LSU
Department of Physics & Astronomy

MARY BIRD PERKINS CANCER CENTER™

LSU Medical/Health Physics Newsletter

Message from the Program Director

Hello to our Alumni, Friends, Colleagues, and Students.

I'm pleased to write this welcome message for the latest newsletter of the LSU-MBPCC Medical Physics and Health Physics Program. The Program has experienced several changes and events during 2024, many of which are highlighted in the newsletter; overall we are functioning well on all fronts. We are financially stable through the generosity of donors, whom we thank profusely. Program operations are supported by the endowment from Dr. Charles Smith, which also supports the Smith Chair of Medical Physics and the Smith Distinguished Professorship in Medical Physics. Three graduate scholarships are available to support our students: the Lorraine and Leon August Superior Graduate Student Scholarship, the Kenneth R. Hogstrom Superior Student Scholarship, and the Dr. Charles M. Smith Superior Graduate Scholarship. The Bella Bowman Foundation continues to support Dr. Newhauser's radiation necrosis research.

We congratulate our 2024 graduates: Rachael Blair, MS, Grant Debevec, MS, Richard Lesieur, MS, Hunter Meyer, MS, Megal Chesal, Ph.D., Maryam Naseri, Ph.D., and Reagan Dugan, Ph.D. Richard and Hunter have stayed to work on Ph.D. degrees, while Rachael, Grant, Megan, Maryam, and Reagan each started physics residency training. All 2024 graduates who entered the physics residency match program successfully matched. We had a new PhD student start in January 2024; 4 new MS students and 2 new Ph.D .students started in Fall 2024. **The new 2024 matriculants include 4 women and 4 international students.** The demand for both MS and Ph.D. tracks remains strong, with more than 100 applicants for Fall 2024 to our medical physics and health physics curricula.

Several changes occurred among Program faculty and staff in 2024. In August Paige Whittington transitioned to Business Manager for the Department of Physics & Astronomy; Maisie Hill was hired as our new Program Coordinator in December. Ara Alexandrian Ph.D. joined MBPCC in March with an adjunct appointment at LSU. Dr. Rui Zhang and Dr. Jeff Chancellor left LSU for faculty positions elsewhere. Dr. Newhauser stepped down as Program Director on June 30 and I became Interim Director on July 1. We will search for an assistant professor-level hire to fill one of the faculty vacancies in 2025. The Program Director position should be permanently filled before our 2026 CAMPEP reaccreditation cycle.

Thanks to the world-wide computer air-travel glitch that prevented many people, including me, from getting to the 2024 AAPM meeting, I missed everyone at the LSU breakfast. We are planning an LSU gathering at the 2025 AAPM meeting in Washington DC – details to come. Meanwhile, if you have news of any sort – new jobs, promotions, new family additions – please let Maisie and I know so we can put it into the 2025 newsletter (pamedphys@lsu.edu, mhill10@lsu.edu, kipmatth@lsu.edu).

All the best.

Kip

Kenneth (Kip) Matthews II, PhD DABR FAAPM
Dr. Charles M. Smith Distinguished Professor of Medical Physics

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Medical/Health Physics Alumni Newsletter is published by the LSU Medical/Health Physics Graduate Program

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Feedback from alumni is always welcomed by the Program. Please send your suggestions or comments to:
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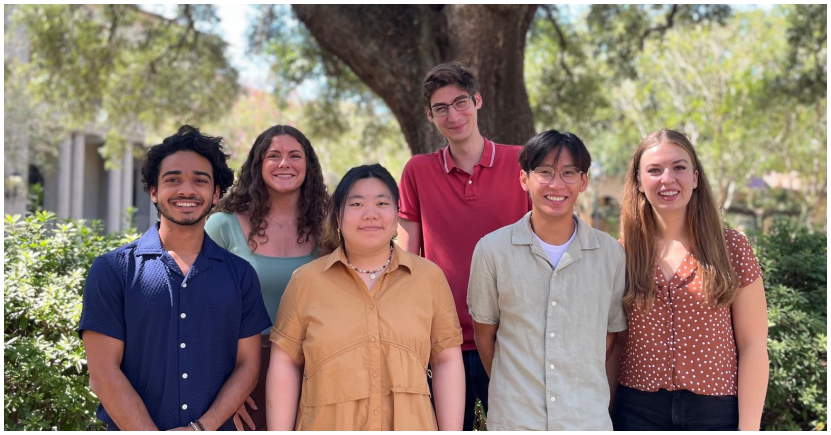

From left to right: 2024 new students Murtuza Taqi, Emma Sargent, Zhenyu Xu, Joshua Jones, David Duong, and Dariia Hozhenko.

Xu, Zhenyu
BS/2023
Duke University
Ph.D. track (MP) 2024 - present

2024 Program Graduates

Hunter Meyer, MS
Continuing to Ph.D.

Advisor: Joyoni Dey, Ph.D.

Dissertation: Small-angle scatter modeling in X-ray interferometry

Richard Lesieur, MS
Continuing to Ph.D.

Advisor: Jonas Fontenot, Ph.D.

