2020 ALUMNI NEWSLETTER

The Official Newsletter of the Duke Medical Physics Alumni Association (DUMPAA)

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Some of the more than 90 attendees at the 2020 (virtual) graduation and award ceremony.

Matthew Goss MS, DABR
DUMPAA President

DUMPAA President

To the Medical Physics Alumni Association-

As 2020 draws to a close, I'm tempted to think back a year from now to reflect on what I was doing then vs where I am now. Our current board members and I were getting ready to take over from the past administration, and personally, I thought I knew what to expect in 2020. We agreed that the incoming board's focus would be expanded social interaction, volunteerism and organized mentorship. Almost immediately, however, we found ourselves faced with the first of two major challenges which drastically changed the course of the year, and the direction of the alumni association itself…

Continued on page 2...

Want to get involved with the newsletter?

Be featured as an alumni or research spotlight?

Contact:
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or Cielle Collins
(ciellecollins10@gmail.com)

DUMPAA President | Matthew Goss (1)

The outbreak of COVID-19 has affected almost every person in this country in some substantial way. Those of us in the healthcare arena, both as front-line providers of patient care and those in affiliated or support roles, have had to adapt to unfamiliar working conditions. Some people have transitioned to working remotely, while others have been asked to continue clinical work despite concerns of personal safety. These new ways of working have impacted our professional, social and family lives in countless ways, and many of our fellow alumni have become sick themselves. While I expected some kind of adjustment, almost immediately I began to hear from fellow alumni via email, phone, video call or the Facebook group created virtually overnight by the program which quickly became a hub of information, resource, and experience-sharing. My suspicions were undoubtedly confirmed: the graduates of the program approached this professional hurdle with the same dedication to quality and excellence that brought them to Duke in the first place, and that the program helped ingrain in our collective senses of responsibility. I'm not surprised that we've continued to be ambassadors of the highest quality and dedicated professionalism, but I am genuinely proud by seeing this demonstrated over and over again from our graduates.

But just as we began adapting to a new way of working and living, the killings of Ahmaud Abery, Breonna Taylor, and George Floyd challenged all of us to examine our privilege, prejudice and role in a larger framework of institutional racism in this country. While their deaths number few among countless other people of color who have died as a result of racial injustice and systemic violence, it felt like a tipping point. The board and I felt it critical to begin to examining the related issues of bias and inclusivity in the alumni association and how these dovetail with the graduate program as well. While we recognized that any one statement couldn't represent the views of each member of the association, being elected representatives we agreed that it was our responsibility to put out a statement which in no uncertain terms conveyed our abhorrence towards ongoing racial violence, admission of personal and collective bias, and interest in organized, ongoing education and self-improvement. Again, I am beyond proud at the willingness of the board to commit to a bold and often unpopular stance, and the association at large for embracing and being actively supportive of these commitments. The ongoing work relating to this will be a major focus of this and hopefully all administrations to come.

We also began creating and implementing a robust and well-organized alumni/student mentorship program. We quickly realized that the immediacy of board preparation, job and residency interviews, professional development and even issues of program and professional inclusivity could benefit from this kind of program, and created a two-way resource for current and future alumni alike. The reality of remote and distanced correspondence made this idea seem all the more obvious, and our progress is something I've been especially happy with. I'm excited for the program go- live in early 2021.

Our initial focus of expanding social events is still an important part of our agenda, albeit one we will need to implement a bit later than we had anticipated. We feel that if anything, we can use the time between now and then to hear your feedback and expand what we want to do to include outreach and volunteerism, adventure trips, alumni sporting events, social outings, dinners and happy hours at several annual meetings, and on-campus reunion visits which can coincide with program-specific events.

We've accepted the changing landscape of how we all communicate now, and as such have opted for an expanded social media and communication platform, which has necessitated our newest board position, Social Media Coordinator. To be as impactful as possible, we will engage alumni through Twitter, Facebook and LinkedIn, which will also go live in early 2021. We have also begun to work more closely with the program administration, faculty and student representatives. We welcome this collaboration, which we hope will provide even more resources benefitting current students and alumni alike, and help address some of the issues we as an alumni association have agreed to focus on.

DUMPAA President | Matthew Goss (2)

It feels like this year forced our association in many ways to transition away from the younger and more autonomous association working to find its own voice, to one confident in its focus and ability to collaborate while maintaining its independence. This past year I've seen members of the alumni association show an amazing dedication to leadership, to innovation, and to selfless professionalism. For most of us, 2020 was the most demanding year in memory; mentally, emotionally, physically, and professionally. But we've risen to its many challenges and done amazing things despite. I'm confident looking towards a year from now, not worried about the unknown difficulties that may and probably will arise, but confident that our humble group will overcome even more challenging obstacles to create, to inspire and to serve.

Matthew D. Goss

Class of 2007

President, Duke University
Medical Physics Alumni
Association

Alumni Association Updates (1)

New Mentorship Program for Duke Medical Physics Alumni and Students - Titania Juang (PhD '15)

The **Duke Medical Physics Alumni Association (DUMPAA) Mentorship Program** is a new initiative aimed toward connecting our membership with both fellow alumni and current Duke Medical Physics students through providing professional mentorship and support.

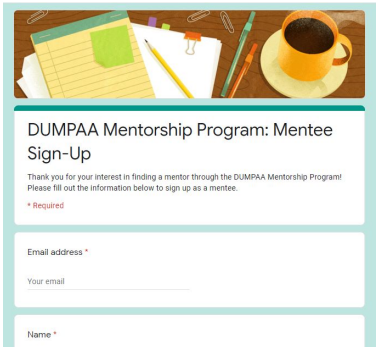
Signing up for the mentorship program as either a mentor or a mentee entails filling out a simple questionnaire that will assist in matching mentees with mentors who have compatible professional goals and expertise.

Sign-ups opened in November 2020 and will remain open through **January 8, 2021** for this first cycle. Mentor-mentee matches will be contacted by email with next steps no later than **January 15, 2021**.

Interested in serving as a mentor for fellow alumni or current Duke MedPhys students?

Sign up to be an alumni mentor:
https://forms.gle/F77s8M4sgA3j2px38

Interested in being paired with fellow alumni to receive peer-to-peer mentorship?



Fill out our mentee sign-up form:
https://forms.gle/KaAwLdyDj3ie4hUu5

Questions regarding the mentorship program can be directed to Titania Juang at *titania.juang@gmail.com*.

Duke Medical Physics Alumni Social Media Launch - Michelle Rokni (MS '18)

We are excited to introduce our new official Duke Medical Physics Alumni Association social media accounts! Currently, we are launching a private DUMPAA Facebook and LinkedIn group, but hope to continue to grow our social media presence in the future.
The Facebook group ("Duke University Medical Physics Alumni Association") will be used as a way for us to communicate with everyone about news and special events. In addition, we want this to be a place for everyone to come and share exciting information, ask questions, and stay connected with one another in an informal setting.
The LinkedIn group ("Duke University Medical Physics Alumni Association") is another great resource that can be used for alumni to connect professionally and network with fellow alumni.

Alumni Association Updates (2)

2020 Overload, A message from your Social Coordinator Chair - Kristy Perez (PhD '11)

In an era of virtual meet-and-greets, during this pandemic we had hoped to coordinate some kind of meeting or event for all of us to say hello to one another. We considered the idea of having a Zoom trivia meetup or just a virtual socializing session. But as 2020 progressed, there seemed to be less and less energy to participate in anything more than simply "making it through the day".

