AMERICAN ASSOCIATION *of* PHYSICISTS IN MEDICINE

focus on our future

2022

AAPM EDUCATION & RESEARCH FUND

Annual Report

AAPM Education & Research Fund

Annual Report 2022

The AAPM Education & Research (E&R) Fund, established in 1990, supports the development of our vital medical physics profession by funding strategic education and research programs and awards. Research support includes seed grants for early-career researchers, a mentorship program, and travel grants. It also recognizes exceptional research through funding best paper awards for our AAPM journals.

Education support includes matching grants for clinical residency programs, fellowships for graduate students, and travel and tuition awards. It also funds an innovation in education award and distinguished lectureships. Of great significance, the Fund is used to attract undergraduates to medical physics and to promote diversity by supporting the Summer Undergraduate Fellowship Program (SUFP) and the Diversity Recruitment through Education and Mentoring (DREAM) Program.

The Education & Research Fund receives revenues primarily from member donations, donations from our local chapters and related organizations, investment earnings, and the transfer of funds from the AAPM operations budget. As always, AAPM is extremely grateful for these generous gifts. Member donations, which are an essential component and provide the catalyst for other revenue sources, contribute to multiple purposed funds in the E&R Fund's portfolio of funds, many being named or memorial funds. In 2022, the AAPM E&R Fund supported approximately $523,000 in programs and awards.

This report recognizes recipients of the following grants, fellowships, and awards funded by the E&R Fund in 2022:

- **Research Seed Grants**

  Science Council, through its Research Committee, funded four $25,000 research seed grants for new researchers in medical physics.

- **ASTRO-AAPM Physics Resident/ Post-Doctoral Fellow Seed Grant**

  In 2022, American Society of Radiation Oncology (ASTRO) and AAPM continued to jointly award a $25,000 grant to a radiation oncology physics resident to support an early career scientist involved in advancing radiation oncology through physics-related research.

- **AAPM/RSNA Imaging Physics Residency Grants**

  In 2019, to extend the previous Imaging Physics Residency Program Grants, the AAPM Board of Directors approved $420,000 and the Radiological Society of North America provided $210,000 to support together nine two-year residencies in imaging physics. Awarded in 2019, 2020, 2021, and 2022, each of two programs are receiving $35,000 per year in matching funds for one resident commencing in the following two years.

- **Summer Undergraduate and DREAM Fellowships**

  Education Council, through its Education and Training of Medical Physicists Committee (ETC), used $96,000 to fund 16 undergraduate fellowships in the Summer Undergraduate Fellowship Program (SUFP) and another $66,000 to fund 11 undergraduate fellowships in the Diversity Recruitment Through Education and Mentoring (DREAM) Program.

- **Journal Publication Awards**

  Endowed funds supported the 2022 annual *Medical Physics* awards for best papers in 2021 in the areas of radiation therapy and imaging physics, the Farrington Daniels Award and the Moses and Sylvia Greenfield Award, respectively. Endowed funds also supported the 2022 annual *Journal of Applied Clinical Medical Physics* awards for outstanding articles in 2021 in four areas of medical physics in honor of its first four editors, Michael D. Mills, Peter R. Almond, George Starkschall, and Edwin C. McCullough.

- **Distinguished Lectureships**

  Our AAPM Annual and Spring Clinical Meetings benefitted from two distinguished lectureships supported annually by endowed funds. These are the Carson/ Zagzebski Distinguished Lecture on Medical Ultrasound and the Anne and Donald Herbert Distinguished Lectureship in Modern Statistical Modeling.

- **Annual Meeting Awards**

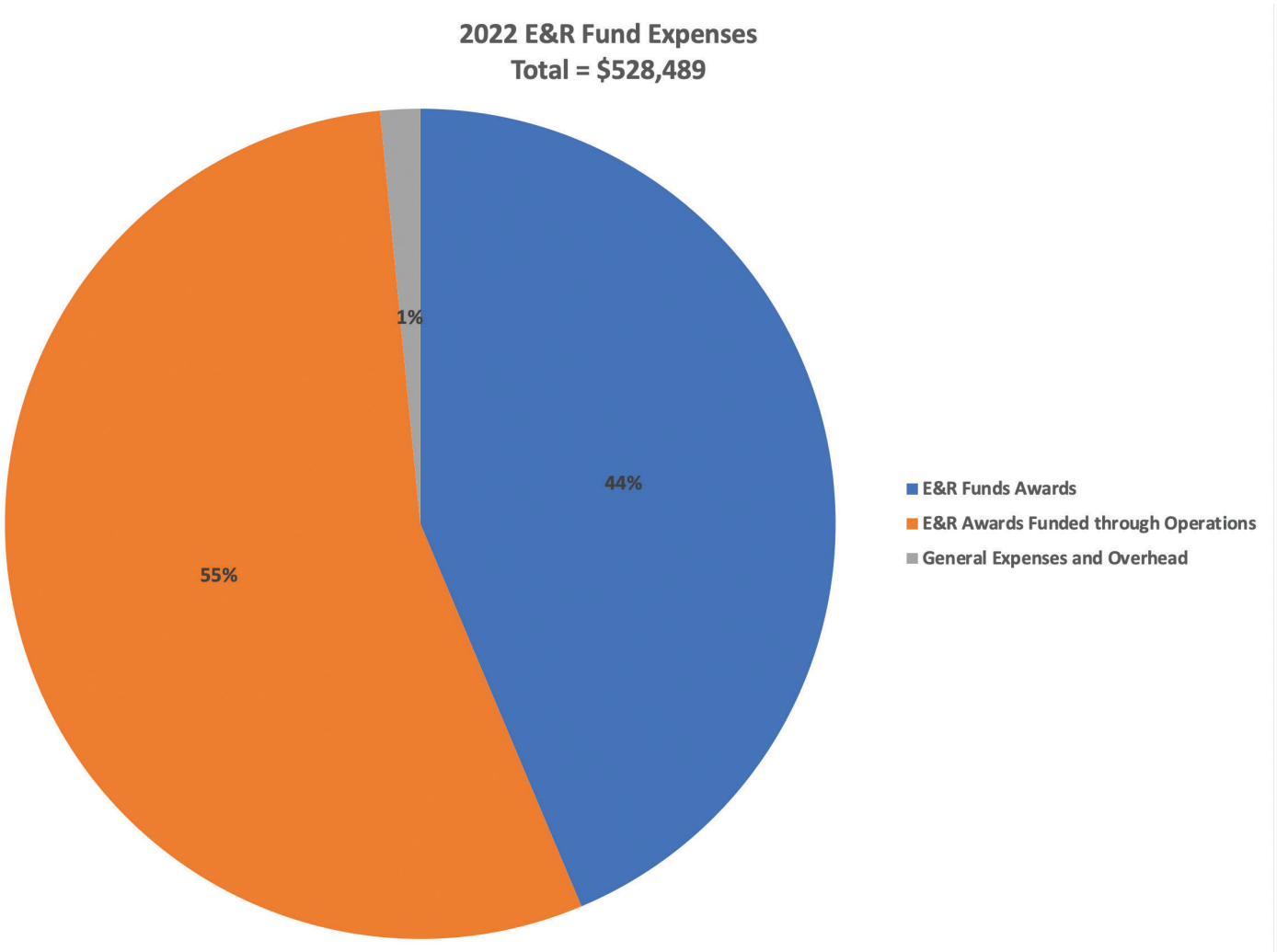
  Research awards made at our 2022 AAPM Annual Meeting include the Jack Fowler Junior Investigator Award, the Jack Krohmer Junior Investigator Award, and the John R. Cameron-John R. Cunningham

Young Investigators Symposium awards. Also, the Arthur Boyer Award for Innovation in Medical Physics Education was made.

- **Other Awards**

  Other awards aimed at cultivating junior medical physics researchers and at providing medical physics education include (1) AAPM Expanding Horizons Travel Grants, (2) AAPM Science Council Associates Mentorship Program, (3) AAPM Summer School Tuition Scholarships, and (4) the Team Best/AAPM Travel Awards.

The benevolence of our members, chapters, industry, and related societies is greatly appreciated, without which these programs and awards would not be possible. The pages to follow detail 2022 award recipients and testimonials, which demonstrate the enormous value the recipients place on this support. As you read the reports, consider how these programs impact our medical physics profession by attracting bright people to our profession, encouraging development of quality graduate and resident medical physics education programs, helping develop outstanding research scientists, and recognizing outstanding research and education accomplishments of many, ***all starting with your contributions to our AAPM E&R Fund.***



Scott Bright, PhD
The University of Texas MD Anderson Cancer Center | Department of Radiation Physics

Modulating a metabolic pathway to amplify the relative biological effectiveness of proton therapy

Radiotherapy (RT) is a mainstay of cancer therapy and can be delivered in various forms including photons and protons. My long-term goal is to design, develop, and translate rational and novel combinations of treatments that leverage the unique physical properties and biological effects of proton RT to enhance its relative biological effectiveness (RBE). I will investigate how a newly discovered inhibitor of cancer cell metabolism (IACS-6274) modulates proton RBE. IACS-6274 specifically reduces the cancer cell's capacity to respond to oxidative stress induced by proton RT. Our central hypothesis is that the higher linear energy transfer (LET) protons (compared to photons), positioned within the tumor, generates more oxidative stress than low-LET protons (at the beam entrance) or photons. Therefore, IACS-6274 might lead to greater radiosensitization in the tumor than in surrounding tissues and increased RBE. Our preliminary results demonstrate that the RBE of protons can be increased two-fold in a lung cancer model. Our results also suggest that a sub-group of patients with mutations in the protein Kelch-like ECH associated protein 1 (KEAP1) may respond favorably to this combination treatment, suggesting KEAP1 as a clinical biomarker. We are now investigating these responses in a pre-clinical model of lung cancer. The data generated will serve as a springboard to apply to other funding sources, helping to establish myself as an independent investigator.

