to minimize infection risk. The compressed schedule means less travel for critically ill patients and less time without anti-angiogenic medications they must pause for treatment. It also means up to five patients can be treated in one long day.

Dosimetry is an important patient safety factor, says **Nima Kokabi, MD**, assistant professor and interim clinical site director for IR at Emory Midtown. He pioneered clinical trials to determine the lowest dose of radiation needed to destroy a tumor while minimizing damage to healthy tissue. The team also must match procedure scheduling with delivery of the radioactive isotope yttrium Y-90 so patients receive the optimal dosage. Nurse navigator **Sonia Benenati** does more than coordinate scheduling: patients also turn to her for help with quality of life issues.

On treatment day, Drs. Bercu and Kokabi map the tumor using angiography. Emory Radiology's nuclear medicine specialists **Dr. David Schuster**, **Dr. David Brandon**, and **Dr. Ila Sethi** then help determine dosing and placement of tiny beads filled with Y-90. Nuclear medicine technologists **Kawai Laurencin** and **Nancy Hicks** provide the CT/PET imaging the radiologists need to guide placement of the Y-90 beads that treat the tumor. The nursing team monitors patients post-procedure and treats side effects before patients leave. Advanced practice providers **Kelda Kemp, RN, MSN, ACNP-BC**, and **Joy Summers, PA-C**, provide aftercare through virtual visits. Referring doctors appreciate how the Emory team shares details about a patient's treatment and consults on next steps.

"Our whole team works to ensure a seamless, safe experience for the patient," says Dr. Bercu. The result is more months of living for patients who thought they were out of options.

TECHNOLOGY ADVANCES QUALITY OF PATIENT CARE

Emory Radiology's Imaging Informatics team, led by Vice Chair **Nabile N. Safdar, MD, MBA**, has improved order accuracy and scheduling efficiency with a new centralized physician order entry system developed in partnership with Emory Libraries & Information Technology Services. Emory physicians now submit electronic orders for imaging studies using a standardized radiology ordering catalog. The orders immediately transmit to schedulers who quickly find a time, date, and location for the study that works for the patient.

Imaging Informatics also launched an online portal through which patients and referring physicians can upload imaging studies completed elsewhere. The studies become part of the patient's electronic medical record and are accessible to the Emory care team, making referrals easier and virtual visits more productive during the COVID-19 pandemic.

PERSONALIZED TRAINING ENSURES ADVANCED PRACTICE PROVIDERS DELIVER EXCELLENCE

Emory Radiology's advanced practice providers (APPs)—physician assistants and nurse practitioners—work at the highest scope of their license as essential members of interventional radiology patient care teams. Seventeen APPs practice at Emory University Hospital, Emory University Hospital Midtown, Emory St. Joseph's Hospital, Emory Johns Creek Hospital, and Grady Hospital, led by Chief APP **Tracy Powell, MSN, ANP-BC**, and Lead APP **Stephanie Hawkins, PA-C**.

Given the highly specialized nature of their work, newly hired APPs undergo personalized on-the-job training to ensure they have the skills and expertise necessary to coordinate patient care and provide pre-procedure patient assessment, informed consent to treatment, and clinical aftercare. APPs also must be trained to perform image-guided procedures such as biopsies, paracentesis, and vascular access for ports.

Photo at left: Lead APP Stephanie Hawkins and Chief APP Tracy Powell

"Our goal is to bring the power of molecular imaging to all patients."

David M. Schuster, MD

Once hired, Tracy and Stephanie sit down with the new APP's supervising physician to create an orientation and training schedule. The new APP receives thick binders containing their IR procedure competency checklist, clinical procedure guidelines, and department policies and procedures. An APP and a physician mentor check in weekly to monitor progress against a goal checklist and to help address any challenges. Progress is assessed at 30, 60, and 90 days.

Most of the APPs work a four 10-hour-day block schedule mirroring that of the IR physicians and covering the spectrum of IR clinical care, from performing procedures to handling outpatient clinic and inpatient consultations. Most have primary and secondary site rotations that help ensure coverage across the enterprise. Flexibility is key.

"We need team players who are eager for the challenge and variety of IR," says Powell. "Our APPs not only expand our capacity to meet demand for care, they also ensure everyone on the team provides the highest quality patient care."

UPDATE: EMORY'S RADIOTRACER AXUMIN

Men now have a trustworthy new option for detecting recurring prostate cancer: PET imaging with the novel radiotracer fluciclovine (F18). Marketed by Blue Earth Diagnostics under the name Axumin, F18 was developed by **Mark M. Goodman, PhD**, professor, who co-directs Emory Radiology's Molecular Imaging, Biomarker and Probe Development Team, and Timothy Shoup, PhD, now at Massachusetts General Hospital. Professor **David M. Schuster, MD**, director of the Division of Nuclear Medicine and Molecular Imaging, led clinical validation.

More than 1,000 men already have benefited from PET imaging using Axumin at Emory. They chose Emory for both its expertise in nuclear medicine and molecular imaging and its personalized continuum of care.

Emory continues to explore Axumin's clinical value through additional trials. A recently completed NIH-funded trial conducted in partnership with Grady Hospital examined tumor treatment outcomes based on conventional versus Axumin imaging. A current NIH-funded trial examines how well a PET/CT scan using Axumin compares with PET/CT using Gallium-68-PSMA for planning radiation treatments and enhancing positive outcomes for men with prostate adenocarcinoma. Participants are recruited at all Emory hospitals and Grady Hospital.

"We continue to be involved in the translation of new radiotracers for prostate and other cancers," says Dr. Schuster. "Our goal is to bring the power of molecular imaging to all patients."

Photo at left: Nuclear physics resident Bria Moore, nuclear medicine resident Domnique Newallo, and medical imaging graduate Kiana Barcus

Image 2020 EDUCATION

Scan this QR code for more online about Education.

Emory Radiology's commitment to equity and inclusion draws residents, fellows, and medical imaging undergraduates who are as diverse as they are accomplished. Trainees thrive in the department's inclusive, collegial, and collaborative environment. Vice Chair for Education **Mark Mullins, MD, PhD**, leads by example as faculty and staff work alongside trainees to ensure academic and professional goals are met without sacrificing personal wellness.

Trainees gain experience in Emory Healthcare's high-volume tertiary care hospitals and specialty medical centers serving diverse urban and suburban populations. They also hone their skills at one of the nation's busiest public hospitals, a bustling veterans medical center, and a renowned pediatric health care center.

BACHELOR OF MEDICAL SCIENCE IN IMAGING PROGRAM

One of only three baccalaureate programs in Georgia, the Bachelor of Medical Science in Imaging (BMSc) program offers a three-year program for students with at least 30 hours of undergraduate coursework and no imaging experience and a one- or two-year bridge program for credentialed radiographers to earn a baccalaureate degree. Students can specialize in CT, MRI, radiography education, or radiology administration. They complete didactics and simulation training with renowned faculty and learn alongside Emory's best registered technologists in clinical rotations. Faculty members are supported for advancing their own academic studies which then enriches the quality of student training; faculty leadership in professional organizations and accreditation evaluations further enhances the program's quality and reputation.

Under the leadership of **Theodore Brzinski, Jr., MS, RT(R)**, the program recently earned eight-year reaccreditation. Recruitment efforts and special scholarship programs like EPiC Pipeline make real the commitment to a diverse student body.