The past months have changed how each of us perceives the passing of time; one thinks one should have an abundance more, considering every fun distraction is closed. The reality is that for many essential employees, there seems to be even less time now for anything extra. Let's not count how many minutes we've spent washing hands or finding a mask that can be tolerated longer than 5 minutes. Being an essential employee has many challenges. The first of which is covering the responsibilities of those who are not considered essential, but another is covering for colleagues who although deemed essential, have sadly contracted COVID-19 themselves. The mental and emotional toll these responsibilities take on every well-meaning team member creates a strong desire to protect the precious few moments we have to ourselves.

Now that we have perfected our handwashing skills, and learned to recognize friends and colleagues by just their eyes and hair, we hope that as the vaccine is distributed we will regain time and energy, rebuilding the reserves we have long-since exhausted. We will find the time and energy to reach out and connect with like-minded people, and to once again cultivate our individual passions and interests. I expectantly dream about a 2021 that includes an alumni trip with Radiating Hope, in-person conferences with an alumni dinners and happy hours and local meet-ups to get to know alumni nearby. It would be amazing to coordinate a weekend gathering at Duke for everyone to spend some time together as a whole.

As 2021 rapidly approaches, I am hopeful for a mask-free breath of fresh air. I encourage you to get out of the basement (or the sub-basement as the case maybe) and soak in some sun. While you have a cell phone signal, send a text or message to one of your Medical Physics peers, colleagues or alumni. This simple gesture might just be the thing helping someone make it through another essential but difficult day. In the coming months, I hope that the alumni will continue to work together supporting each other and reach out to maintain strong connections. Eventually when we do see each other, I hope quarantine will be a distant memory, and that it feels like hardly any time has passed at all since the last time we all saw each other in person.

Alumni Spotlight | Anna Rodrigues

Anna Rodrigues (MS '12, PhD '15) is an assistant professor of Radiation Oncology at Duke University School of Medicine. She is assistant director of the radiation therapy physics residency program and faculty member of the medical physics graduate program.

What is your new position and how are you enjoying it so far?

I have been part of the Radiation Therapy Duke Medical Physics Residency Program administration since I graduated from my residency in 2017. Since 2019, I have been associate director and an associate faculty of the radiation oncology department. Even as a resident I took opportunities to improve the training content and structure (unsure if much to the chagrin or delight of the administration). When I graduated the residency and started as a staff physicist I guess the steering committee saw that it was a natural fit for me to become part of the residency program as assistant director. A lot of my residency activities pertain to day-to-day management of residence: Including communications and logistics — basically making sure residents are on track to completing their competencies as well as being involved in the teaching of residents in multiple rotations. I very much enjoy seeing residents transition from a student mentality to becoming independent physicists. Seeing this process is extremely satisfying and motivating!

What in your training/experience has helped get you where you are today?

I think that the professional aspect of being a medical physicist came rather naturally to me, however, there were certain trainings and experiences in the Duke medical physics program that definitely solidified my knowledge and confidence: Involvement in the Student Advisory Board, student representative on MPAC, organizing the beach retreats, and the mock interviews and CV preparation (now housed in a formal class with many more aspects of professionalism efforts led by Dr. Wilson). Additionally, presenting research at internal meetings such as ROIP, or local chapter meetings (NCHPS), or national meetings at AAPM were exceedingly helpful. My involvement in the AAPM early on in the education committee (I was chair of the STSC as a student) was also a key experience in understanding how to be a medical physicist as a professional and as an educator. I also took a certificate in college teaching as a PhD student. Beyond that it was not just training, classes, or knowledge, but many Medical Physicists (too many to name here) that taught me many key aspects of being an ethical, fair, and professional Medical Physicist.

How has the transition from student to mentor been within Duke?

I always say that I've seen all the sides of Duke Medical Physics: I've been a MS and PhD student, a radiation therapy resident, a staff physicist, and now a faculty physicist, so I feel that I have a unique perspective on all those different positions. One thing that I always try to keep in the forefront of my mind is the student experience. I remember being that student worrying that I wasn't "getting it", especially when it came to the physics applied to the clinic, thinking I was in a completely foreign world (acronyms much?) and having to work very hard to understand and apply the newfound knowledge in this clinical environment. So in all my academic efforts I make a point to put myself in the trainee's shoes to help reduce that disconnect and enhance and further their education.

Alumni Research Spotlight | Jeremiah Sanders (1)

Jeremiah Sanders (Duke MS '16; University of Texas MD Anderson Cancer Center PhD '20) is a medical physics fellow in the Department of Imaging Physics at The University of Texas MD Anderson Cancer Center. His current research focuses on developing MRI techniques for prostate radiotherapy applications and developing machine learning applications in both prostate and brain MRI. He is currently a member of the trainee editorial board of Radiology: Artificial Intelligence.

I recently defended in March a couple weeks after we were required to start working from home due to social distancing guidelines. I am now pursuing a 3-year fellowship in imaging physics, which provides 2 years of residency combined with 1 year of research. I decided to pursue fellowship training because it provided the opportunity to gain the requirements for the ABR exam while continuing to work on research projects. My current research continues my doctoral projects, as well as extends to incorporating aspects of CT and kV portal imaging in addition to MRI. Below is a summary of some of the projects I worked on during my degree, which were recently published in Radiology, IJROBP, Magnetic Resonance in Medicine, Radiotherapy and Oncology, and Brachytherapy.

Developing MRI techniques for prostate radiotherapy:

Computed tomography (CT) provides excellent contrast of radio-opaque brachytherapy seeds but is also limited in soft tissue contrast. Soft tissue contrast of MRI is superior to that of CT. However, brachytherapy seeds are metal and do not produce MR signal, which complicates seed localization for treatment quality assessment (QA) after low-dose-rate (LDR) prostate brachytherapy (LDRPBT). Implantable fiducial markers providing positive MR signal were recently developed for LDRPBT to indirectly assist with seed localization in postimplant MRI. However, because they are small and image quality parameters must be balanced with scan time and SAR limitations in MRI, imaging these markers with MRI has several technical complications. Moreover, MRI pulse sequences are typically tailored to provide a desired tissue weighting; the contrast requirements of the implanted fiducial markers can be different than for the prostate and surrounding organs at risk in MRI.

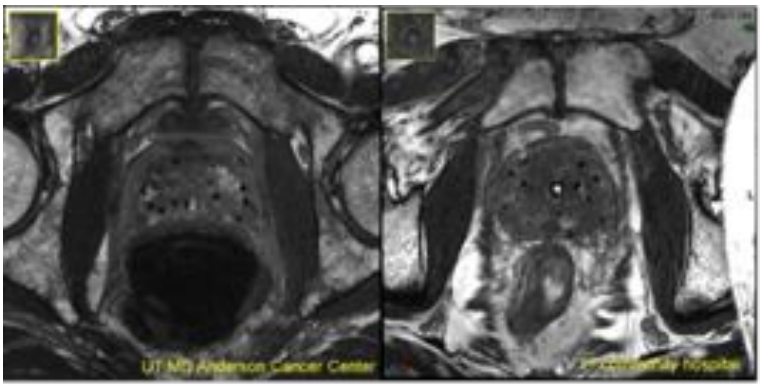


Figure 1. Fully balanced SSFP MRIs acquired without an ERC at (left) MDACC & (right) 1st community hospital using this LDRPBT MRI technique.

