

UNIVERSITY OF CHICAGO
DEPARTMENT OF
RADIOLOGY

2020
—
2021

ANNUAL REPORT



THE UNIVERSITY OF
CHICAGO

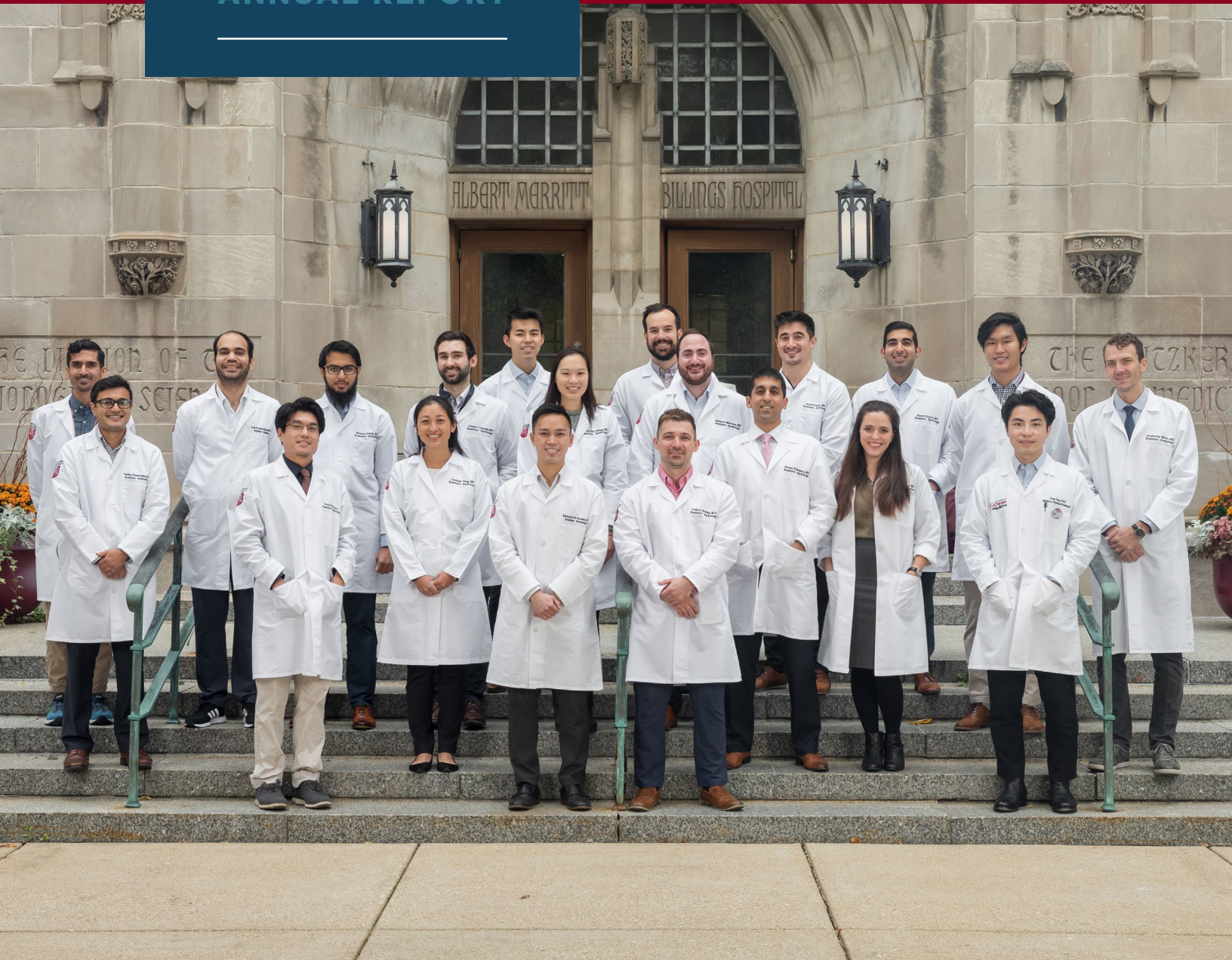


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LETTER FROM THE CHAIR

Dear colleagues and friends,

I am very pleased to see that we are bringing back the annual departmental reports after a hiatus of more than a decade. These reports are opportunities for us to recognize, reflect upon, and communicate our achievements and accomplishments. University of Chicago Department of Radiology has a longstanding history of clinical and teaching excellence and innovation and last year was no exception as our outstanding faculty, staff and trainees continued to thrive despite the challenges.

One of the remarkable achievements of last year was our effort to revisit the mission, vision, and values statement of our department. This was a department-based effort with the contribution of our faculty, trainees, staff, and technologists through interviews, focused-group meetings and surveys. We included the full statement in this annual report for your review. I am very proud to see the focus on our commitment to “lead the world in Radiology with “compassionate care,” “innovative research,” and “delivering the most impactful training” while putting our patients “first and foremost,” “holding ourselves accountable for integrity and quality” and “building a welcoming diverse and equitable work environment.” Our goal is to make this a living statement and apply these values and principles to our daily practice and operations.

During the last two years, the pandemic has challenged us personally and professionally. Thanks to the effective vaccines, the burden of the pandemic seems to be easing up on the clinical front but uncertainty and its several negative consequences continue to impact our lives. By working together, we have rapidly adapted to the fast-changing challenges and maintained our tri-partite mission even during these challenging times. I am hopeful that after another year of transition, we will be able to leave



these stressful times behind. The pandemic also taught us several lessons and we will keep some of them to improve our quality, efficiency, and well-being of our physicians.

Our commitment to education continues to be strong. We have successfully implemented an IR/DR residency program while increasing the number of positions in our diagnostic program. Despite the challenges of online interviews, we have had terrific match results. Our physics graduate education program and clinical physics residencies continue to train future leaders of imaging research and physics.

We have several exciting stories on the research mission. Dr. Maryellen Giger has been awarded a NIBIB contract to build a nationwide COVID imaging database. The Medical Imaging and Data Resource Center (MIDRC) is a multi-institutional initiative aimed at accelerating the transfer of knowledge and innovation in the current COVID-19 pandemic. MIDRC is now hosted at the University of Chicago and will be co-led by ACR, RSNA, and AAPM. This has been an amazing accomplishment not only for our

department but for the entire University. Our efforts to bring our department back to its leading position in molecular imaging continue with radiochemist faculty recruitment and on plans to convert our cyclotron (the only academic cyclotron in Chicagoland area) to a cGMP compliant facility. Our other researchers continue to make remarkable innovations that are important to healthcare.

One of the most important assets of our department is our alumni. In the coming years, we would like to connect and engage more often with our alumni. Dr. Chris Straus and Dr. Kirti Kulkarni are working on a series of pilot online events that will keep them

to implement our wellness plan based on “increasing resilience,” “faculty mentoring,” “ease of use,” and “transparency/communication”. This year, we developed a new mentoring program and curriculum for junior faculty led by our Vice-Chair of Academic Affairs, Dr. Kate Feinstein. In addition, our Vice Chair of Communications, Dr. Kirti Kulkarni, has been making strides on improving the communications within and outside the department.

All of the progress that we achieved during the last year would not be possible without the hard work and dedication of our faculty, trainees, and staff. I would like to thank all of you for your tremendous

“CHICAGO DEPARTMENT OF RADIOLOGY HAS A LONGSTANDING HISTORY OF CLINICAL AND TEACHING EXCELLENCE AND INNOVATION AND LAST YEAR WAS NO EXCEPTION AS OUR OUTSTANDING FACULTY, STAFF AND TRAINEES CONTINUED TO THRIVE DESPITE THE CHALLENGES.”

informed about the many exciting developments and changes in our department. Physician engagement and wellness is another area that we would like to continue to focus on. These topics remain to be challenging for the entire radiology community with the growing expected volumes and declining reimbursement. Under the leadership of our Vice Chair for Wellness Dr. Osman Ahmed, we will continue

contributions and efforts. It is my pleasure to be part of this team and we look forward to another outstanding and exciting year.

Sincerely,

Aytekin Oto, MD

Chair, Department of Radiology



MISSION VISION VALUE STATEMENT

MISSION

Our mission is to be at the forefront of radiological diagnosis, treatment, training, and research. The three key elements of our patient-focused efforts are to:

- Develop and apply tools and knowledge to compassionately care for our patients, in a fair, just, and inclusive community;
 - Advance the field of radiology through innovative research that translates into breakthrough diagnostic and treatment methods;
 - Train and educate radiologists, technologists, and staff to be effective partners with the rest of the care team, experts in the application of imaging sciences, and leaders in the field of radiology.
-

VISION

Our vision is to lead the world in radiology, defying the status quo, in a collaborative work environment that promotes team wellness and diversity. We provide compassionate, equitable care, deliver the most impactful training, and advance patient care and imaging sciences with ground-breaking research.

VALUES

We apply these values to all our work and interactions:

- We focus on our patients, first and foremost, and care for them with compassion, respect and dignity.
- We are an innovative, curious and diverse community, relentlessly pursuing novel insights and efficiencies and applying them as we embrace new technology and approaches.
- We hold ourselves accountable for the integrity, quality, accuracy and value of our work.
- We collaborate openly, effectively and inclusively, valuing transparent and proactive communication, ensuring that the whole team knows about actions, ideas and evolving priorities.
- We value all our team members and their contributions, to build a welcoming, diverse and equitable work environment that supports wellness.
- We are committed to continuous development, learning and improvement, disseminating knowledge to our own students and trainees and to the medical community.

RADIOLOGY FACULTY

The clinical Faculty of the University of Chicago Medical Center within the Department of Radiology work in concert with the administrative and technical staff to provide excellence in patient care, teaching, and research. The subspecialized training and practice of these radiologists focuses a wealth of expertise in diagnostic imaging and intervention. The Sections represent the administrative structure of the professional staff, with the Section Heads responsible for all aspects of patient care, quality assurance, teaching, and academics within their subspecialties. The Section Chiefs work in conjunction with Dr. Aytekin Oto, Chairman, Dr. Steve Montner, Executive Vice Chair of Operations, Dr. Thuong Van Ha, Associate Vice Chair for Operations, and other Vice Chairs of the Department. Together, they provide visionary leadership, help in planning and execution of various initiatives and work towards improving the quality of the clinical, educational, and research programs.

The Radiologists within the Department represent a significant resource for the Medical Center physicians and their patients, and are intimately involved in diagnosis and treatment. Consultations occur continuously among UCMC faculty, and multiple interdisciplinary conferences further focus the clinical capabilities of the Department members. This ongoing contact also promotes the Departmental research program, which involves multiple funded projects, often in conjunction with the Basic Science faculty and our clinical counterparts. This has led to a series of medical advances, including most recently the expansion of breast imaging, with an emphasis on the role of MR, new applications of digital imaging, including the development of computer assisted detection software, novel interventional therapeutic procedures, and virtual colonography.

The Faculty are deeply involved with education, and participate in the basic science curriculum of the School of Medicine, as well as medical student elective rotations. Training of radiology residents is considered a critical responsibility, and the educational program is continually improved and expanded to meet the needs of our specialty. Many of the Sections also provide the opportunity for specialty training of fellows, after completion of their residency requirements. The Faculty participate in continuing medical education endeavors outside the Department and are frequently invited to contribute to teaching programs throughout the world.

The University of Chicago radiologists are internationally recognized for their clinical, educational, and research skills, and hold many prominent positions in key imaging societies, leading radiology publications, and governmental agencies. This national involvement provides the opportunity to shape policy and improve care for our patients, as well as patients throughout the country. The Department's relationship with industry has promoted the development and commercialization of cutting-edge equipment and techniques.

The Department has committed time and resources to a comprehensive quality assurance program which integrates physician and non-physician key indicators in conjunction with national guidelines and evidence-based practice. This allows the continual improvement of procedures and processes that impact our patients on a daily basis. Currently, the Medical Center's information technology group has worked closely with our radiology specialties to provide quality improvement techniques as part of our picture archiving and communications system (PACS). This has allowed rapid communication of examination results, in conjunction with a voice dictation system, and the accrual of information into quality improvement databases.

DEPARTMENT LEADERSHIP

OFFICE OF THE CHAIR

Aytekın Oto

CHAIR AND PROFESSOR OF RADIOLOGY

Steven Montner

EXECUTIVE VICE CHAIR OF OPERATIONS
PROFESSOR OF RADIOLOGY

Thuong Van Ha

ASSOCIATE VICE CHAIR OF OPERATIONS
PROFESSOR OF RADIOLOGY

Paula Martinez

EXECUTIVE ASSISTANT

Kim Lenner

EXECUTIVE DIRECTOR OF RADIOLOGY

Allison Lange

BSD EXECUTIVE ADMINISTRATOR

Carmela Gonzalez

DIRECTOR OF RADIOLOGY

Gerardo Chaquina

ASSISTANT DIRECTOR OF RADIOLOGY

Kris Johnson

ASSISTANT DIRECTOR OF RADIOLOGY

Diep Truong

FINANCE MANAGER

Patricia Reyes

ANALYTICS PROJECT MANAGER

Mandy Velligan

BUSINESS ADMINISTRATOR

Monique Shelton

SENIOR ACADEMIC AFFAIRS PROFESSIONAL

Sonia Willingham

HUMAN RESOURCES ADMINISTRATOR

Crystal Taylor-Nevels

GRANT AND CONTRACT ADMINISTRATOR

Cherita White-Morris

GRANT AND CONTRACT ADMINISTRATOR

Judi Schauer

CLINICAL REVENUE MANAGER (CODING)

Anjanette Jones

MANAGER OF CT

Pennie Stivan

MANAGER OF ULTRASOUND AND MAMMOGRAPHY

Jennifer Spano-Rzepecki

MANAGER OF ADULT GENERAL PROCEDURES

Angela Camacho

MANAGER OF ADULT GENERAL PROCEDURES
2ND SHIFT

Allan Balinao

MANAGER OF NUCLEAR MEDICINE, PET, AND
PEDIATRIC GENERAL PROCEDURES

Rosalie Hughes

MANAGER OF PATIENT ACCESS AND FILM

Michelle Sacramento

MANAGER OF VASCULAR/INTERVENTIONAL

Lara Porterfield

IMAGING MANAGER, MRI

ADMINISTRATIVE SUPPORT

Alanna Bell

ABDOMINAL IMAGING & THORACIC IMAGING
DIVERSITY AND INCLUSION COORDINATOR

Mary Green

BREAST IMAGING & NEURORADIOLOGY
HODGES ALUMNI SOCIETY

Julie Hlavaty

BASIC SCIENCE

Pam Murphy

INTERVENTIONAL RADIOLOGY, CLINICAL PHYSICS

Sheila Mitchell

MUSCULOSKELETAL IMAGING, NUCLEAR MEDICINE,
PEDIATRIC IMAGING, TRAUMA RADIOLOGY

Pamela Lofton

RESEARCH NURSE ASSOCIATE/STUDY COORDINATOR

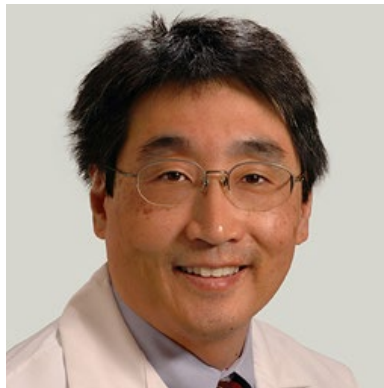


Top row: (left to right) Pam Murphy, Mandy Velligan, Pamela Lofton, Paula Martinez, Alanna Bell, Cherita White-Morris, Allison Lange; Bottom row: Crystal Taylor-Nevils, Ambereen Yousuf, Kim Lenner, Diep Truong.