Dissertation: Comparison of Log File Based Dose Reconstruction to Measurement for Patient Specific QA

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Dissertation: Optics Design and Fabrication for a Lung Interferometry-Radiography System

Grant Debevec, MS

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2024 Program Graduates

Megan Chesal, Ph.D.

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Reagan Dugan, Ph.D.

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Maryam Naseri, Ph.D.

Advisor: Owen Carmichael, Ph.D.

Dissertation: Synthetic Positron Emission Tomography (PET) Scans: Generation, Application, and Preprocessing

Trainee Milestones - Certifications

Congratulations to all students who have made progress in achieving certification. The following current students have chosen to disclose their status.

Matthews, Carson

Student

Passed - Therapeutic
Medical Physics Initial
Qualifying Part 1

Bundi, Purity

Student

Passed - Therapeutic
Medical Physics Initial
Qualifying Part 1

Aire, Morgan

Student

Passed - Therapeutic
Medical Physics Initial
Qualifying Part 1

Taylor, Michael James

Alumnus
Passed - Therapeutic
Medical Physics
Qualifying Part 2

A Message from Student-Faculty Liasion

by Hailey Reaux

Growth has been the defining theme of the 2024–2025 academic year for LSU Medical Physics students. This year, we proudly launched the LSU Medical Physics Club—a new student-led organization designed to foster community, professional development, and outreach. In addition, our students actively participated in the newly implemented mentor/mentee program organized by the Physics Department's Graduate Student Organization (GSO), further demonstrating our commitment to peer support and collaboration.

A major highlight of the year was having the Southwest AAPM chapter host their annual meeting right here in Baton Rouge. LSU students made up a significant portion of graduate attendees and competitors across the Early Career Investigator Symposium (ECIS), poster presentations, and the SLAM competition. We are incredibly proud of:

- Hunter Meyer, who placed 3rd in the ECIS talks,
- Corinne Vanya, who placed in the top 3 for poster presentations, and
- Lilian Dickson, who earned 2nd place in the SLAM talks.

Another standout event was the second annual H.N. Saurage IV Distinguished Lecture, hosted at Mary Bird Perkins Cancer Center. We were honored to welcome Dr. Maryellen Giger, a renowned expert in medical imaging and artificial intelligence, who delivered a compelling lecture titled "A.I. in Medical Imaging and the Need for MIDRC." The event also included a student poster session and a lunch with the speaker, both of which provided opportunities for students to showcase their research and engage meaningfully with faculty and professionals. The poster session was a tremendous success with strong student participation; Lilian Dickson, Olivia Magneson, and Nathan Dobranski swept the top three poster awards. Special thanks to the Saurage family for their continued support and for generously gifting all student participants CC's Coffee House gift cards.

Students also had the unique opportunity to attend the Willis-Knighton Nuclear Oncology Physics/Dosimetry Workshop at the Willis-Knighton Cancer Center in Shreveport; this is just one more example of the enriching professional development experiences available this year.

We're proud to recognize the following students for receiving prestigious scholarships for the upcoming academic year:

- Hunter Meyer – Charles M. Smith Superior Graduate Student Scholarship
- Lilian Dickson – Kenneth R. Hogstrom Superior Graduate Student Scholarship

As we reflect on the achievements and milestones of this past year, it's clear that our program is not only growing in academic excellence, but also in community and connection. It's been inspiring to witness the support, leadership, and camaraderie among students both in and out of the classroom. I also want to extend heartfelt congratulations to Carson Matthews and Morgan Aire on their engagement to each other, to Chloe DiTusa on her recent engagement, and to Olivia Magneson, who will be getting married this summer! Moments like these remind us how lucky we are to be part of a community that celebrates both professional and personal milestones together.

With such a strong foundation built this year, I'm excited to see where the future takes all of us both in our careers and in life. Here's to continued growth, new opportunities, and the incredible people who make this program so special.

Honors and Awards

- MS student Hunter Meyer awarded Best in Physics (Imaging) at AAPM 2024.
- MS student Hunter Meyer awarded the Coates Research Scholar Award from the LSU Department of Physics & Astronomy *(2024-2025)*
- MS student Hunter Meyer awarded the Coates Conference Travel Award from the LSU Department of Physics & Astronomy *(2024-2025)*
- MS student Hunter Meyer awarded the Roussel Family Graduate Student Award in Physics and Astronomy from the LSU Department of Physics & Astronomy *(2024-2025)*
- MS student Lilly Dickson awarded the Outstanding Teaching Assistant Award from the LSU Department of Physics & Astronomy *(2024-2025)*
- Ph.D. student Chloe DiTusa awarded the Goss Family Medical Physics Research Award *(2024-2025)*
- Ph.D. student Maxwell Cole awarded the Charles M. Smith Superior Graduate Student Scholarship *(2024-2025)*
- Ph.D. student Corinne Vanya awarded the Hogstrom Superior Graduate Student Scholarship *(2024-2025)*
- Purity Bundi selected for the American Association of University Women (AAUW) International Fellowship
- Ph.D. students Lily Dickson and Corrine Vanya placed 1st in the H.N Saurage IV Distinguished Lecture Series event poster session
- MS student Nathan Dobranski placed 2nd in the H.N Saurage IV Distinguished Lecture Series event poster session
- MS student Olivia Magneson placed 3rd in H.N Saurage IV Distinguished Lecture Series event poster session