A main part of my doctoral research was developing fully balanced SSFP MRI for imaging all the relevant information (prostate, periprostatic anatomy, fiducial markers, radioactive seeds) for postimplant QA of LDRPBT with a single MR pulse sequence. I demonstrated the ability to acquire prostate MRIs with high SNR and high spatial resolution in ~4-6 minutes without use of an endorectal coil (ERC) for postimplant QA after LDRPBT. Additionally, I assisted in translating and demonstrating some of these MRI techniques on patients at a community hospital, which was the first hospital to use this MRI-based LDRPBT technique outside of our institution.

One aspect of my fellowship research is to help with the continued development of this implantable fiducial marker to provide positive MR signal in addition to providing positive contrast under CT and kV portal imaging. The goal is to develop an implantable fiducial marker that can be visualized under these 3 medical imaging modalities for patients receiving multi-modality radiotherapy treatments requiring multi-modality imaging.

Jeremiah Sanders (Duke MS '16; University of Texas MD Anderson Cancer Center PhD '20) is a medical physics fellow in the Department of Imaging Physics at The University of Texas MD Anderson Cancer Center. His current research focuses on developing MRI techniques for prostate radiotherapy applications and developing machine learning applications in both prostate and brain MRI. He is currently a member of the trainee editorial board of Radiology: Artificial Intelligence.

Developing ML/DL applications for MRI-based prostate brachytherapy:

A second part of my doctoral research was to develop and implement software to aid with the MR image processing tasks required at each step of the treatment workflow for prostate cancer patients receiving LDRPBT. Postimplant QA of LDRPBT requires identifying both the implanted radioactive seeds and segmentation of the prostate and surrounding organs at risk (OARs). Simulation and treatment planning for these patients also requires prostate and OAR segmentation for dose volume histogram analysis. Both segmentation and radioactive source localization require specialized training to perform and are time intensive. I developed object detectors for seed identification in fully balanced SSFP MRIs for postimplant QA. I also investigated modern DL techniques for prostate and OAR segmentation in multi-contrast MRIs, including T1w, T2w, and T2/T1w. I worked to incorporate these algorithms into a commercial treatment planning system for rapid dosimetric analysis.

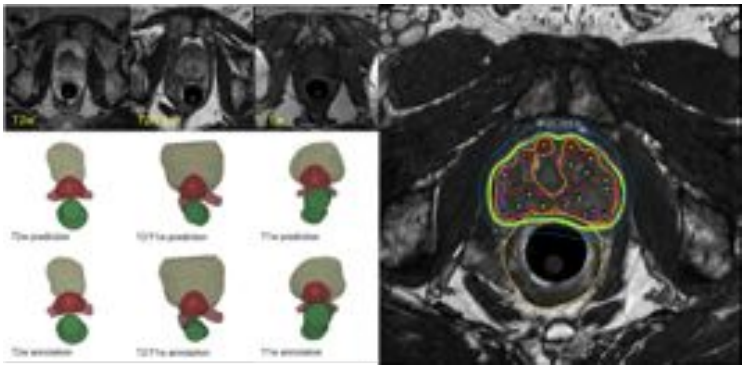


Figure 2. (Left) Autosegmentation examples in multi-contrast MRIs. (Right) Automated postimplant dosimetry after MRI-based LDRPBT.

So far, the work on these algorithms has focused on technical development and demonstrating feasibility.

Another aspect of my fellowship research is to now translate the use of these algorithms and software into our routine clinical workflow for LDRPBT. To do this, we are currently benchmarking the performance of these algorithms against human annotations for the same tasks to determine the most effective ways to use them. We are also working to develop prostate cancer detection and segmentation algorithms for potential applications in dose escalation to the dominant intraprostatic lesion. Finally, we hope to expand the access to these algorithms outside of our institution for other hospitals interested in MRI-based LDRPBT.

Developing ML/DL applications for brain MRI:

I conducted my doctoral research through a fellowship from the Pauline Altman-Goldstein Foundation, which provided me the opportunity to expand the scope of my research projects and learn about other applications of ML/DL in medical imaging. I worked with a colleague and physicians to develop brain metastasis detection and segmentation algorithms for stereotactic radiosurgery applications. We demonstrated near perfect sensitivity to brain metastases ≥6 mm in post-contrast T1w MRI with a low false positive rate across 13 primary cancer types. We also demonstrated that detection sensitivity and segmentation performance for brain metastases strongly depended on metastasis size. I also had the opportunity to develop brain segmentation algorithms for brain MRI and DL techniques for brain perfusion mapping. A final aspect of my fellowship research is to continue the development of these techniques toward potential applications in prospective imaging studies.

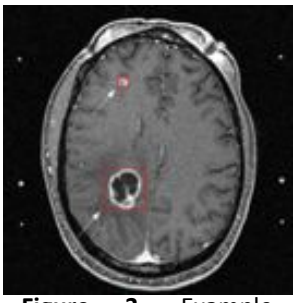


Figure 3. Example predictions of brain metastases both small and large in size identified in T1+C MRI.

Alumni Research Spotlight | Francisco Robles (1)

Francisco (Paco) Robles (PhD '11) is an assistant professor at the Wallace H. Coulter Department of Biomedical Engineering at Georgia Tech & Emory University, and holds an adjunct appointment in electrical and computer engineering, mechanical engineering, and the school of medicine. Dr. Robles directs the Optical Imaging and Spectroscopy (OIS) Lab which seeks to develop and advance optical technologies that improve the understanding of biological processes and the ability to identify and stage disease. He earned his doctorate in medical physics at Duke University with Prof. Adam Wax and completed his postdoctoral training in the Department of Chemistry also at Duke with Prof. Warren S. Warren.

Dr. Robles' work focuses on label-free imaging, linear and nonlinear spectroscopy, and advanced signal processing techniques to gain access to novel forms of functional and molecular information for a variety of biomedical applications. His work to date has led to advances in spectroscopic optical coherence microscopy (SOCT), quantitative phase imaging (QPI), nonlinear pump-probe microscopy, and stimulated Raman scattering (SRS). He has pioneered several new forms of molecular contrast, including molecular reorientation, nonlinear phase dispersion spectroscopy, ultraviolet hyperspectral imaging, and dispersion-based SRS. He has also developed new computational methods for analyzing spectral features in an unsupervised manner.

Most recently, his lab has been focusing on two technologies which continue to push the boundaries of optical imaging and spectroscopy in biomedicine. One of these methods is based on reviving one of the oldest microscopy techniques: ultraviolet (UV) microscopy. Back in the late 1800's, August Köhler, one of the early pioneers in optical microscopy, developed the first UV imaging system. While extremely promising due to its inherent quantitative molecular sensitivity and high spatial resolution, the technology never blossomed due to weak UV light sources and poor sensors. The technology remained idle until recently. Leveraging advances in light sources and detectors, the OIS lab developed hyperspectral and multi-spectral UV imaging methods capable of analyzing live cells and histological tissue sections. In a recent PNAS publication, the Robles group applied this technology to hematology where tens of thousands of blood cells could be imaged and analyzed in seconds using a compact and simple device. This novel platform has significant implications toward the development of a hematological analyzer with improved capabilities for clinical use, as a point-of-care device, and for low-resource settings. Similarly, this approach also has important implications for molecular analysis and cell phenotyping in histopathology and more.