INVESTING IN STUDENT DIVERSITY: EPIC PIPELINE

The Emory Pipeline Collaborative (EPiC) provides students from disadvantaged backgrounds with pathways to health sciences careers like medical imaging. EPiC is part of the National Health Careers Opportunity Program Academy at Emory funded by a five-year grant from the Health Resources and Services Administration of the U.S. Department of Health and Human Services.

Participating high school students enjoy three years of college prep and health-career exploration programming plus mentoring to help them graduate and then matriculate to college. Undergraduates receive scholarship funds, mentoring, and academic support to ensure their success.

Kiana Barcus, RT(R), is one of the first medical imaging Pipeline scholars. Being born six months premature and with only one lung meant her childhood was full of medical imaging to track her growth. Kiana was fascinated by the pictures of her insides. When college-age Kiana accompanied her mother for a mammogram that led to a breast cancer diagnosis, she saw anew the power of the pictures. "That sealed it. I had to become an imaging technologist."

A first-generation college student, Kiana found Emory's program through an online search. She immediately fell

RESIDENT RESEARCH REDEFINES POSSIBILITY

The Radiology Residency Research Track gives residents a jump-start on a research career in academic medicine. Residents gain dedicated research time plus faculty mentorship to support original discovery. Blending work for both the Research and Imaging Informatics tracks, Diagnostic Radiology Chief Resident **Charlotte Chung, MD, PhD** *(L)*, is developing standardized protocols for CT perfusion studies used to diagnose and plan treatment for stroke patients. **Christopher Hesh, MD** *(C)*, is creating models of tumor microvasculature that can be used to test potential image-guided treatments for osteosarcoma, an aggressive malignancy in children. **John Comer, MD, PhD** *(R)*, is employing machine learning to craft 3D neural network architecture to predict brain aneurysm location utilizing non-enhanced CT head imaging with the goal of advancing both the speed and accuracy of diagnosis.

"It's an exciting time for nuclear medicine and molecular imaging."

Erin Grady, MD

in love with CT. "CT is the lifeline for anyone with any kind of trauma. I love how you can learn so much from such a quick procedure."

The Pipeline scholarship offered Kiana her own lifeline. "I'm so glad Ted (Brzinski) suggested I apply. The scholarship money covered most of my tuition which allowed me to invest in extra study materials to help me complete my program. It took away the worry about affording scrubs and even gas to get to classes. Pipeline gave me a mentor who cared about me and supported me while my mom was being treated for breast cancer."

In addition to her Pipeline mentor **Ajeenah Bullock, MSRS, RT(R)**, Kiana values the support of her advisor, **Kimberly Cross, MSRS, RT(R)**. Kim customized CT training for Kiana and brought in CT tech-turned nuclear medicine radiologist **Dr. Domnique Newallo** to provide additional tutorials.

Kiana graduated in July 2020 and wants to give back as she starts her career as a CT technologist at Emory Midtown. "I never imagined I would go to Emory but here I am with an Emory diploma. I want to help students know what's possible. It means so much to help others because so many people have helped me succeed."

NUCLEAR MEDICINE AND MOLECULAR IMAGING IN MEDICINE

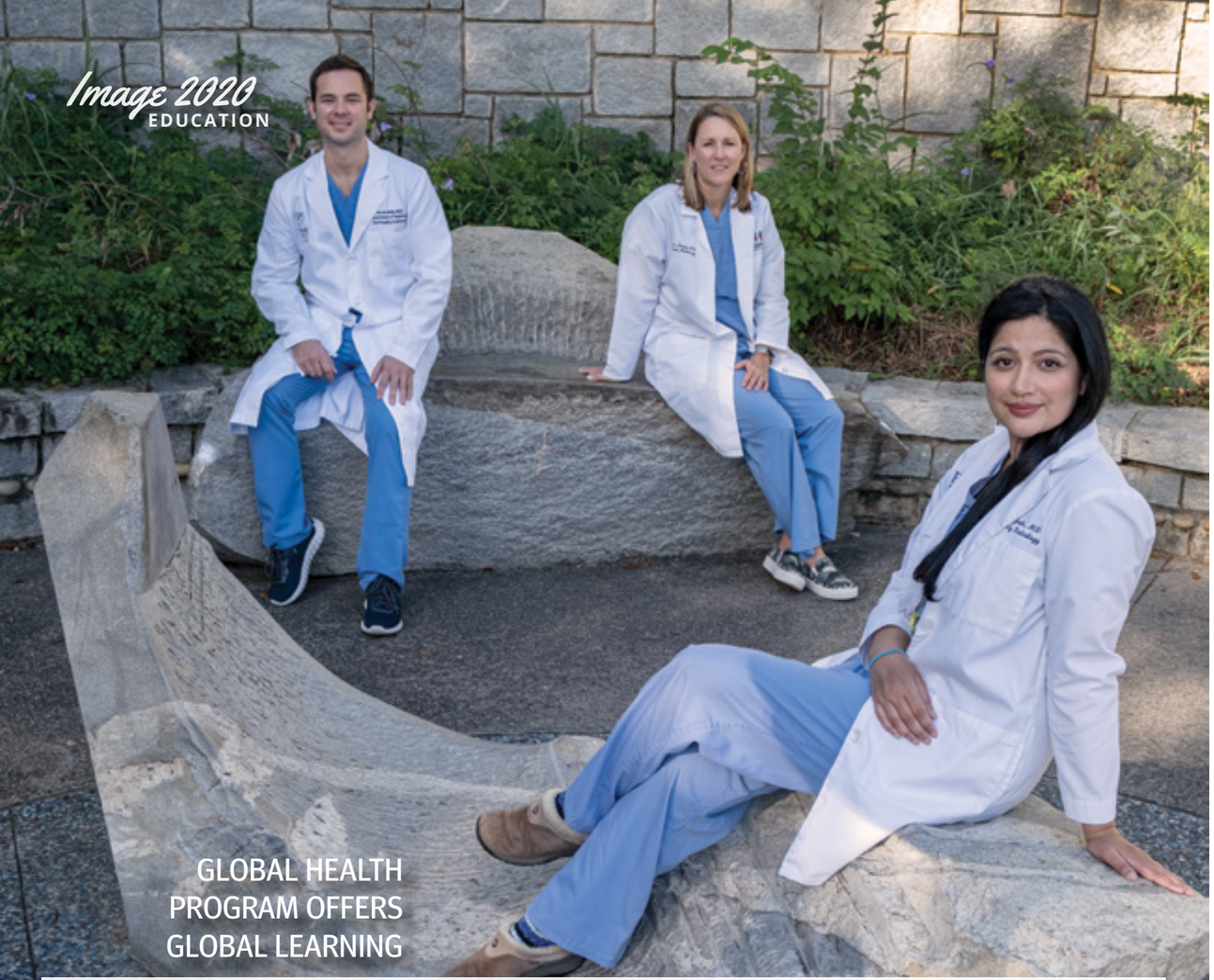
Emory Radiology offers multiple nuclear medicine training programs. The Molecular Imaging in Medicine (MIM) Track augments 32 months of diagnostic radiology residency training with 16 months of nuclear medicine training. Both the four-year (MIM4) and five-year (MIM5) programs cover diagnostic and therapeutic aspects of nuclear medicine plus facets of positron emission tomography (PET); MIM5 adds dedicated research time. Other programs include the three-year Nuclear Medicine Residency, the Nuclear Radiology Fellowship, and the Molecular Imaging & Theragnostics (PET/CT) Fellowship for those seeking additional expertise in PET imaging and radionuclide therapy.

