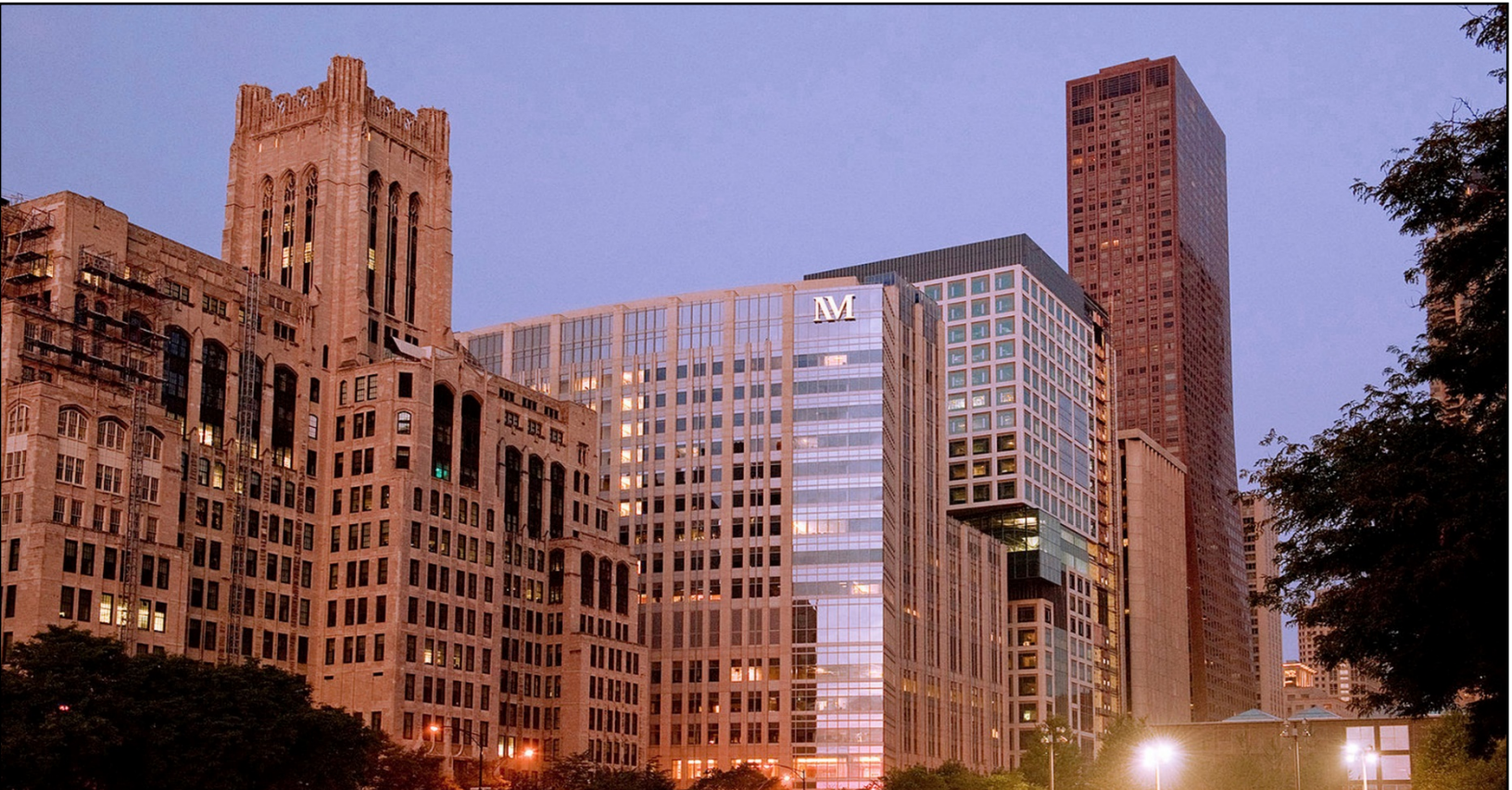


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The Read

Northwestern University Department of
Radiology Newsletter | Summer 2021



Chair's Message from Dr. James C. Carr



Our latest issue of *The Read* illustrates some of the strides we have made recently as we continue to create a cutting-edge and innovative Radiology department. I am pleased to be able to tell you about the latest developments going on in our department.