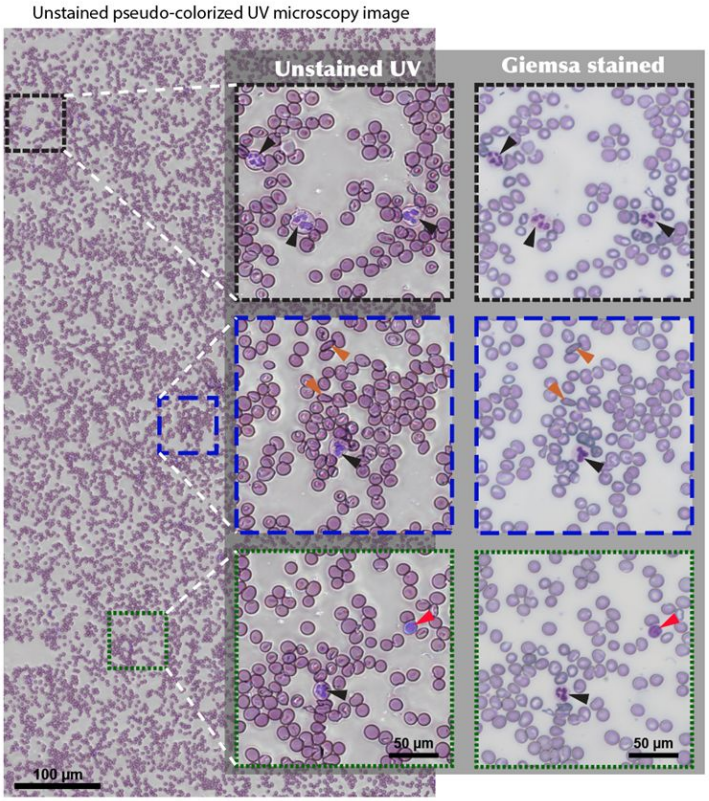


Figure 1: Wide-field pseudo-colorized UV image of a fresh blood sample collected from a sickle cell anemia patient along with its corresponding bright-field microscopy image after fixing and staining. The selected magnified insets highlight cellular features with **black** arrowheads pointing to neutrophils, **orange** arrowheads showing the sickled RBCs, and the **red** arrowheads point to lymphocytes. [Adapted from Ojaghi, et al., PNAS, 2020]

The second major thrust of the OIS lab focuses on advancing optical phase microscopy. Phase microscopy is an essential component of a biologist's toolkit: it enables clear visualization of cells and their internal contents without labels or stains, and without altering their

Alumni Research Spotlight | Francisco Robles (2)

Francisco (Paco) Robles (PhD '11) is an assistant professor at the Wallace H. Coulter Department of Biomedical Engineering at Georgia Tech & Emory University, and holds an adjunct appointment in electrical and computer engineering, mechanical engineering, and the school of medicine. Dr. Robles directs the Optical Imaging and Spectroscopy (OIS) Lab which seeks to develop and advance optical technologies that improve the understanding of biological processes and the ability to identify and stage disease. He earned his doctorate in medical physics at Duke University with Prof. Adam Wax and completed his postdoctoral training in the Department of Chemistry also at Duke with Prof. Warren S. Warren.

function or dynamic behavior. Quantitative phase imaging (QPI), an extension of phase microscopy, extends these capabilities to yield unprecedented insight into internal cellular structures which allows researchers to study cell nanoarchitecture, mass transport and cell membrane fluctuations for various biomedical applications. However, phase microscopy and QPI are limited to thin samples, typically the thickness of a single cell. The Robles lab is working on overcoming this significant barrier and enabling the same rich level of quantitative insight provided by QPI but tomographically in thick scattering samples, including human tissue. Their novel approach is called quantitative oblique back-illumination microscopy (qOBM), which adapts elements of tomographic phase-gradient imaging, with new insight into the illumination distribution of light at the sample based on bulk scattering properties and advanced processing algorithms to yield quantitative phase tomographically in thick samples. The unique capabilities of qOBM will finally enable use of quantitative phase contrast in transnational and clinical applications, including surgical guidance, regenerative medicine and more.

For more information visit the OIS lab website: https://robleslab.gatech.edu/

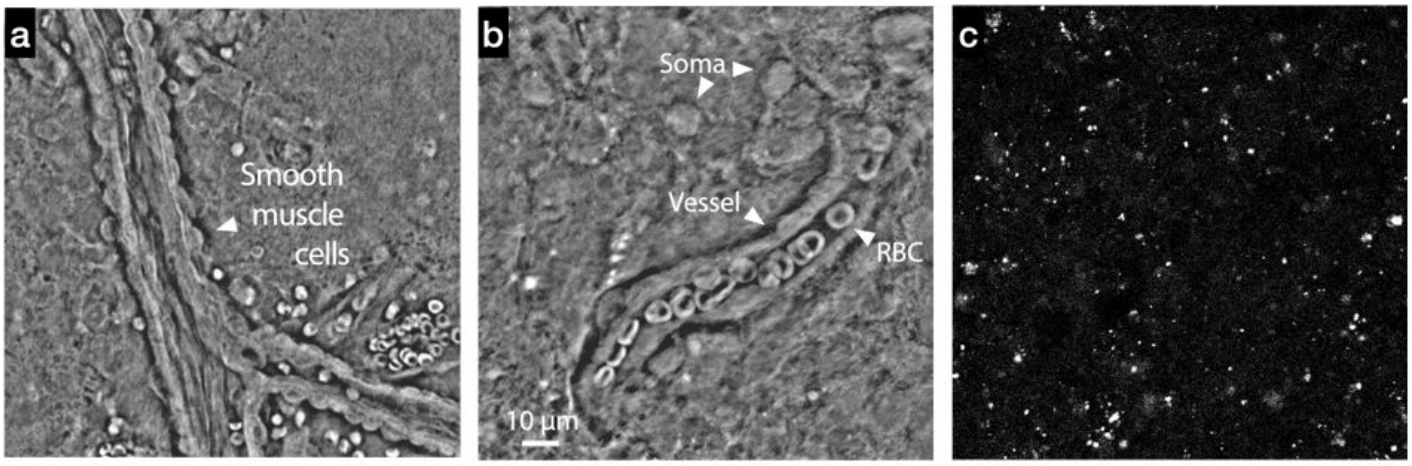


Figure 2: (a),(b) qOBM images of a fresh mouse brain. (c) Confocal reflectance microscopy images of the same brain sample under similar conditions (e.g., objective NA, total integration time, etc.). Undoubtedly qOBM provides a superior display of the brain's cellular composition. [Adapted from Ledwig, et al., Biomed. Opt. Express, 2019].

Statement from the DUMPAA Executive Board and Committee Chairs on Social Injustice

The killings of Ahmaud Arbery, Breonna Taylor, and George Floyd have galvanized a movement that has spread to all corners of the country and the world. These recent events once again bring some uncomfortable realities to the forefront of collective national consciousness. Even before this, I don't think it was possible to ignore the role that race and systemic racism plays in various aspects of American life, including the disparities we see regarding access to and equality in healthcare. The last two weeks have now pushed that dialogue into a new realm, which calls on us to examine our own personal biases and challenge our commitment to change. Whether we practice in industry, education, or direct patient care, this challenge calls for a show of public solidarity with the Black Lives Matter movement. This commitment to support equality and justice will no doubt test our individual characters.