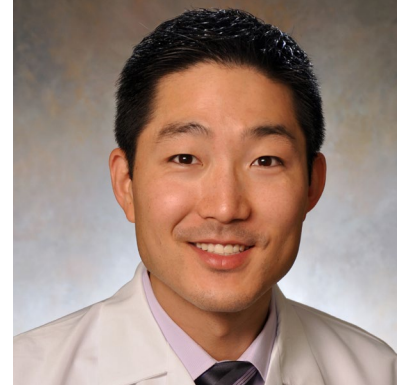
VICE CHAIRS



Osman Ahmed, MD
VICE CHAIR OF WELLNESS



Paul Chang, MD
VICE CHAIR OF INFORMATICS



Jonathan Chung, MD
VICE CHAIR OF QUALITY
IMPROVEMENT



Kate Feinstein, MD
VICE CHAIR FOR ACADEMIC
AFFAIRS

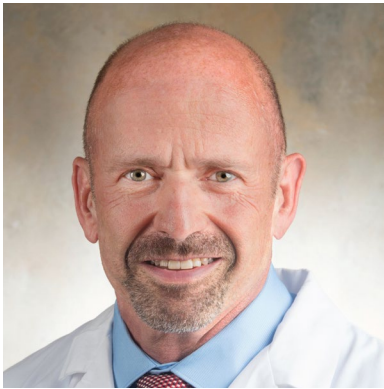


Maryellen Giger, PhD
VICE CHAIR FOR BASIC SCIENCE
RESEARCH



Kirti Kulkarni, MD
VICE CHAIR OF COMMUNICATIONS

VICE CHAIRS



Steve Montner, MD
EXECUTIVE VICE CHAIR OF
OPERATIONS



Thuong Van Ha, MD
ASSOCIATE VICE CHAIR OF
OPERATIONS



Carina Yang, MD
VICE CHAIR OF DIVERSITY &
INCLUSION

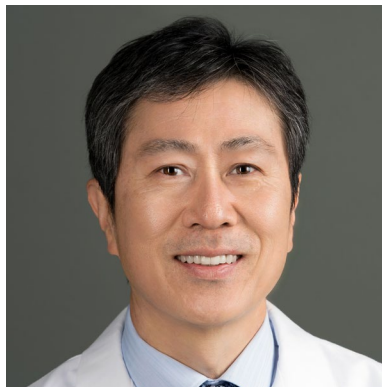


Steve Zangan, MD
VICE CHAIR FOR BUSINESS
DEVELOPMENT

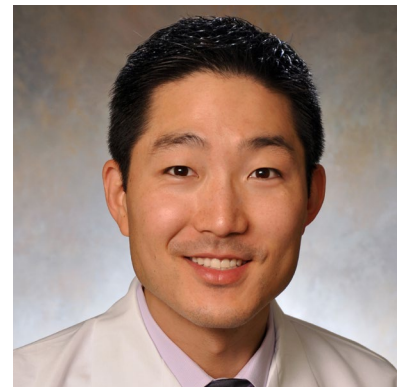
SECTION CHIEFS



Carla Harmath, MD
ABDOMINAL IMAGING



Hiroyuki Abe, MD, PhD
BREAST IMAGING



Jonathan Chung, MD
THORACIC IMAGING

SECTION CHIEFS



Zheng Feng Lu, PhD
CLINICAL PHYSICS



Brian Funaki, MD
INTERVENTIONAL RADIOLOGY



Scott Stacy, MD
MUSCULOSKELETAL IMAGING



Michael Hurley, MD
NEURORADIOLOGY



Daniel Appelbaum, MD
NUCLEAR MEDICINE



Kate Feinstein, MD
PEDIATRIC RADIOLOGY



Monther Gandeel, MD
TRAUMA RADIOLOGY



Greg Karczmar, PhD
MAGNETIC RESONANCE
IMAGING



Yulei Jiang, PhD
ANALYSIS & EVALUATION



Xiaochuan Pan, PhD
ACQUISITION &
RECONSTRUCTION

CLINICAL RADIOLOGY FACULTY

Hiroyuki Abe, MD, PhD
Osmanuddin Syed Ahmed, MD
Saad S. Ali, MD
Daniel Appelbaum, MD
Paul J. Chang, MD
Jonathan Hero Chung, MD
John M. Collins, MD, PhD
Abraham H. Dachman, MD
Larry B. Dixon, MD
Scott E. Eggener, MD
Kate Feinstein, MD
Brian S. Funaki, MD
Daniel T. Ginat, MD, MS
Carla Harmath, MD
Aleksandrs Kalnins, MD, MBA
Kirti Kulkarni, MBBS
Luis Landeras, MBBS
Grace Lee, MD
Jeffrey A. Leef, MD
Jonathan M. Lorenz, MD
Melvy Mathew, MD
Steven Montner, MD
Rakesh Navuluri, MD
Seng Ong, MD
Aytekin Oto, MD, MBA
Amit R. Patel, MD
Pritesh Patel, MD
Yonglin Pu, MD, PhD
G. Scott Stacy, MD
Christopher M. Straus, MD
Narayan Sundaram, MD, MBA
Thuong G. Van Ha, MD
R. Parker Ward, MD
Carina W. Yang, MD
Steven M. Zangan, MD
Mario Zaritzky, MD

CLINICAL ASSOCIATES

Noemi Brunner, MD
Alexandra Funaki, MD
Ariyan Javadi, MD
Omar Metwally, MBBCh
David Paushter MD
Monther Qandeel, MD
Ravi Rajpoot, MD

BASIC SCIENCE FACULTY

Samuel G. Armato, PhD
Kenneth Bader, PhD
Timothy J. Carroll, PhD
Chin-Tu Chen, PhD
Kunio Doi, PhD
Maryellen L. Giger, PhD
Yulei Jiang, PhD
Chien-Min Kao, PhD
Gregory Karczmar, PhD
Patrick J. La Riviere, PhD
Zheng Feng Lu, PhD
Emily L. Marshall, PhD
Bill Conrad O'Brien-Penney, PhD
Xiaochuan Pan, PhD
Ingrid Reiser, PhD
Steffen Sammet, MD PhD

NEW FACULTY APPOINTMENTS

Lydia Chelala, MD
Michael Hurley, MD
Divya Kumari, MD
Kevin Little, PhD
Nisa Oren, MD
Olga Pasternak-Wise, MD, MS
Rajshri Shah, MD

FACULTY RETIREMENTS

Heber MacMahon, MD

FACULTY RETIREMENT: HEBER MACMAHON, MD

Dr. Heber MacMahon received the Gold Key Award in 2021 for his outstanding service to the Department of Radiology at the University of Chicago as well as his contributions to the field of Radiology. He has served 46 years with the University and Medical Center.

Born in Dublin, then spending his early years in Donegal, Ireland, Dr. MacMahon received his medical degree, M.B., B.Ch, B.A.O., from the University College, Dublin (National University of Ireland) in 1970. After internship at St. Vincent's Hospital, Dublin, and at Somerset Hospital, New Jersey, he moved to St. Louis, Missouri. There, he completed a four-year radiology residency at the Mallinckrodt Institute of Radiology at the Washington University School of Medicine. In 1975, Dr. MacMahon was appointed as Instructor of Radiology at the University of Chicago. He joined our faculty as an Assistant Professor in 1976, and achieved the ABR board certification in Diagnostic Radiology in 1975.

Dr. MacMahon was promoted to Associate Professor, Department of Radiology, at The University of Chicago, in 1983, then promoted again in 1993 to Professor with Tenure. He served as Section Chief of Chest Radiology 1979-2018, Associate Director of the Kurt Rossmann Laboratories for Radiologic Image Research, Department of Radiology 1989-2016, and served as Interim Co-Chairman of the Department of Radiology during 2000-2002.

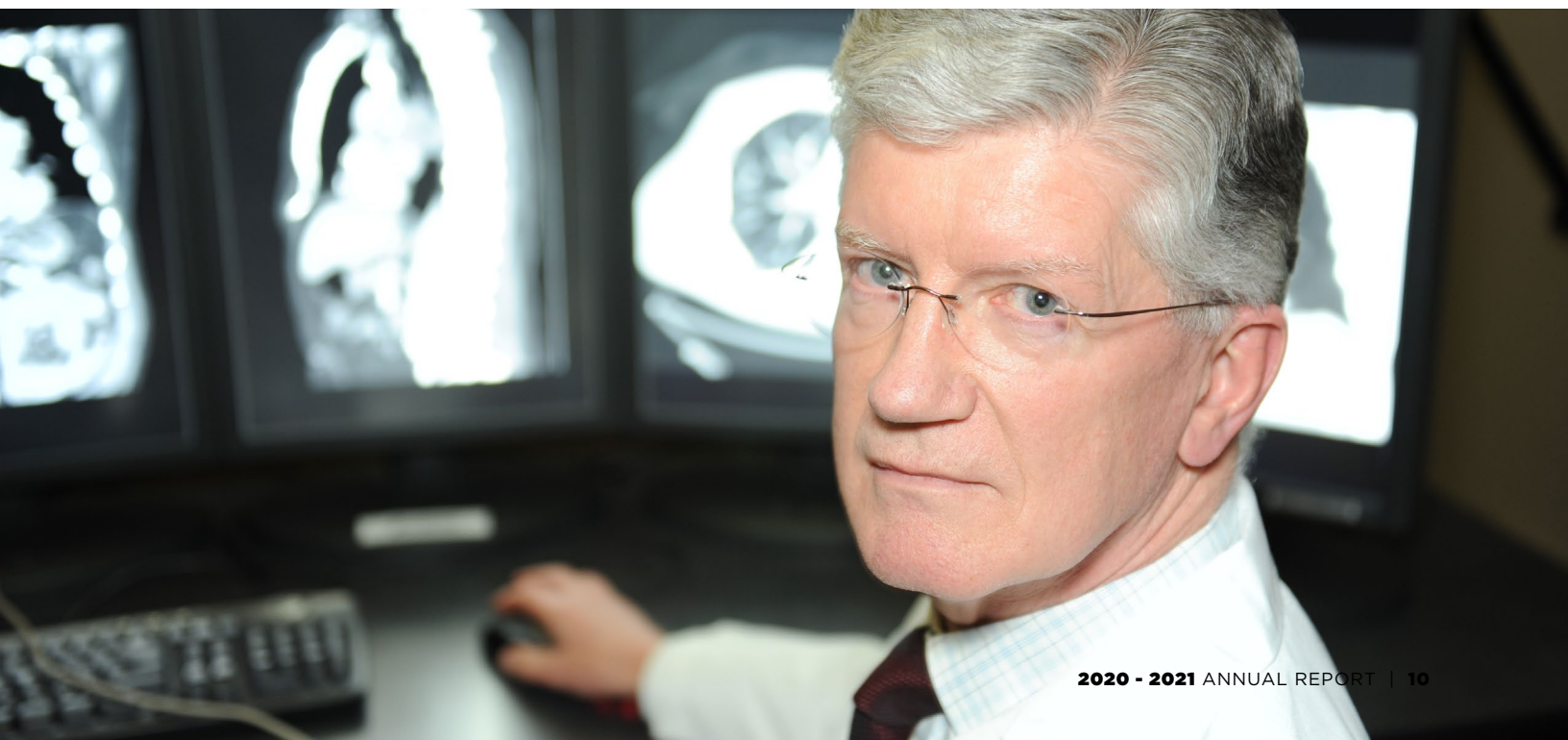
Dr. MacMahon is a distinguished radiologist, well known internationally for his contributions to the field of thoracic imaging. During the 1980's and 90's he collaborated with our medical physics group on research to improve image

quality during the early days of digital radiography, and worked on computer aided detection systems for lung cancer. In 1992 he was inducted into the prestigious Fleischner Society, an international, multidisciplinary medical society for thoracic radiology, dedicated to the diagnosis and treatment of diseases of the chest, and was elected president of the society in 2009. He was the lead author on the sentinel publication "Guidelines for management of small pulmonary nodules detected on CT scans: A statement from the Fleischner Society," which was the most cited article in the radiology literature. It remains the definitive set of recommendations for the management of incidental pulmonary nodules, fundamental to the early detection of lung cancer.

Dr. MacMahon is the go-to person for his colleagues and referring clinicians as the most experienced member of his specialty of chest radiology, and for decades, he has been the lead radiologist for lung cancer imaging.

Regarding education of residents, Dr. MacMahon directed the chest radiology training program. His resident guidelines are still in use. He is always one of the most highly rated educators in the section, and in the department. His evaluations are superb, describing him as extremely patient as well as being a font of knowledge for all things regarding chest imaging.

Dr. MacMahon's record of publications include over 230 peer-reviewed publications. His clinical excellence and dedication to teaching is exemplary. We will miss him dearly, and congratulate him on his retirement.



FACULTY HONORS AND AWARDS 2021

OSMAN AHMED, MD

- Journal of Vascular and Interventional Radiology Top Reviewer Award
- Dr. Gary J. Becker Young Investigator Award, Society of Interventional Radiology
- Journal of Vascular and Interventional Radiology Editorial Fellowship

SAM ARMATO, III, PHD

- iMig Advancement Award (from the International Mesothelioma Interest Group)

PAUL CHANG, MD

- “2021 Top Doctors: Chicago” Chicago Magazine
- AI Champion Clinician Shortlist 2020, AIMed
- Editor’s Recognition Award: Reviewer with Distinction: Radiology: Artificial Intelligence, RSNA

JONATHAN CHUNG, MD

- Editor’s Recognition Award (with Special Distinction) *Radiology - For high quality of their prompt, detailed, and scholarly reviews*

JACK COLLINS, MD, PHD

- Promoted to Associate Professor
- Marc Tetalman Award for Outstanding Teaching 2020

ABRAHAM DACHMAN, MD

- “2021 Top Doctors: Chicago” Chicago Magazine

KATE FEINSTEIN, MD

- William W. Goding Award for Exceptional Service – CAAHEP (Commission on Accreditation of Allied Health Education Programs), January 22, 2021

BRIAN FUNAKI, MD

- American Board of Radiology, Volunteer Service Award
- “2021 Top Doctors: Chicago” Chicago Magazine
- Castle and Connolly Top Doctors

MARYELLEN GIGER, PHD

- RSNA Honored Educator Award
- Appointed as the A.N. Pritzker Distinguished Service Professor of Radiology, the Committee on Medical Physics, and the College, The University of Chicago
- Upstate New York chapter of the AAPM (UNYAPM Lifetime Achievement Award
- Foreign Fellow, COS (Chinese Optical Society)
- SPIE Director’s Award
- BSD Distinguished Investigator Award (senior faculty category), University of Chicago

CARLA HARMATH, MD

- Bucksbaum Associate Junior Faculty Scholar
- Below the belt: Ultrasound of scrotal trauma. Hu-Wang E, Mathew MS, Harmath CB, Paushter DM. Society of Abdominal Radiology Annual Meeting (virtual). Recipient of Certificate of Merit.
- Harmath C, Arora S, Catania R, Frederick-Dyer K, Dasyam A, Mendiratta-Lala M, Borhani A. “Mechanisms of spread of Hepatocellular Carcinoma.” Educational Exhibit, ARRS meeting 4/2021 (Virtual). Recipient of Certificate of Merit

JONATHAN LORENZ, MD

- Named to the Castle Connolly list of Top Doctors®, Illinois region
- America’s Most Honored Professionals (The American Registry)
- “2021 Top Doctors: Chicago” Chicago Magazine

MELVY MATHEW, MD

- Below the belt: Ultrasound of scrotal trauma. Hu-Wang E, Mathew MS, Harmath CB, Paushter DM. Society of Abdominal Radiology Annual Meeting (virtual). Recipient of *Certificate of Merit*.

HEBER MACMAHON, MD

- “2021 Top Doctors: Chicago” Chicago Magazine
- Gold Key Award
- This award is presented by the Medical & Biological Sciences Alumni Association in recognition of outstanding and loyal service to the Division of the Biological Sciences and to the University of Chicago.*

RAKESH NAVULURI, MD

- Fellow of the Society of Interventional Radiology

DAVID PAUSHTER, MD

- Below the belt: Ultrasound of scrotal trauma. Hu-Wang E, Mathew MS, Harmath CB, Paushter DM. Society of Abdominal Radiology Annual Meeting (virtual). Recipient of *Certificate of Merit* Radiographics Editor’s Recognition Award with Distinction 2020
- “2021 Top Doctors: Chicago” Chicago Magazine

THUONG VAN HA, MD

- Castle Connolly Top Doctors, Metro Area
- “2021 Top Doctors: Chicago” Chicago Magazine

TRAINING PROGRAMS

The Department of Radiology is dedicated to excellence in Graduate Medical Education. Our GME programs are designed to cultivate caring, compassionate radiology physicians who become lifelong learners always capable of providing the highest level of medical care.

Our department offers residency programs in Diagnostic Radiology, Interventional Integrated Radiology, Interventional Independent Radiology, Clinical Imaging Medical Physics, and our faculty prominently participate in the Graduate Program in Medical Physics.



Radiology residents enjoying a boat ride along the Chicago river.

RADIOLOGY RESIDENCY PROGRAMS

The Diagnostic Radiology Residency Training Program at the University of Chicago is dedicated to training the next generation of leaders in radiology health care.

We provide exemplary training that combines both inpatient and outpatient experiences, caring for some of the country's most medically complex and challenging patients.

DIAGNOSTIC RADIOLOGY RESIDENCY

PROGRAM LEADERSHIP



Seng Ong, MD
PROGRAM DIRECTOR



Narayan Sundaram, MD, MBA
ASSISTANT PROGRAM DIRECTOR

The Department of Radiology's teaching programs are strongly influenced by the mission of the University of Chicago to pursue academic excellence in all fields of study. Our trainees are given the structure to strengthen clinical and academic acumen while also serving the vibrant population of Chicago's Southside. Graduates of the University of Chicago go on to become leaders in the field of radiology.

The residency program emphasizes a rigorous yet supportive educational environment. Trainees rotate through 10+ subspecialty tracks, each staffed by dedicated faculty members who have either fellowship training or many years of experience in their field. The training program is also well-balanced and offers a broad variety of career pathways, including the practice of general radiology and its subspecialties. Furthermore, the University of Chicago's academic affiliation with NorthShore University HealthSystem allows our residents to complement their training with additional experience at one of the nation's leading community-based teaching hospitals.

Although our primary goal is to train outstanding clinical radiologists, the University of Chicago is a world-class academic institution. Teaching and research are fundamental components of our program. Throughout residency, trainees are encouraged to participate in research activities. Motivated residents are provided dedicated time and funding for this purpose. Thus, a broad range of research activity is underway in the department. As a result, we are particularly proud of the large number of trainees who choose to continue their careers in academic medicine.

Since 2012, the residency program has been led by Dr. Seng Ong, a fellowship trained pediatric radiologist. The recipient of many consecutive Senior Class Teaching Awards, Dr. Ong is deeply committed to his trainees and their education. Dr. Ong is joined by assistant program director Dr. Narayan Sundaram and program administrator, Lee Brauer.

INTEGRATED INTERVENTIONAL RADIOLOGY

PROGRAM LEADERSHIP



Rakesh Navuluri, MD
PROGRAM DIRECTOR



Steve Zangan, MD
ASSOCIATE PROGRAM DIRECTOR

The Integrated Interventional Radiology-Diagnostic Radiology (IR-DR) residency program is a five-year ACGME-accredited program that integrates three years of diagnostic radiology (DR) with two years of interventional radiology (IR) training. The integrated training pathway is supported by faculty with a wealth of training and experience. The residency program is led by Dr. Rakesh Navuluri, who completed his own IR fellowship training at the University of Chicago. Highly accomplished in both clinical and academic radiology, Dr. Navuluri is also a dedicated educator. He is joined by associate program director and vice-chair, Dr. Steven Zangan, and program administrator, Lee Brauer.

Our IR-DR program is unique in the diverse caseload we can offer our trainees. The University of Chicago division of Vascular and Interventional Radiology supports the hospital's Level 1 Adult Trauma Center and all pediatric procedures referred from Comer Children's Hospital. Residents participate in treatment of complex vascular malformations, transplant complications, and trauma among others. There are also dedicated neurointerventional rotations where residents are exposed to the full gamut of neuro procedures. Finally, residents will gain experience with endovascular treatment of peripheral vascular disease through rotations at NorthShore University Hospital.

The program faculty strongly believe that trainees learn best by 'doing' rather than by 'watching'. Residents expect to complete over 3000 cases during their training, with over 98% as primary operator. The case volume and autonomy are important reasons that UC graduates are able to effortlessly transition to practice and are consequently highly recruited.