First, I would like to extend a special welcome to all new residents and fellows who matched into our training programs. I am confident these promising physicians will accomplish much in the coming months and years, and I enthusiastically look forward to their continued growth and achievement.

Residents have also held several meetings for the Women in Radiology Group. These meetings have included book groups, game nights, and wellness-centered discussions for all who attend. This group is highlighted in this issue as well.

Dr. Abboud and team have put the final touches on our new independent Emergency Radiology section. We are now covering evening hours in the ED seven days a week, expanding our department's services and outreach within the hospital.

In the last few months, our new PACS system was successfully rolled out system wide throughout the Northwestern Medicine enterprise. Images from any hospital and out-patient center within NM are now readily available to all healthcare providers. Access from mobile devices for providers and patients is a next step as we continue to enhance the capabilities of PACS in the future. Many thanks to Dr. Alex Korutz and his team for overseeing this important initiative.

I'd also like to congratulate the Interventional Radiology team led by Dr. Riad Salem regarding FDA approval of the yttrium-90 radio embolization treatment. Pre-approval research work and the procedure itself were developed here at Northwestern IR. "We are thrilled to have spearhead this research at Northwestern over the last 10 years, ultimately leading to the FDA approval of an Y90 radio embolization for liver cancer," Dr. Salem says. "This is the first device to receive full regulatory approval, generating a roadmap for other therapies to follow. The outpatient treatment prolongs patients' lives while maintaining quality of life." We are proud of our IR division for this important development, which now delivers enhanced care to our patients.

I'm pleased to present this latest issue of our department newsletter, which highlights a selection of advancements in research, education, and clinical service.

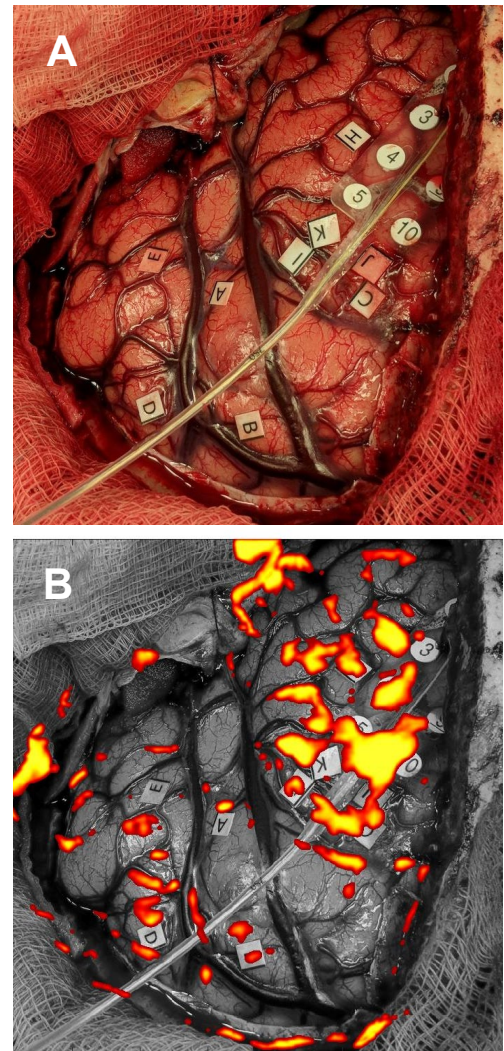
James C. Carr, MD
Chair of Radiology

High-resolution Infrared Thermal Imaging (ITI) for Simultaneous Functional Mapping of the Entire Craniotomy in Awake Patients

NIH NINDS R01 – PIs: Parrish, Todd and Matthew Tate, Co-I: Melissa-Ann Mackie. Staff: Michael Iorga (team leader), Nils Schneider.