I'd like to believe that the majority of us entered this profession because we believed in the nobility of a cause: that serving a greater good to benefit our communities and neighborhoods would outweigh the difficult emotional and mental stresses that come with the territory. If that is true, I would challenge you all to examine that commitment more fundamentally. I personally believe we have an obligation to ask ourselves if equal access to care within our scope of practice is a principle we're willing to extend to more complicated and far-reaching issues like criminal justice reform and systemic racism in our country.

The cultural diversity that this profession and the Duke Medical Physics Graduate Program has allowed me to experience personally is something I've admittedly taken for granted. In looking at our fellow alumni, current students, faculty, and staff, I consider myself unbelievably lucky to be a part of a system that acknowledges the importance of diversity and considers the input and suggestions from each of its members.

Putting the myriad of emotions I personally feel into a public statement representing how we feel as an organization is daunting and fundamentally impossible, but discomfort cannot be an excuse for inaction. We as medical physicists may often play a supporting role in our respective fields, but this is an area where we cannot afford to remain behind the scenes. Each of us has committed ourselves to playing a vital role with dignity and unfettered professionalism. As part of the Duke community, we should expect nothing less from ourselves.

We as representatives of the Duke Medical Physics Alumni Association are working to understand the path forward. Admitting that we see these devastating injustices is a place to start, but it's far from enough. Committing ourselves to never sanction violence against communities of color, whether explicitly or implicitly, should go without saying. This, however, is also not enough. We need to approach the issues the Black community constantly and consistently deals with by using the same desire for self-education that drew each of us to medical physics and thus has brought us all together here. Although it is often easier to turn a blind eye to the injustices we see, we need to be committed to taking the considerably harder path of actively opposing them. Just as many of us have taken leadership roles in the scientific community as educators, we now must set an example by serving as educators in a much larger context.

Social Injustice Awareness | DUMPAA (2)

The Duke Medical Physics Alumni Association leadership recognizes and denounces racial injustice, violence, and brutality toward the Black community. We also recognize that passivity in the face of these problems is unacceptable, and that change begins individually with self-education. We commit ourselves to that education, and to transforming that education into tangible action. We stand by those actively doing the same to effect change in countless marginalized communities across the country. We also commit to becoming a support system, sounding board, and safe forum for discussion among the anger, fear and confusion all around us. We understand that we cannot and do not necessarily speak for every individual reading these words, but each of the members of the Executive Board have agreed to the ideals and actions outlined. We genuinely hope that we can apply our collective focus and professional dedication as a community to a just cause in order to enact measurable, systematic change.

Matthew Goss, MS
President, DUMPAA
Class of 2007

DUMPAA Board & Committee Chairs
Wendy Harris, PhD '18
LaToya Clark, MS '09
Jaclyn Gaylor, MS '18
Michael Trager, MS '17
Cielle Collins, MS '19
Liwei Zhang, MS '07
Kristy Perez, PhD '11
Titania Juang, PhD '15

DUMPAA Compiled Resources - Seeking Submissions!

DUMPAA is compiling a list of resources for those of us who would like to gain additional insight on this topic.

If anyone would like to help contribute to our growing list, which we plan to make available to all of you in the new year, please send your suggested resource (article, book, film, podcast, music, etc.), a link to this resource, and a short description or note to Michael (mtrager92@gmail.com) or Cielle (ciellecollins10@gmail.com), who will share them with the rest of the DUMPAA to add to our existing and growing database.

Media Type	Title	Notes	Submitted	Link
Scientific Publication	Cancer Disparities by Race/Ethnicity and Socioeconomic Status	Ward E, Jemal A, Cokkinides V, et al. Cancer disparities by race/ethnicity and socioeconomic status. CA Cancer J Clin. 2004;54(2):78-93.	Submitted: Titania Juang Reviewed: Kristy Perez	https://pubmed.ncbi.nlm.nih.gov/15061598/
Video	What kids should know about race TED Talk by Angelica Dass	Discussion of the beauty of differences and seeing one-self	Sub: Kristy Perez Rev: Cielle Collins	https://www.ted.com/talks/angelica_dass_what_kids_should_know_about_race
Book/Movie	The Hate U Give	Fictional story of a high school girl who is the lone witness when her best friend is killed by a policeman. It shows us a first person perspective of many of the issues going on in America, and how this all affects/feels to those living in low-income primarily black neighborhoods. I recommend listening to it on audiobook to hear it from the voices it was intended to reflect.	Sub: Cielle Collins Rev: Kristy Perez	https://angiethomas.com/the-hate-u-give

Duke in the community: Staying busy and giving back | COVID-19

Jordan Houri (MS '21) - As our remaining first-year Medical Physics shadowing sessions were canceled in March of this year and reports of nationwide shortages of personal protective equipment were coming in, I knew I needed to try and help in some way. The least I could do to help maintain the safety of our overwhelmed frontline healthcare professionals was to construct DIY reusable plastic face shields and donate them to Durham hospitals and clinics.

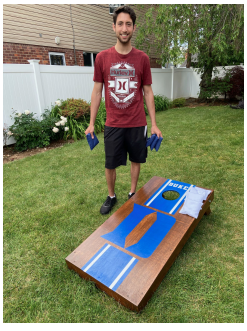
After preparing several samples, I contacted the Duke and Durham VA hospitals together with several other local clinics, such as New Hope Urgent Care and FastMed Urgent Care. When I received a large request for face shields from Lincoln Community Health Center, eight other medical physics students (Dami Fasina, Ericka Chorniak, Junlan Lu, Lam Lay, Vani Yadav, Zach Gude, Scott Hoopingarner, and Grace Babawale) offered their help and we rapidly fulfilled that order. The face shields were all delivered pre-sanitized, and the initial feedback was very positive. The staff found them to be very comfortable due to the foam forehead attachment, in contrast to the other plastic face shields that they have been using, and they told me that they plan on using our face shields for a long time due to their reusability.

Medical physics students building the face shields over Zoom.


Delivering face shields to Lincoln Community Health Center (left) and staff wearing the face shields (right).

The Medical Physics program was incredibly helpful and supported our initiative by subsidizing the initial cost of supplies. Although we hoped to get these face shields to as many healthcare centers as possible, we have focused primarily on clinics in underserved areas that do not have as much access to PPE resources. Recently, I was also contacted by Gerofit, a VA program that supports older adult veterans to exercise in groups, and we also had the opportunity to provide face shields to teachers in Florida after their schools reopened.

Michael Trager (MS '15) got creative during his quarantine and built a custom Duke cornhole set from scratch with his father, while growing out his quarantine hair. He also started a fundraiser to donate meals to front-line healthcare workers. The fundraiser was called "*Quaranbeard: grow a beard for those who can't*", since front-line healthcare workers must be clean shaven to don an N95 respirator. Over $1,000 in donations were collected, which provided meals for over 250 front-line healthcare workers at 5 different hospitals while also supporting local businesses.