Davide Brivio, PhD
Brigham and Women's Hospital | Department of Radiation Oncology

Exploiting pair production for in-vivo X-ray beam monitoring during radiotherapy and for imaging of high-Z nanoparticles during Nanoparticle Enhanced Radiotherapy

This project aims at exploiting the positron-electron pairs generated in the tissue under irradiation by MV X-ray photons for in-vivo beam monitoring and for imaging of high-Z nanoparticles. During radiotherapy positrons are generated via pair production with a yield which is proportional to the atomic number. Soon after, the positrons annihilate, and a pair of 511keV photons are generated. We aim at measuring these 511keV photons in a PET-like fashion and reconstructing their origin in 3D. This would allow 1) in-vivo reconstruction of the location, shape, and intensity of the X-ray beam delivered during radiotherapy and 2) localization and quantification of the high-Z nanoparticles for planning and dosimetry of nanoparticle enhanced radiotherapy. In the first phase of the project, we will investigate, by means of Monte Carlo simulations, the spatial, angular, spectral, and temporal features of the annihilation photons generated in different tissues with and without nanoparticles. In the second phase we will investigate the experimental feasibility of measuring them. The AAPM seed grant will play a major role in my transition to an independent researcher, providing preliminary data to compete for federal fundings.

The Research Seed Funding Grant

Four $25,000 grants were awarded to provide funds to develop exciting investigator-initiated concepts, which will hopefully lead to successful longer term project funding from the NIH or equivalent funding sources. Funding for the 12-month grant period began July 2022. Research results are submitted for presentation at future AAPM meetings.

Sponsored by the AAPM Science Council through the AAPM Education & Research Fund. (See AAPM website for more details, including eligibility requirements.)

Zijian Deng, PhD
University of Texas Southwestern Medical Center | Department of Radiation Oncology

Ultra-sensitive single-pixel bioluminescence tomography for in vivo cell tracking

Intrinsic strong bioluminescent (BL) contrasts are developed to trace cells without external cell labeling and contrast dilution to study cell behaviors in living organisms. Based on 2D surface BL imaging (BLI), BL tomography (BLT) can resolve 3D distribution and quantity of cells in vivo. To approach single-cell tracking, single-pixel imaging (SPI) with a sensitive detector will be employed to maximize the sensitivity of surface BL detection. We hypothesize that our ultra-sensitive single-pixel BLT (SPBLT) system will offer investigators unprecedented capabilities to track the behaviors of single or few cells longitudinally in vivo. We will innovate our BLT system into an SPI framework, including camera lens, digital micromirror device (DMD), collected lens, filters, and single-pixel detector. A total variance-based algorithm will be developed to recover the surface BLI from the single-pixel data and DMD patterns. We will adopt a novel BLT reconstruction strategy that simultaneously reconstructs both tissue optical properties and sources from the BLI to reduce uncertainties from optical properties for accurate 3D cell localization. Furthermore, we will evaluate the performance of SPBLT for the acquisition of weak surface signals and accuracy of 3D reconstruction for single or few cells. The experience we gain from this proposal will help us design the feasibility study of longitudinally tracking behaviors of cells in different biological events for NIH R01 grant application.

Md Belayat Hossain, PhD
University of Pittsburgh | Department of Radiology

Developing a domain-shift correction technique for deep learning algorithms in clinical AI systems

Recent breakthroughs in deep learning (DL) for computer vision have ignited an unprecedented effort to develop artificial intelligence (AI) tools for medical imaging. However, most DL-based AI models have a limited lifetime as technology advances. Our goal is to develop a domain adaptation technique to adapt a clinical AI system when the characteristics of the clinical images change. We hypothesize that Conditional Generative Adversarial Networks (CGANs) can correct the domain-shift by changing images from a new system to look like those from an old system, such that the old AI algorithm can maintain its original performance on new images, until enough cases from the new system can be collected to train a new algorithm. We will use Digital Breast Tomosynthesis (DBT) images to show the feasibility of using CGANs as a tool to correct for a domain-shift. We will simulate 10,000 unique breasts (w/ and w/o masses) using a Virtual Clinical Trial system. We will apply two different reconstruction algorithms to create image sets for the simulated old and new systems having two different image qualities. Finally, we will develop two cancer detection DL models for the old and new systems to test the feasibility of our method. The AAPM seed grant supports the algorithm development and feasibility testing, and it will provide preliminary data enabling me to apply for an NIH grant. It also provides me valuable experience to transition to an independent researcher.

Muhammad Ramish Ashraf, PhD
Stanford University | Department of Radiation Oncology

Methods for accurate beam monitoring and safe dose delivery for FLASH-RT

The normal tissue sparing effect of FLASH has been observed in multiple animal and organ models, and recently the first human patient was treated using FLASH-RT, indicating widespread interest in this novel modality. FLASH-RT is delivered at much higher dose rates (>40 Gy/s) and rapid treatment times (< 500 ms) when compared to conventional forms of radiotherapy. Therefore, FLASH dose delivery requires a feedback system capable of terminating the beam on any single radiation pulse. Unfortunately, clinical linear accelerators use feedback systems which typically integrate beam output over 10-50 ms and thus cannot provide per-pulse response. Additionally, the FLASH effect is said to be highly dependent on the beam temporal metrics such as pulse width. Commonly used dosimeters for FLASH-RT are passive and do not provide any information about the temporal structure of the beam. Hardware is required which can provide feedback on an individual pulse level and can accurately measure temporal characteristics such that the FLASH effect can be accurately understood in its relation to the temporal structure of the beam. Therefore, the work proposed here is motivated by the need to implement real-time dose control and beam monitoring for FLASH-RT. To achieve this, we propose the use of fast electronics and a beam current transformer to asses beam output per pulse. The system will be validated, and safety mechanisms will be put in place to ensure usability for a clinical trial.

ASTRO-AAPM Physics Resident/Post-Doctoral Fellow Seed Grant

One $25,000 grant was jointly awarded by AAPM and the American Society of Radiation Oncology (ASTRO) with the goal of advancing the field of radiation oncology in novel ways through the support of early-career scientists involved in radiation oncology physics-related research.

Sponsored by the AAPM Science Council through the AAPM Education & Research Fund and the American Society of Radiation Oncology (ASTRO). (See AAPM website for more details, including eligibility requirements.)

AAPM/RSNA Imaging Physics Residency Grants

The AAPM Board of Directors approved $420,000 in support over six years ($70,000/year starting in 2020) to co-fund six positions in existing or new imaging physics residency programs, and in support, the Radiological Society of North America (RSNA) Board of Directors approved $210,000 for an additional three positions. The intent of these funds is that after the period of the award is over, the awardees' institutions will continue to fully support these imaging physics residency positions. With this funding, the awardee's institution will receive $35,000 per year for two years as matching support (50/50) for one imaging physics resident. This provides matching funds for nine imaging physics residents over the next six years. (See AAPM web site for more details.)

Two institutions received $35,000 each per year for two years as matching support for one resident. Programs are selected for the award to be funded over the following two years.

Awarded 2022
1st Year Funding 2023
2nd Year Funding 2024

Kalpana Kanal, PhD
Department of Radiology
University of Washington |
Director, Imaging Medical Physics Residency Program

Jie Zhang, PhD
Department of Radiology
University of Kentucky |
Director, Diagnostic Imaging Physics Residency Program

Awarded 2021
1st Year Funding 2022
2nd Year Funding 2023

Scott L. Cupp, MS,
Department of Radiology,
University of Pennsylvania/Penn Medicine | Director, Imaging Physics Residency Program

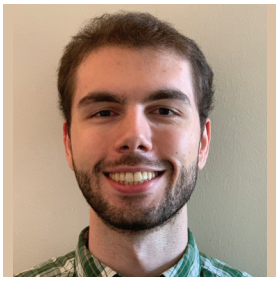
Mi-Ae Park, PhD
Department of Radiology,
University of Texas Southwestern | Director, Medical Imaging Physics Residency Program

Awarded 2020
1st Year Funding 2021
2nd Year Funding 2022

Lindsay S. DeWeese, PhD
Department of Diagnostic Radiology, Oregon Health & Science University |
Director, Diagnostic Imaging Physics Residency Program

David W. Jordan
Department of Radiology,
University Hospitals Cleveland Medical Center |
Director, Medical Imaging Physics Residency Program

Graduate Student Fellowships



Skylar Gay (2021–2023)
The University of Texas MD Anderson Cancer Center

Skylar is completing the second year (2022–2023) of his AAPM/RSNA Graduate Fellowship.