Awake neurosurgery is used in the management of drug-resistant epilepsy, glioma, and neurovascular malformation, in order to localize seizure and/or physiologic activity. Protection of key functional areas is imperative to avoiding postoperative neurologic deficits. Currently, direct electrical stimulation (DES) is the most commonly used method of intraoperative surgical mapping, which identifies functionally critical brain regions so they are not resected. However, DES has low spatial resolution (~1 cm), may provoke seizures, and can only test one area at a time. This newly NIH-funded R01 project will develop a new method of intraoperative functional mapping based on infrared thermography, which has high resolution (~100 micron) and simultaneously monitors the entire exposed brain surface without risk for seizures. The Intraoperative Mapping System will be developed and tested on glioma patients, as tumors have relatively static impact on brain temperature compared to epileptogenic foci and vascular malformations. If successful, this project will create a new method for intraoperative functional mapping during awake neurosurgery. Ultimately, the goal is to improve the precision of intraoperative brain mapping while increasing the safety and efficacy of surgery for patients with

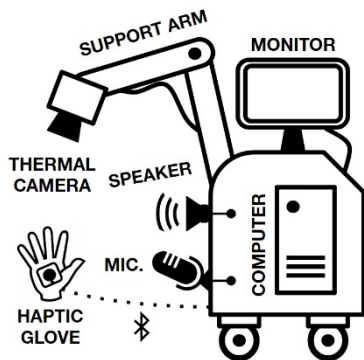
drug-resistant epilepsy, glioma, and neurovascular malformations.



A visual-spectrum craniotomy image of the frontal language area in the left hemisphere (A) and thermal functional heat map overlaid on grayscale version of the same image (B). Letters correspond to positive electrical stimulation sites and numbers denote electrocorticography grids. The same Picture Naming task was used for stim and thermal mapping. Functional areas were determined with 1 minute of thermal mapping, whereas, the electrical stim mapping took 15 minutes. The stim and thermal results are in good agreement indicating that thermal mapping

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is capable of identifying function. No advanced processing has been applied as we are developing those methods currently. This



would improve the detection and reduce the number of false positives.

***Thermal Mapping System,** which communicates to the neuro-navigation system for display of real-time maps.*

- Todd Parrish, MD

Ground Rounds Transitions

GRAND ROUNDS TRANSITIONS AND LOOKING AHEAD

Over the past six months, we implemented many changes to the Grand Rounds at the Department of Radiology with the direction of Dr. James Carr, Chairman of the Department of Radiology and Dr. Senta Berggruen, Vice Chair of Education and Diversity at the Department of Radiology.

1. Virtual Grand Rounds:

Due the unique demands of the pandemic, we established a new, virtual format for the Grand Rounds that initially took effect in May 2020. The virtual lectures have since evolved on various platforms of electronic delivery and modes of interaction.

To simulate the social nature of the Grand Rounds in a socially distanced new world, we have continued to encourage audience participation in these electronic formats. In furthering this effort, we also dedicated some Grand Rounds to multidisciplinary panel discussions that took place on the virtual platform with active audience participation.

Each virtual Grand Rounds is now recorded, and CME information is posted at the start of the live virtual sessions.

Looking ahead, as the pandemic restrictions continue to ease... Stay tuned for a LIVE Grand Rounds lectures to slowly make their comeback!

2. Curriculum expansion:

Our Grand Rounds core curriculum now includes separate sessions on Artificial Intelligence,

Research and Diversity in addition to Abdominal and Genitourinary Imaging, Interventional Radiology, Breast Imaging, Diagnostic and Interventional Neuroradiology, Chest Imaging, Nuclear Medicine/Molecular Imaging, Cardiac Imaging, Pediatric Radiology, Musculoskeletal Radiology, and Business in Radiology.

Also, stay tuned for MORE Grand Rounds lectures in a given year, where we'll get a chance to hear from a greater number of experts on trendy topics!

3. (Re-) Formation of the Grand Rounds Program Committee

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With the level of subspecialty expertise required to institute the curriculum changes, we have re-established the Grand Rounds Program Committee to consist of faculty members from each subspecialty at the Department of Radiology. The Program Committee members are now active in speaker recruitment, working in concert with the individual Sections and the Grand Rounds Program Director.