Honors and Awards

- MS student Morgan Aire placed 2nd in the Slam competition at the Southwest AAPM Chapter meeting in Tulsa, Feb. 2024
- Ph.D. student Richard Lesieur placed 3rd in the Slam competition and won Best Poster in the Early Career Investigator Symposium at the Southwest AAPM Chapter Meeting in Tulsa, Feb. 2024
- Kip Matthews, inaugural recipient of Southwest AAPM Chapter's Mentorship Award at the Southwest AAPM Chapter meeting in Tulsa, Feb. 2024
- Alumna Megan Chesal's patent for "System and Method for Simulating Non-Homogenous Space Radiation Environment" was approved
- Alumnus Jared Taylor's patent for "System and Method for AI Based Spacecraft Shielding Design" was approved

Honors and Awards

Maxwell Cole Awarded Charles M. Smith Superior Graduate Student Scholarship

LSU's Medical Physics and Health Physics Program has announced Maxwell Cole as the 2024 recipient of the prestigious Charles M. Smith Superior Graduate Student Scholarship. Established from the estate of the late Dr. Charles M. Smith of Sulphur, Louisiana, the scholarship represents Dr. Smith's commitment to significantly enhance medical physics education and research programs by supporting graduate students to ensure a continued pipeline of highly qualified medical physicists.

"On behalf of the LSU Mary Bird Perkins Medical & Health Physics Program, I am pleased to announce that Max has been selected to receive the Charles M. Smith Superior Graduate Student Award. This award will provide critical support for Max as he completes his research-based Ph.D. dissertation," said Kip Matthews, Professor and Interim Program Director, Medical Physics & Health Physics at LSU.

Cole, a 2020 LSU BS in physics alumnus, describes the importance of this award as he advances his career.

"I am honored to be the recipient of the Charles M. Smith Superior Graduate Student Scholarship. I aspire to uphold Dr. Smith's altruistic values and his devotion to humanitarianism. This award will assist in supporting me as I complete my dissertation and progress in my medical physics career," said Cole.

Currently, Cole is in the LSU Medical Physics Program working on his doctoral dissertation project, supervised by Dr. Wayne Newhauser. His research focuses on the development of a cardiovascular digital twin. The project involves a first-principles approach to modeling the effects of radiation on the vascular system and blood flow in the entire human body. After completing his Ph.D., Cole plans to attend a therapeutic medical physics residency program.

In 2023, Cole received the Roussel Family Graduate Student award in Communication from LSU, which recognizes exemplary research coupled with the ability to succinctly present research findings. 1974 Ph.D. alumnus, Keith Roussel and his family established an award for graduate students who excel in communicating their research. In 2022, Cole was awarded the LaSPACE Graduate Student Research Award and the Kenneth R. Hogstrom Superior Graduate Student Scholarship.

Additionally, in his senior year at LSU, Cole played an instrumental part during the pandemic, helping those in need using his skills and knowledge to create face masks, ventilators, and face shields for nurses and doctors working with COVID-19 patients. The volunteer operation yielded more than 3,400 items of personal protective equipment (PPE) which were successfully distributed to hospitals in the greater New Orleans and Baton Rouge areas in the first few weeks. For these efforts to help the community, Cole was given the 2020 LSU Ethics Institute Inspire Award for Exemplary Ethical Action, which recognizes students who help another individual or group, stand up for a cause or belief, or otherwise exhibit extraordinary ethical leadership.

Honors and Awards

Maxwell Cole Awarded Charles M. Smith Superior Graduate Student Scholarship

A beloved family medicine practitioner who devoted his career to helping Louisiana families, Smith developed an appreciation for the critical role of physics and medicine while undergoing lifesaving cancer treatment. Motivated to ensure access to the same quality of care in his home state of Louisiana, Smith established the Dr. Charles M. Smith Chair in Medical Physics at LSU in 2006, shortly after LSU and Mary Bird Perkins Cancer Center announced his commitment to significantly enhancing the medical physics education and research programs.

Smith, a native of Bogalusa, Louisiana, was born on Aug. 24, 1930, and passed away Sept. 15, 2020. He earned his Bachelor of Science degree in Biological Sciences from LSU in 1951 and his medical degree from LSU Medical School in New Orleans in 1955. He was a flight surgeon in the U.S. Air Force for two years, then opened his medical practice in Sulphur in 1957, practicing for 35 years and serving as coroner for Calcasieu Parish for more than 20 years. An active community volunteer, he was devoted to the arts and was a generous philanthropist who, in addition to his investments in LSU and the Mary Bird Perkins Cancer Center, supported local children and families and invested in educational access through local scholarships.

The LSU medical physics and health physics groups research the applications of radiation technology to the health-care, national defense, and nuclear energy industries. All graduate students in the Medical Physics and Health Physics Program are required to complete a research thesis (MS) or dissertation (Ph.D.) in their field of study.