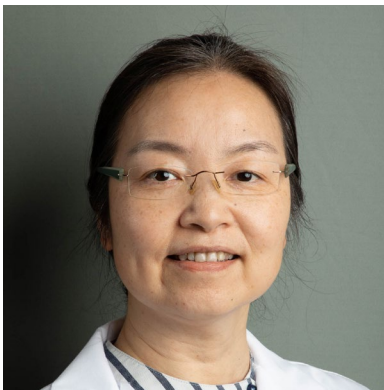
IR-DR residents with Program Director, Dr. Rakesh Navuluri.



Clinical Imaging Physics Residency Program.

CLINICAL IMAGING MEDICAL PHYSICS RESIDENCY PROGRAM

PROGRAM LEADERSHIP



Zheng Feng Lu, PhD
PROGRAM DIRECTOR



Steffen Sammet, MD, PhD
PROGRAM DIRECTOR

The Clinical Imaging Medical Physics Residency Program in the Department of Radiology is a CAMPEP-accredited two-year clinical training program at the University of Chicago Medicine. It was established in 2013 and has one junior and one senior resident in training each year. The residency program was a recipient of the RSNA/AAPM Imaging Physics Residency Grant from 2014 to 2017. It provides broad clinical training and experience in all diagnostic imaging modalities, as well as radiation safety and protection, and includes 20 weeks of rotations in nuclear medicine and PET. The Clinical Imaging Medical Physics Residents are strongly encouraged to participate in scholarly work related to quality and safety.

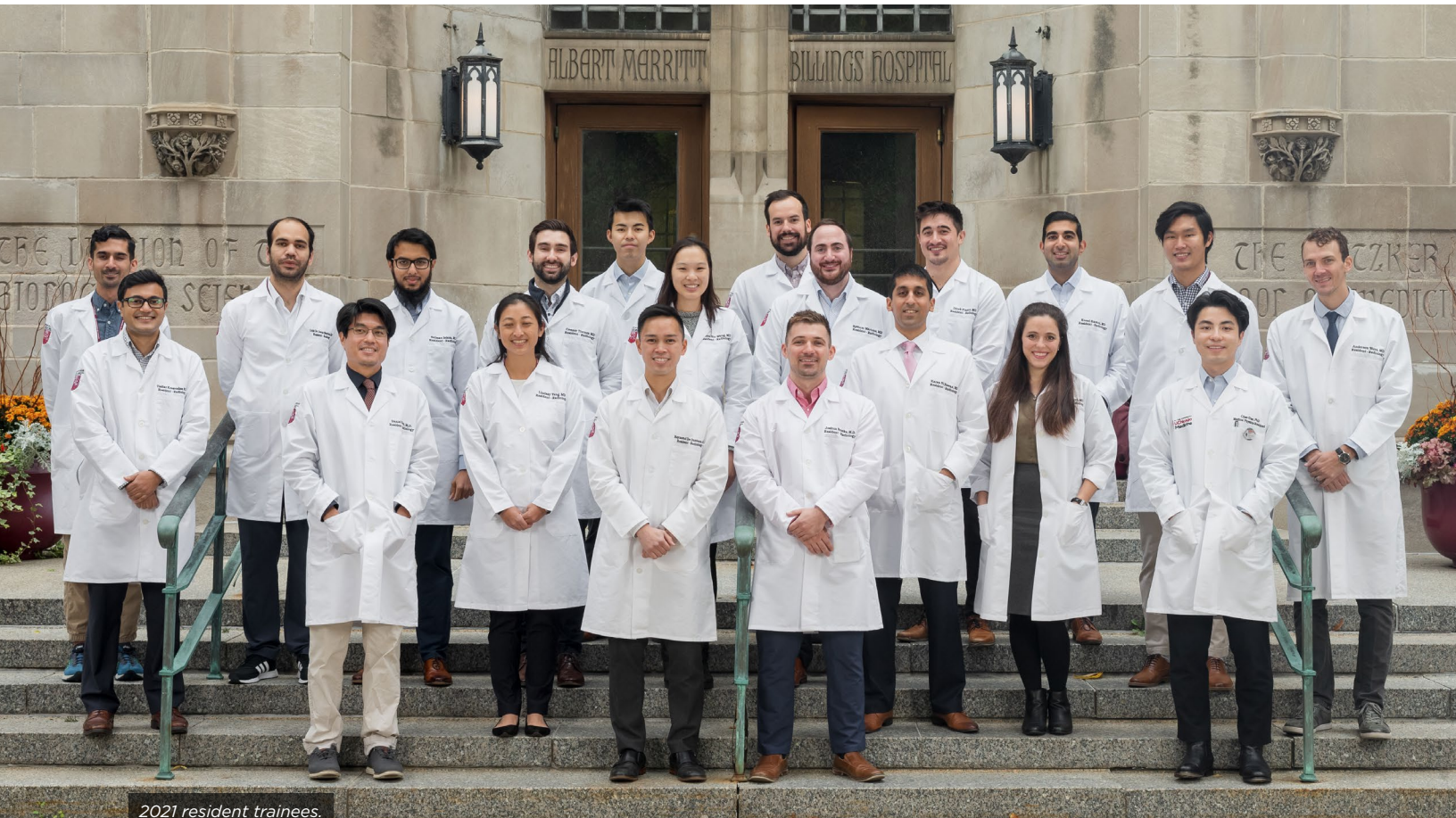
In 2020, Dr. Kayla Blunt (2021 graduate) won the Young Investigator Award and Jack Krohmer Junior Investigator Award from the AAPM Spring Clinical and Annual meetings for her project on visibility of retained foreign objects on portable radiographs. Dr. Chao Guo's (senior resident) work on the impact of the reading environment on radiologists' visual performance was presented at the 2021 AAPM Spring Clinical and Annual meetings, as well as the ACR and RSNA meetings. His work is especially timely now that radiologists' remote reading is becoming more common. Dr. Cameron Kofler (junior resident) is investigating the feasibility of imaging inhaled foreign objects in young pediatric patients with ultra-low dose CT.

CURRENT RESIDENTS 2021

DIAGNOSTIC
RADIOLOGY
26
RESIDENTS

INTERVENTIONAL
RADIOLOGY
10
RESIDENTS

CLINICAL PHYSICS
IMAGING
2
RESIDENTS



2021 resident trainees.

RADIOLOGY FELLOWSHIP PROGRAMS

The Fellowship Programs at the University of Chicago are dedicated to providing our trainees with exposure to a wide array of common and rare clinical diagnoses, as well as mentoring them to develop critical thinking skills and to ask questions that will propel radiology into the future.

The University of Chicago Department of Radiology offers one and two-year fellowships in four subspecialty areas:

- **Abdominal Radiology**
- **Breast Imaging**
- **Musculoskeletal Imaging**
- **Neuroradiology**

ABDOMINAL RADIOLOGY FELLOWSHIP

PROGRAM LEADERSHIP



Abraham Dachman, MD
PROGRAM DIRECTOR

The Abdominal Radiology Fellowship is a one-year comprehensive, structured, ACGME approved fellowship comprising clinical, teaching, and research activity in all aspects of abdominal imaging using all available modalities. There is extensive participation in abdominal MRI (MRI 5 blocks, CT 2 blocks, US 2 blocks, 4 flexible blocks including elective time, MSK and PET-CT. Body biopsies on US block and throughout the year.). The patient population and clinical experience represents both a comprehensive outpatient setting and inpatient tertiary referral center with a high volume of oncology, surgery, gastroenterology, transplantation, and emergency referrals. Fellows will learn to perform and interpret 3D CT angiography, virtual colonoscopy, MRI of the prostate, and other cutting-edge diagnostic studies. In May 2018, we opened a Level 1 adult trauma center which increased the fellow's experience in trauma imaging. Fellows participate in gastrointestinal and genitourinary examinations including video fluoroscopy, dynamic proctography, oropharyngeal motility studies, etc.

BREAST IMAGING FELLOWSHIP

PROGRAM LEADERSHIP



Kirti Kulkarni, MD
PROGRAM DIRECTOR

The Breast Imaging Fellowship at the University of Chicago is a one-year non-accredited clinical fellowship program constituting a closely supervised experience in the application and interpretation of imaging examinations and procedures as they relate to screening mammography and benign and malignant diseases of the breast. The section recruits 2 fellows per year.

The fellowship is split between [University of Chicago Medical Center](#) and [NorthShore University HealthSystem Evanston Hospital](#), which provides a fully complementary learning experience. The ultimate goal of a fellowship program in breast imaging should be for fellow graduates to be fully prepared to assume the role of lead interpreting physician in any breast imaging facility, without the need for additional training.

NEURORADIOLOGY FELLOWSHIP

PROGRAM LEADERSHIP

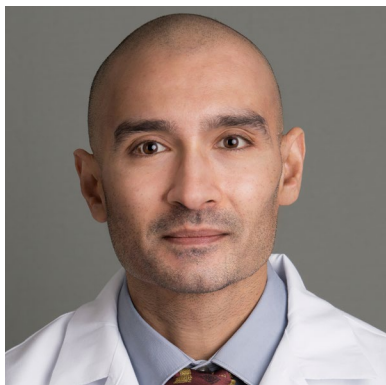


Carina Yang, MD
PROGRAM DIRECTOR

The Neuroradiology Fellowship is a one-year ACGME-accredited clinical training program which includes immersive experience in advanced neuroimaging and the full range of both adult and pediatric imaging procedures of the central nervous system as well as the head and neck. The Fellowship offers extensive adult and pediatric level 1 trauma imaging experience. Pediatric neuroimaging is fully integrated throughout the fellowship year including neonatal cases, and there is also active participatory exposure to a wide array of adult and pediatric neurointerventional procedures. Neuroradiology works very closely with other departments in the hospital including Neurosurgery, Neurology, Neuropathology, Neuro-Oncology, Radiation Oncology, and Otolaryngology. The congenial environment facilitates rewarding multidisciplinary experience in clinical care and scholarly projects. The Neuroradiology fellowship includes 3 fellows, with approximately 8 months of rotation at the [University of Chicago Medical Center](#) and 4 months of rotation at [NorthShore University HealthSystem Evanston Hospital](#), which provide a fully complementary learning experience. There is opportunity for consideration for a second year of more advanced, non-accredited training as well.

MUSCULOSKELETAL IMAGING FELLOWSHIP

PROGRAM LEADERSHIP



Narayan Sundaram, MD, MBA
PROGRAM DIRECTOR

The Musculoskeletal Imaging Fellowship at the University of Chicago Medical Center is a one-year non-accredited clinical training program constituting a closely supervised experience in the application and interpretation of imaging examinations and procedures as they relate to the analysis of disorders of the musculoskeletal system, including bones, joints, and soft tissues. One position is offered per year. The Musculoskeletal Radiology Section offers state-of-the-art multimodality imaging and image-guided interventional procedures for the patients of the University of Chicago Medical Center. The busy Orthopaedic Oncology Service has long been an example of a team-approach to patient care, and the Musculoskeletal Radiology Section provides comprehensive services as part of the University of Chicago Musculoskeletal Oncology Group, including CT and US guided bone/soft tissue biopsies, as well as radiofrequency ablation procedures. The radiologists also work closely with the Section of Sports Medicine to offer imaging services including to elite athletes, such as professional basketball players and college athletes. The section also works closely with the Section of Rheumatology to diagnose complex disorders of joints.

RESIDENCY AND FELLOWSHIP ADMINISTRATIVE LEADERSHIP TEAM

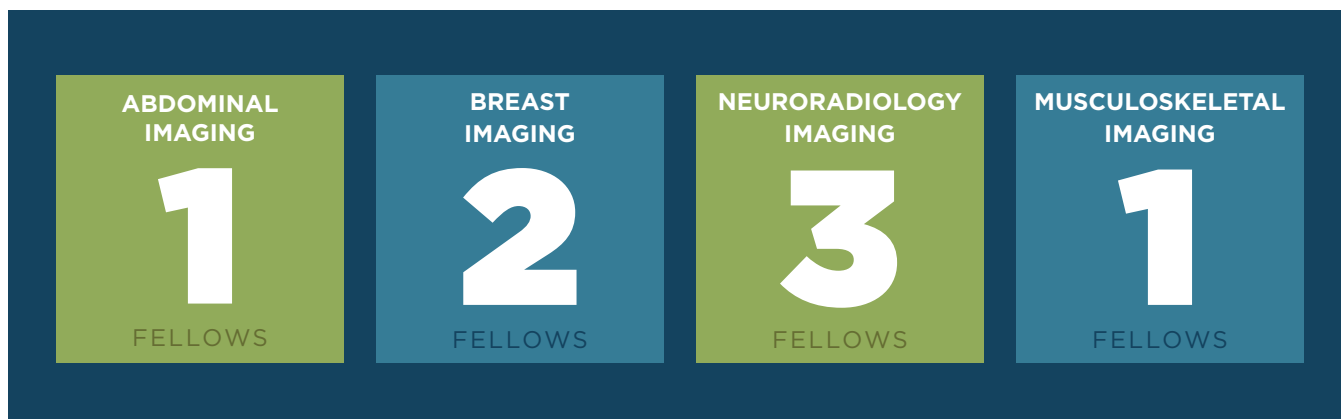


Lee Brauer
RESIDENCY PROGRAM ADMINISTRATOR



Laura Cecil
FELLOW PROGRAM ADMINISTRATOR

CURRENT FELLOWS 2021



GRADUATE PROGRAM IN MEDICAL PHYSICS



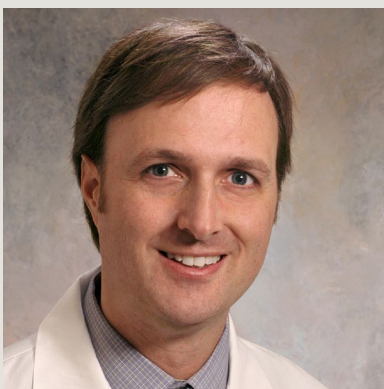
Samuel G. Armato III, PhD
PROGRAM DIRECTOR

The Graduate Program in Medical Physics at the University of Chicago offers research training leading to the Doctor of Philosophy degree. Primary areas of research interests by the program faculty include four components, namely, Physics of Diagnostic Radiology, Physics of Nuclear Medicine, Physics of Magnetic Resonance Imaging/Spectroscopy, and Physics of Radiation Therapy. Unique features of this program are the faculty's focused effort on research in medical imaging and radiation oncology, and on the training of high-level medical physicists.

The Graduate Program in Medical Physics within the Department of Radiology has a training grant from the National Institutes of Health for pre-doctoral student support.

The Graduate Program in Medical Physics currently consists of 21 faculty, who hold appointments in either the Department of Radiology or the Department of Radiation & Cellular Oncology and secondary appointments in the Committee on Medical Physics. Most research projects involve collaboration between basic scientists and clinical colleagues in the department.

MEDICAL STUDENT EDUCATION



Chris Straus, MD
DIRECTOR

Medical student education remains an exciting challenge and a focus of utmost importance, given its impact on our collective ability to provide the highest level of care to our patients. Medical student expectations and curricular changes have been under extensive revision and expansion over the past 5 years. Many of these changes have resulted in the loss of radiology imaging taught by radiologists and programming that was a required student experience within the curriculum. The school curricular requirements however are currently under review and anticipated revision in the coming 2 years. Radiology hopes to reverse many of the more recent trends given student interest and awareness appears directly linked to our ability to reach and have a presence. Despite these changes described, students choosing radiology as a career has not collapsed and the students who have chosen radiology continue to match impressively at the top programs nationally.

Efforts are underway to also create new pathways for students to experience our specialty, including a new position for students to assist our residents in the ER Radiology reading room. This volunteer program is modeled after a successful program at Dartmouth and we are hopeful that a new cohort of students will be able to better appreciate a radiologist's role in the patient care continuum. Students also remain eligible for summer research programs and small research grants through the Radiology Research and Opportunity Program (RROP). This funding again makes smaller funds readily available for student led projects on a short turn around basis (usually two days) and with a short simple one-page application.

We have retained our pre-clinical and senior electives, yet numbers have been impacted by the COVID-19 pandemic and restrictions placed on in-person experiences. Our faculty dedicated student lectures are otherwise available and will be redeployed again at first option to ensure all students' needs and interests are met.

External outreach has otherwise been the greater area of expansion over the past few years. Our department successfully deployed a 1-day student informational expo which quickly included the Chicagoland and then the entire upper mid-west, gaining the attention and support of the College of Radiology (ACR) nationally. This effort has now grown in size and has included students across the country and internationally. The event recently was handed off to the Chicagoland Radiology Society, yet happens each November. Running in parallel to this single day event has been an additional program generated under a national grant from the Association of University Radiologists (AUR), developing a national radiology interest group through a combination of regional programs including the University of Wisconsin. Programming is available to all medical students throughout the country in both MD and DO schools, receiving excellent initial results. This early success will soon be presented and published in 2022 and led by joint leadership from Chicago Children's Hospital and University of Chicago.

As the Department expands and new faculty are hired, there is growing interest and support among our new hires to continue this expansion and role the University of Chicago is playing in medical student education going forward. Our innovations over the past 20 years will be moving forward in the coming decade.



Residents attending didactic lecture in the resident conference room.

RADIOLOGY ALUMNI

PAUL C. HODGES ALUMNI SOCIETY

The Hodges Society remains on our year over year growth path and mission driven expansion to assist our department. Our talented alumni continue to impress us with their skills and reach. The newest members of the Society were inducted informally along with other residents, fellows, and staff at the annual June departmental celebration. The organization continues to focus funding on traditional educational support and research efforts, yet also moving to add new areas of augmentation furthering programs targeting increased networking and exchange for our current staff, trainees, and alums. Trainees receive the main corpus of giving from the Hodge's endowment, given that this has the greatest long-term effect on inspiring excellence in patient care and advancement of our program's reputation.

Hodges remains in contact with our Alumni base though our electronic newsletters and in pending outreach educational sessions highlighting recent work and areas of research. The expanded newsletters have been popular and informative. The society contact lists and programming outperforms every other department in the Biological Sciences Division of its type, and is used as an example for other departments to emulate. Our vision of an interactive and Alumni controlled website, where messaging can be shared through secure channels, remains a goal we promote with departmental leadership.

Alumni funding supports and covers a significant portion of trainee supportive materials and now all of the travel and meeting expenses when trainees present at professional meetings. Hodges augments each trainee approximately \$1500-2000 per year in materials not otherwise available to trainees in other specialties or radiology programs. We believe this makes our program more attractive to the best candidates. We support team building skills

in addition to traditional educational materials, along with a robust networking system used to assist in landing subsequent training positions and employment downstream.