Doctoral Recipients

Mark D'Souza
Second Year or Higher
Toronto Metropolitan University

Kevin Liu
Second Year or Higher
The University of Texas MD Anderson Cancer Center

Jakob Marshall
First Year
The University of British Columbia

Lucas McCullum
First Year
The University of Texas MD Anderson Cancer Center

Masters Recipients

Dixin Chen
First Year
University of Pennsylvania

Jingtong Zhao
First Year
Duke University Medical Center

Robert Dawson
Second Year
University of Florida

The AAPM/RSNA Graduate Fellowship has been awarded in alternating years. Each Fellowship has been awarded for the first two years of graduate study leading to a doctoral degree in Medical Physics (PhD or DMP). A stipend of $13,000 per year, plus tuition support not exceeding $5,000 per year, has been assigned to the recipient.

Sponsored by the AAPM Education & Research General Fund. (See AAPM website for more details, including eligibility requirements.)

NOTE: Beginning in 2022, AAPM/RSNA graduate student fellowships are being awarded as described below.

The AAPM/RSNA Doctoral and Masters Graduate Fellowships are comprised of four Doctoral awards (PhD or DMP) and three MS awards, each in the amount of $10,000. Additionally, one each of the MS and Doctoral awards is reserved for under-represented applicants. Awardees are outstanding students based on their academic record, recommendations, curriculum vitae, and self statement of how an award would befefit their graduate studies.

Sponsored by the AAPM Education & Research General Fund. (See AAPM website for more details, including eligibility requirements.)

AAPM EDUCATION & RESEARCH FUND

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AAPM Planned Giving website
to learn how fortifying the future of medical physics can be part of your legacy!

https://aapm.myplannedgift.org/

Summer Undergraduate Fellowship Program (SUFP)

Santiago Aguirre
Florida International University
Senior, Physics

Mentor: Siju George, MS
Miami Cancer Institute,
Department of Radiation Oncology, Medical Physics

Involvement in QA program setup and radiopharmaceutical dosimetry research

I had the pleasure of working at the Miami Cancer Institute (MCI) with Siju George as my mentor. At MCI, I learned about the Quality Assurance (QA) tests performed on Varian TrueBeam Linear Accelerator. I had the opportunity to observe multiple monthly QA and an annual QA, while understanding the reasoning and application of the recommendations of TG142 and TG 198 to improve the QA program in a radiation oncology department. One of my projects focused on developing and setting up QA tests into a single software platform, QAT+, which packages and analyses all QA tests. In addition, the development of tests using Python scripting focused on automation to improve efficiency and reduce the variability of QA analysis. I also worked on a project validating and commissioning clinical software that calculates the dosimetry of Lu-177 treatments. The project included calculation and quantification of the radiation transport details of the radio-pharmaceutical using NEMA and Jaszczak Phantom images. I gained a comprehensive understanding of a radiation oncology department and how multiple professionals and skill sets are required to ensure that every patient receives the best and proper care they deserve. This deeper understanding has led me to pursue a career in medical physics.

Huay Din
Case Western Reserve University
Senior, Math and Physics

Mentor: Adam Wang, PhD
Stanford University,
Department of Radiology,
Radiological Sciences Laboratory

Is two better than one? Super resolution for dual-layer radiography with convolutional neural networks

Typically, the task of super-resolution starts from a single channel image input. The project I worked on investigated the relative performance difference of single image inputs vs multilayer image inputs via a convolutional neural network (CNN), in particular for a dual-layer flat panel detector. The project's important image quantity is typically limited by either the particular protocol and hardware — which effectively act as upper bounds to the resolution, accuracy, acquisition and processing time, and much more. We propose that super resolution (SR) is an attractive goal, as it's a post-processing challenge and can be boosted in the setting where simultaneous images are captured. I used a convolutional neural network to perform SR and simulated the data acquisition process of a general

The Summer Undergraduate Fellowship Program is a 10-week (40 hours per week) summer program designed to provide opportunities for undergraduate university students to gain experience in medical physics by performing research in a medical physics laboratory or assisting with clinical service at a clinical facility. The mentor and fellow determine the exact 10-week schedule (May-September). In this program, AAPM matches exceptional students with exceptional medical physicists, many who are faculty at leading research centers. Students participating in the program are placed into summer positions that are consistent with their interest. Selected for the program on a competitive basis, summer fellows receive a $6,000 stipend from AAPM.

Sponsored by the AAPM Education Council through the AAPM Education & Research Fund with additional fellowship provided by the AAPM Arizona Chapter. (See AAPM website for more details, including eligibility requirements.)

detector through characteristic functions MTF (modulation transfer function) and NPS (noise power spectrum) and demonstrated that SR may greatly benefit from even a single additional lossy image. The fellowship allowed me to immerse myself in the medical imaging community. Through attending the AAPM Conference, working on medical imaging research, shadowing, and meeting leading researchers, and I learned about how far we have come in medical imaging, the importance of clinical collaborators, and applications. I am leaving my summer with visions on how I can contribute to the field.

Franziska Eisenhuth
McGill University
Senior, Physiology and Physics

Mentor: Ase Ballangrud-Popovic, PhD
Memorial Sloan Kettering Cancer Center, Department of Medical Physics

Determining the effects of radiation planning margin around the gross tumor volume on local control of brain metastasis

The optimal margin size in stereotactic radiosurgery (SRS) for brain metastases is ill-defined. With this retrospective study of patients with primary breast cancer, we aimed to determine the size of the planning margin for optimal local control. The magnetic resonance (MR) studies of a group of patients were analyzed using a 3D convolutional neural network tracking software that automatically segments the lesions on each MR image. The volume of each lesion at follow-up was compared to the its initial volume at baseline to obtain a percent change in volume at each time-point for each lesion. Percent changes in volume at 6 and 12 (± 3) months follow up were not found to be statistically significant between lesions of different margin size, which could indicate that margin has no effect on local outcome. Furthermore, plotting the time course of the percent change in volume for each lesion indicated that lesions belonging to the same patient behaved similarly, and some lesions fluctuated in size for over two years after treatment. This suggests that tumor and patient-specific factors such as histology, genomic markers and systemic therapies should be considered in future studies. This project has contributed to and elucidated further research that is needed to improve the standard of care for patients receiving SRS to brain metastases. My experience in clinical research has been extremely rewarding and has helped me visualize my place in medical physics.

Matthew Gopaulchan
Hofstra University
Senior, Physics

Mentor: Ashley Tao, PhD
Gundersen Health System, Diagnostic Radiology

Development of CBCT template and fluoroscopy peak skin dose program

Over the summer, I had the privilege of working with Dr. Ashley Tao and Dr. Daniel Gómez-Cardona at Gundersen Health System in La Crosse, WI. I shadowed the team through various modalities. This involved assisting with set-up and measurements for general radiography, C-arms, mammography, and CT in different institutions throughout Wisconsin. I shadowed imaging technologists during their daily workflow in modalities such as MR, Nuclear Medicine/PET, and CT. Furthermore, I attended meetings with radiologists and managers to understand the role of medical physicists as a resource for technical issues, even observing a Y-90 radioembolization procedure. Aside from shadowing, I developed a template to assess dose output for On-Board Imaging (OBI) systems. This was based on dose calculation literature for CBCT units. The template verifies that the output dose displayed was accurate. Separately, I created a program to assist with fluoroscopy peak skin dose calculation. The program extracts the useful data from DICOM images, sorts it into discrete positions on the patient, sums all doses, and returns the location and value of the highest exposure. Overall, it was a valuable experience that taught me about the medical physicist's life. I am certain I will pursue this route in the future.

Erica Heller
Pennsylvania State University
Senior, Physics, Astronomy, and Astrophysics

Mentor: Michalis Aristophanous, PhD, Memorial Sloan Kettering Cancer Center, Department of Medical Physics

Investigating treatment outcomes of stereotactic radiosurgery for brain metastases

This summer, I worked with Dr. Michalis Aristophanous at Memorial Sloan Kettering Cancer Center on two projects involving treatment outcomes of Stereotactic Radiosurgery

(SRS) for brain metastases. The first project involved the comparison of an in-house tumor tracking software to manual physician measurements. Changes in diameter and volume from pre-treatment to post-treatment were calculated from the tracker and the manual measurements and used to evaluate the performance of the in-house software. The second project involved prediction modeling of brain metastases outcomes following SRS using radiomics. Quantitative features were pulled from MR images of pre-treatment brain metastases, and given the known treatment outcomes, a prediction model was developed using statistical analysis and basic machine learning tools. Throughout these projects, I gained experience using the Eclipse and MIM software and further developed my statistical analysis and programming knowledge. I also had the opportunity to learn about clinical duties and attend departmental talks and meetings throughout the summer. This fellowship was an incredible experience that gave me great insight into the medical physics field, and I am extremely grateful to have had this opportunity and for the mentorship of Dr. Aristophanous and the MSKCC medical physics team.