Q&A with Interim DGS

Dean Darnell (MS '15) is an Assistant Professor of Radiology at Duke University School of Medicine. He is a faculty member of the medical physics graduate program, and participates in teaching courses in the program, as well as advising numerous students on research projects.

An interview with the Interim Director of Graduate Studies and Duke University Medical Physics alumnus, Dr. Dean Darnell (MS '15)

Duke Medical Physics Alumni Newsletter: *Congratulations on your new role as Interim Director of Graduate Studies. It is great to see a fellow Duke Medical Physics alum achieve such great accomplishments. How did this opportunity come to you and what made you want to accept the position?*
Dean Darnell: The opportunity to become DGS most likely resulted from my time as the Diagnostic Imaging (DI) track director. As DI track director, it gave me insight as to how the medical physics governing body works and how my skill set can add value to the program. In addition, I have known Anuj Kapadia, the preceding DGS, for many years now and we have similar working styles, which probably made me a good candidate for an interim position to replace him in that the student interactions and expectations can remain the same. I wanted to accept the position simply because I thought I could help the program during the transition from Anuj to the next full time DGS.

DMPAN: *What are you most excited for as interim DGS?*
DD: I am most excited to build on relationships with the students. I have started some great relationships with the students from the math workshop I lead during orientation week and from the Math Methods Topics for Medical Physicists class I teach. Building these relationships and getting to know the students on an individual level is the major perk to the job!

DMPAN: *As a Duke Medical Physics Alum, what has it been like to take this role on "the other side of the desk" working with students who are in the position that you were once in?*
DD: I think that it gives me perspective as to what the students' expectations are of the program and hopefully some insight to issues they may have.

DMPAN: *What has been surprising to you so far as you have stepped into this role?*
DD: Just getting started in this new role! Ask me again in a month :)

DMPAN: *You have continuously been contributing to the medical physics program, long after you graduated as a student. As you mentioned, you run the math workshops during orientation week and you teach the math methods course for the program. You are also running your MRI lab and mentoring numerous students as an advisor. As you tackle this new interim DGS role, and possibly consider it as a long-term position, what ideas or changes to the program would you like to implement?*
DD: For the next 6 months I will be solely focused on making sure that the transition between Anuj and myself is seamless and that faculty and students have all the resources they need to be successful academically. If after my interim position is over and I stay on as DGS, I will put together a 3 year plan for what my vision is for the program.

Graduate Program Updates

***Mark Oldham, PhD*,** is the new director of the medical physics program. During his first year leading the program he has supported and driven the development of numerous initiatives. Some of which include developing a robust safety plan to help minimize infections in the program, supporting and working with the DUMPAA to create the Student Mentorship Program, undertaking a huge effort to translate the program to remote instruction, helping to develop a program Transparency Initiative, restarting the Culture Committee, and creating two new committees - the Faculty Affairs Committee and the External Liaison Committee.

Anuj Kapadia, PhD, previously the Director of Graduate Studies for the Medical Physics Program, has accepted a leadership position at Oak Ridge National Labs. He will lead the Computational Sciences and Engineering division's Advanced Computing for Health Sciences section. In this role, Dr. Kapadia will lead a team of about 25 scientists in developing new programs and initiatives that address large-scale global health challenges through supercomputing, computational science resources, and new collaborations with academia, industry, and government.

Lei Ren, PhD, has been promoted to a full professor at Duke and is the first Duke Medical Physics alumnus to be given this honor.

The DUMPAA and Duke Medical Physics Graduate Program are beginning a joint mentorship program.

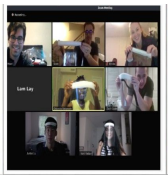
The GRE is now optional for admittance to the Duke Medical Physics Graduate program.

Student Spotlight/Update | Ericka Chorniak (1)

Ericka Chroniak (MS '21) is a second year MS student on the RT track from Casper, Wyoming. She currently serves on the Student Leadership and Advisory Council, the Culture Committee and Duke F1RSTs. She is also a coordinator for the Student Mentorship Program and founder of the Women of MedPhys group. Her thesis research is on a Synergistic Immuno-Photo Nanotherapy for the treatment of metastatic bladder cancer with Dr. Greg Palmer.

Introduction

This year hasn't been easy on anyone, but I'm proud to say that our students have shown incredible perseverance and tenacity. Due to the COVID-19 pandemic, our program has overcome many unforeseen difficulties including converting all classes to a nearly completely online format, conducting the 2020 qualifying exam online, re-directing thesis and scholarship projects to be completed virtually or with restricted laboratory access and managing a shortened semester. All in all, I think our students have emerged from this most difficult of experiences stronger than ever. I am very thankful that our program is highly didactically focused, so our students lost very little of the rigor and opportunity that our program offers when we converted everything online. Of course, we are very proud of our medical professional colleagues for the work that they have done during this pandemic. We are all graciously awaiting the day we can all gather in the medical physics classroom once again.


Organizations

SLAC

So far this year, SLAC has worked with student needs to coordinate a shortened semester so that the end of the semester exams would have less of an interference with the rescheduling of the ABR. Additionally, a few SLAC members participated in the Fall 2020 open house as well as a student lead Q&A session, which were both conducted completely virtually. Both were very successful events. SLAC is still working on coordinating the second year of speed mentoring events as this will also be a virtual affair for first students to meet and greet our faculty and explore the research opportunities available this year. Finally, the current DGS, Dr. Anuj Kapadia, has announced that he will be stepping down from his position here at Duke to lead a team of scientists at Oak Ridge National Laboratory starting this December. Our interim DGS is Dr. Dean Darnell, the current DI track director. Dr. Kapadia will be sorely missed, but I am excited to get to work with Dean. I hope to replicate the energy and excitement he brings to every situation.

Culture Committee

This committee was reinstated this year by one of my PhD peers, Hananiel Setiawan. Having the last 8 months in quarantine to think about the black lives matter movement has lit a fire in our graduate students. I'm happy to report that this committee had their first meeting this year where members of the medical physics community here at Duke shared information about their culture. It was an educational and fun experience for all in (virtual) attendance.

Women of MedPhys

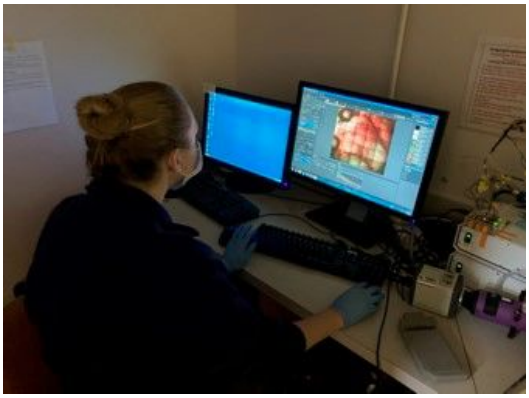
The world of medical physics committee formation was busy this year as I am also forming the Women of MedPhys (WoMP) group. I have worked with the Women's Center and activists in the Fuqua School of Business to get some ideas about meeting topics to educate ourselves and our peers as well as overcome overt and casual sexism in Medical Physics. At this point, the WoMP group is in the very early stages, where informal meetings are being conducted at irregular intervals. Despite this slow progress, I plan to have goals and objectives set out for future leaders to carry out in my absence, after graduation.