Honors and Awards

Medical Physics Ph.D. Candidate Awarded Best in Physics Imaging at 2024 AAPM

LSU medical physics graduate student Hunter Meyer was presented with a 'Best in Physics Award' in the category of Imaging Scientific Session: Diagnostic and Interventional Imaging at the American Association of Physicists in Medicine 66th Annual Meeting & Exhibition.

X-ray interferometry is an emerging imaging modality simultaneously capturing attenuation, phase-shift, and small angle X-ray scattering (dark-field) images. The Talbot-Lau X-ray Interferometer (TLXI) shows clinical promise, where the dark-field images reveal lung disease such as fibrosis, emphysema, and cancer, as well microcalcifications in the breast. However, the TLXI requires an absorption grating that increases patient dose. The Modulated Phase Grating Interferometer (MPGI) is an alternative that can image these new contrast mechanisms with no additional X-ray dose.

Meyer's research titled "Investigating the Modulated Phase Grating Interferometer for Lung and Breast Cancer Screening" involves mathematically modeling the MPGI to aid in design and involves imaging lung tissue analogues to show the utility of the MPGI for dark-field imaging. The MPGI has the potential for lung and breast cancer screening, with increased contrast in the dark-field images compared with traditional X-ray images.

"I'm honored to be recognized by the AAPM and proud of the work that our group has done for X-ray interferometry," said Meyer. "There's a lot of potential for this imaging technology to be used in the clinic, and I hope that the work that I've done will be used to us there."

The MPGI has the potential for lung and breast cancer screening due to the unique contrast mechanisms provided with no additional dose. The LSU research team's theoretical model predicts the fringe visibility before construction, facilitating system development and optimization. They will soon image lung samples and breast samples with microcalcifications.

"It has been a most rewarding experience working with Hunter Meyer, an advanced PhD student," said Associate Prrofessor Joyoni Dey. "Hunter worked meticulously and relentlessly on Modulated Phase Grating mathematics and experiments. It has been a great experience seeing Hunter grow over the years into an independent researcher and a veritable expert in the field."

In addition, the team had a Nature Scientific Reports paper published recently: https://bit.ly/40Lhypy

The AAPM 66th Annual Meeting & Exhibition is the world's largest program of scientific, educational, and professional presentations and exhibits in the medical physics industry drawing thousands of attendees.

Meyer graduated magna cum laude from LSU with a B.S. in physics in 2020. While pursuing his undergraduate degree, Meyer was bestowed the 2020 Byrd Ball Outstanding Undergraduate Research Award and Sigma Pi Sigma honors.

Honors and Awards

Chloe DiTusa Awarded Goss Family Medical Physics Research Award

Congratulations to Chloe DiTusa on being awarded the prestigious Goss Family Medical Physics Research Award for her outstanding work in advancing radiation oncology physics! Chloe's project, "Making the Right Decisions for Adaptive Radiotherapy," exemplifies innovation and dedication in the fight against cancer. Her research promises to enhance treatment accuracy and patient care, driving forward the Mary Bird Perkins Cancer Center's mission of improving survivorship and lessening the burden of cancer.

We'd also like to extend a heartfelt thank you to Devera and Jerry Goss for their unwavering support and commitment to advancing medical physics research. Your generosity and passion for making a difference in cancer treatment are truly inspiring.

We are so proud of Chloe for being awarded the Goss Family Medical Physics Research Award! Chloe's work is a testament to the impact of philanthropy in driving meaningful progress in healthcare. We are grateful for individuals like the Goss family who champion research initiatives and help support the LSU Medical and Health Physics Program at the Mary Bird Perkins Cancer Center!

Honors and Awards

Purity Bundi Selected for American Association of University Women (AAUW) International Fellowship

Purity Bundi has been selected as a fellow for the American Association of University Women (AAUW) International Fellowship 2024-2025 cohort.

The AAUW, with its 107-year legacy, is dedicated to supporting women pursuing full-time graduate study in the United States, particularly those who are not U.S. citizens or permanent residents and who aim to contribute to the advancement of women and girls in their home countries.

Award Program Name: International Master's/First Professional Degree Fellowships

Directory Specialization: Medical Physics - Radiation Therapy

Directory Project Name: A Novel Radiometric Biomarker for Personalized and Adaptive Radiotherapy

Directory Bio: My research project focuses on the development of an integrated biomarker to assess radiation therapy response in cancer patients. This biomarker combines various parameters from different imaging techniques to evaluate the effectiveness of radiation therapy treatment for cancer patients. Additionally, I am deeply committed to championing initiatives aimed at providing affordable and accessible cancer care for women and children in developing nations.

Grants

- **Medical and Health Physics Program**

Proposal #: 008EGS-24
Submitting Campus: LSU and A&M College
Endowment Name: Charles M. Smith Endowed Superior Graduate Scholarship in Medical Physics #2
Match Requested: $80,000

The Smith Scholarship #2 will support students in medical physics. Although this program is relatively small, it is clearly very strong, with demonstrated student success. Specifically, the program is highly competitive (admitting fewer than 10% of applicants) and led by an impressive faculty of renowned scholars. The program is on a growth trajectory, showing increases in enrollments, graduations andre-search funding. In terms of student success, the program has high completion and placement rates, with students receiving prestigious awards and scholarships. Alignment with university and department missions is demonstrated. The proposal is somewhat more vague on workforce needs, although the narrative suggests both workforce shortages and a growing demand due to the aging population and other factors. Funding for the $80,000 match request is recommended.