Erin Grady, MD, associate professor, is the director of nuclear medicine education and also the program director for nuclear medicine training programs. **David Brandon, MD**, associate professor, serves as associate program director. They are collaborative leaders who stress teamwork and a multidisciplinary approach in both training and research.

Dr. Brandon explains, "Nuclear medicine is all about collaboration. Residents train to work closely with imaging technologists to get the images needed for accurate diagnostic and therapeutic procedures. Trainees also learn to work with oncologists and radiology oncologists thanks to our partnership with Winship Cancer Institute at Emory."

Dr. Grady notes, "It's an exciting time for nuclear medicine and molecular imaging. As more radiopharmaceuticals are developed, we gain new options not just for diagnosing but also for treating conditions like neuroendocrine tumors. These theragnostics are attracting more trainees to nuclear medicine."

Nuclear Medicine Chief Resident **Domnique Newallo, MD, RT(R)(CT)**, also values Emory Radiology's commitment to diversity. "The faculty is very diverse; we get an around-the-world perspective I appreciate coming from the military. I especially look up to the powerful and inspiring women faculty in the department; their influence



GLOBAL HEALTH PROGRAM OFFERS GLOBAL LEARNING

Since 2009, Emory Radiology has connected resident training at Emory with resident training at Addis Ababa University and Black Lion Hospital in Ethiopia. The program inspired the Emory Global Health Residency Scholars Program (GHRSP), a year-long elective for residents comprising lectures, discussions, and a clinical rotation in Ethiopia. Each year, two or three radiology residents like **Hernan Bello, MD** *(L)*, participate in GHRSP.

"Coming from Peru, Emory stood out to me for its commitment to global health across its schools and pairing the service with education," he explains.

It also drew associate professor **Leann Linam, MD** *(C)*, associate professor, to Emory. She and **Gayatri Joshi, MD** *(R)*, assistant professor, co-chair the Emory Radiology Global Health Committee.

"We communicate regularly with the Addis Ababa faculty so our residents can prepare lectures, case studies, and even procedural training tailored to the Addis Ababa residents' interests. Maintaining these relationships is key to program success," Dr. Linam says.

"We mirror in Ethiopia what we do at Emory," notes Dr. Joshi. "Our residents demonstrate techniques we've taught them and then watch the Ethiopian residents practice. We review and troubleshoot on the spot so everyone benefits from the teachable moment."

Dr. Bello agrees. "It's a horizontal, co-learning relationship."

Emory residents apply for and usually get up to $500 as a mini-grant for teaching projects. One Emory resident used his mini-grant to prepare 60 hard drives full of medical reference books. Another used the grant to create 3D printed brainstems for neuro-imaging labs.

For residents like Dr. Bello who are preparing for careers in academic medicine, the experience has global rewards. "I'm a better teacher now. In my opinion, teaching someone how to do something is the best thing you can do to sustainably improve health care around the world."

"I especially look up to the powerful and inspiring women faculty in the department; their influence extends beyond Emory to radiology and medicine at the national level."

Domnique Newallo, MD

1 - https://aapm.onlinelibrary.wiley.com/doi/pdf/10.1002/mp.14035

2 - chapter.aapm.org › z_meetings › 1530_Santoso_Jupitz

extends beyond Emory to radiology and medicine at the national level."

MEDICAL PHYSICS RESIDENCY PROGRAM

Launched in 2014, the Medical Physics Residency program offers 24 months of didactic education and practice in medical physics. Thanks to industry partner Alliance Medical Physics, the program gives students broad exposure to the types of services they could provide, whatever their career path.

"Our goal is to make sure there are no barriers to the job of their choice, including board certification," says **Jonathon Nye, PhD**, associate professor and program director. "Our partner's wide variety of instrumentation complements Emory's own robust suite, giving students experience that makes them highly competitive in a growing field."

Randahl Palmer, MS, appreciates the partnership. "Having the industry partner gave us so much more hands-on experience but we also got the structured academic training that prepared me for board certification and for working in the field. It's a nice balance." Randahl graduated in 2019 and now is a consultant with Alliance.

Bria Moore, PhD, who earned her doctorate in medical physics from Duke, is enjoying an optional third year of nuclear medicine training in preparation for a career in clinical care. "I love working on a team where each person has a specific role that's essential to the care of a patient. That includes addressing patients' fears about nuclear medicine safety."

Faculty members are medical physicists with expertise in radiation safety and knowledge of current and emerging technologies. Trainees participate in Emory Radiology's quality activities, including MRI safety, dose tracking, regulatory documentation, and planning with the CT Quality Committee, co-chaired by program faculty member **Rebecca Neill, MS, DABR**.

Increasing gender and racial/ethnic diversity is a priority for the profession: 30% of medical physicists are female[1] and fewer than 3% are Black[2]. Bria is changing that. "So often I am the only one like me in the room so I want to lead the way for younger people," she says. She also knows diversity matters to patients. "When I come in, patients who look like me will say, "I don't know what you do, but I'm so glad you're here."

TRACKING RESIDENT INNOVATION

The Adopt-A-Resident program has provided funding and faculty mentorship to help nearly 20 residents reimagine resident training since 2008, says **Christopher Ho, MD**, associate professor and director of the Diagnostic Radiology Residency program. Such resident-led innovation created popular tracks residents now can pursue to advance their professional training in ways that support their career goals. Between 2018 and 2020, the ***Clinical Education Track*** prepared eight residents for academic radiology teaching careers while six residents in the ***Research Track*** honed their skills for an academic research career. Eight residents in the ***Integrated Imaging Informatics Track*** completed 33 projects leveraging technology to improve quality and efficiency in radiology while the ***Innovation Track***, established in 2018, supported two residents addressing clinical challenges in medical innovation and product design.

UNTANGLING THE CAROTID ARTERY WEB

Internal carotid artery webs are vascular abnormalities found in up to 40% of patients with cryptogenic strokes, particularly younger patients. Emory Radiology's associate professors **John Oshinski, PhD** *(L)*, Center for Systems Imaging director and **Jason Allen, MD, PhD** *(R)*, director of the Division of Neuroradiology, were awarded a two-year R21 grant from the National Institutes of Health to use 4D flow MRI to quantify the effects of carotid webs on blood flow patterns in comparison to age-matched healthy subjects. The approach innovatively blends the clinical expertise of Dr. Allen and **Diogo Haussen, MD,** assistant professor and a neurointerventional specialist at Grady who will assist with patient recruitment and assessment, with Dr. Oshinski's expertise in fluid mechanics and hemodynamic analysis. The team hopes to lay the groundwork for utilizing 4D flow MRI as a tool for evaluating patient-specific relative stroke risk and directing treatment.

"4D flow MRI has the potential to provide impactful insights into the altered hemodynamics produced by carotid webs, and this study may lead to a new diagnostic biomarker to help direct treatment in carotid web patients," says Dr. Oshinski.

Scan this QR code for more online about Research.

Multidisciplinary teams are united by an indefatigable faith in the power of science and driven by an insatiable curiosity to develop new ways to diagnose, treat, and understand complex disease processes. Teams also are investigating factors affecting radiologists' wellness, an area of increasing concern.

"We're pleased that Emory Radiology's team science approach is yielding novel collaborations and deeper insight into persistent research questions," says **Elizabeth Krupinski, PhD**, professor and vice chair for research.