Erika Jank
Creighton University
Senior, Biomedical Physics

Mentor: Ashley Cetnar, PhD
The Ohio State University Wexner Medical Center, Department of Radiation Oncology

Exploring the use of contour-based intrafraction motion review for spine stereotactic body radiotherapy treatments

My project investigated the use of intrafraction motion review to monitor patient position during radiation therapy treatment. Patient motion during treatment is a serious concern for spine stereotactic body radiotherapy since the sharper dose gradient presents a threat to the spinal cord. The presence of spinal fixation hardware provides an opportunity for beam-on motion tracking. A spine phantom was placed on a programmable motion platform, which made shifts to mimic random patient motion. A simulated treatment that consisted of triggered images with a contour overlay of the hardware was shown to clinicians. These participants decided after each image if the phantom had shifted outside of clinical tolerance, indicating that they would pause the treatment beam. The results were analyzed to explore the feasibility of using intrafraction motion review for spine stereotactic body radiotherapy cases. Performing this project provided me with countless new skills and deepened my understanding of this topic and the research process. This fellowship intensified my passion for the field of medical physics and confirmed my plans for the future.

Marlin Keller
The Ohio State University
Senior, Physics

Mentor: Maryellen Giger, PhD
University of Chicago, Department of Radiology

Convolutional neural network for cranial gunshot wound survival prediction

This past summer, I was very fortunate to have worked with Dr. Maryellen Giger and her group at the University of Chicago. The University of Chicago Medical Center sees more gunshot wound patients than any other trauma center in the nation. Determining overall survival and Glasgow Coma Scores for patients presenting gunshot wounds to the brain is difficult, especially when patients are under heavy sedation. Our project focused on applying machine learning to develop a diagnostic tool that provides neurologists and radiologists with overall survival and coma scores from initial CT scans. I gathered relevant patient data, cropped and reshaped CT scans, and developed the Convolutional Neural Network (CNN) focusing on overall survival predictions. The project is still ongoing, but preliminary results were extremely promising. The group plans on providing the network with segmentations of critical brain structures to improve performance. This work has solidified my desire for a career in medical physics. I am extremely grateful to the AAPM for this outstanding opportunity, along with Dr. Maryellen Giger, and all of the Giger Lab staff for the guidance and support throughout the summer.

Olivia Magneson
Lebanon Valley College
Senior, Physics

Mentor: Atchar Sudhyadhom, PhD
Brigham & Women's Hospital/ Dana-Farber Cancer Institute/ Harvard Medical School, Department of Radiation Oncology

Optimization and validation of a multimodel (kVCT and MRI) method for electron density calculations

Throughout my fellowship, I worked on optimizing and then validating a novel multi-modal method to determine the stopping power ratio (SPR) and electron density (ED), two quantities necessary to predict where proton therapy radiation will deliver its effect in the body. I worked in the lab creating and imaging real-meat phantoms with kVCT and MRI. The data was collected and analyzed in Python to calculate an electron density (ED) map. Using a previously developed equation that links CT and MRI data with ED and SPR, we were able to determine optimal equation parameters by minimizing the difference between our multi-modal ED calculation with 'ground truth' values determined by MVCT. Accurate ED and SPR values will allow proton therapy treatments to be precisely delivered to tumors while avoiding surrounding healthy tissues, potentially allowing more cancers to be curable. This project allowed me to apply the skills and knowledge I have developed in the classroom to meaningful work that could one day be applied in the clinic. This summer experience was amazing, and I want to thank Dr. Sudhyadhom, the rest of the faculty at Dana-Farber Cancer Institute, and AAPM for the opportunity.

Joseph Skovron
University of San Francisco
Junior, Physics

Mentor: Eric Ford, PhD
University of Washington, Department of Radiation Oncology

Ethostherapy commissioning

My project focused on the Varian Ethos Machine and the commissioning of the machine into the University of Washington Department of Radiation Oncology clinic. I focused on understanding the workflow associated with Ethos and the new and highly exciting Adaptive Radiotherapy. This project is important because it would be the first machine in the clinic that would have the use of AI and radiotherapy. With AI, there would be better accuracy and precision when it comes to imaging and treatment. One of the additions that adaptive radiotherapy would provide would the on-couch treatment adaptation. My project was performed through working with the various physicists at the clinic by understanding the workflow, setting up the Ethos and ARIA software, and gathering patient data from treatment plans on the Ethos emulator. Not only was I focused on the AI aspect, I also gained insight into other medical procedures such as brachytherapy and IORT. The project goals, such as gathering data from the Ethos emulator and ARIA to be analyzed and gaining field exposure of day-to-day medical physicists, were accomplished. I am excited for the Ethos machine to finally be added to the University this coming September-October. It will have a positive impact in the way patients are treated! I am grateful for the AAPM to have given me this summer opportunity. This fellowship was rewarding, as it made me realize what an important role a physicist can have in their career by helping save people's lives.

Austin Trebley
Purdue University
Senior, Radiological Health Sciences

Mentor: Christopher Njeh, PhD
Indiana University Health, Department of Radiation Oncology

Dosimetric effect of the orthopedic metallic artifact reduction (O-MAR) algorithm on CT, titanium, and treatment planning system parameters

The project investigates how various parameters along the CT imaging and treatment planning process can have dosimetric impacts when using the orthopedic metallic artifact reduction algorithm (O-MAR) at the CT console. The O-MAR algorithm has been shown in past studies to significantly improve image quality of a patient with metal prostheses present in the image, but the question we aim to answer is whether the O-MAR algorithm causes significantly different dose calculations. As metal prostheses are used very commonly is many prostheses, it is important to understand the relationship between the O-MAR algorithm and varying parameters and the dosimetric impact they

have. The project was performed varying the CT acquisition settings (kVp and mAs), depth of titanium insert, size of titanium insert, and the radiation field size and acquiring a non-O-MAR corrected image as well as an O-MAR corrected image. Using an AP/PA radiation treatment set-up, we analyzed the differences in the dose calculations for each varying parameter. Looking at various dosimetric quantities such as the HU differences, dose profile, and MU differences, we were able to infer whether the O-MAR algorithm is causing a significantly different dose for each parameter. This led to the conclusion that only size of the insert and the field size cause significantly different dosimetric values. This fellowship allowed me to be exposed to medical physics research in multiple facets such as imaging and therapy research.

Elena Grace Vasquez
University of California, Berkeley
Senior, Physics and Applied Mathematics

Mentor: Piotr Zygmanski, PhD
Harvard Medical School & Dana-Farber Cancer Institute, Department of Radiation Oncology

Electrical impedance tomography and Laplace simulations

This summer I worked on Electrical Impedance Tomography (EIT) and Laplace simulations. EIT applied to many aspects of medicine allows for a new radiation-free, low-cost imaging modality. Thus, to gain physical intuition, I began by doing Laplace simulations that demonstrate how current, electricity, and electrodes work in 2D and 3D systems. This was very important because it gave me the foundational knowledge of EIT to begin building and working on the device itself. Then, I collaborated with Junyi Zhu, a PhD candidate at MIT, on the hardware and software needed for the system. Throughout the fellowship we tested the system in multiple geometries, with multiple phantoms, and even irradiated it to visualize any changes. We gained a deeper understanding of the system, which allowed us to perform new experiments on it, specif ically ones that connect to radiation treatment. Overall, this summer fellowship has proven to me that my next step is to attain a PhD, and that Medical Physics is the field in which I belong.

Nathan Aaron Dobranski
Michigan State University
Junior, Physics

Mentor: Mark Oldham, PhD
Duke University Medical Center, Department of Radiation Oncology

Eric D. Hornfeck
University of South Florida
Junior, Physics

Mentor: David (Bo) McClatchy III, PhD
Massachusetts General Hospital | Harvard Medical School, Department of Radiation Oncology

Naomi Michelle Jensen
Brigham Young University
Junior, Physics

Mentor: Eric Aliotta, PhD
Memorial Sloan Kettering Cancer Center, Department of Medical Physics

Anthony Gary Leja
University of Illinois Urbana-Champaign
Senior, Physics

Mentor: Rongxiao Zhang, PhD
Dartmouth Geisel School of Medicine, Division of Radiation Oncology

Pierangelis M. Valerio
Vassar College
Junior, Physics

Mentor: Luis Augusto Perles, PhD
The University of Texas MD Anderson Cancer Center, Department of Radiation Physics

Diversity Recruitment through Education and Mentoring Program (DREAM)

Diversity Recruitment through Education and Mentoring Program (DREAM) is a ten-week (40-hours per week) summer program designed to increase the number of underrepresented groups in medical physics by creating new opportunities, outreach, and mentoring geared towards diversity recruitment of undergraduate students in the field of medical physics. Students participating in the program are placed into summer positions that are consistent with their interest. Selected for the program on a competitive basis, DREAM fellows receive a $6,000 stipend from AAPM.