- **Dr. Kip Matthews**

Kip Matthews (PI for Refined Imaging LLC)
Innovation Corp (I-Corp): Implementation and validation of a lung x-ray interferometry imaging system, with applications to COPD, COVID-19 and other lung diseases.
National Institutes of Health, 3R41HL158414-01A1W1. 3/2024-4/2024. $55,000

- **Shanice Manning**

LaSPACE GSRA: Modeling the impact of radiation dose on the human brain
National Aeronautics and Space Administration, AWD-AM250708. 12/2024-5/2025. $10,000

- **Nousha Afshari**

LaSPACE GSRA: Biological radiation damage models for noncancerous effects.
National Aeronautics and Space Administration, AWD-AM250800. 12/2024-5/2025. $10,000

Featured Stories

2024 Provost's Fund for Innovation in Research Awards

The largest internal funding program in LSU history, the Provost's Fund for Innovation in Research has invested $1.2 million in 15 interdisciplinary research teams. Aligned with LSU's Scholarship First Agenda, the teams and their projects aim to solve pressing problems in Louisiana and everywhere.

This year's Big Idea awards are categorized into five Phase 1 grants at $25,000 each (increased from $10,000 last year) to help researchers get organized; eight Phase 2 grants at $75,000 to develop preliminary data and create a long-term research agenda; and two Phase 3 grants at $250,000 to develop large, center-scale grant proposals for national impact.

In total, the funded projects will engage more than 65 faculty across nine colleges and schools on LSU's flagship campus in Baton Rouge, extending collaboration to LSU Athletics, LSU AgCenter, Pennington Biomedical Research Center and LSU Health New Orleans. Two projects support advances in agriculture; seven projects drive discovery in biomedicine; six projects elevate the coast and environment; six projects protect the state and nation through stronger defense and cybersecurity; and six projects help secure the future of energy.

Associate Professor, LSU Department of Physics & Astronomy, Rui Zhang, will lead a research team to establish a research center for personalized radiotherapy to treat and cure cancer. About two-thirds of all cancer patients receive radiotherapy, while survivors sometimes develop acute and chronic problems based on these broadly prescribed treatments. The goal of this project is to combine radiological physics, oncology, imaging, radiomics, artificial intelligence, health economics, statistical modeling and clinical trial design to improve the safety, quality and cost-effectiveness of personalized radiotherapy. Collaborators on the project include Beibei Guo, associate professor of experimental statistics in the College of Agriculture.

Featured Stories

From Fields to Modeling: Navigating the Unexpected Journey to Becoming a Researcher

by Christian Foti

Very few people know what they want to do when they get to college and, as a first-generation student, I was no exception.

Majoring in chemistry, I found myself arriving at LSU's campus with no clue of what I was going to do for the next four years. The only thing I was certain of was that I was not going to do another sweltering summer working at my dad's furniture store.

In my quest for a summer activity, Brayden Blanchard, a longtime friend, and a PhD student, messaged me asking if I wanted a summer job at the LSU AgCenter Sugar Research Station.

Knowing nothing about sugarcane and being a naïve freshman, I took the job as it was something different for me to do for a summer. Little did I know that I was trading the comfort of the shade for the relentless heat in the field.

While my grasp of sugarcane science saw only a modest improvement, I saw firsthand the ins and outs of being a graduate student and what it meant to be a scientist, learning not only from Brayden but also from the master's students Zachary Taylor and Warner Simon. It was during this student worker position that I realized I wanted to go to graduate school and pursue academic research.

Naturally, being a chemistry student, I thought that my love for research would be through good-ole wet bench chemistry. Now, while I love learning about chemistry, I figured out through a lot of trial and error that doing research in a chemistry lab just isn't what I wanted to do post-grad and beyond.

At the start of the spring semester, my academic advisor introduced me to the MARC program, which helps students from diverse backgrounds find research opportunities. Around the same time, I connected with a Chief Medical Physicist who happened to be a family acquaintance, and it was through this connection that I discovered the fascinating world of medical physics.

While I found this field really interesting, I had no idea how to pursue it, especially since my chemistry degree only required general physics classes. Later that semester, during finals week, I received my acceptance email to the MARC Program and was very excited about this opportunity. It was then that I made the decision with MARC to pursue Medical Physics and reached out to a faculty advisor who conducts Medical Physics research. I then met Professor Wayne Newhauser, the former director of the Medical and Health Physics Program in the LSU Department of Physics & Astronomy, who was more than excited to let me jump on the project that he and his Ph.D. student, Maxwell Cole, were working on.

Featured Stories

From Fields to Modeling: Navigating the Unexpected Journey to Becoming a Researcher

Professor Newhauser and his lab focus on improving the understanding of health issues that cancer patients face with radiation therapy. One big problem in treating cancer with radiation is that sometimes blood may stop flowing properly within the vessels, so tissues don't get enough oxygen, and cells may die.

Think of it as lots of pipes, such as an irrigation system carrying water to plants in a field. But for some reason, water isn't reaching some plants. We do not know why this happens, but we hope to gain better insight through modeling.