4. Our faculty experts in the Program Committee with their respective field of expertise include:

Abdominal and Genitourinary Imaging:
Linda Kelahan, MD

Breast Imaging: Dipti Gupta, MD

Musculoskeletal Radiology: Jonathan Samet, MD

Pediatric Radiology: Sarah Moum, MD

Neuroradiology (Diagnostic): Ceylan Cankurtaran, MD

Neuroradiology (Interventional): Sameer Ansari, MD PhD

Artificial Intelligence: Virginia Hill, MD and Ulas Bagci, PhD

Research (other than AI): Mohammed Elbaz, PhD

Chest Imaging: Hatice Savas, MD

Nuclear Medicine/Molecular Imaging:
Hatice Savas, MD

Cardiac Imaging: Brad Allen, MD

We still have an open spot for Program Committee participation in *Interventional Radiology* and we encourage junior faculty to sign up!

5. Expansion of Grand Rounds distribution lists:

In this broader effort, we have also expanded the email blasts to include the system-wide NM Radiology Departments such as Lakeview, Delnor and CDH. We have also increased efforts to custom-target our audiences depending on the type of subspecialty expertise offered at Radiology Grand Rounds.

6. Program Director Role Transition

And on a final note, as the now-former Program Director of Grand Rounds for the Department of Radiology, I am excited to announce that Dr. Hatice Savas will soon complete her transition into the role of the Program Director of Grand Rounds. Congratulations to Dr. Savas!

- Ceylan Z. Cankurtaran, MD

NeuroPET Initiative

We are excited to announce that the first research grant application of the NeuroPET working group has been funded!

The NeuroPET working group was established in January 2021 in order to enhance the neuro-oncological applications of PET imaging and PET/MRI.

In a short period of time, the core multidisciplinary group of experts including Ceylan Z. Cankurtaran, MD and Benjamin Liu, MD from Neuroradiology; Hatice Savas, MD and Timothy Houston, PharmD from Nuclear Medicine; and Roger Stupp, MD from Neuro-oncology formed a new collaboration with the University of Chicago cyclotron facility for radiotracer import in order to initiate novel F18-FLT PET and PET/MRI imaging at NM.

The pilot funding for this initiative has been recently granted: incorporating further expertise from Yu-Fen (Jennie) Chen, PhD from the Department of Radiology and Hui Zhang, PhD from the Brain Tumor SPORE Biostatistics and Bioinformatics Core, the NeuroPET workgroup has been funded for FY2022 for their proposed study “Multimodality Imaging with Advanced Multiparametric MRI and Molecular Imaging to improve treatment planning and evaluate early response assessment in Neurooncology: A pilot study for multidisciplinary initiative.” by the Woman’s Board of Northwestern Memorial Hospital.

Looking into the future, we are excited to potentially create a novel imaging service line to be offered to those patients in need.

- *Ceylan Z. Cankurtaran, MD*

Complex IVC Filter Practice at Northwestern IR Instrumental in Device Breakthrough

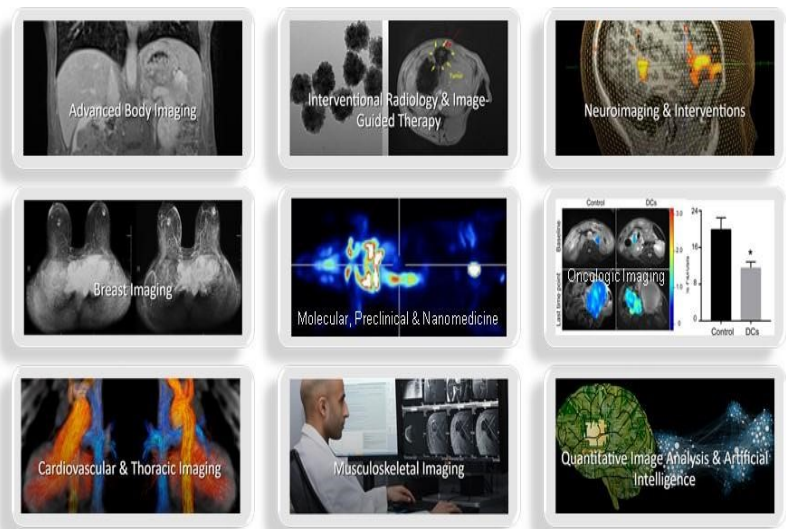
Northwestern has been at the forefront of advanced inferior vena cava filter retrieval for several years. We were one of the first practices to utilize the Excimer laser sheath, indicated for removal of pacemaker leads, to retrieve embedded IVC filters. Based primarily upon our significant experience, supported with experience from several other centers, Philips has achieved breakthrough technology designation from the US Food and Drug Administration as it moves towards being the first device specifically indicated for advanced filter retrieval. Kush Desai, along with Robert Lewandowski and former faculty Robert Ryu have led this effort in what promises to be an important step forward in managing patients with difficult to retrieve filters.

