

THE READ



NORTHWESTERN UNIVERSITY | DEPARTMENT OF RADIOLOGY





Dear Friends and Colleagues: Greetings and welcome to our Winter 2023 Newsletter.

As we have begun another academic year, I would like to look back on some of the many great achievements of the Department of Radiology in 2022.

Clinical radiology operations continue to expand throughout the Northwestern healthcare system. We have an active and evolving Radiology structure that seeks to harmonize imaging protocols across the enterprise, promote consistency in interventional practices, and develop a quality dashboard to ensure that we consistently deliver high-quality clinical service to patients throughout Northwestern's many locations. This has been a large undertaking and a massive accomplishment by everyone on our clinical operational side. Thank you to all involved with this effort.

The installation of PACS is now complete throughout the Northwestern Medicine enterprise. Palos hospital went live with Visage a few weeks ago and everything is working smoothly. Clinicians at all locations can now access images in a simple and streamlined fashion. Over the next couple of years, we can also look forward to the deployment of new tools, including useful artificial intelligence algorithms, throughout our viewing platforms.

This December marked the opening of the first of four ambulatory imaging centers within our region. After the Evanston location opening, we will be focusing centers in Irving Park, Oak Brook, and Bronzville over the next 2-3 years. These centers will allow us to provide high-quality Northwestern Medicine care to more patients within our region and Radiology will be essential in their long-term development.

Research has seen a record amount of external funding in the past fiscal year. I want to commend all our research faculty and staff for their outstanding work in continuing to expand our research enterprise. Your work develops cutting-edge imaging and interventional techniques that can be translated into the clinical environment so that we can provide better care for our patients.

Our department continues to support our faculty and strengthen training programs for our students, residents, and fellows. The Northwestern University Radiology Mentoring Program (NU RaMP), under the direction of Dr. Jeanne Horowitz, continues to expand and provide guidance to faculty as they pursue their academic careers. We have had a record number of applicants this year to our residency programs which continue to be top-ranked and widely regarded as the best in the nation.

We are continuing to develop initiatives centered around sustainability in healthcare and these efforts are being led by Drs. Tarek Hijaz, Jeanne Horowitz, and Michael Markl. Northwestern Radiology cares about people and their environment. Increasing awareness about sustainability is one step toward our objective of reducing this department's impact on the environment. A number of projects are underway to increase environmental awareness throughout the department but also reduce our overall carbon footprint. More to come on this topic!

I would also like to highlight the ongoing and increasing amount of programming from the Diversity, Equity, and Inclusion committee in our department headed by Dr. Senta Berggruen. This past year, this committee has worked to bolster community and institutional equity through a high school internship program, a technologist program, fundraisers, and other highly successful initiatives.

Finally, I would like to congratulate one of our own faculty, Dr. Howard Chrisman, who has been named CEO of Northwestern Memorial Healthcare, starting January 1st, 2023. He succeeds Mr. Dean Harrison, whose efforts over the last two decades have made Northwestern Medicine one of the best known academic medical institutions in the country. We wish Howard all the best success for the future.

This past year has ushered in many accomplishments for the Department of Radiology and I look forward to continuing growth and excellence in the coming year.

Sincerely,

James Carr

More Than 20 Years of Lung Cancer Screening at Northwestern Memorial

In Conversation with Dr. Eric Hart and Denise Wojcik, RN.



Dr. Eric Hart, MD

More Than 20 Years of Lung Cancer Screening at Northwestern Memorial: In Conversation with Dr. Eric Hart and Denise Wojcik, RN.

In 2021, Dr. Eric Hart was appointed Clinical Director of Northwestern Medicine's lung cancer screening program in all five regions. Hart, who specializes in Thoracic Imaging and imaging lung cancer, was previously an investigator on the National Lung Screening Trial (NLST) funded by NIH/ NCI, which imaged over 53,000 participants to prove cancer screening decreases mortality from lung cancer. Denise Wojcik, RN, has been the CT Patient Lung Coordinator for the program for the past four years.

A primary goal of the program is to be more inclusive and increase the eligibility pool. Wojcik, who was previously the Low Dose CT Lung Screening Program Coordinator, Medical Imaging RN, and Pain Clinic RN at Centegra Health System for 14 years, added, "The new changes and CMS guidelines will help us to be more inclusive to people of color and more diversity. We want to catch these lung cancers at stage 1 when they can be cured. You can only treat cancer if they come in while they're eligible to come in so we want to make sure they can."