My research utilizes computational blood vessel generation coupled with radiation therapy simulations. Specifically, the project focuses on vasodilation induced by nitric oxide concentrations. I'm developing a module that integrates with vessel generation, enabling accurate blood flow rate prediction considering vasodilation.

To put it simply, we are simulating how blood vessels react to radiation by generating a computational network of vessels. My vasodilation module is just adding a layer of detail to the blood vessel modeling, as right now, we have them coded as perfectly straight pipes, which is not the case in the human body.

My goal is to collaborate with Dr. Newhauser and Max by integrating my blood flow module into their radiation simulation. This will allow us to obtain more accurate data on how radiation affects blood flow, helping future Medical Physicists and Radiation Oncologists make more informed decisions about cancer treatments.

During my research journey, I've had the opportunity to present my work at the Summer Undergraduate Research Forum through MARC last summer, as well as at LSU Discover Day. Another fantastic aspect of the MARC program is that I'll be heading to another institution this summer to conduct further research.

Personally, I find this opportunity and research fascinating because I can witness my work unfolding in real time. Bit by bit, I've seen the vessel generation and vasodilation code come to life. In my past research experiences, I often felt disconnected from my work, unable to see it materialize. Here, I can observe my work evolving in real time, right before my eyes.

In conclusion, the point I want to drive home is that becoming a researcher, or even a scientist in general, is not a straightforward path. Science by itself isn't always straightforward.

I learned that not all science is done in a pristine white laboratory with perfectly labeled beakers. Science is counting individual sugarcane stalks in the July heat all day. Science is running a chemical reaction and not having any idea what you are going to get as a product. It is coding all day long just to run into your twentieth error because you can't remember if it is a colon or a semicolon.

So, whether you are a freshman nearing the end of your first year of college, a senior gazing at graduation on the horizon, or somewhere in between, and you feel unsure about your science career... Keep turning those pages; eventually, you will end up where you want to be.

Medical/Health Physics in the News

Mary Bird Perkins Cancer Center H.N. Saurage IV Distinguished Lecture Series

Mary Bird Perkins Cancer Center recently hosted the H.N. Saurage IV Distinguished Lecture Series, welcoming Dr. Maryellen L. Giger, a global leader in medical imaging and artificial intelligence, as this year's distinguished speaker. Her presentation, "Artificial Intelligence in Medical Imaging and the Need for MIDRC," explored the transformative role of AI in enhancing diagnostic precision and patient outcomes.

The event also celebrated innovation through a competitive poster session, where LSU Physics & Astronomy graduate students showcased groundbreaking research. Congratulations to Lily Dickson and Corrine Vanya (1st place), Nathan Dobranski (2nd place), and Olivia Magneson (3rd place) for their exceptional projects advancing medical physics and imaging technologies.

This annual series, supported by the H.N. Saurage IV Family Fund, fosters collaboration and research that elevate cancer care in Louisiana and beyond. Thank you to the Saurage family for their continued generosity and vision!

Medical/Health Physics in the News

Mary Bird Perkins Cancer Center H.N. Saurage IV Distinguished Lecture Series

by Dariia Hozenko

I'm incredibly grateful to the Mary Bird Perkins Cancer Center and LSU Medical and Health Physics program for organizing an event where Maryellen Giger shared her insights into her research, the field, and clinical practice. Dr. Giger, recognized as one of the 50 most influential medical physicists of the past 50 years by the International Organization for Medical Physics, was truly inspiring.

We also had the honor of meeting Dr. Kenneth R. Hogstrom, LSU professor emeritus, whose remarkable contributions to the LSU Medical and Health Physics program and radiotherapy have left a lasting impact on the field.

A heartfelt thanks to the staff from the Mary Bird Perkins Cancer Center and LSU who made this event possible. It was an honor to be part of this inspiring experience.

Selected Publications

2022

- I. Hidrovo, S. Carr, K. Ham, L. G. Butler, A. Roy, J. Dey. "Observation of fringe patterns from a modulated phase grating x-ray interferometry system," Proc. SPIE vol. 12031, Medical Imaging 2022: Physics of Medical Imaging, 120313L (2022)
- E. Park, J. Xu, J. Dey, "Hybrid modulated-phase-grating for phase contrast x-ray for a varying fringe period clinical interferometry system", Proc. SPIE vol. 12031, Medical Imaging 2022: Physics of Medical Imaging; 120313N (2022)
- B. Smith, J. Dey, "Maximum-likelihood estimation of thickness with a linear-scatter model for mammography", Proc. SPIE vol. 12031, Medical Imaging 2022: Physics of Medical Imaging; 120311Y (2022)

2024

- H. Meyer*, J. Dey, S. Carr*, K. Ham, L. Butler, K. M. Dooley, I. Hidrovo*, Markus Bleuel, T. Varga, J. Schulz, T. Beckenbach, and K. Kaiser, "Theoretical and experimental analysis of the modulated phase grating X-ray interferometer", Scientific Reports (Nature), Nov 2024. https://doi.org/10.1038/s41598-024-78133-8.
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- Ekhtiari H, Sangchooli A, Carmichael O, Moeller FG, O'Donnell P, Oquendo M, Paulus MP, Pizzagalli DA, Ramey T, Schacht J, Zare-Bidoky M, Childress AR, Brady K. Neuroimaging Biomarkers in Addiction. Nature Mental Health. 2024;2:1498-1517. PMCID: PMC11398440. PMID: 39281741.
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Selected Publications