Sponsored by the AAPM Education Council through the AAPM Education & Research Fund, which also includes one fellowship funded by the AAPM Southwest Chapter. (See AAPM website for more details, including eligibility requirements.)

Allison Grace Cartee
Emory University
Senior, Engineering Sciences

Mentor: George Sgouros, PhD
Johns Hopkins University, School of Medicine,
Department of Radiology,
Radiological Physics Division

SPECT/CT pharmacokinetics of alpha-particle emitting drugs

Through the AAPM's DREAM program, I matched at Johns Hopkins University in the Sgouros lab. In addition to murine handling and histology, my primary project sought to quantify the pharmacokinetics of the alpha-particle emitting drug Xofigo, approved by the FDA to treat castrate resistant prostate cancer (CRPC) metastatic to bone. I quantified radioactivity on complementary SPECT/CT scans and tracked the agent over three patients' first and last treatment cycles on scans taken 0-2, 24, 48h post-agent injection. My project reports the first instance of Xofigo visualization on SPECT/CT scans. By better understanding how Xofigo tracks through patients, we hope to improve current FDA dosages and or approve Xofigo for other cancers beyond CRPC. My DREAM fellowship marked the first time I worked on a project independently. Instead of relying on a graduate mentor or a previously written protocol, I developed my own protocols and gained a strong sense of research independence and responsibility. My time with the Sgouros lab gave me the confidence to take a larger role in my current Emory honors thesis, and I anticipate publishing the thesis within a larger data set at the end of the year.

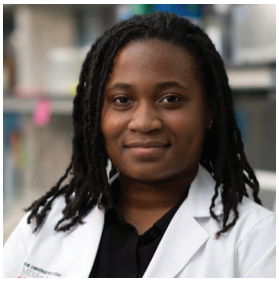
Grace Francis
Purdue University
Senior, Applied Physics

Mentor: Mariana Guerrero, PhD
University of Maryland, School of Medicine,
Department of Radiation Oncology

Composite dose for HDR brachytherapy treatment of GYN patients

I started at the University of Maryland Medical Center with Dr. Guerrero in early May. We decided to wait to start our project so that I could get some background experience in medical physics. I got to start by shadowing members of the radiation oncology department, including the oncologists, dosimetrists, physicists, and radiation therapists. They all helped me to cement my desire in pursuing medical physics. We then began my project, which was to evaluate the accuracy of deformable image registration (DIR) in assessing cumulative dose distributions of the combination of external beam radiotherapy and fractionated intracavitary brachytherapy for gynecological cancer. The current method for assessing this relationship is using simple addition of dose-volume histogram (DVH) parameters; however, this method is likely to overestimate the dose, so having a consistent method to do this with DIR would be a beneficial contribution to the

field of medical physics. We performed this project using MIM Maestro to compare the DVH parameters obtained from simple addition with those from DIR with equivalent dose accumulation. We found that there was no significant difference between the D_{2cc} values for the two methods within the bladder and rectum. This experience has helped me to confirm my decision to pursue graduate education in medical physics and has clarified that within medical physics, I would like to specialize in therapeutic medical physics.



Brianna McCrae
Texas A&M University
Senior, Nuclear Engineering

Mentor: Emil Schueler, PhD
The University of Texas MD Anderson Cancer Center, Division of Radiation Oncology, Department of Radiation Physics

Characterization of FLASH radiotherapy

FLASH radiotherapy is radiation delivered at ultra-high dose rates. It is important because, while it has comparable tumor control to conventional radiation therapy, the normal tissue toxicity is significantly reduced. In Dr. Schueler's lab, we were working on the characterization of FLASH so it could be safely used in clinical applications. I specifically worked with helping to create a calibration curve for thermo-luminescent dosimeters (TLDs), which can be used for treatment delivery verification. The TLDs were successfully irradiated, and the calibration curve was close to being completed by the time I finished my mentorship. Another project I worked on was creating a Python code for getting the dose from an irradiated piece of film. I successfully completed the code for a highlighted portion of a piece of film as well as for a vertically irradiated piece of film. This mentorship introduced me to the broad field of medical physics and everything it has to offer. In addition to getting experience in research, I also got to shadow in the clinic. I immensely enjoyed my time at MD Anderson and I look forward to continuing my education in the field!

Bridget Patrick
Stanford University
Junior, Electrical Engineering

Mentor: Edward Graves, PhD
Stanford University, Department of Radiation Oncology-Radiation Physics

Imaging changes in tumor macrophage levels before and after radiotherapy

This summer I worked with Professor Edward Graves at Stanford University in the Radiation Oncology-Radiation Physics Department. My project focused on tracking macrophage response and inflammation during radiation treatments, specifically in pediatric patients. I fit T2 relaxation curves to relate the T2 value to how much iron oxide is in a certain portion of the image, signifying areas with higher concentrations of macrophages. While the project is still ongoing, one outcome from the research may include comparing different techniques and software to calculate T2 values. The project will also provide a better understanding of tissue reactions and macrophage activity when radiation is received. I spent several weeks of my fellowship gaining exposure to clinical medical physics. I am very grateful to Piotr Dubrowski and Nejdeh Shahbazian for allowing me to shadow them at their respective clinics and learn about patient flow, different types of treatments and treatment planning, QA, and observe a brachytherapy procedure among many other things. I am also very thankful to the AAPM for this opportunity to learn about medical physics and receive very valuable mentorship. I look forward to continuing to work in and learn more about medical physics!

Olivia Stojak
University of Illinois at Urbana-Champaign
Junior, Nuclear, Plasma, and Radiological Engineering
Mentor: Hyejoo Kang, PhD
Loyola University Medical Center, Department of Radiation Oncology

Synthetic MRI from CT simulation scans using deep-learning models for high-dose-rate prostate brachytherapy

The project focused on synthesizing MRI from CT scans by developing a deep-learning model, specifically for high-dose-rate prostate brachytherapy. The project overcame challenges typically associated with acquiring both MRI and CT during treatment. Some challenges include machines being in different departments, a patient has metal in their body, MRI is more expensive, patient comfort and care, and time efficiency. The project trained and tested an in-house developed deep learning algorithm. Before training, data preprocessing must occur to enhance the dataset. For the project, I mainly worked on enhancing the dataset, so that the data better trained the algorithm. First, CT images were processed through the software Velocity by Varian Medical Systems to match the CT images to the MRI images in size. Then I created a cropping function using Python. The function inputs 512 x 512 CT and MRI images. If they are DICOM files, they get rescaled, and I de-identified the patient data with Python code. Then the function crops the images to be 384 x 384, centered around the prostate. This crop includes the important section of the scan that is used in treatment planning and excludes air. The images are filtered to only include good images that would be beneficial to train the deep-learning algorithm. This fellowship enlightened me with knowledge of medical physics. I learned about the day-to-day life of a physicist and their role in treatment planning.

Oscar Martin Alonso Cortes
Stanford University
Senior, Physics
Mentor: Madan M. Rehani, PhD
Massachusetts General Hospital/Harvard Medical School, Radiation Protection

Jesiah K. Showers
Bethel University
Senior, Applied Physics and Mathematics
Mentor: Benedikt Rudek, PhD
VA Boston Healthcare System - Jamaica Plain Radiation Oncology Program

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Medical Physics Journal Best Paper Awards

Farrington Daniels Award

(Funded by the endowed Farrington Daniels Fund)

This award is for an outstanding paper on radiation therapy dosimetry, planning, or delivery published in *Medical Physics* in 2021. Presented in 2022, the awardees were **Athena Evalour Simbahon Paz, Kilian-Simon Baumann, Uli Andreas Weber, Matthias Witt, Klemens Zink, Marco Durante,** and **Christian Graeff** for their paper entitled "Compensating for beam modulation due to microscopic lung heterogeneities in carbon ion therapy treatment planning," *Medical Physics* 2021, 48: 8052-8061.

Moses and Sylvia Greenfield Award

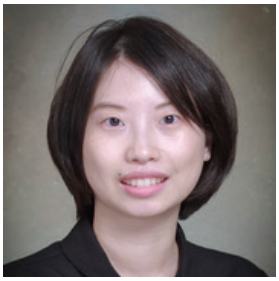
(Funded by the endowed Moses and Sylvia Greenfield Fund)

This award is for an outstanding paper on imaging, published in *Medical Physics* in 2021. Presented in 2022, the awardees were **Elias Eulig, Joscha Maier, Michael Knaup, N. Robert Bennett, Klaus Hörndler, Adam S. Wang,** and **Marc Kachelrieß** for their paper entitled "Deep learning- based reconstruction of interventional tools and devices from four X-ray projections for tomographic interventional guidance," *Medical Physics* 2021, 48: 5837-5850.