Student Spotlight/Update | Ericka Chorniak (2)

Ericka Chroniak (MS '21) is a second year MS student on the RT track from Casper, Wyoming. She currently serves on the Student Leadership and Advisory Council, the Culture Committee and Duke F1RSTs. She is also a coordinator for the Student Mentorship Program and founder of the Women of MedPhys group. Her thesis research is on a Synergistic Immuno-Photo Nanotherapy for the treatment of metastatic bladder cancer with Dr. Greg Palmer.

Student Mentorship Program

The student mentorship program is alive and well though the mentorships may look a bit different this year, with some first-year students residing in another country. Many student mentor-mentee pairs have been in contact via email and text and have been addressing many questions about how to study, who should prepare to take the ABR and how to find a research lab in a pandemic. As co-coordinators, Zach and I wanted to kick off the school year with a virtual meet and greet, to help establish that well known Duke family feeling among the first-year class. So, we put together an ice breaker event where we played two truths and a lie with our incoming class and let them hear from a few of our current students. Many sent in questions and concerns about what school would be like in a virtual environment, and how virtual orientation weeks would be conducted. We thought it highly necessary to establish these relationships before the math workshop in specific, as that experience was the event that enabled our strong friendships to form. Additionally, I set up and ran a grocery service for our students. Duke has many precautions set in place to prevent infection and community spread to our students, and one precaution was a mandatory 2-week quarantine for all students entering Durham. This mandate prevented many students from being able to grocery shop for themselves. This burden was eased with the grocery-run service.



Extra-curriculars

In January, we reinstated a paper recycling program within the Hock Medical Physics suite. I set up site for students to place and accept partially used scratch paper before recycling to help reduce our carbon footprint. In March and April, when the pandemic was taking a toll on stocks of medical supplies around the US, my fellow MS student, Jordan Houri, initiated and executed a group effort to manufacture face shields for surrounding hospitals. He purchased and distributed supplies to students who volunteered for the effort and demonstrated the proper construction over zoom. In November, first-year students and second year MS students were able to finally see each other in person while participating in a socially distanced axe throwing event. Our SLAC outreach coordinator, Dami Fasina, is also working on hosting virtual outreach events. This will be the first time our program will be able to impact students outside of the Durham area – we are all very excited for this opportunity.

Student Spotlight/Update | Ericka Chorniak (3)

Ericka Chroniak (MS '21) is a second year MS student on the RT track from Casper, Wyoming. She currently serves on the Student Leadership and Advisory Council, the Culture Committee and Duke F1RSTs. She is also a coordinator for the Student Mentorship Program and founder of the Women of MedPhys group. Her thesis research is on a Synergistic Immuno-Photo Nanotherapy for the treatment of metastatic bladder cancer with Dr. Greg Palmer.

Online Learning in Medical Physics – Course Evolution

Most courses that we have offered in our program were conducted entirely virtually this Fall. The virtual year started off back in March, when all classes were converted online following spring break. This was a big change for our instructors, and especially for those new classes being taught this year (including Advanced Mathematical Methods for Medical Physicists taught by Dr. Dean Darnell). This also meant all defenses and exams were also all conducted virtually. Students completed the qualifier exam online in late April. The 3-hour test was multiple choice and open book/open note. Despite the relaxed exam length and format, it retained its rigor with 'ungoogleable' questions. The spring semester finished off with the program's first virtual celebration of the graduating class of 2020.

The summer looked different for our students as well, as most students had to redirect their research projects to be completed virtually. The meant many converted their research to simulation, coding work or image analysis work. Duke began lifting laboratory lockdowns in July, allowing personnel to enter wet labs on shifted schedules, which enabled some students to continue hands-on research. First year students successfully completed the rigorous math workshop and other orientation events completely online at the end of the summer. Dr. Dean Darnell gave the math workshop lectures multiple times if time zone differences or travel plans caused attendance conflict.

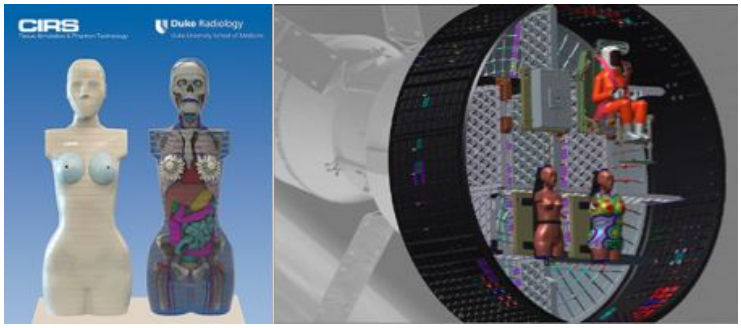
The Fall semester continued with hybrid course formats, where students could attend all lectures virtually, but there were some opportunities for in-person sessions. Due to restrictions, first-year students had the enjoyment of an exam-free Anatomy course but were not able to tour the Siemen's facility in their Introduction to Imaging course as previous years were able to do. More senior students were given the opportunity to participate in a voluntary patient interaction course set up and conducted by Dr. Anna Rodrigues. This supplemental course helped participants interested in clinical work understand their role as a medical physicist with regards to patient communication. The clinical practicum course was also conducted virtually, where some students could sign up for in-person sessions if they were interested. While some instances had some technical difficulties, the online practicum was an overall success and even sparked interest in forming a new online class for second year MS students in the Spring semester, focusing solely on treatment planning in Eclipse.

Zachary Dean Shrock Memorial Scholarship | Jordan Houri

Jordan Houri (MS '21) is a 2nd-year master's student in Duke's Medical Physics Graduate program. He is from San Diego, CA, and he earned his bachelor's degree in physics from Oxford University in 2018. After graduating from Oxford, he spent a year working in the Department of Radiation Medicine at UCSD, leveraging convolutional neural networks to improve the accuracy and efficiency of tumor detection in brain MRIs. Together with his advisor, Dr. Kapadia, he is currently working on a thesis project using Monte Carlo simulation to estimate the radiation exposure faced by astronauts in space. Outside of academics, he volunteers with Meals on Wheels and a Duke University-led task force on bridging the digital divide in Durham. In his spare time, Jordan enjoys cycling on the American Tobacco Trail and video calls with his dogs back at home in California.

I am incredibly honored to have been awarded the Zachary Dean Shrock Memorial Scholarship for the 2020-21 academic year. Though I unfortunately never had the opportunity to meet Zach, I hope that my volunteer service and my efforts to perform meaningful research pay homage to the namesake of this award.

Throughout the pandemic, I have tried to give back to the Durham community by developing the face shield initiative in partnership with the Medical Physics program, delivering meals with Meals on Wheels, and by participating in a Duke Digital Divide task force aimed at improving access to food and healthcare and decreasing social isolation among older adults and persons with disabilities. At the same time, I have also been fortunate to have been undertaking computational research that I was able to continue from home when labs began to close.

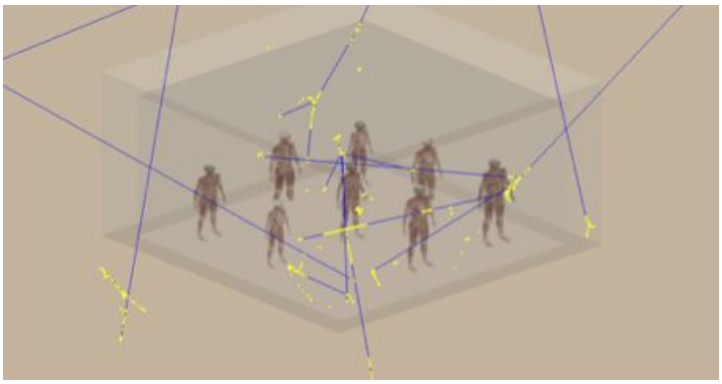


The physical XCAT phantom, named "Helga", which NASA will launch on a flight around the Moon next summer.