INVENTION IMPROVES QUALITY OF HIP MRI

The unique curved structure of the hip joint presents a diagnostic challenge. Injuries like tears in the acetabular labrum and defects along the thick ring of cartilage surrounding the hip socket can be painful and difficult to image. Musculoskeletal radiologist **Felix M. Gonzalez, MD**, turned to his colleague **David Reiter, PhD**, a medical imaging scientist specializing in MRI applications, for help. Together, they developed a device that uses traction to painlessly open the hip socket during MR imaging so the radiologist can see the entire labrum and surrounding structures which increases the diagnostic value of radiology reports.

"This really pushes the edge of science forward for the patients' benefit," says Dr. Gonzalez.

The design emerged after consulting **Kyle Hammond, MD**, Emory sports medicine orthopaedic surgeon. With departmental seed grant funding, the team enlisted the help of **Mohamed Islam, PhD**, a biomedical engineering graduate from Georgia Tech working in Reiter's lab, to design and fabricate a prototype that was MRI-compatible, patient-safe, and could apply different amounts of force depending on patient size. The team is awaiting news about its patent application.

The clinical value of their invention is significant, especially for the elite athletes who come to Emory for surgical care. The more precise the MR imaging is, the more effectively the surgeon can prepare to repair defects with minimal impact on surrounding tissues.

"It's a great example of Emory Radiology's approach to team science," says Dr. Reiter. "Being embedded in the Division of Musculoskeletal Imaging creates opportunities for bi-directional communication between research and clinical practice, allowing for collaborative imaging innovation."

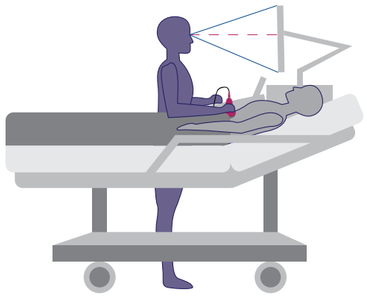
UNDERSTANDING EMERGENCY DEPARTMENT IMAGING SUPERUSERS

Tarek Hanna, MD, an associate professor specializing in emergency and trauma imaging, is concerned about emergency department imaging superusers: people who undergo a disproportionate number of imaging exams over multiple visits for reasons other than traumatic injury. Trying to identify such patients in datasets is a challenge, especially in hospital systems with a level 1 trauma center like Emory. Enter **Michal Horný, PhD**, an assistant professor and a health economist by training. Dr. Horný suggested applying the same technique used to measure the productivity of academic researchers: the h-index.

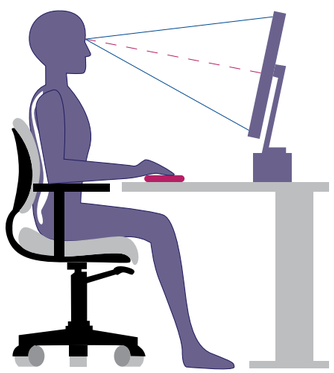
The superuser h-index considers the number of imaging studies over the number of visits, with kinds of imaging studies weighted by complexity or difficulty. The h-index score quantifies patient-level utilization of ED imaging

"As physicians, we need to take care of ourselves to ensure the highest quality of patient care."

Rebecca L. Seidel, MD



Ergonomics of Sonography



Ergonomic Sitting Position

to more precisely identify superusers, which then leads to understanding the factors associated with superuser status, and most importantly, to developing interventions that help people receive appropriate care in non-emergency settings.

"Adding Michal to the team was profound because he has the economics and statistics expertise we needed," says **Richard Duszak, Jr., MD**, vice chair for policy and practice, and a member of the research team along with radiologists **Amanda Chahine, MD**, **Matthew Zygmont, MD**, and **Keith Herr, MD**.

REIMAGINING READING ROOM ERGONOMICS

Rebecca L. Seidel, MD, associate professor and breast imaging specialist, and **Elizabeth A. Krupinski, PhD**, professor and expert in human factors affecting imaging interpretation, are investigating radiologists' susceptibility to sitting disease, a term for the negative effects of being sedentary. Their latest research found most radiologists experience discomfort in at least one body area. Long hours spent sitting at a computer workstation significantly contributed to pain incidence and severity. While overall pain levels did not differ by gender, the location and severity of pain did.

"Chronic pain and fatigue can degrade the quality of imaging interpretation. As physicians, we need to take care of ourselves to ensure the highest quality of patient care," Dr. Seidel says.

The team provides recommendations for optimizing ergonomics in the reading room and during image-guided procedures. They also suggest education about exercises, stretching, and posture adjustments to reduce pain. Their work is featured in *The Science of Imaging Informatics in Medicine* podcast, a Mayo Clinic continuing education course, journal articles, and conference presentations.

CENTER FOR SYSTEMS IMAGING

The Center for Systems Imaging (CSI) provides MRI, PET, and microPET/CT imaging, radiopharmacy services, and data analysis for animal and human imaging studies led by Emory-affiliated investigators. CSI also supports the development and application of imaging biomarkers and hosts educational programs.

CSI Director **John Oshinski, PhD**, reports that 58 investigators in 17 departments and programs benefited from $2.2 million in CSI services in FY 2019, up 33% from FY 2018 and 53% from FY 2017. These departments account for $2 million of that revenue: Neurology, Medicine, Psychiatry, Pediatrics, Psychology, and Radiology.

CSI's unique capacity for pediatric imaging benefits Marcus Autism Center, one of only five National Institutes of Health Autism Centers of Excellence. CSI's techniques decrease noise, minimize radiation dosage, and maximize comfort for children.

CSI is an important academic partner, providing MRI lab experiences for undergraduate medical imaging students and medical physics residents. Emory Radiology's Nuclear Medicine and Molecular Imaging residents train at CSI in Gallium-68 generation and labeling. The training is timely because demand for Gallium-68 jumped 52% in 2019.

Dr. Oshinski teaches an MRI and imaging physics class for students in the Wallace H. Coulter Department of

Image 2020
RESEARCH

"Guiding the next generation of scientists is a humbling and rewarding responsibility."

Candace Fleischer, PhD

Biomedical Engineering at Emory and Georgia Tech. The students augment classroom learning with a series of lab experiments using CSI scanners. Such hands-on learning helps them stand out to academic and industry employers.

COLLABORATION ADVANCES BRAIN IMAGING

The Fleischer Biomedical Spectroscopy and Imaging Laboratory, led by assistant professor **Candace Fleischer, PhD**, collaborates with researchers across Emory, other academic and health care institutions, and even industry to develop new magnetic resonance-based tools and biomarkers for studying the brain.

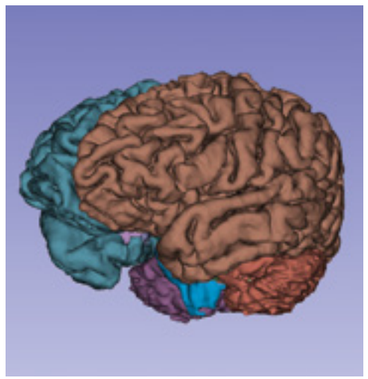
Dr. Fleischer and her team of collaborators recently developed a novel algorithm to process data from phased array coils in an MRI scanner to improve the clinical application of MR spectroscopy for evaluating brain chemistry. Their groundbreaking work, "Optimized Truncation to Integrate Multi-Channel MRS Data Using Rank-*R* Singular Value Decomposition," graced the cover of *NMR in Biomedicine*'s July 2020 issue. The project team included Fleischer Lab's **Dongsuk Sung**, whose contributions earned him lead authorship, and **Maame Owusu-Ansah**, both currently biomedical engineering graduate students; Emory biostatistician **Benjamin Risk, PhD**; Emory Radiology professor **Hui Mao, PhD**; and Xiaodong Zhong, PhD, senior R&D expert with Siemens Healthineers.