Journal of Applied Clinical Medical Physics (JACMP) Best Paper Awards

(Funded by the endowed JACMP Editors' Fund)

Michael D. Mills Editor In Chief Award

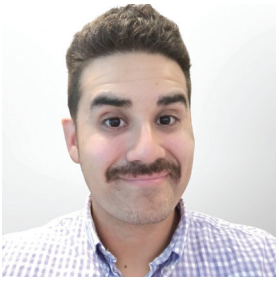


This Award of Excellence is for an outstanding general medical physics article published in *JACMP* in 2021. Presented in 2022, the awardees were **Kai Huang, Dong Joo Rhee, Rachel Ger, Rick Layman, Jinzhong Yang, Carlos E. Cardenas,** and **Laurence E. Court** for their paper entitled "Impact of slice thickness, pixel size, and CT dose on the performance of automatic contouring algorithms," *J Appl Clin Med Phys* 2021; 22:5: 168–174.

George Starkschall Award

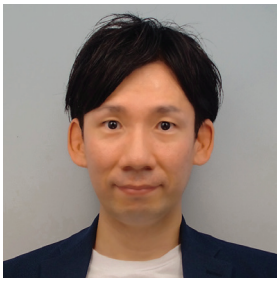
This Award of Excellence is for an outstanding radiation oncology physics article published in the *JACMP* in 2021. Presented in 2022, the awardees were **Amarjit Saini, Chris Tichacek, William Johansson, Gage Redler, Geoffrey Zhang, Eduardo G. Moros, Muqeem Qayyum,** and **Vladimir Feygelman** for the paper entitled "Unlocking a closed system: dosimetric commissioning of a ring gantry linear accelerator in a multivendor environment," *J Appl Clin Med Phys* 2021; 22:2:21–34.

Peter R. Almond Award



The Peter R. Almond Award of Excellence is for an outstanding radiation measurements article published in *JACMP* in 2021. Presented in 2022, the awardees were **Luis Muñoz, Tomas Kron, Marco Petasecca, Joseph Bucci, Michael Jackson, Peter Metcalfe, Anatoly B. Rosenfeld,** and **Giordano Biasi** for their paper entitled "Consistency of small-field dosimetry, on and off axis, in beam- matched linacs used for stereotactic radiosurgery," *J Appl Clin Med Phys* 2021; 22:2:185–193.

Edwin C. McCullough Award



The Edwin C. McCullough Award of Excellence is for an outstanding medical Imaging physics article published in the *JACMP* in 2021. Presented in 2022, the awardees were **Toshimune Ito, Yohji Matsusaka, Masahisa Onoguchi, Hajime Ichikawa, Koichi Okuda, Takayuki Shibutani, Masaaki Shishido,** and **Kozo Sato,** for their paper entitled "Experimental evaluation of the GE NM/CT 870 CZT clinical SPECT system equipped with WEHR and MEHRS collimator," *J Appl Clin Med Phys* 2021; 22:2: 165–177.

Jack Fowler Early-Career Investigator Award

(Funded by the Jack Fowler Award Fund)

This award was established in honor of Jack Fowler, PhD, Emeritus Professor of Human Oncology and Medical Physics, University of Wisconsin. The award was presented to **Stephanie Bennett, PhD,** Brigham and Women's Hospital, Dana Farber Cancer Institute and Harvard Medical School, for the top scoring abstract submitted by Early-Career Investigators who entered the competition, entitled "A Method for Clinical Gadolinium-Based Nanoparticle Quantification Using MRI."

Jack Krohmer Early-Career Investigator Award

(Sponsored by the Krohmer Memorial Fund and AAPM Science Council through the AAPM Education & Research Fund)

This award was established in honor of Jack Krohmer, PhD, a pioneer in the medical physics community. The award was presented to **Brian M. Anderson, PhD**, University of California San Diego, Radiation Medicine and Applied Sciences Medical Physics Residency Program, for the best abstract submitted by Early-Career Investigators to the Scientific Program of the AAPM Annual Meeting, judged according to criteria of significance, innovation, and the potential for major scientific impact in an area of cutting-edge interest in medical physics. The abstract was entitled "EPIDEEP: Predicting In-Vivo EPID Transit Images - a Deep Learning Approach."

Arthur Boyer Award for Innovation in Medical Physics Education

(Funded by the Boyer Innovation in Medical Physics Education Fund)

This award is given for the best presentation at an Education Council session concerning innovative programs in medical physics education of physicists, physicians, ancillary personnel, and the public. Presentations can be concerned with scientific research, novel teaching strategies (team teaching or adult learning efforts), or novel educational materials (lectures, websites, or other innovations). This year's award went to **Joseph B. Schulz**, Stanford Health Care, for a presentation entitled, "An Affordable Platform for Virtual Reality-Based Patient Education in Radiation Therapy."

Carson/Zagzebski Distinguished Lecture On Medical Ultrasound

(Funded by the endowed Carson/Zagzebski Fund)

On Saturday, March 26 at the 2022 AAPM Spring Clinical Meeting, invited lecturer **Ivan Rosado-Mendez, PhD**, University of Wisconsin-Madison, delivered his lecture, "*US.QIBA - Pulse Echo Quantitative US Parameters (PEQUS) and Shear Wave Speed (SWS)*."

The Anne and Donald Herbert Distinguished Lectureship in Modern Statistical Modeling

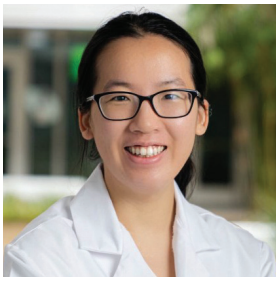
(Funded by the endowed Anne and Donald Herbert Fund)

On Tuesday, July 12 at the 2022 AAPM Annual Meeting, invited lecturer **Soren Bentzen, PhD**, Division Director, Biostatistics and Bioinformatics, University of Maryland School of Medicine, delivered his lecture, "*Models and Modeling in Radiation Oncology — What's Next?*"

John R. Cameron Early-Career Investigators Symposium Award

(Funded by the endowed John Cameron Fund)

The Early-Career Investigators Symposium is a competition in honor of University of Wisconsin Professor Emeritus John R. Cameron, PhD and John R. Cunningham, PhD, from Princess Margaret Hospital, and subsequently from the University of Alberta. The 10 highest scored abstracts submitted for the Symposium are selected for presentation, from which the top three presentations receive awards. 2022 winners were:



1st Place
Qihui Lyu, PhD
University of California, Los Angeles, Radiation Oncology Medical Physics Residency Program
"Pair Production Tomography Imaging"

3rd Place
Constance A. Owens
The University of Texas MD Anderson Cancer Center, PhD Student, Graduate Program in Medical Physics
"Development and Validation of a Population-Based Anatomical Colorectal Model for Radiation Dosimetry in Late Effects Studies of Childhood Cancer Survivors"

2nd Place
Rachel Petragallo
University of California, Los Angeles,
PhD Student, Graduate Program in Physics & Biology in Medicine
"A Multi-Institutional, Convolutional Neural Network-Based Approach to the Detection of Vertebral Body Mis-Alignments in Planar X-Ray Setup Images"

AAPM Science Council Associates Mentorship Program

AAPM Science Council Associates Mentorship Program has been established to recognize and cultivate outstanding researchers at an early stage in their careers with the goal of promoting a long-term commitment to science within AAPM. The program uses the process of "shadowing" to integrate the Associates into the scientific activities of the organization. Science Council Associates participate in the program for one year, and are funded up to $4,000 per Associate (to cover travel costs including flight, hotel, and meeting registration) to attend two consecutive AAPM Annual Meetings, including the pre-meeting activities associated with each Committee.

Sponsored by the AAPM Science Council through the AAPM Education & Research Fund (See AAPM website for more details, including eligibility requirements.)

Science Council Associates Mentorship Program Recipients

- **Muhammad Ramish Ashraf, PhD**
  Radiation Oncology Physics Resident
  Stanford University
  Department of Radiation Oncology
  Mentor: Katja M. Langen, PhD
  Professor
  Emory University
- **Jie Fu, PhD**
  Radiation Oncology Physics Resident
  Stanford University
  Department of Radiation Oncology
  Mentor: Charles S. Mayo, PhD
  Professor
  University of Michigan
- **Yu Gao, PhD**
  Clinical Assistant Professor
  Stanford University
  Department of Radiation Oncology
  Mentor: Jeffrey Siebers, PhD
  Director of Radiological Physics
  University of Virginia Health Systems
- **Rachael L. Hachadorian, PhD**
  Radiation Oncology Physics Resident
  Harvard Medical School/
  Massachusetts General Hospital
  Mentor: Magdalena Bazalova-Carter, PhD
  Associate Professor
  University of Victoria
- **Casey Lee, PhD**
  Medical Physics Resident
  Brigham and Women's Hospital/
  Harvard Medical School
  Mentor: Sonja Dieterich, PhD
  Professor
  University of California Davis Medical Center
- **Kelly Nealon, MS**
  Graduate Research Assistant
  The University of Texas MD Anderson Cancer Center
  GSBS Medical Physics Program
  Mentor: Jean Moran, PhD
  Vice Chair & Director-Division of Radiotherapy Physics
  Memorial Sloan Kettering Cancer Center
- **Xingyu Nie, PhD**
  Assistant Professor
  University of Kentucky/UK HealthCare
  Mentor: Kevin Wunderle, PhD
  Diagnostic Medical Physicist
  Cleveland Clinic Foundation
- **Lauren Smith, PhD**
  Radiation Oncology Physics Resident
  University of California, Los Angeles Health
  Mentor: Geoffrey S. Ibbott, PhD
  Associate Executive Director
  The American Board of Radiology

Summer School Tuition Scholarships

Summer School Tuition Scholarships are in the form of a full waiver of tuition fees for the entire AAPM 2022 Summer School. This award is available to applicants who are in the first five years of their careers in medical physics.