- Meyer, Hunter C., “The Theory of X-ray and Neutron Interferometry Using a Modulated Phase Grating” (2024). *LSU Master’s Theses.* 5942. https://repository.lsu.edu/gradschool_theses/5942
- Lesieur, Richard M., “Comparison of Log File Based Dose Reconstruction to Measurement for Patient Specific QA” (2024). *LSU Master’s Theses*. 5991. https://repository.lsu.edu/gradschool_theses/5991
- Blair, Rachael Lyn, “Optics Design and Fabrication for a Lung Interferometry-Radiography System” (2024). *LSU Master’s Theses.* 5982. https://repository.lsu.edu/gradschool_theses/5982
- Debevec, Grant C., “Post-Modeling Adjustments and Delivered Dose Verification of the 6FFF Beam Model Commissioned for the Monaco Treatment Planning System” (2024). *LSU Master’s Theses.* 5931. https://repository.lsu.edu/gradschool_theses/5931
- Chesal, Megan, “Development of a Cosmic Ray Generator for Ground-based Radiobiology Experiments” (2024). *LSU Doctoral Dissertations*. 6473. https://repository.lsu.edu/gradschool_dissertations/6473
- Dugan, Reagan T., “AUGMENTATION AND ANALYSIS OF DIFFUSION MRI DATA VIA MACHINE LEARNING METHODS” (2024). *LSU Doctoral Dissertations.* 6393. https://repository.lsu.edu/gradschool_dissertations/6393
- Naseri, Maryam, “Synthetic Positron Emission Tomography (PET) Scans: Generation, Application, and Preprocessing” (2024). *LSU Doctoral Dissertations.* 6437. https://repository.lsu.edu/gradschool_dissertations/6437

Seminars and Presentations

- Matthews, C., Stathakis, S., Schneider, C. “Dosimetric Evaluation of Bulk Density. Overrides in. MR-Guided Adaptive Radiation Therapy.” American Association of Physicists in Medicine 66th Annual Meeting and Exhibition. Los Angeles, CA. Jul 2024.
- Matthews, C., Aire, M., Stathakis, S., Kirby, K., Schneider, C. “A Comparison of Electron Densities between Reference and AI-Generated Pseudo-CTs for MRI-Based Treatment Planning.” American Association of Physicists in Medicine 66th Annual Meeting and Exhibition. Los Angeles, CA. Jul 2024.
- Matthews, C., Stathakis, S., Schneider, C. “Uncertainty Introduced by Use of Bulk Density Overrides in Dose Calculations for Prostate MR-guided Adaptive Radiation Therapy.” H.N. Saurage IV Distinguished Lecture Series in Medical Physics. Baton Rouge, LA. Oct 2024.
- Matthews, C., Stathakis, S., Schneider, C. “Uncertainty Introduced by Bulk Density Assignment for Dose Calculations in MR-guided Adaptive Radiation Therapy.” Cancer Advocacy Group of Louisiana’s NeauxCancer Conference. New Orleans, LA. Mar 2024.
- Matthews, C., Stathakis, S., Schneider, C. “Uncertainty Introduced by Bulk Density Assignment for Dose Calculations in MR-guided Adaptive Radiation Therapy.” Southwest Chapter of the American Association of Physicists in Medicine annual meeting. Tulsa, OK. Feb 2024.
- Meyer, H., Dey, J. Investigating the Modulated Phase Grating Interferometer for Lung and Breast Cancer Screening. Accepted for Oral Presentation at the 2024 AAPM Annual Meeting and awarded Best in Physics (Imaging).
- Meyer, H., Dey, J., S. Carr, et al. Investigating the Modulated Phase Grating Interferometer for Lung and Breast Cancer Screening. Oral Presentation at the LSU Graduate Research Conference (2024)
- Lesieur, R., Schneider, C. (2024, February 15th) Comparison of Log File Based Dose Reconstruction to Measurement for Patient Specific QA [Poster Presentation]. 2024 SWAAPM Annual Meeting, Hard Rock Hotel & Casino, Tulsa, OK, United States
- Lesieur, R (2024, February 16th) A Recipe for Patient Plan QA [Oral Presentation] 2024 SWAAPM Annual Meeting, Hard Rock Hotel & Casino, Tulsa, OK, United States
- Lesieur, R., Schneider, C. (2024, March 1st) Comparison of Log File Based Dose Reconstruction to Measurement for Patient Specific QA [Poster Presentation]. CAGLA NeauxCancer 2024 Conference, Ritz-Carlton, New Orleans, LA, United States