The 30-member Hodges board has been successful and best represents our reach nationally and internationally, including representation from all alums from over a 50-year span, including our Chief residents.

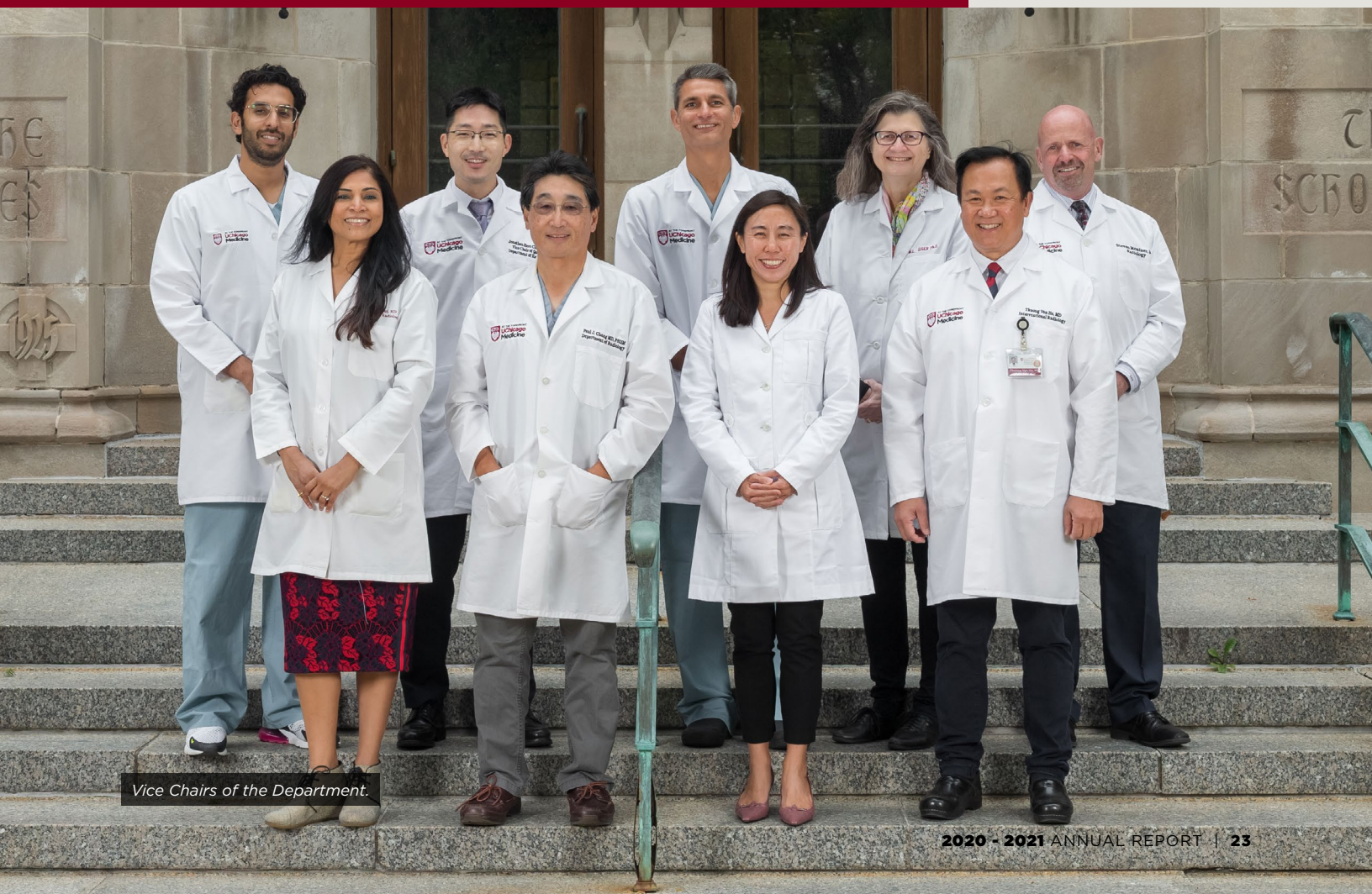
Research Awards and funding total over \$10,000 a year and the process evolved to provide needed funding to the largest number of eligible projects. The selection process remains linked to the start of the Academic calendar July 1st, yet funds are now available potentially to a requesting trainee midyear given that opportunities are not always predictable. Current recipients are honored at our annual Alumni RSNA event and on the department's website.

A special thanks to the Paul C. Hodges Alumni and past supporters of the Society. Your generosity and interest in funding our efforts remain paramount in our overall success and departmental mission.

INITIATIVES 2021

Despite the times of isolation and uncertainty that COVID imposed on us in 2020-2021, the work of our Vice Chairs remained united and forward-thinking. We are proud to display the progress of our department and excited for the initiatives led by Vice Chairs.

Highlighted below is the work of the Vice Chair committees for Wellness, Informatics, Quality, Academic Affairs, Basic Science Research, Communications, Operations, Diversity and Inclusion, and Business Development.



Vice Chairs of the Department.

VICE CHAIR REPORTS

VICE CHAIR OF WELLNESS

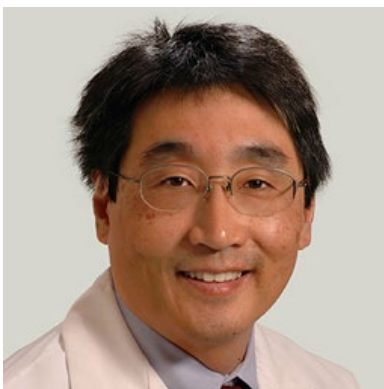


Osman Ahmed, MD

Dr. Osman Ahmed was recently appointed by Dr. Oto to replace Dr. Kalnins as Vice Chair of Wellness for the Department of Radiology. Dr. Ahmed is humbled to be given the opportunity to carry forward the outstanding work and mission set forth by Dr. Kalnins. Among his many successful events have included the wellness photo contest, meal initiatives for frontline workers, faculty engagement initiatives, and diverse religion-driven dialogue to improve culture. Our objective with wellness as we continue forward will be simple: improve the mental and physical well-being of all radiology faculty and staff to maintain or improve morale and engagement. To accomplish this goal, we have a newly formed committee for wellness that will act to represent the individual interests and needs of each section. These members include: Emily Marshall, Steven Zangan, Lydia Chelala, Raju Shah, Mario Zaritsky, Michael Hurley, Melvy Matthew, Narayan Sundaram, and Kevin Little. In addition, all members of our department will be able to provide input on wellness at scheduled faculty meetings.

Over the upcoming year, the major initiative we plan to tackle is promoting the concept of “ease of use” at the workplace. This will primarily be identifying areas that can allow us to work more efficiently/effectively by eliminating unnecessary annoyances or disturbances. We have set up a bi-annual period in which any faculty member can suggest improvements for how their workplace environment can be made easier to work in. Our committee will plan to review these suggestions and address them together over the next 6 months.

VICE CHAIR OF INFORMATICS



Paul Chang, MD

Vice Chair of Informatics Paul Chang, M.D., FSIM, is an internationally recognized expert in the field of imaging informatics. His research and development projects are primarily related to imaging informatics as well as enterprise-wide informatics interoperability issues. His work in workstation design has resulted in presentation and navigation models that have been adopted by most PACS systems. He was co-founder of Stentor PACS (acquired by Philips Medical Systems), which was based on a novel lossless wavelet-based image distribution algorithm co-invented by Dr. Chang. Dr. Chang has been awarded the Gold Medal by the RSNA “for having revolutionized the practice of radiology through his expertise in the field of imaging informatics.”

Current informatics initiatives at the University of Chicago include 1) the development of a robust SOA-based Enterprise Service Bus (ESB) that provides granular access to clinical information to allow the creation of customized clinical and research applications; 2) an ambitious “closed loop imaging” infrastructure that establishes interoperability across information systems, including modalities, to improve efficiency and quality in image acquisition, interpretation, and results delivery/acknowledgement; 3) an enterprise wide business intelligence and analytics infrastructure leveraging existing SOA architecture and noSQL approaches to support advanced analytics, AI/machine learning, and complex workflow orchestration.

Examples of 2020-2021 radiology informatics deliverables include:

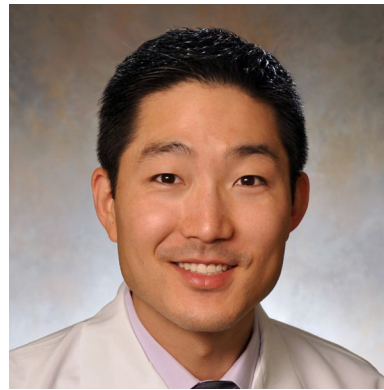
- Deployment of external image exchange infrastructure (Ambra)
- Implementation of shared risk breast imaging collaboration (Solis)
- Software development to support departmental peer learning initiatives
- Informatics deliverables for imaging ordering decision support
- Clinical deployment of various clinical AI applications, including lung cancer screening, pulmonary embolism, and stroke hemorrhage detection
- Machine learning upgrades to closed loop imaging to support automated image study protocolling
- Development of AI enabled stroke notification system

VICE CHAIR OF QUALITY

Our current quality improvement program, led by Vice Chair Jonathan Chung MD, has been developed upon three main pillars: appropriate use of imaging, taking advantages of synergies, and leveraging technology.

1. **Appropriate use of imaging:** Given the current constraints and payment climate we work in, it is essential to use imaging appropriately, only when the benefit/risk and cost ratio make sense. Radiology should lead the appropriate imaging initiative as stewards of this limited resource. Aleks Kalnins, MD, MBA has been instrumental in the inception of this pillar.
2. **Synergies:** In our department, we also want to leverage our potential synergies to create quality work that provides 2-for-1s and 3-for-1s as often as we can. Certainly, there are QI projects that are essential and do not offer multiplicative advantages, so we prioritize our QI opportunities based on overall impact to patient care first and then on potential synergies—whether financial, helping in wellness, research, or education.
3. **Technology:** The field of Radiology has had to work harder to grow and evolve with the current healthcare climate. From a clinical, research, and educational standpoint, there is little room to simply work harder unless we are willing to sacrifice our department's overall wellness and ultimately patient care. Thinking outside the box, radiology lives in the RIS/PACS environment, and thus, can benefit from tech-based tools. We are already using AI in our clinical practice and plan to leverage NLP in large ways to reduce waste while improving patient care, clinical efficiency, and billings.

Putting our pillars into action over the past year, we are proud of our efforts assessing CTA use in the trauma setting and implementing a tech-based transition to peer learning. With the help of Carina Yang MD and fellows, Mohammed Alagha MD and Ross Kuprien MD (and now supported by



Jonathan Chung, MD

Olga Pasternak-Wise MD), we retrospectively analyzed data to show that CTA neck is extremely low yield in level 2 trauma patients. Additionally, with the help of Jim Li (Pritzker MS, matched in Radiology at BID in Boston), Pritesh Patel MD, and Osman Ahmed MD, we retrospectively analyzed CTA abd/pel imaging to show that dual phase imaging was very low yield and should only be used in the level 1 trauma setting. Both research groups have worked with the trauma department, which will no longer perform CTA neck in patients with low mechanism injury in the level 2 setting or dual phase CTA abd/pel imaging in level 2 patients.

Lastly, in an initiative spearheaded by Pritesh Patel MD, data showed that traditional peer review does not improve diagnostic performance of radiologists and is an extra administrative burden. The traditional format also led to undesirable behavior in our team, hurting morale. We are now transitioning to peer learning, using a tech-based interface fully integrated into our RIS/PACS environment and created by Divya Mukta from the Rad IT development team. This will improve ease of practice and promote a just culture with an overall emphasis on improving performance rather than punishing mistakes.

VICE CHAIR OF ACADEMIC AFFAIRS



Kate Feinstein, MD

The Academic Affairs team is led by Vice Chair Kate Feinstein, MD, FACR. Monique Shelton is the senior academic affairs specialist. Ms. Shelton, Dr. Feinstein, Dr. Montner, Allison Lange, and Kimberly Lenner meet weekly to track faculty recruitment, academic appointments, faculty credentialing, and faculty promotions. The departmental Diversity and Inclusion Council has authored a search committee guide to assist search committee members in recruiting a diverse applicant pool and evaluating them without bias. Over the past year, with the help of search committee chairs, search committee members, and interviewers, the department has recruited a chief of neuroradiology, a nuclear medical physicist, two interventional radiologists, a nuclear medicine physician, and an abdominal imaging radiologist. The promotions committee, chaired by Dr. Brian Funaki, has been instrumental in assessing faculty members' readiness for promotion. Kudos to Drs. Carla Harmath and Luis Landeras who have been promoted to Associate Professor. Several faculty members are preparing for promotion at the Associate and Full Professor levels.

An initiative for the Academic Affairs team is the creation of a mentorship plan. In this new process each junior faculty member will be paired with a senior faculty member, usually the section chief, to set goals and a structure for the junior faculty member's academic career. Programs for mentors and mentees include CV construction, pathways to promotion lectures, mentoring workshops, and steps to national recognition guidance. The Basic Scientists are working on a mentorship program. In the future, the programs will be combined for a uniform radiology mentorship policy.

VICE CHAIR OF BASIC SCIENCE RESEARCH



Maryellen Giger, PhD

The Department of Radiology has 12 basic science faculty members, along with four clinical medical physics faculty members, with imaging science research interests including computer-aided diagnosis & machine learning/deep learning analysis for the interpretation of a variety of medical images (such as breast, thoracic, thyroid, colon, cardiac, skeletal & radioisotope images), new acquisition methods for MRI and MRIS, novel tomographic reconstruction methods, new methods for PET, SPECT and optical imaging, evaluation methodologies & ROC analysis, and developments of novel imaging instrumentation.

The faculty labs include over 70 grant-supported researchers including research professors, research associate professors, research assistant professors, research lab computer scientists & staff, post-docs, graduate students, medical students, and undergraduates. Over the past few years, the faculty have brought in over \$39M, average \$7.9M per year of funding to the department along with multiple collaborative agreements, material transfer agreements, and patents.

Highlights from the past few years include the growth of MRI research and resource center, the creation of the molecular imaging & cyclotron center, the rise in micro- to macro- tomographic imaging and reconstruction methods, and the creation of MIDRC, the Medical Imaging and Data Resource Center. These highlights are presented in this report.

VICE CHAIR OF COMMUNICATIONS



Kirti Kulkarni, MD

The Communications team is led by Kirti Kulkarni, MD. Team members include Olivia Schultz, MD, Mandy Velligan, Allison Lange, and Patricia Reyes. Dr. Kulkarni was appointed by the department chair, Aytekin Oto, MD, MBA, following recognition of how important communication is for optimal patient care. Though this need has always existed, communication became even more strained during the pandemic and in the remote work environment. Thus, the Communications team is now making a concerted effort to improve communication within the department, with other departments in the hospital, and with our Southside community and its patients. The primary goal is improving patient and clinician understanding of a radiologist's critical role in patient care.

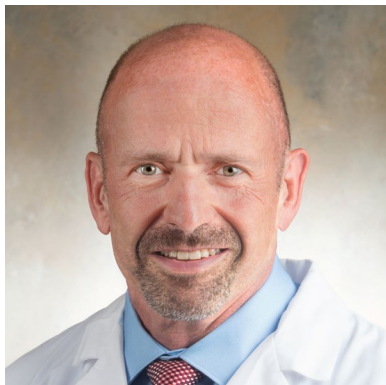
Led by Dr. Kulkarni's appreciation for transparency and camaraderie, the team started their initiatives by putting together people of different backgrounds and strengths to brainstorm how communication can be improved. Ideas have blossomed from these teams, including creating educational videos with our faculty for referring physicians as well as embedding pictures and web links into our reports for patients to access in their patient portal. Furthermore, within the department itself, communication has been emphasized through daily teachings with residents and creating a culture that prioritizes emotional investment in the job and colleagues. This is important for creating a workplace where people come for growth and sense of fulfillment, which translates into genuine communication and relationship building.

The Communications team is particularly proud that their initiatives have been highlighted in a case study published and distributed by the ACR. It has provided a platform to spread the importance of communication not only at the University of Chicago but throughout the field of radiology. For similar reasons, this team has been instrumental in the composition of this year's Annual Report. We hope that showcasing the people of this department and their achievements can elevate the connections we have with one another and also serve as a model for other departments around the country.



2021 Communications team led by Dr. Kirti Kulkarni.

VICE CHAIRS OF OPERATIONS



Steve Montner, MD

The Radiology Operations Team is responsible for carrying out departmental tasks that allow the department to function, from ensuring that the right equipment is available to having adequate faculty hires to support clinical work. The team is headed by Steven Montner, Executive Vice Chair of Radiology Operations and President of the Medical Staff. Recently, Thuong Van Ha joined the team as Associate Vice Chair of Radiology Operations. The Executive Vice Chair and Associate Vice Chair rely on the support of the Hospital and Departmental Administration, especially the Executive Director and the Executive Administrator, Kim Lenner and Allison Lange. Our newest arrow in our quiver is recently recruited Carmela Gonzalez, Director of Radiology.

With the onset of the pandemic, remote working requirements necessitated redistribution of workstations to offices throughout the hospital and to personal home offices. This was a major undertaking, requiring coordination from different hospital units from purchasing to IT, and in the end allowing clinical work to proceed seamlessly.



Thuong Van Ha, MD

Faculty recruitment and hiring are an important part of Radiology and as such Radiology Operations facilitate the process. Over the last year, successful hiring includes a new chief of neuroradiology, two interventional radiology physicians, a chest radiologist, and several others. Recruitments are underway for a musculoskeletal specialist, a breast imager and additional neuroradiologists.

Radiology Operations also seek to facilitate faculty workflow to maximize the faculty clinical and research productivity and optimize their educational endeavors. As such, Radiology Operations work closely with each individual section to identify problem areas and to provide solutions, from IT backlog to increasing support staff. Radiology Operations is also responsible for faculty compliance and evaluation and the goal is to maintain transparency in this process.

Going forward into the next year and beyond, major emphasis for Radiology Operations will be further integration with our partners, River East and South Loop increasing capacity, as well as equipment upgrades at the main campus. Transparency in leadership remains a constant goal.