- *Kush Desai, MD FSIR*

Northwestern Radiology UIM Student Research Summer Fellowship

Overview: This Northwestern Radiology 6-10-week summer fellowship program gives students underrepresented in medicine (UIM) the opportunity to gain insight into the specialty of Radiology while developing research skills required to perform medical imaging research. Recipients will work closely with mentors in the department of radiology to define study objectives, test hypotheses, and analyze data. They will also have the opportunity to learn about the Radiology residency program. Ultimately, this experience gives UIM medical students a chance to consider academic radiology as a future career option.

Nature of Projects: Any area of research in the radiologic sciences is eligible for funding. Projects may include any of the following: Hypothesis-driven clinical translational science; evaluation of new diagnostic imaging technology; interventional radiology, clinical investigation; drug, device or therapy development; comparative effectiveness; health disparities research; evidence-based radiology; quality improvement; clinical workflow and practice efficiency; imaging informatics and artificial intelligence.



Candidates, Radiology Mentors & Application: The department offers the opportunity to work with mentors to formulate a question, develop the research skills to answer it, and produce a scholarly product. Candidates will work with their mentor to jointly develop a research proposal suitable for summer research. The finalized proposal should identify the Radiology mentor, include a cover letter, a recent CV of the candidate, and a 1-page description of the research project (title, background, aims, hypothesis, study design, timing and duration of the project).

Award Amount: Grant recipients receive up to \$5,000 (\$ 500 per week for up to 10

weeks). It is to be used as a stipend for the medical student. Funds are intended to secure time for the recipient and may not be used for non-personnel research expenses.

Eligibility: Applications should be UIMs who are undergraduates or full-time students in medicine, biomedical engineering; electrical engineering, computer science or a related field. Candidates must commit to work full-time for 6-10 weeks on the proposed research project. The research project must be performed with a mentor in the Department of Radiology at Northwestern University.

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Minorities Underrepresented in Medicine UIM Applicants: The Association of American Medical Colleges defines UIM using the following criteria: Racial and ethnic populations who are underrepresented in the medical profession relative to their numbers in the general population. This includes those who self-identify as a member of a racial or ethnic group historically underrepresented in medicine, such as:

- African-American/Black
- American Indian/Alaska Native
- Hispanic/Latino
- Native Hawaiian/Pacific Islander

Candidates interested in a research project and mentors in Radiology, contact:

Cynthia Collazo, Research Office at
Radiology
Department of Radiology
Northwestern University, Feinberg School
of Medicine

737 N. Michigan Avenue, Suite 1600
Chicago, Illinois 60611
Phone: +1 312-926-2270 | Email:
Cynthia.casillas@northwestern.edu

- *Dr. Michael Markl*

We are thrilled to have spearheaded this research at Northwestern over the last 10 years, ultimately leading to the FDA approval of an Y90 radio embolization for liver cancer. This is the first device to receive full regulatory approval, generating a roadmap for other therapies to follow. The outpatient treatment prolongs patients' lives while maintaining quality of life.

- *Riad Salem, MD, MBA*

Congrats to Dr. Bradley Allen as new Chief of Cardiovascular & Thoracic Imaging at Northwestern University.



“Thank you, Dr. James Carr, for this opportunity. I am honored and humbled. I am really looking forward to bringing these two sections together and helping the Cardiovascular and Thoracic Imaging Section grow into a leading subspecialty section in our department and within cardiovascular and chest radiology communities.”

- *Dr. Bradley Allen*

Medical Student Education in the Era of COVID: The Benefits of a Hybrid Approach

"Am I going to get sick? Who am I putting at risk? Am I going to spread it to someone else?"