The minimum age for entry into lung cancer screening is now 50, down from age 55 in the past. SPO078068 As the pool of eligible screening patients opens, Hart and Wojcik agree that inclusion of a broader age range, as well as an increase in minority populations and women, means that changes are necessary to achieve this goal.

While adhering to Northwestern Medicine's value of offering the best patient experience, Hart and team have been tasked with providing a high-quality exam as part of the screening process at any site in the hospital network. "We've installed new software for patient tracking and nodule tracking for doctors. Combined data analytics help us analyze what's working or not working in different regions," Hart says of some of the changes have been implemented since 2021.

"Our goal is to standardize the cancer screening process through all regions," Hart continues. "More standardization helps us provide more data about the outcomes in each region."

Patient navigation beyond the screening process is essential. Navigation means opening the pathways that patients move through in order to learn about results. This process should be as quick and streamlined as possible.

"What we have done is to get a unified order set in place when necessary," Hart says of steering the program. "We have electronic and paper records. We have begun the process of navigating patients to their next step of care."

About Northwestern's current screening program, Wojcik adds, "We have more dedicated people to lung health. Lung cancer screening is only one part. We can connect patients to other parts of the network, like the Canning Thoracic Institute."

According to Hart, the majority of individuals screened have a negative result. "Screening isn't right for everyone but it can be helpful," he says. He estimated that 15% of those screened need short-term follow-up and a path to treatment. Nearly 85% of patients who have a screening are negative and come back in a year. "It's like the old loot commercials said – you can't win if you don't play."

One of the biggest challenges Hart and Wojcik say they face is overcoming the stigma of a lung cancer diagnosis. "Nobody should feel stigmatized over lung cancer," Wojcik says. "We have to break barriers over that. There should be no shame even if you were a smoker."

Hart continues, "It's just being empathetic to the fact that people have a problem, not how they got it. We practice de-stigmatizing language at Northwestern Medicine as well."

"People need to know –," Wojcik says, "that is, physicians, healthcare providers, and patients – that the American Cancer Association says only 6% are being screened. There is need. And it's an annual exam just like mammography. We want to put more information in the hands of our providers and the public. The question is why not be screened?"

The first step in the process is to determine if you are eligible for a screening, which can be done on the Northwestern Medicine website. The next step is discussing screening with a primary care provider.

For more information on the lung cancer screening program at Northwestern Memorial, including informational booklets on lung nodules and screening, you can go to the Northwestern Medicine Lung Cancer Screening Program site. There, you can also request an appointment, find a doctor, and learn more about the facility and program.

"We believe we have a very high-quality program and we've put the pieces in place for patients to see success," Hart says.

Written by: Eric Hart, MD

T32 Training Program in MRI

TRAINEES ACTIVELY ENROLLED

These trainees have the unique opportunity to gain invaluable knowledge and experience.

KIMBERLY HEMMERLING

THARA NALLAMOTHU

NEHA REDDY

JASMINE VU

ELIZABETH WEISS



For more information on the program and eligibility, please see the training program's website.

The Training Program in MRI (TPMRI) funded by the National Institute of Biomedical Imaging and Bioengineering (NIBIB T32EB025766) is now in its fourth year. With the goal of “providing complete funding to support pre-doctoral students in Radiology and Biomedical Engineering at Northwestern University,” this program supports up to five PhD graduate students each year and includes travel expenses, stipends, tuition coverage, and project costs.

The need for this program is based on “the explosive growth of MRI as a non-invasive clinical imaging modality drives the need for highly trained scientists to further the development of this critical field,” says Dr. Michael Markl, TPMRI Program Director and Vice Chair of Research in the Department of Radiology. “Each year, well over 5,000 research scientists convene at the annual meeting of the International Society of Magnetic Resonance in Medicine (ISMRM). Each year, an increasing number of scientists indicate that MRI is a very active area of research. It is noteworthy that all major NIH institutes fund extensive research and development dedicated to MRI. In addition, many biotech companies are beginning to rely heavily on MRI as a tool for drug development.”

The goal for trainees is to gain clarity in the career options in biomedical imaging as well as to understand the clinical translational potential of MRI research.

The program, which is described as “multidisciplinary in nature, covering complementary imaging science topics for broad training in translational MRI projects” aims to give engineering students in radiology a more comprehensive understanding of MRI physics and engineering concepts as well as clinical applications. Trainees will gain exposure to industry partners, physicians at Northwestern and Lurie, as well as close training with both a MD and PhD mentor.