VICE CHAIR OF DIVERSITY AND INCLUSION



Carina Yang, MD

Vice Chair of Diversity & Inclusion (D&I) Carina Yang, MD initiated a refreshed D&I Council this year to enhance the pre-existing, active Diversity Committee. She works closely with two directors: Emily Marshall, PhD who serves as the Director of Women, Underrepresented Minorities, and Inclusivity; and Osman Ahmed, MD who serves as the Director of Health Equity and Mentorship/Sponsorship. Core members are comprised of both clinical and basic science faculty, with the support of several liaisons extending our reach to our training programs, including two trainee representatives.

Over the last year, D&I was intimately interweaved and prominently featured throughout the department's newly developed Mission Vision Values (MVV) statement. There were also numerous relevant enrichment and training sessions: implicit bias training for faculty members, dedicated D&I Grand

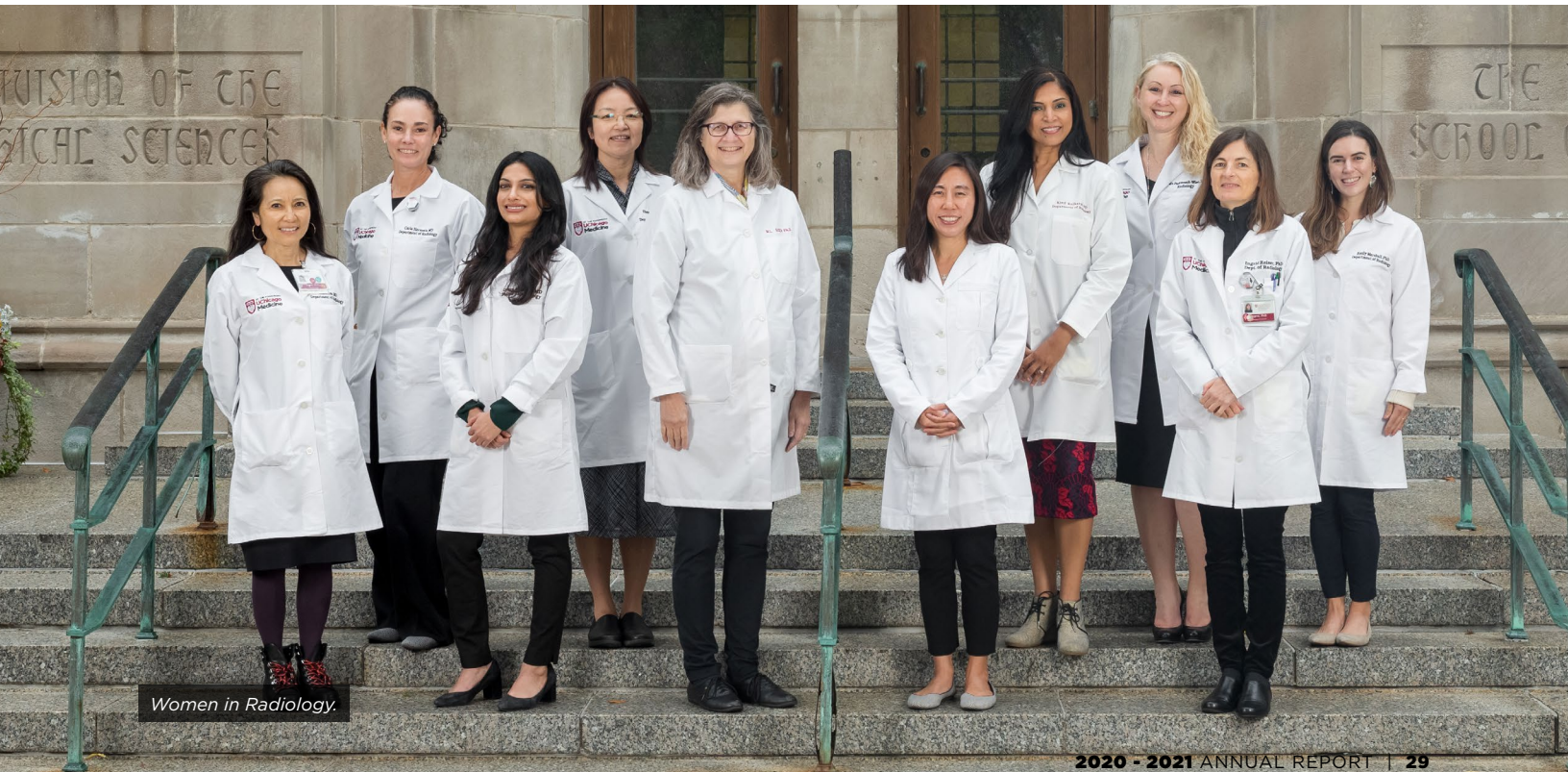
Rounds, and Radiology Faculty Advancing in Medical Education (FAME) sessions on topics of minimizing bias in narrative assessment as well as in letters of recommendation. Department members participated in several virtual “cultural sharing” sessions, and an interactive session exploring religious and cultural diversity.

At the faculty level, each search committee has a D&I council member to monitor Best Practices. Our department’s continued commitment to the annual Chicagoland Radiology Expo has strengthened the pipeline into radiology, with focused panels this year on “URiM in radiology” and “global outreach opportunities.” Additionally, several department faculty and trainees performed community outreach, introducing local grade school children to radiology through participation in the South Side Science Scholars program (S4). Most recently, a new Women in Radiology group was established, and the inaugural event centered on a book club discussion of “The Confidence Code.”

In the coming year, we will fulfill our goals by enhancing departmental diversity, strengthening our sense of community, and increasing culture competency. This will include changes relating to residency recruitment. We are implementing a holistic evaluation form during applicant review, establishing a diverse core search committee, and then pairing applicants who are underrepresented in medicine (URiM) with URiM interviewers. Women in Radiology will organize professional development programming, such as workshops for all faculty and trainees as well as presentations from early-career female radiologists to share their areas of expertise. An environmental pulse survey regarding faculty and trainee outlook on the status of departmental D&I will be completed. Community outreach will also continue, with initial plans to partner with the Bridgeport Free Clinic to promote patient education of cancer screening. Lastly, University of Chicago hopes to soon serve as a preceptor/host site for the Pipeline Initiative for the Enrichment of Radiology for URiM first-year medical students.



Members of the Diversity and Inclusion Team led by Dr. Carina Yang.



Women in Radiology.

VICE CHAIR OF BUSINESS DEVELOPMENT



Steve Zangan, MD

The business development team, led by Vice Chair Steven Zangan MD, plays an instrumental role in the ambitious UChicago Medicine Vision 2025 plan. This plan incorporates five key strategies to build upon our strengths and expand the forefront of health, discovery, and innovation.

First, we aim to excel in the patient and clinical experience. We will build a digitally enabled organization for patients and support the ease of practice for our physicians. The department has successfully implemented Ambra Image Exchange, allowing seamless cloud-based sharing of imaging studies from outside institutions. Patients can even upload their imaging through MyChart. We have also developed a remote second opinion program, through which patients receive written or telehealth second opinions from our expert radiologists without leaving home.

Strategies two through four target enhanced growth, specifically in our signature specialty programs, offsite locations, and Southside community. Currently, our radiologists elevate signature specialty programs in oncology, transplant, heart and vascular medicine, and trauma, among others. Growth here will allow us to integrate discovery and delivery of novel therapies and build capabilities for treating complex conditions. We also wish to grow our enterprise to Orland Park, South Loop, River East, and Ingalls Hospital. Expanding our health system network will integrate patient care, expand access, and elevate coordination throughout our health system. Additionally, through our international sites, such as the Center in Beijing, we have created clinical, educational and research opportunities with global partners. Lastly, we plan to improve the health of our local community. Through programs like the breast imaging South Side Task Force, we strengthen partnerships with the local community to improve access and care delivery for our neighbors.

The fifth and final strategy will be to deliver high-quality, cost-effective care. Our faculty hold key leadership roles within the University of Chicago Physician Group, finance teams and contract committees, allowing us to deliver exceptional value through high-quality care with greater cost efficiency. Our success has laid the foundation for the new era of value-based care.



Offsite Locations: Orland Park and River East.



CLINICAL SECTIONS

The Department of Radiology continues to expand in areas of clinical service, education, and research. New facilities, new programs, and new faculty abound. The Department is in the middle of the most aggressive expansion of imaging facilities ever at the University of Chicago, and of a magnitude rarely encountered nationwide.

The subspecialized training and practice of our clinical radiologists focuses a wealth of expertise in diagnostic imaging and intervention. The Sections represent the administrative structure of the professional staff, with the Section Heads responsible for all aspects of patient care, quality assurance, teaching, and academics within their subspecialties. The Section Chiefs work in conjunction with Dr. Aytekin Oto, Chairman, Dr. Steve Montner, Executive Vice Chair of Operations, Dr. Thuong Van Ha, Associate Vice Chair for Operations and other Vice Chairs of the department on a weekly basis to work on various initiatives.

ABDOMINAL IMAGING

CARLA HARMATH, MD

ASSOCIATE PROFESSOR OF RADIOLOGY
SECTION CHIEF, ABDOMINAL IMAGING

Our mission as the Section of Abdominal Imaging is to provide the most accurate diagnostic and follow up imaging with the least invasion and lowest cost to our patients. We align with the American College of Radiology Imaging 3.0 initiative and aim to educate the next generation of abdominal imagers on the importance of wise imaging utilization and multidisciplinary approach to patient care.

We have advanced the mission of our section through scholarship, citizenship, education, and clinical practice. In the 2020-2021 academic year, we have maintained high scholarly output. Our physicians have multiple senior authorship publications in the American Journal of Roentgenology. A paper presentation titled, "Model observers predict radiologists' detection of retained foreign objects in homogenous and anthropomorphic backgrounds" was the winner of the Jack Krohmer Junior Investigator Competition. Additionally, the section members have been actively participating as faculty and lecturers in societal meetings, such as SAR and RSNA. They also serve as reviewers for several journals, and hold editorial positions.

The abdominal imaging members participate actively in citizenship events outside the institution. For example, Dr. Mathew was a physician volunteer at the Chicago Street Medicine/food pantry. Dr. Paushter is the vice chair

for affordable housing commission in Highland Park. Dr. Dachman is part of the educational board of his local school. Dr. Patel is a charitable contributor, as are other sectional members. Additionally, some section members are active in diversity and inclusion issues, having contributed to departmental initiatives, as well as lecturing in national meetings about DEI issues. The members are active in numerous departmental and institutional committees, as well as societal committees.

The abdominal imagers also receive above average evaluations for our residents. We are committed to resident education, both informally and formally as exemplified by participation in workstation teaching as well as educational conferences and lectures. Additionally, several members of our section have had educational exhibits in national and international meetings in the past academic year. They have received awards at SAR and ARRS.

Lastly, our section is dedicated to our clinical work. Our members participate in numerous multidisciplinary conferences, weekly and monthly. They are also always available for consultations and review of outside exams with clinicians upon request. We maintain our worklist daily and achieve turn-around time within the department standard.



Section of Abdominal Imaging: (left to right) Grace Lee, Abraham H. Dachman, Carla Harmath, Joelle Wazen, Paul Chang.

THORACIC IMAGING

JONATHAN H. CHUNG, MD

PROFESSOR OF RADIOLOGY
SECTION CHIEF, THORACIC IMAGING

The Section of Thoracic Imaging provides state of the art imaging and interpretation of thoracic diseases in close collaboration with internists, pulmonologists, and thoracic surgeons at the University of Chicago Medical Center. The section provides training for residents and fellows in the department of radiology, as well as trainees from other clinical departments.

In the past year, we have increased lung cancer screening, cardiac CT, and cardiac MRI by 30%, 24%, 27%, respectively. We hope to increase these three services by >5% in the next year. Our technology allows us to deliver clinically. Chest radiography is performed using dual energy digital devices for enhanced detection of early lung disease. CT scans are acquired with state-of-the-art CT scanners with routine use of maximum resolution and multiplanar reconstruction. AI-based algorithms to detect pulmonary nodules using computer-aided diagnosis and vessel subtraction are

employed to increase sensitivity for pulmonary nodule detection. State of the art MRI is available for specific problem solving and cardiac/vascular applications. Interventional thoracic procedures such as biopsies and catheter drainage are performed in the adjacent section of interventional radiology.

Section faculty are also active in research, with a major focus on interstitial lung disease assessment on CT and computer aided diagnosis (CAD), much of which is performed in collaboration with the Section of Radiological Sciences. Current research in interstitial lung disease involves semi-quantitative and quantitative analysis of chest CT scans to optimize diagnosis, predict outcomes, and augment medical therapy. The section also invests heavily to fulfill our department's "Continuum of Quality" program which encompasses our missions of quality control, quality assurance, and quality improvement.



Section of Thoracic Imaging: (left to right) Jonathan Chung, Steve Montner, Chris Straus, Lydia Chelala.



Section of Breast Imaging: (left to right) Kirti Kulkarni, Hiroyuki Abe, Rajshri Shah.

BREAST IMAGING

HIROYUKI ABE, MD, PHD

PROFESSOR OF RADIOLOGY
SECTION CHIEF, BREAST IMAGING

The mission of the Section of Breast Imaging within the Department of Radiology is to provide excellent comprehensive screening and diagnostic breast health care for our patients. Major emphasis is given to top-notch clinical care, participation in national clinical trials to further screening guideline policies, investigation of important laboratory observations that translate into clinical applications, and education and outreach in the neighboring south side community.

In the coming year, our goal is to maintain productivity greater than the 50th percentile of the Association of Administrators in Academic Radiology (AAARD). Aligned with the mission of our section, we will achieve in the clinical, research, and educational domains.

Clinically, the Section of Breast Imaging extended the hours of screening exams on weekdays and provided occasional Saturday service. This has made remarkable increase in productivity. Dr. Shah has been appointed as a director of the University of Chicago Breast Imaging Network and energetically contributed to a development of the offsite joint venture with Solis Mammography. With her leadership, the reflexive order system was successfully implemented in conjunction with ambulatory care.

In research, Dr. Abe is involved in multiple research projects. He is the PI of a DCIS research project funded by a Segal

foundation grant. He has published multiple papers as a senior author and additional papers as a co-author. He also wrote a book chapter for Breast MRI Interpretation: Screening and Diagnosis (Thieme) by Gillian Newstead, MD who is a former chief of our section. Dr. Kulkarni works with Dr. Xiaochaun Pan's NIH-funded research team, which focuses on intraoperative 3D specimen imaging for breast specimen margin assessment. The team's work was presented at the 22nd Annual American Society of Breast Surgeons Meeting in May 2021. In September 2021, it was accepted for publication as a scientific paper in the Annals of Surgical Oncology.

In education, Dr. Kulkarni is a member of the global health initiative program at the University of Chicago and is involved in various mentorship programs throughout the Chicago Southside. Dr. Kulkarni has co-chaired the Chicagoland Radiology Expo for the last five years. Her enthusiasm for mentorship programs has led to the creation of the Midwest Breast Imaging Fellowship Consortium (MWBIFC). MWBIFC is a targeted mentorship and educational program that fosters the next generation of breast imaging leaders. She is the founder of the mentorship arm of the MWBIFC, which promotes a modern take on mentorship with a matched process based on specific goals.

MUSCULOSKELETAL IMAGING

SCOTT STACY, MD

PROFESSOR OF RADIOLOGY
SECTION CHIEF, MUSCULOSKELETAL IMAGING

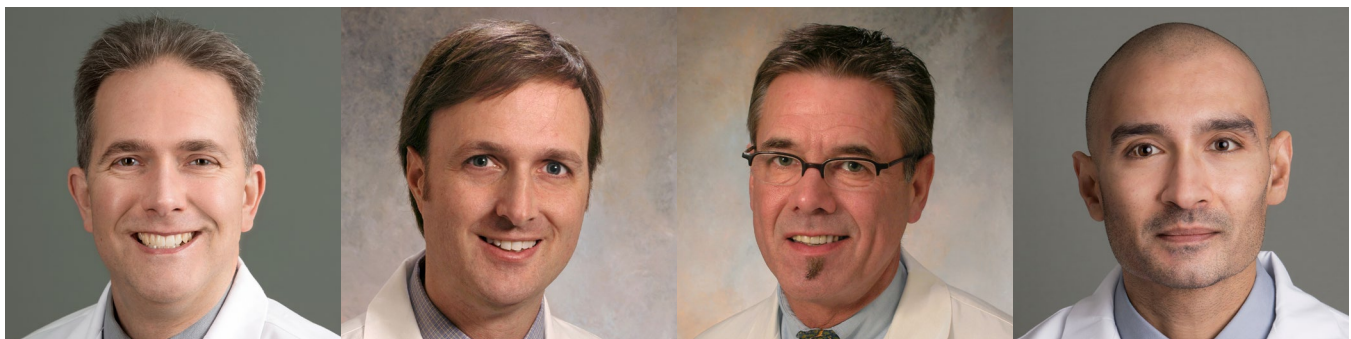
The Musculoskeletal (MSK) Imaging Section continues to offer state-of-the-art multimodality imaging and image-guided interventional procedures for the patients of University of Chicago Medicine. Although the overall number of exams performed by the Section decreased dramatically during the height of the pandemic, volumes have since risen to well-above pre-pandemic levels. Over the past year, Drs. Sundaram and Stacy have worked together to increase the number of diagnostic MSK-ultrasound examinations and ultrasound-guided procedures performed by the Section, and our sectional goal for the upcoming year is to provide educational in-service presentations to the ultrasound technologists so that they may begin to perform selected MSK-exams independently.

Our close proximity to the Orthopaedic and Rheumatology outpatient clinics facilitates communication and consultation with other physicians specializing in disease processes of the bones, joints and associated soft tissues. The busy Orthopaedic Oncology Service has long been an example of a team-approach to patient care, and the members of the MSK Section provide comprehensive services as part of the University of Chicago Musculoskeletal Oncology Group. We also now meet monthly with the Pediatric Rheumatologists to discuss interesting cases during a new conference.