Sponsored by the AAPM Administrative Council through the AAPM Education & Research Fund (See AAPM website for more details, including eligibility requirements)

Summer School Tuition Scholarship Recipients

- **Muhammad Ramish Ashraf, PhD**
  Stanford University, Department of Radiation Oncology
- **Yushi Chang, PhD**
  University of Pennsylvania, Department of Radiation Oncology
- **Zachary Christ, MS**
  Forrest General Cancer Center, Department of Radiation Oncology
- **Sagarika Jain, MS**
  Ohio State University Comprehensive Cancer Center – James, Department of Radiation Oncology
- **Sharon Lebron, PhD**
  Cancer Care Centers of Brevard, Department of Radiation Oncology
- **Ching-Ling Teng, PhD**
  Mount Sinai Health System, Department of Radiation Oncology
- **Yawei Zhang, PhD**
  University of Florida Health Proton Therapy Institute, Department of Radiation Oncology

AAPM Expanding Horizons Travel Grant Awardees

Round 1

- **Yulun He, BS**
  The University of Texas MD Anderson Cancer Center, GSBS Medical Physics Program
  American Radium Society Annual Meeting
- **Felix Mathew, MS**
  McGill University, Medical Physics Unit
  Neutron and Ion Dosimetry Symposium (NEUDOS-14)

AAPM Expanding Horizons Travel Grant Awardees (cont.)

Round 2

- **Vidheesha Arora, MS**
  The University of Toledo, Medical Physics Graduate Program
  IEEE International Ultrasonics Symposium (IUS)
- **Syamantak Khan, PhD**
  Stanford University, Department of Radiation Oncology
  Radiation Research Society Annual Meeting (RRS)
- **Kevin Liu, MS**
  The University of Texas MD Anderson Cancer Center, GSBS Medical Physics Program
  Radiation Research Society Annual Meeting (RRS)
- **Devin Miles, PhD**
  Johns Hopkins University School of Medicine, Medical Physics Residency Program
  FLASH Radiotherapy and Particle Therapy (FRPT)
- **Hieu Nguyen, PhD**
  Stanford University, Department of Radiation Oncology
  World Molecular Imaging Conference (WMIC)
- **Lewei Zhao, PhD**
  Beaumont Proton Therapy Center, Proton Physics Research Group
  Triangle Computational and Applied Mathematics Symposium (TCAMS)

Team BEST®/AAPM Award Recipients

- **Christian De Caro**
  University of Wisconsin – Madison, Medical Physics Graduate Program
- **Lian Duan**
  University of Pennsylvania, Medical Physics Graduate Program
- **Mohamed Eldib, PhD**
  University of Colorado Anschutz, Postdoctoral Research Fellow
- **Ke Lu, PhD**
  Duke University Health System, Medical Physics Residency Program
- **Qihui Lyu, PhD**
  University of California, Los Angeles, Radiation Oncology Medical Physics Residency Program
- **Rachel Petragallo, MS**
  University of California, Los Angeles, Physics & Biology in Medicine Graduate Program
- **Joshua Wancura, PhD**
  University of Rochester, Therapeutic Medical Physics Residency Program
- **Hui Wang, PhD**
  University of Nevada, Las Vegas, Medical Physics Postdoctural Scholar
- **Zhenyu Yang**
  Duke University, Medical Physics Graduate Program
- **Yang Zhang, PhD**
  Rutgers-Cancer Institute of New Jersey, Radiation Oncology Physics Residency Program

AAPM Expanding Horizons Travel Grants

AAPM Expanding Horizons Travel Grants are awarded twice annually. As many as ten grants, each up to $1,000, are given for the purpose of providing additional support for student and trainee travel to conferences that are not specifically geared toward medical physics. The travel grant is designed to provide an opportunity to broaden the scope of scientific meetings attended in order to introduce students and trainees to new topics which may be of relevance to medical physics research and which may subsequently be incorporated into future research in order to progress the field in new directions.

Sponsored by the AAPM Science Council through the AAPM Education & Research Fund (See AAPM website for more details, including eligibility requirements.)

Team BEST®/ AAPM Awards

TeamBest® provides funding for 10 fellowships in the amount of $500 each, to be used for travel, food and lodging expenses to attend the Annual Meeting. AAPM provides complimentary Annual Meeting registration for each recipient, including social functions. TeamBest® also provides a plaque for each of the five fellowship recipients.

Sponsored by TeamBest® through the AAPM Education & Research Fund

The AAPM Development Committee uses this report to convey important activities supported by our Education & Research (E&R) Fund, which would not be possible without your thoughtful donations. ***We hope you share our joy*** in how the E&R Fund is used to promote medical physics research, support education of future medical physicists, and recognize outstanding medical physicist accomplishments.

For those interested in E&R Fund data, despite a bear market, its current state remains healthy and is described in the bar graphs that follow, showing its balances at the end of 2022, revenues for 2022, and member contributions for 2022. To maintain and expand our important E&R Fund activities, your Development Committee aims to continue growing our E&R Fund.

To that end, each member is encouraged to contribute to one or more of the AAPM E&R Fund portfolio options, whichever best suits your passion (see https://www.aapm.org/education/edfundlinks.asp). Remember, its expanded popular giving option (Policy AP95) was extended through 2026. AAPM now matches donations to the E&R Fund (up to $500,000 in total) for any members donating at least $2,500, either through a one-time donation or a five-year or less pledge. Also, for such donations your donor level will immediately reflect the total amount pledged plus the total amount matched.

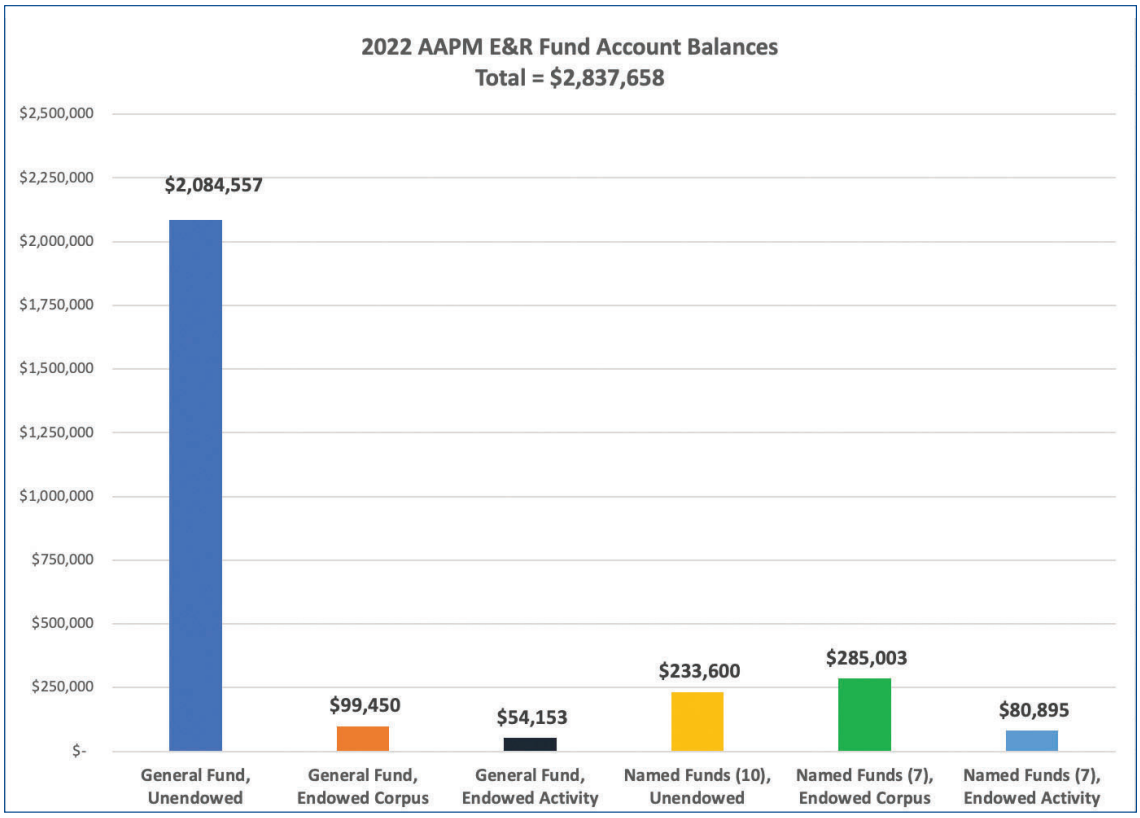
Other notable options include, but are not limited to, memorial gifts (Policy AP99), named fund gifts (Policy AP6), and future legacy gifts (Policy AP18), the latter having a $5,000 matching incentive. Whatever your passion, however you might give, please keep your AAPM in mind!