The anxiety of balancing these possibilities during what was supposed to be the most important and exciting segment of our medical education – our third-year clerkships – grew more taxing throughout the pandemic. With the rollout of the COVID19 vaccines and the efforts of the medical school to offer new educational opportunities like virtual clerkships, lectures, and clinical skill assessments, we all did the best we could to continue to learn medicine. Though initially challenging for both faculty and students to adapt to this new reality, it has become increasingly clear that what seemed like a temporary means of bridging education has the potential to augment the in-person experience like never before. There is perhaps no greater example of this than the redesign of the General Diagnostic Radiology and Advanced Body Imaging electives.

Dr. Goodhartz and Dr. Wood redesigned the General Diagnostic Radiology elective to blend virtual, self-directed learning with the benefits of being in the reading room. Each day of the elective, an online course dashboard is filled with links to various modules, readings, and standardized practice cases that helped me build a strong foundation of radiological knowledge over the course of the month. Dr. Magnetta implemented a similar hybrid model for the Body Imaging elective, seamlessly integrating case-based learning into the reading room environment. Each week we were able to practice dictating our own interpretations of cases into a template using an online PACS. Every case had links to review articles and modules that were invaluable in helping develop search patterns and discern specific imaging characteristics of a vast array of pathologies. At the end of each week Dr. Magnetta personally reviewed each case in detail with us and gave us the unique chance to learn how someone in the field would approach the images in real time.

Through these experiences it has become clear that virtual learning can be leveraged not simply to keep these electives afloat during an international health crisis, but to enhance them. It is one thing to have someone tell you about the various imaging findings related to a disease process, but it is an entirely more powerful learning experience to read about these processes independently, practice looking for relevant findings on an online case, and eventually be able to see the findings in a real patient in the reading room. An educational approach like this can help students develop the skills essential for a resident in any field, but especially for somebody planning a career in Radiology. Self-directed learning is part of the continual learning process necessary throughout a medical career. It can help maximize the educational experience and teaching we receive back in the real clinical environment. As we continue to transition back to pre-pandemic life, I would love to see these electives continue to be in this hybrid format and am thoroughly excited for the innovative additions that are yet to come.

- Srirajkumar Ranganathan, 4th-year Medical Student

Women in Radiology Group

It has been a busy 2021 so far for the Northwestern Women in Radiology (WiR) group! Led by the Vice Chair of Education and Diversity and former program director, Dr. Senta Berggruen, and third year radiology resident, Dr. Lauren Vassiliades, the group has hosted many events with topics ranging from women in leadership, the importance of community and networking, negotiation skills, recruitment of female medical students into radiology, and the worldwide He-for-she movement and how male colleagues can support women in radiology.



In addition to robust group discussions, the leaders of the Northwestern Women in Radiology group also hosted a Women in Radiology Multi Institutional Panel in April 2021, with 6 female leader panelists, including Dr. Senta Berggruen, with additional participants from 5 other academic institutions including University of Texas Southwestern, University of Pennsylvania, Case Western University, Indiana University, and Massachusetts General Hospital. The Northwestern Women in Radiology group also hosts social events for the members, and the very first in-person event, a book club, was held at the restaurant, Beatrix, in July 2021, where members were able to socialize and discuss Brene Brown's, Dare to Lead. It was great for everyone to finally see each other again in person!



The Northwestern Women in Radiology group has many more events to look forward to this year. The next meeting will be September 8, with the topic of discussion pending. Planning is underway for the first outreach event in December, a bake sale, with the proceeds benefitting a local charity supporting homeless women in Chicago. The Women in Radiology group looks forward to seeing all the women in the department at future events and male colleagues too!

Incorporating Radiology into Early Medical Education



The pre-clinical years of medical school set the foundation of knowledge and skills that we build upon for the rest of our careers. The core curriculum includes organ-based teaching on the anatomy, pathophysiology, and management of patients. Within that curriculum, radiologic imaging is often presented intermittently as pathognomonic signs without regular Radiologist-led anatomy or pathology lessons. I would argue, however, that radiology – led by Radiologists – should become an area of focus during pre-clinical years.

Anatomy is a core aspect of medicine, and its teaching has evolved over the years; from a largely cadaver-based experience, the integration of new technologies has presented innovative ways to present and interact with the human body. In practice, however, the day-to-day anatomy we see is in radiologic images. Chest X-rays, body CTs, US, and MRIs are the modalities that we turn to when we need more information and form the conduit through which we understand the anatomy, and thus pathology, of our patients.