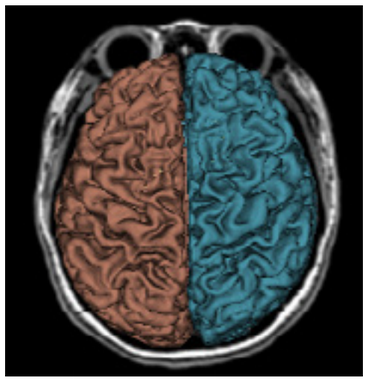
Additionally, the Fleischer Lab recently identified a potential glutamine biomarker to monitor progression of glioma, an aggressive brain cancer. The team also is collaborating with the Shepherd Center to advance the use of MR thermometry and spectroscopy to better understand brain function in coma patients.

Dr. Fleischer emphasizes the power of collaboration both in her lab and the courses she teaches in the Neuroscience Graduate Program at Emory. She also takes seriously her role as a mentor.

"Guiding the next generation of scientists is a humbling and rewarding responsibility. Mentoring and outreach are particularly important now as we deal with the pandemic and also the national reckoning on racism and social justice. Most of my students are non-white, so navigating the reality of persistent racial and social inequality in our country has been a powerful experience, one that's required us to address tough issues affecting their safety and well-being."

Images courtesy of Dongsuk Sung, Copyright 2020 Fleischer Lab





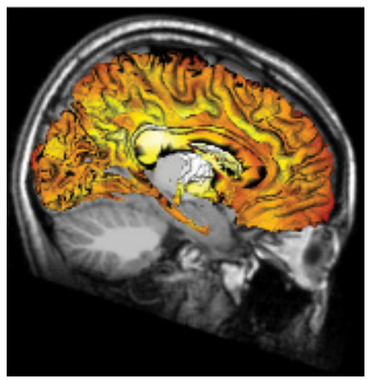


Image 2020
COVID-19 & EMORY RADIOLOGY

COVID-19 swept across Georgia in early spring, a deadly force flattening life's landscape. All of Emory Healthcare, including Emory Radiology, swiftly implemented protocols to win the race to save lives while preventing infection spread. Life-saving work happened behind closed doors by team members whose dedication shone through their eyes, the only part of them visible beneath layers of personal protective equipment.

The following describes just some of the ways every member of the department united in sacrifice and commitment, rising together with hope for a better tomorrow while fighting to save lives and protect health today.

CLINICAL CARE

REDEPLOYING TO MEET CRITICAL CARE NEEDS

Nine Emory Radiology advanced practice providers with experience in surgery, critical care, and other areas redeployed to departments that became short-handed during the surge. Several residents also volunteered to redeploy should the need arise. When asked why, they simply answered, "Because it's the right thing to do."

RECONFIGURING OPERATIONS

Clinical operations leaders including Nursing Director of Radiology & Imaging Services **Pamela Stanley, MSN, RN, PCCN-K**, and **Dr. Marta Heilbrun** worked with Emory Healthcare Infection Prevention and Control

"Because it's the right thing to do."

Emory Radiology advanced practice providers

Scan this QR code for more online about Emory Radiology and COVID-19.

to reconfigure clinical operations to protect patients and employees, leveraging Lean and EmPower principles already driving departmental care transformation. Signage, where appropriate, and training ensured implementation.

- Established protocols for sanitizing imaging equipment and facilities and for donning/doffing personal protective equipment (PPE) for all imaging modalities.
- Created rooms with negative air flow for COVID+ patients undergoing IR, neuro-IR and CT-guided procedures with standardized protocols for PPE use and infection prevention.
- Division of Interventional Radiology Director **Janice Newsome, MD**, implemented cohort staffing for procedural teams to minimize virus exposure and transmission.
- Created protocols for responding to patient codes with minimal personnel and stocked supply carts with PPE for responding personnel.
- Leveraged community partnerships to acquire PPE during periods of shortage.
- Changed from just-in-time resource acquisition to stockpiling PPE and other materials.

Once clinic operations reopened in June, the department additionally implemented the following:

- Made modality screening forms available electronically to patients so they can arrive imaging-ready.
- Expanded the scheduled length of time per imaging study to minimize traffic in waiting areas and to accommodate disinfection protocols; and
- Expanded hours of operation to nights and weekends to accommodate sanitizing procedures between patients.

REDEFINING THE WORKPLACE

Immediately transitioning to remote working and learning not only limited virus transmission, it also freed space to be reconfigured as needed for COVID care. Emory Radiology provided resources to maintain productivity, connectivity, and the highest quality patient care:

- ***Offsite Imaging Interpretation***: Vice Chair for Imaging Informatics **Dr. Safdar** and his team deployed over 40 PACS workstations, plus 24 for faculty serving Grady and Children's Healthcare of Atlanta, so faculty, especially cardiothoracic and emergency & trauma imaging specialists, could interpret imaging studies offsite 24/7. Residents and fellows benefited educationally by connecting to virtual readout sessions conducted by on-site faculty.
- ***Distanced Onsite Workspaces***: The department decreased workstation density and improved ventilation in reading rooms to reduce virus transmission.
- ***Centralized COVID Communications***: The Communications and Creative Services team, led by **Camille Dingle, MBA**, produced and maintained an online hub for COVID-related resources and information. The team also maintained a strong social media presence while producing email updates that were distributed daily during the spring surge and weekly over the summer regarding the status of departmental and enterprise-wide operations.

"The pandemic pushed us to make tough choices but we remained committed to ensuring our students could fulfill their academic requirements without jeopardizing either their safety or our faculty's safety."

Theodore Brzinski, Jr., MS, RT(R)

- ***Weekly Town Halls***: Weekly presentations by department Chair **Dr. Carolyn Meltzer** via Zoom of the latest COVID information and news helped unite the department's 1,100-plus members in health and hope.
- ***Daily Leadership Huddles***: Vice Chair for Clinical Affairs **Dr. Amit Saindane** and Vice Chair for Quality **Marta Heilbrun, MD, MS**, turned the daily huddle structure into an online daily meeting of department leaders via Microsoft Teams. This 15- to 30-minute check-in facilitated collaborative problem-solving and planning using huddle boards to track progress and document process improvements.

EDUCATION

When Emory University transitioned all students to remote learning and curtailed clinical rotations to protect student health in March, Emory Radiology leveraged technology to keep medical training on-track.

TRAINING IN THE ONLINE HOT SEAT

Ryan Peterson, MD, assistant professor and associate program director of the Diagnostic Radiology Residency, pivoted to Zoom for case conferences. The resident in the "hot-seat" would prepare the case and then answer questions and provide recommendations for next steps. High-yield cases helped first-year residents prepare for call; more complex cases challenged upper-level residents. **Brent Weinberg, MD**, **PhD,** assistant professor, answered questions and added teaching points using the "chat" function. Chief Resident **Patricia Balthazar, MD, PhD**, promoted case sessions on social media and managed participant access to prevent security breaches. The sessions proved so popular, faculty and trainees from Indiana University, University of Florida, Georgetown University, Medical College of Wisconsin, University of South Florida, and AdventHealth in Orlando swelled attendance from 50 to 120 learners, creating a rich environment for collaborative learning.