Seminars and Presentations

- Lesieur, R., Schneider, C. (2024, October 25th) Comparing Dose Accumulations in MR Guided Adaptive Radiotherapy and VMAT [Poster Presentation]. 2024 H.N. Saurage IV Distinguished Lecture Series Event, Mary Bird Perkins Cancer Center, Baton Rouge, LA, United States
- Lesieur, R., Schneider, C. (2024, July 20th) Comparison of Log File Based Dose Reconstruction to Measurement for Patient Specific QA [Poster Presentation]. 2024 AAPM Annual Meeting, Los Angeles Convention Center, Los Angeles, CA, United States
- Heath M., Matthews K., Pitcher GM, Hogstrom, K, Constructing Depth Dose Curves from Measured Electron Beam Energy Spectra for Medical Linear Accelerators. AAPM SouthWest Chapter Annual Conference. Tulsa, OK. 2024
- Heath M., Matthews KL, Pitcher GM, Hogstrom KR, "Constructing Depth Dose Curves from Direct Measurements of Electron Energy Spectra", Snap Oral at AAPM Annual Meeting, Los Angeles, CA. 2024.
- K. Kirby, R. Dugan, C. Schneider, S. Stathakis. "Initial Assessment of a Large Field of View Phantom for Routine MR Image Quality on a 1.5T MRgRT System." American Association of Physicists in Medicine Annual Meeting. Los Angeles, CA, July 2024.
- C. DiTusa, P. Mavroidis, G. Debevec, C. Schneider, K. Kirby, S. Stathakis. "Making the Right Decisions for Adaptive Radiotherapy." American Association of Physicists in Medicine Annual Meeting. Los Angeles, CA, July 2024.
- C. Schneider, K. Kirby, S. Stathakis. "Implementation of Third Party Auto-Contouring Software into the 1.5-T MR-Linac Adaptive Workflow." American Association of Physicists in Medicine Annual Meeting. Los Angeles, CA, July 2024.
- C. DiTusa, C. Schneider, J. Chen, A. Husain, P. Mavroidis. G. Debevec, K. Kirby, D. Solis, G. Pitcher, S. Stathakis. "Evaluation of 2 Commercial AI Segmentation Systems." American Association of Physicists in Medicine Annual Meeting. Los Angeles, CA, July 2024.
- R. Dugan. D. Solis, E. Chorniak, K. Kirby. "Effect of Respiratory Regularity and Scan Plane on Displacement Accuracy in a Clinical Stack-of-Stars MRI Pulse Sequence." American Association of Physicists in Medicine Annual Meeting. Los Angeles, CA, July 2024.
- M. Aire, R. Dugan, D. Solis, K. Kirby. "Displacement Comparison of Stack-of-Stars 4D-MR and 4D-CT Using Clinical Respiratory Waveforms." American Association of Physicists in Medicine Annual Meeting. Los Angeles, CA, July 2024.

Seminars and Presentations

- M. Aire, C. Matthews, C. Schneider, S. Stathakis, K. Kirby. “Analysis of Geometric Distortion in AI-Generated Synthetic CTs Created By an FDA-Approved Clinical Software Solution.” American Association of Physicists in Medicine Annual Meeting. Los Angeles, CA, July 2024.
- Dugan, R. Solis, D. Kirby, K. “Effect of Radial Sampling Percentage and Breathing Pattern on Displacement Accuracy in a Clinical Stack-of-Stars MRI Pulse Sequence: A Phantom Study.” American Association of Physicists in Medicine Spring Clinical Meeting. St. Louis, MO. March 2024.
- O. Magneson, K. Kirby.” Comparison of Respiratory Motion between 4D-MR and 4D-CT in Compression Belt Patients.” Mary Bird Perkins Saurage Poster Competition; Baton Rouge, LA, Oct. 2024.
- Dugan, R. Solis, D. Kirby, K. “Effect of Radial Sampling Percentage and Breathing Pattern on Displacement Accuracy in a Clinical Stack-of-Stars MRI Pulse Sequence: A Phantom Study.” Early Career Investigator Symposium, Southwest Chapter of the American Association of Physicists in Medicine annual meeting. Tulsa, OK. Feb 2024.
- Aire, M., Kirby, K. “MR Fingerprinting.” Southwest Chapter of the American Association of Physicists in Medicine annual meeting, MedPhys SLAM presentation. Tulsa, OK. Feb 2024.
- Aire, M. Solis, D. Kirby, K. “Comparing motion displacement accuracy in a clinical stack-of-stars 4D-MR method with 4D-CT with different cine times.” Southwest Chapter of the American Association of Physicists in Medicine annual meeting. Tulsa, OK. Feb 2024.
- Kirby, K. June 2024. “MR Safety: B1 time-varying radiofrequency fields.” MR Safety Update Webinar, MTMI.
- Kirby, K. June 2024. “The MR-LINAC: Imaging and Safety.” Invited talk for the American College of Radiology.
- Kirby, K. April 2024. “Unity MR-only planning using a commercial synthetic CT solution: MR perspective.” Elekta Users Meeting, Dallas, TX.
- Kirby, K. March 2024. “Challenges in MRI Only Radiation Therapy Treatment Planning.” American Association of Physicists in Medicine Spring Clinical Meeting. St. Louis, MO.
- Dey, J. “Modulated Phase Grating Interferometry”, invited talk, Radiological Sciences, University of California, Los Angeles, July 18, 2024.