Our curriculum can incorporate Radiologists with dedicated lectures teaching pathology from an imaging perspective to better prepare students for their clinical years. For example, lectures on tumor staging and features through histology slides can be augmented by Radiologic Oncology lectures covering basic image-based tumor staging and features. Before working with cadavers, we can introduce mock-pre-operative planning with Body Imaging Radiologists guiding students through relevant anatomy prior to dissection. Each organ system curriculum already has topic-specific faculty and can be expanded to include topic-specific Radiologists to create a stronger foundation in imaging and understanding of anatomy-based pathology for trainees.

- *Brandon Matthew Caldwell, 4th-year Medical Student*

New Grants

CONGRATULATIONS TO THE FOLLOWING INVESTIGATORS ON RECEIVING NEW GRANT FUNDING!

Brad Allen, AHA Career Development Award, "Hemodynamic evaluation in type B aortic dissection with 4D flow MRI for risk-stratification and treatment planning"

Jennie Chen, Third Coast Center for AIDS Research Pilot Award, "Cerebral Small Vessel Disease in Early HIV Infection"

Laleh Golestani Rad, NIBIB R01, "Reconfigurable MRI technology for safe and high-resolution imaging of deep brain stimulation at 3T"

Jeesoo Lee and Michael Markl, NMH Dixon Translational Award, "Multimodality Quantification of Mitral Valvular Regurgitation in Complex Anatomies Including Percutaneous Mitral Valve Clip Placement"

Daniel Kim, NHLBI R01 Renewal, "Precision MRI of Left Atrial Fibrosis for Patients with Atrial Fibrillation"

Daniel Kim, Oliver Cossairt, and Aggelos Katsaggelos, NIBIB R21, "Next-Generation Cardiovascular MRI powered by Artificial Intelligence"

AHA 20TPA35490311 (PI: Mohammed Elbaz) (1/1/2021 – 12/31/2023)
American Heart Association (AHA) Transformational Project Award
Title: "4D Hemodynamic Signatures of Atrial Fibrillation, Ablation Efficacy and Risk of Stroke"

Daniel Kim and Daniel Lee, NMH Dixon Translational Award, "MRI of Chronic Heart Injury Associated with COVID-19"

Michael Markl and Sameer Ansari, NHLBI R01, "Non-invasive Evaluation of Intracranial Atherosclerotic Disease Using Hemodynamic Biomarkers"

Michael Markl and James Carr, NHLBI R01 Renewal, "Comprehensive Cardiac Structure-Function Analysis in Heart Transplantation"

Todd Parrish and Matthew Tate, NINDS R01, "High-resolution Infrared Thermal Imaging (ITI) for Simultaneous Functional Mapping of the Entire Craniotomy in Awake Patients"

Ann Ragin, NINDS R21, "The Role of Aortic-Carotid Hemodynamics and Aberrant Flow in HIV Cerebral Injury"

Hatice Savas and Ceylan Cankurtaran, NMH Women's Board Eleanor Wood-Prince Grant, "Multimodality Imaging with advanced multiparametric MRI and molecular imaging to improve treatment planning and evaluate early response assessment in neurooncology: A pilot study for multidisciplinary initiative"

- Abby Hagler

First Ever Radiology Resident Retreat Coming Soon

The first ever radiology resident retreat will be held on September 10th, 2021. A normal feature of any residency is the social connections made with people who the residents spend days, weeks, and years with. Many lifelong friendships are forged during this uniquely challenging time in training.

Since the arrival of COVID-19, the residents have experienced an unprecedented level of distancing and isolation. Despite the isolation, the residents have maintained a high level of professionalism at work. The retreat will serve as an opportunity to reestablish cohesiveness among the residents after more than a year of relative isolation.

All DR residents, R1-R3 integrated IR residents, and a few faculty members will be attending the retreat. Leah Gilligan (R2) planned the event which will be held at Whirlyball in Bucktown. Multiple activities are planned including team-building games and activities such as Whirlyball and laser tag.

Guest speakers will also be discussing strategies and techniques to maintain wellness in residency and throughout a career in medicine. The event will close with a discussion among all residents and leadership about ways to maintain open communication between residents and faculty/leadership.

- *Rishi Agrawal*