The section continues to excel in the areas of education and academics as well. Our imagers place a priority on teaching students, residents and fellows and have served diligently on education-related committees. In 2020, Dr. Sundaram assumed the role of Program Director of the Musculoskeletal Imaging Fellowship - a role previously held by Dr. Dixon since 1999. At the beginning of 2021, Dr. Sundaram also became

the Assistant Program Director for the Diagnostic Radiology Residency. Dr. Straus, who was promoted to Professor in 2020 and elected as a Fellow of the Association of University Radiologists, continues to serve as the Director of Medical Student Education for the Department.

Academically, the Section maintained a national and international presence with presentations and exhibits at the meetings of the Radiologic Society of North America, the American Roentgen Ray Society, the Society of Skeletal Radiology, the Society of Academic Bone Radiologists, and the Royal College of Radiologists in the UK. The scholarly work of the MSK department is diverse. Two highlighted projects include Dr. Stacy's work with the Forensic Firearm Laboratory of the Chicago Police Department. Together, they studied the imaging appearance of different types of bullets associated with gunshot injuries in Chicago. The work resulted in an award-winning exhibit at ARRS as well as a paper with former University of Chicago Radiologist, Stephen Thomas, describing newly encountered copper projectiles with unique terminal ballistics that allow its radiographic identification and safe handling in the MR environment. Second, Dr. Sundaram along with members of the basic science team, are developing a deep learning algorithm to discern non-displaced fractures of the proximal femur that may go unnoticed in the emergency room setting.



Scott Stacy, MD

Chris Straus, MD

Larry Dixon, MD

Narayan Sundaram, MD, MBA

NUCLEAR MEDICINE

DANIEL APPELBAUM, MD

PROFESSOR OF RADIOLOGY
SECTION CHIEF, NUCLEAR MEDICINE

The past year has been an exciting one in nuclear medicine. Despite a brief lull due the pandemic, our clinical service has been growing rapidly. For PET, this is due to both the increasing demand for our high-quality imaging of existing tracers, most commonly FDG, but also with the advent of newer tracers, such as Dotatate, a novel neuroendocrine radiotracer, and Lutathera, Dotatate's therapeutic analog. These have now been used in both routine clinical as well as clinical research trial settings. We have worked closely with our clinical colleagues in surgery and oncology as well as our associates in interventional radiology to build the largest neuroendocrine tumor diagnostic and therapeutic center in the region. We look forward to continuing to expand our PET offerings in the coming year with two additional novel tracers: F18 estradiol for advanced imaging of certain types of breast and endometrial cancer and labeled PSMA PET for prostate cancer.

In addition to whole body cancer imaging, we have been increasing our brain and cardiac PET imaging services as well. On the neurologic side, imaging seizures and tumors remains strong, while our dementia evaluation service continues to grow, using not only the standard FDG but newer amyloid and tau imaging, the latter in collaboration and development with our own medical cyclotron facility. This facility gives us access not only to novel neurologic tracers but also oncologic ones (such as PSMA ligands). It also can synthesize cardiac PET tracers. We are currently

working with the facility to bring the cardiac perfusion tracer N13 ammonia to the U of C, which would make us the only center in the region to offer cardiac perfusion PET.

It is not surprising, therefore, that we have now outgrown the capacity of our current single PET/CT system. We are very happy to now have a second PET/CT in operation—currently as a high quality “mobile” unit (fixed on-site) and soon a permanent state-of-the-art new digital PET/CT system.

Sectional research largely revolves around clinical trials, often in conjunction with the cyclotron facility with much of the work spearheaded by Dr. Yonglin Pu. Some of his more recent work includes developing a clinic-pathologic and PET/CT prognostic index for patients with certain types of lung cancer. On the educational side, Dr. Daniel Appelbaum has recently published the 2nd edition of his popular Nuclear Medicine RadCases textbook, and Dr. Chris Straus continues to lead many of our educational endeavors at the University with residents and medical students.

One thing the section definitely does not look forward to in this coming year is the retirement of our pre-eminent physicist and heart and soul of the section, Dr. Bill O'Brien Penney. Bill's extreme value to the section over his decades of tireless service is impossible to overstate, with his thoughtful efforts and insights integral to every aspect of operations from optimizing images to the safe and accurate administration of therapy doses to patients. He will be sorely missed.



Section of Nuclear Medicine: (left to right) Yonglin Pu, Daniel Appelbaum, Chris Straus, Kevin Little, Bill Conrad O'Brien-Penney.

NEURORADIOLOGY

MICHAEL HURLEY, MD

PROFESSOR OF RADIOLOGY
SECTION CHIEF, NEURORADIOLOGY

The Neuroradiology section continues to provide state-of-the-art multimodality diagnostic and interventional neuroradiology services. The section works closely with referring services, participating in at least six interdisciplinary conferences including head and neck, brain tumor, and epilepsy meetings weekly. As a Certified Comprehensive Stroke Center (CSC), the section is prepared for rapid assessment of stroke cases for possible intervention, especially for large vessel occlusion disease. Neurointerventional radiology provides services around the clock. Mechanical thrombectomy procedures, the benchmark and most logistically demanding procedures for CSCs, have increased 2-3 fold over the past year, making University of Chicago one of the busiest thrombectomy centers in the Midwest.

Our section grew this year with Dr. Aleks Kalnins and Dr. Olga Pasternak-Wise joining from private practice jobs in 2020. They have enhanced the department's ability to handle increased diagnostic neuroradiology volume.

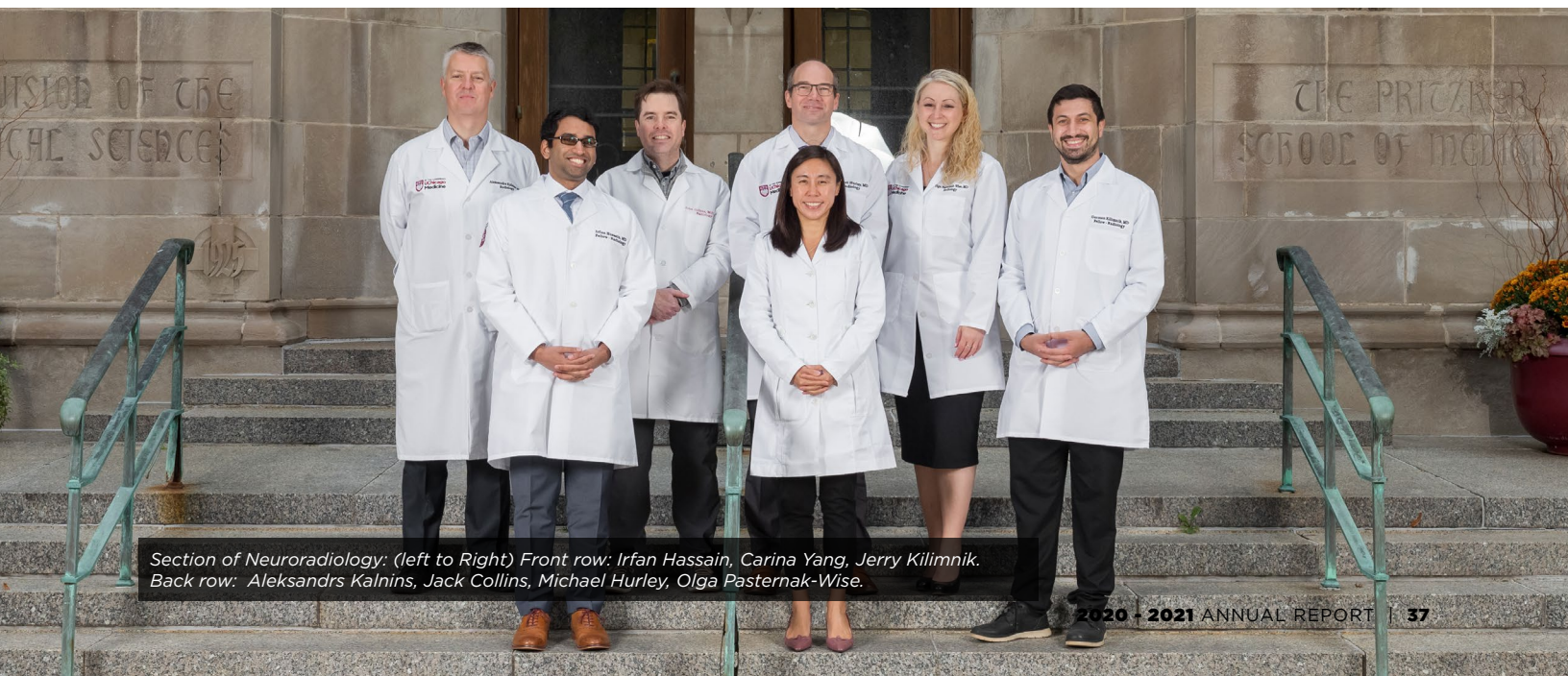
In neurointerventional radiology, Dr. Greg Christoforidis departed in August 2020, taking a job in private practice in Columbus, Ohio. Dr. Tareq Kass-Hout, a neurologist trained in neurointerventional procedures, joined the neuroendovascular practice from Rush Medical Center. Starting in August 2021, Dr. Michael Hurley was recruited as Professor of Radiology and Section Chief of Neuroradiology. Dr. Hurley is a neuroendovascular specialist, coming to the University after 14 years at Northwestern University. In true multi-departmental collaboration, Drs. Hurley and Kass-Hout

co-direct Neurointerventional Radiology. They have also brought in the Department of Neurosurgery.

Members of the section accounted for over 20 peer review publications. Dr. Daniel Ginat added nine peer-reviewed journal publications to an already long list of approximately 140. He also received the Editors Recognition Award with distinction from Radiographics in 2020. In addition to adding four publications over the last year, Dr. Jack Collins was promoted to Associate Professor. Dr. Saad Ali has also recently been promoted to Associate Professor. Dr. Carina Yang continues to lead regular simulation safety trainings for the RSNA. Dr. Hurley and Pasternak have successfully competed for seed funding to develop laboratory and clinical research projects aimed at eventual NIH grant submission. Partnership with Northwestern University and collaboration with Dr. Tim Carroll's MRI research lab included an NIH-funded multicenter study of vessel wall imaging in intracranial atherosclerotic disease.

On the clinical MR side, MRI protocol development has created closer teamwork with monthly meetings now including Dr. Collins, Lara Porterfield and Jonathan Taylor. Additionally, Dr. Pasternak-Wise is leading initiatives to optimize CT protocols and technical quality.

The fellowship remains strong under Dr. Yang's guidance. All three neuroradiology fellows plan to submit abstracts to the ASNR this year. The section has also created a virtual open house to familiarize prospective fellows with the fellowship offerings.



Section of Neuroradiology: (left to right) Front row: Irfan Hassain, Carina Yang, Jerry Kilimnik. Back row: Aleksandrs Kalnins, Jack Collins, Michael Hurley, Olga Pasternak-Wise.

INTERVENTIONAL RADIOLOGY

BRIAN FUNAKI, MD

PROFESSOR OF RADIOLOGY
SECTION CHIEF, INTERVENTIONAL RADIOLOGY

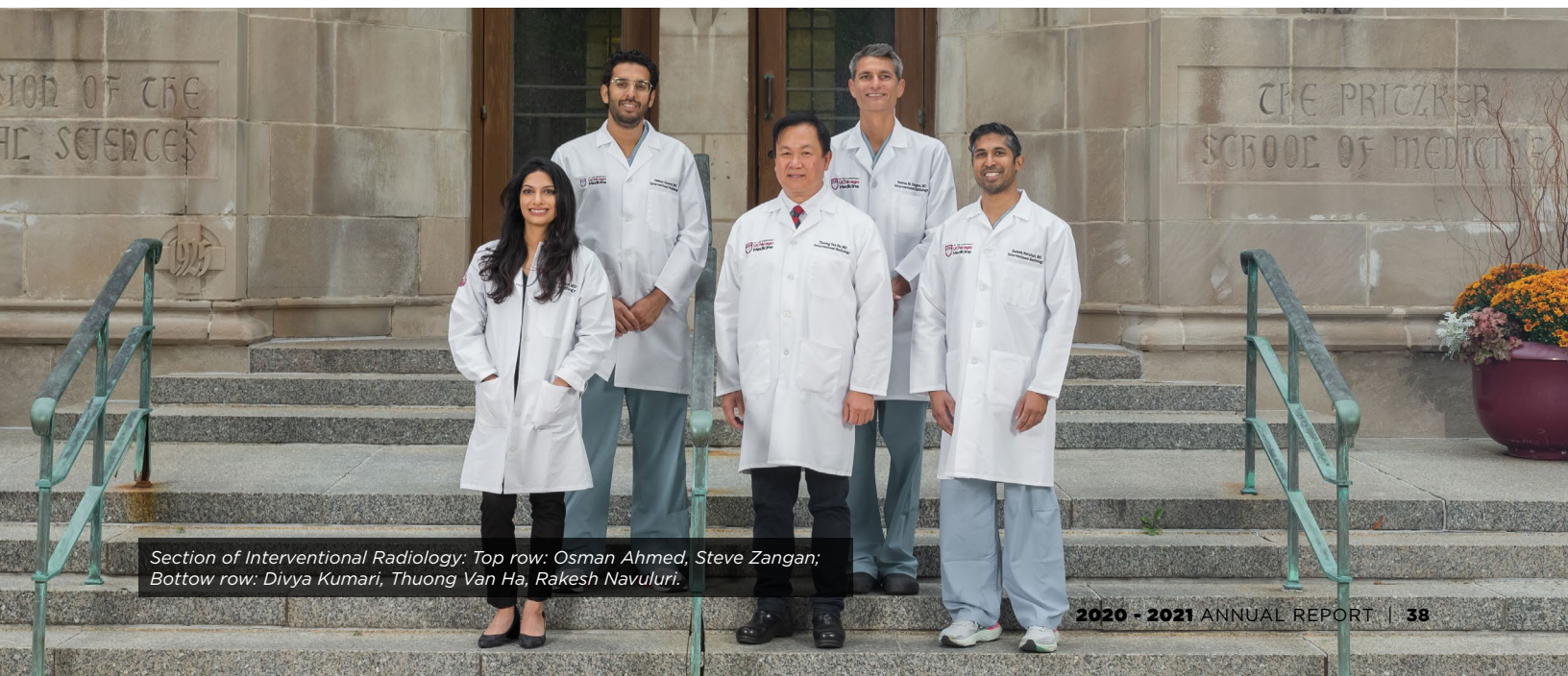
Interventional Radiology continues to serve a broad base of patients and grow rapidly. We provide the full gamut of interventions with 9 fellowship trained faculty and have made great strides in the past year despite the challenges of the ongoing pandemic. IR was at one point, the only service in the medical center performing interventions on both inpatients and in an urgent setting. As a section, our goals in the next year are to continue our standard of excellence in our tripartite mission of clinical care, education, and research.

The addition of trauma, and more recently musculoskeletal interventions has expanded the scope and volume of practice. Dr. Van Ha recently assumed the position of Director of IR Operations. We were able to establish a burgeoning independent clinic under the direction of Dr. Navuluri with both advance practice nurses, house staff, and faculty seeing patients who require longitudinal care. This includes patients with vascular malformations, HHT, hepatic malignancies, vena cava filters, fibroid disease, and adrenal vein disorders to name a few. The IR Clinic provides comprehensive patient care and is mandated as an essential component of the newly created Interventional Radiology residency. We have also opened a new vascular access and minor procedure service in Mitchell Hospital staffed by one faculty member and physician assistant.

The IR residency led by Dr. Navuluri has been among the most competitive residencies in the U.S., and we have matched outstanding candidates that are beginning to progress in their training. Academically, our section continues to thrive on a national and international level. Drs. Funaki and Ahmed are

Associate Editors of the Journal of Vascular and Interventional Radiology (University of Chicago is the only institution with 2 AEs). Dr. Lorenz is the Chairman of the American College of Radiology's Appropriateness Criteria Expert Panel on Interventional Radiology. Drs. Funaki and Navuluri were examiners for the American Board of Radiology oral certifying examinations. Dr. Leef along with members of the Section of Trauma Surgery organized a national joint IR-Surgery trauma meeting entitled, "How to Save a Life."

A total of 12 peer-reviewed and 5 invited manuscripts were published by section members during the academic year. Six new grants have been or are in the process of being secured. More than 30 invited national and international lectures were given by section members; all full-time faculty lectured at all major radiology meetings including SIR, RSNA, ARRS, GEST, and CIRSE. Dr. Leef was promoted to professor and Dr. Ahmed to Associate Professor. Both Drs. Zangan and Navuluri were elected as fellows of the Society of Interventional Radiology. Drs. Funaki, Leef, Van Ha, and Lorenz were recognized as "Top Doctors" by Chicago Magazine. Dr. Ahmed won the Gary Becker SIR Young Investigator Award and Distinguished Young Faculty at University of Chicago.



Section of Interventional Radiology: Top row: Osman Ahmed, Steve Zangan; Bottom row: Divya Kumari, Thuong Van Ha, Rakesh Navuluri.

PEDIATRIC RADIOLOGY

KATE FEINSTEIN, MD

PROFESSOR OF RADIOLOGY
SECTION CHIEF, PEDIATRIC RADIOLOGY

The pediatric radiology section has focused on taking care of our patients and staff during the pandemic. At times, we have been the first physicians to lay hands on our patients because prior care has been via telemedicine. The pediatric radiologists have personally performed fluoroscopic and ultrasonographic exams, manned the reading room in Comer, and worked on-site with radiology residents. Electronic communication has also changed how we participate in interdisciplinary conferences and educational activities. Zoom interdisciplinary meetings have been quite successful with increased attendance. We will likely continue in this fashion. In order to make our remote resident educational offerings more engaging, we have designed our weekly noon presentations to be interactive and have shied away from delivering lectures. We believe this has enhanced the personal touch with our residents, albeit at a distance. In order for our care team to maintain cohesion, we have telephoned our radiographers when they were ill. Staff members constantly saw our masked faces in the reading room and knew we were there with them.