This past year, the program has implemented new training elements. Students have previously organized chalk talks and a journal club, as well as hosted speakers at the joint CTI-TPMRI speaker series run by Drs. Dong-Hyun Kim and Mohammed Elbaz. Because students are working toward submitting grants while in the program, grant writing sessions are now held with Dr. Ann Ragin, who organizes faculty to workshop Specific Aims statements and provides a mock NIH study section session.

Dr. Laleh Golestani Rad also introduced a hands-on hardware course to help students create coils and other MR hardware needed for research. Dr. Brad Allen organizes trainees attending medical student clinical rotations for each section. Clinical exposure helps trainees see how radiologists deal with images and artifacts on a daily basis.

This program allows trainees to not only interact with working physicians and industry partner, but it also aims for them to develop translational research projects with dual mentorship in a team environment.

So far, past trainees have been awarded the following grants:

- Justin Baraboo (Mentor: Markl) F31HL135915 “Arrhythmia-resolved 5D Flow MRI in Atrial Fibrillation and Stroke.”
- Divya Joshi (Mentor: Dewald) F31HD110236 “Quantification of Musculoskeletal Structural Adaptations Underlying Passive Wrist Joint Properties in Children and Adults with Hemiparetic Cerebral Palsy.”
- Michael Iorga (Mentor: Parrish) F31NS115362 “Intraoperative functional mapping using infrared thermography.”
- Suvai Gunasekaran (Mentor: Daniel Kim) K99HL161469 “Non-contrast 3D T1p Mapping for Myocardial Fibrosis Quantification of Pediatric Cardiomyopathy Patients.”

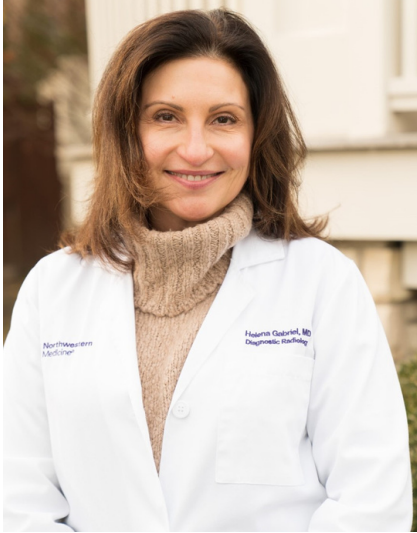
Trainees Justin Baraboo, Kim Hemmerling, Divya Joshi, Jasmine Vu, and Kristina Zvolanek also submitted and presented abstracts at ISMRM secret session at the 2022 meeting.

The TPMRI is headed by Dr. Michael Markl and Dr. James Carr, Clinical Co-Director. A Steering Committee of Department of Radiology faculty mentors meets regularly to organize programmatic events and assess the program. An Advisory Committee consists of Dr. John Oshinski of Emory, Dr. Walter Kucharczyk of the University of Toronto, Dr. Jay Walsh of the University of Illinois, and Dr. Norbert Pelc of Stanford University.

Current trainees include Jasmine Vu, Neha Reddy, Kim Hemmerling, Thara Nallamotheu, and Elizabeth Weiss. Their primary mentors are Drs. Laleh Golestani Rad, Molly Bright, Mohammed Elbaz, and Michael Markl.

Written by: Abby Hagler

Congratulations Helena Gabriel



Helena Gabriel has just been appointed to the executive board of the Society of Radiologists in Ultrasound, of which she is currently secretary. In addition, Helena was elected Vice President of the ACR US guidelines and practice parameters committee.

Written by: Helena Gabriel, MD

A Memorial for Dr. William Spies



DR. WILLIAM GARY SPIES

December 27, 1952 - November 11, 2022

Bill was a long-standing member of our faculty for over 30 - years, and together with his brother Stewart, he helped expand the nuclear medicine practice in the Department of Radiology at Northwestern. He was a committed teacher and an outstanding clinician who was well respected by all his physician colleagues and co-workers. He will be missed by all of us.

In lieu of flowers, memorial contributions may be made to American Lung Association, 55 West Wacker Drive, Suite 1150, Chicago, Illinois 60601, www.lung.org.

Written by: Ryan Avery

Resident Wellness

Throughout the last few years, resident wellness has been a topic at the forefront of medical training, particularly with the interminable COVID pandemic. As an institution and community, supporting and emphasizing resident wellness at Northwestern grows ever more important. The diagnostic radiology residency has implemented numerous wellness initiatives during this time to strengthen resident morale.