SAFELY RESUMING CLINICAL ROTATIONS

The undergraduate medical imaging program resumed clinical training in phases starting in June. Every student and faculty member received PPE kits and access to on-demand COVID testing. Students also were protected from encountering COVID+ and potentially COVID+ patients. Seniors returned June 1 to complete clinical rotations and other requirements with Emory covering tuition so they could graduate in July. Clinical rotations for all other BMSc students resumed on June 29; simulation labs reopened August 1 with fewer students per section and more sections. Didactic classes continued online like most of Emory's undergraduate classes this fall.

"The pandemic pushed us to make tough choices but we remained committed to ensuring our students could fulfill their academic requirements without jeopardizing either their safety or our faculty's safety," says Program Director **Ted Brzinski**.

RESEARCH

As COVID-19 rapidly spread, Emory Radiology researchers pivoted toward investigating ways to better and more quickly understand and treat its impact on multiple organ systems.

FUSION ARCHITECTURE TRAINED FOR COVID

Imon Banerjee, PhD *(L)*, **Hari Trivedi, MD** *(C)*, and **Judy W. Gichoya, MD, MS** *(R)*, assistant professors in Emory Radiology's Health Innovations and Translational Informatics Lab, are collaborating with colleagues at Stanford University on a model that fuses patient clinical data, including risk factors, with imaging studies to predict COVID diagnosis and disease progression. By training the model using clinical data from highly diverse patient populations both with and without COVID, the investigators aim to create a powerful tool to expedite diagnosis and treatment planning to maximize patient outcomes. The project leverages the expertise of Drs. Banerjee and Gichoya in fusion architecture—incorporating data from many sources—for deep machine learning to predict clinical outcomes.

PREDICTING COVID PULMONARY SEVERITY

Carlo N. DeCecco, MD, PhD, associate professor, and **Marly van Assen, PhD**, post-doctoral fellow, are working with Ali Adibi, PhD, director of the Center for Advanced Processing-tools for Electromagnetic/acoustics Xtals at Georgia Tech, on the COVID-19 PREDICTION Study. Submitted as an R21 NIH grant, the project aims to build a predictive model that can distinguish COVID-19 pneumonia from other lung pathologies using chest imaging and clinical data. Machine learning also will monitor disease progression over time, ideally finding imaging and clinical parameters that can identify patients likely to develop severe cases of lung-involved COVID-19. They hope this tool for COVID-19 early detection and prognostication will aid clinical decision-making to improve patient outcomes and optimize resource allocation.

UNDERSTANDING IMPACT ON PATIENT VOLUME

Dr. Jamlik-Omari Johnson and colleagues are examining the impact of COVID-19 infection fears on patient care-seeking in emergency departments. The results are guiding the team in developing strategies to address delays in care, essential as COVID infections keep surging.

Dr. Richard Duszak, Jr., vice chair for policy and practice, is evaluating the impact of the shutdown on imaging volumes from nine community radiology practices across the US. Diagnostic imaging volumes substantially declined, especially in mammography, suggesting a next phase of research about the impact of delayed medical care on patient health.

Photo at left: Vice Chair for Clinical Affairs Amit Saindane and Vice Chair for Quality Marta Heilbrun

EFFECTS OF COVID-19 ON EMORY RADIOLOGY

WORKPLACE ADJUSTMENTS

WORKING FROM HOME
- 40 UNIVERSITY STAFF
- 12 NON-CLINICAL FACULTY

9 APPs
REDEPLOYED TO COVID RESULTS CLINIC AND COVID ICU

WORKSTATIONS DEPLOYED FOR HOME USE
- 40 EHC FACULTY
- 24 GRADY & CHILDREN'S FACULTY

88%
EMORY COVID PATIENT SURVIVAL RATE

30+
TOWNHALLS

50+
COVID-RELATED DEPARTMENT-WIDE EMAILS

VIRTUAL EVENTS
10 RETIREMENT PARTIES
FACULTY & STAFF AWARDS
NEW FACULTY RETREAT
3 SERVICE EXCELLENCE INSTITUTE
RADIOLOGY LEADERSHIP ACADEMY
STATE OF THE DEPARTMENT ADDRESS
RESIDENTS WELCOME PARTY
RESIDENTS FAREWELL PARTY

ONLINE HUB FOR COVID-RELATED RESOURCES AND INFORMATION

240+
TIER 3 HUDDLES

4 FACULTY TEACH ON TWITTER
RYAN PETERSON, MD
ADAM SINGER, MD
STEFAN TIGGES, MD
RYAN CHRISTIE, MD

CARING FOR OUR PATIENTS

- PROTOCOLS FOR SANITIZING IMAGING EQUIPMENT AND FACILITIES
- EXPANDED TIME PER IMAGING STUDY
- EXPANDED HOURS TO NIGHTS AND WEEKENDS
- MINIMIZED TRAFFIC IN WAITING AREAS
- SCREENING FORMS AVAILABLE ELECTRONICALLY TO PATIENTS
- NEW PROTOCOLS FOR IMAGING COVID PATIENTS

DECREASED READING ROOM DENSITY

124
WELL-BEING INDEX ASSESSMENTS

- ON-DEMAND COVID TESTING
- ACCESS TO PPE KITS
- IMPROVED VENTILATION IN READING ROOMS
- ROOMS WITH NEGATIVE AIR FLOW FOR COVID+ PATIENTS
- COHORT STAFFING FOR PROCEDURAL TEAMS

STAYING CONNECTED

CARING FOR OURSELVES

Image 2020
PROMOTING DIVERSITY, EQUITY, AND INCLUSION

Scan this QR code for more online about Diversity, Equity, and Inclusion.

Photo at left: Emory Radiology team members celebrate Diversity Day 2019

Our people are the foundation of our success. . . We commit to developing and fostering a diverse and inclusive work environment in which every member of the Emory Radiology community is recognized, respected, and encouraged to develop to his/her greatest potential. – Emory Radiology Strategic Plan 2018-2022

BOLD LEADERSHIP FOR DIVERSITY, EQUITY, AND INCLUSION

In 2019, School of Medicine Dean **Vikas P. Sukhatme, MD, ScD**, appointed department chair **Dr. Carolyn Meltzer** as the school's first executive associate dean of faculty academic advancement, leadership, and inclusion (FAALI). Each SOM department then was charged with appointing a leader for its diversity efforts. A search committee process resulted in the appointment of **Dr. Jamlik-Omari Johnson** as Radiology's inaugural vice chair for diversity, equity, and inclusion on October 1, 2020. Dr. Johnson will lead the development and implementation of policies and programs to promote equity and inclusion. Priorities include advancing those typically under-represented in medicine and radiology; enhancing awareness and action regarding bias, stereotyping, and microaggressions; and setting metric-driven goals to evaluate progress. He represents the department on the School of Medicine Diversity Council.

The Emory Radiology Diversity, Equity, and Inclusion (DEI) Committee, co-chaired in 2019-2020 by **Nadja Kadom, MD,** associate professor, and **Derek West, MD**, associate professor, with interim co-chair **Krystal Archer-Arroyo, MD**, assistant professor, had 36 faculty, staff, and trainee members. The committee spearheaded several initiatives, described in the colorful boxes below, with the help of the Communications and Creative Services team.

DIVERSITY EQUITY AND INCLUSION (DEI) TOOLKIT

The DEI toolkit provides instructional and assistive resources as well as university and departmental policies promoting diversity, equity, and inclusion. The toolkit is easily accessible by faculty, staff, and trainees on the department intranet.