During the pandemic we have become more sensitive to healthcare inequities in our patients. Our sectional goal for the coming year tries to address one of our observations. The project is entitled *Neonatal healthcare equity for screening radiology exams: A pilot study to determine barriers to care.*

It appears that screening ultrasound exams in neonates are not performed for all who require them. These exams include renal ultrasonography for fetal hydronephrosis, spine ultrasonography for neurocutaneous stigmata, and hip ultrasonography in those with predisposing conditions to developmental hip dysplasia. The optimal time for the exams is as follows: renal ultrasonography – between 7 and 14 days of age, spine ultrasonography – before 14 weeks of age, and hip ultrasonography – between 7 and 10 weeks of age. The radiologists have noticed that some exams are requested before discharge from the nursery because the pediatricians believe the families will not be able to return for necessary screening. As a result, discharge may be delayed due to wait time for exam completion and to compound the problem, performing the exam too early may not yield a diagnosis therefore mandating reexamination (renal and hip sonograms require specific physiological conditions in order to be diagnostic). Working with Dr. Poj Lysouvakon, medical director of the newborn nursery, we will identify barriers to requesting the exams (IP order vs. OP order), insurance glitches, family transportation issues, problems in communication with non-affiliated pediatricians, and others. After identifying the barriers, we would like to determine realistic options to alleviate the obstacles.



CLINICAL IMAGING MEDICAL PHYSICS

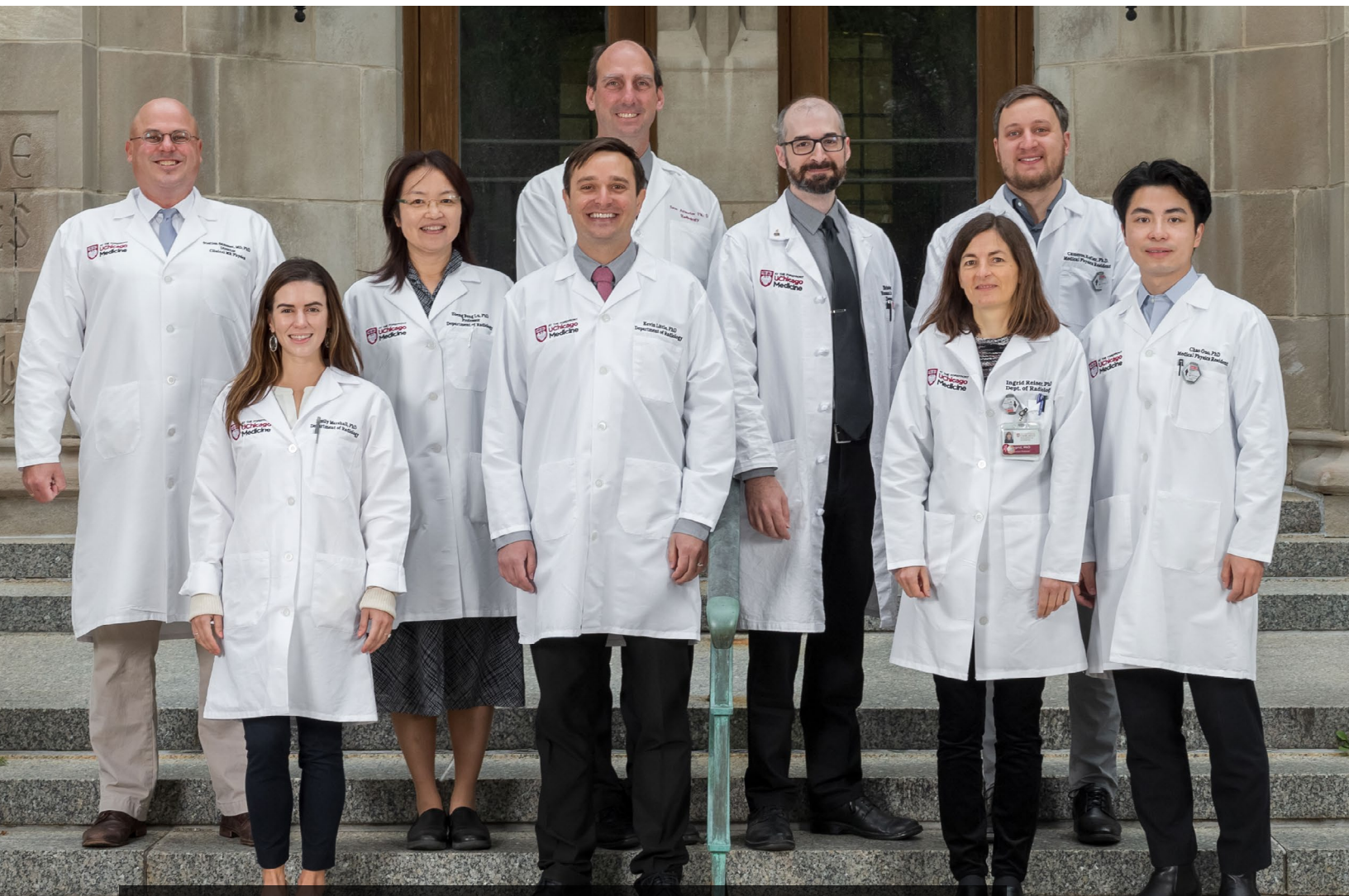
ZHENG FENG LU, PHD

PROFESSOR OF RADIOLOGY
SECTION CHIEF, CLINICAL IMAGING MEDICAL PHYSICS

The Clinical Physics Section consists of six ABR-certified diagnostic medical physicists that cover the clinical physics aspect of all the imaging equipment in the radiology department at the main campus, as well as in the UChicago Medicine offsite locations at Orland Park, River East, and South Loop. They ensure regulatory compliance in accordance with State, Federal, and accrediting body requirements. They participate in selecting, implementing, and optimizing state-of-the-art imaging technology for best patient care. They serve as a resource to the hospital physicians and staff to ensure quality practices and safety for patients and staff. They oversee a Clinical Imaging Physics Residency Program, and participate in the education of medical physics graduate students, radiology residents,

fellows, and staff. They are actively engaged in various scholarly activities and contribute to the departmental tripartite mission of education, clinical care, and research.

As experts in the field, section members participate in research, and serve Radiology through society involvement, holding committee and leadership positions. During the past academic year, the Clinical Physics Section has published 7 peer reviewed articles, 2 invited publications, 9 scientific presentations, 10 invited presentations, 2 exhibits, 3 book chapters, 6 new or ongoing funded grant involvements, 8 new or ongoing IRB approved projects, and moderated 8 sessions at national and international conferences.



Section of Clinical Imaging Medical Physics: Top row: Steffen Sammet, Zheng Feng Lu, Samuel G. Armado, Nicholas Grusauskas, Cameron Kofler. Bottom row: Emily Marshall, Kevin Little, Ingrid Reiser, Chao Guo.

RESEARCH DIVISIONS AND LABS

The Department of Radiology, with Maryellen Giger as Vice Chair for Basic Science Research, has 16 basic science faculty members belonging to one of four sections:

1. **Imaging Sciences:** Acquisition & Reconstruction

Section Chief: XIAOCHUAN PAN

2. **Imaging Sciences:** Analysis & Evaluation

Section Chief: YULEI JIANG

3. **Magnetic Resonance Imaging**

Section Chief: GREG KARCZMAR

4. **Clinical Medical Physics**

Section Chief: ZHENG FENG LU

Within the Section of Imaging Sciences: Acquisition & Reconstruction, the research focuses on new acquisition methods for advanced CT systems and imaging approaches,

novel tomographic reconstruction methods, new methods for PET, SPECT, acoustic, and optical imaging, and developments of novel imaging instrumentation. Within the Section of Imaging Sciences: Analysis & Evaluation, the research interests include evaluation methodologies & ROC analysis, computer-aided diagnosis/machine learning/artificial intelligence in interpretation of medical images (such as breast, thoracic, colon, cardiac, skeletal & radioisotope images). Within the Section of Magnetic Resonance Imaging, the research focuses on MRI and MRIS. Research brings together the basic science faculty with the clinical faculty of radiologists as many endeavors are multi-disciplinary.

Recent exemplary highlights are presented in this report in focused articles.



Basic science faculty.

RESEARCH LABS

MARYELLEN L. GIGER, PHD LAB

A.N. PRITZKER PROFESSOR OF RADIOLOGY

Research in the Giger Lab involves novel mathematical techniques and computer algorithms for extracting tumor signatures from multi-modality medical images and in understanding the efficacy of such methods in the diagnosis of cancer and other diseases, and, in general, personalized healthcare with big data. The lab's research in computational image-based analyses of breast cancer for risk assessment, diagnosis, prognosis, and response to therapy has yielded various translated components, and they are now using these image-based phenotypes, i.e., these "virtual biopsies" in imaging-multi-omics studies for discovery.

Recent AI investigations in medical imaging within the Giger lab include (a) novel incorporation of machine learning and deep learning methods in the diagnosis of breast cancers on MRI, (b) multi-stage harmonization for robust AI across

breast MR datasets, (c) investigation of continuous learning for AI in cancer diagnosis, (d) assessment of indeterminate thyroid lesions on ultrasound, (d) dual-energy three compartment breast imaging (3CB) for novel compositional biomarkers of breast lesions, (e) machine learning for early detection of hypoxic-ischemic brain injury after cardiac arrest, (f) cascaded deep nets in prognosis of COVID-19 on chest radiographs and thoracic CTs, and (g) deep learning for automatic instance segmentation of immune cells in human lupus nephritis.

The lab has extended their AI in medical imaging research to include the analysis of COVID-19 on CT and chest radiographs, and many lab members are involved in the NIH NIBIB-funded Medical Imaging and Data Resource Center (MIDRC; midrc.org).

PATRICK LA RIVIERE, PHD LAB

PROFESSOR OF RADIOLOGY

The La Riviere Lab works on computational imaging across a wide variety of scales, modalities, and subjects. At the smallest scale, the lab works on novel approaches to computational microscopy in collaboration with investigators at the National Institutes of Health (NIH) and the Marine Biological Laboratory. Most recently, they have developed a multiview confocal microscope that achieves super-resolution using both classical and learning-based computational strategies. Done in collaboration with Hari Shroff at NIH, this work has recently been accepted for publication in Nature. At the largest scale, the lab works on tomographic imaging of the Great Pyramid at Giza using

naturally occurring cosmic ray muons to probe for unknown voids in the interior of the pyramid. Working in collaboration with detector developers at Fermilab and the University of Virginia, the La Riviere lab is developing the tomographic reconstruction approaches for the project, which is still in the planning and simulation phase. Naturally, the lab still works at the human scale as well, performing research in image-guidance for radiation therapy using x-ray fluorescence tomography, novel approaches to megavoltage radiation detection and novel combination of megavoltage and kilovoltage detection.

XIAOCHUAN PAN, PHD LAB

PROFESSOR OF RADIOLOGY

The Pan lab conducts research on tomographic imaging and its applications, including advanced cone-beam CT imaging, dual- and multiple-energy CT imaging, molecular imaging, magnetic resonance imaging, and objective assessment of image quality. The overall objectives of the research are to improve existing, and to develop new, imaging technologies and workflows with a strong emphasis on translation to clinical and practical applications. The Pan lab collaborates with investigators in our department and in the Departments of Radiation and Cellular Oncology, Pathology, and Surgery at the University of Chicago. Additionally, we have collaborations with investigators from other academic institutions, national labs, and industry. Recent research programs in the Pan lab include algorithm-enabled dual- and multiple-energy CT for applications to improving diagnosis

in radiology and treatment planning and assessment in radiation therapy, advanced cone-beam CT tailored to guide and assess surgical and orthopedic procedures, quantitative imaging such as tomosynthesis imaging with limited-angular-range data for improved lung and breast cancer screening, and development of CT solutions for surgical specimen imaging for intraoperative specimen assessment and guidance in breast conserving surgery. In collaboration with leading veterinary researchers in the country, the Pan lab also investigates innovative cone-beam CT system and imaging workflow for equine imaging. The Pan lab research programs are supported in part by grants from the NIH and other Federal Funding Agencies. We have also been supported by private foundations and corporate grants.

CHIEN-MIN KAO, PHD LAB

ASSOCIATE PROFESSOR OF RADIOLOGY

The Kao's lab currently focuses on PET research, emphasizing compact high-performance systems and hybrid imaging. They investigate the developments of highly multiplexing readouts for modern PET detectors that employ many small solid-state photodetectors, of economical and yet high-density sampling data acquisition technologies, of practical and compact PET detectors capable of depth-of-interaction and/or time-of-flight, of compact insert systems to enable simultaneous PET/MR imaging with an existing MRI scanner, and of unique hybrid PET/EPRI small-animal systems. A prototypical PET/EPRI small-animal system has been developed and routinely used for comparing in vivo oxygen imaging by PET with FMISO, which is clinically

available but only semi-quantitative, and by EPRI, which is quantitative but not currently available in the clinic. Using PET/EPRI images, they also are developing methods for producing quantitative oxygen maps using clinical PET that can be used for accurately boosting radiation to hypoxic tumor regions to improve treatment. A higher resolution and longer system for whole-body PET/EPRI small-animal imaging is being developed. Kao's lab also conducts research on image reconstruction methods that can enable new system designs or new imaging functionalities, and kinetic modeling for extracting functional parameters such as neuroreceptor binding from dynamic molecular imaging studies.

CHIN-TU CHEN, PHD LAB

ASSOCIATE PROFESSOR OF RADIOLOGY

The Chen Lab's research interests, primarily in molecular imaging and theranostics, cover imaging physics & instrumentation, image reconstruction & processing, imaging tracers & theranostic probes, physiological modeling, quantitative & intelligent image analysis, as well as their applications in cancer, neurological & behavioral disorders, cardiovascular diseases, diabetes, tissue & organ injury and repair, etc. Current major research projects include: (1) semiconductor detector-based SPECT and PET inserts for hybrid imaging in use with CT, MRI, or EPRI; (2) multi-modality image reconstruction, processing and analysis in which information from one imaging source is employed to improve and enhance images from other sources;

(3) Argonne/UChicago Joint Radioisotope Initiative for accelerator-based production of uncommon medical radioisotopes such as V-48, Sc-43/47, Tb-155/161, etc.; (4) the use of these uncommon radioisotopes in cancer imaging and theranostic applications, for example, V-48-vanadyl for early diagnosis and staging of colorectal cancer, Sc-43/47-PSMA-617 for high-risk and advanced prostate cancer, Sc-43/47-DOTATATE for neuroendocrine tumors, etc.; (5) integrated imaging of PET, MRI and EPRI for improving radiotherapy of hypoxic tumors; (6) investigation of nicotine receptors using PET, MRI, fluorescence microscopy, and study of the role of nicotine and its receptors in Alzheimer's disease.

KENNETH BADER, PHD LAB

ASSISTANT PROFESSOR OF RADIOLOGY

Members of the BADER (Biomedical Acoustics Development and Engineering) Lab have been investigating the use of focused ultrasound to break down deep vein thrombosis, or clots that form in the leg. Deep vein thrombosis is a common ailment for patients at the University of Chicago Medical Center, and many of them end up in the catheter laboratory for lengthy procedures (> 1 day) that are not always effective. Our focused ultrasound systems can generate bubbles spontaneously in soft tissues like clot, which enhances the action of the drug administer as part of the standard-of-case. We have conducted studies to understand the bubble-clot interaction, and have identified two primary mechanisms responsible for clot disruption: 1) Direct interaction between the bubbles and the clot resulting in irreversible damage to erythrocytes (the primary component by weight of the clot). 2) Enhanced delivery of the lytic due to bubble-induced fluid mixing, as indicated by increases in fibrin remnants (the primary extracellular scaffolding of the clot). We have also

conducted studies to determine the reason thrombi become resistance to lytic drugs via analysis of their composition, and identified a wide range of thrombus morphologies that depended on age and etymology of the specimen. A link was also identified between the response of the sample to lytic drug and its magnetic microstructure, providing a means to predict treatment outcomes using MRI.

We also explored the use of focused ultrasound for the treatment of renal tumors, observing tumor tissue was nonviable in regions targeted by bubble activity and strong perfusion surrounding the ablation zone for regions that were previously hypoxic. To improve image guidance for deep abdominal targets like the kidney, we have shown chirp-coded excitation, a sequence that has increased sensitivity at depth compared to other ultrasound imaging methods, increases contrast by a factor of three compared to standard sequences.

RADIOLOGY TRANSLATIONAL RESEARCH

The University of Chicago's history is rooted in research, collaboration and innovation. The world's first use of Tc-99m for medical imaging was demonstrated at the University of Chicago. Image co-registration and integration research done at the university in the 1980's germinated the field of multi-modality imaging. In the early 1990's, the University of Chicago pioneered the field of computer-aided diagnosis (CAD), developing the first prototype for mammographic CAD. This tradition of innovation and application remains strong.

Thus, spotlighted here are the updates from the Cyclotron facility, MRIRC lab, a Medical Imaging and Data Resource Center (MIDRC), and Neuro MRI.



The Cyclotron (left) in its vault and one of the clean rooms with its shielded hot cells and a synthesis unit (right).

CYCLOTRON FACILITY

The new Cyclotron Facility in the Department of Radiology at the University of Chicago opened in February of 2017. It has been in operations just under five years. It is the only academic Cyclotron Facility in the entire state of Illinois. The Facility is under the Scientific Direction of Chin-Tu Chen, PhD and its Program Director, Richard Freifelder, PhD. We have a small but energetic staff of three: operator and QC specialist Anna Kucharski, B.A., chemist Kaustab Ghosh, PhD., and lead chemist, Mohammed Bhuiyan, PhD. The 6,500 square foot facility is in the subbasement of the Mitchell Hospital building and directly adjacent to the 2,000 square foot Integrated Small Animal Imaging and Research Resource (iSAIRR) facility. The facility consists of the accelerator area, a small research laboratory and the main production and Quality Control areas. Production takes place in one of 4 classified clean rooms and the Quality Control of the drug products is performed in the central lab and a fifth classified clean room. This modern facility is compliant with current regulations to produce radiopharmaceuticals.

The facility was designed to manufacture positron emission tomography tracers for use in PET imaging and to be able to serve the pre-clinical and the clinical research community, not only here at the University of Chicago but also within the greater Chicago area. We currently have a modest pallet of drugs that can be produced on demand (c.f. voices.uchicago.edu/cyclotron). These drugs have applications in oncology, neurology, and cardiology. We also hold an active IND for fluorothymidine (FLT), a cancer proliferation agent, for human use and we expect to be expanding that drugs usage to Northwestern in 2022.