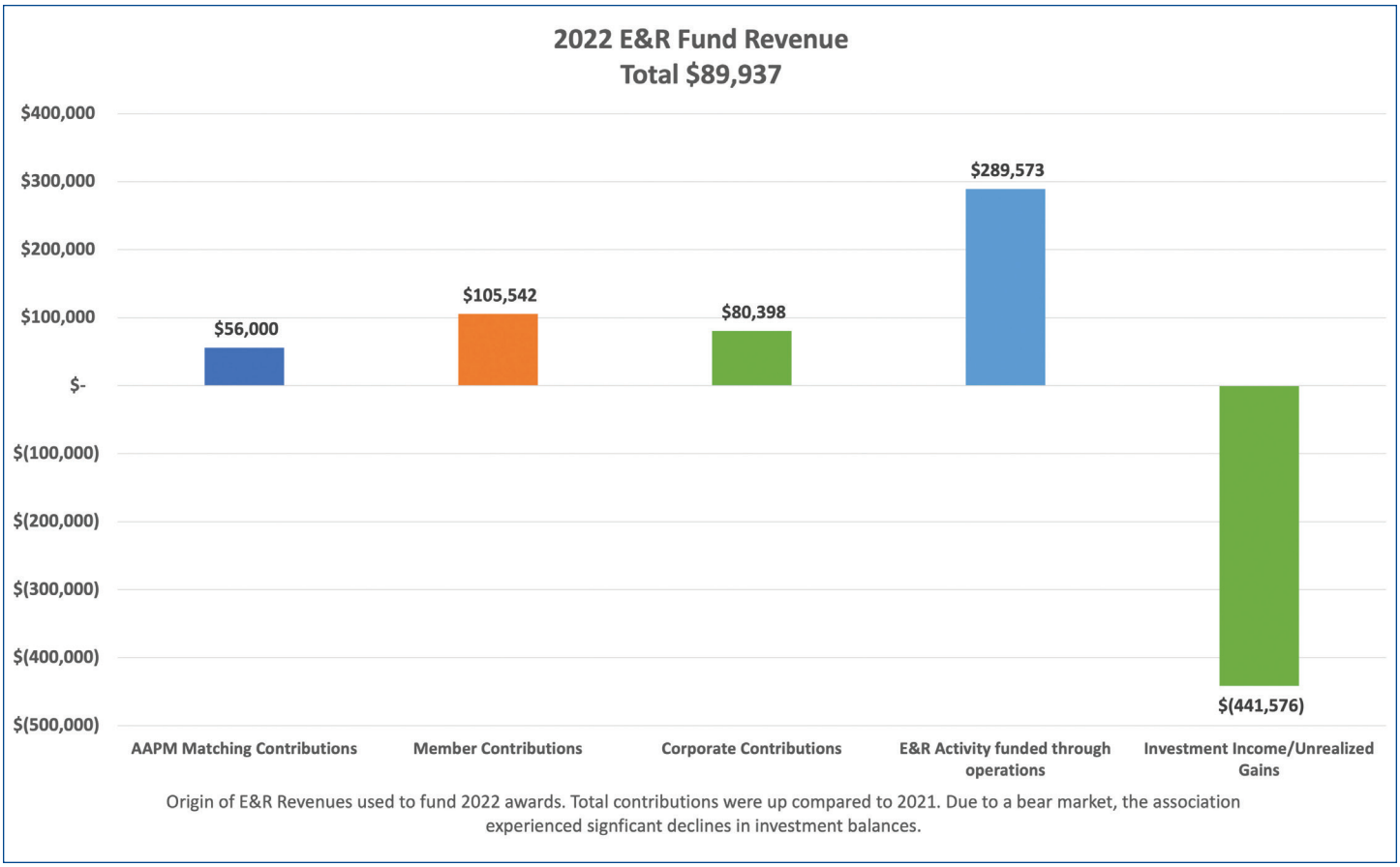
There are different ways to donate, and some can be more financially favorable than others. Whether giving to AAPM or other charitable organizations, **AAPM provides member education on giving options through its Planned Giving website (https://aapm.myplannedgift.org/).**

Our members and awardees truly appreciate and thank you for your support! On the following pages is a listing of the approximately 2100 members, companies, and professional societies who have given to our E&R Fund.

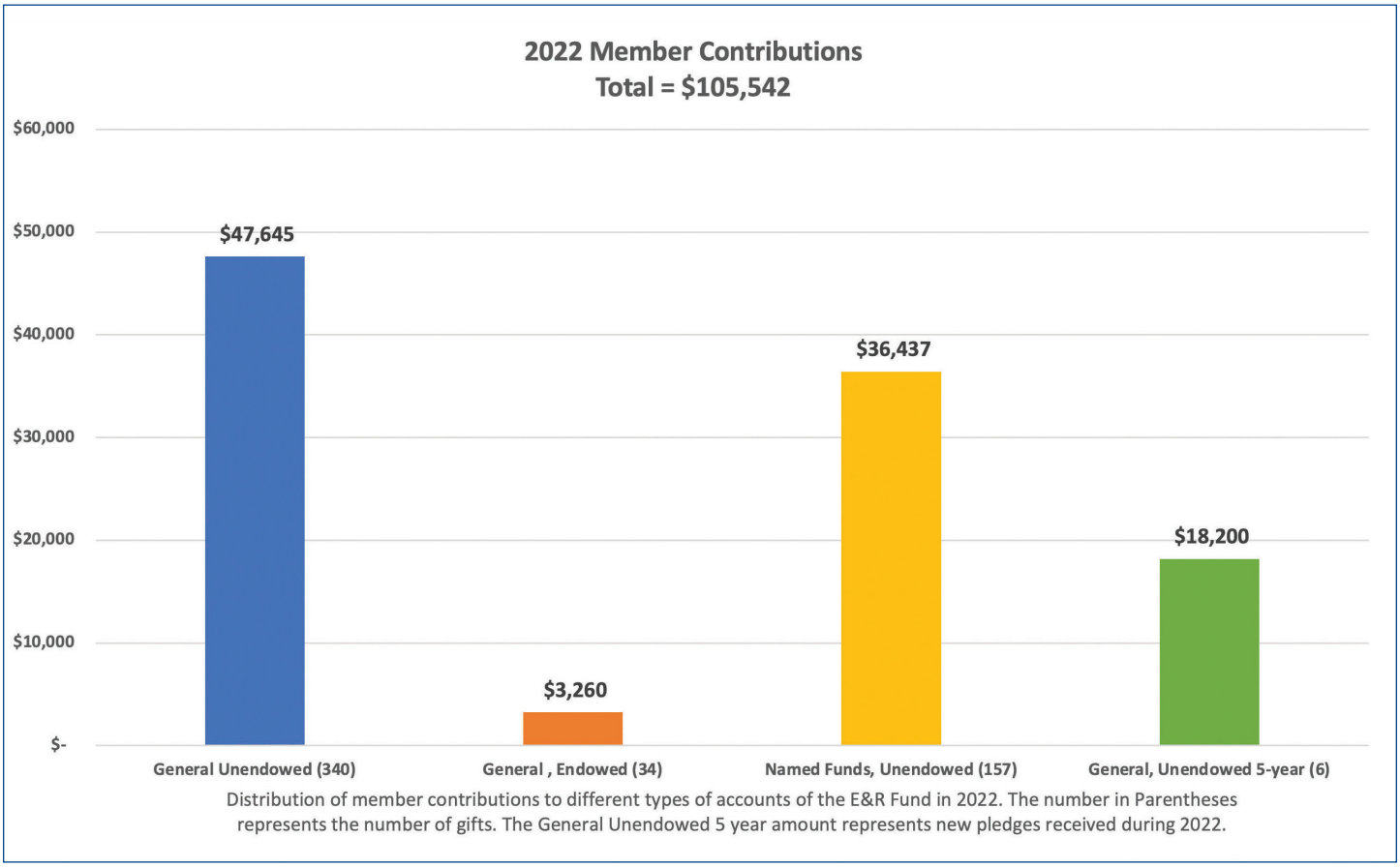
Kenneth R. Hogstrom, PhD
Chair, AAPM Development Committee

AAPM is a 501 (c)(3) organization with EIN 23-7057224.





Origin of E&R Revenues used to fund 2022 awards. Total contributions were up compared to 2021. Due to a bear market, the association experienced signficant declines in investment balances.



Distribution of member contributions to different types of accounts of the E&R Fund in 2022. The number in Parentheses represents the number of gifts. The General Unendowed 5 year amount represents new pledges received during 2022.

2022 E&R Fund | Contributors (as of December 31, 2022)

AAPM would like to acknowledge and thank the following individuals and organizations who have made contributions to the Education & Research Fund since its inception in 1990:

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$20,000 and Above

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