February 2022 marked the first-ever radiology residency retreat. The day was filled with wellness-related topics, including guest lecturer Dr. Lucas Beuchler from the orthopedics department who discussed strategies to combat physician burnout. Large and small group teambuilding and leadership discussions were held throughout the day (in addition to a few competitive games of laser tag and WhirlyBall) to warm up after the February snowfall! The event was such a success that it bears repeating and will become a yearly tradition. A committee of enthusiastic resident volunteers is currently hard at work planning our next retreat to be held in February of 2023.

A new event held this summer was a Cubs baseball game against the Milwaukee Brewers on August 21st! Residents spent the afternoon with their colleagues atop a roof adjacent to Wrigley Field with magnificent views of the game as well as the US Navy Blue Angels as they flew over the stadium.

One of the most rewarding, although stressful, rotations is the month-long rotation of reading emergency department studies, which includes busy overnight shifts. As part of its commitment to support residents during this demanding rotation, the program sponsors a lunch for the residents currently on the rotation and a resident-nominated faculty member. Not only does this lunch allow residents to decompress after a busy month, but it also gets the faculty members jovially competitive against each other to be elected! The inaugural lunch was held on August 16th at La Briola with the July ED residents and their guest of honor, Emergency Radiology attending Andrew Kure.

Our ongoing commitment to resident wellness is paramount at Northwestern. We are excited by the recent initiatives to support resident wellness, and we look forward to working with the Wellness Council to continue the mission of supporting our co-residents throughout their four years of training.



Written by: Abby Hagler

R01 Renewal Works to Improve Left Atrial Fibrosis Treatment in Clinical Practice

Dr. Daniel Kim was awarded a R01 grant renewal for the ongoing project “Precision MRI of Left Atrial Fibrosis for Patients with Atrial Fibrillation,” which looks to create an avenue of more personalized medicine for patients. This latest five-year award is built on the prior R01 titled “MRI of Diffuse Left Ventricular Fibrosis in Atrial Fibrillation.”

The overall goal of this project is to help patients avoid an unnecessary procedure that can cost up to or greater than \$20,000 for non-responders. Dr. Kim says, “Fibrosis plays a central role in the development of an arrhythmogenic substrate for AF and may be a marker for more extensive disease less amenable to standard pulmonary vein isolation.”

Dr. Kim, who previously held an appointment at the University of Utah prior to joining the Department of Radiology at Northwestern, was part of a group that was one of the first to show that 3D LA late gadolinium enhancement (LGE) cardiovascular magnetic resonance (CMR) has great promise to predict AF recurrence post-ablation. “However,” Kim notes, “the ‘Utah’ classification of LA fibrosis has garnered skepticism because of a lack of independent verification and validation. This lack of reproducibility stems from two fundamental methodologic deficiencies: (a) inadequate spatial resolution (1.5 mm x 1.5 mm x 2.5 to 5 mm) and contrast-to-noise ratio (CNR) and lengthy scan time (~11 min) at 1.5 Tesla and (b) unreliable image analysis techniques for quantification of fibrosis in the thin (~2 mm) LA wall. These deficiencies preclude widespread adoption of LA fibrosis quantification in clinical practice.”

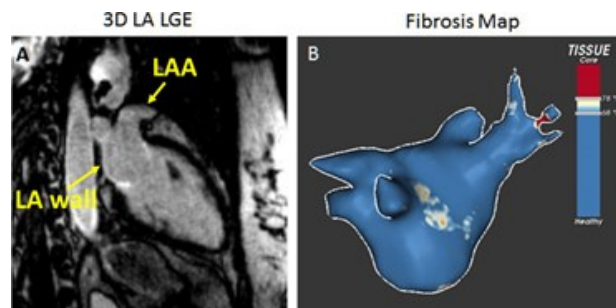


Figure 1. Paroxysmal AF patient with 5% fibrosis: LGE image (left) and fibrosis map (right).

This renewal seeks to move beyond these deficiencies. “We aim to develop disruptive technologies for quantification of LA fibrosis by integrating the following advanced techniques,” Kim says. “The specific objectives of this multi-center study are to: a) develop and validate robust 3D LA LGE CMR acquisition and reconstruction methods for 1.5 Tesla, (b) develop and validate a novel LGE signatures technique for quantification of LA fibrosis, and c) evaluate the prediction accuracy and reproducibility of LA fibrosis signatures across two sites.”