We have formed collaborations here at the University with groups in the Departments of Radiology, Radiation Oncology, Medicine, and Chemistry. We have also been working with and have shipped drugs to the University of Illinois at Chicago, Northwestern University, Rush University, Advocate Lutheran Medical Center, and the Swedish

Hospital. Recent work has involved Argonne National Labs on the production of a true theragnostic pair: ^{43}Sc (produced at the Cyclotron Facility) and ^{47}Sc (produced at Argonne). Unlike the popular $^{68}\text{Ga}/^{177}\text{Lu}$ theragnostic pair, with this pair the chemistry is identical.

Our collaborators are not all within academia, we are also working with Cerveau and Meilleur Technologies to produce two compounds for use in human clinical trials under INDs held by the two companies. ^{18}F -MK6240 is a tau imaging agent and ^{18}F -NAV4694 is an amyloid agent both licensed by Cerveau and Meilleur respectively and are used in Alzheimer's research. As of this writing, we have manufactured 47 batches of these drugs and they have been injected into 64 patients in the greater Chicago area. These have been distributed outside of the University of Chicago via the Chicago Biomedical Consortium (CBC) and the Institute for Translational Medicine (ITM). To make these drugs more widely available and to comply with the regulatory aspects of PET radiopharmaceutical drug distribution we are forming a new consortium of Universities and Hospitals within the Midwest region specifically to be able to obtain these critical new, PET drugs for multi-site and multiple clinical trials.

Development of the onsite production capability of an existing radiopharmaceutical can take as long as 6 months and the process is challenging. While our staffing is small, we have developed several compounds that have been reported on elsewhere (FEPPA, ^{18}F -NaBF₄, FLT, F-Miso, ^{18}F -Nifene, ^{18}F -2-FA85380, ^{11}C -PIB, ^{68}Ga -PMSA-11, etc.). But we have also been working on new, novel compounds: ^{18}F -3-F-4-AP for imaging of multiple sclerosis (MS), ^{8}F -JW199 for imaging of cancer, ^{18}F -IGF1 for imaging of neural disorders, etc. We welcome discussions with researchers to understand their needs and to try and help their research.



Mosaic of the Cyclotron Staff (left to right): Rich Freifelder, Kaustab Ghosh, Anna Kucharski, Mohammed Bhuiyan, and Chin-Tu Chen.

Currently only 2 of our 5 cleanrooms have the needed “hot-cells” required to shield our workers from the high levels of radiation that the cyclotron accelerator can produce. However, we are expecting to add another room with cells in calendar year 2022 to increase our production capacity and allow for more ^{11}C work. We will also be able to produce ^{15}O as H_2O , CO , CO_2 , and O_2 in the new production room. This small expansion project will also add some needed equipment and move us further towards full cGMP compliance (needed for clinical production of drugs). The project will also include a small renovation and new equipment that will allow us to produce $^{13}\text{N-NH}_3$ as a cardiac imaging agent. ^{13}N has vastly superior imaging qualities as compared to ^{82}Rb which can be generator produced. This joint Radiology/Cardiology project will enable the establishment of a cardiac PET program at the University of Chicago and is not available anywhere else within the

State of Illinois using this important radioisotope. This work is being done in collaboration with Ionetix and we hope to obtain full FDA approval for clinical usage of this drug in 2022-2023 under an ANDA held by Ionetix.

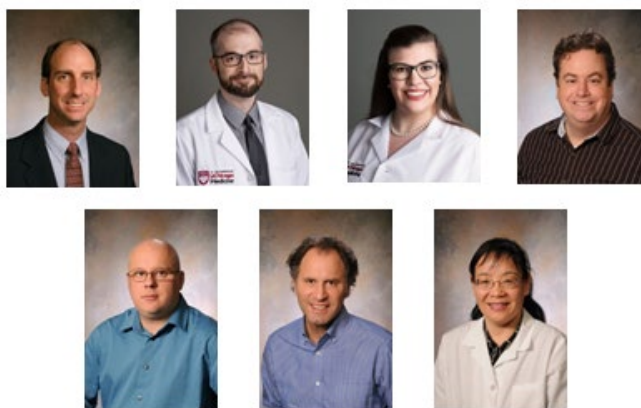
Future work will involve an increase in staffing to meet the clinical ($^{13}\text{N-NH}_3$), clinical trials (MK6240 and NAV4694), and preclinical needs. We are also actively looking for a faculty level radiochemist to enhance our research work, bring new ideas and new compounds to the University, and to be better able to work with physician scientists and basic scientists on new and novel tracers. We expect our academic-industry partnerships to continue and grow. The Cyclotron Facility is a unique facility with many challenges but it also affords access to unique drugs that are available nowhere else in the state or in the immediate Chicago region.

HIRO OFFICE

The goal of Human Imaging Research Office (HIRO) is to assist University of Chicago investigators and research staff with medical imaging exams performed on human subjects for research purposes. This includes the acquisition, analysis, collection, de-identification, and distribution of image data for both basic science research and clinical trials. Our services ensure research-related imaging fulfills protocol requirements and allow investigators to obtain HIPAA- and IRB-compliant clinical research data.

HIRO provides services for almost all types of medical imaging, including: X-ray (radiographs, fluoroscopy, angiography, cardiac cath), DXA, CT, MRI, ultrasound (general, echocardiography, vascular, ob/gyn), nuclear medicine (planar, SPECT, MIBG), PET, ophthalmology imaging, endoscopy and bronchoscopy, and many types of specialty imaging.

Specifically, in the past year, HIRO began collaborating with the Center for Research Informatics’ (CRI’s) Clinical Research Data Warehouse (CRDW) Team to provide medical imaging data for their COVID-19 Limited Data Mart. The Data Mart now has 152,906 chest radiographs, 11,375 chest CT scans, and 5,862 head CT scans. The HIRO is proud to contribute to the research community’s efforts in investigating and combating this pandemic.

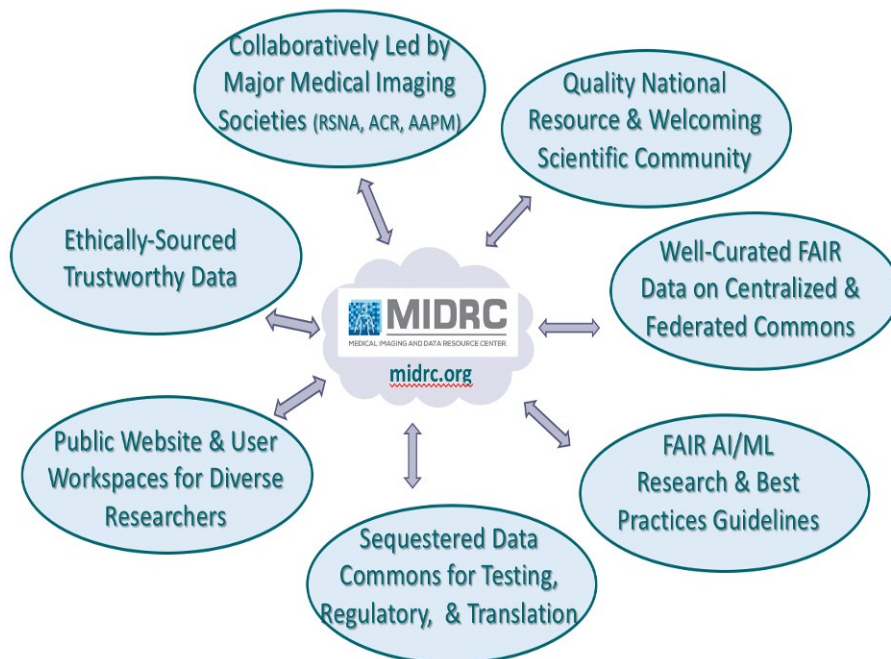


MIDRC

The Department of Radiology at the University of Chicago is host to the Medical Imaging and Data Resource Center (MIDRC; midrc.org), with Maryellen Giger, the A. N. Pritzker Distinguished Service Professor of Radiology and the Committee on Medical Physics serving as the contact PI on the \$20 million, 2-year contract from the NIH National Institute of Biomedical Imaging and Bioengineering (NIBIB). MIDRC is a multi-institutional collaborative initiative driven by the medical imaging community and is aimed at accelerating the transfer of knowledge and innovation in the current COVID-19 pandemic and beyond. MIDRC, funded by NIBIB is co-led by the American College of Radiology® (ACR®), the Radiological Society of North America (RSNA), and the American Association of Physicists in Medicine (AAPM). The aim of MIDRC is to foster machine learning innovation through data sharing for rapid and flexible collection, analysis, and dissemination of imaging and associated clinical data by providing researchers with unparalleled resources in the fight against COVID-19.

From the start of the pandemic, it was clear that medical imaging would have an essential role in any comprehensive epidemiological approach to defeating this disease. Consequently, an important public health need arose for the aggregation, analysis, and dissemination of COVID-19 medical images and associated clinical data. Leveraging the existing and developing infrastructure provided by the participating organizations, MIDRC serves as a linked-data commons that coordinates access to data and harmonizes data management activities at three critical stages: (1) intake, including curation, de-identification, abstraction, and quality assessment (2) annotation and labelling of images and other data using semi-automated approaches and (3) distributed access and query methods. Beyond ACR, RSNA, and AAPM, MIDRC includes over 23 institutions (from academia, private practice, and FDA) with over 100 investigators.

MIDRC receives COVID-19 images and data through intake portals at RSNA and ACR, and then, through a Data Commons Portal on the [Gen3 Data Ecosystem](#), enables a single public access point for data discovery, linking the MIDRC collection through secure services and a common query infrastructure and allowing additional data sources to be incorporated over time. The imaging data is being collected from multiple sources including academic medical



centers, community hospitals, and others. While RSNA and ACR bring their expertise in ingestion of imaging and non-imaging data, cleaning, labeling, and curating, AAPM brings its expertise in physical image quality and harmonization, and in metrology including tailored distributions, standards, and evaluation metrics.

Beyond its public Open Commons, one of the unique attributes of MIDRC is that it has a Sequestered Commons consisting of sequestered MIDRC data for use in testing and which will provide a valuable resource for data science

challenges and a path to long-term sustainability through industry support for translation to—and approval through regulatory—clinical use which will impact public health worldwide.

Other members of UChicago Radiology participating in MIDRC include, Sam Armato, PhD, Natalie Baughan, Gillian Campbell, Chun-Wai Chan, MSc, Karen Drukker, PhD, Jordan Fuhrman, Nicholas Grusauskas, PhD, Hui Li, PhD, John Papaioannou, MS, Katherine Pizer, and Heather Whitney, PhD.



Katherine Pizer and Maryellen Giger, PhD attending RSNA 2021 at the MIDRC booth.

MRIRC RESEARCH LAB

The newly founded University of Chicago MRI Research Center houses Magnetic Resonance Scanners and experienced support staff. The MRIRC includes:

- A recently upgraded Philips Achieva 3.0T scanner with dStream technology that is equipped for both neuro- and body-imaging. The scanner has the necessary equipment for functional MRI (fMRI) as well as devices for presenting visual and auditory stimuli during fMRI scans and for recording behavioral responses. This scanner will soon be equipped with MRI-guided high intensity focused ultrasound (HIFU). Specialized coils for body imaging (breast, prostate) are available.
- A Philips 1.5 T scanner used primarily for clinical trials. This scanner is also equipped with MRI-guided HIFU. We plan to replace this scanner in late fall with a Philips Ingenia 3.0T scanner with dStream technology, also equipped with MRI-guided HIFU.
- A 9.4 T, narrow bore scanner. This scanner is used for small animal studies and is part of the University's Integrated Small Animal Imaging Research Resource.

Support staff at the MRIRC includes: three MRI Physicists, of which one is a Certified Medical Physicist with Special Competency in MRI Physics (ABMP), two Clinical Research Coordinators, and two MR Technologists dedicated to research MRI practice.

Physicists at the MRIRC are developing innovative MRI methods and supporting users of the MRIRC Core facility through protocol design and optimization, performing QA studies, and data processing. Research at the MRIRC includes development of new fMRI methods, MRI methods for characterizing stroke, breast and prostate cancer imaging, use of quantitative MRI in clinical trials, including improvements in quantitative MRI methods, and development of new cardiac imaging methods. Support from veterinary technologists with specialized imaging experience is available from the Integrated Small Animal Imaging Research Resource.

NEURO MRI

Research Focus: We are developing new MRI scans that map out oxygen utilization in the brain, identify clinically unstable atherosclerotic plaques (the source of many ischemic strokes), and brain aneurysm (the source of hemorrhagic strokes). Additionally, there is work being done in identifying the contributions of the microstructural cytoarchitecture of tissue to the macroscopic MRI signal using techniques including diffusion weighted MRI and echo planar spectroscopic imaging.

Graduate Education: We take pride in our student mentorship and are fully engaged with the Graduate Program in Medical Physics (CAMPEP accredited). We strive to educate the greater University by offering MRI physics training seminars to the MRI 'users' community. Attendees include graduate students, postdoctoral researchers, and PIs.

Extramural Funding: The neurological MRI research group is funded by the National Institutes of Health, American Heart Association, The National Science Foundation, and the Safadi Foundation.

Cross Institutional Engagement: We collaborate with the Neurovascular service from Northwestern University to study intracranial atherosclerotic disease (ICAD). We also continue to support the CASH (Cavernous Angiomas With Symptomatic Hemorrhage) where we have harmonized

multiple MRI scanners (University of Chicago, Johns Hopkins University, Mayo Clinic, University of New Mexico, University of California-San Francisco). A recent collaboration with the Argonne National Labs showed, for the first time, the link between individual neurons (10-4 mm) and microstructural MRI (~1 mm).

Cross Departmental Engagement: We collaborate with physicians from the Departments of Neurology and Neurosurgery, who treat stroke, vascular disease, multiple sclerosis, and implantable devices. We also collaborate with faculty from the department of Neurobiology to develop a multi-modal multiscale imaging pipeline.

Corporate Engagement: We derived a mathematical model that predicts the growth of a brain infarction after blockage of a blood vessel to the brain and found we can slow the growth of the infarct with flow augmentation using norepinephrine and hydralazine. We are using these findings in collaboration with a pharmaceutical company (Prolong Medical) to assess the role that a new class of neuroprotectants can alter stroke management.

Future Prospective: Our goal is to translate our new imaging techniques (O2 Utilization, MS lesions, aneurysm rupture, stroke prediction, and microstructural imaging) toward the clinical use at the UCMC and to the broader community.

FUTURE LEADERS & PETS OF RADIOLOGY



Keegan Edward Warren Lenner - 4.30.2021
Grandson of Kimberly Lenner



Llewyn Ephraim Bader - 4.30.2021
Son of Ken Bader, PhD



Mila Maryam Ahmed - 2.25.2021
Daughter of Osman Ahmed, MD



Niyam Krishna Sundaram - 7.22.2021
Son of Narayan Sundaram, MD, MBA



Max - Carla Harmath



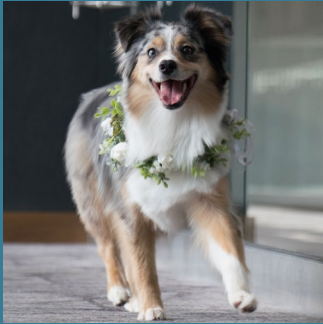
Pet Rock - Chris Straus



Tux and Ava - Conor Tierney



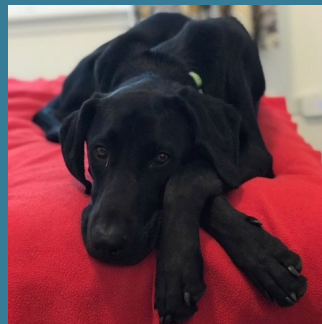
Rocky - Jessica Telleria



Miley - Johnathan Fergus



Igor Feinstein Skolly -
Kate Feinstein



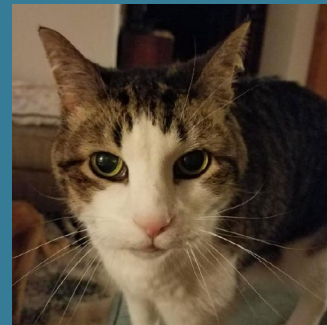
Bruno - Ken Bader



Glen and Fiddich -
Kim Lenner



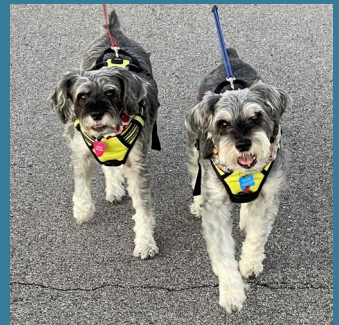
Oakie - Mary Green



Sku - Mary green



Lucy - Melvy Mathew



Bootsy and Reggie -
Mandy Velligan



Cholo - Noemi Brunner



Pepe - Sam Armato



Zeus, Jack and Tucker -
Steven Montner

**RADIOLOGY
SNAPSHOT:
TOGETHER
WE THRIVE!**



Residents enjoying a paddle boat ride after completing their Core exam



Diversity and Inclusion Council Cultural Sharing Potluck



Trainees attending a welcome party for the RI class



Trainees and faculty attending the inaugural Women in Radiology lunch

TECHNOLOGISTS

224



LEAD TECHS

29



NURSES

8



CLINICAL & BASIC
SCIENCE FACULTY

58



ADMINISTRATIVE
STAFF

29



BASIC SCIENCE
RESEARCHERS

40



RESIDENTS

36



FELLOWS

7



GRAD STUDENTS

21



TECH MANAGERS

8



IT

11



ASSISTANT
DIRECTORS

2



OUR MISSION

To advance patient care by being at the forefront of radiology through diagnosis, inclusive care, expert training, and advanced research that leads to breakthroughs in the field.

OUR VISION

To lead the world in radiology and defy the status quo in a collaborative work environment that promotes team wellness and diversity.

OUR VALUES

PATIENT-FOCUSED – We treat all with compassion, respect, and dignity.

INCLUSION – We collaborate in a diverse, curious, and innovative team.

INTEGRITY – We hold ourselves accountable for the accuracy and quality of our work.

EQUITY – We strive to create a welcoming environment focused on wellness.

INNOVATION – We are committed to continuous development within our department and within the field.



THE UNIVERSITY OF
CHICAGO

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