#EMORYRADSEESYOU CAMPAIGN

Leveraging the power of social media, the EmoryRadSeesYou campaign shares snapshots plus cultural and personal insights about Emory Radiology's diverse team members. The campaign's pro-diversity messages engage EmoryRad's 1,200+ Instagram followers.

DID YOU KNOW CAMPAIGN

The campaign involved a series of monthly emails defining DEI-related concepts and linking to resources in the DEI Toolkit for further information. Each of the 11 emails defined a different concept such as microaggression, gender-neutral pronouns, unconscious bias, and equity. Team leaders were encouraged to use the emails to foster discussion and shared learning.

DIVERSITY DAY

This new celebration coincided with the 2018 and 2019 State of the Department addresses by Emory Radiology Chair Dr. Carolyn Meltzer. Contests encouraged team members to share photos of them sporting t-shirts and other items bearing the special DEI logo with Radiology's nearly 4,430+ Twitter followers.

WHITE COATS FOR BLACK LIVES

On June 5th, hundreds of Radiology team members joined thousands of Emory community members kneeling in protest against racist violence for 8 minutes and 46 seconds—the length of time George Floyd suffered under the knee of a police officer charged with his murder—followed by an online vigil of solidarity.

UNCONSCIOUS BIAS EDUCATION PROGRAM

Several Radiology faculty and staff members completed the School of Medicine's training to facilitate unconscious bias education sessions online (due to COVID) in which faculty, staff, and trainees recognize biases and change patterns of discriminatory behavior.

RESOURCE: THE WELL-BEING INDEX

- MedEd Solutions product.
- Nine-question survey based on validated Mayo Clinic research.
- Measures six dimensions of well-being and distress; compares to national benchmarks.
- Customizes recommendations of resources to improve well-being.
- 51% of residents engaged since February 2020.
- 36% of faculty engaged since July 2020.
- Anonymous, aggregated data identifies departmental trends.

ACTION: COMBATTING SITTING DISEASE

The Physician Wellness Luncheon series drew faculty and trainees out of their chairs in the reading room for wellness-focused presentations and activities. Yoga in the Reading Room pilot series introduced on-duty faculty and trainees to an option for combatting the effects of prolonged sitting.

FOCUS: EMOTIONAL WELLNESS AND COVID-19

Dr. Seidel curated an online library of resources to help Emory colleagues deal with the emotional and physical pressures of the COVID-19 pandemic. The trove of online resources proved so popular, the American College of Radiology created a page on their website so it, too, could provide the same information to radiologists across the country. Scan the QR code to see the library.

Image 2020 CULTIVATING A CULTURE OF WELLNESS

Scan this QR code for more online about Wellness.

EMORY RADIOLOGY
WELLNESS

Emory Radiology is dedicated to fostering the well-being of its faculty, staff, and trainees. Associate professor **Rebecca Seidel, MD**, a member of the American College of Radiology's (ACR) Well-being Committee and the Emory School of Medicine Wellness Working Group, chairs Emory Radiology's Wellness Committee (#EmoryRadWell). The following highlights the 14-member committee's work in 2019-2020.

KEYS TO CREATING A CULTURE OF EMPLOYEE WELL-BEING:

- Prioritize well-being in the departmental strategic plan.
- Use validated tools to assess needs and progress.
- Set measurable targets/goals for improving well-being.
- Leverage resources/programs at Emory and beyond.
- Apply Lean and EmPower principles to improve workflow and reduce waste.
- Address physical, operational, and psychosocial factors.
- Partner for action. Emory Radiology's partners include the School of Medicine, Emory Healthcare, and the Emory Faculty and Staff Assistance Program.

Photo at left: Wellness Committee member Roger Loret Gerard, Committee Chair Rebecca Seidel, and Resident Wellness Co-Chair My-Linh Nguyen

SPOTLIGHT: RESIDENT WELLNESS

Residents **Neena Davisson, MD**, and **My-Linh Nguyen, MD**, co-chaired the Resident Wellness Subcommittee, which was formed in 2019 to address trainee well-being.

- ***First Resident Wellness Retreat***: (January 2020) Half-day event with wellness talks by faculty, team-building exercises, and informal socializing.
- ***Winter Doldrums Week***: (Feb 2020) Emory residents joined residents around the country for activities shared on social media using #RadResCamaRADerie. Included cycling, cooking, and yoga classes; volunteering at the Atlanta Community Food Bank; and warm cookies and milk from the department after noon conference.
- ***Wellness Houses***: (Ongoing) Residents are grouped into four themed wellness houses to compete for points for volunteer, fitness, and social activities.
- ***Wellness-Themed Conferences***: (Ongoing) Lectures and activities included in residents' noon conference schedule.
- ***Pandemic Virtual Wellness***: (Spring 2020) Yoga, socials, and more via Zoom during COVID-19 lockdown.
- ***Second Wellness Retreat***: (Fall 2020) Virtual event with luncheon, guest speaker, breakout sessions with wellness houses, and an office stretching session.

Image 2020 AWARDS & RECOGNITION

Fellow of the American College of Radiology (ACR)
Kathleen Gundry, MD
Aine Marie Kelly, MD

Fellow of the Society of Abdominal Radiology (SAR)
Aarti Sekhar, MD

Fellow of the Society of Breast Imaging (SBI)
Anna Holbrook, MD

Fellow of the American Society of Emergency Radiology (ASER)
Krystal Archer-Arroyo, MD
Jamlik-Omari Johnson, MD

Fellow of the Society of Interventional Radiology (SIR)
Matthew Hawkins, MD
Janice Newsome, MD

Fellow of the Society of Computed Body Tomography and Magnetic Resonance
Sadhna Nandwana, MD

Society for Pediatric Interventional Radiology (SPIR) - Pioneer Award for Best Scientific Paper
Jay Shah, MD

Chair for American Society of Functional Radiology (ASFR) Clinical Practice Committee
Jason Allen, MD, PhD

ARRS Leonard Berlin Scholarship in Medical Professionalism
Richard Duszak, MD, FACR, FRBMA

Association of University Radiologists (AUR) Gold Medal
Jonathan Lewin, MD, FACR

ACR/AUR Research Scholars Program
Valeria Makeeva, MD

International Society for Optics and Photonics (SPIE) Fellow
Xiangyang Tang, PhD, DABR

American Society of Neuroradiology (ASNR) Outstanding Presentation
Jason Allen, MD, PhD
Anna Trofimova, MD, PhD

Radiological Society of North America (RSNA) R&E Foundation Resident/Fellow Research Grant
Charlotte Chung, MD, PhD

Academy of Radiology & Biomedical Imaging Research, Distinguished Investigator Award
Richard Duszak, MD, FACR, FRBMA

RSNA Research Scholar Grant
Nima Kokabi, MD

ASNR Gold Medal
Carolyn Meltzer, MD, FACR

Radiology Alliance for Health Services Research (RAHSR) Harvey L. Neiman Award
Anna Trofimova, MD, PhD

ASA Radiological Association/RSNA Research Resident Grant
Charlotte Chung, MD, PhD

RSNA Outstanding Researcher
Elizabeth Krupinski, PhD
Carolyn Meltzer, MD, FACR

National Medical Fellowships Pioneer Award
Jonathan Lewin, MD, FACR

Journal of the American College of Radiology (JACR) Silver Medal Exceptional Manuscript Review
Richard Duszak, MD, FACR, FRBMA

American Roentgen Ray Society (ARRS) Outstanding Educator Award
Mark Mullins, MD, PhD

Association of Vascular and Interventional Radiographers (AVIR) Gold Medal Lecture
Janice Newsome, MD, FSIR