Radiology Sustainability Update

Magnetic Resonance Imaging (MRI) is a highly versatile imaging modality, but its routine clinical operation can generate substantial energy consumption, which is associated with excessive cost and contribution to climate change. Northwestern University and Siemens share the common goal to develop methods for more sustainable operation of MRI at lower energy consumption while maintaining operation efficacy and radiologic image quality. To develop strategies for more energy efficient scanner operation (e.g., workflows, low-energy pulse sequences), methods are needed to estimate the energy consumption of an MRI system during data acquisition in real-time or near real-time. The scientific objective of this project is to develop new methodology for software derived estimation of power consumption during the routine operation of an MRI system.



Recent Developments in Diversity, Equity, and Inclusion

The Department of DEI Council Hosted 30 Chicagoland High School Scholars

In May 2022, the Department's DEI Council hosted 30 Chicagoland high school students through collaboration with the Lurie Cancer Center Lab Exploration Experience Program. Students spent half the day in several departments. They talked to allied health personnel in departments; this was done to introduce students to a career in radiology. By experiencing the departments first-hand, they could better visualize the potential opportunities available to them in the field of radiology.

In recognition of the 30 high school students who participated, the department of Radiology wishes to extend our appreciation. By giving students an opportunity to experience the departments in person, they were able to gain a greater understanding of the job opportunities available to them. They were also given an opportunity to ask questions and receive advice from the allied health personnel. The department of Radiology recognizes the efforts of the students and would like to extend its appreciation.

The Department of DEI Engages with Students at the SNMA and Midwest LMSA Conference

In collaboration with the Office of Diversity and Inclusion, our faculty and trainees engaged with students at the SNMA and Midwest LMSA meetings to network and recruit medical students to consider radiology as a career opportunity. The SNMA and Midwest LMSA meetings provide a great platform for faculty and trainees to meet potential medical students. They foster relationships, and discuss the advantages of a career in radiology. The Office of Diversity and Inclusion provided guidance and support to ensure radiology was represented in a meaningful way.

Dr. Anu Jawahar organized RadExpo, an international virtual meeting designed to introduce students to radiology, in November, where our radiology faculty and trainees also participated in various panels. The aim of the event was to create awareness of the field of radiology. It also provided a platform for students to interact with experts. It also encouraged collaboration between radiology departments in different countries.

The Women in Radiology Group Summer Networking Event

The Women in Radiology Group, led by Dr. Vassiliades, held a summer networking event at an off-campus restaurant and hosted a Picture a Scientist presentation and subsequent discussion. The value of community, collaboration, and networking at Northwestern for all, including females, and women, was endorsed by participants.

The event was designed to bring attention to the importance of female representation in the field of radiology. It was also designed to provide an opportunity for students to engage in meaningful conversation and build a robust support system. The discussion and presentation highlighted the need to create a safe and encouraging environment for women to pursue their interests in the field.

DEI Hosted 3 College Students in the NM Summer Internship Program

The Department of DEI hosted three college students in the NM Summer Internship program. The students rotated in the radiology department and other clinical NM areas for eight weeks, working on various radiology QI research projects.

The internship program was designed to give students the opportunity to gain experience in a real-world setting, while also allowing them to work on research projects that could potentially benefit the department. The students were given a chance to learn from the staff and gain insight into how the radiology department functions.

Northwestern New Grants

*Congratulations to the following
investigators on receiving new grant funding*

Ulas Bagci, PhD, RSNA Emerging Issues – Long Term COVID Effects grant, “PASC Pulmonary Fibrosis Prediction with Deep Learning and Multimodal Data”

Justin Baraboo, NIH/ NHLBI F31, “Arrhythmia-resolved 5D Flow MRI in Atrial Fibrillation and Stroke”

Kelly Jarvis, PhD, NIH/ NIA KO1, “Heart-brain MRI for the evaluation of hemodynamic coupling in aging and Alzheimer’s disease”

Kelly Jarvis, PhD, Northwestern Center for Applied Health Research on Aging Pepper Scholars Program grant, “Heart-brain MRI evaluation of hemodynamic coupling in hypertension and healthy aging”

Laleh Golestani Rad, PhD, NIH/ NIBIB R03, “Assessing RF heating of active implantable medical devices in low-field MRI system”

Laleh Golestani Rad, PhD, NIH/ NIBIB R03, “Application of machine learning for fas prediction of MRI-induced RF heating in patients with implanted conductive leads”

Huili Yang, AHA Pre-doctoral Fellowship, “Real-time Exercise Cardiac Magnetic Resonance Imaging for Assessment of Mitral Regurgitation”

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