For my master's thesis project, I have been working with Dr. Kapadia to develop a Monte Carlo toolkit for simulating the radiation environment at any time and location in outer space. Our goal is to combine this tool with the highly detailed and anatomically realistic XCAT digital human body models developed by our group in RAI Labs in order to predict the radiation dose that astronauts would be exposed to during any type of deep space mission, such as a lunar orbit trajectory or a 6 month stay on the surface of Mars, with unprecedented accuracy. This capability will enable space agencies to make mission planning decisions that minimize the risk of cancer to their astronauts.

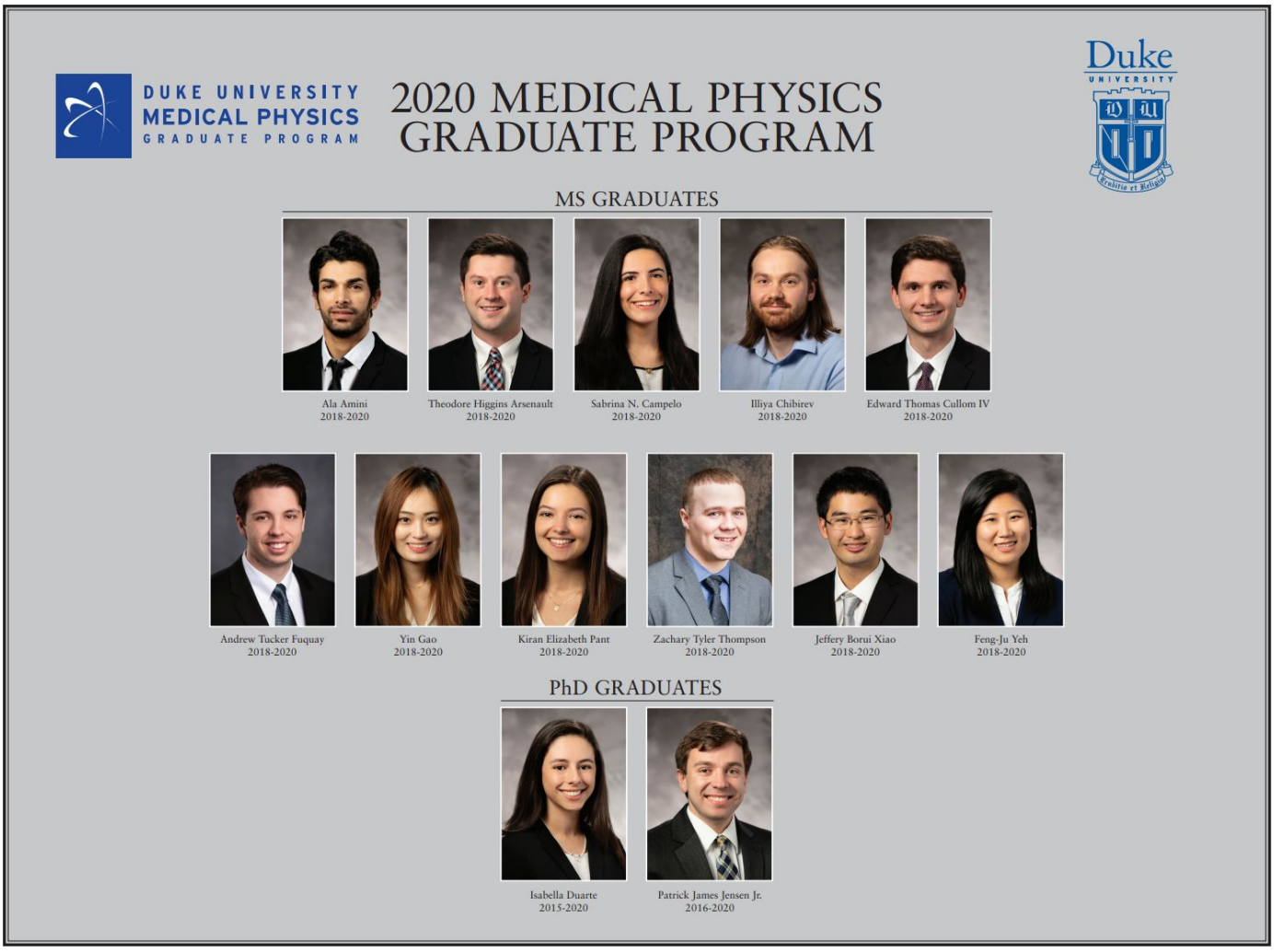
One particularly exciting aspect of this project is that NASA is planning on launching a physical dosimetry phantom, 3D printed based on XCAT specifications, on a trajectory around the Moon next summer. This means that we will have the unique opportunity to validate our model against empirical data from identical circumstances.

Despite most conferences in 2020 being moved online, I am looking forward to using the scholarship funds to travel to the NCI, NASA, and RRS joint Symposium, "Particle Radiobiology in Space and Oncology," which had been postponed from 2020 to 2021 and is still intended to be held in-person, where I will hopefully have the chance to present my results with leaders and pioneers in the field of space radiation research.



A visualization of our Monte Carlo simulation with a population of eight different XCAT phantoms within a shielding enclosure on the surface of Mars. Galactic cosmic ray tracks are shown as blue lines.

Class of 2020



Alumni News (1)

Jessica Nute, PhD (MS '09) started a new job back in January 2019 at UT Health San Antonio. In the last two years she has become the Associate Director of the Graduate Program in Radiological Sciences (GPRS), the Chair of the GPRS Committee on Graduate Studies, the Vice-Chair of Radiation Safety and won the Teacher of the Year Award. She works with an excellent group of imaging physicists, radiologists and technologists and does residency training with Doctorate in Medical Physics students. She loves the work and especially enjoys teaching and working with students. She bought her first house and should be married by now but is looking forward to her Covid-free wedding in November 2021. She spent her 2 months in lock-down learning how to make sourdough bread and copying bakes from The Great British Baking Show. She is thinking about adopting a dog to round out this weirdly satisfying and suburban life she has found herself in.

Jessica Nute in new job

Alumni News (2)

Irene Zawisza (MS ‘15) got married to Dylan Boll at Saint Ambrose Catholic Church in Schuylkill Haven, PA on July 25, 2020.

Irene Zawisza married Dylan Ball in July 2020

Maryann O. N. Ayoade and family

Maryann O. N. Ayoade (MS ‘09) - My husband and I had our second child, Amaryah, born on February 2nd, 2020 (superbowl 2020, also the first global palindrome day in 909 years).

Jill Hauck (MS ‘16) - In October, I started a new position with West Tennessee Healthcare and we bought a house in Jackson, TN. Here are some pictures of me, my boyfriend Kody, and our dog Memphis from the day we closed on the house. I'm absolutely loving my new job, and Memphis is crazy about his new big backyard.

Jill Hauck, Kody, and Memphis with new home in Jackson, TN