Society of Nuclear Medicine and Molecular Imaging - Alavi-Mandell Award
Olayinka Abiodun-Ojo, MD, MPH

AUR Trainee Prize Award – 1st Place Poster or Exhibit
Patricia Balthazar, MD

Radiology Research Alliance (RRA) Innovation and Leadership Award
Carolyn Meltzer, MD, FACR

Alliance of Medical Student Educators in Radiology (AMSER) Excellence in Education Award
Stefan Tigges, MD

Exceptional Reviewer, Journal of Breast Imaging
Anna Holbrook, MD

RSNA Honored Educator Award
Elizabeth Krupinski, PhD
Ryan Peterson, MD
Nabile Safdar, MD

Atlanta Magazine – Top Doctor
Curtis Lewis, MD
Maria Piraner, MD
J. David Prologo, MD

ARRS Gold Medal
Jonathan Lewin, MD, FACR

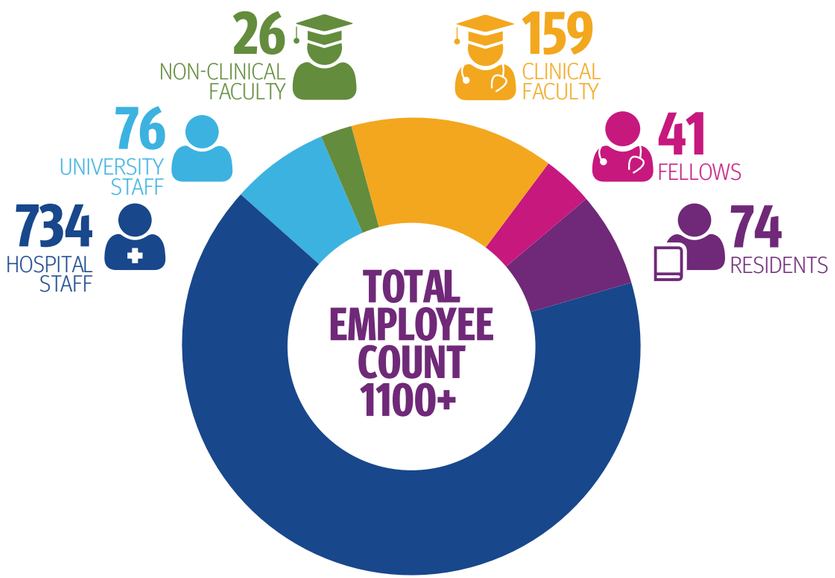
ARRS Summa Cum Laude Award
Karen Zheng, MD

ACR Gold Merit Award
Patricia Balthazar, MD

ASNR Magna Cum Laude
Charlotte Chung, MD, PhD

North American Society for Cardiovascular Imaging Gold Medal
Arthur Stillman, MD

RADIOLOGY BY THE NUMBERS



11 CLINICAL DIVISIONS

8 SERVICE LINES

6 RESEARCH DIVISIONS

13 FELLOWSHIP PROGRAMS

4 RESIDENCY PROGRAMS

NUMBER OF SCANS

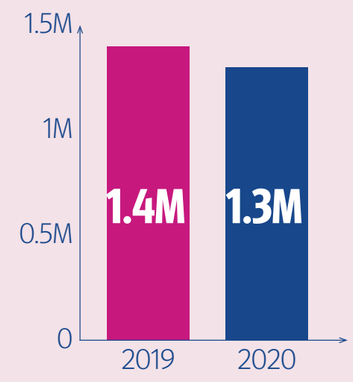
515K
PATIENTS REFERRED

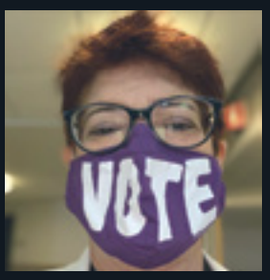
$49M
GRANT DOLLARS 2011-2020

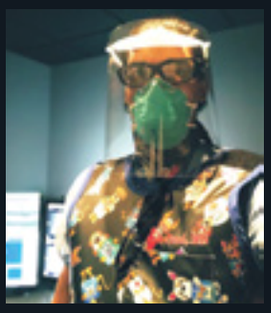
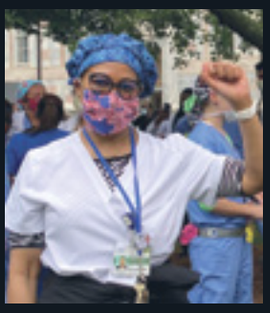
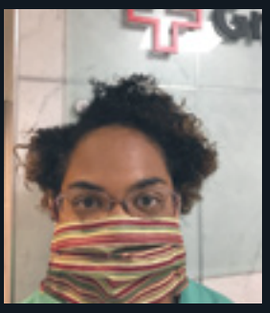
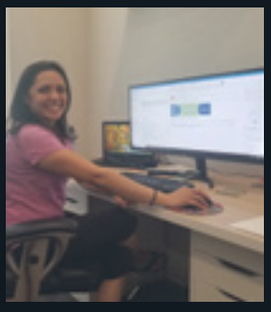
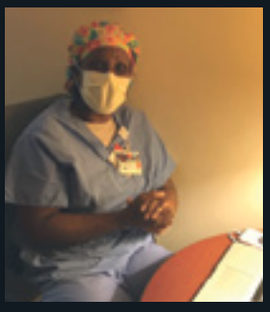
17
ADVANCED PRACTICE PROVIDERS

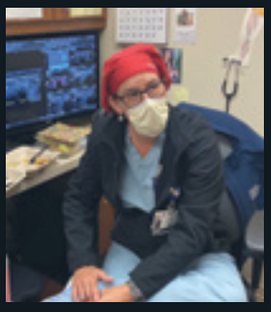
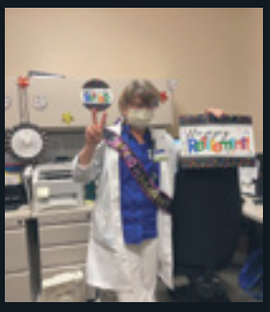
8
PATIENT CARE HOSPITALS

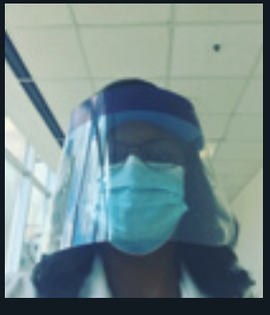
30
PATENTS






The Department of Radiology and Imaging Sciences continually cultivates charitable gifts from those who share our commitment to Rising Together for Health and Hope. We invite you to learn more about the following opportunities to support our work.

The Bill Torres Fund for Radiology Education: Supports training programs for current residents and fellows as well as medical students planning to specialize in radiology and imaging sciences.

Richard S. Colvin Radiology Residency Endowed Fund: Provides financial support to ensure Emory residents have access to the most advanced education and training resources to prepare them for rewarding careers in radiology and imaging sciences.

Radiology Global Health Project: Supports faculty, staff, and trainees who engage in international humanitarian efforts in radiology and medicine.

Adopt-a-Resident: Provides funding plus faculty mentorship for enterprising residents who undertake and complete specialized projects that advance the quality of clinical, academic, and research training.

To explore these or other giving opportunities to benefit Emory Radiology and Imaging Sciences, visit Radiology Give page or contact **Ashley Michaud, MPA**, senior director of development, at ***404-778-1250*** or ***ashleymichaud@emory.edu***.

www.radiology.emory.edu

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